Exhibit No: 700
Issue: Evergy Transportation Electrification Portfolio
Witness: Max Baumhefner
Type of Exhibit: Surrebuttal Testimony
Sponsoring Party: NRDC and Sierra Club
Case No.: ET-2021-0151
Date testimony prepared: Sept 13, 2021

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Evergy Metro, Inc. d/b/a Evergy Missouri Metro And Evergy Missouri West, Inc. d/b/a Evergy Missouri West for Approval of a Transportation Electrification Portfolio	)))))	**File No. ET-2021-0151**

SURREBUTTAL TESTIMONY OF MAX BAUMHEFNER

ON BEHALF OF

NATURAL RESOURCES DEFENSE COUNCIL AND SIERRA CLUB

SEPTEMBER 13, 2021

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SURREBUTTAL TESTIMONY OF MAX BAUMHEFNER

QUALIFICATIONS AND PURPOSE OF TESTIMONY

Q. Please state your name, position and business address.

A. My name is Max Baumhefner. I am a senior attorney with the Natural Resources Defense Council (NRDC). My office is located at 111 Sutter Street, 21st Floor, San Francisco, California, 94104.

Q. On whose behalf is this testimony being offered?

A. I am testifying on behalf of NRDC and Sierra Club in this proceeding.

Q. Did you file Rebuttal Testimony this proceeding?

A. No, I did not.

Q. Please summarize your relevant experience in the field of electric utility regulation.

A. I have worked for over ten years on utility policies to advance the electrification of the transportation sector. My experience is summarized in my resume, provided as Schedule MB-1. While I have not served as a witness before the Public Service Commission of Missouri, I assisted my colleague, Noah Garcia, in developing the testimony he provided in Case No. ET-2016-0246. I have also served as an expert witness in the following quasi-judicial state utility regulatory commission proceedings:

- Michigan Public Service Commission: Case No. U-20134, Case No. U-20697, Case No. U-20963
- California Public Utilities Commission: Application (A.) 14-04-014, A.14-10-014, A.15-02-009, A.17-01-020, et al., A.18-01-012
- Nevada Public Service Commission: Docket No. 18-02002

- New Mexico Public Regulation Commission: Case No. 20-00237-UT, Case No. 20-00150-UT

I have also been an active participant in coalition engagements in similar quasi-judicial proceedings across the United States. I have also presented before other state utility regulatory commissions, legislatures, energy commissions, air quality and environmental regulatory bodies.

Q. What is the purpose of your testimony?

A. I am testifying on behalf of NRDC and Sierra Club in response to the Rebuttal Testimony of several parties, including:

- Office of the Public Counsel (OPC) witness Geoffrey Marke concerning the need for vehicle charging infrastructure in the service territory of Evergy Missouri Metro and Evergy Missouri West (collectively, "Evergy" or the "Company") and the benefits of transportation electrification;
- OPC witness Marke and ChargePoint witness Justin Wilson concerning Evergy's proposed Residential Rebate and Commercial Rebate programs;
- OPC witness Marke, ChargePoint witness Wilson, and Staff concerning the proposed EV rates; and
- Staff and witness Wilson concerning the proposed expansion of the Clean Charge Network.

THE STATE OF THE ELECTRIC VEHICLE MARKET AND THE NEED FOR CHARGING INFRASTRUCTURE

Q. What is your response to witness Marke concerning the importance of public charging stations to plug-in electric vehicle ("PEV" or "EV") adoption?

A. Witness Marke doubts the importance of public charging and argues that "Evergy's CCN investments suggest that ubiquitous EV charging stations are not strongly correlated with EV adoption."[1] This assertion runs counter to academic research demonstrating that dollars spent to deploy charging infrastructure spur twice as many EV purchases as dollars spent on vehicle purchase incentives (which are also effective in driving EV sales):

> Based on quarterly EV sales and charging station deployment in 353 metro areas from 2011 to 2013, our empirical analysis finds indirect network effects on both sides of the market, with those on the EV demand side being stronger. The federal income tax credit of up to $7,500 for EV buyers contributed to about 40% of EV sales during 2011–13, with feedback loops explaining 40% of that increase. A policy of equal-sized spending but subsidizing charging station deployment could have been more than twice as effective in promoting EV adoption.[2]

Public charging is also needed to enable widespread EV adoption that will provide widespread benefits to *all* customers. As researchers from Idaho National Laboratory note, "the availability of public infrastructure provides consumer confidence against 'range anxiety,' or the perceived fear by battery electric vehicle drivers of becoming stranded once the battery is depleted; however, this availability means that infrastructure must naturally

[1] Marke Rebuttal, page 9, lines 2-3.
[2] Shanjun Li, Lang Tong, Jianwei Xing, and Yiyi Zhou, *The Market for Electric Vehicles: Indirect Network Effects and Policy Design*, Journal of the Association of Environmental and Resource Economists Vol. 4, No. 1, March 2017, available at: https://doi.org/10.1086/689702

precede the adoption of PEVs."[3] The downward pressure on electric rates that could result from widespread EV adoption that improves the utilization of the grid is less likely to materialize unless a sufficient public charging network is established and charging is effectively managed.

As noted by the National Academies of Science, electric utilities are well-situated to facilitate the public charging network needed to enable widespread EV adoption:

> That conclusion reflects the prospect that a network of public charging stations would induce more utility customers to purchase PEVs, which would lead not only to electricity consumption at the public chargers, but also to much greater consumption of electricity at residences served by the utilities. If public charging infrastructure drives greater [electric vehicle miles travelled] and greater deployment of vehicles, capital and variable costs for public infrastructure might be covered by the incremental revenue from additional electricity that PEV drivers consume at home, where roughly 80 percent of PEV charging takes place.[4]

Accordingly, the Company's goal of increasing access to public charging is well-justified and aligned with the consensus of experts in the field.

