

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO

PROCEEDING NO. 20A-___E

**IN THE MATTER OF THE VERIFIED APPLICATION OF BLACK HILLS COLORADO
ELECTRIC, LLC FOR APPROVAL OF ITS TRANSPORTATION ELECTRIFICATION
PLAN, READY EV, FOR PROGRAM YEARS 2021 – 2023 AND FOR RELATED TARIFF
APPROVALS.**

DIRECT TESTIMONY AND ATTACHMENTS OF

T. AARON CARR

ON BEHALF OF

BLACK HILLS COLORADO ELECTRIC, LLC

May 8, 2020

SUMMARY OF THE DIRECT TESTIMONY OF T. AARON CARR

Mr. T. Aaron Carr is employed by Black Hills Service Company, as Director of Energy Innovation. Mr. Carr presents the Company's Transportation Electrification Plan, Ready EV. Mr. Carr describes the origin of Ready EV, as well as the multiple facets and actions in Ready EV designed to increase EV adoption rates, raise the general awareness of the benefits of EVs, and advocacy steps the Company proposes to undertake in support of EVs.

Mr. Carr describes four different utility business models for addressing EV and EV charging. The models are called "business as usual," "make-ready," "owner-operator," and "utility incentive." He testifies that the Company's EVSE approach is akin to the "utility incentive" model, as the Company is not proposing to own EVSE, but rather will provide rebates to help incentivize and offset the make-ready infrastructure costs and the cost of the EVSE. He explains that this model will avoid potential cost impacts to customers that could result if the Company owned EVSE.

Mr. Carr testifies that the Company has conducted a market analysis to estimate the long-term growth rates of electric vehicles in Southern Colorado and the amount of EVSE necessary to support that EV growth. He explains the methodology used to create the market analysis is reasonable and based on verifiable sources.

Mr. Carr explains that the Company has qualified vendors to provide EVSE to customers requesting EVSE rebates. These vendors are ChargePoint and Enel X. Mr. Carr provides that these vendors will play an important part in providing EV charging data to the Company.

Mr. Carr explains that Black Hills desires to address the electrification of public transit and fleets in its service territory, and that it will use the first TEP to work with stakeholders to develop related pilots that can be launched.

Mr. Carr testifies to the Company's EV employee engagement program that will build a base of employees knowledgeable about EVs with the goal of increasing their purchase or leasing of EVs. He also testifies to the Company's EV dealership engagement program that will develop partnerships with local dealerships and become a trusted resource with dealerships.

Mr. Carr concludes by explaining that the Company is managing Ready EV staffing efforts through various legacy members of the Company that assisted in designing the Plan. Going forward, the Company will have a dedicated full-time employee to oversee the various aspects of Ready EV.

Table of Contents

<u>SECTION</u>	<u>PAGE</u>
I. INTRODUCTION AND BACKGROUND.....	6
II. STATEMENT OF QUALIFICATIONS.....	6
III. PURPOSE OF TESTIMONY	7
IV. READY EV PLAN BACKGROUND	7
V. EVSE INFRASTRUCTURE APPROACH	11
VI. EV MARKET ANALYSIS.....	16
VII. REBATE VENDOR SELECTION	22
VIII. FLEET ELECTRIFICATION.....	25
IX. EV EMPLOYEE ENGAGEMENT PROGRAM	28
X. EV DEALERSHIP ENGAGEMENT PROGRAM	29
XI. COMPANY STAFFING NEEDS.....	30

Attachments

- Hearing Exhibit 102, Attachment TAC-1** Ready EV Plan, Black Hills’
Transportation Electrification Plan
- Hearing Exhibit 102, Attachment TAC-2** EV Forecast Detail

