



November 5, 2018

Case No. 18-2660-INV
-Via Electronic Filing-

Ms. Judith C. Whitney, Clerk
Vermont Public Utility Commission
112 State Street
Montpellier, VT 05620-2701

RE: Comments of Greenlots in Response to Commission Questions

Dear Clerk Whitney,

Greenlots submits these comments in response to the Vermont Public Utility Commission's ("the Commission") October 24, 2018 Order Commencing Next Step of Investigation ("the Order"), requesting comments on a set of questions related to jurisdictional approaches to electric vehicle ("EV") charging in Vermont.

Greenlots is a leading provider of EV charging software and services committed to accelerating transportation electrification in Vermont. The Greenlots network supports a significant percentage of the DC fast charging infrastructure in North America, and an increasing percentage of the Level 2 infrastructure. Greenlots' smart charging solutions are built around an open standards-based focus on future-proofing while helping site hosts, utilities, and grid operators manage dynamic EV charging loads and respond to local and system conditions.

Usage Fees

1. Describe how usage fees would be calculated for Vermont customers using public EV charging stations. Please identify each component used in determining the final fee, and if a component is not always used in determining the final fee, explain the circumstances under which it is used and the reasons why.

Usage fees to EV drivers using public EV charging stations can vary by application, technology, charging speed and context. For example, Level 2 charging fees will often be different than those for DC fast charging ("DCFC"), where the EV charging infrastructure has significantly higher costs. Additionally, where it is determined that there should be a price incentive for drivers not to stay parked longer than needed to charge, there may be a per hour or minute cost for dwell time when there is no charging. With respect to the manner in which energy is billed, while charging per kWh is the fairest and most accurate measure, in some contexts this is replaced by a per minute rate, in particular in situations where there are prohibitions or regulation pertaining to reselling energy by the kWh. This kWh rate may vary depending on the time of day to pass on appropriate price signals to drivers.

Greenlots recognizes that cost savings is one of the most significant factors in EV adoption, and therefore is cognizant that a minimum, pricing for EV charging should ideally be lower than

traditional fuels. Indeed – the lower the cost, the more attractive EVs are to prospective buyers. Therefore, pricing is a significant component of EV market development, and should be recognized as such. Inherently this dynamic can create tension between utility and third-party facilitation of EV charging. Greenlots would also encourage the Commission to consider that rates can be paired with managed charging programs that can assist in ensuring EV charging benefits the grid and responds to grid constraints and demands.

2. Are usage fees variable based on factors such as time spent at the charging station, time of day when charging occurs, type of vehicle charging at the station, etc.? For example, if a kWh charge applies to the first hour of charging and a vehicle remains at the station charging beyond that hour, could or would an additional fee above and beyond the kWh fee apply to all subsequent hours? Please explain your company's approach to setting and applying fees at charging stations.

Yes, fees vary based on many factors, including those above. Generally, Greenlots does not set rates, but facilitates based upon fees decided upon by clients/site hosts.

3. Describe any limitations imposed on the fee structures for EV charging station use in states other than Vermont.

Greenlots is not aware of any state that has instituted such limitations.

4. Do or should the fees charged to consumers at public EV charging stations vary based on the electricity rates charged by the utility that serves the charging station?

The extent to which different utilities have different costs and rates, yes those variations generally should be seen by the consumer in most contexts. To maximize the value of EV charging to the grid, price signals that reflect local or system realities need to be seen by the user/consumer. This being said, in many contexts this function can be better provided by managed or smart charging than through rates. Reflected in fees this can potentially be quite dynamic. Additionally, ensuring fuel cost savings compared to gasoline should be a policy goal incorporated into rate design and the final prices seen by consumers.

5. Will or should variations in electricity rates due to time-of-use rate structures offered by the electric utility serving a public charging station be passed through to the users of public EV charging stations?

