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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
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HONOLULU, HAWAII 96813-5097

February 5, 2020
1:15 p.m.
State Capitol, Room 225

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S.B. 2104
RELATING TO TRANSPORTATION.

Senate Committee on Transportation

The Department of Transportation (DOT) **supports with amendments** S.B. 2104 which establishes driver licensing requirements for a new class of motorcycle.

The bill proposes amendments to 286-102(b)(3), HRS to allow a class 3 driver's license to be used to drive a motorcycle that is similar to an autocycle, except that it is electric, and it is steered with handlebars.

DOT suggests that this vehicle could be classified as an autocycle by amending the autocycle definition in 286-2, HRS as follows: " (2) Every motor vehicle that has a steering wheel or handlebar and seating that does not require the operator to straddle or sit astride on it, and is designed to travel on three wheels in contact with the ground, called an autocycle which is certified by the manufacturer to comply with all applicable Federal Motor Vehicle Safety Standards (FMVSS) as of the date of manufacture." This definition will accommodate both electric and gasoline powered vehicles.

Removing the description of the vehicle from 286-102 (b)(3), HRS will make it easier to read.

Regarding the characteristics of the vehicle, subparagraph (C) requires seat belts to be installed, and (D) requires seat belt assemblies to comply with federal standards. However, it should be noted that the FMVSS for motorcycles do not include occupant protection. Requiring belts to be installed and presumably used may help to keep occupants in the vehicle when active forces are trying to push them out, but unless the vehicle is crash tested, the value of the seat belts in a crash is unknown.

Also, in (D) is a requirement for the vehicle to comply with the FMVSS No. 216, Roof Crush Resistance, which is not a motorcycle standard. Placing this requirement in the definition will make it overly restrictive and possibly exclude similar vehicles without the standard installed.

We believe subparagraph (E) may be overly restrictive. If this requirement is included, another amendment to the statute will be required if another manufacturer wants to register a similar vehicle that is driven by the rear wheel or has a front track width of 47 inches.

Subparagraph (F) has the advantage having the brake application process the same as a car. This makes for an easy transition from driving a car to driving this vehicle. However, it could prevent the registration of similar vehicles with hand lever brake applications with equal effectiveness.

In subparagraph (H) the requirement of a charging system being available within one-half mile of the business storage location is not understood, assuming there will be a charging system at the storage location,

Thank you for the opportunity to provide testimony.

Senator Lorraine R. Inouye, Chair

Senator Breene Harimoto, Vice Chair

Committee On Transportation

Dean N. Shimabukuro

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Wednesday, Feb. 5, 2020

I am in favor of the passage of SB 2104

As a former long-time employee in the automobile sales industry in Hawaii I have seen a wide variety of vehicles distributed to our local population over the years. Most recently, as the manager of a retail carwash operation that is owned by a local auto dealership group in Central Oahu I have seen a trend by that populace towards owning large-size SUV's and pick-up trucks.

In addition to the fuel consumption issues that these types of vehicles present I wish to point out that the Gross Vehicle Weight of each of these vehicles is certainly greater than the 1300 pounds of a vehicle that is currently being proposed for introduction into the State of Hawaii. I believe this is significant in light of the amount of funding that is being directed by the Department of Transportation to roadway maintenance that may be exacerbated by the additional weight of these vehicles on our roadways.

Because of this, I believe that passage of his bill will be a significant step towards relieving part of this budgetary issue. I urge this committee to pass SB2104. Thank you for the opportunity to testify.

2020 Legislative Session
Testimony of Brent Gale
In SUPPORT of SB 2104
February 2020

Testimony of Brent Gale
In Support of SB 2104

Honorable Chair and Members of the Committee:

Introduction - My name is Brent Gale, and I live at 307 Pualoa Nani Place, Wailea. I strongly SUPPORT this bill as a critical step toward reducing CO2 emissions in the transportation sector in our State. I am a principal and senior energy consultant for StrataG Consulting, Inc., a Hawai'i corporation providing energy and human resources consulting services. I have 44 years of experience in the energy industry and have previously submitted testimony before the Hawai'i Public Utilities Commission and elsewhere. I have a juris doctorate and am licensed to practice law elsewhere but not in Hawai'i. I have not been retained by anyone to lobby this bill and am not being compensated for this testimony.[1]

Need for bill and purpose – Our State has identified reducing CO2 emissions as a critical strategic, environmental and public safety goal. Achieving meaningful CO2 reductions in the transportation sector will be very challenging,[2] and it is critical to take reasonable steps now.[3]

[1] Disclosure: My wife and I have a modest 400 share investment in Arcimoto, an Oregon company that manufactures and sells three-wheeled electric vehicles. We are also in the queue to purchase one of Arcimoto's electric vehicles which are scheduled to become available here in 2020. The Arcimoto electric vehicle seats two people, meets applicable federal standards plus federal standards for seat belt assemblies and roof crush resistance, has a range of over 100 miles per charge, has a top speed of 75 mph, and has a miles per gallon equivalent of over 173.

