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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Rocky Mountain Power to Implement the Programs Authorized by the Sustainable Transportation and Energy Plan Act	**Docket No. 16-035-36** UCE Exhibit 4.0 – Phase Three Direct Testimony

PHASE THREE DIRECT TESTIMONY OF KEVIN EMERSON

ON BEHALF OF

UTAH CLEAN ENERGY AND

SOUTHWEST ENERGY EFFICIENCY PROJECT

DATED this 6th of April, 2017

Sophie Hayes
Attorney for Utah Clean Energy

INTRODUCTION

Q. Please state your name and business address.

A. My name is Kevin Emerson. My business address is 1014 2nd Ave, Salt Lake City, Utah 84103.

Q. By whom are you employed and in what capacity?

A. I am the Energy Efficiency Program Director for Utah Clean Energy, a non-profit and non-partisan public interest organization whose mission is to lead and accelerate the clean energy transformation with vision and expertise. We work to stop energy waste, create clean energy, and build a smart energy future.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Utah Clean Energy (UCE) and the Southwest Energy Efficiency Project (SWEEP).

Q. Please review your professional experience and qualifications.

A. I have worked for Utah Clean Energy since 2006. I serve as a regular participant on RMP's DSM Advisory Group and Steering Committee, and since 2013 I have led electric vehicle policy efforts for Utah Clean Energy. Through my work with Utah Clean Energy over the last 10 years, I have been involved in a number of regulatory dockets, including rate cases, tariff filings, and other dockets relating to energy efficiency and demand-side management. I have over 10 years of experience working on state, local, and national energy policy, providing expertise and policy support on energy efficiency

and electric vehicle issues. I have served on numerous energy policy working groups and taskforces, co-chairing the Building Committee that developed the Building Efficiency recommendations of Governor Herbert's Energy Efficiency and Conservation Plan. I graduated with a Bachelor of Science degree in Environmental Studies from the University of Utah and a Master of Science degree in Environmental Sustainability from the University of Edinburgh in Edinburgh, Scotland.

OVERVIEW AND CONCLUSIONS

Q. What are Utah Clean Energy's and SWEEP's interests in Rocky Mountain Power's electric vehicle incentive program?

A. Utah Clean Energy and SWEEP strongly support a transition to electrified transportation as part of a more efficient, cleaner, and smarter energy future. Today, approximately 2,500 electric vehicles (EVs) are registered in the state of Utah. This represents less than 1% of the total number of light duty passenger vehicles in the state. Through the passage of the STEP Act, Rocky Mountain Power received approval to provide expanded EV infrastructure on behalf of its ratepayers. Expanded EV charging infrastcutre at home, at places of work, and in public settings is critical to overcoming "range anxiety" among potential EV owners. Once someone realizes that EV infrastucture is widely available they will be more likely to select an EV. In the near term, each fully electric EV benefits local air quality immediately by eliminating the PM2.5 and other criteria pollutantion emissions within Utah's nonattainment areas. Even when accounting for upstream electricity generation emissions EVs reduce PM2.5 and

other critera pollutants by up to 99% as compared to gasoline-powered vehicles[1]. EVs also represent an opportunity to reduce carbon dioxide emissions as the utility sector transitions toward less fossil-fuel intensive resources. Transitioning to EVs also reduces transportation costs for Utah residentis and businesses since charging an EV typically saves bewteen $345 and $646 annually in fuel costs compared to a typical gasoline vehicle.[2] In the long-term, greater deployment of EVs represents an opportunity to make the electric grid more flexible and resilient, for example, by enabling 2-way communication bewetween EVs and the utility.

