



On your bike

E-bikes could play an important role in lowering carbon emissions but the challenges will be affordability and providing enough cycleways. **by RUSSELL BROWN • photograph by ADRIAN MALLOCH**



When Stefan Atkinson had a modest financial windfall a couple of years ago, he could have bought a used car. Instead, he plumped for an NCM Milano city e-bike. But he wanted to carry more, so then came the cargo bike, a Radkutsche Rapid, which now occupies the car park in the Kāinga Ora home he shares with his partner, Ngawini Hohaia.

For Hohaia, it was a significant step up from her unpowered bike. "I said, 'I'm not going back to a normal bike any more,'" she recalls. "It's just awesome."

When that bike was stolen, they used the insurance payout to upgrade to a fat-tired ET.Cycle T1000. The latest addition to the

family is a Boostbikes Scout 750, which has a 750-watt motor and requires a licence to ride. "Typical journeys are shopping and pleasure rides," says Atkinson. "We don't own a car so we cycle everywhere. It's a shitload of fun. And we don't burn fossil fuels."

Atkinson and Hohaia were able to fund their own purchases, but when the government revealed its first Emissions Reduction Plan (ERP) last month, an interesting fact emerged. Its scrap-and-replace scheme – a big-ticket item to help low-income families replace their dirty old cars with low-emission vehicles – could also be used to help buy e-bikes. Not that the government seemed especially keen to advertise this fact.

The word "e-bike" appears exactly once in the ERP's 345 pages. Was it official

Ngawini Hohaia and Stefan Atkinson are committed e-bike users for work and pleasure and no longer own a car.

scepticism of the benefits? Or government fear of the controversy that swirls around any cycling initiative?

Evidence for e-bikes as a tool to reduce emissions is strong. A 2018 study conducted by Massey University researchers in Wellington to assess the environmental impact of e-bikes concluded that "specific policies to promote e-bike use should ... focus on encouraging people to get onto their bikes, improving separate cycling infrastructure for bicycles, and applying disincentives for car use where there are attractive alternative transport modes available".

In 2020, the University of Otago's Public Health Expert blog declared that "it's clear that e-bikes need to be seen as an integral part of a low-carbon transport system."

When it's used as transport – an important proviso – adding an e-bike to a household significantly reduces the number of car journeys taken. In a household where the owner already rides a conventional bike, moving to an e-bike boosts both the number

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of cycle trips taken – by a factor of three or four – and their average distance. The size of the effect varies from country to country – car journeys are reduced more in countries where the car is dominant.

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A 2019 paper by University of Auckland sociologist Dr Kirsty Wild, funded by the Ministry of Business, Innovation and Employment and published in the *Journal of Transport & Health*, explored "the reasons why cyclists are the happiest commuters" and concluded that any successful effort to get people on bikes would rely as much on "a keen appreciation of its pleasures as its perils", venturing that "electric bicycles may further enhance cyclist mode satisfaction".

New Zealanders certainly seem keen. It's estimated between 100,000 and 200,000 of us are already e-bike users and last year, more than 50,000 were imported into the country. That's six e-bikes for every new electric vehicle sold. In the next two or three years, e-bikes are likely to overtake all new car sales – the main impediment is simply sourcing enough bikes.

The question is whether more committed government support could not only increase e-bike uptake, but nudge it towards more of the people who will actually use e-bikes for transport.

SPARKING INTEREST

It was, after all, a subsidy that helped spark the e-bike boom.



Maurice Wells from Electric Bike Team says pandemic lockdowns helped drive interest in e-bikes.

Maurice Wells has been selling e-bikes since 2009, first from his pioneering store in Sydney, Glow Worm, and now from Electric Bike Team at one end of the "pink path" cycleway in central Auckland. For the first five or six years, he was used to patiently explaining what an e-bike was any time someone asked him what he did.

In 2016, electricity retailer Mercury Energy launched a scheme that offered customers a subsidy of up to \$500 on a new e-bike. It also arranged test rides and sold the idea to potential customers. The market took off.

"Mercury did something really simple that the industry at large had kind of failed to do," says Wells. "They did a video of someone riding a bright-coloured cruiser e-bike, dressed like a normal person, just sailing up a hill. And that said so much more than many other attempts at marketing e-bikes have done."

