Sarah Clack: So, just to go over what we're going to be doing today. We're going to start off with Richard Smith, giving us a bit of background about why we are running this webinar today. Then we'll have Liz Fletcher from Birdwood Energy to discuss alternative power options that are available. We have a pre-recording from Joel Vanderuit, who's a general manager at Tall Trees. And Tall Trees is a nursery, and they've got a backup battery and solar system for their nursery. And so, during the video, Joel will explain a bit about why they've invested in that.

 And then, we've also got Bruce Manintveld here today with us, who's a dairy farmer from Gippsland. And so, he's got a generator as a backup power option to operate the dairy. So, we'll hear from Bruce. And then, we'll have an opportunity for questions after that. So, I will pass over to Richard to give us a bit of a background about why we're running this webinar today.

Richard Smith: Thanks, Sarah. So, I'm Richard. I'm in the dairy and the recovery teams. So, the reason we developed this webinar was, some of the findings from the 19-20 bushfires, as well as it was reinforced by the Gippsland storm event, which occurred in June, as well as the localised power outages in October, that occurred in Gippsland. So, generally when we're talking about power outages in these settings, we're either talking about bushfires, or storm events. So, if we can have the next slide, Sarah.

 So, the loss of any power, the loss of power to agricultural businesses, can cause a failure of critical infrastructure. And for animal businesses, we're talking about things like livestock water systems, fences, milk harvesting equipment, if we've got dairies, automatic feeding systems, heat or refrigeration, irrigation systems, if we're talking about horticulture businesses, as well as loss of packing lines, and loss of cool rooms.

 So just to highlight, power outages can have a critical impact on dairy businesses. So, if we lose power, and we can't milk dairy cattle, their milk producing cells will begin to shut down after 36 hours. So, that will have a critical impact to your bottom line, to your business, as well as to the welfare of your animals. In a trial conducted in NZ by Dairy NZ, 25% of cows that weren't milked for seven days, developed mastitis. Now, if you think of a 200 cow herd, at least 50 cows of them developed clinical mastitis. And another proportion of them developed subclinical mastitis. Now, the rapid change from 12 hour milking to 24 hour milking, can have critical changes on animal behavior, which is directly linked to animal welfare. So, things like changes in eating time, rumination, gait that can have critical impacts.

 So most people, when they think about horticulture, they don't think of the impacts that power outages can have on horticultural businesses. So, we can have failure of irrigation systems, failure of GPS base stations. Now, this will directly impact those farms running control traffic operations. So, you won't be able to do anything like, you won't be able to do spraying, planting, or harvesting. It can cause failure are packing lines in cool rooms.

 So, these are the impacts that we're talking about, that can occur for agricultural businesses when we have our power outages. So, today we'll be discussing what backup systems can be employed to make sure that we can operate those critical infrastructure during these power outages. Back to you, Sarah.

Sarah Clack: Awesome. Thank you for that, Richard. I'll stop sharing my screen, and I will let Liz share her screen. So, I've just realized, Liz, that I forgot to get a bio for you today. But yeah, I'd like to welcome Liz from Birdwood Energy, to present about backup power options available to farmers.

Liz Fletcher: Thanks so much, Sarah. And thanks, Richard. That was a really interesting rundown. So, very quick intro on myself. So, I've been working with customers in the energy space for a bit over 10 years now, across Victoria, and New South Wales, and even a little time in WA. Have spent some time in networks, in retailers, and now find myself in an organization called Birdwood Energy. And we really focus on helping customers make investment decisions. We don't sell hardware, which is an important piece, but very much about helping customers make investment decisions. And then, making sure that they actually work for them over the life of that investment. So, the purpose of this is obviously running through how dairy farmers can set yourselves up for outages, when and if they may occur.

 So, the team have asked me to run through these five topics. So, we're going to run through the challenge of reliability, which Richard's already tapped into slightly, look at the tech options. So, whether we're looking at batteries, or solar, or backup generation, how we actually size that system, based on your needs. Some things to think about, as you go through the process of installing. And then probably, to be honest, the most important piece is about how do you actually operate that system safely, and in a way that actually works for your operation.

 So, if we jump into the challenge, so Richard spoke about what causes outages, but some background on what's actually happening on the energy system. So, you would've heard in the news, Australia is leading the way in the uptake of what we call behind the meter renewables, so solar. So, we have more homes with solar on the roof, than anywhere else in the world. In fact, when you add it all together, it's bigger than any of our power stations put together.