[2] Achieving CO2 reductions in the transportation sector will be much more difficult than in the electric generation sector. In the electric generation sector, the CO2 emitting resources are almost exclusively owned by a few highly regulated and well financed companies, cooperatives or government entities. In contrast, CO2 emitting vehicles are owned by millions of individuals. The most polluting of the vehicles are owned by those who can't afford to, or

Passage of this bill is one very important step that we can take immediately, with minimal to zero impact on the State treasury.

The purpose of this bill is simply to recognize emerging electric vehicle technology and add a narrow new category of vehicle which can be operated by drivers with a type 3 Hawai'i driver's license or the equivalent from another state or country. The category added is electric-powered, three-wheeled vehicles with handlebars that comply with the safety and public interest requirements specified in the bill. Currently under HRS sections 286-2 and 286-102, three-wheeled electric vehicles with handlebars can only be operated on public highways by drivers possessing a motorcycle driver's license or three-wheel endorsement, which severely limits the sales and rental market potential of the electric vehicles.

If licensing impediments are removed, I anticipate that three-wheeled electric vehicles will be very attractive to our State and actively rented or purchased as an alternative to fossil-fuel-powered, CO2-emitting mopeds, as well as CO2-emitting motor scooters, motorcycles, and even cars. By my calculations, every moped with a two-cycle engine emits 2.2 pounds of CO2 for every 10 miles driven. And thousands of mopeds are driven in our State every day, many of them by tourists. It is not reasonable to expect tourists will be willing or able to forfeit their state's driver's license in order to secure a Hawai'i motorcycle driver's license or a three-wheel endorsement as our statutes currently require. Instead, they will continue to rent combustion-engine-powered mopeds and continue to emit CO2.

It is critical to provide consumers with a non-CO2-emitting option to mopeds, motor scooters, motorcycles and cars, and this bill would help do that. In addition to having no CO2

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choose not to, maintain their vehicles. It is not realistic to assume these individuals will or can spend $30,000 or more to replace their polluting vehicles with electric-powered 4-wheeled sedans and SUVs, regardless of tax credits.

[3] "The transportation sector accounts for a significant portion of US greenhouse gas emissions, roughly 28 percent in 2016. Further, emissions from transportation grew 21 percent between 1990 and 2016, whereas emissions from the electric sector declined 1 percent over the same period. In fact, today's power sector emits the same amount of carbon dioxide as it did a generation ago, although it produces nearly 30 percent more electricity annually. These trends indicate the value of electrifying transportation as part of an overall decarbonization policy." Farnsworth, D., Shipley, J., Sliger, J. and Lazar, J. (2019, January). *Beneficial electrification of transportation.* Montpelier, VT: Regulatory Assistance Project, at 10.

emissions, three-wheeled electric vehicles can reduce traffic congestion, parking congestion, and imported gasoline and oil usage. This bill can also be expected to have a positive impact upon the penetration of publicly available electric vehicle charging stations in our State, and it will do so without the need for incremental state funds, complementing the program administered by Hawai'i Energy and the efforts of the Public Utilities Commission and regulated utilities.

What the bill does NOT do – In contrast to SB 408 from the 2019 Session, this bill does not change, add to or subtract from the current definition of "autocycle" in HRS Section 286-2. If a vehicle was an autocycle before this bill, it will still be one after the bill passes. If the vehicle was not an autocycle before, it still won't be one after the bill passes. This should address one of Hawai'i DOT's principal concerns from last session.

This bill does not change, add to or subtract from the current definition of "electric vehicle" in HRS 291-71. While it would be desirable that owners of three-wheeled electric vehicles qualify for the same statutory benefits as owners of four-wheeled EVs, this bill does not pursue that change at this time, and thus creates no negative impact on the state budget.

This bill does not require the state or DOT to incur incremental costs to train DMV driver's license examiners. First, there are already three-wheeled, combustion-engine vehicles in the State whose operators must be licensed, and examiners are already trained for those. Second, this bill doesn't require new or separate DMV examinations; it simply adds a category of electric vehicle that can be operated with a current type 3 license.