GLOSSARY OF ACRONYMS AND DEFINED TERMS

AQCC	Air Quality Control Commission
AMI	Advanced Metering Infrastructure
AEG	Applied Economics Group
BHC	Black Hills Corporation
BHSC	Black Hills Service Company, LLC
BHEAP	Black Hills Energy Assistance Program
Black Hills or Company	Black Hills Colorado Electric, LLC
CIS+	Customer Information System Plus
CCOSS	Class Cost of Service Study
Communication Strategy	Customer Communication and Education Strategy
DCFC	Direct Current Fast Chargers
DSMCA	Demand Side Management Cost Adjustment
EV	Electric Vehicle
EV rates	newly proposed EV rates for charging
EVSE	Electric Vehicle Supply Equipment
FERC	Federal Energy Regulatory Commission
GHG	Greenhouse gas
IRS	Internal Revenue Service
kW	Kilowatt
LEAP	Low-Income Energy Assistance Program
LGS-S	Large General Service – Secondary
LGS-SEV	Large General Service Secondary EV rate schedule
LPS	Large Power Service
MDMS or MDM	Meter Data Management System
mTRC	Modified Total Resource Cost Test
NEBs	Non-Energy Benefits
NOPR	Notice of Proposed Rulemaking
PCT	Participant Cost Test
PIM	Performance Incentive Mechanism
PUC or Commission	Colorado Public Utilities Commission
PSCo	Public Service Company of Colorado
Ready EV or Ready EV Plan	Company's first Transportation Electrification Plan
Ready EV programs	design elements of the Ready EV Plan
RIM	Rate Payer Impact Measure
RS-EV	Residential EV rate schedule
RS-1	Residential service rate schedule
SCADA	Supervisory Control and Data Acquisition
SGS-N or SGS-D	Small General Service
SGS-EV	Small General Service EV rate schedule
TEP	Transportation Electric Plan
TOD rates	time-of-day rates
WACC	weighted average cost of capital
ZEV	zero emission vehicle

DIRECT TESTIMONY OF T. AARON CARR

I. INTRODUCTION AND BACKGROUND

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is T. Aaron Carr. My business address is 7001 Mount Rushmore Road, Rapid City, South Dakota.

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

A. I am employed by Black Hills Service Company, LLC, a wholly-owned subsidiary of Black Hills Corporation (“BHC”). I am the Director of Energy Innovation.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. I am testifying on behalf of Black Hills Colorado Electric, LLC (“Black Hills” or “Company”).

II. STATEMENT OF QUALIFICATIONS

Q. WHAT ARE YOUR DUTIES AND RESPONSIBILITIES IN YOUR CURRENT POSITION?

A. I focus on driving growth and development through innovative program creation and design. My primary focus areas include renewable portfolio development, strategic business development opportunities, and leadership in program creation for new technologies such as the Ready EV Plan.

Q. PLEASE OUTLINE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

1 A. A summary of my education, employment history and experience is provided in
2 Appendix A.

3 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?**

4 A. No.
5

6 **III. PURPOSE OF TESTIMONY**

7 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

8 A. The purpose of my testimony is to introduce and present the Company's Transportation
9 Electrification Plan ("TEP"), known as "Ready EV" or the "Ready EV Plan." For the
10 Company's first TEP, I describe the genesis of Ready EV, as well as the multiple facets
11 and actions in Ready EV designed to increase electric vehicle ("EV") adoption rates, raise
12 the general awareness of the benefits of EVs, and advocacy steps for EVs the Company
13 proposes to undertake.

14 **Q. ARE YOU SPONSORING ANY ATTACHMENTS?**

15 A. Yes. I am sponsoring the following attachments:

- 16 • Hearing Exhibit 102, Attachment TAC-1 – Ready EV Plan, Black Hills'
17 Transportation Electrification Plan
- 18 • Hearing Exhibit 102, Attachment TAC-2 – EV Forecast Detail
19

20 **IV. READY EV PLAN BACKGROUND**

21 **Q. WHAT IS THE PURPOSE OF THE COMPANY'S FIRST TEP—THE READY EV**
22 **PLAN?**

1 A. The purpose of the Company's first TEP, the "Ready EV Plan," is to accelerate the
2 adoption of electric vehicles through the deployment of customer-focused outreach and
3 education events, partnerships, new EV rates, and rebates for chargers. Ready EV will also
4 support Black Hills' sustainability efforts and commitment to environmental stewardship
5 and energy innovation.