Q. What is the purpose of your testimony?

A. My testimony addresses Rocky Mountain Power's plug-in electric vehicle incentive pilot program design. (Utah Clean Energy witness Sarah Wright will address the Company's Time of Use rate design proposals to encourage residential charging in off peak hours.) UCE and SWEEP are generally supportive of the Company's incentive proposal, as this proposal will play an important role in expanding EV charging infrastructure in the non-residential sector in Utah. However, UCE and SWEEP oppose the Company's exclusion of a standalone residential Level 2 charger incentive as most charging takes place at home. Exclusion of this group is leaving out a large segment of Rocky Mountain Power customers, who represent an important opportunity to install additional EV infrastructure. UCE and SWEEP also recommend modifications to the

[1] Southwest Energy Efficiency Project and Utah Clean Energy (January 2017) *The Potential for Electric Vehicles to Reduce Vehicle Emissions and Provide Economic Benefits in the Wasatch Front*, available at: http://www.swenergy.org/data/sites/1/media/documents/publications/documents/2017_EV_Emissions_Update_Wasatch_Front_Jan-2017.pdf.
[2] Ibid.

non-residential incentives category by proposing an explicit breakout for multifamily Level 2 chargers to address this harder-to-reach category and provide opportunity for residential customers in the multifamily hours to have access to Level 2 charging infrastructure. We also recommend a modification to the DC Fast Charger category to better align the incentive with the current state of EV technology. Our proposal retains the same total annual budget that the Company proposed.

PLUG-IN ELECTRIC VEHICLE INCENTIVE PILOT PROGRAM

Q. What is the basis for the company's proposal?

A. As part of the comprehensive legislative package that was the "Sustainable Transportation and Energy Plan," in 2016, the Utah Legislature enacted Utah Code Section 54-20-103, "Electric vehicle incentive program," which is set forth below:

> (1) The commission shall, before July 1, 2017, authorize a large-scale electric utility to establish a program that promotes customer choice in electric vehicle charging equipment and service that includes:
> (a) an incentive to a large-scale electric utility customer to install or provide electric vehicle infrastructure;
> (b) time of use pricing for electric vehicle charging;
> (c) any measure that the commission determines is in the public interest that incentivizes the competitive deployment of electric vehicle charging infrastructure.
> (2) The commission may review the expenditures made by a large-scale electric utility for the program described in Subsection (1) in order to determine if the large-scale electric utility made the expenditures prudently in accordance with the purposes of the program.
> (3) A large-scale electric utility proposing a program for approval by the commission under this section shall, before submitting the program to the commission for approval, seek input from:
> (a) the Division of Public Utilities;
> (b) the Office of Consumer Services;

(c) the Division of Air Quality; and
(d) any person that fi[3]les a request for notice with the commission.

Q. Please describe the Company's proposed incentives for electric vehicle charging infrastructure.

A. The Company has proposed different incentives for the following: participation in a Time of Use (TOU) pilot program, non-residential alternating current (AC) Level 2 Chargers, DC Fast Chargers, and custom projects. The Company has allocated annual incentive caps for each of these different incentive categories along with different prescriptive incentives that will be offered to individual customers.

Q. What is the Company's proposal for residential incentive?

A. The Company has proposed a prescriptive incentive for residential customers participating in the Time of Use pilot program. A maximum "up to" incentive of $200 will be offered to a residential customer who owns an EV that participates in the TOU pilot program.

Q. What are your concerns with the Company's proposed residential incentive?

A. There may be some reluctance to enroll in the TOU pilot rate so UCE and SWEEP support the Company's proposal to provide an incentive to induce customers to enroll into the TOU pilot. Currently residential EV charging consists of a mix of Level 1

[3] Level 2 chargers run on 240-volt current and are faster than traditional, Level 1 chargers, which run on 140-volt current.

and Level 2 charging infrastructure. For customers already using Level 2 chargers, an up-to $200 incentive is likely sufficient to encourage them to participate in the TOU pilot. While this TOU incentive will assist in garnering greater participation in the TOU pilot program, the Company's proposed incentive to participate in the residential TOU pilot does not empower residential customers to invest in Level 2 chargers and utilize a TOU rate in a way that most efficiently utilizes the electric grid.

Q. Why is failure to install Level 2 chargers at home a problem?

A. The vast majority of EV charging is expected to take place at home. The report by the Idaho National Laboratory (INL), *Plugged In: How Americans Charge their Electric Vehicles,* found that between 84% and 87% of EV charging took place at home, depending on the vehicle type[4]. It is important to make decisions today to help residential customers adopt technologies for at-home charging that enable the most efficient use of the electric grid. Level 2 charging infrastructure is needed to effectively enable residential customers to shift their EV charging to "super off-peak" hours, as explained in Mrs. Wright's testimony. A lack of residential Level 2 charging infrastructure will prevent the most efficient charging behavior going into the future.

