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Sierra Club California Comments on AB 2127 Report

Additional submitted attachment is included below.

February 26, 2021

Hannon Rasool, Deputy Director Fuels and Transportation Division
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Docket No. 19-AB-2127

Submitted electronically via rulemaking docket
[https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=19-AB-2127]

RE: AB 2127 Electric Vehicle Charging Infrastructure Assessment

Dear Mr. Rasool:

We appreciate the opportunity to provide these comments on the DRAFT AB 2127 Electric Vehicle Charging Infrastructure Assessment report and as presented at the two workshops on this subject on February 4th and 5th, 2021.

We would first like to congratulate the California Energy Commission (CEC) team and all its collaborators on this comprehensive and excellent ground-breaking report. That you all were able to develop new analytical tools, utilize and integrate them so quickly and well is very impressive. We offer the following recommendations to help you perfect an already valuable draft report.

I. <u>EV demand assumption for this report should be consistent with the most recent policy directives and analytical information available to meet the state's current goals.</u>

The report describes several demand targets that have been considered including:

- 5 million electric vehicles (EVs) on the road by 2030 from Governor Brown's executive order (EO) and as referenced in AB 2127.
- 3.3 million EVs as the mid-case scenario from the CEC's 2020 Integrated Energy Policy Report (IEPR) Electric Vehicle EV demand forecast.
- 8 million EVs from CARB's draft Mobile Source Strategy (MSS) report created as a conceptual scenario that would enable the state being positioned to meet Governor Newsom's Executive Order (EO) N-79-20 calling for 100% sales of zero-emission vehicles (ZEVs) by 2030.

Referencing all these different assumptions is confusing to stakeholders and undermines attention to the goals required by Governor Newsom's EO.

We strongly recommend that the CEC use only the Mobile Sources Strategy (MSS) vehicle demand assumptions and cease referencing other demand assumptions. The MSS report assumes that there need to be 8 million EVs on the road by 2030 and 2.9 million for 2025 in order to position the state to support Governor Newsom's Executive Order (EO) N-79-20 requirement of having 100% of car sales by ZEVs by 2035. This assumption should be used both in the EVI-Pro II and EVI-RoadTrip modeling tools. We recommend that all references in the AB 2127 report to the number of chargers and related charts should be revised in the final draft to reflect this singular focus on the MSS goal of 8 million vehicles in 2030.

This report references the electric vehicle service equipment (EVSE) goal of 250,000 chargers including 10,000 direct current fast chargers (DCFCs) as the goal that needs to be reached by 2025. But this goal was part of Governor Brown's EO intended to support a goal of 1.5 million EVs on the road by 2025. Since then, Governor Newsom's EO supersedes that target and his EO states, "The Energy Commission, in consultation with the State Air Resources Board and the Public Utilities Commission, shall update the biennial statewide assessment of zero-emission vehicle infrastructure required by Assembly Bill 2127 to support the levels of electric vehicle adoption required by this Order."

We strongly recommend that the CEC use CARB's MSS projected 2.9 million EVs as the only assumption for 2025 and that it use its newly updated analytical tools, to calculate the quantity of EVSE needed.

We view the above two recommendations as the most important changes that should be made in the draft AB2127 report to ensure that CEC plans for sufficient EVSE to meet the EV demand expected to be necessary to comply with the Governor's EO.

CARBs forecast for 8 million ZEVs by 2030 is a conceptual scenario but it is entirely feasible and likely so long as there is sufficient EVSE to support it. The single largest obstacle to increased adoption has been the higher upfront cost of EVs compared to internal combustion engine (ICE) vehicles. However, that cost obstacle to EV adoption is quickly fading. Within only two to four years ZEVS are expected to reach cost parity with ICE vehicles. Once that milestone is reached and with the continued decline in battery and manufacturing costs, both the upfront cost and operating costs for an EV will increasingly be less expensive than for comparable ICE vehicles. This will become a key and compelling driver of dramatic increases in adoption. (See Appendix A to this letter for detailed information on EV costs.)

II. Refine the assumptions used in the EVI- Pro in "Appendix B - EVI-Pro 2 Inputs and Parameters"

Many of the assumptions for both battery size and range are significantly too small for several of the vehicle types and are not representative of the specifications we're actually seeing for currently available and recently announced vehicles. This is true for small cars, large SUVs and pickup trucks.