Q. What is your response to witness Marke concerning the need for additional charging infrastructure to support vehicle electrification in Evergy's service territory?

A. Witness Marke testifies that the possibility of federal funding for public charging infrastructure in Missouri should result in the denial of Evergy's proposal.[5] He further testifies that, even if federal funding never comes to fruition, sufficient charging

[3] Jim Francfort et al., *Considerations For Corridor and Community DC Fast Charging Complex System Design*, p. ii (March, 2017), available at: https://avt.inl.gov/sites/default/files/pdf/reports/DCFCChargingComplexSystemDesign.pdf, last checked June 21, 2021.

[4] National Research Council of the National Academies of Sciences, *Overcoming Barriers to the Deployment of Plug-in Electric Vehicles*, The National Academies Press, 2015, at 116.

[5] Marke Rebuttal, page 10, lines 16-19 and page 12, lines 22-25.

infrastructure either already exists[6] or will be built by private actors.[7] I disagree with his assessment. While the EV market is primed to expand rapidly, that expansion could be hampered by a growing charging infrastructure gap that federal programs and independent investments will be unable to close alone.

Despite challenges felt across the auto industry as vehicle production ground to a halt and auto purchases fell considerably at the outset of the COVID-19 pandemic, EVs sales are growing rapidly, increasing 167 percent during the first half of 2021 compared to the first half of 2020.[8] The second quarter of 2021 was the highest quarter ever for EV sales, with each month setting a new record for that respective month and June marking a record for any month.

On the charging infrastructure front, in the first half of 2021, investor-owned utilities were approved to invest $458 million in transportation electrification programs and a further $301 million is pending approval.[9] Over the same period in 2020, investor-owned utilities were approved to invest $60 million and $158 million was pending approval in transportation electrification programs. Nearly 70 percent of the $458 million approved in the first half of 2021 was from two programs; one from Public Service Electric and Gas Company in New Jersey valued at $205 million and one from Xcel Energy in Colorado valued at $110 million.

[6] *Id.* at page 8, line 20 to page 9 line 3.
[7] *Id.* at page 11, lines 13-15.
[8] Sales data from the Atlas EV Hub Automakers Dashboard (hereinafter, "EV Hub Automakers Dashboard"), available at: https://www.atlasevhub.com/materials/automakers-dashboard/ (license required); last visited September 8, 2021.
[9] Utility investment data from the Atlas EV Hub Utility Filings Dashboard, available at: https://www.atlasevhub.com/materials/electric-utility-filings/ (license required); last visited September 8, 2021.

Back in July of 2020, fifteen states signed a memorandum of understanding committing to 100 percent zero emission bus and truck sales by 2050.[10] Commitments such as these from large vehicle markets will continue to drive investment in EV technology and demand for EVs elsewhere in the country. More than 60 new passenger EV models are expected to reach the market before the end of 2022.[11] New models, including the Ford Mustang Mach-E and Volkswagen ID.4, are competitively priced near the average new vehicle purchase price seen in 2020.[12] The cost of EVs is expected to fall further with advances in battery technology and an expansion of domestic manufacturing. In December 2020, Bloomberg New Energy Finance reported that average battery prices declined by more than 90 percent from 2010 levels and now average $135 per kilowatt hour.[13] Such drastic reductions in battery costs are making EVs of various types and sizes cost-effective more quickly than was previously anticipated. New models are expected in the medium- and heavy-duty vehicle market with major manufacturers, including Volvo, Mack, Daimler, Peterbilt, and Ford promising to produce new electric vans and trucks in 2021.

In the first half of 2021, automakers and manufacturers pledged nearly $58 billion for research, manufacturing, and distribution operations in the United States.[14] This is

[10] Patricio Portillo, *15 States Take Historic Action on Transportation Pollution*, July 14, 2020, available at https://www.nrdc.org/experts/patricio-portillo/15-states-take-historic-action-transportation-pollution, last checked June 21, 2021.

[11] Model data from the Atlas EV Hub Automakers Dashboard.

[12] CNET, *Average New Car Price Crosses $40,000 and That's Just Nuts*, Jan. 13, 2021 (average new vehicle price in 2020), available at https://www.cnet.com/roadshow/news/average-new-car-price-2020/, last checked June 21, 2021.

[13] Bloomberg New Energy Finance, *Electric Cars are About to be as Cheap as Gas Powered Models*, Dec. 16, 2020 (battery price data), available at: https://www.bloomberg.com/news/articles/2020-12-16/electric-cars-are-about-to-be-as-cheap-as-gas-powered-models, last checked June 21, 2021.

[14] Investment data from the Atlas EV Hub Global Private Investments Dashboard: https://www.atlasevhub.com/materials/private-investment/, (license required); last visited September 8, 2021.

nearly twice the amount pledged in all of 2020. The growth in the EV market and the increase in investment by large automakers and manufacturers is consistent with President Biden's Executive Order calling for 50 percent of all vehicles sold to be EVs (including plug-in hybrids) by 2030.[15]

But research demonstrates the pace of charging infrastructure deployment needs to significantly accelerate to meet the needs of the growing EV market:

> To support electric vehicle growth through 2030, public and workplace chargers will need to increase 27% annually, which is less than the rate of charger growth between 2017 and 2020, but requires adding an average of over 200,000 chargers each year by 2026. This growing charging network would include 500,000 public chargers by around 2027, several years faster than the Biden administration's goal for 2030.[16]

And the charging infrastructure gap is even greater in the Midwest and South:

> To meet projected EV growth, public and workplace charging infrastructure will need to grow at greater rates in many rural areas. Many regions across the Midwest and South with less infrastructure investment to date would need annual charger growth rates exceeding 50%, at least double the national average.[17]

In Kansas City, the number of non-home chargers will need to increase from 1,458 in 2020, to 10,314 in 2030 to support anticipated EV market growth.[18]

Mr. Marke's assertion that potential federal funding for charging infrastructure deployment will obviate the need for Evergy's proposed investments does not add up. The

