For this issue, QTLC sat down with Lex Forsyth, CEO of Janus Electric – the electric trucking solution that is rewriting the rulebook for low-emission freight.

QTLC: Thanks Lex, for making the time to share some insights on the future of road freight. In a nutshell, what is "the Janus Solution" and how is it different from the low-emission options people may be more familiar with?

Lex Forsyth: The Janus Solution is basically a conversion module for vehicles up to 10 years of age taking them from diesel to full electric with our exchangeable battery solution. It's similar to a swap-and-go gas bottle but it's charge-and-change for the battery. The real difference is that we're not selling a truck that's not on the road. We're using *existing* trucks (Kenworth's, MACKs, Freightliners, etc.) so there's not a huge change to vehicle operations.

There's also a software portal that sits over the top that manages energy, battery requirements, charge stations, and truck data to make sure there's always a charged battery available.

The fleet customer only pays for the energy that goes back into the battery. And because of the way we've set up the system, fleets can have as much ownership of the model as they like – they can own batteries if they choose to, they can own a charge station if they choose to and participate in the broader ecosystem or keep it a closed loop for themselves.

QTLC: Of course, this isn't just a theoretical concept – there are trials with converted Janus trucks already underway. Can you tell us a little more about them?

Lex Forsyth: Well, we're now in the process of delivering the fifth truck for Cement Australia. We've also got NewCold in Melbourne in operation and a partnership between Janus, Qube and OzMinerals/BHP will be underway in South Australia shortly.

We also have a longstanding trial with Fennel Forestry in South Australia. That truck has driven in excess of 40,000km as a fully electric vehicle, with 180 battery swaps and is performing really well. The range ultimately comes back to operating conditions (what the vehicles are towing, where they're operating) but overwhelmingly all the trials have been very successful; obviously they're not without teething issues but we've resolved them through the implementation process, just like any other trial. It's a new technology but it is pulling the loads and performing as expected.

In terms of our battery exchange, the network has started to spread out: Brisbane, Sydney, two sites in Melbourne, Mt Gambier, Port Augusta – and locations in Adelaide, Sydney, and Newcastle very shortly. These are based on following customer demand. We're not trying to build a network that goes everywhere yet; the network will spread its wings wider but at the moment, it's a staged approach.

QTLC: And so, what is the overall cost of switching to the Janus ecosystem? Obviously, the battery drivetrain might have some payload implications – are there any other cost impacts that have come out of your trials to date?

Lex Forsyth: In broad terms, it typically costs around $175,000 to convert the vehicle itself, which does not include ownership of the battery. But then, most fleets are getting $25,000-$30,000 back for the components that are removed (the diesel engine, the transmission, ancillary services, air cleaners, etc.), either from componentry sales (e.g., to wreckers) or as a swing motor or spare gearbox to have in their fleet pool.

We charge a subscription and usage fee of $200 per month for the vehicle to be on the Ecosystem platform – it needs to be on there to track energy use, vehicle operations, and the battery – in order to give fleets full visibility of operational data.

In terms of payload penalties, it depends on the original spec of the vehicle. If it's a day cab, it's closer to 2.5 tonnes, if it's a sleeper cab it's roughly 2 tonnes. The reality is that all zero emissions vehicles are heavy; every zero emissions operator has the same issue. Janus is working with each state's transport department to get a dispensation on steer/drive axles so that we can get the zero emission vehicles back to payload parity with a diesel vehicle. We need to ensure that our clients are not disadvantaged in payload and to date, we've had great success in Victoria with that.

As for servicing costs, our system is actually similar to a Tesla model where you don't need to bring the vehicle back in for a code update – we can dial into the vehicle remotely to provide efficiencies around servicing. The fleets are seeing a reduction in their service time and service intervals. For example, there's no longer a need for a B-service. Depending on your duty cycles, this can give an extra 10-12 days' uptime in the vehicle's available days of operation, purely based on not having to come in for the oil change, fuel filters, air cleans, etc.

So obviously everything comes back to utilisation factors, but we've found that in most applications there is a saving in operating on zero emissions.

QTLC: You mentioned the full Janus solution is supported by a software management platform. What is the data telling you about switching to zero emissions?

Lex Forsyth: One of the things that fleets are interested in is the reporting that we give on the vehicle in real-time – accelerator position, brake applications, regenerative braking, power applications – we're really honing in on the data that drives efficiency out of the vehicle.