The pandemic changed things again. With the streets largely empty during the 2020 lockdown and not much else to do, families hauled their bikes out of the garage and rediscovered riding. When the shops opened again, some of them went out and upgraded.

But the more enduring effect was the redirection of spending by customers who might otherwise have used the money for international travel. "They had time on their hands, they had money to burn and they needed to amuse themselves domestically," says Wells. "So they were buying e-bikes and taking them to rail trails."

Some stores, notably the Australian-owned 99 Bikes chain, still offer e-bikes from \$2000 or even less. But higher-end bikes, selling for \$6000 to \$10,000, are now the basis of Electric Bike Team's business. However, Wells and his staff began tracking something interesting. When they sat at the city end of Auckland's Northwestern Cycleway during morning rush hour and counted bicycles, they saw more cheap hub-motor bikes than sophisticated mid-drive models. When the cheaper bikes they sold came in for service, they had higher odometer readings and the owners needed them back more urgently – because the bikes were their transport.

Something else happened. Just as everyone wanted an e-bike, the global supply chain crunch hit. Wholesalers who would carry six to nine months' inventory now routinely carry none.



Big Street Bikers marketing head Jessica de Heij and founder Cleve Cameron with one of the company's Locky Docks parking stations with security racks and "free charging for e-bikes".

Some European manufacturers say they're pre-sold for the next two years. However, the launch of the Black e-bike range by the retailer Electrify NZ may help. The bikes are manufactured in China but designed here for New Zealand preferences and price points.

Only a handful of models on Electric Bike

"If there was quality infrastructure, and you had a small vehicle that was fun and easy to use, people will choose to use those vehicles."

Team's shop floor are now priced below \$5000. But that, says Auckland University's Wild, is partly a matter of "expectation creep". People who might have spent \$2000 three or four years ago are now prepared to pay \$5000 for a more sophisticated bike.

For people who can afford it, she says, the key is trying before you buy. She would also like to see easier access to salary-sacrifice

schemes that allow employees to trade a little of their cash income for the non-cash benefit of an e-bike.

"I'm not convinced we've worked through all the regulatory barriers to making them easy for workplaces to implement. I think the fringe benefit tax thing is still an issue."

THE RIGHT PRICE

Wellington-based advocate Oliver Bruce is an engineer who helped Uber launch in New Zealand. He also founded a company called Micromobility Industries with Romanian-American analyst Horace Dediu (who coined the now-universal term "micromobility"). Bruce would like to see the current clean-car rebate scheme extended to include a specific class of e-bike: cargo bikes.

"I'd specifically include that they need to be able to carry children or a minimum of 120kg of load. That way you are definitely not going to be subsidising [Xero co-founder] Rod Drury's next \$20,000 e-mountain bike."

Cargo bikes, which come with trays or boxes on the front or rear, can be set up to carry goods or, crucially, kids. Wells, who does his morning commute on an e-cargo bike, now sells a range of models and has

even set up a play space for children to use while their parents browse.

The *Listener* spoke to Bruce just before he left for Amsterdam to host the Micromobility Europe conference. He says e-bikes and scooters are just the visible edge of a coming wave of small electric vehicles.

Most trips that Kiwis take are short, he notes. "On average, only about 50% of trips are further than 5km. If there was

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good-quality infrastructure, and you had a small vehicle that was fun and easy to use, people would choose over time to use those vehicles. They'll use them because they're better; they're the most convenient way to get around a city; they're the most fun."

Wild's 2018 study, *Electric City: E-bikes and the future of cycling in New Zealand*, concluded that people were prepared to commute much further on an e-bike than on a standard bike. But a key factor was access to high-quality cycling "highways", such as Auckland's Northwestern Cycleway, which runs alongside State Highway 16. Only 1 or 2% of commuter journeys in the city are currently by bike, but the figure is more like 8% in the suburb of Pt Chevalier, where a safe, easy 5km ride on the path replaces what can be a torrid journey on the roads.

Electric City also highlighted another way e-bikes are being used: what Wild calls "trip-chaining", or the use of bikes for multi-stop errand journeys. But they, too, require safe routes.