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[15] Taken from the White House, *FACT SHEET: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks*, Aug. 5, 2021, available at: FACT SHEET: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks | The White House, last checked September 8, 2021.
[16] Gordon Bauer, Chih-Wei Hsu, Mike Nicholas, and Nic Lutsey, *Charging Up America: Assessing the Growing Need for U.S. Charging Infrastructure Through 2030,* International Council on Clean Transportation, July 2021, available at: https://theicct.org/publications/charging-up-america-jul2021.
[17] *Id.*
[18] *Id.*

report cited above estimates that the investment needed to close the charging infrastructure gap by 2030 nationally is $28 billion.[19] Other researchers estimate $87 billion (including $39 billion for public fast charging) is needed by 2035 to grow the passenger EV market.[20]

In any case, potential federal investments are not big enough to meet the need. Congress is currently considering a "Bipartisan Infrastructure Framework" that would allocate $5 billion to the U.S. Department of Transportation to provide to the states to facilitate the deployment of EV charging infrastructure and would allocate $2.5 billion for federal grants for EV charging *and* refueling infrastructure for other alternative fuels (meaning only a portion of that $2.5 billion will be used for EV charging). And those funds are meant to meet the needs of both passenger vehicles *and* commercial medium and heavy-duty vehicles. The estimates of the investment needed to close the charging infrastructure gap described above focused exclusively on light-duty passenger vehicles, meaning potential federal dollars that are already insufficient relative to the documented need for light-duty vehicle charging are even more insufficient relative to the combined need for light-, medium-, and heavy-duty vehicle charging. In sum, the limited funds the federal government *may* provide are a much-needed, but far-from-sufficient investment. Utility programs and other investments will still be needed to close a growing charging infrastructure gap.

[19] *Id.*
[20] Atlas Public Policy, *U.S. Passenger Vehicle Electrification Infrastructure Assessment,* available at: https://atlaspolicy.com/rand/u-s-passenger-vehicle-electrification-infrastructure-assessment/

HOW WIDESPREAD TRANSPORTATION ELECTRIFICATION BENEFITS EVERYONE

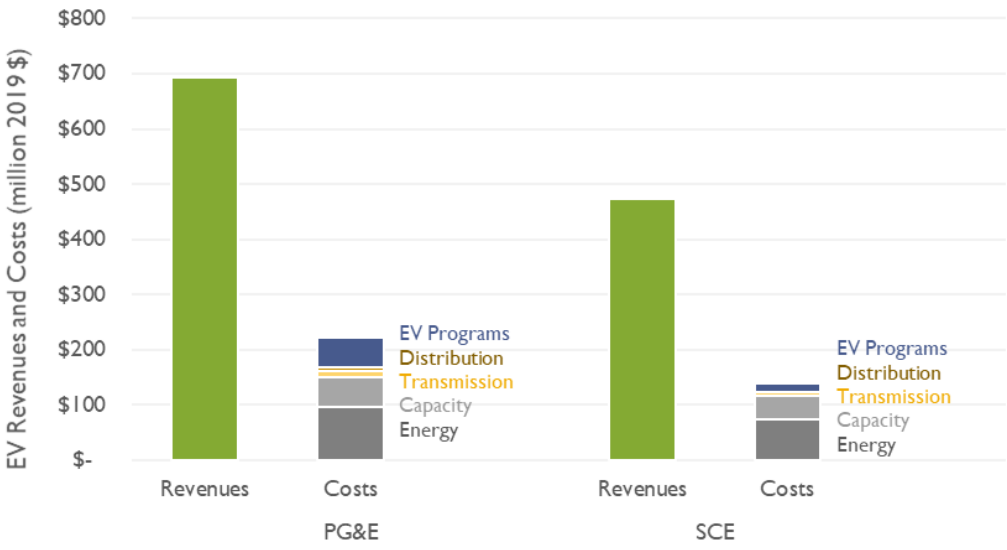
Q. What is your response to witness Marke concerning the grid benefits, including downward pressure on rates, that can result from the use of electric vehicles?

A. Witness Marke does not view downward pressure on rates resulting from electric vehicle charging as a justification for investments to support EV charging infrastructure and contends that "Evergy already has a ubiquitous EV charging infrastructure in place (900+ stations and 1800+ outlets …) and ratepayers have received neither the downward pressure on rates nor mass adoption of registered EVs they were promised as compensation for this existing infrastructure buildout."[21] Mr. Marke provides no empirical evidence that existing EV customers have not already exerted downward pressure on rates in Evergy's service territory. While I also cannot provide Evergy-specific analysis demonstrating otherwise, there is no reason to believe Evergy's territory is somehow different than the service territories in which downward pressure on rates resulting from EV charging has been documented, such that the same basic result would not be replicated in Evergy's territory if that analysis were in hand. In just seven years in the two utility service territories with the most EVs in the United States, EV customers have contributed more than $800 million in net-revenue to the body of utility customers.[22] Synapse Energy Economics evaluated the revenues and costs associated with EVs from 2012 through 2019 in the service territories of Pacific Gas & Electric (PG&E) and Southern California Edison (SCE).[23] The results

[21] Marke Rebuttal, page 8, line 20 to page 9, line 2.
[22] Frost, Jason, Whited, Melissa, and Allison, Avi. *Electric Vehicles are Driving Electric Rates Down.* Energy Economics, Inc., June 2020 Update.
[23] *Id.*

shown in Figure 1 compare the new revenue the utilities collected from EV drivers to the cost of the energy required to charge those vehicles, plus the costs of any associated upgrades to the distribution and transmission grid, and the costs of utility EV infrastructure programs that are deploying charging stations for all types of EVs (programs with budgets that significantly exceed the budgets of Evergy's proposed Transportation Electrification Portfolio and spending on existing EV programs to date).