This bill does not require the State to incur incremental costs to train drivers. Instead, this bill requires any business regularly engaged in renting three-wheeled electric vehicles with handlebars to drivers with valid type 3 licenses, or the equivalent from another state or country, to provide instructional training regarding starting and stopping the vehicle, as well as braking, throttle and steering controls. See Bill provision 3(H).

This bill does not require a DMV driver's license examiner to unwillingly ride in a three-wheeled electric vehicle for purposes of skills testing a driver. Nothing in the bill prevents

DOT from requiring by rule that the driving skills test for new or renewed type 3 driver's licenses be performed by the driver in a four-wheeled vehicle or on a closed course as currently is done for two and three-wheeled vehicles. If the Legislature wishes to include specific authorization to DOT in this regard, I certainly have no objection.

Source and purpose of proposed restrictions in the bill – Following the end of the 2019 session, I and others supporting this bill met with Hawai'i DOT to identify and address its concerns with SB 408 from last session. We met in person at DOT's offices twice and exchanged many emails and proposals. As I previously noted, in response to one of DOT's expressed concerns regarding last session's SB 408, this bill takes a completely different approach than SB 408 and does not change or add to the autocycle definition in HRS 286-2. Thus, DOT's concern with SB 408 from last session about changing the definition of autocycle in HRS 286-2 and the outdated 2013 AAMVA report referenced by DOT to support its objection to last session's SB 408 should not be obstacles to passage of this bill.[4]

In addition, in these discussions with DOT other concerns were identified by DOT and the bill supporters. These concerns are addressed in Section 1 of the bill, at proposed HRS 286-102 (3) and proposed HRS 286-102 (3) (A) through (H) as follows:

- Current HRS 286-71 establishes safety standards for autocycles as defined in HRS 286-2. HRS 286-71 does not apply to three-wheeled electric vehicles with handlebars. Proposed HRS-102 (3) in this bill would extend the safety standards of HRS 286-71 to three-wheeled electric vehicles with handlebars when operated by a driver with a type 3 license or equivalent. This is a reasonable safety provision.
- Current HRS section 291-71 (b) defines an "electric vehicle" as a vehicle with four wheels. Rather than amend section 291-71 to include three-wheeled electric vehicles in that definition, the operative language from HRS 291-71 defining an electric vehicle has been included in proposed HRS 286-102 (3) (A) in this bill.
- Proposed HRS 286-102 (3) (B) in this bill requires a seat that the driver sits in, rather than straddle or sits astride on, for electric three-wheeled vehicles with handlebars when operated by a driver with a type 3 license or equivalent. This is a reasonable safety restriction drawn from the current requirements for autocycles in HRS section 286-2.

[4] I am not representing that DOT supports this bill. I have requested DOT support this bill but do not know DOT's position.

- Proposed HRS 286-102 (3) (C) in this bill requires seat belts for electric three-wheeled vehicles with handlebars when operated by a driver with a type 3 license or equivalent. This is a reasonable safety restriction. This bill does not require seat belts for other types of motorcycles, motor scooters or mopeds, so it should not impact those types of vehicles.
- To be licensed and operate in our state, all vehicles must be certified by the manufacturer as complying with all applicable Federal Motor Vehicle Safety Standards (FMVSS). As an incremental safety restriction, proposed HRS 286-102 (3) (D) in this bill requires that if an electric three-wheeled vehicle with handlebars will be operated by a driver with a type 3 license, that vehicle must also be certified as complying with the FMVSS 216 (a) standard for roof crush resistance and the FMVSS 209 standard for seat belt assemblies. Other autocycles, two and three-wheeled motorcycles, motor scooters and mopeds are currently not required to comply with these two FMVSS, and this bill should not impact those types of vehicles.
- Proposed HRS 286-102 (3) (E) in this bill requires electric three-wheeled vehicles with handlebars operated by drivers with a type 3 license to have two front wheels with minimum spacing between the wheels and with motors for each wheel. This requirement increases stability of the vehicle, makes the vehicle operate more like a front-wheel drive car rather than a motorcycle, and is a reasonable safety restriction.
- Proposed HRS 286-102 (3) (F) in this bill requires electric three-wheeled vehicles with handlebars operated by drivers with a type 3 license to have a foot-operated brake. This is a reasonable safety restriction that recognizes drivers with a type 3 license may not initially be experienced in using hand-operated brakes and makes the vehicle operate more like a car than a motorcycle..
- Proposed HRS 286-102 (3) (G) in this bill requires electric three-wheeled vehicles with handlebars operated by drivers with a type 3 license to have a transmission that does not require shifting by the driver. This is a reasonable safety restriction which recognizes that not all drivers are experienced in manually shifting a transmission.
- Recognizing that drivers with a type 3 license renting electric three-wheeled vehicles with handlebars may not be experienced in driving vehicles with handlebars and handlebar type controls, proposed HRS 286-102 (3) (H) in this bill requires businesses regularly engaged in renting this category of vehicle to drivers with a type 3 license or equivalent to offer renters/drivers instructional training regarding braking, throttle and steering operation, as well as starting and stopping the vehicle. This is a reasonable safety restriction. The bill allows the driver to accept or decline the training. The bill does not require the business to document each driver's choice to accept or decline training, although documentation may be expected as a good business practice.
- Proposed HRS 286-102 (3) (H) in this bill also requires that if a business is regularly engaged in renting three-wheeled electric vehicles with handlebars to drivers with a type 3 license or equivalent, then there must be an electric charging system as defined in HRS section 291-71 publicly available within one-half mile of the business's storage location for the vehicles. This is a very beneficial public interest requirement which should serve rental customers and the general public well, and further the penetration

