

Inquiry into e-mobility safety and use in Queensland

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Inquiry into e-mobility safety and use in Queensland Submission

Introduction

- [1] Thank you for the opportunity to provide my submission to the State Development, Infrastructure and Works Committee undertaking the *Inquiry into e-mobility safety and use in Queensland*.
- [2] My submission only relates to e-bikes. I have no experience nor hold views about e-scooters and e-skateboards or any other Personal Mobility Device.
- [3] My views as a community member address 5 of your 8 terms of reference:

Terms of reference

1. Benefits of e-mobility (including both Personal Mobility Devices (PMDs), such as e-scooters and e-skateboards, as well as e-bikes) for Queensland;	✓
2. Safety issues associated with e-mobility use, including increasing crashes, injuries, fatalities, and community concerns;	✗
3. Issues associated with e-mobility ownership, such as risk of fire, storage and disposal of lithium batteries used in emobility, and any consideration of mitigants or controls;	✗
4. Suitability of current regulatory frameworks for PMDs and e-bikes, informed by approaches in Australia and internationally;	✓
5. Effectiveness of current enforcement approaches and powers to address dangerous riding behaviours and the use of illegal devices;	✗
6. Gaps between Commonwealth and Queensland laws that allow illegal devices to be imported and used;	✓
7. Communication and education about device requirements, rules, and consequences for unsafe use; and	✓
8. Broad stakeholder perspectives, including from community members, road user groups, disability advocates, health and trauma experts, academia, the e-mobility industry, and all levels of government.	✓

1. Benefits of e-mobility such as e-bikes for Queensland

- [4] E-bikes produce obvious environmental community benefits and financial benefits for the owner. When balanced against the need to protect the safety of the community, the potential benefits are massive and unquestionable.
- [5] My view is that the Queensland government should adopt e-bike regulations that **maximise the benefits**. That is stating the obvious, but my view of the legislative changes that should be made probably differ remarkably from most.
- [6] To maximise benefits, power limits should be set at 750-watts. A maximum assisted speed of 45 km/h and 32 km/h throttle should apply. These settings are permitted in other jurisdictions and should be adopted here. Reasons are explained below.

4.0 Suitability of current regulatory frameworks for PMDs and e-bikes, informed by approaches in Australia and internationally

Maximum 25 km/h e-bike speed limit

- [7] I am an experienced e-bike rider and owner. I'm 62.
- [8] The current 25 km/h maximum speed set in Queensland and other Australian jurisdictions does not maximise benefits. Raising the speed limit will.
- [9] I have tried riding an e-bike at 32 km/h. That speed did not feel at all unsafe. The physical environment and riding conditions were such that an even higher speed would also feel safe. A safe speed depends on the surroundings and situation.
- [10] Many other jurisdictions limit speed to 32 km/h. I advocate a maximum 45 km/h limit, but that speed should not apply everywhere. Queensland permits motor vehicles to travel at speeds above 100 km/h – but only where appropriate. School and constructions zones mandate a far lower limit. The limits are strictly enforced.
- [11] E-bike speed limits should vary according to the surroundings. New South Wales has a maximum 25 km/h limit for e-bikes but also has some 15 km/h speed zones.
- [12] 45 km/h is about 28 mph. That is the limit in 'Category 3' e-bikes across the United States. The Category 3 classification allows the rider to use pedal assist until that speed. That is nearly double the current limit permitted here.
- [13] On a hill near my house, my e-bike hits 45 km/h when rolling downhill. The speed limit is 50 km/h on that road. I can lawfully and safely ride down the hill at 45 km/h. Why is it considered unsafe to ride back up the hill at exactly that same speed? This contradiction will result in a speeding fine if I break the laws of gravity.
- [14] American e-bike commuters can get to work more quickly than Australian e-bike commuters due to the more reasonable speed limit. A typical e-bike ride of 20 minutes for a workplace commuter might take the rider less than 15 if Category 3 limits were available here. A return trip in this example would save 10 minutes a day or more. That is about an extra hour of additional time over a 5-day work week.
- [15] Lawyers in the office I was working with until recently charge \$400 to \$700 per hour, billed in 6-minute units. An e-bike commuting lawyer could potentially generate an extra 2 units (\$80 to \$140) of economic activity every day.
- [16] Getting to work and home again more swiftly enables higher productivity.
- [17] The ability to get to commute more quickly will encourage some to give up their car.