Figure 1: PG&E and SCE Revenues and Costs of EV Charging, 2012-2019[24]



In total, EV drivers contributed an estimated $806 million more than the associated costs, and that net-revenue was returned to all utility customers in the form of rates that were lower than they otherwise would have been.

Of course, the absolute numbers would be smaller if this analysis were done in Evergy's service territory because there are less EVs in the region, but there is no reason to expect the results would not be directionally the same. Cars are cars, and people are

[24] *Id.* at p. 4, Fig. 4.

people. People drive their EVs and charge them in a similar manner, regardless of where they live. And people generally sleep during the night, regardless of what utility service territory in which they sleep. And EVs are generally charged while people are sleeping, taking advantage of spare capacity in the electric grid and bringing in new revenue in excess of associated costs.

The Synapse Energy Economics analysis described above is retrospective, documenting what has already happened in the real-world, but it also lends credence to prospective estimates of the future benefits that would result from widespread EV adoption. For example, MJ Bradley & Associates estimates that widespread EV adoption and off-peak charging would reduce collective electric utility bills in Indiana by $5.6 billion by 2050.[25] Again, the absolute numbers would be smaller if that analysis were done for Evergy's service territory given it is less populous than the state of Indiana, but there is no reason to believe the results would not be directionally the same.

EV adoption in Evergy service territory has likely already exerted downward pressure on rates, though that is likely a small effect given there are relatively few EVs in the service territory. But widespread EV adoption, which requires widespread access to charging where people live, work, and play, will result in significant downward pressure on rates if charging is properly managed.

[25] MJ Bradley & Associates, *Electric Vehicle Cost-Benefit Analysis Plug-in Electric Vehicle Cost-Benefit Analysis: Indiana*, June 2018. Available at: https://mjbradley.com/sites/default/files/IN%20PEV%20CB%20Analysis%20FINAL.pdf

Q. What is your response to witness Marke concerning the potential for environmental benefits resulting from the use of electric vehicles in Evergy's service territory?

A. Witness Marke testifies that "the positive externalities associated with the net reduction in tailpipe emissions needs to be offset by the increased environmental consequences associated with increased emissions from fossil fuel generation, as well as the greater use of toxicity from heavy metals in the both [sic] the extraction and disposal process."[26] Electric vehicles are cleaner than conventional vehicles today and will become even cleaner as the electric grid transitions to renewable resources like renewable solar and wind power. According to the U.S. Department of Energy and U.S. Environmental Protection Agency, a typical EV charged in Kansas City emits about three times less much carbon pollution per mile as the average new gasoline vehicle, after accounting for power plant emissions.[27] That is the situation today in Missouri. And a comprehensive (800 page, three-volume), forward-looking joint analysis by the Electric Power Research Institute (EPRI) and NRDC finds that widespread EV adoption provides significant reductions in emissions of both greenhouse gases and local air quality pollutants that will grow as the grid becomes cleaner and cleaner.[28] That analysis accounts for upstream emissions from battery manufacturing and power generation.

In fact, EVs are not just a "nice-to-have" source of environmental benefits, but a "must-have" if we are to avoid significant human hardship and dire environmental

[26] Marke Rebuttal, page 7, lines 1-3.
[27] U.S. Department of Energy and U.S. Environmental Protection Agency, *Beyond Tailpipe Emissions Calculator*: https://www.fueleconomy.gov/feg/Find.do?year=2021&vehicleId=43401&zipCode=64030&action=bt3, last checked September 3, 2021.
[28] EPRI and NRDC, *Environmental Assessment of a Full Electric Transportation Portfolio:* Vol. 1- 3, Sept. 2015; available at https://www.epri.com/#/pages/product/3002006881/, last checked June 21, 2021.

consequences. Numerous independent studies have come to the same conclusion: reducing global warming pollution to the levels required to avoid the worst impacts of climate change will require a dramatic shift to electric vehicles powered by renewable and other zero-carbon energy sources.[29] Electric vehicles are also needed to meet air quality standards and address pollution in communities located next to freeways and major roads, who bear the brunt of tailpipe pollution. It is estimated that traffic pollution causes more than 50,000 premature deaths annually in the lower 48 states, which is more than 1.5 times the deaths from traffic accidents on an annual basis.[30]

THE RESIDENTIAL EV REBATE PROGRAM

Q. What is your response to ChargePoint witness Wilson concerning his proposed modifications to the Residential Rebate program?

A. Mr. Wilson supports the Residential Rebate program subject to three modifications: first, that the $500 rebate be available for use "toward both the charger and installation costs;" second, to allow customers to choose to hardwire their Level 2 charging station or to install a NEMA outlet, rather than require installation of a NEMA outlet; and third, to

[29] *See, e.g.*, Williams, J.H. *et al*, *Pathways to Deep Decarbonization in the United States*, ENERGY AND ENVIRONMENTAL ECONOMICS, INC. (E3) (Nov. 2014); California Council on Science and Technology, *California's Energy Future*: *The View to 2050* (May 2011); Williams, J.H. *et al*, *The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity*, SCIENCE 335, No. 6064, pp. 53-59 (Jan. 2012); Cunningham, Joshua, *Achieving an 80% GHG Reduction by 2050 in California's Passenger Vehicle Fleet*, SAE INTERNATIONAL JOURNAL OF PASSENGER CARS—ELECTRONIC AND ELECTRICAL SYSTEMS 3, No. 2, pp. 19-36 (Dec. 2010); Wei, Max *et al*, *Deep Carbon Reductions in California Require Electrification and Integration across Economic Sectors*, ENVIRONMENTAL RESEARCH LETTERS 8, No. 1 (2013); Melaina, M. and K. Webster, *Role of Fuel Carbon Intensity in Achieving 2050 Greenhouse Gas Reductions within the Light-Duty Vehicle Sector*, ENVIRON. SCI. TECHNOL. 45, No. 9, pp. 3865-3871 (2011); International Energy Agency, *Transport, Energy, and CO2: Moving Towards Sustainability*, OECD/IEA (2009); National Research Council, *Transitions to Alternative Vehicles and Fuels,* THE NATIONAL ACADEMIES PRESS (2013).

