BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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IN THE MATTER OF PUBLIC SERVICE COMPANY OF COLORADO FOR APPROVAL OF ITS 2021-2023 TRANSPORTATION ELECTRIFICATION PLAN	**)**	**PROCEEDING NO. 20A-XXXXE**

DIRECT TESTIMONY AND ATTACHMENTS OF STEVEN W. WISHART

ON

BEHALF OF

PUBLIC SERVICE COMPANY OF COLORADO

May 15, 2020

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GLOSSARY OF ACRONYMS AND DEFINED TERMS

Acronym/Defined Term	Meaning
C&I	Commercial and Industrial
Charger Service	Charging Equipment from Public Service
Commission	Colorado Public Utilities Commission
CPCA	Customer Program Cost Adjustment
CPP	Critical Peak Pricing
DCFC	Direct Current Fast Charge
DSMCA	Demand-Side Management Cost Adjustment
E3	Energy+Environmental Economics
E3 Study	Analysis Performed by Energy+Environmental Economics
EV	Electric Vehicle
kW	Kilowatt
kWh	Kilowatt hours
NCP	Non-Coincident Peak
O&M	Operations and Maintenance
Public Service or the Company	Public Service Company of Colorado
Schedule EVC	Electric Vehicle Charges Tariff
Schedule S-EV	Secondary Voltage Time-of-Use- Electric Vehicle Rate
Schedule SG	Secondary General Service Rate
SRCS	Solar Rewards Community Service
SB 19-077	Senate Bill 19-077

Acronym/Defined Term	**Meaning**
TAVRR	Total Aggregate Variable Retail Rate
TEP or Plan	Transportation Electrification Plan
TEP Budget Share	TEP Budget Share of Charger Capital
Xcel Energy	Xcel Energy Inc.
XES	Xcel Energy Services Inc.

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I. INTRODUCTION, QUALIFICATIONS, PURPOSE OF TESTIMONY, RECOMMENDATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Steven W. Wishart. My business address is 1800 Larimer, Suite 1100, Denver, Colorado 80202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?

A. I am employed by Xcel Energy Services Inc. ("XES") as Manager of Pricing and Planning. XES is a wholly-owned subsidiary of Xcel Energy Inc. ("Xcel Energy") and provides an array of support services to Public Service Company of Colorado ("Public Service" or the "Company") and the other utility operating company subsidiaries of Xcel Energy on a coordinated basis.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THE PROCEEDING?

A. I am testifying on behalf of Public Service.

Q. PLEASE SUMMARIZE YOUR RESPONSIBILITIES AND QUALIFICATIONS.

A. As the Manager of Pricing and Planning, I am responsible for financial and policy analyses associated with the Company's electric, natural gas, and steam rates, in addition to the regular administration of the Company's electric, natural gas, and steam tariffs. My duties include quantitative analyses, cost allocation and rate design, and policy support on a number of state regulatory issues. A description of my qualifications, duties, and responsibilities is set forth after the conclusion of my Direct Testimony in my Statement of Qualifications.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. In my testimony I present the Company's proposed Electric Vehicle Charging tariff, Schedule EVC. The tariff lists the charges that are associated with Electric Vehicle ("EV") charging services included in the Transportation Electrification Plan ("TEP" or "Plan") as well as the rates to be charged at Direct Current Fast Charge ("DCFC") charging stations operated by Public Service. The TEP includes residential, multi-family, and commercial options that allow for customers to avoid the upfront cost of charging equipment and instead pay a fixed monthly charge for charging equipment provided by the Company. These rates are based on the installed cost of level 2 charging equipment and the associated levelized revenue requirements.

Next, I discuss the Company's proposal for public fast charging stations that will be operated by the Company in areas where privately owned charging stations are not likely to be financially viable. I present the proposed pricing structure for

those stations, which includes rates that are significantly higher during critical system peaks.

At the end of this section, I address a slight revision the Company proposes to make to its Secondary Voltage Time-of-Use- Electric Vehicle Rate ("Schedule S-EV") in order to accommodate the EV charging services proposed in Schedule EVC.

In the next section of my testimony I discuss Company's proposed cost recovery for TEP investments. Public Service requests that these investments be recovered through the Demand-Side Management Cost Adjustment ("DSMCA"). The Company is also proposing to rename the rider as the Customer Program Cost Adjustment ("CPCA") to better reflect the purpose of this non-base rate adjustment. In this section I discuss the class costs allocation that the Company would propose to use in recovery through the CPCA and present illustrative examples of the impact of the TEP costs on the CPCA rates.

I conclude my Direct Testimony by presenting a cost benefit analysis of the benefits of EVs that was conducted by Energy+Environmental Economics ("E3"). The analysis shows that EVs benefit their owners through life time fuel savings, other customers through improved system utilization, and Colorado as a whole through lower overall emissions.