6 **Q. PLEASE PROVIDE THE GENERAL BACKGROUND OF HOW THE READY EV**
7 **STRATEGY WAS FORMED.**

8 A. The concept for Ready EV started in December 2018, when Black Hills Corporation
9 ("BHC") began exploring opportunities to improve its environmental sustainability efforts
10 across all of its electric service territories, engaging customers with a new service, and
11 exploring the potential for sales growth via EV charging and infrastructure investment.
12 Those efforts culminated with the formal launch in December 2019 of new EV service
13 offerings in BHC's three electric service territories (Wyoming, South Dakota, and Southern
14 Colorado). For Colorado, the new EV services are the programs proposed in this
15 proceeding in our Ready EV Plan. The Ready EV Plan is the Company's proposal to
16 comply with new Colorado statutory requirements, assist in the widespread adoption of
17 EVs, and create a tailored plan that meets the needs of Black Hills' customers in Southern
18 Colorado.

19 **Q. IS BLACK HILLS CORPORATION PROPOSING SIMILAR PROGRAMS AS**
20 **CONTAINED IN THE READY EV PLAN IN OTHER STATES WHERE IT HAS**
21 **ELECTRIC UTILITIES?**

22 A. Yes. As I mentioned, in December 2019, Black Hills Corporation began providing new
23 EV service offerings in South Dakota, Wyoming, and Colorado. In each of these states,

1 BHC launched campaigns to increase EV adoption rates. A common core element of the
2 programs being launched in these states is new rebates for electric vehicle supply
3 equipment (“EVSE”), as well as new marketing and communication efforts to increase
4 customer awareness of the benefits of EVs.

5 **Q. HOW IS THE READY EV PLAN PROPOSED IN COLORADO DIFFERENT**
6 **THAN THE EV PROGRAMS LAUNCHED IN BHC’S OTHER STATES WHERE**
7 **IT PROVIDES ELECTRIC SERVICE?**

8 A. The Ready EV Plan represents the first comprehensive EV plan submitted for approval at
9 a public utility commission for an electric utility of BHC. Notably, the Ready EV Plan
10 contains new EV rates that are based on time-of-day design elements, which is discussed
11 in the Direct Testimony of Mr. Michael Grubert. These rates represent the first specific
12 EV rates proposed by an electric utility of BHC. There are other differences as well, such
13 as a low-income specific rebate being offered in the Ready EV Plan, as well as a new
14 stakeholder engagement process and a Performance Incentive Mechanism. These
15 programs are different than what is offered in South Dakota and Wyoming.

16 **Q. YOU MENTIONED REBATES FOR EV CHARGERS BEING OFFERED IN**
17 **SOUTH DAKOTA AND WYOMING. WHAT HAS BEEN BLACK HILLS**
18 **CORPORATION’S APPROACH TO OFFERING THOSE REBATES?**

19 A. In December 2019, the rebates were offered to all electric utility customers in the service
20 territories that Black Hills Corporation serves, including in Colorado. These rebates are
21 the same as those proposed in the Colorado Ready EV Plan. The only difference in offered
22 rebates is that the Ready EV Plan contains a new low-income rebate, which is not offered
23 in Black Hills Corporation’s other electric utility service territories.

1 These rebates are currently being funded by shareholders, until regulatory filings
2 are made to public utility commissions, proposing cost recovery mechanisms for these
3 rebates. Mr. Grant Gervais discusses in his Direct Testimony how the Company seeks to
4 recover the costs of those rebates.