[30] *See* Caiazzo, Fabio *et al*, *Air Pollution and Early Deaths in the United States*, ATMOSPHERIC ENVIRONMENT 79, pp. 198-208 (Nov. 2013); National Highway Traffic Safety Administration, *Fatality Analysis Reporting System (FARS) Encyclopedia*.

develop a list of qualifying EV charging stations for the Residential Rebate program.[31] Like Mr. Wilson, I support approval of the program and generally agree with his proposed modifications.

"Home charging is a virtual necessity for mainstream PEV buyers," according to the National Academies of Science, in its comprehensive report on barriers to EV adoption.[32] Homes are where vehicles are parked for the most hours of the day, making them the most convenient place to charge, especially overnight when people are sleeping and there is plenty of spare capacity in the grid. Accordingly, the Company is appropriately targeting a critical segment with its Residential Rebate program.

Q. What is your response to the concerns raised by Staff and OPC that the Residential Rebate program will not necessarily support strong integration of EV charging load?

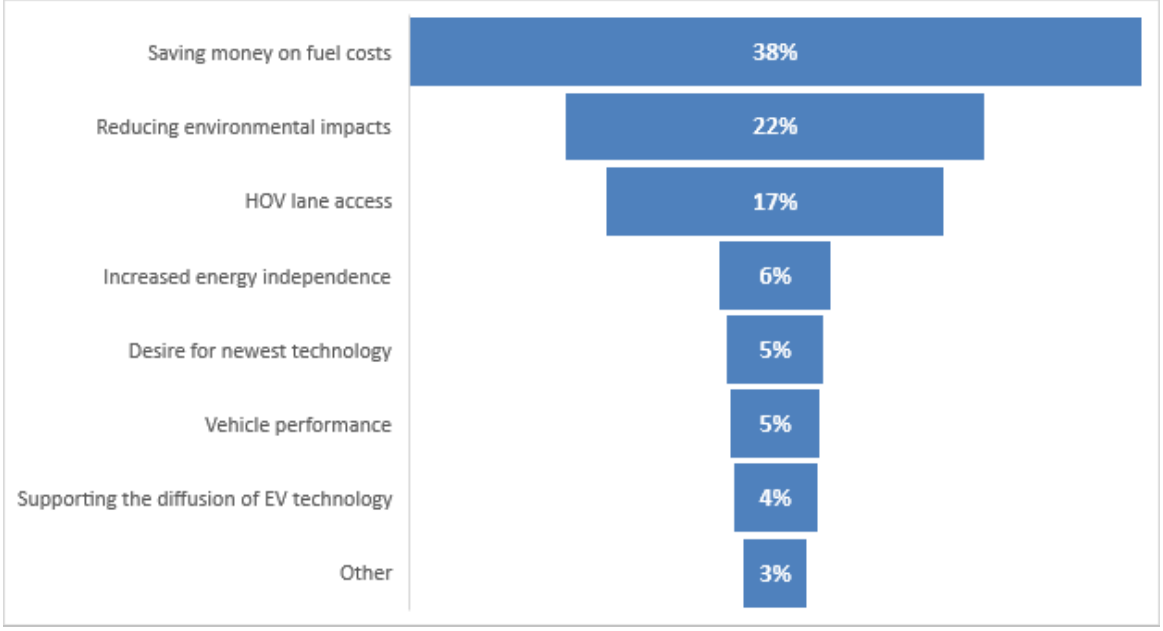
A. OPC witness Marke opposes the Residential Rebate program and argues that instead Evergy should establish a time-of-use rate (TOU) for home charging in its next rate-case.[33] Staff also opposes the program, partially because there is no requirement for participation in a managed charging program.[34] I disagree with the conclusion that the program should be rejected, but I agree TOU rates are an effective means to manage EV charging load and increase fuel cost savings, and agree rebate recipients should be

[31] Wilson Rebuttal, page 7, line 17 to page 9, line 19.
[32] National Research Council of the National Academies of Sciences*, Overcoming Barriers to the Deployment of Plug-in Electric Vehicles*, THE NATIONAL ACADEMIES PRESS (2015), at 83.
[33] Marke Rebuttal, page 16.
[34] *See* Staff Rebuttal, page 15.

required to take service on a TOU rate to help ensure the program supports system-wide grid benefits.

The vast majority of EV charging occurs in the residential segment, and residential rate design and enrollment (rates do not matter if people are not taking service on them) have a direct impact on the fuel cost savings that motivate EV purchase decisions. By encouraging EV drivers to charge in off-peak times when energy production costs are lower, well-designed time-variant rates maximize fuel cost savings, which a survey of nearly 20,000 EV drivers reveals are the single biggest motivator of EV purchase decisions.[35]

Figure 2: Most Important Reason to Acquire an EV[36]



[35] California Clean Vehicle Rebate Project, EV Consumer Survey Dashboard, available at https://cleanvehiclerebate.org/eng/survey-dashboard/ev, last checked June 21, 2021.