Q. ARE YOU SPONSORING ANY ATTACHMENTS AS PART OF YOUR DIRECT TESTIMONY?

A. Yes, I am sponsoring the following attachments, which were prepared by me or under my direct supervision:

- Attachment SWW-1 – Electric Vehicle Charges – Schedule EVC
- Attachment SWW-2 – Proposed Revision to Schedule S-EV
- Attachment SWW-3 – Proposed Revision to DSMCA Rider (CPCA)
- Attachment SWW-4 – Proposed Revision to Schedule SRCS
- Attachment SWW-5 – TEP Class Cost Allocation
- Attachment SWW-6 – CPCA Bill Impacts
- Attachment SWW-7 – E3 Benefit-Cost Analysis of Transportation Electrification in the Xcel Energy Colorado Service Territory

Q. WHAT RECOMMENDATIONS ARE YOU MAKING IN YOUR DIRECT TESTIMONY?

A. I recommend that the Colorado Public Utilities Commission ("Commission") approve Schedule EVC and the charges, terms, and conditions included therein and the related adjustment to Schedule S-EV. I also recommend that the Commission approve the Company's request to recover TEP related costs through the Customer Program Cost Adjustment ("CPCA"), which revises and renames the existing electric Demand-Side Management Cost Adjustment ("DSMCA") and the related adjustment to Schedule SRCS to reflect the renaming of the DSMCA.

II. OVERVIEW OF THE ELECTRIC VEHICLE CHARGES TARIFF-SCHEDULE EVC

Q. PLEASE DESCRIBE THE PROPOSED ELECTRIC VEHICLE CHARGES TARIFF.

A. The Electric Vehicles Charges tariff lists the charges that are associated with the programs, specifies the applicability and availability of those services, and includes brief terms and conditions. I have included the proposed Schedule EVC as Attachment SWW-1 to my Direct Testimony.

Q. WHICH CHARGES ARE LISTED IN SCHEDULE EVC?

A. The tariff lists the monthly fixed charges for customers who elect to receive level 2 charging equipment from Public Service ("charger service") and the rates that will be charged at DCFC charging stations operated by the Company. Table SWW-D-1 lists the charger services rates and public fast charging rates that are included in Schedule EVC.

Table SWW-D-1 – Schedule EVC Rates and Charges

LEVEL 2 CHARGING EQUIPMENT MONTHLY ILLUSTRATIVE RATES	
Residential Home Charging Service	$13.29
Multi-Unit Dwelling Charging Service – Shared Parking	$28.21 to $55.38
Multi-Unit Dwelling Charging Service – Personal Parking	$15.37
Fleet & Workplace Charging Service	$28.21 to $55.38
PUBLIC DCFC CHARGING STATION RATES	
Standard Charging Rate	$0.90 per minute
Critical Peak Pricing	$3.75 per minute

Q. WHY ARE RATES FOR PUBLIC DCFC CHARGING STATIONS INCLUDED IN SCHEDULE EVC?

A. Operating public EV charging stations is a new business area for Public Service. But it is essentially still the delivery of electricity to an end use customer. As such the Company is requesting that the Commission approve the rates charged at its public DCFC stations as it would approve any other rate.

Q. WHAT PROGRAM DEFINITIONS ARE INCLUDED IN SCHEDULE EVC?

A. The tariff includes high level definitions for the various charging services. As described by Company witness Kevin Schwain, the Charging Services provide level 2 charging equipment to residential, multi-unit dwellings, and workplaces in exchange of a fixed monthly charge that is included on the customers electric bill.

Q. WHAT TERMS AND CONDITIONS ARE INCLUDED IN SCHEDULE EVC?

A. The terms and conditions include availability conditions for commercial customers and specifies a removal fee for Residential customers who choose to discontinue charger service early. However, most terms and conditions associated with charger service will be contained in a separate customer agreement.

Q. HOW WERE THE CHARGES FOR THE EV CHARGING SERVICE DEVELOPED?

A. The EV charging service rates are based on the levelized revenue requirement for the charging equipment provided to customers plus the expected maintenance costs and program administration costs. The rate design ensures that over the ten-year expected life of the level 2 charger, the participating customers will pay the full cost of that equipment. The maintenance, accounting, and data services costs associated with these programs are also significant, accounting for 35 to 45

percent of the monthly charge. The following table presents some of the calculations used in deriving the proposed rates.

Table SWW-D-2 – Monthly Charger Service Rates

	Residential	Multi-Unit Dwelling Personal Parking	Fleet & Workplace Charging
Charger Cost	$530.00	$530.00	$1,250.00
Installation	+ $250.00	+ $250.00	+ $125.00
Total Installed Cost	$780.00	$780.00	$1,375.00
Levelized Revenue Requirements Factor	x 13.32%	x 13.32%	x 13.32%
Annual Revenue Requirement	$103.89	$103.89	$183.13
Operations & Maintenance	+ $30.00	+ $30.00	+ $100.00
Customer Accounting & Service	+ $25.56	+ $25.56	+ $13.38
Data Services	+ $0.00	+ $25.00	+ $42.00
Revenue Requirement per Charger	$159.45	$184.45	$338.51
Months per Year	÷ 12	÷ 12	÷ 12
Rate per Month	$13.29	$15.37	$28.21

III. XCEL ENERGY OPERATED DCFC CHARGING STATIONS

Q. WHAT RATES IS THE COMPANY PROPOSING TO CHARGE AT ITS DCFC CHARGING STATION?

A. The Company proposes a standard charge of 90 cents per minute and a rate of $3.75 per minute during critical peak events.