[4] Idaho National Lab, *Plugged In: How Americans Charge their Electric Vehicles*. (2015) https://avt.inl.gov/sites/default/files/pdf/arra/SummaryReport.pdf.

Q. How do Level 1 EV chargers fail to enable the most efficient use of the electric grid?

A. Level 1 chargers typically add 2-5 miles of range per hour of charging and hence take more than 8 hours to provide a full charge,[5] whereas Level 2 charger take much less time. In fact, the INL study previously cited found that Level 2 at-home charging was completed in 5 hours and most within 1-3 hours[6]. The experience cited in this study shows how helpful at-home Level 2 charging is to complete charging in a shorter timeframe that aligns the "super off-peak" hours demonstrated in Sarah Wright's testimony. Expanded Level 2 charging infrastructure will enable customers to charge their vehicles entirely within "super off-peak" hours, setting the stage for system-wide benefits. On the other hand, customers with Level 1 chargers will not be able to charge their vehicles entirely within the duration of super off peak hours of lowest utility demand. At this time of increased awareness of and demand for EV we should help shift the growing EV market toward chargers capable of charging vehicles in a way that eases demand on the grid while accommodating vehicles with larger battery capacities.

Q. Do technological changes in the EV market exist that make the issue of expanded Level 2 at-home charging especially relevant today?

A. Yes. The battery capacity of EVs continues to increase as more advanced and longer range EV models, such as the Tesla Model 3, Chevrolet Bolt, and the next generation Leaf are becoming available in the market. All will have a 200-plus mile

[5] U.S. Department of Energy, *Plug-In Electric Vehicle Handbook for Workplace Charging Hosts, Clean Cities* http://www.afdc.energy.gov/uploads/publication/pev_workplace_charging_hosts.pdf.
[6] Idaho National Lab, *Plugged In: How Americans Charge their Electric Vehicles*. (2015) https://avt.inl.gov/sites/default/files/pdf/arra/SummaryReport.pdf.

range. Level 1 chargers will have an increasingly difficult time fully charging these vehicles in Rocky Mountain Power's "super off-peak" hours of lowest system demand.

Q. Do you recommend an incentive for Level 2 residential charging infrastructure?

A. Yes. The Company should provide a meaningful incentive for residential Level 2 charging. As we understand it, the residential EV incentive was originally envisioned as an incentive for residential charging infrastructure, but, in the end, the Company changed its proposed incentive to a 'thank you' payment for TOU pilot participants designed to induce participation in the TOU pilot. The Company plans to recruit customers who own EVs to participate in the proposed EV TOU rate by offering an "up-to" $200 incentive.

As noted earlier, a majority of EV owners are expected to rely on at-home EV chargers, and the cost of charger and installation can be significant. The INL study found that the average cost of residential Level 2 chargers and installation was $1,354.[7] The $200 incentive, which is primarily a 'thank you' for participating in the TOU pilot, doesn't overcome the existing cost barrier for widespread installation of Level 2 at-home charging.

Furthermore, home charging is more likely to take place overnight during off peak periods in contrast to public and commercial charging. This has the potential to provide a benefit to the grid and all rate payers. I therefore strongly recommend a direct Level 2 EV charger incentive for residential customers.

[7] Ibid.

Q. Can you provide examples of utilities that are already providing incentives for residential charging infrastructure?

A. As more EVs become more widely available in the market, it is becoming a standard practice for utilities to offer incentives to expand residential EV charging infrastructure. Numerous utilities offer incentives that exceed $200. For example, Puget Sound Energy offers $500, Indiana-Michigan Power offers $2,500, Lansing Board of Power and Light offers $1,000, Great River Energy offers $500, and Northern Indiana Public Service Company offers $1,650.[8]

Q. What is Utah Clean Energy's and SWEEP's proposal for expanding residential EV charging infrastructure?

A. I recommend that the Company reallocate $50,000 from the Grant-Based Custom Projects and Partnerships category to a new Residential Level 2 EV charger incentive category. Specifically, the incentive should be $500 per charger, capped at 75% of the cost of the charger plus installation. The incentives should be initially capped at 100 Level 2 chargers for the first year, for a total annual budget of $50,000. This incentive should be monitored and possibly reduced after the first year. If there is low demand, un-used funds could be shifted to the general Grant-Based Custom Project program. With a cost of $50,000, I believe this proposed incentive is a modest and reasonable budget for this important sector, where the majority of EV charging takes place. Leaving residential

[8] Southwest Energy Efficiency Project, *How Leading Utilities are Embracing Electric Vehicles* (2016) http://www.swenergy.org/data/sites/1/media/documents/publications/documents/How_Leading_Utilities_Are_Embracing_EVs_Feb-2016.pdf.