For example, in “Table B-2 - Electric Range for BEVs (battery electric vehicles) by Vehicle Classification and Simulation Year” the range assumptions shown for “pickup trucks is 169 miles in 2021 and increasing to 177 by 2030. A recent Electrek article ranks most available or announced electric vehicles by range and is shown in Appendix B of this letter.[1] We have made some additions to the bottom of this list. As you can see in this list for announced pickup trucks, the ranges start at 250 miles and go to 500 miles. As another example, large SUV ranges are shown in Appendix B as 142 miles in 2020 to 154 by 2030. Yet, the announced ranges for GMs Hummer are 250, 300 or 350 miles and for the Rivian R1S are 250 and 300 miles.

For small cars, there is no technological reason why they also cannot have ranges of 200 + miles. As they start making cars in this style, original equipment makers (OEMs) may well make shorter range vehicles like the Mini Cooper Electric with its 110-mile range to keep costs down and to be used mostly as an urban car but may also make longer range vehicles. The Chevy Bolt at 259 miles and VW ID 4 at 250 miles of range may both be considered small cars depending on how you define this.

We recommend that the CEC examine the range and battery sizes of currently available and announced vehicles and increase their assumptions for these in Appendix B to be more realistic in, at minimum, the large SUV, pickup and small cars vehicle categories.

We recommend that the assumption for the 70%/30% spit for BEVs/PHEVs (plug-in hybrid electric vehicles) by 2030 be changed to 80%/20%. Bloomberg New Energy Finance’s (BNEF’s) 2020 EV outlook[2] shows the split globally has already rapidly changed from about 50%/50% in 2015 to about 25% PHEVs and 75% BEVs in 2019. BNEF forecasts that in the US, the ratio by 2040 will be about 87%/13%. So an intermediate split between these two is about 80%/20%.

III. Reconsider Charging Assumptions for Ride-Hailing EV Deployment

Currently the CEC assumes that there will not be any overnight charging for Transportation Network Company (TNC) vehicles. A common current business practice for TNCs for many drivers is that they own / lease their own cars, use them both personally and professionally and fill up their tanks as needed for both purposes. If this practice carried forward for EVs and their owners charged them at night, it could materially reduce the need for public chargers. **We recommend that the CEC contact TNCs on current and expected future business practices for EVs and adjust the assumption on how much charging for these vehicles will be done overnight vs none in the current assumption.**

On page 2 of the executive summary, it states, “In some cases, Level 1 chargers may be sufficient at select public destinations primarily serving transportation network company vehicles and at select multi-unit dwellings.” **We believe that it is unlikely that Level I charging will**

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[1] https://electrek.co/2021/02/03/longest-range-evs-2021/
[2] https://efiling.energy.ca.gov/GetDocument.aspx?tn=233410&DocumentContentId=65926

play any material role in charging EVs for TNC purposes and recommend that the phrase "primarily serving transportation network company vehicles and…" be deleted.

IV. Update the Market Analysis Underlying the Hevi-Load Tool

A foundational data set the CEC used in its HEVI-LOAD tool was CARB's "190225 ACT (Advanced Clean Trucks**)** Market Analysis" – a truck electrification viability analysis tool. This tool was last updated in February 2019. In the last two years, battery technology has improved, dramatically lowering costs and increasing vehicle ranges. In addition, many new vehicles have been introduced. **We recommend that the CEC request CARB to update its "190225 ACT Market Analysis" tool and use the new dataset to re-run its scenarios which could result in a need for fewer charging stations.**

V. Make the Results of Quantitative Modeling Available at the Local Level

In the report, staff have indicated that they will continue improving the sophistication of their modeling tools and will produce detailed reports for most within 3-6 months When this process is completed, **we recommend that the CEC work to package these results together in an integrated way and at a granular level so they can be distributed to key stakeholders such as local jurisdictions, utilities, electric vehicle service providers (EVSPs), the California Public Utility Commission (CPUC) and others so that they can begin using this information to begin EVSE planning in their local areas.**

VI. Finalize and Implement Connector and Communication Standards

We fully support CEC's desire to set hardware connection and software communications protocol standards to promote universal interoperability. **We recommend that the CEC either directly or with a sister agency such as CARB require that all new electric vehicles sold in the state must utilize the combined charging system (CCS) connector as the single standard (which may be accomplished with an adapter for Tesla), that the Open Charge Point Protocol (OCPP) be required for all new EVSE equipment for communication between the charger and network management systems and that the ISO 15118 become the required standard for all new light duty (LD) vehicles and chargers as the communication protocol between the vehicle and the EVSE**.