 What that's doing, is meaning that we have this really cheap energy. To be honest, almost too much energy, in the middle of the day. But to move it around, we need to build more network. And that is actually pushing up the cost of network. So, we're seeing a real shift in energy costs, and also the way we operate. And then, the trend that's playing out in businesses like you guys, is that you're choosing to do what we call insourcing reliability. So, you would be thinking about solar, you'd be thinking about your backup generation and those things, just because if sometimes the investment case or the business case for investing behind the meter or on your site, is actually more cost effective than paying higher network costs. And you can actually bring down the cost for everyone.

 And so, that's where we start playing this construct of, in energy we talk about a trilemma. So, we are trying to balance reliability with affordability and sustainability. Having spoken to a few in the dairy industry, there is an increasing demand from providers of managing carbon intensity of production. And as you move through the supply chain, there are possible carbon tariffs, and things like that, that will start to emerge. And so, understanding that gets everything, is an important thing when you start making decisions about assets that are going to be on your property for 10 plus years. And so, they're important things to think about.

 So, focusing very core on the dairy sector, there is an amazing document done by Dairy Australia, focusing on energy. And this is a graph that came out of there, which highlights why, while solar is great and cheap, and can deliver some really good long term benefits. Its generation profile isn't as useful for your sector, as it can be for other sectors. And so, that's where we start having these more interesting conversations about how we leverage other pieces of technology.

 So, in that document, which I'm sure Sarah could share, or you've probably already had a look at, there's some work around how some of the energy can be moved into the middle of the day, but this is the challenge really. And this is a challenge we're seeing in the whole sector. The most expensive periods of time for energy now, is where there's a highest demand. And unfortunately, as an industry, the dairy industry correlates to those points in time, at the moment. So, that's pretty much why we can't just solve the world with solar.

 So today, we're really going to focus on how we can leverage the cheap solar output from solar, new technologies, which are increasingly very well tested, or batteries. And the more familiar technology of generators with a couple of new additions, which we're starting to see come through. And I know we've got some case studies coming through as well.

 So, this is a diagram that we think about at Birdwood, of how we put it together. In energy strategy, we really believe that you need to think about all these different pieces before you commit. But when we focus on a backup system, we really focus on these three pieces.

 So, while this is a text heavy slide. I think the interesting thing to think about when you are looking at a backup system, it needs to really work for you on the days that there is a storm, or there is a truck that runs into a power pole. It needs to work for those days. But it also needs to work the whole year round, and it needs to pay back. It needs to be commercial.

 So, the biggest difference when we balance out between a battery solution and a generator solution, is that a battery, and similar to solar, is very much automated. It uses technology to charge and discharge. It's really simple to implement. Your people don't really need to do anything. But it is all dealt with there.

 Whereas generators, I would assume a lot of your sites actually already have generators. But you understand that that requires a bit more leg work. But you probably are much more comfortable with it. You're used to navigating those pieces. The key thing to note, is that a lot of the systems... And we're going to hear from people today, are starting to move towards this hybrid piece. And really, it's about understanding the mix that you want, based on your carbon targets, your cost targets. And really, what you want out of this system as well. So, we need to think about what are your requirements for information sharing? What are your requirements for financial impacts?

 Which brings us to step three, sizing our system. So, a key thing to understand... Well, there's five big questions. First question is always, have you done all your energy efficiency initiatives? So, we don't want to be building a system that's going to be powering anything that's wasteful. If you have available land, that's not being used for other purposes, or doesn't have another value, solar can obviously provide benefit to you now, and into the future. And is effectively the fuel stock for a battery system as well. So, understanding that is a really important piece.

 And then, as we move through question C, we get to one of the hardest questions when we have conversations with customers, is about what is the actual maximum energy demand that you're going to need during that outage? The reason why we ask that is, I think about a system almost like a bucket, with a big part pipe on the end. And so, we need to know how much you're going to draw from the system during that outage. And that's the power of the possible system.

 And then, the second piece of the information that we really need to figure out is, how long, how big do you actually need the well to get you through those periods in time, where there's an outage. Now, the benefit of solar system, and also obviously a generator, is that it can top up the system during that period of time, when the sun's shining, or when you refill the tanks. But during a storm, you may have issues with supply for fuel, or the sun may not be shining. So, these are really important things to think about when you start navigating these questions.