Level 2 EV chargers "off the table" limits residential customers from benefitting in the same way as non-residential customers from ratepayer-funded EV charger incentives approved through STEP Act.

Q. Why do you propose an incentive of $500 per charger, capped at 75% of the cost of charger and installation for residential charging?

A. Given that the average cost of a Level 2 chargers with installation is likely to be over $1,300, I believe $500 is a reasonable incentive that will help drive the market for residential charging. Offering a residential Level 2 EV charger incentive that also covers part of the cost of installation is equitable given that the Company has also proposed to include charger and installation costs up to 75% of costs for the Non-residential and DC Fast Charger EV incentive categories.

Q. Does your proposed new residential Level 2 incentive have any other benefits to the EV phase of this Docket?

A. Yes, in addition to helping to encourage the installation of new Level 2 EV chargers in the local market, this incentive could help increase the pool of residential customers to recruit to participate in the TOU rate pilot.

Q. What is the Company's proposal for non-residential EV charger incentives?

A. The Company has proposed an incentive of up to $3,000 per Level 2 charger, capped at 75% of total charger and installation costs, with an annual incentive cap of $400,000.

Q. What is your response to the Company's proposed non-residential EV charger incentives?

A. The incentive amounts per station for non-residential Level 2 chargers should be increased. In many cases, the costs of installation can be much higher than just the cost of the charger itself, due to the costs associated with getting electricity to the parking spot. The U.S. Department of Energy commissioned an analysis of the costs of installing non-residential charging in 2015, and found that the cost of a single port charger for workplace or public charging typically varied from $1,700-6,000 for the equipment, and installation costs that averaged $3,000 and ranged up to $12,700.[9]

Q. Are the Company's proposed incentives aligned with similar incentives being offered by other utilities?

A. No. The utilities that UCE and SWEEP investigated have higher incentives for non-residential customers. When looking at other incentive programs for EV charging infrastructure in the western US, we found higher levels of funding per site. For example, in Colorado EV chargers incentives are provided through the Charge Ahead program, administered by the Colorado Energy Office and the Regional Air Quality Council.

[9] http://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf.

Charge Ahead will fund up to $3,260 for a single port Level 2chargers, and $6,260 for the more common dual port charger[10]. This covers up to 80% of the costs of the charger and a portion of installation costs.

In Nevada, NV Energy administered a Shared Investment program that offered up to $5,000 for single port Level 2 charger and $7,000 for dual port Level 2 chargers. In California, the PUC recently approved a settlement in which PGE pays the entire cost of getting electricity to the charger. The site host then purchases and owns the charger, and PGE pays 25% of the costs of the charger for workplace charging, 50% for multifamily housing, and 100% if it is located in a low income disadvantaged area.

Q. What is your recommendation for non-residential Level 2 chargers?

A. We believe that the $3,000 incentive cap proposed will likely limit the uptake of these rebates, and result in inadequate deployment of charging infrastructure. Therefore, we recommend the Company offer $4,000 incentives per charger, capped at 75% of the cost of charger and installation, per single port Level 2 charger and $7,000 per dual port Level 2 charger. It is my understanding that the Company's proposal applies only to single port Level 2 chargers. Dual port chargers cost approximately twice as much as single port chargers, and hence we propose the higher incentive level.

We also recommend that the effectiveness of these rebate levels be evaluated after one year, and that the Company consider modifications to the rebate levels if necessary in order to get uptake.

[10] https://raqc.egnyte.com/dl/q67J2egDh5/Charge_Ahead_Colorado_Grant_Application_Guide.pdf.