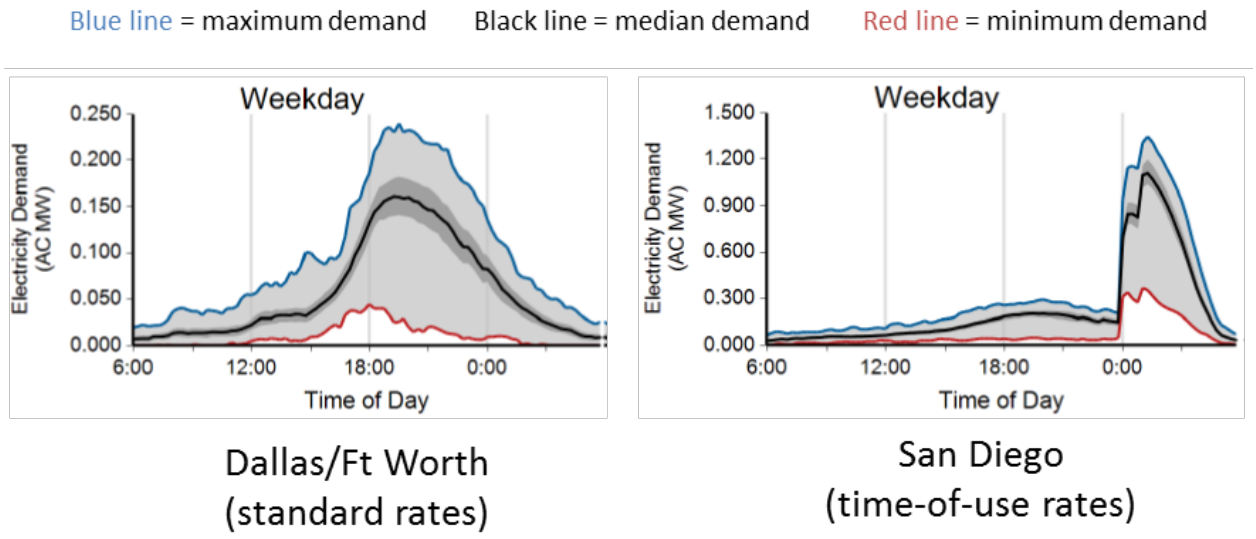
[36] Center for Sustainable Energy, available at *California Plug-in Electric Vehicle Owner Survey Dashboard*, last checked June 21, 2021.

Offering attractive time-variant rates and ensuring as many EV drivers as possible take service on those rates is also key to managing EV charging to support the operation of the grid.

This is not a theoretical proposition, but a phenomenon that has been documented in states across the nation. For example, in Michigan, Consumers Energy's PowerMIDrive pilot showed that participating customers, who are required to take service on a TOU rate, conducted 86 percent of their weekday charging during off-peak hours.[37] And real-world data from other states reveals that EV customers who are not on TOU rates charge immediately upon returning home in the evening, generally exacerbating peak system-wide electricity demand, whereas EV customers on well-designed TOU rates charge almost exclusively during off-peak hours, as illustrated in Figure 3. In contrast to drivers in Texas who charge during evening peak hours, EV customers in San Diego (who were required to take service on a TOU rate designed for EVs as a condition of receiving a free Level 2 charging station) charge almost entirely between midnight and 5:00 AM when people are generally sleeping and there is plenty of spare capacity on the grid.

[37] *See* Consumers Energy response to discovery request, Ex MEC-73 (MEC-CE-695), available at: https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t000000RUASjAAP

Figure 3: Residential EV Charging on Flat vs. Time-of-Use Rates[38]



Accordingly, to increase fuel cost savings and to encourage charging that supports the grid and benefits all utility customers, recipients of Evergy's charging infrastructure rebates should take service on time-variant rates.

THE COMMERCIAL EV REBATE PROGRAM

Q. What is your response to witness Marke concerning the need for additional charging infrastructure in Evergy's service territory?

A. Mr. Marke's assertion that the Commercial rebate program be rejected because he believes there is already adequate public charging infrastructure in Evergy's service territory does not comport with the analysis cited above demonstrating that in Kansas City alone, the number of non-home chargers will need to increase from 1,458 in 2020, to 10,314 in 2030

[38] Schey, *et al*, *A First Look at the Impact of Electric Vehicle Charging on the Electric Grid*, The EV Project at EVS26 (May 2012).

to support anticipated EV market growth.[39] His criticism also fails to appreciate that the Commercial Rebate program is designed to serve the needs of critical segments other than publicly accessible charging, such as workplace and multi-family housing. Multi-family charging, for example, serves the home charging need that Mr. Marke recognizes is so critical for EV adoption.[40]

Unfortunately, less than half of U.S. vehicles have reliable access to a dedicated off-street parking space at an owned residence where charging infrastructure could be installed.[41] As the National Academies of Science notes: "Lack of access to charging infrastructure at home will constitute a significant barrier to PEV deployment for households without a dedicated parking spot or for whom the parking location is far from access to electricity."[42] It is essential for the EV market to move beyond single family detached homes to scale up to meet long-term climate and air quality goals. Experience demonstrates that the multi-family segment requires dedicated attention. Accordingly, I recommend that the Commercial Rebate program be approved and at least 20 percent of Commercial Rebates be reserved for multi-family locations.

[39] *Id.*
[40] Marke Rebuttal, page 18, lines 14-15.
[41] Traut et al., *US Residential Charging Potential for Electric Vehicles*, Transportation Research Part D (Nov. 2013), available at https://www.cmu.edu/me/ddl/publications/2013-TRD-Traut-etal-Residential-EV-Charging.pdf, last checked June 21, 2021.
[42] National Research Council of the National Academies of Sciences, *Overcoming Barriers to the Deployment of Plug-in Electric Vehicles*, THE NATIONAL ACADEMIES PRESS, p. 116 (2015).

Q. Do you agree with Mr. Marke that, if the Commercial Rebate program is approved, the Commission should cap rebate amounts at 20 percent of the total costs of the charging station to be installed?

A. No. The proposed rebate amounts will still require site hosts to put significant "skin in the game," both in the form of additional costs associated with the charging infrastructure and the costs of the vehicles themselves. Mr. Marke's proposed 20 percent cost cap would be below industry best practices and result in inadequate customer participation, especially in hard-to-reach segments like multi-family housing.

