FERMATA ENERGY

April 4, 2022

California Air Resources Board (CARB)
1001 "I" Street
Sacramento, CA 95814

Re: Fermata Energy's Comments on CARB's March 15 workshop on the Initial 2022 Scoping Plan Model Results

Dear California Air Resources Board,

Fermata Energy LLC, d/ba/ Fermata Energy, is pleased to submit comments on the March 15th, 2022 workshop on the initial results from the 2022 scoping plan model.

Fermata Energy operates Vehicle-to-Everything (V2X) bidirectional charging technologies that integrate EVs with buildings and the grid, turning EVs into valuable storage assets that reduce energy costs, stabilize the grid, increase energy resilience, and combat climate change. Fermata Energy enables utilities to more rapidly integrate renewable energy onto the grid, and Vehicle-to-Building (V2B) and Vehicle-to-Grid (V2G) revenue makes EVs more cost-effective. In short, Fermata Energy offers solutions to two major challenges we face today: the integration of clean, renewable energy, and the adoption of EVs.

In addition to developing the hardware and software required to perform V2X activities, Fermata Energy has spent nearly 10 years studying how V2X can unlock additional value streams from EVs, including those that are commercially viable today without regulatory intervention and how to best monetize these value streams. Fermata Energy has extensive experience with analyzing use cases, monetization mechanisms, and business models to maximize the benefits of V2X technologies. Our revenue model includes system sales and recurring sources of income.

Fermata Energy's comments focus on the mention of storage on slides 25 and 26 in the presentation by Energy+Environmental Economics (E3). Our recommendation is that in future versions of slides 25 and 26 in presentation in workshops and to the CARB Board, acknowledge verbally and in an asterisk that:

1) the modeling here did not include DER resources
2) under the aggressive decarbonization pathways explored, procuring DER resources and particularly V2G, could be a more cost effective way to integrate large quantities of wind and solar than procuring grid scale stationary storage alone. This is particularly apparent beyond 2030 when EV penetration will be much higher.

Although we would advocate for including V2G directly as a candidate resource in RESOLVE, given the modeling complexity and the short timelines, we do not expect E3 or CARB staff to do this. However, V2G technologies and policies are quickly evolving. So, it is with certainty we can

say that at least some storage needs and grid services in California will be provided by V2G. We believe CARB should acknowledge this and seek to improve their modeling capabilities so we can begin to understand what the cost effective balance is between grid scale stationary storage and vehicle based storage.

California is a recognized leader on V2G and vehicle grid integration (VGI) technology, with numerous initiatives led by the CEC (e.g., GFO-21-303 - Vehicle-to-Building Technologies for Resilient Backup Power), the investor owned utilities (e.g., PG&E's and SCE's proposed VGI pilots, the new Emergency Load Reduction Program, the proposed emerging market and technology VGI program, and the utilities' proposed dynamic or export rates that help VGI), and the work of the Smart Inverter Operationalizing Working Group (SIOWG) on standards and interconnection.

V2X technology in California has significant potential to provide mobile, dispatchable capacity. V2X presents a growing yet currently untapped resource to help support grid resilience and reliability. V2X technology at scale can deliver the following benefits:

1. Clean, affordable, and reliable transportation
2. Lower the cost of electricity bills
3. Free, backup power solutions that would normally cost tens of thousands
4. of dollars.
5. Enables EV owners to earn revenue from demand response and other services that help integrate and grow renewable energy on the grid

As PG&E's CEO Patti Poppe noted in an October 2021 interview with the *Los Angeles Times*:

> *"The electric vehicles on the road in PG&E's service area today have 6,700 megawatts of capacity… But imagine a Flex Alert being averted because we actually leverage the supply that's available in vehicles to power homes and business. Sixty-seven hundred megawatts — that's three Diablo Canyon nuclear power plants. It's on the road today, and we are not using it as a power source. We're only using it as a power draw."*[1]

As Patti Poppe remarked, during PSPS events, V2X technology can provide mobile assets that can be flexibly deployed to provide power for a range of resilience scenarios impacting areas and communities most at risk. V2L and V2G technology can also be very cost-effective for ratepayers compared to stationary storage systems, since the cost of the vehicle has already been paid for. For the same level of SGIP incentives that a 6-hour 7 kW stationary system can receive today (e.g. $35,000), a 7 kW bidirectional charger can be installed at a home or a multi-family building (before any other subsidies) and an entire off-lease EV can be purchased. For example, an off-board 7 kW bidirectional DC EVSE is estimated to cost $5,000-$7,000 (purchase and installed price) compared to a more typical Level 2 AC charging station

[1] https://www.latimes.com/environment/newsletter/2021-10-14/as-california-fires-burn-pge-ceo-promises-fixes-boiling-point

($600-1,500).[2] While this is a premium compared to a normal charging station, it is still far less than a comparable home storage system. It is very expensive to purchase long-duration storage to deploy at a home or business.[3]

In closing, Fermata greatly appreciates the work of CARB on the scoping plan and the many workshops you have held on this important topic. As a V2X services provider with projects in California and nationwide, Fermata Energy has years of expertise monetizing and studying V2X use cases, and we look forward to sharing our resources and knowledge on this subject with staff to help develop these models. Melissa Chan (Director of Grid Solutions and Strategic Partnerships) and Oliver Garnett (Data Scientist & Optimization Engineer) may be contacted if you would like to discuss further. You may reach them at melissa@fermataenergy.com and oliver@fermataenergy.com.

Sincerely,

John Wheeler
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[2] The Wallbox Quasar, a bidirectional DC charger for home use, is expected to retail for $4,000. "The price of Level 2 residential EVSE varies, but typically ranges from $500 to $2,000 before installation and state or utility incentives." https://www.mhelectric2020.com/electric-vehicle-chargers/

[3] "Typically, residential consumers' batteries can reach 5 kW / 13.5 kilowatt-hours (kWh)." Source: IRENA (2019), Innovation landscape brief: Behind-the-meter batteries, International Renewable Energy Agency, Abu Dhabi.