 And so, then we get to question E, which is, how are your energy needs going to change over the next 10 years? So, the energy market's changing, your market is changing. Are you planning to expand? Are you planning to shrink your operations? These are really important questions to decide on technologies, because the technologies are changing. It's really important that you take... Well, we tend to call a very much a plug and play model, so that you're not stuck with a particular system that won't interact with another one, if you choose to expand it.

 And so, that question is very, very pivotal, because you may end up with a solution that doesn't keep you in power during an outage, in five years time, because you've not necessarily planned in that timeline. There's not to say you can't expand something, but it's something to keep in the back of your mind.

 So then, installing your system. Now personally, this is the bit I find the most hard to navigate, especially when we're looking at new types of technologies or emerging technologies, like battery, and automation, and some of those things. My biggest piece of advice would be to find an experienced installer, and get them to work with your existing electrician, who knows your site. All the work we do with customers, and I've ever done with customers, you all know your sites, and you've got an electrician who's installed your systems. And they have everything drawn up in an SLD, even if it's on the back of a napkin, it doesn't matter. It will save you a lot of time and trauma, if you can get someone who knows how to deploy these systems, to work really closely with someone who really knows your site. And then, they will talk together, to get you the best outcome.

 Would suggest that you should be asking, whoever's delivering your system, to propose plans for installation and operational maintenance. Should be really understanding how the system is going to work, if your farm is going to expand. And also, really understand any performance and uptime guarantees. This is, at the end of the day, you're doing this to meet an emergency need. So, it needs to work when it needs to work. And you need to understand what the service standards you're receiving are.

 Then, if we move to a more operational perspective, these systems can actually deliver revenue for you outside your outages. And so, I would very much suggest that you should speak to whoever does your energy contracting, or your energy consultant, or even your retailer, to make sure that you're getting paid when you should be. And that system can be helping bring down energy costs for everyone as well, during those peak times when you're not using it. And then, the follow-up piece is just making sure that your system has a strong data function, so that as carbon and all of those things come to the fore, and we all need to report on those, you can do that really easily without having to run around in circles or pay a consultant. It will just save you a lot of stress in the long run.

 So, then we get to the fun bit, to be honest. So, operating the system. As I said, it's really important that you know your system's going to work when that outage happens. So, batteries need to be cycled daily to keep them in good maintenance. That any automation system or standard off the shelf product, will automatically do that. But there are a bunch of technologies. We have an optimiser that we built with one of the universities. There are other products on the market who can program a battery to do what you need. The same for generators.

 Generators, as you probably already know, they should be run monthly, and they need to be serviced on a quarterly basis. Batteries don't really need a lot of maintenance. It's really just a container. But their location is the most important, because at the end of the day, it's a box of chemicals. So, it's very important that's in a safe, cool location. So, you're managing any of the risk there.

 So, the one thing I would just put forward is that, if you're going to invest in a backup system, which the financial benefit can be quite high. I would very much recommend that you make sure it's just a backup system, because your system can be delivering value to you 99% of the year. And that can actually pay back the cost during the outage. And that can pay for maintenance, and all of those types of things that you would have to do anyway. So, in conversations I had with generator suppliers and batteries to do this, to pull this together, they definitely said that they're seeing a big trend towards generators and batteries to be put in with the technologies, to work during an outage. But that are actually running to supply power on a daily, if not hourly basis.

 So, I think the dual purpose element there is really quite important for us to think about. So, that's where the presentation finishes at this point in time. I would definitely suggest that backup systems are really valuable, in terms of the commercials. We're working on a project with regional communities in Victoria, across Wodonga, Healesville, and the Surf Coast at the moment. And the communities are really thinking about how they can do this. And the councils are thinking about how they can do this. Even to do a simple things as charging phones, during bushfires and storms. So, your industry is not the only one thinking about this. But it's definitely something that everyone has on the top of their minds at the moment.

 So, I will leave it there, happy to chat to anyone through the questions. And I look forward to hearing the other presentations. Thanks so much, Sarah.

Sarah Clack: Thank you for that, Liz. So, that was very insightful, Liz. And we're now going to... Unfortunately, Joel from Tall Trees was unable to make it today. But earlier this week, I was lucky enough to be able to have a chat with him. And we were able to record a little snippet of him discussing the systems that they have at Tall Trees, which is a nursery that do street trees, et cetera. So, I will just share my screen now. Make sure I have my sound on. And we'll hit play in a second, to hear from Joel.

Joel Vanderuit: Joel from Tall Trees. We're a production nursery, growing plants and trees for the commercial and civil landscape divisions. We’re located on 20 acres of land down on the Mornington Peninsula. And basically, I just wanted to talk to you guys today about our solar setup, and why we put that in place. Some of the reasoning behind that, and why it's become a really valuable part of our infrastructure here.