Maximum 6 km/h throttle speed limit

- [18] My e-bike uses the popular '*cadence*' system to determine the amount of power the battery should apply to the motor and therefore regulate my speed. The faster I pedal, the faster my e-bike will move.
- [19] Other e-bikes use the '*torque sensing*' system. The more effort the rider applies when pedalling, the faster the e-bike will move.
- [20] A cadence system can make '*ghost pedalling*' possible. A low gear (one used when riding up a hill) can be selected. The rider can pedal with almost no effort. The effect is lawfully pedalling to maintain 25 km/h but use less effort than a pedestrian uses to walk. My understanding is that ghost pedalling complies with the law.
- [21] I have ridden an e-bike with ghost pedalling and felt it to be exactly as safe as a torque sensing system.
- [22] I have also experienced an e-bike with a 32 km/h throttle speed limit. I discovered that using a throttle is almost identical to ghost pedalling. There is no difference between gently rotating my legs to pedal and using my thumb to activate a throttle.
- [23] A rider who commutes to work and use ghost pedalling does not need to exert much or any effort. The clothes they wear to the office will not be dripping with sweat when they arrive.
- [24] For those that do manual work, they can arrive fresh at work and ready to exert themselves.
- [25] Our work colleagues commuting by car do not get sweaty clothes nor need to exert themselves physically before engaging in hands-on work tasks.
- [26] The US 'Class 2' categorisation provides for a maximum 20 mph (32 km/h) speed limit when using the throttle.
- [27] We too should adopt that speed limit for throttle use.
- [28] Having used both ghost pedalling and throttle at 'high-speed', it feels illogical that an e-bike can lawfully be configured for ghost pedalling, but the use of a throttle prohibited. E-bike riders should be allowed to throttle to their destination. They should be allowed to throttle at a reasonable speed.
- [29] Setting speed limits that are too low for the surroundings and physical environment is frustrating for riders. Restricting a throttle to 6 km/h makes little sense.
- [30] Liberalisation of restrictions will improve compliance by reducing rider frustration.

Maximum 250-watt motor power limit

- [31] The 250-watt power limit is too low and disadvantages some riders.
- [32] My front hub motor meets the street legal 250-watt maximum. When I ride on the bicycle path by Parkwood East Station approaching Uplands Drive, I cannot get to the top because the hill is too long and too steep.
- [33] New South Wales changed their maximum to 500-watts, in part, because of this reason. 250-watts is not enough power to climb steep hills.
- [34] 750-watts is the most appropriate power limit. My e-bike might get to the top of the hill with a 500-watt limit when unloaded. If I fill my rear and front cargo baskets with heavy grocery items my e-bike could gain 10 or more kilos. A 750-watt motor would have good prospects for reaching the top. A 250-watt limited motor will not.
- [35] 750-watts is the maximum power set federally in the United States. We can infer that they view that limit as not unsafe. Why should we interpret that same power limit as unsafe or too powerful for Queensland?
- [36] Higher power limits will encourage higher uptake. More businesses will use e-bikes and replace petrol powered vehicles. Heavy cargo e-bikes need a lot of power, but we don't allow that now. We can help minimise our environmental footprint if we adopt higher power limits because e-bikes will become more useful and practical.
- [37] Changing the maximum power level will help maximise the benefits of e-bike use. That should be the primary goal of legislative amendment.
- [38] Automobiles in Queensland do not have power restrictions. We allow extremely high-powered vehicles to be driven on our roads. Some cars have truly remarkable acceleration and unthinkable kilowatts of power and Newton-metres of torque.
- [39] If motor vehicles had a similar power limitation, it would mean something like the equivalent of a 1 litre, 3-cylinder motor found in a city-class car being the only motor permitted for cement trucks, delivery vans, fire engines, and sports cars.
- [40] We cannot have unlimited power. At some point, an electrically powered bicycle crosses a threshold and becomes a motorbike. Setting the boundary at 250-watts means a power limit far too low. Bicycles structurally can handle a 750-watt motor.
- [41] A power limit in sync with US standards will enable Australian consumers to buy the same electric motors and e-bikes designed for the massive US market. Basing our regulations on those standards will allow Australian consumers far more choice.