Q. HOW DID THE COMPANY DETERMINE THE PROPOSED PRICING FOR CHARGING AT ITS DCFC STATIONS?

A. First the Company determined that it was important to design rates around a per minute charge instead of a cost per kilowatt-hour ('kWh"). This pricing scheme is used by other public EV charging stations and is important to prevent customers from lingering at the charging station and preventing other customers from using the facility. If charging were based on a per kWh charge, a customer could pull up for a 25kWh charge, which would take approximately 10 minutes, using a 150-kilowatt ("kW") DCFC charger, but could occupy the space for an hour as they shopped or ate at nearby businesses.

Second the standard rate of 90 cents per minute was calculated to be similar to the pricing levels of other public fast charging facilities. The Company observed that EVgo charged 30 cent per minute for charging at a 50kW station, Electrify America charges $0.58 per minute at 125kW charging stations, and Tesla's rates were $0.26 per minute for charging over 60kW. The Company set its standard charging rate to be equivalent to the highest observed rate on a cost per kWh basis. The Company chose to set a relatively high rate because the purpose of our charging stations is not to compete with other existing stations, but

rather to extend the network of publicly available fast charging locations and reduce the range anxiety associated with EVs.

The rate for charging during critical peak events is based on the critical peak pricing (CPP) rate included in the Company's commercial EV rate (Schedule S-EV). The Schedule S-EV CPP rate is $1.50 per kWh. For a 150kW DCFC charger with the equivalent output of 2.5kWh per minute the resulting rate is $3.75 per minute. The following table compares the proposed rates for Xcel Energy operated DCFC stations to the publicly stated charging rates for EVgo, Electrify America, and Tesla.

Table SWW-D-3 –Fast Charging Rate Comparison

	Rate Per Minute	kWh per Minute	Equivalent Cost Per kWh
EVgo 50kW	$0.30/min	0.8kWh	$0.36/kWh
Electrify America 125kW	$0.58/min	2.1kWh	$0.28/kWh
Tesla 60kW	$0.26/min	1.0kWh	$0.26/kWh
Xcel Energy 150kW Standard Rate	$0.90/min	2.5kWh	$0.36/kWh
Xcel Energy 150kW CPP Rate	$3.75/min	2.5kWh	$1.50/kWh

Q. ISN'T THE PRICING DURING CRITICAL PEAK EVENTS EXCESSIVE?

A. I do not believe so. One of the potential benefits of the electrification of the transportation sector is improved utilization of the existing electric system. However, if EVs are charged during our system peak it may require the construction of new powerplants and associated transmission lines and that potential benefit will not be realized. Therefore, it is critically important to dissuade drivers from charging during peak events on our system. The Company did

consider simply making the charging station unavailable during peak events but concluded that it was better to make the stations available at high rates in case drivers urgently needed to charge and were willing to pay the CPP level.

Q. HOW WILL CUSTOMERS BE INFORMED OF A CRITICAL PEAK EVENT?

A. The Company intends to have its public fast charging stations state the cost of charging on the user interface. The station will also state how long the CPP event will last.

Q. HOW OFTEN WILL CPP EVENTS BE CALLED?

A. The Schedule S-EV limits critical peak events to 15 four-hour events each year or a total of 60 hours per year. This represents fewer than 1 percent of the total hours in a year. The Company calls CPP events based on the day-ahead temperature forecast and day-ahead generation reserve to load forecast. In the event that the day-ahead temperature forecast indicates that system peaking conditions may occur, or the reserve to load ratio is forecasted to fall below ten percent (10%), a CPP event will be called. While the Schedule S-EV limits CPP events to 15 per year, the Company does not necessarily call all 15 events each year. In 2018 there were 11 CPP events, and in 2019 there were 8. Table SWW-D-4 shows the CPP events called by the Company in 2018 and 2019.

Table SWW-D-4 – 2018 & 2019 CPP Events

Date	Start	Stop	Duration Hours
6/7/2018	1:00 PM	5:00 PM	4:00
6/8/2018	1:00 PM	5:00 PM	4:00
6/14/2018	3:00 PM	7:00 PM	4:00
6/15/2018	2:00 PM	6:00 PM	4:00
6/26/2018	4:00 PM	8:00 PM	4:00
6/27/2018	3:00 PM	7:00 PM	4:00
6/28/2018	3:00 PM	7:00 PM	4:00
6/29/2018	3:00 PM	7:00 PM	4:00
7/2/2018	4:00 PM	8:00 PM	4:00
7/10/2018	3:00 PM	7:00 PM	4:00
9/18/2018	3:00 PM	7:00 PM	4:00
6/28/2019	3:00 PM	7:00 PM	4:00
7/11/2019	3:00 PM	7:00 PM	4:00
7/12/2019	3:00 PM	7:00 PM	4:00
7/18/2019	2:00 PM	6:00 PM	4:00
7/19/2019	2:00 PM	6:00 PM	4:00
7/30/2019	2:00 PM	6:00 PM	4:00
8/19/2019	2:00 PM	6:00 PM	4:00
8/20/2019	2:00 PM	6:00 PM	4:00

