Kelly Wickham:

So, resilient horticulture and investing in sustainable energy on farms. So there's the agenda, we'll just cover off on some of those points and really get up to a Clive. We invested heavily in on farm energy assessments over the last four years, completing 1,300 assessments over that period, and over 658 infrastructure grants, so upgrades, e.g. So half of those, half of those, assessments landed in, upgrades, which is great. This is really just the beginning of what's possible, and currently we're demonstrating. Sustainable energy upgrades at our Tatura and Ellenbank Smart Farms. And there's a few bits and pieces to come at Horsham which are really, poignant for this group which are controlled environment units which is quite different than a glass house or a greenhouse.

Kelly Wickham:

We've got a ground source heat exchange set a kit going into an existing glass house, and then we've got some floating solar as well as a flywheel. So yeah, watch this space that's being implemented over the course of this financial year. It's pretty exciting developments. And then this webinar, webinar series really that's all about bringing that knowledge to a lot broader audience and letting that broader audience bring that knowledge back to us.

Kelly Wickham:

And lastly on that front, we're doing a, completing a benchmarking exercise with the RMIT master students on trying to figure out what's the sort of average energy use in a horticulture setting for moving water, cool rooms and so on and so forth. So yeah, watch the space on that as well. And then the next steps for us is piloting on farm emissions actions.

Kelly Wickham:

So yeah, we're already underway with that. We've got more than 20 horticulture operations that have expressed interests in participating, and I think we'll get about 14 of those on board shortly in the new year, the new calendar year. So, but yeah, more for the context. Looking at all those 1300 energy assessments, you'll see that horticulture was a big taker of those assessments, so almost 30 percent of all of those were completed in the horticulture sector, and you'll see why in a second. Obviously dairy was the largest group with the amount of energy they use in parlours and intensive settings and whatnot, so it stands to reason that dairy and horticulture were the top two, based on, well, here we go. Look at the costs associated with horticulture. That's average across all energy carriers. So we're looking at electricity, gas, LPG, and diesel, with electricity being the number one by far, and most of our series is looking at upgrades that actually contribute to diminishing that, that cost stack there in horticulture. So, we also have greenhouse gas savings potential. So there's a stack of savings potential that we realized through those assessments, but only, you know, maybe a third of those were adopted. So there's much more work to be done. And you'll see why is some, really the Europeans are looking at emissions standards and how you actually produce a product coming into that part of the world, those standards will spread throughout the world probably in no time flat. And so we want to make sure our growers and producers are on top of that and ahead of the game. That's why we're doing these, you know, completing the series, but also the sort of grants and programs we've run previously and hopefully into the future as well. Yeah, we're looking at a 2045 net zero emissions target by, yeah, by 2045.

Kelly Wickham:

All right, so, interestingly, a lot of people don't think that there's much that they can do, but this stack here is our biggest contributor and we all have a part to play in that. All of our households, all of our operations and commercial operations. That's where we're playing. That's the sandpit we're playing in now. This is, obviously a big part of agriculture is burping and farting cows, manure management. For horticulture, really, electricity and fertilizer use are the top two emission sources, so that's where we're really going to focus a lot of our efforts.

Kelly Wickham:

And finally, why people should care also is this, prices have gone ballistic since the privatization of electricity, markets and the complexity that comes with that. The gas has been going nuts as well, so it's really, the opportunities are endless in terms of savings, transparency. Making sure that you're eligible for export markets and meeting community expectations.

Kelly Wickham:

So there's, there's stacks of reasons why, um, people are trying to remove, you know, reduce their electricity use and their emissions as well as a result. So lastly, before I throw to Clive, we're actually doing a series of extension services. This is just one of them. We have a community of practice, where people from NSW DPI, Sustainability Victoria and Department of Energy, Environment and Climate Action contributed to that body of knowledge I was speaking to it before that we post on our AUS web based platform and then finally those demonstration projects I spoke to before. We use all of these things to try and enhance farmer investment in sustainable energy. So, pretty good suite of opportunities to move the dial when it comes to energy sustainability. And there's that ExtensionAUS platform. What it looks like all of those articles and case studies. If you can think of it, it's probably there, and if it's not, help us contribute to that by producing it so you can be part of that body of knowledge.

