Date of Hearing: July 10, 2019

ASSEMBLY COMMITTEE ON COMMUNICATIONS AND CONVEYANCE
Miguel Santiago, Chair
SB 676 (Bradford) – As Amended July 5, 2019

SENATE VOTE: 38-0

SUBJECT: Transportation electrification: electric vehicles: grid integration

SUMMARY: Requires the California Public Utilities Commission (CPUC) to establish strategies and quantifiable metrics to maximize the use of feasible and cost-effective electric vehicle grid integration. Specifically, **this bill**:

1) Requires the CPUC, by December 31, 2020, in an existing proceeding, to establish strategies and quantifiable metrics to maximize the use of feasible and cost-effective electric vehicle grid integration by January 1, 2030, consistent with all of the following:

    a) The electric vehicle grid integration strategies shall account for the effect of time-of-use rates on electricity demand from electric vehicle (EV) charging;

    b) Expenditures on electric vehicle grid integration shall be in the best interests of ratepayers, as specified;

    c) The electric vehicle grid integration strategies shall reflect electrical demand attributable to EV charging, including from existing approved rates and programs;

    d) Electric vehicle grid integration shall be consistent with specified transportation electrification goals; and,

    e) The CPUC shall consider incorporating the National Institute of Standards and Technology's reliability and cybersecurity protocols, or other equally protective or more protective cybersecurity protocols, into the electric vehicle grid integration strategies.

2) Requires a local publicly owned electric utility, as part of its integrated resource plan update adopted on and after January 1, 2020, as specified, to consider both of the following:

    a) Establishing electric vehicle grid integration strategies that are in the best interests of ratepayers and that reflect the local publicly owned electric utility's estimated electrical demand attributable to EV charging, as applicable; and,

    b) Evaluating how it's existing and planned electric vehicle grid integration programs, including its electrical rates and investments in transportation electrification, to the extent feasible, further the electric vehicle grid integration strategies it has established, as applicable.

3) Requires the CPUC, in carrying out its responsibilities pertaining to transportation electrification, as specified, to reference the specified established electric vehicle grid integration strategies in relevant ongoing and subsequent proceedings that address issues of

transportation electrification in any part and shall identify how programs and investments that the CPUC may approve will advance the achievement of the strategies.

4) Requires the CPUC, in executing its responsibilities on transportation electrification, as specified, to consider how, or if, electric vehicle grid integration can mitigate any generation, transmission, or distribution costs, or increase the economic, social, or environmental benefits associated with transportation electrification, and shall not foreclose future utilization of electric vehicle grid integration.

5) Requires each community choice aggregator, one year after the CPUC establishes specified electric vehicle grid integration strategies, to report annually to the CPUC describing how its current and planned programs, rates, and investments in transportation electrification are expected to further the electric vehicle grid integration strategies.

6) Requires each electrical corporation, in each of its specified applications to the CPUC for transportation electrification programs and investments, to quantify how the investments described in the application are expected to further the specified adopted electric vehicle grid integration strategies.

7) Requires each electrical corporation that files an application for programs and investments to accelerate widespread transportation electrification, in each of its load research report compliance filings or alternative compliance filings submitted to the CPUC, to report the electrical corporation's annual measurable progress in furthering the specified adopted electric vehicle grid integration strategies.

8) Requires the CPUC, in an existing proceeding, review each load-serving entity's annual measurable progress in furthering the specified adopted electric vehicle grid integration strategies, and may, if appropriate, issue recommendations to ensure reasonable progress toward achieving vehicle grid integration.

9) Specifies that nothing in this bill authorizes a delay of any new rate or program for EV charging or electric vehicle grid integration as to which consideration or approval is pending before the CPUC on or before January 1, 2020.

10) Specifies that, as regards electrical corporations, this bill only applies to electrical corporations that are required to file an integrated resource plan, as specified.

11) Defines "electric vehicle grid integration" for purposes of this bill to mean any method of altering the time, charging level, or location at which grid-connected EVs charge or discharge, in a manner that optimizes plug-in EV interaction with the electrical grid and provides net benefits to ratepayers by doing any of the following:

    a) Increasing electrical grid asset utilization;

    b) Avoiding otherwise necessary distribution infrastructure upgrades;

    c) Integrating renewable energy resources;

    d) Reducing the cost of electricity supply; or,

e) Offering reliability services, as specified, or the Independent System Operator tariff.