Q. HOW CAN EV DRIVERS LIMIT THEIR EXPOSURE TO CPP AT XCEL ENERGY PUBLIC FAST CHARGING STATIONS?

A. First, even if all 15 CCP events occur there will only be 60 total hours with elevated pricing, or 0.7 percent of all hours in a year. So, it is very unlikely that drivers will encounter elevated pricing levels at all. If a customer does find the need to charge during a CPP event, they should consider limiting their charging to only the amount needed to reach their destination. For example, a 10-kWh charge, which would take 4 minutes, would only cost $15 and provide about 30 miles of range. Another alternative would be to postpone charging until the critical peak has ended. While it may be inconvenient to wait a few hours to charge, delaying EV charging to avoid peak demand periods will create benefits for the entire Public Service system.

Q. WILL THE RATES CHARGED AT XCEL ENERGY OPERATED DCFC STATIONS BE SUFFICIENT TO COVER ALL OF THE COSTS OF CONSTRUCTING AND MAINTAINING THOSE FACILITIES?

A. No. Public Service is proposing to operate DCFC stations in locations where it is not financially viable for private companies to do so, thereby filling gaps in the EV charging network. The profitability of an Xcel Energy operated DCFC station, or lack thereof, will be contingent upon how often the charging station is used and the amount of revenues collected that offset the fixed costs associated with each station. The Company's TEP budget uses an estimated cost for a DCFC station of $131,714 per charging port with an equivalent levelized revenue requirement of $17,459 per year and annual operation and maintenance expenses of $3,951. In addition to those costs the Company will be charging those stations for electricity usage under the Schedule S-EV rate. At low utilization rates the revenues generated from the Xcel Energy DCFC stations will be insufficient to cover the expected costs. The following table illustrates the expected losses for a single DCFC charging port at various utilization levels.

Table SWW-D-5 – DCFC Station Profitability Analysis

	DCFC Station Costs				DCFC Station Revenue			
Utilization Rate	DCFC Station Revenue Requirements	O&M (3%)	Schedule S-EV Charges	Total Costs	Standard Charge	CPP Rate	Total Revenue	Net Profit (Loss)
1%	$17,459	$3,951	$11,883	$33,294	$4,709	$90	$4,799	($28,495)
2%	$17,459	$3,951	$13,472	$34,882	$9,418	$180	$9,598	($25,285)
3%	$17,459	$3,951	$15,060	$36,470	$14,126	$270	$14,396	($22,074)
4%	$17,459	$3,951	$16,649	$38,059	$18,835	$360	$19,195	($18,864)
5%	$17,459	$3,951	$18,237	$39,647	$23,544	$450	$23,994	($15,653)
Breakeven 9.9%	$17,459	$3,951	$25,981	$47,392	$46,503	$889	$47,392	$0

Q. HOW WILL PUBLIC SERVICE ADDRESS THE POTENTIAL LOSSES ASSOCIATED WITH ITS DCFC STATIONS?

A. As discussed by Company witness Arthur Freitas, our proposal is to recover TEP related costs, including the costs of the DCFC stations, through the CPCA rider. Those costs would be reduced through revenues earned through the DCFC stations as well as through the monthly charges for charger services. The subsidization of these public DCFC chargers is in the public interest because we are proposing to place these chargers so as to serve underserved lower-income and rural areas

IV. TARIFF ADJUSTMENT TO IMPLEMENT SCHEDULE EVC

Q. DID THE COMPANY IDENTIFY ANY NEEDED ADJUSTMENTS TO OTHER TARIFF PROVISIONS TO IMPLEMENT SCHEDULE EVC?

A. Yes. We have determined some language in Schedule S-EV, particularly on Electric Tariff Sheet 50D, will need to be adjusted to accommodate the EV charging services we propose to provide under Schedule EVC. I have attached a redline reflecting this proposed edit to Schedule S-EV, as Attachment SWW-2

Q. CAN YOU PLEASE EXPLAIN WHY THIS PROPOSED REVISION IS WARRANTED?

A. Under Schedule EVC, the Company would install, own, and maintain charging equipment for customers we expect will take service under S-EV. This plan is inconsistent with Sheet 50D, which provides that under Schedule S-EV, “Customer is responsible for all necessary requirements to install own, operate, maintain the Electric Vehicle charging equipment.” We propose to create an exception to this condition for customers taking EV charging service under Schedule EVC.