5 **Q. WHAT ORGANIZATIONAL APPROACH HAS THE COMPANY TAKEN TO**
6 **DEVELOP THE READY EV PLAN?**

7 A. The Company developed a cross-functional team of experts to develop, lead, and change
8 over time the Ready EV Plan. The Ready EV team is composed of several sub-teams,
9 focusing on various aspects and challenges that Black Hills' customers face as they seek
10 to acquire an electric vehicle. The business team focused on the market analysis and size
11 of opportunity in our service territory for growing EV adoption. The marketing and public
12 relations team focused on branding, marketing, and internal and external education plan
13 development. The economic and business development team focused on leveraging other
14 stakeholders, site host opportunities, and public partnerships with state agencies to electrify
15 interstate corridors near our service territory. The regulatory group explored the challenges
16 and opportunities related to our existing tariffs, researched appropriate rebate amounts, and
17 set forth a plan for future EV tariff filings. Finally, the infrastructure and engineering team
18 reviewed the system impacts that electric vehicles can have on our systems, as well as
19 vetted EV charging companies for inclusion in our rebate program.

20 **Q. WHAT ARE THE OTHER MAJOR ASPECTS OF THE READY EV PLAN?**

21 A. All aspects of the Ready EV Plan are addressed in Attachment TAC-1, which is itself the
22 Ready EV Plan. The other major aspects include the following: (1) EV charging rates;
23 (2) an EVSE approach, (3) EVSE rebates, (4) fleet electrification programs, (5) low-

1 income customer programs, (6) a revision to the Company's distribution line extension
2 tariff, (7) a Customer Communication and Education Strategy, (8) an EV dealership
3 engagement program, (9) an employee EV engagement program, (10) a safety and
4 reliability assessment, (11) plan metrics, (12) a Plan budget, and (13) stakeholder
5 engagement. My testimony, as well as the testimonies of the Company's other witnesses,
6 discuss these Plan elements.

7 **Q. PLEASE SPECIFICALLY DESCRIBE WHAT ELEMENTS OF THE READY EV**
8 **PLAN YOU WILL ADDRESS.**

9 A. I will address the following:

- 10 • (2) the Company's EVSE charging infrastructure approach;
- 11 • (4) fleet electrification;
- 12 • (8) an EV dealership engagement program; and
- 13 • (9) an EV employee engagement program.
- 14

15 **V. EVSE INFRASTRUCTURE APPROACH**

16 **Q. PLEASE PROVIDE A SUMMARY OF THE DIFFERENT EV CHARGING**
17 **INFRASTRUCTURE UTILITY BUSINESS MODELS.**

18 A. As depicted in Figure TAC-1 below, there are generally four different EV charging
19 infrastructure utility business models.