 So, the main reason we decided to invest was, it actually comes back to water for us. So for a nursery, irrigation and getting water to plants is the number one concern above all else. Without that irrigation, we could lose the whole nursery in 24 to 48 hour period, depending on the weather conditions for that day. So, to run those pumps, and to get that water out, power security was really vital for us.

 We have tried other things in the past. We had generators in place. We even tried auto start generators that would kick in. But we found them a bit cumbersome, quite large, and in the way. And we found the auto start quite unreliable. So, if ever we had hot days, we still had to send people to the nursery to ensure that the irrigation had been through, and that everything was supposed to be doing what it was supposed to be doing.

 So, that's the main reason we went down the path of putting solar. The other was a bit of an advantageous situation. We just built a very new structure that lends itself perfectly to installing quite a large system. So, we put two and two together, and put that system in. Really brief run down in the system. We have a 35 kilowatt battery set up, with 30 batteries, and around 120 panels on the roof.

 We did an estimation of our system at the time. Our daily consumption was around 60 kilowatt hours. So, we've built the potential to around 140. That's during daylight hours with the solar. As I said, the battery system is around 35 kilowatts.

 Now, the impact power outages for us is, as I briefly touched on, it's crucial that we're A, aware of them, and B, are able to do something about them. We can't just close the doors and hope for the best when the power goes out. We still need to irrigate. We still need to get water to 20 acres of trees. And we also have quite a large administrative operation here at Tall Trees. So, when that power does go out, computers go off, the internet shuts down, and our phones don't work. So, there's a multifaceted reason why we wanted to secure that power supply.

 We've had it in place now since 2018. And it's been almost flawless since. We have had quite a few power outages, including some recent storms. And we were able to continue operating, both administratively in the office, and with our irrigation, trusting that system. The solar runs everything during the day. So, straight from the panels. And we get two irrigation runs through. Over summer, especially, we need to irrigate at night, and very early in the morning, because we have recycled water. So, our staff can't be out in the nursery during those hours. So, we actually need the batteries for that first run at four or five in the morning before the lights turn on. So, that's been crucial for us to have that battery set up, rather than just depending on the solar itself.

 Now that we are a few years into this, a couple of things that I wish I put a bit more time into, was perhaps a bit more of an accurate forecast of our growth. We've ended up putting on quite a few bits of machinery, contributing to our automation systems here. Whilst they are handling the load, we are still growing. So, there is probably going to come a time, in the not too distant future, we're going to have to expand the capacity of the storage unit, and possibly put in more panels on the roof as well.

 But that being said, we did just put another five kilowatt system, just to run the office. So, we've taken some of that strain off from the main irrigation supply chain, to help. It was a small thing we could do to really expand that capacity, without going above and beyond up on the roof. It's quite a tricky spot. Look, I hope you guys have got something out of this presentation. If anyone ever has any questions, the guys can send you my address, and happy to help out.

Sarah Clack: All right. So, that was our video from Joel there. And it was great to see that, some of those things that from Liz, and those key points around making sure your size, your system, to be for the future, have a really come out there. And also, some of the people aspects around the generators versus the solar and battery system, have been an impact for Joel and his team there at Tall Trees.

 So now, I'd like to welcome Bruce Manintveld to speak to us. So, Bruce is a dairy farmer in Gippsland. And he has a generator system run by PTO, that is used during power outages to operate the dairy. So, over to you, Bruce.

Bruce Manintveld: Thanks, Sarah. Yes. Sarah asked me to come on to this. Sorry. Sarah asked me to come along, and share my experiences with what happens when our power went off. What has happened to us when the power goes off and why we put the system in. So, a little short history about us.

 We're a dairy farm up at Mirboo North, in South Gippsland, running 330 to 340 hours through a 28 unit herringbone, with quite a few other bits in place packed on to it drawing more and more power all the time. But why we was so keen, we bought the place. It didn't have a general... Or when we looked at the place, it had a set up, a hydraulic set up to run the vacuum pump, so we can actually milk. But when we actually moved in, that had been taken away. The people who sold the farm, taken it with them, which is fine. That didn't stress us too much. But we organised to put a generator in this place, within the first eight months of being here.

 And the reason, before when we were share... Before we bought this place, we were share farming over at Shady Creek, near Warragul. And in the last year there, the power went out for about 40 hours in the middle of early September. So, right towards the end of our calving period of peak production. And so, the cows didn't get milked for 24 hours. And in the meantime of that, the neighbour had managed to get a generator hooked up to his dairy.

