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Oxygen Initiative Comments on 2020 IEPR

Additional submitted attachment is included below.

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Oxygen Initiative 2020 IEPR Comments

Background

Oxygen Initiative is committed to the accelerated adoption of zero-carbon technologies such as plug-in electric vehicles (PEVs) and develops software that aids various fragmented stakeholders in supporting this acceleration with game-changing technologies. As such, we express our appreciation for the California Energy Commission's (CEC) staff and leadership and their work in assembling the Integrated Energy Policy Report (IEPR) workshops held on August 4 and 6, 2020.

Our comments here are directed to the portions of the IEPR that deal with strategies supportive of California's statutory goals and Executive Directives, namely:

- Achieving a renewable portfolio standard (RPS) of 60% by 2030 and carbon-free electricity sector by 2045
- Accelerated transportation electrification to reduce air pollution and greenhouse gases
- Smart charging of 5 million passenger electric vehicles and over 100,000 medium and heavy duty electric vehicles by 2030 as a means to:
    - Simplify the customer refueling experience with a 'Plug and Play' experience wherever and whenever they refuel.
    - Anticipate the seamless roaming requirements of future 'ACES' (Autonomous, Connected, Electric and Shared) vehicles.

    - Avoid any impact on range needs of the vehicle owner due to smart charging
    - Achieve optimized (lowest) carbon intensity of needed e-fuel via dynamic "Location Marginal Pricing" in support of the Low Carbon Fuel Standard (LCFS)
    - Enabling PEVs to provide real-time load augmentation during periods of "over-generation".
    - Intelligently prioritize staggering of vehicle charging profiles to avoid local transformer overload while respecting planned departure time and needed energy.
    - Automate the creation of dispatchable, and eventually, bidirectional mobile energy resources to maximize flexibility at the gigawatt-scale necessary for California to respond to system emergencies.
- Working in concert with the international community to achieve scalable solutions to climate change among automakers and charging station manufacturers.

California is long overdue in declaring its intention to support and implement the ISO 15118 interoperability standard for EV charging

Oxygen Initiative (OI) agrees with Commissioner Patty Monahan's statement that the Energy Commission, in assembling the national laboratories and California's public and private universities, is veritably undertaking a "Manhattan Project" to integrate tens of millions of electric vehicles, trucks, and other types of transportation into the electric

system and onto California's roads by 2045. There's no easy way to say, however, that the CEC has been repeating similar things for years now without any indication it plans to stop talking and start doing. Let us state things so they cannot possibly be misunderstood: Success in humanity's race to address runaway global warming requires unprecedented **and** immediate action. That means deployment of the best available control technologies to slash vehicle and grid emissions as fast as possible while simplifying the user experience. "Delighting the consumer" with a simple experience is indispensable to accelerate market uptake and flip the market for vehicles from ICE to EVs quickly. That statement militates toward a common and unique interoperability standard. IE, all vehicles and all stations speak the same language.

The presentations from the National Renewable Energy Laboratory and Lawrence Berkeley National Laboratory illustrate the potential for approximately 5 GW of car and truck charging load to occur during peak hours in the 2030 timeframe. Only a scalable control system that enables:

- consumer simplicity
- dynamic price-responsive charging
- aggregation of energy market-certified and dispatch-able resources
- at both AC Level 2 and DC Level 3
- seamless roaming
- robust cybersecurity

will make this real. Happily for the State of California, the solution already exists and the CEC has already invested in test implementations of this technology with cooperation from international stakeholders like Daimler and Innogy from Germany.

Procrastination Penalties will be Severe

If the extended, record-setting, and widespread heatwave and wildfires this August and the resulting Stage 3 Alerts and rolling-blackouts called by the CAISO are any indication of the resource adequacy and distribution grid[1] capacity shortfalls the State will face as our planet continues to warm, California must take decisive action now to develop new energy storage resources that leverage the time flexibility of PEV charging and improve the reliability of our electric system. Although the 2014 *California Vehicle-Grid Integration (VGI) Roadmap* offers clarion calls for this mobilization, California's inability to make critical decisions and see them through implementation for the greater part of a decade has now resulted in electric reliability impacts that were largely preventable. Further, the deployment of charging infrastructure that is incapable of supporting either the needs of the grid today nor the cars of the future continues apace.