Kelly Wickham:

So here we go. This is Clive Larkman from Larkman Nurseries. He's a man, a man about town who really is a mover and a shaker in the nursery sector and owns Larkman Nurseries since what 1989 was it, Clive?

Clive Larkman:

89 since I've been here. 1986.

Kelly Wickham:

And what were you, what was that, recent appointment, you're ahead of, what was it? Tell me again. Tell us again?

Clive Larkman:

Chaired Agribusiness Yarra Valley. I'm about to become president of IPPS Australia, and two or three other bodies on Victorian Agribusiness Council. So yeah, a few different bodies.

Kelly Wickham:

Brilliant. So can you just give us a sense of the overall operation at your nursery, like you set the scene of what you're doing there, but also then just a general overview of how you use it, just in a broader sense, how you use the energy to power that operation.

Clive Larkman:

We basically have two, two businesses, one based in Lilydale, one based in Wandin. The photo you see on the screen there is a Wandin based one, and we propagate our stock in Lilydale and shift up in the Wandin one. The Wandin based product sells those small pots there to the garden centres. The Lillydale business sells small pots to other growers and farmers all over Australia and occasionally overseas. Move on to the next slide if you've got another. The Lillydale property is a, mostly a propagation property and this is where we take cuttings, we put them in soil, potting mix, until they put roots on underneath, we put them in little small pots about five centimetres in diameter. Then we produce about one to one and a half million a year plants in that system. The other business takes about a hundred thousand, two hundred thousand of those. And the rest go all over the country. We are a main supplier to the lavender industry for plants for lavender farms. We've been working on that for a long time. As a propagation nursery, that means we need, that's our high energy input. Unfortunately, our high energy input is in winter when our sales are low, our income's low, and energy costs are the dearest, you know.

Clive Larkman:

We've always wanted to do solar power or alternative energy because, you know, below a per unit price, it's probably less than half a percent. It doesn't matter. It's still something I can cut down quite easily. And we put a, some solar panels in around 10 years ago, because there was a really good deal coming through. And it worked out at cost neutral over seven years. And, but we always wanted more and I don't know, somewhere around about 2019 someone from your area came and spoke at a, a quarterly seminar I used to run for Yarra Valley Agribusiness, and they spoke about the options that you guys did of funding it, repaying it, attaching it to the rates and repaying it over a period that makes the repayments less than the savings.

Kelly Wickham:

So how did you start that process then? What did you have to do?

Clive Larkman:

I contacted the person that came and spoke to me, just someone at council and he put me in touch with, I think her name was Christine and we went from there and I can't understand how it was so simple to the banks. It was just so easy, so simple, that we decided to go ahead with it. So I then asked the guy in the Yarra Ranges who he would recommend as a supplier and designer of a system.

Kelly Wickham:

So once you made, heard that initial offering, your first port of call was the council? Is that right?

Clive Larkman:

Yeah, because they were the ones that were pushing it through our agribusiness network.

Kelly Wickham:

Right. Okay.

Clive Larkman:

In other parts of the country it would differ. But that's it. And because Chair Agribusiness Yarra Valley, which is a, that's a part funded, like a chamber of commerce for rural businesses in the Yarra Ranges. I knew what people to go and talk to.

Clive Larkman:

So, I've always wanted to, and there's two reasons I wanted solar power. And funny enough, it wasn't to save money. It was because in the Yarra Ranges, we are forever dropping out of power. Car hits a tree, power line goes down. And where we are, we're not in the high priority to reconnect power and they all go out at once.

Clive Larkman:

In 2020 or 2021, just after we install this, the power's out for 10 days. Now, we can't run a business with no power.

Kelly Wickham:

That's right. So you've got a battery there as well, is that right?