V. CUSTOMER PROGRAM COST ADJUSTMENT

Q. WHAT IS THE CPCA?

A. As discussed by Company witness Arthur Freitas, the Company recommends that the net revenue requirements associated with the TEP be collected through the existing DSMCA rider, which will be renamed as the Customer Program Cost Adjustment or CPCA. I have included a redlined version of the CPCA tariff as Attachment SWW-3. For simplicity the Company proposes to maintain the same rate updating process currently used with the DSMCA rider. The CPCA rates will be adjusted through an October 1st filing that sets rates beginning January 1st based on forecasted revenue requirements, sales volumes, and class costs allocation factors. Annual costs and revenues are subsequently trued up in an April 1st filing with adjusted rates effective July 1st. This midyear filing also includes adjustments for performance incentives earned during the previous year.

Q. IS THE COMPANY REQUESTING TO ADJUST ANY OTHER TARIFF PROVISIONS TO ACCOMMODATE THE RENAMING OF THE DSMCA?

A. Yes. We are proposing a modest revision to our current Solar Rewards Community Service ("SRCS"). Schedule SRCS's reference to the "DSMCA" in the calculation of the Total Aggregate Variable Retail Rate ("TAVRR") to accommodate the renamed "CPCA" rider.

Q. PLEASE EXPLAIN THE EFFECT OF THIS PROPOSED ADJUSTMENT.

A. The TAVRR is a customer-specific kWh rate for C&I customers receiving SRCS service from a SRCS resource that was operational prior to January 1, 2017, and it is calculated using the customer's billed amounts from the calendar year

preceding the current service year for multiple riders, including the DSMCA, among several other components. With our proposed revision, the TAVRR calculation will now incorporate the CPCA in the same manner that it currently incorporates the DSMCA. If Schedule SRCS is not updated to incorporate a reference to the CPCA, when the CPCA takes effect, the TAVRR calculation as currently described in Schedule SRCS would not be possible. I provide Public Service's requested tariff adjustment as Attachment SWW-4.

Q. WHAT ASPECTS OF THE CPCA WILL YOUR TESTIMONY ADDRESS?

A. I am addressing the class cost allocation that will be applied to TEP revenue requirements in the CPCA. I also provide illustrative rate calculations to demonstrate how the TEP costs may impact customer bills.

Q. HOW DOES THE COMPANY PROPOSE TO ALLOCATE TEP COSTS AMONG RATE CLASSES?

A. The Company is proposing a cost allocation that closely tracks the TEP investments and utilizes some methods that the Commission has previously approved and some that are specific to TEP costs. The following table lists the allocators used and the TEP costs categories that they are applied to. The derivation and application of the class cost allocators is provided in Attachment SWW-5.

Table SWW-D-6 – Class Cost Allocation

Cost Allocation Method	TEP Costs Category
Non-Coincident Peak Excluding TG & Lighting	• EV Infrastructure Supply Capital • Amortized Infrastructure Rebates
TEP Budget Share of Charger Capital	• Charger Service Capital
Residential Direct Assignment	• Residential & Multi-Unit Charger Operation & Maintenance ("O&M") • Residential Charging Service Revenue
Commercial Direct Assignment	• Fleet/Workplace Charger Service O&M • Commercial Charging Service Revenue
Base Rate Revenue	• Innovation • Advisory Services • Evaluation

Q. PLEASE DESCRIBE THE NON-COINCIDENT PEAK COST ALLOCATION METHOD.

A. The non-coincident peak ("NCP") methodology allocates costs based on each class's peak demand. This methodology has been used to allocate distribution costs in Phase II proceedings previously. Because the EV infrastructure investments closely resemble distribution assets, it is appropriate to use the same cost allocation methodology. The NCP allocation method will also be applied to the amortized rebate expenses included in the TEP. The rebates will be primarily for EV wiring which is also similar to distribution assets. The NCP allocator excludes any cost allocation to transmission voltage customers because those customers do not utilize distribution assets. It also excludes lighting customers. The Company chose not to allocate TEP costs to lighting customers because, due to their nature, these customers cannot participate in TEP programs.

Q. PLEASE DESCRIBE THE TEP BUDGET SHARE OF CHARGER CAPITAL METHOD.

A. This methodology is similar to the approach used for allocating the Company's natural gas conservation program costs where residential and commercial costs are directly allocated to those customer groups. The TEP Budget Share of Charger Capital ("TEP Budget Share") first identifies how much investment in charging equipment is going to residential customers and how much is going to commercial customers. Next the costs are further allocated to sub classes of residential and commercial using the NCP method. The TEP Budget Share method is appropriate because a larger share of charger investments is planned for the residential class. As such the residential class should appropriately receive a larger share of the total charger investment costs.

Q. PLEASE DESCRIBE THE RESIDENTIAL DIRECT ASSIGNMENT METHOD.

A. To the extent that the TEP revenue requirements can be specifically assigned to residential customers, this allocation does so and subdivides the allocated costs between standard residential customers and residential customers on the Company's demand-based rate, Schedule RD. This allocation method is applied to charging service O&M and applied to revenues received through the residential and multi-unit dwelling charger service fees.