 So, we ran them up there about 30 hours after being milked the last time. Put them through his shed at nine o'clock at night. And then, ran them home again. The power came back on the following day. So, we ran bought them home, milked them in our own shed again, back then. I thought that's good. So, we lost 10 odd thousand litres then. We thought, "Oh, we'll get away with it, it's not too bad. It looked all right." And then, so a day and a half later, when I went to get the cows to milk them the next morning, rode into the paddock, opened the gate into the paddock to get the cows. Found the bike in, and go, "Cow down the gate with milk fever. That's a bit of a problem, but not unusual." It happens.

 So, treated her with milk fever. Gave her a pack, always carry some 4in1 with me. So, we gave her a couple packs of that. Got back on the bike, set her up, and got her settled. And got back on the bike, and get the rest of the cows. And as I swing the bike around, I saw another one. I go, "Argh. This isn't good." So, as I was swinging the bike around with the headlights, to organise to get the 4in1 pack into her, I saw another cow down. "This isn't looking good." So, quick fly around the paddock on the bike, there's 14 cows down with milk fever. Three dead cows. And a whole heap of others that were staggering around all over the place.

 Sorry. So, it turns out we basically just stressed the cow that big time, from not being milked for 24 hours, and then sending them to their neighbour's shed, and bringing them back. And then, trying to fire them back up again. And the whole thing had just tipped the herd over. And yeah, that was a fun morning, that one.

 In the end, we treated about 50 cows that morning, possibly more. I think we ended up another 20 or so over the next day or two, just basically through classic milk fever symptoms, and fixed them all with packs of 4in1. But Sunday morning, five o'clock, didn't have enough 4in1 packs to do all that. So, rang the vet. Got him to just basically bring out a couple of boxes of 4in1. Couple of, 40 or 60 bags of 4in1, just to treat the cows we didn't have enough for.

 My parents were 20 minutes away. I rang them to see if they had any. They didn't have any. But they then got on and rang the local supply store, and got some more packs out of them. So, we ended up... I don't know how many packs we went through probably a hundred that morning. And yeah, it was great fun. So all up it cost us about 12,000 liters of milk, three dead cows. And we started giving CalMag to the rest of the herd, for the next week, just to make sure, try and get over it. Try to get them through it as best we could.

 As mentioned earlier about cell count issues and herd health problems. Well, that's obviously a herd health problem. But the cell count, we actually got away with the cell count. It didn't move, apart from the milk that was sitting in the vat already, that didn't get picked up for another 24 hours. It blew that cell count out. But the actual cows got over the cell count without a major hiccup. And we did the sums on what that outage cost us. And it was more than putting a generator in. Just that one 40 hour outage, and we would've paid for the generator.

 And we were share farming, so we hadn't done anything about it. We had mentioned to the farm owner a few times, it'd be a good idea to get one in, and by the day, halfway through the power outage, the farmer's going, "I think when the power comes back on, we might put a generator in." So, that was a win. I think that was good. And that showed up a couple of months later, and it was all installed. I don't think we ever used it as such, to run the milking shed.

 Yes. Then when we bought this place, we thought, well, one of the first things we wanted to get done was put a generator in, so we could milk when power went out. And because we had one put in out there, we knew what we were looking to do. And my brother's an electrician. So, we lent on him a bit for ideas on what needed to happen, and spoke to the electrician who we're using up here, to put things in, and whatever else. And we ended up putting in an 85 kVA PTO tractor power generator. The reason we went with the tractor powered one, because I'm not a mechanic. And I figured the first thing that happens, is when I needed the generator to work, it wouldn't work. I wouldn't know how to get the motor going to get it started. So, I just thought the tractor it'll be working. Much easier.

 We have a lot of trouble trying to... If you ask, trying to get an electrician to tell you how big a generator to put in, they don't like giving you a direct answer, because there's a lot of... It's not just as simple as running around the shed, and adding up all the motors, the power usage of all the motors, because you need to cover the startup surge as well. Because whenever your motor starts up, it'll run a surge of power, which will trip the system out. And that's probably right for a lot of those big motors, but all the small electronics that are slowly more and more creeping into dairies, they don't like that sort of thing happening to them. They get upset when the power jumps around a bit. So, we went that way.