Q. Do you have comments related to other categories of non-residential EV charger infrastructure?

A. Yes. Under the Company's proposal, multifamily is grouped within its non-residential category. However, EV charging in multifamily housing is critical to EV adoption, and is much more challenging than workplace charging[11]. This is recognized, for example, in the PGE program, which provides the full cost of electrical service to the site and provides higher rebates for the EV chargers for multifamily than for workplace charging. Achieving increased Level 2 EV charger installations in this sector will require covering beyond just the cost of the charger, as it is usually more expensive to install chargers in multifamily units.

Q. What is Utah Clean Energy's and SWEEP's EV charger incentive proposal for multi-family customers?

A. We recommend that multifamily customers be broken out as a separate subcategory within the non-residential category, with the incentive offering of $8,000 capped at 80% of the cost of the EV charger and installation per single port charger and $10,000 (also capped at 80%) for dual port chargers and their installation.

The annual budget for this new multifamily category could be set initially at $100,000 – reducing the annual budget for non-residential, non-multifamily incentives to

[11] Peterson D., *Addressing Challenges to Electric Vehicle Charging in Multifamily Residential Buildings*, UCLA, Luskin Center for Innovation, June 2011. http://innovation.luskin.ucla.edu/sites/default/files/EV_Multifamily_Report_10_2011.pdf.

$300,000. (See Table 1 at the end of my testimony for a summary of UCE's incentive proposals.) Alternatively, this new category could be developed within the Grants-based Custom Projects and Partnerships category.

Q. **Why does Utah Clean Energy propose a separate category for incentives to the multifamily units?**

A. Given the high costs associated with installing a Level 2 EV charger in the multifamily setting, it is worth exploring allocation of some budget towards covering the cost of installation. Multifamily units are a fairly important section of the market, and as the majority of EV charging takes place at home, helping promote charger installations in multifamily units will help drive the EV market in Utah. During this first year we recommend that the Company conduct interviews with multifamily owners to better understand challenges of expanded EV infrastructure in the multifamily sector and what ongoing incentive levels and structures would be most effective at expanding EV infrastructure in this sector.

Q. What is the Company's proposal for DC fast charger incentives?

A. The Company has proposed providing an incentive of up to $30,000 per charger, capped at 75% of total charger and installation cost, with an annual budget of $400,000.

Q. What is your response to the Company's proposed DC Fast Charger incentives?

A. The Company's proposal underestimates the cost of installing DC Fast Chargers (DCFC). UCE and SWEEP are concerned that the proposed incentives will be

insufficient to stimulate additional deployment of DCFC. This is particularly a problem for DCFC in rural areas along highway corridors, where the cost of access to power is higher.

Q. Do Utah Clean Energy and SWEEP have concerns about the ability of the Company's incentive proposal for DC Fast Chargers to drive the market?

A. Yes. SWEEP recently conducted an analysis of the costs of installing DC Fast Chargers (DCFC) in both urban areas and rural highway corridors, and found that the cost of these systems in Colorado can range from $165,000 to $195,000 for highway corridor charging.[12] Thus, in our opinion, unless someone was already planning on doing an installation, the $30,000 incentive is unlikely to move the market. We believe that rural highway corridor charging is more likely to be funded through the Company's proposed Grant-based Customer Projects and Partnerships program. Even for urban DCFC, however, SWEEP's study found costs ranging between $45,000 and $85,000, with a midrange of $65,000. Since it is difficult for station operators to even recover the full operating and maintenance costs of DCFC, we believe that the incentive is unlikely to spur additional DCFC installations unless it covers most of the capital cost. I suggest setting the incentive level based on 75% of the midrange urban DCFC cost that SWEEP's study found, which is $65,000. Specifically, I recommend that the DCFC incentive be set at $45,000 per charger, capped at 75% of the cost of the charger and installation.

[12] This SWEEP report scheduled to be published in May, but UCE/SWEEP can provide it upon request.

Q. In the first year of the program that starts July 1, 2017, do you have concerns about the Company's proposal to re-allocate unused funds into the Grant-based Custom Projects and Partnerships category?