Generally speaking, yes they should. EV time-of-use (“TOU”) rates represent a rather blunt but in some cases appropriate beginning instrument to deliver price signals to drivers, especially at low levels of EV market penetration. As mentioned above, other strategies, including managed or smart charging or even real-time or dynamic pricing represent more accurate instruments that can better utilize and dispatch flexible EV loads at charging stations with longer dwell times, to

better maximize system-wide benefits and cost reductions. Other dynamic pricing instruments can also be deployed in higher power charging and shorter dwell time contexts, including DC fast charging. For these reasons, we encourage the Commission to look beyond TOU rate design and towards technology-facilitated smart/managed charging programs.

We must emphasize that a key element in providing these benefits and unlocking this value, in addition to technology, is a central utility role. Managed charging programs can provide grid services in the same way that demand response programs do, but can be more impactful as they can also increase load. This capability of load increase and decrease is an extremely powerful tool in helping to manage and maximize the efficiency of utilization of grid assets and deliver value to all utility customers.

6. Can the charging capabilities (e.g., speed) of the EV affect the rates that a consumer will be charged at the EV charging station? Please explain and offer examples from your experience.

Greenlots believes that this consideration of different EV charging capabilities and speeds can be addressed by having rates be based on energy delivered rather than time spent charging. This said, we are supportive of and can facilitate a wide range of pricing and smart charging approaches. As we understand the question, this specific approach would require further investigation.

7. How would drivers charging their vehicles at a public EV charging station pay for their usage (e.g., by credit card)?

Credit card-based payment systems have traditionally been the backbone used to facilitate payment and support payment interoperability and driver roaming in the U.S. across publicly-accessible charging stations (particularly DCFC). Similarity and familiarity with how drivers pay for gasoline is also key. For these reasons, Greenlots generally believes that public charging stations should support credit card payments. There is also benefit in utilizing communication methodologies such as Open Charge Point Interface (“OCPI”) to provide additional mechanisms to ensure payment interoperability and ease of driver experience across different networks.

EV Charging Station Technology

8. What factors affect the charging speeds for different EVs?

Greenlots defers to the responses of EV and EVSE manufacturers in answering this question.

9. How will a utility determine the electricity usage of a charging station connected to its distribution grid?

Greenlots defers to the responses and judgements of utilities in answering this question.

10. Would utilities prefer to install their own meters or rely on meters included in the EV charging stations?

Greenlots defers to the responses and judgements of utilities in answering this question.

11. If a utility relies on the meter in a charging station to measure electricity service to that charging station, will the utility be able to determine the time of sale for each kWh delivered to the charging station for the purpose of applying time-of-use-rates to the electricity delivered?

Yes, this is possible when appropriate, smart, networked EV chargers with sub-metering capabilities are used in conjunction with – or even in the absence of – AMI/smart meters. This capability is already being utilized in other jurisdictions, including California and Minnesota.

12. Can EV charging stations be configured so that more than one vehicle can charge at a single station at the same time (e.g., multiple cables or automatic disconnect when one car is fully charged) to avoid the need for one car to move to a new parking space in order for the second car to charge?

Some chargers support this capability, but DC fast chargers have generally only supported charging on one port at a time.

Consumer Protection

13. Does any State of Vermont entity currently have the authority to verify the accuracy of the electricity meters in EV charging stations? If yes, which agency? Please describe an appropriate regulatory oversight structure for that role. If no, what agency is best positioned to take on that oversight role and why?

At this time Greenlots defers to the judgement of Vermont state agencies/entities in addressing this question.

14. What recourse would consumers have for complaints arising from public EV charging station usage absent Department of Public Service and Commission jurisdiction?

While Greenlots supports the exemption of entities providing EV charging services not otherwise utilities from utility economic and rate regulation, regulation or support with respect to both consumer protection and safety is appropriate. In some cases or jurisdictions these functions may be appropriately offered by other agencies. While utility investments come with certain inherent protections in these areas, this is not necessarily the case with other market participants, especially when competition is non-existent or limited. While Vermont may decide that safety considerations are appropriately addressed by other state and local agencies, ensuring that appropriate consumer recourses and protections are maintained absent traditional regulation from the Commission should be a primary consideration for stakeholders.

