Peter Doolan:

I am Peter Doolan at Doolan Farms. I'm a third generation dairy farmer. We currently have three generations on the farm here. Mum and dad started milking here many years ago. And Sam and I, and our wives are share farming with mum and dad. We're milking 600 cows at the moment on about 280 hectares. And we have a lot of out paddocks for young stock and for pasture production. We're in Ecklin South, Southwest Victoria.

Peter Doolan:

We put a new water chiller in, glycol system and it goes to an underground tank during the day, off solar. So it acts as a thermal storage battery. And then during milking, we pump out of that through a plate cooler system and chills the milk down to about five to six degrees when it enters the vat. Whereas the old system was just a regular plate cooler off the cooling tower and that again, the vat would be at sort of 16, 18 degrees. So by doing that, and trying to do it during the day, we probably halved our energy bill there with cooling milk.

Peter Doolan:

And then another new hot water system was put in. New CO2 heat pump, which also runs during the day. And that heats our water. It's gone from an 18 kilowatt three-phase hot water system that runs off-peak at night to now 4.8 kilowatt system that runs during the day off solar. It takes a little bit longer to heat the water, but it's a lot more energy efficient. On paper, it should reduce our energy usage by 75%. We've found at the moment it's about 50%, but we've got some tweaking to do and some more control measures to put in that should get us down to that 75% reduction. So very energy efficient.

Jarrod Leak:

My name is Jarrod Leak and I'm the CEO for the Australian Alliance for Energy Productivity or A2EP, as we're known in energy circles. We have a focus on improving energy productivity across Australia in manufacturing, agriculture and transport industries. And we have a specific interest in heat pumps because of how they can improve energy productivity. And that means they can deliver more value for less kilowatt-hours or less gigajoules, they’re proven that they can achieve at least 300% improvement in energy productivity. We've been investigating the technology through various feasibility studies and tracking technology and tracking suppliers over the last four or five years. And we've seen a tremendous development and interest in their technology over this last few years. And with the increasing energy prices, we're seeing an ever-increased interest in the technology as well.

Peter Doolan:

Overall it went to plan. We used, one of our stipulations was that we wanted to use local tradespeople because if there's a breakdown or a fault, they're literally within half an hour away, they can be here to fix the fault. There's not as much downtime. So our chiller unit was produced locally. Our new hot water pump was produced in Melbourne and we used a local industrial plumber to plumb that in. So he knows the system. He's done a few of those systems now. So we pretty much try to use as many local tradespeople as we could.

Jarrod Leak:

So when you are looking at purchasing a heat pump, whilst it's nice to hear from your neighbours and they give you a tick to say, this heat pump worked for them. You do need to assess it for your own circumstances. Now you do need to be able to understand what you're being offered and hold that heat pump supplier to account. And that means getting multiple quotes and really listing out the different facets of each heat pump offer. Things like how they measure the temperature through the heat pump, different refrigerants that they have, and obviously the cost and the size of the compressors on board. So it's really a matter of, there is still definitely due diligence here involved.

Peter Doolan:

The idea was to take the peaks out. A lot of dairy farms are energy hungry in the morning before dark when there's not a lot of solar, and then in the evening. We are very high energy usage and that's using the solar and changing the way we use energy throughout the day on solar. That's taken a lot of the high peak load demands out of the system. So we've plateaued our usage and tried to be more sustainable. That'll safeguard us in the future for high energy costs. There's still a bit more fine tune to do, which we will do over time and that'll probably bring the efficiencies down a lot more. So that'll be good.

Peter Doolan:

So basically two thirds of our energy usage was heating water and cooling milk. So by targeting those two areas, we're able to pretty much halve the cost in those two areas.

Jarrod Leak:

Heat pumps, the main thing is efficiency, and you're looking at that at least 300% efficiency certainly versus an electric resistance heating and up to 400 or four times the performance versus say, LPG or gas burning hot water system. So that's number one, you're getting efficiency. And say, what does that give you as well? So that gives you an ability to get more out of those thin swirl lines, those thin power lines that are coming to your property and you're getting more value out of those. So that means maybe you can add on and enlarge the herd size. It also means you are future proofing for future electrification of your property demands of energy. So that might be electrification of your irrigation system, your ATVs and other vehicles. Maybe it comes into crushing grain and things as well. So what you're doing is you're future proofing by getting the most out of the energy that you have. And is that energy coming from the thin swirl lines or is that coming from your solar PV future proofing?

Jarrod Leak:

Finally, and of course the big topic is decarbonization. What this does is, by being 300% efficient, then you're instantly reducing the energy requirement, electricity requirements, say. That helps you decarbonize. If you're still going to be pulling from the grid and as this grid decarbonizes, then that's less and less carbon emissions coming from your hot water heating. And that goes a long way to be able to say, "Hey, you're a net-zero milk producer." And really this is what's needed through the entire dairy food chain as well.

Peter Doolan:

The projects that we've done for energy reduction in our journey, we put a new VSD on the vacuum pump, which reduced our energy consumption with the vacuum pump. It sort of halved that. And the chiller unit that's also halved our milk cooling regime and the new heat pump system, that's halved our energy cost as well. We reckon that with a fit bit more fine-tuning and automation, we can get that down to about 75% overall reduction in heating water. So that's a big game changer I think that way.