Clive Larkman:

Yeah, we've got a fairly small battery system, as you saw there, but it will run the office and the key controllers of our watering system, which are the solenoids, which turn on and off because they're very low power usage, for about five hours. A, for the fact that when water's critical in the summer, where you've got daylight from sort of 6am till 7pm, the solar power will run it directly off the solar power, then the batteries only have to allow us for a few hours in the evening until it cools down. Eventually I'll put more batteries in and put more solar panels in because I want to be able to develop a system where, and you've told me, the computer, computer power's there, where it can calculate how much power I've generated during the day, how much I've got in my batteries, how much I'm going to need if the power goes out at dark to get through the morning, and then whatever power's left it'll just use to run my heating system or my night powering system.

Kelly Wickham:

So did you, that initial foray into local government, okay. But you hadn't had a quote at that time. There was no, you know, installer. It was just that initial, how do I deal with the bureaucracy? That's how it starts, yeah? Is that?

Clive Larkman:

Well, it was, how do I make it happen?

Kelly Wickham:

Okay, and what, what did the council do at that stage?

Clive Larkman:

They put me in touch with Christine and they put me in touch with the designer. The designer came up with a package. We worked out what the cost was. And Christine and, and your, your, the system said, Okay, it's going to cost that. Let's look at your power bills. Okay, you're going to save this. So your payback is nine years at this interest rate at these repayments and I said, well, it's a no brainer, let's just do it.

Kelly Wickham:

And would you, would you say if you looked at your power bills previously and what they are now, is it to feel like, like with, with the infrastructure in place, is it almost like a break even proposition?

Clive Larkman:

It's hard to tell, as I said to you, at the same time, in 2020, in the middle of COVID, we turned a 100 square metre propagation facility into a 500 square metre propagation facility which uses twice as much power. We put in a whole new heating system which saves power, and at the same time, last, this year or power has gone up 40%, I can't tell when I'm saving money, but I'm not paying much more than I was.

Kelly Wickham:

And you've doubled your productivity in a sense. That's brilliant, yep. So that's a really terrific outcome. And how, like, was there an initial down payment? How did the initial payment, like, did you, because it's not cheap, everybody knows on the phone, on the webinar that, investing in batteries and solar is not a cheap investment, but.

Clive Larkman:

I think you had some rules. If the total package was, I think under $60,000, it didn't require any upfront payments. It could be $50,000 or $40K. I don't know. There's a figure there. If we kept it under that, it didn't require any upfront payments. It didn't require an accountant's analysis of the business. It just required some basic turnover figures, profit margins. And they went through with it. So it was just really, really simple.

Kelly Wickham:

And no upfront payments.

Clive Larkman:

No, no, no. Right. That's, that's, yep. It's attached to your rates. So it doesn't count as a loan. So when I go to the bank, it's not a loan on the books, it's a charge attached to the property, which if you're in government doesn't make a lot of difference. But if you're in private enterprise, that can make a huge difference to your bank interest rates and your funding and your ability to borrow money for other projects.

Kelly Wickham:

So there you go. They already answered the where did you start question that I had for you. Well, first off, so it's, the infrastructure itself you said was under under $60,000?

Clive Larkman:

In that figure, yeah.

Kelly Wickham:

Yep. And you've double, effectively doubled your productivity without paying more is what you're saying. Is that right? Correct. Right.

Clive Larkman:

I think we've got 39 panels, but I keep telling you, the real benefit for us is when the power goes off in summer, the switch is so quick, our computers don't even flicker. Yeah. And it just means we can keep working the office. All our key sprinkler systems, which are run by solenoids, where we have to water in the summer, probably every two or three minutes, every 20 minutes, they're turning on. So we're talking about critical watering. We don't have to panic. It just happens.

Clive Larkman:

We have our whole system split into two, all our power. The key, the huge users of power, which are the air conditioning units and in summer and the heating units in winter, they're on a separate phase. So when the power drops out, they drop out as well.