12) Specifies that electric vehicle grid integration strategies shall not require the use of any specific technology.

13) Authorizes electric vehicle grid integration to be achieved using multiple strategies, including, but not limited to, electrical rate design and the adoption of technology and customer services that help provide net benefits to ratepayers, as specified.

14) Authorizes the CPUC to adopt a revised definition for "electric vehicle grid integration" through a new or existing proceeding to replace the specified definition in this bill. Any revised definition of "electric vehicle grid integration" adopted by the CPUC shall be applicable to load-serving entities, as specified.

15) Makes the following findings and declarations:

a) State policy incentivizes and encourages the increased use of EVs, and relies, in part, on the ratepayers of electrical corporations to fund policies intended to increase the usage of EVs;

b) Changes in electrical demand and generation have created escalating peak and low periods of electrical supply and demand, and the cost of wholesale electricity and electricity delivery during peak demand periods is typically greater than during other periods;

c) It is feasible and practicable to adjust the period during which an EV charges, in part or in full, to reduce its cost impact during periods of peak demand or grid congestion, to utilize available renewable electric generation, to avoid curtailments of renewable electric generation, and to provide reliability services; and,

d) Time-of-use rates for customers with EVs can reduce costs or mitigate cost increases for all ratepayers due to increased usage of EVs by incentivizing EV charging at periods of low demand and low grid congestion.

16) Specifies that it is the policy of the state and the intent of the Legislature to maximize net ratepayer and grid benefits from transportation electrification and reduce costs or mitigate cost increases for all ratepayers due to increased usage of EVs by accelerating electric vehicle grid integration and by ensuring that any investments in transportation electrification do not foreclose the electric vehicle grid integration potential of these investments.

EXISTING LAW:

1) Requires the CPUC, in consultation with the California Air Resources Board (CARB) and the California Energy Commission (CEC), to direct electrical corporations to file applications for programs and investments to accelerate widespread transportation electrification to reduce dependence on petroleum, meet air quality standards, achieve the goals set forth in the Charge Ahead California Initiative, as specified, and reduce emissions of greenhouse gas (GHG) to 40 percent below 1990 levels by 2030, and to 80 percent below 1990 levels by

2050. Programs proposed by electrical corporations shall seek to minimize overall costs and maximize overall benefits. Requires the CPUC to approve, or modify and approve, programs and investments in transportation electrification, including those that deploy charging infrastructure, via a reasonable cost recovery mechanism, as specified, do not unfairly compete with nonutility enterprises as specified, include performance accountability measures, and are in the interests of ratepayers, as specified. (Public Utilities Code (PUC) Section 740.12 (b))

2) Requires the CPUC to review data concerning current and future electric transportation adoption and charging infrastructure utilization prior to authorizing an electrical corporation to collect new program costs related to transportation electrification in customer rates. If market barriers unrelated to the investment made by an electric corporation prevent electric transportation from adequately utilizing available charging infrastructure, the CPUC shall not permit additional investments in transportation electrification without a reasonable showing that the investments would not result in long-term stranded costs recoverable from ratepayers. (PUC Section 740.12 (c))

3) Defines "transportation electrification" to mean the use of electricity from external sources of electrical power, including the electrical grid, for all or part of vehicles, vessels, trains, boats, or other equipment that are mobile sources of air pollution and greenhouse gases and the related programs and charging and propulsion infrastructure investments to enable and encourage this use of electricity. (PUC Section 237.5)

4) Requires all charges demanded or received by any public utility, or by any two or more public utilities, for any product or commodity furnished or to be furnished or any service rendered or to be rendered to be just and reasonable, as specified. Requires every public utility to furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities, including telephone facilities, as specified, as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees, and the public. (PUC Section 451)

5) Requires the CPUC, in cooperation with CEC, CARB, air quality management districts and air pollution control districts, regulated electrical and gas corporations, and the motor vehicle industry, to evaluate and implement policies to promote the development of equipment and infrastructure needed to facilitate the use of electric power and natural gas to fuel low-emission vehicles. (PUC Section 740.3)

6) Requires the CPUC, in consultation with CEC, CARB, electrical corporations, and the motor vehicle industry, to evaluate policies to develop infrastructure sufficient to overcome any barriers to the widespread deployment and use of plug-in hybrid and EVs, as specified. (PUC Section 740.2)

FISCAL EFFECT: Unknown. This bill has been keyed fiscal by the Legislative Counsel.