We're starting to develop some good baseline numbers in certain applications. For example, we're seeing good regenerative braking for operations in metropolitan areas; the highest we've had so far is a 68% day on regenerative braking in one application – which is huge! It obviously gives a good extension of range for those vehicles.

What provides good data is time and consistency of collection. We now have a diverse cross-section of operations – B-Doubles, single trailers, spread tri-axles, fridge vans, quads, and triple road trains – hence the data we are obtaining is giving us solid understanding of what the vehicles' capacity is and what energy is consumed.

QTLC: What other issues are fleet customers interested in? What kind of assurances were needed to give them the confidence to take the plunge? How do you manage the uncertainty with your customers?

Lex Forsyth: Well, we've got to realise it's a transition: it's not a one-size-fits-all solution. We look at this from an analytical point of view to provide the client with the best solution for their operation. Some operations may not be immediately suitable for our solution but we're tailor-making solutions that work across 80-90% of the existing supply chain, fleets, and OEM products. Port operators, fixed line-haul routes, metropolitan pick-up/delivery fleets, bulk transport, point-to-point capital city – all of these make a lot of sense for battery exchange.

We really try to work through the numbers with our fleet customers. One of the unique things we've found is that when operators first get the vehicle, they're getting around 15% regenerative braking and then as we talk to them, they get confidence in how that regen works and you see the increase. We've seen 30-40% jumps in regen as drivers get more accustomed to driving that vehicle and utilising it.

Some customers have asked about safety. We've improved the vertical centre of gravity by roughly 7% and on the horizontal by 5%, so our vehicles provide more stability on the road in comparison to a diesel vehicle, as there is a better weight distribution.

Other customers ask how it works from a compliance perspective (e.g. with the ADRs). At Janus, we've been able to put the battery back far enough from the steer axle to adhere to the current regulations. Another point of difference is that our trucks are a vehicle modification, not a recertification. We've developed a 170-page document detailing the testing and analysis of the entire system that goes through to formulate the modification plate going onto the vehicle. So, it really is an integrated solution into the existing vehicle.

QTLC: Obviously, you work very closely with fleets themselves, but what role do you see for shippers, freight purchasers and the broader supply chain? Where are the levers for change there?

Lex Forsyth: The biggest thing is, how does the industry take this value add of zero-emission supply chain and be able to keep that point of difference in the market – and make the market pay for it?

In a sense, fleets aren't doing this to reduce costs, they're actually doing this to provide a compliant zero-emissions delivery option. It's a question of changing the value mindset in customer expectations. There's a lot of customers that want the zero-emissions supply chain, purely because they've got to account for their Scope 3 emissions. And to date, the vast majority of our volume has come from the customers driving freight operators to deliver a greener supply chain.

That's not always the case though. We've had some fleets that have said to themselves: "I need to start taking this on because I'm going to be pushed down this path anyway eventually – we've got to make a start". Increasingly fleets themselves are seeing some first mover advantage here; if they go out to the

supply chain with a zero-emission solution, it does help them with natural, organic growth within their customer base.

It's really a mixture of both fleet-initiated and customer-initiated change working together.

QTLC: So, what advice do you have for operators who might be getting serious about zero-emission freight?

Lex Forsyth: You've got to look at all the pieces to the puzzle then put the best puzzle together – and it doesn't take long to do that.

The first thing I'd encourage fleets to do is to look at your freight task and ask "Have we got a significant high duty cycle on a particular route? It's about getting the low-hanging fruit first. Analysing your freight task to see if there is a consistent number of deliveries between X and Y…then looking at those routes and seeing what you can do.

Another thing to be mindful of when you're buying a fixed battery asset is that you're limiting yourself to the chemistry of that battery today. Battery technologies are developing fast, increasing their energy density which then flows on to increasing range for those vehicles. We're seeing some battery producers announcing a doubling of energy density – that in itself is a big step forward for the industry. With the Janus solution, you're not limited to technology that's fixed to the vehicle; we adapt our battery packs as cell chemistry changes.

Ultimately, it's about working through the full process: looking at the freight task, analysing your source of energy, do you have renewables that can fit into it, where are the vehicles operating, what network is there, where would you *like* to go eventually. And that's where we think the Janus Solution can really provide value.