Kelly Wickham:

Right. Yeah. Okay. And so are you finding that You know, the, the need for that backup is that, is that twice a year, the once, how often does that occur for you? Cause that's really going to ramp up your payback period.

Clive Larkman:

I would say on average, four or five times a year, you've had them twice in this winter and the power company decides I want to do some work on the lines or a storm comes through.

Kelly Wickham:

And your, your system enables you to get through those periods.

Clive Larkman:

Yeah, and we don't, we don't even really notice that the power’s gone out sometimes.

Kelly Wickham:

If you didn't have that, what sort of cost would that be on your business? If that was, if that, you were totally offline during some of those power down, down periods, what would you, what would be the losses? Is there any?

Clive Larkman:

Well, I can't, I can't put a dollar figure on it, but it means we've got to run two little... You know, Bunnings type generators, we've got to drag and drop this and we spend hours of staff time setting it up and then we've got to spend more staff time monitoring to make sure they're working properly to keep the sprinklers working and the office working and it's more just a huge inconvenience. And if I'm not here, then there's really nobody else in the business that will actually do it properly and set it all up. So it's just, it's a really inconvenient problem. And if it goes on for days, it's an even bigger problem. The only one we didn't allow for was the first time it happened was the next morning we had one of those pea soup fogs where you couldn't see five meters, so the solar panels wouldn't work either. So we had to put generators in then anyway, but that was a pretty rare occurrence.

Kelly Wickham:

And so most of your power demand is electrical isn't it?

Clive Larkman:

Yes, yeah. We do use a little bit of gas, but not much.

Kelly Wickham:

Oh right, so the thermal, the thermal demand is the lower end of the, lower end of the line.

Clive Larkman:

We use our power, we have to heat the beds where the plants are growing, and the most economical way of heating them is putting water underneath the plants. And the best way to heat water is electricity, because if you use gas, you have an inefficiency in heating the air between the burner and wherever the water tank is. So, with electricity, your heating elements in the water, so there's no loss there. And then we can warm up the beds all day.

Kelly Wickham:

Right. It's interesting cause the thermal energy is more efficiently generated but not applied, which is quite interesting. Yeah. So yeah, I was, well, I, I was fascinated by when we visited your, your place, the heat pump that you've installed, it's quite unique. Can you, just tell us a little bit about, we've had a couple of heat pumps where we invested in it during the Ag Energy Investment Plan. They're both on, well, the two that I know, were both on dairy farms and we've seen, we've realized something like in the order of two to two and a half, you know, COP of two and a two and a half. So, two and a half kilowatts out of one that goes in. So how, can you describe your heat pump, how you installed that? What sort of COP you're getting?

Clive Larkman:

On my photo there, that's a heat pump there. It's designed for heating spas and pools. We've got two. We've got one that heats the water for the nursery and we've got one that heats the water for our pool, for our bed and breakfast. That keeps 55,000 litres of water at 28 0C between October and April, running it between one and two hours a day at most. It's supposed to have a COP of one kilowatt in, six kilowatts out. I don't believe any marketing, but if I'm getting four, which is two thirds of what they say I'm getting, I'm still doing really well. That thing there runs, keeps our water. You can see behind my, on the right-hand side of the image, a big blue thing.

Clive Larkman:

That's a 15,000 litre water tank. And we've got about 10,000 maybe 5,000 litres of water in the system at any one time. That pump keeps that water at 40 degrees all day, every day. The only time it doesn't work is when the ambient temperature drops below seven degrees. And we've got a backup system that heats up a large volume of water at night where we use that.

Clive Larkman:

But basically it runs perfectly well between, so long as the temperature doesn't drop below 7, and when it does drop below 7, that's generally only between 10pm and 6am. So, it's very, very efficient.

Kelly Wickham:

And that would be just a couple of months a year, really, that that happens then?