Q. PLEASE DESCRIBE THE COMMERCIAL DIRECT ASSIGNMENT METHOD.

A. This method allocates cost directly to commercial customers and then subdivides those costs to individual commercial classes using the NCP method, excluding

transmission voltage and lighting customers as they are not able to participate in TEP programs

Q. PLEASE DESCRIBE THE BASE RATE REVENUE ALLOCATION METHOD.

A. This method is applied to cost categories that cannot be directly attributable to residential or commercial customers. The Base Rate Revenue uses the total base rate revenue for each customer class to derive cost allocation ratios. The Company has previously used this method to allocate DSM program costs and costs associated with low income programs. In the CPCA rider this method will be applied to innovation, advisory, and evaluation programs. As with other TEP class cost allocation methods, this allocation excludes transmission voltage and lighting customers.

Q. WHAT IS THE OVERALL RESULT OF THE TEP COST ALLOCATION METHODS?

A. Attachment SWW-4 provides the details for the proposed class cost allocation. Overall the methodology results in the largest customer classes receiving the largest shares of cost allocation. The following table provides an illustrative example of how TEP costs would be allocated. This example is based on the current TEP budget. Cost allocations will be updated with the annual CPCA rider filings to reflect year to year changes in TEP investments and class NCPs.

Table SWW-D-7 – TEP Class Cost Allocation Example

	Overall Allocation	2021	2022	2023
Residential	44.75%	$3,485,367	$5,063,166	$6,922,755
Residential Demand	0.14%	$10,879	$15,992	$22,035
Small Commercial	5.62%	$427,459	$629,889	$886,661
Secondary General	41.00%	$3,092,279	$4,590,077	$6,492,923
Primary General	8.48%	$646,895	$950,170	$1,334,586
Transmission General	0.00%	$0	$0	$0
Lighting	0.00%	$0	$0	$0
Total	100.00%	$7,662,879	$11,249,295	$15,658,961

Q. HOW WILL THE TOTAL CPCA RATES BE CALCULATED?

A. Based on the TEP class cost allocation, TEP rates will be derived for each customer class. The rates will either be energy-based rates ($/kWh) or demand-based rates ($/kW-month) depending on customer class. The final step in the process is to simply add the TEP rate to the traditional DSMCA rates to derive the total CPCA charges. The following example uses the DSMCA rates that are currently in effect[1] and it demonstrates that even using 2023 TEP revenue requirements, which will be higher than 2021 or 2022 TEP revenue requirements, the TEP portion of the CPCA will be much smaller than the DSMCA portion.

[1] The Company used 2020 DSMCA rates because at this time the Company does not have a Commission approved 2023 DSM budget.

Table SWW-D-8 – Example 2023 CPCA Total Rate Calculation

Rate Class	DSMCA Rate	TEP Rate	Total CPCA Rate
Residential General	$0.00199/kWh	$0.00073/kWh	$0.00272/kWh
Residential Demand	$0.22/kW-month	$0.17/kW-month	$0.39/kW-month
Small Commercial	$0.00181/kWh	$0.00067/kWh	$0.00248/kWh
C&I Secondary	$0.62/kW-month	$0.20/kW-month	$0.82/kW-month
C&I Primary	$0.60/kW-month	$0.19/kW-month	$0.79/kW-month
C&I Transmission	$0.54/kW-month	$0.00/kW-month	$0.54/kW-month
Street & Area Lighting	$0.00097/kWh	$0.00000/kWh	$0.00097/kWh
Traffic Signal Lighting	$0.00097/kWh	$0.00000/kWh	$0.00097/kWh

Q. WHAT WOULD BE THE IMPACT OF THE CPCA ON TYPICAL CUSTOMER BILLS?

A. Because the revenue requirements of the TEP are relatively small in comparison to the total revenue requirements of the Public Service system, the corresponding bill impacts are also small. Also, because most of the program spending is targeted towards commercial workplace and fleet services, the impacts to commercial customers are slightly larger. The following table summarizes the expected monthly bill impact using 2023 TEP revenue requirements, and Attachment SWW-4 provides the complete bill analysis.

Table SWW-D-9 – Estimated CPCA Monthly Bill Impact Summary Excluding Incremental Electric Vehicle Revenue

	Current Bills	Bill With TEP/CPCA	Monthly $ Change	Monthly % Change
Residential – R	$72.27	$72.73	$0.46	0.63%
Commercial – C	$108.09	$108.73	$0.64	0.59%
Secondary General – SG	$2,200	$2,213	$13	0.59%
Primary General – PG	$36,249	$36,436	$187	0.52%
Transmission General - TG	$581,594	$581,594	$0	0.00%

Q. DO THESE RESULTS THAT SHOW BILL IMPACTS IN EXCESS OF ONE HALF OF ONE PERCENT INDICATE THAT THE COMPANY'S TEP PROPOSAL VIOLATES THE BILL IMPACT LIMIT IN SENATE BILL 19-077 ("SB 19-077")?

A. No. This analysis is limited to only the impact of the TEP revenue requirements in the CPCA rider. SB 19-077 indicates that "The Commission shall consider revenues from electric vehicles in the utilities service territory in evaluating the retail rate impact." The preceding bill impact analysis does not consider the benefits of incremental revenues from EVs; therefore, it is not the proper basis upon which to measure statutory compliance.