of electric vehicles and electric vehicle charging systems in the state. This proposed requirement should complement the electric vehicle charging system program administered by Hawai'i Energy and the efforts of the Public Utilities Commission and the electric utilities. The requirement is appropriately directed to the storage location of the business rather than the retail location because the two locations may be remote from each other (as is typical in car rental businesses), and vehicle charging will most likely occur at the storage location. The bill appropriately does not require the rental business to provide a publicly available charging system if one is already available within one-half mile of the business's vehicle storage location. One-half mile is a reasonable distance, balancing customer convenience with potential land use restrictions and conflicts.

Section 2 of the bill amending HRS Section 286-81(3) expands the limited exemption to the requirement that persons under the age of eighteen wear a helmet. Currently, section 286-81 exempts from the helmet requirement those motorcycles and motor scooters that have three wheels, are powered by an electric motor, have a seat belt or restraint system for driver and passenger, and have a fully enclosed cab. This proposed amendment would expand the exemption to include vehicles meeting all the specified criteria but having only a partially enclosed cab. This proposed amendment is reasonable recognizing the requirement for seat belts.

Reasons a motorcycle license or 3-wheel endorsement are not required for public safety –

The standard state DMV driving skills exam for two and three wheeled motorcycles tests for principally three concerns: Can the driver (1) counter-steer at speed; (2) coordinate hand and foot movements to safely brake; and (3) avoid stalling. None of these concerns apply to three-wheeled electric vehicles: (1) A driver does not/cannot counter-steer a three-wheeled vehicle, a fact acknowledged by the DMV manual; (2) this bill requires the electric vehicle have a foot brake just like a car so hand/foot coordination is unnecessary for braking all wheels; and (3) an electric vehicle doesn't stall. Thus, the principal concerns which are the focus of the motorcycle and the three-wheel endorsement skills exam don't apply, and a motorcycle license or three-wheel endorsement should not be necessary.

In addition, because these electric vehicles are front wheel drive with a minimum front track width of four feet, they handle more like a front-wheel drive car than a motorcycle. Because they are electric, there is also no need for clutching or shifting. And, because these electric vehicles have the throttle on the handlebars, the driver cannot accelerate unless his/her hands are where they should be – on the steering mechanism. Thus, there are no valid reasons for requiring a motorcycle driver's license or a three-wheel endorsement for three-wheeled electric vehicles with handlebars, as the current law requires.

The handlebar issue – The requirement in current HRS 286-2 that an autocycle have a steering wheel, not handlebars, and the DOT's objection last session to SB 408's proposed change in the definition of autocycle in HRS 286-2 were founded upon a 2013 report by the American Association of Motor Vehicle Administrators (AAMVA) regarding best practices for regulation of three-wheel vehicles. While SB 2104 makes no changes to current HRS 286-2 or the definition of autocycle and thus avoids DOT's objections to last session's SB 408, I would still like to offer a few observations regarding handlebars and the 2013 AAMVA report. First, the 2013 report is extremely outdated with respect to electric vehicle technology, relying upon 2012 and prior technology and data. To put that outdated technology in perspective, Tesla had only sold 2,200 electric vehicles as of the end of 2012. Second, the 2013 AAMVA report is a compendium of three-wheel vehicle activity up to that date and contains only recommendations regarding best practices for each state to <u>consider</u> regarding three-wheeled vehicles. The 2013 report does <u>not</u> contain <u>mandates</u>. Third, the 2013 report recognizes that technology will evolve; state requirements and policies will need to also evolve. Fourth, and most importantly, the 2013 report at page 5 finds that the mass distribution of the vehicle is the crucial criterium. The report states that the mass of what it considers a three-wheel motorcycle is beneath the operator and has a direct connection to the way a vehicle handles. In contrast, the report finds that (1) the mass of an autocycle is spread out either above or at the same height as the operator and (2) the operator is within the vehicle and does not have to worry about their location in the vehicle or positioning themselves when cornering or stopping. The