Clive Larkman:

Oh, we're talking maybe 20 days of the whole year where it can't cope, and even when it can't cope, when we know that's happening, we turn our beds down from 23 degrees to 19 degrees. So that we'll generally get through. So we're looking at maybe two to three hours, five, six times a year where it's not coping and we can live with that.

Kelly Wickham:

Oh, right. And so it's interesting that you said that's a spa pump. What made you reach out for something like that?

Clive Larkman:

I'm a bit of a weirdo. I spend my whole life looking at what everybody else is doing in other industries and seeing what I can take from another industry and put in my industry. I happened to be at a plumbing store and they had a big ad for this heat pump for your spa, and I thought, I'll ring up, I'll do some research. It comes with a variable speed pump and the pump, and the heat pump and the water pump go together. They're Bluetooth connected. So as the water is needed, the pump boosts up high. Then it runs down and runs a lot less to keep the water kicking over. They quoted me about $6,000 delivered and about $2,000 to install it.

Kelly Wickham:

And so it's performing to your expectation, obviously then.

Clive Larkman:

Yeah, they told me one nursery tried it before in WA before we tried it and they told the nursery you can't use as your prime source of heat because it won’t work at certain temperatures. I'm aware of that, so I've designed my system to allow for that. And I, you know, I recommend it to anybody. And one of the people's criticisms I get is people say, well it won't work over 40, 40, 42 degrees. So, and we need 70 degrees water. Well, if you put the heat pump on your return, not your outgoings, the water you're heating is 10 degrees, 15 degrees warmer than what it was if you didn't put this in. And so, if it's running during the day, we've got solar power running it. It really is super efficient.

Kelly Wickham:

So performing to expectation and cost effective, easily installed, you know. Did you do that yourself? Did you do the work yourself on this case?

Clive Larkman:

Uh, no, I got a plumber to do it because we just don't have enough hours in the day and I can't copper weld. And when you work with water at this temperature, you can't really use PVC. You need to use the copper.

Kelly Wickham:

Copper. Okay. Yep. Yep. And is that's something under the finance mechanism you mentioned before. Could you like this precluding how you did do it? Could you have invested in that under the same package that you mentioned we were talking about before earlier?

Clive Larkman:

I probably could have but for eight thousand dollars, it's sort of didn't matter. Yeah Seriously, um, and the return is so quick.

Kelly Wickham:

Yeah, right So interestingly, we've got a yeah a heat pump that could be driven partially by the solar power with batteries as a package that you could actually install with no upfront costs. That's what we're talking about right now. And administratively, Clive has experienced a lot of government bureaucracy, saying that this is quite an easy experience to go through as well. Is that right?

Clive Larkman:

It is, and they change my repayments from monthly to quarterly, and they send me an email out four weeks before the payments due to go out reminding me the payment's coming out and how much it is and what day it'll come out.

Kelly Wickham:

That's brilliant. And again, just to reiterate for the many folks that came in later, Clive's been able to double production while maintaining similar energy costs while, again, zero up front. So it's quite a, one of our greatest barriers. Sorry, I just want to let people know that we did a bit of work on the barriers to investment in infrastructure upgrades for energy, and two of the top barriers were upfront costs and a hesitance around the stated performance outcomes that were expected. And it feels like to me, Clive, you kind of overcome both of those. Well, overcome number one in terms of the investment was completed at zero upfront costs and that the upgrades you've landed are performing as expected. Is that safe to say?

Clive Larkman:

It's also safe to say, that you guys set your payment, repayment terms at below the calculated savings. So, they come in, they'll do analysis, what, how much power you're using, how much you're paying for your power, what the calculated theoretical savings are. And I'll set the repayment terms less than that by extending the length of the contract so that your net cashflow is positive, not negative. And I just can't see why you don't do it.

Kelly Wickham:

Why you wouldn't do it. Exactly right. So that's really compelling argument. I mean, with those are, there's several other barriers obviously to that investment that we're speaking of, but those top two or the top one, really that, well, it's definitely one of the top three, I'm sorry, is making that upfront investment. So that's, that's a huge statement to be made and from a guy who's actually quite, critical and analytical about these sort of things and can really pursue infrastructure upgrades in his own head and deliver those. So I think coming from a decent source. So the, the background to this webinar.