"Christchurch has done an amazing job of rolling out practically their whole [cycle] network – and they doubled their cycle mode share in the last few years," she says.

Christchurch was the first place Auckland company Big Street Bikers installed one of its Locky Docks – secure bike-parking racks with free charging for e-bikes. Big Street Bikers founder Cleve Cameron says use has grown steadily every month: "It's very much 'build it and they will come.'"

There are 30 Locky Dock sites in Auckland, Wellington and Christchurch, with another 100 to come this year. Locations are chosen for amenity, but Cameron has



If you fancy spending your weekends trail-riding, you'll need a hybrid or "rail trail" bike. Beyond that, you're in e-mountain bike territory.

Saddle savvy

The nuts and bolts of what to look for if you're thinking of buying an e-bike.

An e-bike is a bicycle with an electric motor and a battery either bolted on or built in. Unlike Europe, New Zealand has no specific speed limits for e-bikes, but the Ministry of Transport stipulates that motors must

be limited to 250 watts of "sustained output" – more than that and it's a moped and requires a licence to ride.

Before buying an e-bike, you need to decide how you'll use it. If you're going to commute or make shopping trips, you'll want a bike that's primarily designed for the road. If you'd also like to spend your weekends trail-riding, you'll need a hybrid or "rail trail" bike. Beyond that, it's e-mountain bikes, which are specialist machines. Then there are cargo bikes, which are a class of their own.

It's important to test-ride before you buy – ideally, in something like the conditions

you intend to ride in. If you'll be going up steep hills, you need to know that your bike has enough power to last the distance. Servicing also needs to be taken into account. A cheap bike could turn out to be a costly mistake if there's no one to fix or replace it. Ask the retailer for an assurance that both service and parts will be available for the next few years.

Motors

There are two basic kinds: hub motors and mid-drives. A hub motor sits in the hub of the rear wheel. Hub-motor bikes are generally much cheaper and a bit noisier, but they work perfectly well. Almost all of

them use cadence sensors – that is, the faster you turn the pedals, the more assistance. A key limitation is that they don't deliver anything until you have the pedals turning – so you may want to consider a bike with a throttle, which will get you away from the lights quickly until your legs catch up.

Mid-drive motors sit in the middle of the bike between the pedals. They're generally found on more expensive bikes, and on high-end models they're becoming very sophisticated. Motors built by the market leader, Bosch, measure cadence, torque (how much effort you're applying to the pedals) and the speed of travel 1000 times a second to facilitate what the company describes as "an organic interplay" between rider and bike.

E-bike motor torque – which you can roughly translate as "grunt" – is measured in Newton-metres (Nm). If you're planning to ride on mostly level roads, 40 or 50Nm might be sufficient for your needs and 60Nm is mid-range. If there are steep hills in prospect, look at 70Nm and upwards.

Speed

Many higher-end bikes come from European manufacturers, which may mean they arrive here with 25km/h speed limiters. You can pedal faster than that if you like, but the assist drops out at that speed. This is fine on the

serene cycle superhighways of Europe and it might be fine for you, but some people find riding in traffic easier if their bikes can do 35 to 40km/h. Extra speed, of course, means hazards come up more quickly and impacts are harder. Just because you can do 40km/h doesn't mean you have to do it all the time.

Batteries

Batteries tend to be either 36 or 48 volts – the higher voltage, the more power the bike has. The quoted range on a single charge is a tricky number – it depends on what assist level you've set and the terrain. It's more meaningful to look at watt-hours, which typically range from 250 to 500. In medium conditions, travelling a kilometre will use nine or 10 watt-hours, so that's your range calculation.

The drivetrain: gears, chains and belts

Most e-bikes use the classic derailleur gearing system – and that's where corners might be cut on cheaper models. The electrical components on a cheaper bike will account for between \$1500 and \$2000 of its cost. The difference between that and the retail price is what the rest of the bike costs – and you get what you pay for in drivetrain systems.

Some mid-drive bikes simplify the whole thing with a more limited range of gears set in the rear hub. A few come

with continuously variable transmissions (CVTs), which promise a smoother ride, but are an acquired taste. Those typically offer both manual and automatic gear modes.