Q. HAVE YOU CONDUCTED A RATE IMPACT ANALYSIS TO DEMONSTRATE THAT THE COMPANY'S TEP PROPOSAL COMPLIES WITH SB 19-077?

A. Yes. To demonstrate statutory compliance, I compared the expected sales revenue from EVs less the utility costs associated with serving those customers to the total TEP revenue requirements. This approach properly accounts for the rate benefits that are created through improved utilization of the Public Service system. Because they are charged primarily during off-peak hours, EVs increase the utilization of the power grid without the need to construct costly generation assets. This means that average electricity costs for all customers is expected to be lower due to the proliferation of EVs.

In the next section of my testimony I present an analysis that was conducted by E3 that quantifies the costs and the benefits of EVs in Colorado. E3 estimates that from 2021 to 2023, revenues from EVs will grow from $24 million to $58 million, while the cost to supply that power in 2021 will be $6 million and grow to $15

million. This means that EVs will create an annual net benefit of $43 million in 2023 for all Public Service customers. Because this net benefit is larger than the TEP revenue requirements, the retail rate impact is expected to be negative. The following table provides the year by year details of my analysis and shows that not only does the Company's TEP proposal comply with the retail rate impact limits in SB 19-077, the net impact of EVs is a slight reduction in overall rates. Put another way, while the statute allows the retail rate impact to be *increased* by up to 0.5 percent, this analysis shows that, factoring in EV revenues as the statute requires, the rate impact is actually a reduction.

Table SWW-D-10 – SB 19-077 Retail Rate Impact Analysis

		2021	2022	2023
	Revenue from EV Charging	($24,303,013)	($38,789,022)	($57,976,355)
+	Cost to Serve EV Charging	$5,706,195	$9,144,388	$15,191,135
=	Net Revenue from EV Charging	($18,596,818)	($29,644,634)	($42,785,220)
+	TEP Revenue Requirement	$7,662,879	$11,249,295	$15,658,961
=	Retail Rate Impact	($10,933,939)	($18,395,339)	($27,126,259)
÷	Approximate Total Retail Revenues	$2,905,533,410	$2,963,644,079	$3,022,916,960
=	Retail Rate Impact - Percentage	-0.4%	-0.6%	-0.9%

Q. IS IT POSSIBLE THAT THE STATUTORY RETAIL RATE IMPACT LIMIT COULD BE A LIMITING FACTOR IN THE FUTURE?

A. Yes. Obviously, this limit could be reached if the Company's proposed TEP budget was much higher. I estimate that in 2021 the TEP gross revenue requirement would have to be increased from $7.6 million up to $33 million before the retail rate impact limit was reached. Also, while the costs to serve EV charging is currently very low those costs could increase as the number of EVs grows and the concentrations increase. The Company will continue to evaluate the impacts of

EVs on the distribution grid in order to identify any changes to the cost of serving these customers. Finally, it is possible that revenues from EVs may not materialize as projected. However, in the above retail rate impact analysis, the statutory limit of 0.5 percent would not be met even if EV revenues were held flat through the three-year analysis period.

VI. ENERGY+ENVIRONMENTAL ECONOMICS BENEFIT- COST ANALYSIS OF TRANSPORTATION ELECTRIFICATION IN THE XCEL ENERGY COLORADO SERVICE TERRITORY

Q. WHAT IS THE PURPOSE OF THIS THIS SECTION OF YOUR TESTIMONY?

A. In this section I provide an overview of the Benefit- Cost Analysis of Transportation Electrification in the Xcel Energy Colorado Service Territory EV costs benefit analysis conducted by E3 ("E3 study"). The E3 study is included as Attachment SWW-7.

Q. WHO IS E3?

A. E3 is an energy consulting firm that helps utilities, regulators, and policy makers make the best strategic decisions possible as they implement new public policies, respond to technological advances, and address customers' shifting expectations. Public Service retained E3 to conduct an independent study of EVs in our service territory as they have previously done for Hawaii, Washington, Oregon, Ohio, and New York.

Q. WHAT WAS THE SCOPE OF THE E3 STUDY?

A. E3 evaluated net benefits to EV drivers, Public Service customers, and the citizens of Colorado from the adoption of EVs in our service territory. E3 studied the growth in the EV market from 2020 through 2030 when over 450,000 EVs will be charging in Public Service's territory. While a majority of EVs are expected to be personal light duty vehicles the study also investigated commercial fleets, electric school buses, and electric transit buses. The analysis extends through 2041 to account for the twelve-year life of EVs purchased in 2030.

Q. IS THE E3 STUDY SPECIFICALLY FOCUSED ON PUBLIC SERVICE'S 2021-2023 TEP PROPOSAL?

A. No. While all the elements of the TEP are intended to increase the adoption of EVs it is not possible to calculate exactly how many additional EVs will be deployed as a result of the Plan. Therefore, E3 studies the overall impact of EVs in our service territory.