On June 23, 2014, Oxygen Initiative (f.k.a. KnGrid) presented to the Lead Commissioner Workshop on Electric and Natural Gas Vehicles in California (Docket 14-IEP-1B) on the importance of VGI standards for charging equipment. KnGrid identified the need to harmonize electric vehicle charging and charging station operations with the grid by using policy, market signals, and demonstrations to coax automotive OEMs to em-

[1] https://losangeles.cbslocal.com/2020/08/19/ladwp-reports-power-outages-amid-ongoing-heat-wave/

brace a common, global smart charge interoperability standard: ISO/IEC 15118.[2] The 2014 IEPR affirmed this need with a recommendation: "Conduct timely implementation of research, development, and demonstration projects on VGI funded through the Electric Program Investment Charge (EPIC)" related to consistent communication pathways, control and communications technologies, strategies to lower consumer costs, and increasing benefits to the grid.[3] Indeed, even prior to the implementation of EPIC, the Energy Commission's Public Interest Energy Research Program (PIER) investment in the University of California at San Diego microgrid successfully proved "for the first time a global standard defines intelligent charging, allowing the car and the grid to communicate with each other in real time to determine grid capacity and customer needs." The PIER final report, *Cumulative Impacts of High Penetration Electric Vehicle Charging and Photovoltaic Generation on Distribution Circuits* found that intelligently managing charging with the ISO 15118 protocol minimized any significant voltage impacts on local distribution.[4]

On December 7, 2016, Oxygen Initiative presented to the Joint CEC and CPUC staff workshop on Vehicle-Grid Integration Communication Standards (Docket 16-TRAN-01). Oxygen Initiative emphasized once again the importance of adopting ISO 15118 for **all** California investments in charging infrastructure, including utility ratepayer-funded programs, in order to respond to the automakers' signals toward implementing ISO 15118 for AC Level 2 smart charging in addition to its use within the Combined Charging Standard for DC fast charging. Oxygen Initiative warned about the risk of

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[2] https://efiling.energy.ca.gov/GetDocument.aspx?tn=73370&DocumentContentId=10146

[3] 2014 IEPR at 141.

[4] http://solar.ucsd.edu/c/wp-content/uploads/2016/04/Report-on-High-Pen-of-EVs-and-PVs-Task-52-final.pdf

stranding investments in charging equipment without the enabling equipment to implement ISO 15118, the Home Plug Green-Phy modem.[5] A group of 9 automakers submitted to the CEC/CPUC workshop a comment that, while they did not want to be mandated to adopt the ISO/IEC 15118 VGI standard, they fully supported the implementation of interoperable infrastructure based on it.[6] Despite this growing consensus among automakers, and Oxygen Initiative's caution that a creation of a new technical working group to evaluate standards would prolong an already lengthy, wasteful and unproductive stalemate, a new VGI Communications Protocol Working Group simply replicated a stale dialogue for over a year. [7]

Published in February 2018, the VGI Working Group Draft Report replicated the market failure by failing to select a **common and unique** communications protocol (only specifying hardware) and allowing for "one or a combination of" ISO 15118 and Smart Energy Profile 2.0b to be implemented between the PEV and the charger.[8] This recommendation directly contradicted the recommendation of the 9 automakers' submission to the agencies over a year before, "opposing the implementation of SEP 2.0 or any alternative communication standard between the EV and EVSE besides ISO 15118". As a result, automakers were unable to leverage ISO 15118-based scalable smart charging and begin series-production of VGI-ready vehicles that also support California's goal of accelerated market uptake. Further, by limiting the scope of the use cases to which the