15. What information should be available to the users of public EV charging stations at the time they are charging their vehicles (e.g., phone number for technical assistance from station operator, phone number for consumer protection assistance, etc. posted in plain view on the charging station)?

This is a larger discussion that we're seeing addressed in some states in a weights and measures pathway, but by and large, yes, at minimum, users should be able to have a support number available when charging. Pricing (especially) dynamic, and other considerations may best be communicated via app, but this is generally an appropriate set of questions to further explore.

Utility Participation

16. Do third-party charge providers compete directly with utilities in any other states?

Greenlots disagrees with the premise of this question. Utility investment in EV charging infrastructure and their provision of EV charging services should not be confused for anti-competitive behavior, or that they are competing with other providers. Rather, utility investment in charging infrastructure, growing the installed infrastructure base, helps spark EV purchasing decisions and grow the total customer base, getting the market closer to an inflection point where asset utilization rates of charging infrastructure can attract greater private investment to sustain a healthy, competitive market. At the same time, it provides needed market opportunities for suppliers in the absence of motivated buyers across most market segments, incentivizing competition and product innovation through utility procurement programs.

Beyond direct utility procurement, other market participants benefit from improved economics associated with investing in charging infrastructure, as the utility investment accelerates EV adoption, thereby increasing utilization of non-utility infrastructure. This results in increased opportunities for all market participants, positioning utility investment—including utility ownership—as a market catalyst, rather than a market constraint.

Utility investment in EV charging infrastructure fundamentally enables electric vehicle service providers and grows the market – which results in a virtuous cycle for drivers and electric vehicle charging equipment and service providers, where more drivers improve the business case for charging such that more charging is deployed, which draws more drivers to adopt electric vehicles. Therefore, utility investments in charging infrastructure should be seen as a needed complementary approach to catalyzing the market in addition to anything being developed by third parties.

17. Do any Vermont utilities have an interest in offering their own charging facilities? If so, how would that arrangement be structured (e.g., facilities and services subject to traditional utility regulation or services provided by an affiliate subject to the same level of regulation applied to non-utility providers of charging services)?

Greenlots defers to the utilities in answering this question.

18. Are there states that treat charging stations owned by utilities differently than they treat charging stations owned by non-utilities? If so, please identify those states and describe the differences in treatment and the reasons therefor.

Greenlots is not aware of any state that treats charging stations owned by utilities identically to the way they treat charging stations owned by non-utilities. In particular, the application of utility regulation differs in these two contexts.

19. If a utility offers time-of-use rates to a residential customer for charging an EV at home, or to a business customer for charging employee EVs at work, would or should that utility also offer the same time-of-use rates to non-utility operator of a public EV charging station? What considerations would go into determining whether to tariff such an offering?

While deferring to the responses and judgements of utilities in answering this question, we note that generally speaking, the most appropriate rates for non-utility operators of public EV charging stations is the otherwise applicable commercial rate for that context. While there has been much talk about differential rate treatment for non-utility DCFC operators to provide demand charge relief, Greenlots recognizes that demand charges send important price signals, and we generally do not support their blanket removal or retiring for DCFC applications, as this largely ignores technology-based alternative solutions. Smart charging technology alone can significantly reduce costs associated with demand charges, and integrating storage with charging can provide more flexibility and potential cost savings.

General

20. Are there other considerations that these questions do not reflect, and if so, what are they?

As a variety of these questions address considerations surrounding utility involvement in transportation electrification, we feel it is important to recognize that a deep and flexible utility role is essential to leverage its full involvement, assets and capabilities to accelerate the market and best position ratepayers to realize the full array of benefits transportation electrification can bring. Whether this be the ownership of charging infrastructure or the development of rates that send better price signals to manage EV loads in ways that best support the needs of the grid, or minimizing or avoiding unnecessary grid investments by knowing where, when and how EV loads are interacting with distribution infrastructure; these and many other benefits will not be fully realized without deep and active participation by the utility. These realities are reflected in the 2018 Multi-State ZEV Action Plan developed by the ZEV Task Force, which Vermont is part of, recognizing the need for broad utility involvement.