COMMENTS:

1) **Authors Statement:** According to the author, "California has set ambitious goals to electrify its transportation sector, which will dramatically increase the electrical load from our vehicles. But the State's electrical grid already faces many challenges, in part due to our

increased use of intermittent renewable energy. If EV charging is grid integrated, it can mitigate this problem and provide a variety of benefits, including but not limited to, shifting load out of peak demand periods, absorbing excess solar generation during midday, and shedding load as demand rapidly ramps. SB 676 ensures that Vehicle Grid Integration (VGI) is a genuine part of the conversation as the State continue to invest billions of dollars in transportation electrification, with significant investments from ratepayers."

2) **Background:** The transportation sector represents 50 percent of the California's GHG emissions and 80 percent of nitrogen oxides. Reducing carbon emissions from the transportation sector is a critical step needed in order to meet California's climate goals and clean air standards. Zero-emissions Vehicles (ZEVs) run on electricity stored in batteries instead of fossil fuels, such as plug-in EVs, plug in hybrid EVs, and hydrogen fuel cell EVs. ZEVs are a vital component of the state's effort to reach its GHG emission reduction goals. The availability of new vehicle models, improved battery technology resulting in greater driving range, increase availability of electric charging infrastructure, and federal and state incentives have all contributed to expanding the ZEV market. At the end of 2017, California had over 350,000 plug in EVs on the road.

3) **California's ZEV Action Plan:** In 2012, Governor Brown issued Executive Order B-16-12 which directed the CPUC and other state agencies to help accelerate the market for ZEVs to support the adoption of 1.5 million ZEVs on California roads by 2025 and the integration of plug-in EV charging into the state's electricity grid by 2020. In October 2016, the Governor's Interagency Working Group on ZEVs released its 2016 ZEV Action Plan, which provided an updated roadmap towards reaching the states ZEV goals. The plan highlighted certain priorities for ZEV development and adoption including, raising consumer awareness and education about ZEVs; ensuring ZEVs are accessible to a broad range of Californians; making ZEV technologies commercially viable in targeted sectors; and aiding ZEV market growth beyond California.

   In January 2018, Governor Brown issued Executive Order B-48-18 directing all state entities to work with the private sector and all appropriate levels of government to put at least five million ZEVs on California roads by 2030. The executive order directed all state entities to spur the construction and installation of ZEV charging and fueling infrastructure, find ways to streamline ZEV infrastructure installation processes, and carry out additional programs and actions to reach the goal.

4) **Transportation Electrification:** Since 2012, California's EV market has grown significantly through the expansion of federal and state incentives and programs. In 2015, the Legislature passed SB 350 (De Leon) Chapter 547, Statutes of 2015, which set 2030 GHG reduction targets to be achieved through a variety of measures, including widespread transportation electrification. In 2016, the CPUC directed California's investor owned utilities (IOUs) to submit applications proposing projects aimed at achieving the transportation electrification goals in SB 350. The CPUC has since approved nearly $750 million in IOU transportation electrification infrastructure programs and is still reviewing proposals for nearly $1 billion in additional investment programs.

   To meet the demands of increasing EVs on the road, the State will need to develop comprehensive plans to accommodate EVs and consider its impact on other sectors of the state. This includes addressing questions on how to install thousands of public EV chargers,

how to facilitate at-home charging, what impact will EVs have on our electric grid, and what type of technology and methods need to be established in order to create uniform standards and pricing. Aside from the CPUCs efforts on SB 350, the CEC is conducting research and demonstrations to identify and develop strategic opportunities to adopt charging infrastructure protocols that can help avoid energy waste, manage peak load, and develop infrastructure plans for EVs. Furthermore, CARB has the authority to adopt requirements to ensure public charging stations have interoperable billing standards to ensure that EV drivers are provided clear information of any change in price and have the abilty to opt in or out of such price changes.