VII. EVSE Implementation Performance Assessment

We commend the CEC for creating the new web page, "Zero Emission Vehicle and Infrastructure Statistics". This is a good beginning but now the critical next step needs to include time-based targets of what we need based on the Modeled Charging Needs analysis and to show the gaps between needs and actuals in a variance report just like a financial budget variance report. For example, new targets should be set at least every two years for stats initially at the state level for DCFCs, Level 2 chargers, chargers for multi-unit dwellings (MUDs) (critically important to track), for urban areas, rural areas, for highways used for road trips, DACs, etc. A third phase of this type of reporting could be done down to the local level, however that would best be defined – such as at the county, city, electrical infrastructure zone ("TAZ") and/or zip code level. These reports will be helpful to track whether actual progress is keeping up with needs. **We recommend that the CEC create new time-based granular variance reports comparing needed vs actual chargers for a number of key criteria (e.g. in total, for MUDs, DCFCs, etc.) at least every other year and post these to the Zero Emission Vehicles and Infrastructure Statistics web page.**

Summary

The availability of sufficient charging infrastructure is an important limiting factor for the rapid adoption of EVs. The CEC's report defines what is needed to meet California's EVSE needs. It will inform agencies and stakeholders involved in providing infrastructure. It will drive the investment, design and implementation of the charging infrastructure needed to support California's critical transformation of the state's transportation section to zero-emission vehicles.

The CEC has done an excellent job in this draft of the first AB 2127 report and has set in motion next steps to continue improving future analysis. The single most important assumption that the CEC must correct is to set the light-duty vehicle demand assumption to CARB's Mobile Source Strategy assumption of 8 million vehicles by 2030 and abandon analysis around other now dated and superseded goals to avoid stakeholder confusion and show full commitment to positioning the state to accomplish Governor Newsom's executive order N-79-20.

Sincerely,

Ray Pingle
Lead Volunteer on Vehicle Electrification Policy

Daniel Barad
Policy Advocate

Cc:
Commissioner Patty Monahan, Lead Commissioner for
Clean Transportation and
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Primary Authors
Noel Crisostomo
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Appendix A - Why 8 million EVs by 2030 is Feasible – EV Costs

EVs have a lower Total Cost of Ownership (TCO) <u>today</u> compared with ICE vehicles. - According to Consumer Reports, the Total Cost of Ownership (TCO) for many current models of electric vehicles today is positive compared to similar ICE vehicles. Consumers can save $6,000 to $10,000 over five years in total costs from EVs compared to ICE vehicles Their report shows that maintenance costs for EVs are only 50% of those for ICE vehicles while fuel costs are 60% less.[3] They conclude that "Overall, these results show that the latest generation of mainstream EVs typically cost less to own than similar gas-powered vehicles, a new development in the automotive marketplace with serious potential consumer benefits." And this does not include the benefit of the new California Clean Fuel Reward incentive of $1,500/vehicle at the time of EV purchase.

EVs will reach up-front cost parity with ICE vehicles within the next 2-4 years
Upfront cost parity with ICE vehicles is expected to occur within the next 2-4 years according to many experts including Bloomberg New energy Finance (BNEF) and several OEMs.