Moreover, the nature of EVSE assets, being a natural extension of existing utility infrastructure, with similar hardware, features and capabilities as for example smart meters, fit very well within the core competencies and capabilities of utilities. This is particularly true with respect to ownership and maintenance of widely-dispersed, long-lived electricity-dispensing and metering equipment, and ensuring the safety and reliability of those assets. Having existing qualified field personnel allows for this, while purchasing economics to lower costs and having relevant system, business process, software and customer service expertise and capabilities further aligns naturally with the demands of successful EVSE deployment. Utilities are also well positioned to support the hiring and training of field support personnel and other key roles necessary execute the electrification of transportation.

Utility programs also by and large can extend the same type of reliability to EV charging infrastructure that ratepayers expect for all other utility services. A badly undervalued aspect of the EV charging equipment and services market is the cost associated with keeping equipment up and running and repairing or replacing it quickly if and when it encounters an issue. While early adopters of EVs may tolerate the often-poor reliability associated with much of the charging infrastructure that is deployed today, the broader market likely will not. Moreover, as the demands on EVSE deployments increase with more EV drivers on the road, many of the factors that lead to poor reliability may compound. This therefore represents a key barrier to widespread transportation electrification. To achieve the level of reliability drivers currently experience from traditional fueling stations, much more needs to be done. Utility program investment offers opportunity for electric vehicle service providers to benefit from a more accurately valued maintenance service that will not only improve reliability of EVSE within the utility program, but will likely extend beyond the bounds of the program to benefit EV charging equipment and service providers in the market as a whole.

Without an integrated, holistic approach developed by the utility, the ability of the EV consumer to engage suffers, with the EV charging space fragmented by geography, market segment, business structure and sales priorities. The end consumer (the driver) can become frustrated as a result of this fragmented and disparate approach. However, the utility stands in a unique and powerful position to help resolve these issues with a more comprehensive, structured and rational approach that overcomes barriers to market growth and ensures and maximizes benefits to all ratepayers. Without prescribing a specific role for the utility within the context of market accelerator, Greenlots believes that providing flexibility for utilities to self-select the role(s) that best fit(s) its distribution system, customers, and future planning is essential to helping motivate the utility to be excited about its involvement in accelerating the market.

It is clear that the deeper the utility role, the greater the benefit to ratepayers, EV drivers, auto manufacturers, and indeed EV charging companies. Ratepayers benefit in many ways, but the ability of the utility to minimize costs associated with unmanaged charging and maximize positive load shape is key to realize the greatest depth of benefits to ratepayers. This implicates active

management and visibility, though utility management does not necessarily require asset ownership.

EV drivers benefit the most from the deployment of an adequate volume of charging infrastructure that is well maintained and reasonably priced. These are implicit characteristics of infrastructure owned and managed by utilities. Critically, this infrastructure deployment allows the barrier of range anxiety to be eliminated. Auto manufacturers are focused on selling vehicles and with a few exceptions have not made meaningful investments in charging infrastructure. The existing lack of infrastructure has been a primary barrier for auto manufacturers to assess demand for electric vehicles and has slowed down investment, planning, and development in electric models. An adequate volume of charging infrastructure means that auto manufacturers can focus on non-infrastructure barriers such as model availability, dealership training, marketing, etc. Charging software and hardware providers benefit directly from utility ownership by competing for the utility's business in the procurement of charging products and services. Direct utility procurement results in a marketplace with decisions based upon features, functions, track record, and price, allowing big and small players to participate with a leveled playing field.

Conclusion

Greenlots encourages the Commission to consider the virtues of deeper, flexible utility involvement in its analysis of the utility's relationship to other market participants and the market as a whole. Greenlots appreciates the work that the Commission has invested into this process, and the opportunity to offer these comments. We look forward to continued participation in this investigation and digging more deeply into the relevant issues to best be able to support transportation electrification and advanced mobility in Vermont.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Thomas Ashley', with a stylized, cursive script.

Thomas Ashley
VP, Policy