6. Gaps between Commonwealth and Queensland laws that allow illegal devices to be imported and used

Import and use of illegal devices

- [42] I understand that the maximum 500-watt motor permitted for use in New South Wales is contrary to the definition found in the Australian Design Rules.
- [43] That is a step in the right direction.
- [44] The precedent has been set. Queensland can (and should) also adopt a higher maximum motor power limit.
- [45] If other States and Territories also liberalise the maximum watt and maximum speed limits, the ADR rules could (and should) change accordingly. The ADR rules should change to match the United States federal laws for street legal use.
- [46] My front wheel hub motor has recently died. I have invested many hours considering replacement options. I can buy a street legal replacement or buy an off-road kit. Off-road kits are not power limited but can only be used on private land.
- [47] Those kits are not illegal. Legality depends upon location of use. The buyer is liable if an off-road kit is used on public roads, not the vendor. That is not problematic.
- [48] Other commentators (rightly) express concern about the highly powered off-road conversion kits installed on mountain bikes and fat-bikes and operated unsafely (predominately by young people).
- [49] The problem is behavioural, and the locations of dangerous misuse. It is less related or unrelated to the power output of a motor.
- [50] Vendors need to be able to continue to import high-powered e-bike motors and e-bike conversion kits. There are plenty of legitimate use-cases.
- [51] On farms and for those that live in regional Queensland on large blocks of land, high output motors will suit heavy e-bikes. E-bikes designed to carry tools or equipment, or to pull a trailer for example need more torque than a light commuter city e-bike.
- [52] If only the import of street legal motors and e-bikes is permitted, thousands of Queenslanders with a legitimate use-case on their land will become unable to buy what they need. The move to a low-carbon footprint will be hampered.
- [53] Motorists that speed or drive dangerously are heavily fined. Riders of e-bikes with motors exceeding 750 watts riding on public roads can also be fined or punished.

Gaps between Commonwealth and Queensland laws

- [54] The extant laws in Queensland encourage non-compliance. The statistics representing e-bike owners that have unlocked the speed limit and/or power to unlawful limits speak for themselves. I will explain two reasons.
- [55] While researching options for a replacement front motor hub, I also checked what motor kit would be best for my other bicycle (a brand-name mountain bike). A mid-drive motor set to 250-watts will comply with the current laws.
- [56] A Hong Kong based manufacturer produces three motors with high powered motors that will work exceptionally well with my mountain bike. The build quality and alignment capabilities are remarkably better than any competitor.
- [57] Their cheapest motor seems ideal. I can buy their motors from one of three or four authorised Australian re-sellers or directly from Hong Kong. Buyers can choose one of two versions. One version applies firmware to restrict power to 'street legal' 250-watts. The other version is 'off road' and has a nominal rating of 750-watts.
- [58] If I buy the firmware restricted version, that might comply in Queensland. The power restriction cannot be overcome through any sort of software configuration setting. If I buy the firmware restricted version, I will lose the ability to ride safely and lawfully at 500-watts as New South Wales laws permit.
- [59] If I buy their firmware unrestricted, off-road use 750-watt version, I can flick between 'street legal' and 'race' modes as circumstances demand on the display or app on my phone. 'Street legal' settings could comply with the current Queensland rules and 'race' settings matched to meet New South Wales laws.
- [60] The price is the same regardless of the option.
- [61] The logical purchase option is obvious. Only a fool would restrict their lawful enjoyment and use of their e-bike by complying with the illogical laws.
- [62] Laws based on archaic legislation drawn in the past were appropriate for the day and age. Current laws in Queensland were not drawn with unanticipated legislations changes in New South Wales (resulting in an incentive for Queenslanders to not comply with the rules) in mind.
- [63] The rules need changing to encourage compliance.
- [64] E-bike riders should have the right to ride on the street using software to meet compliance requirements. Riders should be able to switch on the fly when they reach their off-road use destination.

- [65] My understanding of current regulations is that the ability to switch modes from 250-watts to some other higher limit is not lawful. The motor must not be able to exceed the power limit, presumably because Queenslanders cannot be trusted to ride safely and in accordance with speed limits.
- [66] Firmware can enable compliance, but the outcome results in a disincentive to comply with the laws and a barrier to promoting high uptake rates of usage.
- [67] Replacing my broken front hub motor is a second example. The results are the inescapable conclusion that an unlawful, high-powered motor best suits my needs.
- [68] I have a belt drive e-bike. I converted it years ago to a front hub motor as that was the only option at the time.
- [69] A rear hub motor would be safer. I would be 'pushed' instead of 'pulled'. Steering and power delivery would be separated, similar to rear-wheel-drive performance cars. My e-bike has gears in the rear hub so replacement with an electronic motor would sacrifice the 11-speeds. A rear hub motor is not practicable.
- [70] Two mid-drive motors have now become available. Both are produced by the abovementioned Hong Kong-based manufacturer. They are similar to the cheapest model. They differ in part because no firmware is available to restrict the power.
- [71] Motor alignment with the belt and the rear sprocket is critical. The belt will spin off the bike or worse if alignment is not right. Chains with derailleurs are designed to move so alignment is important but not crucial. Those are the only two mid-drive motors in the world (so far as I can tell) readily available for sale that suit my e-bike.
- [72] I much prefer a mid-drive motor. A hub motor is like a car stuck in third gear. The vehicle can move faster or slower, but it is inefficient. A mid-drive motor amplifies rider effort by taking advantage of the gears. The torque sensing system results in a natural riding experience without the physical exertion needed for hill climbing and bringing home the grocery shopping. It is more efficient.
- [73] Both motors offer street legal mode by default. If I buy one of the motors, I could use a switch and limit speed and power through software configurations settings. I could always ride lawfully on Queensland roads.
- [74] The current laws do not permit me to operate lawfully because motor settings can be switched to high-powered off-road use, even I never used that off-road setting.
- [75] To comply with Queensland laws, it appears that I cannot buy a motor that best suits my needs. The incentive for me to ignore the rules should be obvious.