> **Battery cost reductions** – The cost of batteries is the biggest contributor to the current higher up-front cost of EVs but this cost is dropping rapidly.
>
> > **BNEF** - "Lithium-ion battery pack prices, which were above $1,100 per kilowatt-hour in 2010, have fallen 89% in real terms to $137/kWh in 2020. By 2023, average prices will be close to $100/kWh …" "It is at around this price point [$100 / kWh] that automakers should be able to produce and sell mass market EVs at the same price (and with the same margin) as comparable internal combustion vehicles in some markets." Further, costs are forecast to drop to $58 / kWh by 2030. BNEF notes that battery costs declined 13% from 2018 to 2019 and declined an additional 13% from 2019 to 2020.[4]
> >
> > **GM**: At a major announcement on March 4, 2020, GM noted "Continuous Improvement in Battery Costs: GM's joint venture with LG Chem will drive battery cell costs below $100/kWh and ongoing technological and manufacturing breakthroughs will drive costs even lower."
> >
> > **VW**: VW has awarded $48 billion worth of electric vehicle battery contracts to support its plan to produce over 1 million electric vehicles per year by 2025 between all its brands. They now claim to be buying batteries for $100 per kWh for their electric vehicles. The automaker said that electric cars will soon reach price parity with gas-powered vehicles.[5]

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[3] https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf
[4] https://about.bnef.com/blog/battery-pack-prices-cited-below-100-kwh-for-the-first-time-in-2020-while-market-average-sits-at-137-kwh/
[5] https://electrek.co/2019/11/18/vw-id-3-electric-car-40-cheaper-than-e-golf/

Tesla - Tesla announced new batteries and manufacturing methods that will produce a battery 56% lower in cost than its current batteries in September 2020.[6] In 2020, Tesla's battery costs were $115/kWh.[7] This would likely mean battery prices for Tesla of well below Bloomberg's market forecast of $101/kWh in 2023 potentially enabling it to achieve cost parity or even having a lower cost than a comparable ICE vehicle. Tesla announced it could make a LD EV in three years priced at $25,000 using the new lower cost batteries.

Technical Manufacturing Innovations – Most OEMs are also investing in technical innovations to further lower vehicle costs beyond those from battery cost reductions. Examples include:

Tesla – Vehicle-body integration - their new 4680 batteries will be used to provide structural support to the vehicle and eliminate some of the normal pack infrastructure resulting in cost savings of 7%.

Their innovative Giga Casting machine is making the key rear vehicle structural component in one piece eliminating 79 parts, eliminating 300 robots, reducing the required body shop space by 30 percent and significantly reducing labor costs for a 40% reduction in rear underbody costs.[8,9]

GM – GM's new third generation modular system, Ultium, consists of modular battery packs that can be arranged in any combination from 1 – 12 modules and three standard electric motors that can be utilized in 5 standard drive train configurations which will offer significant cost savings and flexibility to work for a multitude of vehicles.

"GM's Ultium cells, arranged in different combinations of flexible modules and battery packs, can provide the energy for every segment on the road today, from performance vehicles to work trucks, with less than one quarter of the propulsion combinations currently used for internal combustion engines."

"Ultium Drive follows the trend of integrating powertrain components to save weight and space. For example, by integrating the power electronics into the drive units' assemblies, GM says it has reduced the mass of the power electronics by nearly 50 percent compared to its previous generation of EVs, saving cost and packaging space while increasing performance by 25 percent."

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[6] https://www.tesla.com/2020shareholdermeeting
[7] https://www.bloomberg.com/news/articles/2020-12-16/electric-cars-are-about-to-be-as-cheap-as-gas-powered-models
[8] https://cleantechnica.com/2020/11/22/teslas-manufacturing-revolution-machines-that-set-tesla-apart/
[9] https://chargedevs.com/newswire/elon-musk-and-sandy-munro-talk-production-hell-megacastings-structural-battery-packs-and-much-more/

VW – “VW’s next-generation MEB electric platform is apparently delivering some significant cost reductions. VW CEO Herbert Diess says the first vehicle on the platform, the ID.3 electric car is 40% cheaper to build than the e-Golf.”[10]

Economies of Scale

Market leading OEMs are investing billions to rapidly introduce new models including popular pick-up truck, crossover and SUV vehicle types using cost-effective flexible platforms as noted above. All this will allow R&D expenses to be spread out over millions of EVs while also achieving economies of scale that will enable further significant cost reductions.