Q. What is your response to witness Wilson concerning collection of charger utilization data?

A. Mr. Wilson recommends the "Commission direct Evergy to remove the proposed requirement that site hosts provide Evergy with access to charger utilization data," on the grounds the proposed requirement is too broad and not needed for customers taking service on one of the proposed EV rates given those customers will be separately metered.[43] I would agree with Mr. Wilson that requiring site hosts to provide charger utilization data at sites where the same information can be gathered via separate utility meters is not necessary. However, it does not follow that the Commission should direct Evergy to remove the reporting requirement for all sites, nor does it follow that participating customers should not be required to report on other critical metrics. Instead, Evergy should retain the requirement that site-hosts provide charging utilization and load profile data at sites where the EV charging stations are not separately metered. And to the extent Mr. Wilson's criticism of the proposed requirement is premised upon the open-ended nature of

[43] Wilson Rebuttal, page 11, line 18 to page 14, line 19.

the requirement, I would recommend the Commission direct Evergy to be more specific as to what data customers will be required to provide. Those requirements should be tailored to ensure Evergy can provide the Commission with the information it will need to conduct program evaluation and to inform future Commission policy as well as future program design. Specifically, as it relates to charger utilization, Evergy should report to the Commission on the following:

- Charger utilization and load profiles by segment (public, workplace, multi-family, etc.) and by rate choice (e.g., "Electric Transit Service," "Business EV Charging Service," or other rate).
- Prices paid by drivers at locations where fees are collected from drivers.

To the extent the data needed to report to the Commission on those critical metrics is available through separate utility metering, Evergy need not require site hosts to provide it from EVSE, but in instances where that data is not available from the meter, site hosts should provide it to Evergy. Such reporting requirements are the norm in similar utility programs (see footnote 44) and are a reasonable condition to impose upon the recipient of customer-funded rebates.[44]

[44] *See, e.g.*, Colorado Public Utilities Commission, Docket No. 20A-0204E, *Commission Decision No. C21-0017 Granting Application with Modifications* (mailed Jan. 11, 2021) at ¶ 256 (approving a $110M Xcel Energy electric vehicle program and requiring reporting "data on load-shifting, energy sales during on-peak, shoulder, and off-peak periods from each of the Company's proposed programs, as well as aggregated customer load profile data to allow for comparisons of the impact of differing pricing arrangements on charging behavior" as "important data to develop a more flexible grid."); Michigan Public Service Commission, Case No. U-20134, Order Approving Settlement Agreement (issued January 9, 2019) at Attachment 3, page 2 (approving a $10M Consumers Energy electric vehicle rebate program that "requires site hosts to report pricing for charging, and report to Commission and stakeholders at least annually."); Public Utilities Commission of Ohio, Case No. 16-1852-EL-SSO, Opinion and Order (April 25, 2018) at 30-31 (approving $10M AEP Ohio electric vehicle rebate program and "require[ing] reporting of prices charged to EV drivers at all charging stations in a manner and form as established by AEP Ohio, including, but not limited to, reporting of intended prices as a precondition on receipt of rebates" and requiring collection of following charging station data for reporting purposes: "usage, data regarding grid reliability, load growth, the potential for demand response, load profiles, prices paid by EV drivers and site host pricing models/strategies, equipment provider selected, installation costs by equipment provider, and outage incidents by equipment provider.");

Q. What is your response to witness Wilson concerning the requirement that rebate recipients agree to participate in demand response events?

A. Mr. Wilson recommends the Commission:

> direct Evergy to remove the proposed requirement that customers agree to participate in potential future demand response events. Instead, the Commission should encourage Evergy to propose an optional demand response program for EV chargers in the future for the Commission's consideration.[45]

The Commission should distinguish between requiring customers to agree to participate in future demand response *programs* and requiring customers to agree to participate in future demand response *events* called pursuant to those programs. Mr. Wilson recommends the Commission replace what he describes as a requirement to participate in demand response *events* with a non-binding encouragement that Evergy develop optional demand response *programs*. I agree with Mr. Wilson that it is unreasonable to require customers to agree to participate in future demand response events, but think it is appropriate to require customers receiving rebates to enroll in demand response programs. Once those programs are in operation, customers would retain the discretion as to whether to participate in individual events. I will also note that ChargePoint was a strong supporter of the nation's first EV charging "make-ready" rebate program (Southern California Edison's

Minnesota Public Utilities Commission, Docket No. E-002/M-18-643, *Order Approving Pilots With Modifications, Authorizing Deferred Accounting, and Setting Reporting Requirements* (July 17, 2019) at 22 (requiring annual "site level" reporting of, among other things, "location of the site," "number of ports at the site," "revenues, broken down by a. energy revenues; b. demand charge revenues; and c. fixed cost revenues," and "Rates and fees charged to end-user customers, and if those rates changed during the year, what period they were in effect" as well as monthly "site level" reporting of "kWh consumed in the on-and off-peak periods of Xcel's tariff; 2. Coincident peak demand, at the MISO system peak and NSP system peak, including the time of day at which the peak occurred; 3. Non-coincident peak demand, including the time of day the peak occurred; 4. Number of charging events, times, and durations, to the extent available; and 5. Percentage of charging that aligned with any onsite generation, if applicable.").

[45] Wilson Rebuttal, page 14, lines 15-19.

"ChargeReady Pilot"), which included a nearly identical requirement that customers agree to participate in future demand response programs.[46]

THE ELECTRIC TRANSIT SERVICE ("ETS") AND BUSINESS EV CHARGING SERVICE ("BEVCS") RATES

Q. What is your response to testimony regarding the proposed EV rates?

A. Mr. Wilson recommends the Commission approve the proposed EV rates.[47] Mr. Marke appears to support the proposed EV rates, but raises vague "legal concerns" as to whether this proceeding is the proper venue to consider those rates.[48] And Staff argues the Commission should not approve the proposed rates in this proceeding.[49] Without opining on the legal arguments, I will note that from a practical, program implementation perspective, and to provide greater regulatory certainty, it would be far better for the Commission to approve the proposed EV rates in this case. Doing so would be consistent with the regulatory best practice of many other states in which commissions have often simultaneously approved utility EV programs and new rates designed for EVs that support program implementation and that also support customer adoption of EVs outside the context of specific infrastructure programs.