5) **Vehicle Grid Integration:** Transportation electrification can reduce the states reliance on petroleum but it can also increase its use of electricity if EV charging is not optimized with the grid. Without taking steps to better align EV charging patterns with excess renewable energy availability throughout the day, EVs may actually shift emissions from the transportation sector to the electricity sector potentially offsetting some of the benefits of owning an EV. VGI is a broad term that encompasses the many ways in which an EV can provide grid services by optimizing a EVs interaction with the electric grid. VGI can help mitigate issues by optimizing EV charging to ensure an increase in EV charging does not increase the use of electricity during peak hours; when energy cost the most to generate, therefore requiring additional generation during hours when the electric grid is most under stress.

6) **VGI Working Group:** If done correctly, VGI has the potential to reduce overall operating cost for EV owners and building managers, delay or offset utility distribution upgrade and maintenance investments, and/or mitigate wholesale energy prices. In 2017, the CPUC convened a working group to gather input from stakeholders in developing policies that support VGI. In October 2018, the working group released a staff report that noted that a more holistic approach involving communication protocols, market facilitation, wholesale and retail rate improvements, load management, demand response programs and other policy changes would be necessary to enable the implementation of VGI in some cases. In December 2018, the CPUC issued R.18-12-006, which directed its Energy Division to develop a process for a new interagency, multi-stakeholder working group focused on developing the cost and benefits of VGI use cases in conjunction with the implementation of the statewide VGI roadmap.

   However, according to the author the state has not done enough to adequately and proactively consider how to mitigate the electric load impact of transportation electrification. This bill requires the CPUC in an existing proceeding to establish strategies and quantifiable metrics to maximize the use of feasible and cost-effective electric vehicle grid integration by January 1, 2030. As a result, this bill would set in motion for the CPUC to develop specific standards and metrics that would jump start VGI. California has hosted a number of successful pilot programs on VGI, however, it is important to keep in mind that VGI is still in a nascent stage.

7) **Prior Legislation:** AB 2127 (Ting) of 2018 required CEC, working with CARB and the CPUC, to prepare a statewide assessment of EV charging infrastructure needs. *Status: Chaptered by the Secretary of State, Chapter 365, Statutes of 2018.*

SB 1000 (Lara) of 2018 required CEC to evaluate the extent to which charging infrastructure is proportionately deployed and use funds to more proportionately deploy EV chargers as needed; prohibited cities and counties from restricting EV charging access, and required the CPUC to explore facilitating the development of technologies related to charging. *Status: Chaptered by the Secretary of State, Chapter 368, Statutes of 2018.*

SB 350 (De Leon) of 2015 set GHG reduction targets to be achieved by 2030 through a variety of measures, including supporting electrification of the transportation system and established requirements of the CPUC in adopting EV charging proposals from the IOUs. *Status: Chaptered by the Secretary of State, Chapter 547, Statutes of 2015.*

SB 1275 (De Leon) of 2014 established the Charge Ahead California Initiative to be administered by CARB, in consultation with the CEC, air pollution control and air quality management districts, and the public. Specifies that the goals of the initiative is to, among other things, place in service at least one million ZEVs by January 1, 2023, and to increase access for disadvantaged, low-income, and moderate-income communities and consumers to ZEVs. *Status: Chaptered by the Secretary of State, Chapter 530, Statutes of 2014.*

8) **Double-referral:** This bill is double referred, having been previously heard by the Assembly Committee on Utilities and Energy on July 3, 2019 and approved on a 12-0 vote.

REGISTERED SUPPORT / OPPOSITION:

Support (prior version)

Advanced Energy Economy
American Honda Motor Company, Inc.
American Wind Energy Association
California Efficiency and Demand Management Council
California Energy Storage Alliance
California League of Conservation Voters
eMotorWerks
Enel X North America
Environmental Defense Fund
EVBox Inc.
Electric Vehicle Charging Association
Greenlots
Natural Resources Defense Council

Opposition (prior version)

California Community Choice Association (unless amended)
California Municipal Utilities Association (unless amended)
City of Monterey
City of San Jose
Indivisible South Bay - LA
San Jose Community Energy Advocates
Sacramento Municipal Utility District (unless amended)

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