three-wheeled electric vehicles which are the subject of this bill satisfy the 2013 report's mass distribution criteria for autocycles: (1) mass is spread over the electric vehicle with 70 percent of it being in front of and at the height of the operator, and (2) the driver does not have to worry about location or positioning when cornering or stopping. In fact, the operator of a three-wheeled electric vehicle which is the subject of this bill will be in a seat (not straddling or astride one) with a seat belt and unable to move sufficiently to negatively impact cornering or stopping.

Despite concluding that mass distribution was the crucial criterium, the 2013 AAMVA report suggested that if a three-wheel vehicle had handlebars, it should be treated as a three-wheel motorcycle. The report offers no support for its handlebar suggestion, and there is no rational basis for it. Moreover, the report's suggestion is incompatible with developing electric vehicle technology. Range anxiety – how far the vehicle can travel before refueling/recharging – is one of the biggest concerns of electric vehicle drivers and one of the most significant impediments to increased electric vehicle penetration. By converting from the steering wheel used in previous pre-market versions of its vehicle to handlebars in the version being marketed currently, Arcimoto (the U.S. manufacturer of three-wheeled vehicles mentioned in footnote 1) was able to reduce the weight of its vehicle from 1,900 pounds to 1,300 pounds, a 600 pound weight reduction that increased range without negatively impacting safety or performance. Reducing vehicle weight without negatively impacting safety and performance is critical to the electric vehicle industry supplanting CO2 emitting vehicles and is a critical technological evolution the State should recognize by passing this bill.

I acknowledge the State has legitimate safety concerns that operators of all motor vehicles must possess the knowledge and skills to safely operate the vehicles they are driving. These concerns include handling/stability, turning, braking, shifting and seat belts. The focus of these concerns and the associated licensing law should not be on whether the particular vehicle has a steering mechanism that is circular (i.e., a wheel) or a bar (i.e., handlebars). Instead, the focus should be that two-wheeled vehicles (including manual and motorized bicycles), as compared to three-wheeled vehicles, are less stable, handle differently, require skill and

balance when turning, require experience with hand-braking, require experience with manual shifting, and lack safety belts. Consequently, a different set of licensing requirements for two-wheeled vehicles is both defensible and necessary. But, a three-wheeled electric vehicle with two widely-spaced driving wheels in front of the vehicle poses none of the unique concerns associated with the operation of two-wheeled vehicles. Stability, handling, turning, and braking of a three-wheeled electric vehicle with two widely-spaced driving wheels in the front are more comparable to a four-wheeled, front-wheel-drive car than a motorcycle, notwithstanding the existence of handlebars.

Handlebars should not have any significant adverse impact upon vehicle safety; in fact, I find them more intuitive and responsive than a steering wheel. The existence of handlebars should not be the determining factor for whether a motorcycle type 2 license or a general type 3 license is required to operate a vehicle; the number of tires on the ground, the existence of seat belts, the front track width, and the mass distribution of the vehicle are much more relevant factors.

Summation - I truly believe three-wheeled electric vehicles are the nearly perfect vehicle for our islands. Electric vehicles on average can convert 60 percent of electric energy into miles traveled, while internal combustion engines on average can convert only 20 percent of their energy source into miles traveled.[5] Safe, quiet, non-CO2-emitting and compact, these three-wheeled electric vehicles can help us make further progress toward our CO2 reduction goals while at the same time addressing part of our ever-increasing traffic congestion and parking problems if our State allows them to be operated by drivers with type 3 driver's licenses or equivalent. Passage of this bill is critical to this progress. Thank you for the opportunity to offer this written testimony. If it would be beneficial, I would be pleased to appear in person before the Committee to discuss this bill.

[5] Source: Farnsworth, D., Shipley, J., Sliger, J. and Lazar, J. (2019, January). *Beneficial electrification of transportation.* Montpelier, VT: Regulatory Assistance Project, at 8.

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