 Well, the other thing you need to consider is, if you're going to put a PTO powered generator in, you need to consider the size of the tractor, because the tractor needs to be big enough to then run the generator. You can use a small tractor to run a big generator, as long as you're not drawing any power off it. But the moment you start turning more and more motors on, that's when the tractor won't cope. So, you need the tractor size to suit the generator. Or the other option we did at Shady Creek, before we had a bigger tractor, was to put... So, start isolating various bits of the system out. So, we set it up so the hot water service couldn't run while the vacuum pump was running. The three big drawers in a dairy, are the vacuum pump, the milk vat, and the hot water service.

 So, if you isolate one of those three, actually you can get away with a smaller power to run it, when you need it to run. But we also made sure that we had extra... The 85 kVA one we put in we’ve got spare power in it to run more things as we need to add them in later on, if we need to add them in later on, or maybe just get bigger, or all those things. But yeah.

 So, that's basically why we put one in. The power went out this year again for 40 odd hours, this year in June, when one of the big storms came through Gippsland, we’ve had three this year so far. But the one that came through on June took it out here for 40, nearly 50 hours this year. And we just backed the gen tractor up, and off we went. No stress whatsoever. We didn't have to worry about herd health. We didn't have to worry about any of that sort of thing.

 Just not having to worry about the stress of knowing what you're going to do, and how you're going to cope when the power goes out, it's just that relaxing. It just takes so much pressure off. It's great. So yeah, I wouldn't run a dairy now without trying to have some way of milking the cows. Even if you just milk the cows, and dump the milk, you still need to have some way to be able to milk them.

 And I'm reasonably, a feeling around, that at some point it's going to be part of our milk quality requirements from the factories or milk animal welfare standards from factories, that we're going to need to be able to milk the cows consistently. Whether you're doing it once a day, or twice a day, or whatever, there's going to be a requirement at some point, I reckon, from animal welfare that we need to be able to milk them consistently, to avoid issues.

 So yeah, I think that's basically all I've really got to say, is that it's very important there's a generator, or some way of milking. And a generator that's big enough to cope with everything, and it's got room for future increases in herd size, or shed size probably more important. I think that's important. Hey Sarah, I'll hang around if there's any questions at the end for any of us, that's great.

Sarah Clack: That's fantastic, Bruce. Thank you so much for sharing your story. Yeah, it's great to see... Well, it's really unfortunate to see the event that actually saw you guys start implementing a generator. But it's great to see that you guys have implemented a generator, and the benefits that you're seeing with just being able to milk through, and continue operations on farm when that power goes out. Even through that June storm event that we did have in Gippsland.

 So, now I'd like to open it up for questions. And we've had a couple start to come through the chat box. If you can please send your questions to myself, just so that no questions do get lost. Because last webinar I presented, I had ran and organized, we did have a couple of questions get lost. So, if they can come through to myself, that just makes it a little bit easier, because the presenters aren't always able to check their message chat for the questions, as they're answering other questions.

 So, we have had a question here come through. What scope is there for hedging energy prices as a form of insurance, to fix the price of electricity, and protect against any adverse movements. Farmers could make more use of hedging, forward buying and selling. Any thoughts? I actually think that this one's probably a bit out of the scope of today's webinar, talking about power outages. But Liz, I will pass it over to you, to see if you do have a response to this question.

Liz Fletcher: Yeah. Hedging energy prices is just like fixing a loan from the bank. So, you can choose to have a variable, or you can have a fixed. Any standard retail contract is effectively an energy hedge. A backup power system to bring back to this conversation, effectively acts as a physical hedge, against future energy prices. So, Bruce's story about installing that system on his site, in theory, he's got a set price for energy. He knows what it costs him to operate that system. That is a physical hedge for energy prices. So, there are lots of different ways you can do it. But yeah, it's definitely an option, and something you can speak to a consultant or even a retailer about, if that's something you think is important for your business.

Sarah Clack: Thank you for that, Liz. Liz, you mentioned before that you got a question in your chat earlier come through there, about solar working during a power outage?

Liz Fletcher: Yeah. So, this is something that's really exciting. So, Australia has actually developed much of the technology in solar. Actually, I think 90% of solar panels originate from technology that came out of UNSW. But since that happened, the inverters have changed a lot. And so, we now have grid forming inverters, and a bunch of new pieces of technology, that enable your solar to keep working if there is an outage.

 So, I think if that's something that your system is struggling with, it's definitely worth a chat with whoever installed it, to see if you could upgrade your inverter, to enable you to use your solar energy during an outage.