GM – “General Motors said Thursday [1/28/21] that it would phase out petroleum-powered cars and trucks and sell only vehicles that have zero tailpipe emissions by 2035…”[11] The company plans to spend $27 billion over the next five years to introduce 30 all-electric models globally by mid-decade, and 40% of the company’s U.S. models offered will be battery electric vehicles by the end of 2025, including an electric Hummer pickup truck that it expects to start delivering to customers this year.[12]

VW – “Volkswagen said that it expects the entire Volkswagen Group to build about 20 million MEB-based electric vehicles by 2029.[13]

“Volkswagen is aiming to produce a total of 1.5 million electrified vehicles per year by 2025, and it expects the ID.4 to account for around a third of this total—500,000 per year globally by then, when the brand will have local production of the ID.4 in Germany, in China, and in the U.S.”[14]The Volkswagen Passenger Cars and Volkswagen Commercial Vehicles brands are working flat out on the transformation to the e-mobility era and the conversion of plants to e-mobility.[15]

Ford - Ford CEO Jim Farley said on the company's Q4 earnings call that it will invest $29 billion in autonomous vehicles (AVs) and electric vehicles (EVs) through 2025, a dramatic ramp-up of its spending in those areas. He noted that the auto sector is at an inflection point toward greater EV adoption and that one in 10

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[10] https://electrek.co/2019/11/18/vw-id-3-electric-car-40-cheaper-than-e-golf/

[11] https://www.nytimes.com/2021/01/28/business/gm-zero-emission-vehicles.html?referringSource=articleShare

[12] https://www.greencarreports.com/news/1131102_gm-s-all-electric-pledge-no-tailpipes-by-2035-net-zero-carbon-by-2040

[13] https://www.greencarreports.com/news/1129655_volkswagen-aims-to-sell-500-000-id-4-electric-crossovers-annually-by-2025

[14] ibid

[15] https://electrek.co/2020/10/15/vw-massive-robots-build-id4-suv-idbuzz-electric-minibus/#:~:text=Volkswagen%20has%20confirmed%20that%20it%20placed%20a%20massive,it%20comes%20to%20deploying%20electric%20vehicle%20production%20capacity.

vehicles sold in Europe in December were "pure electric," while EV sales in China continue to grow.[16]

Daimler Mercedes-Benz - German auto giant Daimler has announced a new plan to invest €70 billion ($85 billion) in “research and development and in property, plant and equipment” between 2021 and 2025, the lion’s share of which will be used “to accelerate the transformation towards electrification and digitization.” “Most of this investment will be at Mercedes-Benz Cars…” [17]

Similar announcements have been made for other OEMs including Honda[18] Hyundai[19] and Kia[20].

Lordstown Motors – This start-up will also be making electric pickup trucks in a factory purchased from GM and now has orders for more than 100,000 vehicles. It is also expected to begin production in September this year.[21] Its factory has a capacity to build 600,000 vehicles per year.

Rivian – Rivian, the startup electric vehicle maker, has raised over $8 billion in the last two years from major investors including Fidelity Investments and Amazon. They anticipate beginning manufacturing and delivery of their adventure pickup truck and SUV as well as a commercial delivery van for Amazon this year (Amazon ordered 100,000 vans from Rivian) and claim that they already have sold out all their production for the first year. They have a factory capable to making 250,000 vehicles a year.

OEMs will be making lower cost EVs to broaden the market

Examples of OEMs making statements about plans to make more affordable EVs prior to 2025 include:

- GM just announced that a new version of its Chevy Bolt with improved styling and features will now sell for $32,000 which is $5,500 less than its current version with a continuing range of 259 miles.[22]
- At Tesla’s Battery Day event, Elon Musk announced that he believes Tesla could make a compelling BEV in three years that will cost $25,000.[23]
- “As costs come down, Volkswagen is planning to make a sub-$22,500 all-electric vehicle. It is expected around 2023.”[24]

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[16] https://www.utilitydive.com/news/ford-bets-29b-on-leading-the-electric-vehicle-revolution/594782/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202021-02-09%20Utility%20Dive%20Newsletter%20%5Bissue:32350%5D&utm_term=Utility%20Dive

[17] https://chargedevs.com/newswire/daimler-announces-massive-new-investments-in-evs-plus-a-fund-to-protect-workers/

[18] https://chargedevs.com/newswire/honda-ditches-diesels-plans-to-phase-out-gas-only-cars-in-europe-in-2022/

[19] https://www.greencarreports.com/news/1130255_hyundai-will-have-at-least-10-electrified-cars-in-its-us-lineup-by-2022

[20] https://www.greencarreports.com/news/1130978_kia-teases-designs-for-7-evs-due-by-2027

[21] https://electrek.co/2021/01/11/lordstown-over-100000-pre-orders-electric-pickup-truck/

[22] https://www.greencarreports.com/news/1131283_2022-chevy-bolt-ev-price-cut-affordability-ev-tax-credit-or-not

[23] ibid

[24] Ibid

Financial Incentives for Vehicles

As the CEC knows, there are many Federal, State, Utility, County and City incentives out there that can further lower the costs of EVs.