Q. WHAT WERE SOME OF THE RESULTS OF THE STUDY?

A. While the study speaks for itself, the results showed that EVs are net beneficial investments for drivers. Although the upfront purchase costs for EVs is higher than for internal combustion engine vehicles the life time savings of electricity instead of gasoline in addition to lower maintenance costs, results in a net present value benefit of over $1,000 per vehicle.

The study also supports the expectation that the expansion of electric vehicles will have downward pressure on overall Public Service rates. This is similar to any new load that comes on to the system and particularly true for EV load which tends to be focused in off-peak hours. Retail rates are based on the average cost of service but the cost to serve new load, or the marginal cost of service, is considerably lower than the average cost. The result is that new load, such as EVs, benefits all customers.

The E3 study identified the largest benefit will accrue to society as a whole. The analysis quantified the annual reduction in carbon dioxide and applied the societal cost of carbon of $46/ton and found that the total benefits to society significantly outweigh the total costs.

Q. DID THE E3 STUDY EVALUATE THE IMPACT OF MANAGED CHARGING ON THE OVERALL BENEFITS CREATED BY EV ADOPTION?

A. Yes, the study estimated that managed charging could substantially increase the benefits from EVs. Managed charging will shift even more EV load to off peak periods, thus lowering the cost of service and increasing the benefits for all. In addition, increased charging in the off-peak period has the potential to utilize excess renewable energy that is likely to become more common in the coming years.

Q. DID THE E3 STUDY IDENTIFY ANY CHALLENGES FOR THE EV MARKET?

A. Yes. The study identified that for rideshare services such as Lyft and Uber the high cost of public charging could be a barrier. If rideshare drivers must rely primarily on relatively high priced public DCFC stations the cost of electricity may be even higher than the cost of gasoline, which would eliminate the financial incentives to adopt EVs. The study observed that ridesharing services could secure lower cost charging for their drivers or that utilities could play a roll in providing lower cost charging.

The E3 study also concluded that electric school busses were not likely to be cost effective options at this time. Electric busses have high upfront costs which can be offset through fuel savings over the life of the vehicle. However, school busses tend to travel relatively few miles on a daily basis and practically none on the weekends and in summer. As a result, the opportunity for fuel savings is more limited than with other types of electric vehicles.

Q. WHAT CONCLUSIONS DID YOU DRAW FROM THE E3 STUDY?

A. E3 provided detailed hourly patterns for EV charging that showed a majority of EV charging occurring off-peak and that even more off-peak charging can be achieved with managed charging. With low cost off-peak charging and growing utility revenues from EV adoption there will be ample margin for utility investment in EV infrastructure and services without negative rate impacts for other customers.

VII. CONCLUSION

Q. PLEASE SUMMARIZE YOUR DIRECT TESTIMONY AND RECOMMENDATIONS.

A. The primary purpose of my testimony is to present and explain the new Electric Vehicle Charging tariff, Schedule EVC. I also provide supporting information regarding the Company's proposal for recovery of TEP revenue requirements through the CPCA rider. I recommend that the Commission approve the creation of Schedule EVC and approve recovery of costs through the CPCA.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Statement of Qualifications

Steven W. Wishart

I began my employment with Xcel Energy Services, Inc. in 2005, in the Company's Demand-Side Management department. I am currently a Manager in the Pricing and Planning Group. My responsibilities include quantitative analyses, cost allocation, and rate design, and policy support on a number of Colorado regulatory issues.

Prior to taking my current position, I worked for Xcel Energy Services Inc. in Minneapolis, Minnesota, as Director of Resource Planning for the Northern States Power region. In that role, I oversaw resource planning and resource acquisition processes for that company.

From 2009 through 2012, I worked for the Company as the Manager of Quantitative Analytics. In that role, I managed a group responsible for conducting long-term analyses of the costs and performance of Xcel's electric generating systems.

Prior to joining Xcel Energy in 2005, I was a PhD candidate in the Department of Applied Economics at the University of Minnesota where I studied energy related topics.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

* * * *

IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO FOR APPROVAL OF ITS 2021-2023 TRANSPORTATION ELECTRIFICATION PLAN	)))))	**PROCEEDING NO. 20A-XXXXE**

AFFIDAVIT OF STEVEN W. WISHART
ON BEHALF OF
PUBLIC SERVICE COMPANY OF COLORADO

I, Steven W. Wishart, being duly sworn, state that the Direct Testimony and attachments were prepared by me or under my supervision, control, and direction; that the Testimony and attachments are true and correct to the best of my information, knowledge and belief; and that I would give the same testimony orally and would present the same attachments if asked under oath.

Signed in Denver, Colorado, this 15 day of May 2020.

Steve Wishart

Steven W. Wishart
Manager, Pricing and Planning

Subscribed and sworn to before me this 15th day of May, 2020.

SCHUNA D WRIGHT
Notary Public
State of Colorado
Notary ID # 19974007693
My Commission Expires 05-06-2021

Schuna D. Wright

Notary Public

My Commission expires May 6, 2021