Sarah Clack: Awesome. Thank you for that, Liz. I also forgot to mention earlier, that we do have a case study on our energy smart farming page, about Tall Trees as well. Which gives a bit more detail, and different details around the Tall Trees story around their solar and battery system as well.

Liz Fletcher: Sarah, I've just got. There's a question here for Bruce. What did you do about hot water heating as your hot water system is meant to heat to the right temperature in your system?

Bruce Manintveld: Yeah. Because we can now actually run the whole lot at once, because the system's big enough to cope with it, we can run the hot water service. And our hot water service is probably set up slightly different to everyone else. It's actually run by an analog meter in the dairy. So, I can run it in the middle of the day. It's a slightly dodging setup. I think it's quite legal. But it's how it was done 30 odd years ago.

 So, we can actually run the generator and run the hot water service whenever we want. So, now we can set that up. Now we can just, while we can milk, we can run the hot water service at the same time now. But in the short term, if you run a cold wash through your dairy, it's not going to be an issue. But if it's off for a week, you're probably going to start causing milk quality issues. And if you explain that to your factory at the moment, they're probably going to be okay about it, because what's the why. But yeah, still hot water service is very important, I think. Just as important as getting the milk cool. So, we are lucky. I think you probably can set it up that way as well, regardless. I'm sure there are other options to do it, but yeah.

Liz Fletcher: There's a lot of technologies that can do this now.

Bruce Manintveld: Yeah. Because it always used to run through the meter.

Liz Fletcher: Yeah. In South Australia now, they've transferred, as you say the meter, even on households, because there's so much excess solar in the grid. Everyone's 10 o'clock standard automatic timer, has been moved to 10 o'clock in the morning, rather than 10 o'clock at night. So yeah, absolutely. So, what you're doing is the way in which who knows is, whether that's the way it should be done. But what you're doing is exactly what everyone can be doing as well.

Richard Smith: Hi Liz, I've had a question come in regarding the full load or partial load. If you only want to run part of your system. What are the pros and cons there?

Liz Fletcher: So, it comes down to, to be honest, the physical setup. And Bruce, you probably went through this process when you were designing your system, in how the actual wiring was done. Is that something you explored through your process?

Bruce Manintveld: Yeah, I guess that was part of the reason that the last farm got set up to isolate the hot water service. Because we couldn't run the hot water in one going. And yeah, ours is now just all on or all off. But yeah, you could have, if you'd had got into the switch board, meter box, whatever, you could've isolated various parts, but out to turned bits. Have bits and pieces, didn't run through the generator, I guess.

Liz Fletcher: Yeah. A 100%.

Bruce Manintveld: We went the other option, and thought, we'll just make sure we can run everything, and we can run it easily.

Liz Fletcher: And I think that's a decision. Understanding your risk profile. If you've got things that don't need to be run in an outage, then you can isolate. Like for example, if you had a house, for example, that was connected to the same circuit, you might have the TV, and those things, which don't need to be able to be turned on in an outage, as an example. I'm sure your kids would say otherwise. But there are things that you could put on a second circuit, which would mean that you're not draining out of your generator, or your battery system, unnecessary loads. But they're just decisions you can make.

Sarah Clack: Thank you for that, Liz and Bruce. We have had more of a comment here, about making sure that you are selecting reputable suppliers. So, making sure that you've got suppliers that are potentially known and trusted, and that can be reliable. So that, if you do have any issues with needing service, or there is an issue with the system, that they will be there so that they can come, and they can make sure that you get those services that you need, to make sure that the system is reliable for you. Especially when we're talking around power outages. Because as Liz and Bruce have said, we do want this system to work. And as well, Joel also mentioned in his video. We do want this system to work when the power does go out.

Liz Fletcher: 100%. All of the systems that we have seen go in, we've worked with a local provider and installer, but also the onsite electrician, whoever. Bruce, it was your brother in your circumstance. But whoever knows the site. Because you want to be able to call them, and say, "Hey, the thing, it's not turning on." Otherwise, you'll be in a bit of strife.

Sarah Clack: The other thing too, Liz is, what's your thoughts... And Bruce, what's your thoughts about farmers, if they want to, say hire a generator? What things do they need to do beforehand to make sure it's an easy connection, so that it's quick and easy in the times where there is a power outage?