The "Bipartisan Infrastructure Framework" that Congress is currently considering would amend Section 111(d) of the Public Utility Regulatory Policies Act to require state regulatory commissions to consider rates to expand transportation electrification.

[46] *See* California Public Utilities Commission, A.14-10-014, *Decision Authorizing Southern California Edison Company's Charge Ready 2 Infrastructure and Market Education Programs* (January 14, 2016) at 31-38 (describing the demand response and load management plans).
[47] Wilson Rebuttal, page 21, lines 6-7.
[48] Marke Rebuttal, page 19, line 20.
[49] Staff Rebuttal, page 4, line 19.

Compliance with that federal legislation will likely require dedicated proceedings given the timeframes specified in the bill; the Commission may as well get ahead of the issue now by disposing of the proposed EV rates in this proceeding. Rates designed for EVs play an important role in improving the economics of transportation electrification while also encouraging charging that supports the operation of the electric grid to the benefit of all utility customers.

THE CLEAN CHARGE NETWORK EXPANSION

Q. What is your response to the argument the Clean Charge Network (CCN) expansion be largely denied?

A. While expressing general support for Streetlight Corridor Pilot portion of the CCN expansion, Staff argues:

> Because funds may be available to Evergy under the Bipartisan Infrastructure Deal or available for third party providers to target these less profitable areas, Staff recommends the Commission deny Evergy's expansion application at this time and encourage Evergy to apply when funding is available.[50]

As noted above, the potential funding that could become available *if* the Bipartisan Infrastructure Framework passes Congress is far from sufficient to meet a growing charging infrastructure gap and does not displace the need for investments by utilities and other entities. The modest expansion of the CCN Evergy proposes likewise represents only a small, albeit important, step toward meeting the infrastructure needs in the state.

[50] Staff Rebuttal, page 28.

Q. What is your response to the argument that site hosts be granted unfettered discretion to charge additional fees at CCN charging stations?

A. Instead of the per-kWh pricing that is currently the norm at CCN stations where fees are collected from EV drivers, Witness Wilson argues:

> Some site hosts might prefer a flat fee or a per-minute fee, while others may prefer a per-kWh price. Site hosts should be free to set prices and change prices as they see fit to support their goals.[51]

Site-hosts should not be at liberty to mark-up the price of electricity at customer-funded, utility-owned charging stations, nor to levy fees that result in drivers whose cars cannot charge as quickly paying more for the same amount of electricity as drivers whose cars can charge more quickly. While the industry is generally moving toward higher-power charging stations (with 150kW becoming typical for new DC Fast Charging stations and new EVs such as the Ford Mustang Mach-E), many EVs on the road, especially more affordable EVs, cannot charge at 150kW. Even the top-of-the-line 2020 LEAF can only charge at 100kW. And the most affordable 2020 Nissan LEAF equipped with a quick charge port and most used EVs (other than Teslas) can only charge at 50kW. A 2021 Chevrolet Bolt is still only capable of charging at 55kW. If a site-host for a CCN fast charging station levied a flat fee (instead of the per-kWh pricing that currently exists at CCN stations), a driver of a vehicle that can only charge at 50kW would only get a third as much electricity for the same flat fee as a driver of a vehicle that can charge at 150kW, assuming both plug in for the same amount of time. And if a site-host for a CCN fast charging station levied a per-minute fee, a driver of a vehicle that can only charge at 50kW would pay three times as much for the same amount of electricity as a driver of a vehicle

[51] Wilson Rebuttal, page 17.

that can charge at 150kW. Site-hosts for customer-funded, utility-owned charging stations should not be at liberty to mark up the price of electricity or levy inequitable fees.

SUMMARY OF RECOMMENDATIONS

Q. Please summarize your recommendations.

A. I recommend that the Commission approve Evergy's proposed Transportation Electrification Portfolio subject to the following modifications:

- To increase fuel cost savings and to encourage charging that supports the grid and benefits all utility customers, recipients of charging infrastructure rebates should take service on TOU rates;
- At least 20 percent of Commercial Rebates be reserved for multi-family locations;
- To inform program evaluation and future Commission policy, at sites where charger utilization data and load profiles cannot be obtained via dedicated utility metering, site hosts should be required to provide that data to Evergy and at any site where fees are charged for charging, site-hosts should report those fees to Evergy. Evergy should report on charger utilization, load profiles, and pricing structures by segment and rate choice to the Commission; and
- Rebate recipients should be required to enroll in demand response programs, but should retain the discretion to participate in future demand response events called pursuant to those programs.

Q. Does that complete your testimony?

A. Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Evergy Metro, Inc. d/b/a Evergy Missouri Metro And Evergy Missouri West, Inc. d/b/a Evergy Missouri West for Approval of a Transportation Electrification Portfolio	)))))	**File No. ET-2021-0151**

County of Santa Barbara)
State of California)

AFFIDAVIT OF MAX BAUMHEFNER

Max Baumhefner, of lawful age, on his oath states: that he has participated in the preparation of the following surrebuttal testimony in question and answer form, which is attached hereto and made a part hereof for all purposes, and is to be presented in the above case; that the answers in the following surrebuttal testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such answers are true to the best of his knowledge and belief.

Max Baumhefner

In witness whereof I have hereunto subscribed my name and affixed my official seal this ___ day of September, 2021.

See attached CA Notary form
9/13/21

JURAT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Santa Barbara

Subscribed and sworn to (or affirmed) before me on
this 13 day of September, 20 21
by Maxwell Baumhefner
proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

Signature Diane K. Zamora

(Seal)

DIANE K. ZAMORA
COMM. #2336230
NOTARY PUBLIC - CALIFORNIA
SANTA BARBARA COUNTY
My Comm. Expires October 22, 2024