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[5] https://efiling.energy.ca.gov/GetDocument.aspx?tn=215107&DocumentContentId=26553

[6] http://docketpublic.energy.ca.gov/PublicDocuments/16-TRAN-01/TN215326_20170113T100319_Stefa_Reinsdorf_OEM_Group_Comments_OEM_Consolidated_Comment_to.pdf

[7] https://efiling.energy.ca.gov/GetDocument.aspx?tn=221741&DocumentContentId=29474

[8] http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M211/K654/211654688.PDF

recommendation was applicable, **none of the utilities' charging infrastructure programs were required to implement any communication protocols**.

The 2017 IEPR, developed concurrently to the VGI Working Group Final Report, recommended that, to accelerate the use of distributed energy resources, state agencies should "Standardize electric vehicle charging equipment to enable resource dispatch and work with charging equipment and vehicle manufacturers…to better integrate electric vehicles with the grid".[9] Nearly three years later, California has not implemented this recommendation and so our comments to the 2017 IEPR bear repeating: "In our opinion, the failure to declare a VGI standard places a regulatory failure on top of an existing market failure. Where we can step in to help simplify the consumer's experience and the automaker's production planning challenges while supporting our guiding principles for grid integration, we must."

Progress, however slowly, is starting to correct this regulatory failure. CPUC Energy Division Staff's *Transportation Electrification Framework* (Rulemaking 18-12-006) recognizes the importance of implementing standards-based smart charging consistently across California in a manner that is scalable in a manner amenable to automaker mass deployment. It states (emphasis added):

"All publicly funded EVSE that are intended for use as a VGI resource should meet the hardware and software requirements consistent with CEC planned requirements. Energy Division staff recommend the IOUs should collaborate with industry stakeholders working to improve and finalize ISO 15118 as a solution for VGI communication needs, in alignment with the efforts already underway at the CEC's CALeVIP program." […]

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ISO 15118 has been implemented or considered as a requirement for EVSE in the European Union, the UK, the Netherlands, Germany, South Korea, and India. Further, auto manufacturers indicated they intend to deploy ISO 15118 as a communication solution for AC and DC conductive charging (as well as wireless charging technology) and generally do not want to support multiple protocols. Stakeholders assert the CPUC should not establish a standard for EVSE to EV communication at this time, given the nascent EVSE market. Energy Division staff understands this concern but finds that **establishing a standard communication pathway could send a strong signal to the EVSE market that public charging stations deployed in California must be capable of these types of functions.** To prevent the deployment of EVSE that will be obsolete as standards are being developed and updated to reflect current market needs, the IOUs should support EVSE with the capability to accept "over-the-air" updates to avoid the need for new hardware to be installed if the communication standards are modified."[10]

In addition, Energy Commission Staff's assessment[11] of needed hardware and software presented at the August 4 workshop confirm that the marginal cost of equipment necessary to implement ISO 15118 is less than 2% of the unit cost of a Level 2 EVSE for a manufacturer to produce 10,000 chargers—a minuscule contribution of the 4-5 million that NREL identified would be needed within the next decade. Importantly, smart chargers based on ISO 15118 interoperability will improve network use, reduce grid capacity and operational costs and enable the provision of ancillary services to inte-

[10] https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442463904 at 81-83

[11] https://efiling.energy.ca.gov/getdocument.aspx?tn=234172

grate renewables. Ultimately, ISO 15118 will promote choice for drivers to seamlessly roam across e-mobility service providers – thereby encouraging competition and lowering the cost of enabling revolution-scale adoption of PEVs. CEC and CPUC staffs' analyses are indeed validated by the manufacture of smart chargers now commercially available with ISO 15118 capabilities to serve multiple use cases: from passenger cars and to eventually commercial trucks.[12]

Lack of clarity around standard's hasn't stopped investment in stations with no standard at all. Hundreds of millions of public dollars expended upon thousands of deployed chargers currently lack standardized capabilities to smart charge upcoming vehicles. Oxygen Initiative agrees with Energy Commission and CPUC Staff's findings that standardization is critical to power widespread transportation electrification with clean energy—but more must be done, and faster, to execute California's vision for VGI based upon the global ISO 15118 standard.