- [76] Tech support with both an Australian reseller and the manufacturer confirmed that their cheapest motor is incompatible with a belt drive. They are working on a solution. I was told that firmware for the other two motors is under development.
- [77] When the firmware restricting power is available, I can buy one and ride lawfully in Queensland.
- [78] I will feel frustration when I ride in New South Wales. I would be locked to 250-watts even on private land. The problem expressed about my mountain bike will apply equally to my belt drive e-bike.
- [79] E-bike riders sometimes invest considerable time and money into their e-bike or their e-bike conversion. Riders should be permitted to use their e-bike to maximum potential.
- [80] I would highly value the ability to select modes as appropriate for the road and physical environment. Using software to change settings to distinguish between public roads and private property makes sense. Locking the motor does not.
- [81] To maximise benefits, we need to encourage both compliance with laws and encourage higher uptake. Increasing the power output and speed limit maximums help achieve both of these aims.

7. Communication and education about device requirements, rules, and consequences for unsafe use

- [82] The Committee is to be informed by approaches in other jurisdictions. According to a British Columbia ('BC'), Canada governmental website¹, e-bikes ('*motor assisted cycles*') for riders aged 16 and above may ride up to 32 km/h and use up to a 500-watt motor.
- [83] Riders in BC aged 14 and 15 are limited to 25 km/h and a 250-watt motor.
- [84] Motor vehicles in Queensland are not power-limited. We do limit access to high powered vehicles for learner drivers.
- [85] We could adopt the approach in BC and by our own motor vehicle road rules by restricting power for younger riders.
- [86] Riders over 18 would be subject to the standard regulations and rules.

¹ <https://www2.gov.bc.ca/gov/content/transportation/driving-and-cycling/cycling/cycling-regulations-restrictions-rules/e-bikes>.

8. Broad stakeholder perspectives, including from community members, road user groups, disability advocates, health and trauma experts, academia, the e-mobility industry, and all levels of government.

- [87] The regulatory scheme used in the United States is complicated due to variance amongst State and municipal regulations.
- [88] According to advice from Gemini, an artificial intelligence too, Pennsylvania is an example of a jurisdiction that allows an e-bike to both throttle to the Category 2 limit of 20 mph (32 km/h) and use pedal assist the Category 3 limit of 28 mph (45 km/h). Other jurisdictions in the US require the e-bike to be one or the other.
- [89] We should implement legislation that enables Queensland residents to ride and throttle at these limits. Penalties should apply to speeding and dangerous riding.
- [90] Those settings are not dangerous because speed limits can be determined according to surroundings. Only dedicated paths could have the 45 km/h limit, for example. Highly congested areas require a much lower speed limit.
- [91] Changing the limit to 750 watts for public roads to match American levels is not dangerous and solves problems for the many cyclists requiring more power.
- [92] Increased numbers of e-bike riders could potentially lead to safer riding. Motorists would become accustomed to numerous riders and adapt driving habits accordingly. A high volume of e-bike riders would help justify the cost to the government to expand safe riding lanes or trails.
- [93] I empathise with other commenters negatively affected by misuse of high-powered e-bikes. I agree with their concern regarding safety of pedestrians and young riders. The imposition of penalties for misuse and the determination of speed zones must consider safety of the community.
- [94] Changing Queensland laws to 750-watts; 45 km/h speed; and 32 km/h throttle speed limits will help encourage compliance and increase adoption of e-bike use. That is a desirable outcome. We need to maximise benefits. Adopting these settings will do so.