High-end non-derailleur bikes sometimes dispense with a chain in favour of a belt. These systems tend to be clean, quiet and very reliable.

Other stuff

It's a mystery that so many bikes are sold for city use without mudguards. Unless you plan to never ride on a wet road, get mudguards.

If you see an e-bike with old-fashioned lever brakes, don't buy it. The additional power of e-bikes makes disc brakes (hydraulic, ideally) a safety essential.

How much will you want to carry? Shopping is one of the best things to do with an e-bike, so look for a solid carrying rack and budget for pannier bags. Panniers can be either permanently attached or removable, so think about what suits you.

An often-overlooked feature is integrated lighting. It's handy being able to turn on your lights from the handlebars and, because they run from the bike's own battery, if your bike is going, your lights will, too.

Finally, get a lock. Not a snaky little cable lock, but the big, solid chain kind.

negotiated a "special arrangement" with Auckland Council. That's important, he says, "because if we're wanting to hit those targets in the emissions reduction plan of reducing vehicle kilometres travelled by 20%, we have to really clear the way for these new choices in transport".

Meanwhile, Big Street Bikers has parked its original plan for e-bike subscriptions and ride-to-own schemes. "The biggest thing to be done for e-bikes is actually make them more equitable, so underserved communities are able to access the bikes and use them as a daily transport thing as opposed to just a leisure thing," says

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Cameron. "The big job to be done in terms of reducing emissions and switching short trips from cars to bikes is really finding a way to make it affordable for communities where people can't buy a \$10,000 Riese & Müller."

PRIMARY WHEELS

E-bikes and other new vehicles won't mean the end of cars in New Zealand.

"People are worried about whether it's realistic to replace a car with an e-bike and I don't really think that matters," says Wild. "In wealthy neighbourhoods with multiple cars per household, that's great if people can reduce the number of cars they have. But we want to replace trips – we don't need the bikes to replace cars."

Bruce has a ready metaphor for the micromobility shift. "Ultimately, what we're going to see is that these vehicles are going to get so good and so capable, and very cheap. People will say, 'I'm going to choose to use them as my primary form of transport,' in the same way that you might use a smartphone versus a laptop as your primary computing device. It doesn't mean you don't use your laptop. In the same way, we will still use our cars to go to the beach sometimes."

Bruce has urged Ministry of Transport officials to gather better data to get an idea of demand and what different groups of users need. The government, he says, has pointed out that supply is already unable to keep up with demand. "That ignores that the bikes aren't necessarily getting to the people who need them. The risk is that low-income families can't afford to buy appropriate bikes – just cheap and fuel-inefficient cars." ■

AS E-BIKES BECOME MORE popular, it's becoming harder to narrow down individual recommendations. *Consumer* has traditionally offered the most comprehensive range of reviews and recommendations. Although it hasn't published any new e-bike reviews for a year, it told the *Listener* it's weeks away from launching the results of an improved testing system. Its

site is still useful to get an idea of features to look for.

For now, of the 22 bikes still listed on *Consumer*, two models from the Nelson company Hybrid stand out as the best-rated under \$6000 (and also for their carbon-fibre frames). Hybrid's whole range is on pre-order until later this month.

New Zealand-designed bikes (no e-bikes are actually



Hybrid Black Tempo

manufactured here) are also worth a look under \$5000 and \$3000. Electrify, the former importer of the sturdy and popular Magnum range, now has its own Black range, which starts with a simple hub-drive bike at \$2500. Hikobike's range starts around the same price



Hikobike Scout

Electrify Smartmotion

and has an emphasis on bikes that can handle both commuting and weekend trail rides. Market pioneer Smartmotion is now owned by Electrify and the new 48-volt version of its Pacer commuter bike offers a lot for its \$3000 price.

Jeremy Rose, who reviews expensive e-bikes for *BusinessDesk*, says his mid-priced Avanti commuter bike provides great service and that will apply to most of the e-bikes from established international cycle brands.

The *Listener* also conducted an unscientific survey on Twitter, but everyone just cited their own bike and said it was awesome.