Recommendations to achieve our vision:

To launch this monumental effort, the Governor and the Energy Commission should issue a public statement:

> "The State of California intends to build a homogenous standards-based charging station ecosystem for electric vehicles by 2030. This system will support the global

[12] https://www.electrifyamerica.com/assets/pdf/Operating%20Instructions%20-%20Electrify%20America%20Electric%20Vehicle%20Home%20Charger.b535571b.pdf; https://assets.new.siemens.com/siemens/assets/api/uuid:8483ab78-3d68-4c80-a625-f0faf5dc4c61/sids-b40060-00-4aus-lo-res.pdf; https://filecenter.deltaww.com/Products/Download/08/catalogue/AC%20MAX-Leaflet_NA_202001.pdf; https://www.charinev.org/news/news-detail-2018/news/charin-is-publishing-a-solution-for-high-power-charging-of-tucks-and-busses-beyond-1-mw/

interoperability standard: ISO 15118 already deployed by leading automakers around the world. Our plan will accelerate EV adoption by providing all EV drivers a plug and play experience called "Plug and Charge" throughout the State. That means the bill just follows you home wherever you are. Further, it will support California's plans to increase use of renewable energy and achieve a zero carbon grid by 2045 while improving grid reliability."

Moving beyond equipment specification requires:

- rigorous testing of capabilities among automakers, station manufacturers and EVSPs.
- laying out, and sticking to a build schedule that supports broad adoption of light and heavy-duty EVs
- planning, funding and supporting retrofit of the existing network of non-ISO 15118 stations

Clear Goals:

- Lay out a plan now to create 1GWh of Dispatch-able energy from between 200K to 300K vehicles within 2 years. That could be accomplished with either AC or DC charging infrastructure in homes. EV owners could be compensated annually to make their vehicles available during summer months from 4PM to 9PM. The Utilities (at the direction of the CPUC) or the CEC could fund the development of this "Stage 3 Resource." The dispatch control system could be tested exten-

sively over the next 2 years and be available for the next big heat weather event. The benefit of this bold plan would be both practical and political:

- It sends a clear market signal to all stakeholders that California is serious about VGI
- It creates excitement and enthusiasm about supporting the ISO 15118 standard.
- It shows 'can-do' attitude about using technology to solve big climate problems.
- It may offer the first window into the viability of DC Level 1 charging infrastructure that supports discharging EV batteries at scale using series-production light-duty vehicles.

- CEC: Support electrical manufacturers and fund chargers reflecting automaker technology roadmaps to achieve economies of scale
  - Incorporating the test procedures described above, by 202X all publicly-funded and Lever 2 infrastructure must be ready to be upgraded over-the-air with…
  - Retrofits of existing chargers should be replaced with ISO 15118 chargers by the end of 2025. Some financial support may be indicated to get this done in this timeframe, particularly for residential Level 2 charging stations.
- Utilities: Will need to accelerate work on dynamic pricing tariffs that can be leveraged by standards-based vehicles capable of responding automatically prices based on the Day-Ahead Hourly Energy Market initially.

- Concepts for competitive infrastructure installations like those in TERPA should leverage charging and network interoperability standards identified in slide 6 of Staff's presentation on Hardware and Software. Establishing a fair competition among manufacturers would require a minimum level of technical capabilities so that suppliers are unable to undercut efforts to incorporate advanced designs.

Conclusion

Oxygen Initiative appreciates the opportunity to provide this feedback. We hope that frustrations expressed in this document are accepted in the spirit that they're delivered: our goal is topple any remaining reluctance to act decisively.