A. Yes. The Company proposed that on September 30 of each year, any unused funds from the Non-residential and DC Fast Charging incentive categories would be re-allocated to the Grant-based Custom Projects and Partnership category. Mr. Comeau explains in his testimony that this is designed to "manage the annual budget of $2 million." However, as proposed, this allows only 3 months in the first year for this program to be designed, marketed and rolled out, for customers to purchase EV chargers, and for incentives to be issued (assuming the Commission rules to make the incentives take effect on July 1, 2017). This narrow timeframe would severely limit the uptake of EV incentives in the first year especially at time when these EV charging incentives will be brand new to the market. We would like to work the parties to develop a solution that complies with statute and also meets the needs of potential EV infrastructure participants.

Q. Please summarize your recommended changes to the Company's proposed EV incentive program.

A. We propose the adoption of the abovementioned modifications to the Company's proposed EV incentive program to take into effective starting July 1, 2017. We recommend retaining the Company's proposed $1,500,000 annual incentive budget and making changes between categories to ensure that residential customers have a meaningful incentive to adopt Level 2 AC chargers for at-home charging and TOU participation, so

customers in uniquely challenging multifamily buildings have a meaningful incentive to adopt Level 2 chargers; and to bring DCFC online that are prepared to meet customer needs for the long-term. Table 1 below describes our proposed incentive modifications, reallocation, and annual incentive cap in detail.

Table 1 - UCE/SWEEP's Alternative EV Charger Incentive Program Proposal

	Rocky Mountain Power Proposal			**UCE/SWEEP Alternative Proposal**		
Category	**Measure**	**Incentives "up to"**	**Annual Incentive Cap**	**Measure**	**Incentives "up to"**	**Annual Incentive Cap**
Time of Use Pilot Program	Participation in Time of Use Rate in Electric Service Schedule 2E	$200 per customer	$200,000	No change proposed		
Plug-In Electric Vehicle Charging Stations	N/A			Residential Level 2 Charger (for first 100 customers in Year 1)	$500 per customer capped at 75% of charger and installation	$50,000*
	Non-residential Level 2 Charger	$3,000 per charger up to 75% of total charger and installation	$400,000	Non-residential Level 2 Charger (single port)	$4,000 per charger capped at 75% of total charger and installation	$300,000**
				Non-residential Level 2 Charger (dual port)	$7,000 per charger capped at 75% of total charger and installation	
	N/A			Multifamily Level 2 Charger (single port)	$8,000 per charger capped at 80% of total charger and installation	$100,000**
				Multifamily Level 2	$10,000 per charger	

				Charger (dual port)	capped at 80% of total charger and installation	
	DC Fast Charger	$30,000 per charger up to 75% of total charger and installation	$400,000	DC Fast Charger	$45,000 per charger capped at 75% of total charger and installation	$400,000
	Grant-based Custom Projects and Partnerships	Custom	$500,000	No change proposed		$450,000*
Total	$1,500,000			$1,500,000		
* - Reallocation of $50,000 from Grant-based Custom Projects and Partnerships to new Residential category ** - Reallocation $100,000 from Non-residential to new Multifamily subcategory						

Q. How can this incentive program avoid creating EV infrastructure "stranded costs?"

A. This is an important time to expand local EV charging infrastructure that will be operating for years to come. Yet the Company's proposed program does not specify what standards will be required to ensure that the chargers receiving incentives represent a long-term prudent use of ratepayer funds. The Commission should keep the long-term in mind when approving this incentive, with an eye toward ensuring that EV chargers that receive incentive through this program are future-proofed so they can adapt for future operability. Chargers that are eligible for incentives through this program should be required to meet basic industry-accepted standards for charging, operability, and communications so they will meet customer EV charging needs and minimum electric grid communication for the duration of the chargers useful life.

We recommend that the Commission should require, to the extent practicable, that chargers receiving incentives through this pilot to meet all industry-accepted standards

for EV charger safety and performance, published by entities such as Underwriters Laboratories. In addition, charging equipment with built-in or easy-to-update functionality for remote monitoring, simple customer scheduling, two-way communication between the charger and the utility, and similar functions, should be given preference as these chargers will have a longer useful life as the EV charging market and utility matures and expands in Utah. Electric vehicle chargers that meet these types of standards are less likely to become obsolete in the near term and become stranded costs to the customers and ratepayers in general.

Q. Does this conclude your testimony?

A. Yes.