Clive Larkman:

There is a third benefit to it. And anyone in small business knows that the minute you walk through the bank's door asked to borrow money, you're going to feel, you're going to feel like you're, you're begging for something. The banks don't really make it easy for you. You know, you've got to justify it. You've got to argue with them. It was just a really, really simple process.

Kelly Wickham:

Fantastic results. So this is a really good news story. That's why we brought Clive in to run this webinar. But the other objective here was, for those that missed the beginning, was to have a conversation. So I simply asked Clive a few questions, and my hope is that folks that are participating today will contribute to those questions, but also to contribute to the body of knowledge that's an experience that's related to what we've discussed over the last half an hour, and we're opening questions up to folks from here on out.

Kelly Wickham:

So, just for me, Clive, in the meantime, what's, like, on the sustainable energy front, because there's, you know, the, zero, well, zero from the grid is nice to consider and dream about, but what do you reckon you'll do next?

Clive Larkman:

I'm looking for alternative ways of generating energy in winter. So I'm waiting for the fans to come down in price and, and go up in reliability and I'm waiting for, you and I talked about those vacuum tubes. And I'm also looking at up any other way I can to generate electricity in winter, plus more batteries in the computer system to allow a more, way I can control the way the power is saved and stored rather than put it back into the grid.

Kelly Wickham:

And have you begun that pursuit or where are you at with those investigations?

Clive Larkman:

I don't go pursuing, I go, I just listen. We just spent three weeks travelling around Europe, visiting nurseries there, visiting nurseries in America in October. You just listen and learn and think, and you'll hear something and go, I'll try that, or I'll try that, or I'll have a look at that. So it's just opening all the time to... Whatever comes my way, I want to trip over.

Kelly Wickham:

And could you give us a rough estimate of what that gap is, that winter gap that you need to fill, that you're talking about at the moment? Is that possible?

Clive Larkman:

It's about $5-6,000 a quarter. I'm running at about $4,000 a quarter, $3,000 a quarter in summer. In winter, it goes up to about $7,000. So about $4,000 or $5,000 of power I need to generate there. Yeah, it's run my heating system. It's the big heating systems that I have to use in those really cold nights is 40 kilowatts. So that's a big system.

Kelly Wickham:

So, are you talking 40 kilowatt hours a day? What you talking about?

Clive Larkman:

It's a 40 kilowatt heater. Oh, sorry. You're talking about heater, ... that I have to use as my backup and I need to be able, have, have enough power to at least run part of that, and it gets really, really cold.

Clive Larkman:

Any kind of horticulture where you're going to heat things, thus system works really well, or if you've got a cool things, of course, if you're air conditioning, then it really works well.

Kelly Wickham:

Got a question from Rick Glover here. Let me just so Rick's asked, what square metre per square area are you heating? And, have you looked at synchronizing a small generator with your solar battery?

Clive Larkman:

Yes, we're looking at putting in a 10 kilowatt generator as complete backup because we also have a bed and breakfast. We want to run the whole thing. That's down the track. We've just come through the worst cash flow winter we've had for a long time, so we're just holding off on that. The square meter is a funny question. We're a propagation nursery and it is on a square meter. We're not heating the air above the plants. And we've got about 400 square metres of bed space.

Kelly Wickham:

400 square metres?

Clive Larkman:

Most people that are heating air are actually talking cubic metres. Whereas we're not heating air. We have to raise the temperature of the root zone of the plants. We've got to try and keep it at 23 degrees. And we don't really care what the temperature of the air above the plants is. Does that make sense? If you're heating the whole room, then you need formulas for cubic heating, not square meter. And the general practice right across South East Australia is 3 watts per square meter per day is what you need to put in on average over a 12 month period. In the middle of winter, it's a lot more.

Kelly Wickham:

Terrific.