By no later than 2025, EVs will both be less expensive to buy and to operate than ICE vehicles. Once the cost parity line is crossed in about 2023-2024 and with the continual decline in battery costs combined with lower costs realized from innovative design and manufacturing, economies of scale and increasingly fierce competition, EVs will increasingly both cost less to buy and less to operate than ICE vehicles. This will create a very compelling economic case for consumers to begin rapidly transitioning to prefer purchasing EVs over more expensive to buy and operate ICE vehicles.

Another historical obstacle to EV adoption has been range anxiety. But range is rapidly fading as a concern with nearly all new EVs having at least a 200-mile range and some now getting up to 400 miles plus. This concern is also mitigated with a robust charging infrastructure and increasing experience and knowledge of how this all works.

For all these reasons, we believe that not only is CARB's projection of 8 million cars required by 2030 to achieve Governor Newsom's EO but that it is very doable.

Appendix B - Longest range EVs for 2021[25]

Electric Vehicle	**EPA est. Range**	**Release Date**
Tesla Model S Plaid+	520+ miles	Late 2021
Lucid Air Grand Touring	517 miles	Summer 2021
Lucid Air Dream Edition	503 miles	Spring 2021
Tesla Model S Long Range	412 miles	March 2021
Lucid Air Touring	406 miles	Late 2021
Tesla Model S Plaid	390 miles	March 2021
Tesla Model X Long Range	360 miles	April 2021
Tesla Model 3 Long Range	353 miles	**Available**
Tesla Model X Plaid	349 miles	April 2021
Tesla Model Y Long Range	326 miles	**Available**
Tesla Model 3 Performance	315 miles	**Available**
Ford Mustang Mach-E CA Route 1 Edition	305 miles	**Available**
Tesla Model Y Performance	303 miles	**Available**
Rivian R1T Launch Edition	300+ miles	June 2021
Rivian R1S Launch Edition	300+ miles	August 2021
Ford Mustang Mach-E Premium	300 miles	**Available**
Ford Mustang Mach-E First Edition	270 miles	**Available**
Tesla Model 3 Standard Range Plus	263 miles	**Available**
Chevy Bolt EV (2021)	259 miles	March 2021
Hyundai Kona Electric	258 miles	**Available**
Volkswagen ID.4	250 miles	March 2021
Ford Mustang Mach-E Select	200 miles	**Available**
Ford Mustang Mach-E GT	150 miles	Spring 2021
Tesla Model Y Standard Range	244 miles	**Available**
Kia Nero EV	239 miles	**Available**
Jaguar I-Pace	234 miles	**Available**
Porsche Taycan 4S	227 miles	**Available**
Nissan Leaf Plus	226 miles	**Available**
Audi e-tron	222 miles	**Available**
Porsche Taycan Turbo	212 miles	**Available**
Volvo XC40 Recharge	208 miles	**Available**
Porsche Taycan Turbo S	201 miles	**Available**

[25] https://electrek.co/2021/02/03/longest-range-evs-2021/

BMW i3 & i3s w/ range extender	200 miles	**Available**
Hyundai Ioniq Electric	170 miles	**Available**
BMW i3 & i3s	153 miles	**Available**
MINI Cooper Electric	110 miles	**Available**

Sierra Club California Additions

Nissan Leaf S	150 Miles	**Available**
Hyundai Ioniq Electric	170 miles	**Available**
Polestar 2	233 Miles	Announced
Tesla Cyber Truck	250, 300, 500 Miles	Announced
Lordstown Endurance Pickup	250 miles	Announced
GM Hummer	250, 300, 350	Announced