Bruce Manintveld: I guess, at some point you still got to have somewhere to plug it into the dairy, into your system somewhere. The one we had to put in at Shady Creek was actually a portable one, so we can actually pick it up and take it around the farm, and do welding or something, somewhere else on the farm with the same, at other times of the year when the power wasn't out. So, that was useful. But we still had to get a plug wired in. So, presumably there'll be a standard plug within the industry for that sort of thing. I'm not a 100% sure, but I imagine it's probably just a standard three phase plug, is it? I'm not sure.

Liz Fletcher: Yeah.

Bruce Manintveld: Or amp, or whatever.

Liz Fletcher: Something to that point, I think, yeah. The one thing I would say is that, if you wanted to hire something for outages, chances are you'll be paying a lot more, because everyone else wants one, because there's an outage. So, that's a cost benefit analysis to think about, in how you go about that. Because there are only so many generators, and a lot... But it's an interesting model. And I think even with batteries, mobile batteries are becoming a thing. After the bushfires, a lot of the councils have thought about them, from a community perspective. So yeah, it's a really interesting model to think about.

Sarah Clack: Richard, is there any insights from what you've seen with the recovery efforts, post the Gippsland storm event, with farmers and their access to generators? Were there issues with farmers accessing generators in that situation?

Richard Smith: Definitely. We've seen it twice this year. Two dominant occasions, obviously in June, but also in October. If you're trying to hire a generator at a time when everybody's without power, you've run into a couple of risks. Firstly, generally people tend to get the first generator that they can find, because they need to access it immediately. So, they haven't put the groundwork into what size the system is.

 So, we had a couple of instances where hire generators were actually destroyed. So, you've not only got to pay the hire cost, but you've got to also pay the replacement cost, which in most instances is for retail, for the price of the generator. Plus you have a whole range of training each time you hire a generator. It might have slightly different operating procedures to turn it on, or turn it off. So, you've got to factor that into consideration.

 Firstly, we've also got to have your system set up, so you can actually plug the generator in. So, you've got to have a pre-installed safety switch. You don't want to get to a situation where you need a generator, but you also need to hire an electrician at the same time, to wire your system up, to actually plug in that hire generator that you're going to return in two to three days.

 So, these are the instances that I've seen. And I've spoken to people who have run into the situation, where they've had to hire a generator. This is what they've faced with. And they've now got this thing that, they've spent the money, they've purchased it. They've either blown it up, or they can't use it until another electrician arrives. And why is it in, or why is the system for safety switches and transfer switches, at a time when everybody also wants electricians?

 So, it is one of these things where it's doable, but you've got to have, you’ve got to preplan how you're going to do it. So, you'll have to do the groundwork first. If your risk management plan is, you're hiring a generator, you've got to make sure that you have planned out that your system, that you know what size generator you need. That your dairy shed, or whatever you're going to plug into it, is wired correctly, to be able to take that generator. You've got transfer switches, you've got safety switches, and you know the operation procedure. So, that's the things that we've seen, if you're going to hire a generator.

Sarah Clack: Fantastic. Thank you for that, Richard. That is great to get some of those points that, and from those experiences of other farmers, during the recent events and power outages that we've had. We also have had a question back on... A comment back on that last question two, from a colleague, that we also need to factor in that you may not have access to your property to get a generator, or an electrician in on site.

 So, if we've had a severe weather event, might have some flooding, might have trees down. We might have roads that are damaged, that may... Or if we've got fire, we may not be able to access the property. So yeah, so that's something to be aware of. So, how can the phone companies solve power outage issues? We can make power with gennies, but no internet. I think that's a bit of a tough question, maybe out of scope for today, but

Liz Fletcher: It's such an interesting... Yeah, it's such an interesting question. Because yeah, it's a really interesting question. Publicly, Telstra have been trying to figure out how they can use... Because they obviously have generators and batteries at all of their points, but it is a challenge. It's definitely something that's being worked on through these processes. And it's also something we're looking at, with the Surf Coast, on their microwave towers down that way, about how you can deliver power. Because you're totally right, what happened in Mallacoota during the bushfires, is exactly what happened. So, people are very aware and working on that.

Sarah Clack: Yeah. And there's just a bit of backup there to that question, saying that they need to operate some devices by internet, such as irrigation controllers, et cetera. So, just a bit of wrapping up. Like to say a big thank you to Liz, for her presentation today. Bruce, for sharing his experiences, and why they've gone and put in a generator, and the benefits that they've had from that, in just being able to continue operation. And also, thank you to Joel who was not able to join us here today, but was able to do a pre-recording for us. And also, a thank you to Richard, who has been involved in developing this webinar with me. Heavily involved. And for presenting today, as well as other contacts as well.