Clive Larkman:

Very, very little work done academically anywhere on the heat inputs for propagation.

Kelly Wickham:

Is that right? So heating inputs to propagation? You're saying there's very little literature review on that?

Clive Larkman:

There's only one person. It was a guy in Queensland in the mid 90s who actually did the calculation on the square meter you need to... Because it's deceptive. You're just trying to heat the roots zone of the plants. And sometimes the top air might already be 20 degrees, you still need to get the root zone up to 23. You've got to get the roots on the plants, not leaves.

Kelly Wickham:

We've got another question from Peter Young. I know Peter, we go back a ways. Peter says, what organic waste do you produce from, waste material generally? Let me get this out of the way... each year, like, do you have any idea tonnage wise? Because it could be converted into power or bio fertilizer or both.

Clive Larkman:

We don't produce enough, and our organic waste, it has two types. It's potting media, which is also mixed with sand and perlite and vermiculite, so you can't burn it. And the waste cutting material of that when we're producing our cuttings. And it's really just plant tips and twigs and leaves. And we come to a huge mulch pile at our other property and just spread it back on the ground as fertiliser or compost.

Kelly Wickham:

Keep using it. That's it.

Kelly Wickham:

I wanted to ask the group a question for the folks online from, I hope, hopefully you've heard most of Clive's, about his decisions to go with this infrastructure upgrade. I'm wondering, are people online interested in pursuing the same type of investment structure that he's, that Clive has landed at his nursery? Are people considering upgrades?

Kelly Wickham:

There's another, there's another question there. Oh, here we go. Is this a Yarra Valley Council program or a Victorian government program that funded the system? Is it still available? So that actually started at the City of Melbourne, first and foremost, and now it's across Australia. Everybody can do it.

Clive Larkman:

It's a standard in Australia and it runs it through your local council. So if you're in the Yarra Ranges, you go to the Yarra Ranges. Most rural and peri urban councils have agricultural development sections. You go and speak to them and they should be able to put you in touch. And if not, you just contact Kelly or myself.

Kelly Wickham:

Great, so Chun's got a, let me just make sure I got that right, Chun. Chun Goh has got a question or a statement. Hi, I'm from Energy Smart Water. We've done one of this, we've done a study and provided solutions to help farmers in their heating demand to overcome the challenge during the winter months. Feel free to reach out if you need any assistance with your heating solutions. Okay, so hopefully people can see Chun's statement there. So, from energy smart water, you're looking at heating water during the winter challenge. During, sorry, heating water during winter. Reach out to Chun. He's right there in the chat box there. So not something I could respond to myself, but yeah. This is part of the rationale, also behind the webinar series, is for us to show and showcase, sorry, best practice measures that we've realized through Ag Energy Investment Plan and through other measures as well. So we're very objective about where they come from, but what we want to do is fast track energy investment upgrades. Really, that's really what it's all about. We're not interested in highlighting particular products or particularly service providers, but all of them that are good and this is the form in which we can do that.

Kelly Wickham:

So we've got the what's next. We've heard about Clive’s heat pump system there. It's an old well, it's not an old I should say It's a brand new or relatively new spa pump. I wish Mario was there. He's our invest infrastructures delivery man who's installed or had installed most of the energy upgrades at Ellinbank and is going to support the system upgrades at Horsham as well, just to compare notes on heat pumps. The fact that Clive's getting a COP of one to four, with that spa pump, that's his estimate, nonetheless, is quite, quite a great result, and it's something that we'd love to compare notes on, due to the heat pump that we've installed out of Ellinbank. I think that's closer to two and a half or three, which is still great. Yeah, it would be interesting just to see the design and implementation of those separate systems and how we can maximize the utility of those going forward.

Kelly Wickham:

The A2EP has written a guideline on how to, you know, upgrade with heat pumps and what should, what considerations need to be made as well.

Kelly Wickham:

If you have any further questions, just drop a line to me. You've got my Email address. There's my phone number as well. I'm in the horticulture team.