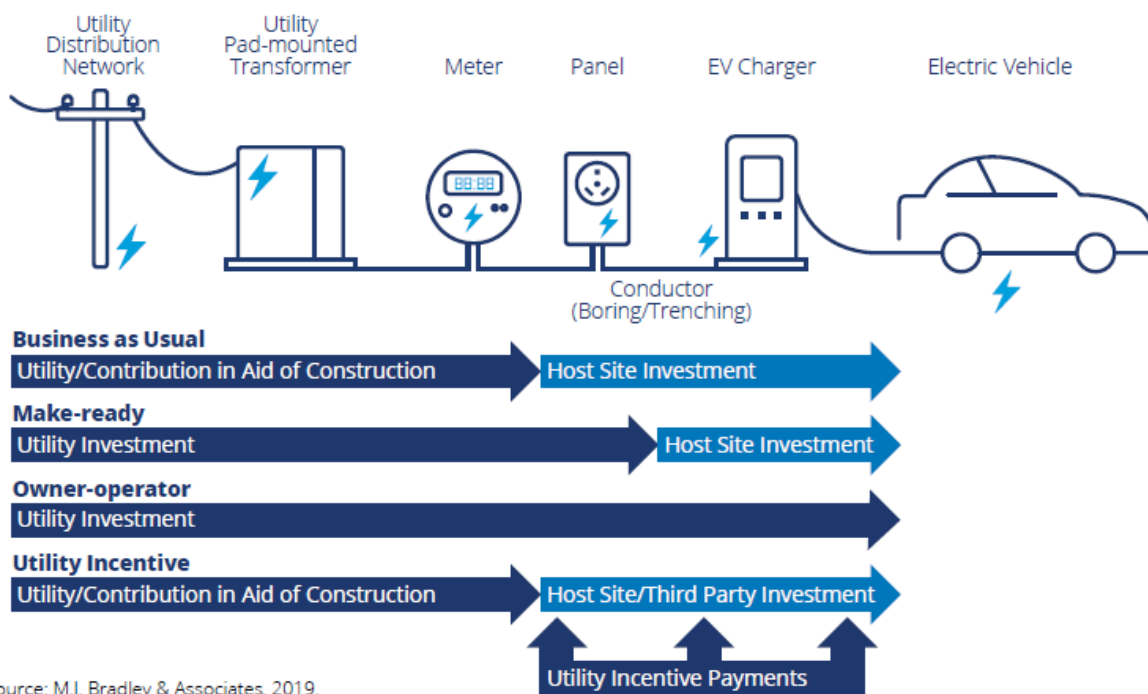
20 The first model, called "business as usual," is the scenario whereby the utility
21 provides service to the EVSE meter. The infrastructure behind the meter (*i.e.*, panel and
22 conductor), also known as "make ready infrastructure" is provided by the site host.

23 The second model, called "make-ready," is the scenario whereby the utility
24 provides equipment and service up to the EVSE. The utility provides the "make ready"
25 infrastructure and the site host provides the EV charger.

The third model, called “owner-operator” is the scenario whereby the utility owns and operates 100% of the infrastructure including the EVSE.

The fourth model, called “utility incentive,” is the scenario whereby the utility provides service to the EVSE meter, but also provides incentives to help offset the make-ready infrastructure costs and the cost of the EV charger.

Figure TAC-1: Utility Business Models



Source: M.J. Bradley & Associates, 2019.

Q. WHICH BUSINESS MODEL DOES THE COMPANY FEEL IS MOST APPROPRIATE TO MEET THE DESIRED OUTCOMES OF THE READY EV PLAN AND WHY WAS IT CHOSEN?

A. After careful consideration and evaluation, the Company’s Ready EV Plan closely resembles the utility incentive business model. The Company is not currently proposing to

1 own public-use EVSE at this time, rather the Company will provide rebates to help
2 incentivize and offset the make-ready infrastructure costs and the cost of the EVSE.

3 The Company explored utility ownership of charging infrastructure, examining
4 whether such ownership could allow the Company to assist in controlling the pace of build-
5 out, as well as providing new methods to grow its load. However, after discussing with
6 various other utilities and conducting further research, the Company determined that
7 ownership of charging infrastructure on a wide-scale basis is not in the best interest of its
8 customers.

9 **Q. WHY IS COMPANY OWNERSHIP OF CHARGING INFRASTRUCTURE NOT**
10 **IN THE BEST INTEREST OF ITS CUSTOMERS?**

11 A. The Company believes that ownership of EVSE is not in the best interest of its customers.
12 As I will discuss in greater detail below, ownership of EVSE assets in a competitive
13 business venture is a risky venture. This could impart stranded costs upon our customers if
14 the EVSE assets were rate-based and later became obsolete. Additionally, the development
15 of a new business segment becomes an administrative burden to the Company and distracts
16 from our core mission of providing safe and reliable service. There are four primary
17 reasons supporting the Company's decision not to pursue ownership of charging
18 infrastructure.

19 First, with any Company investment, there is a risk associated with creating a
20 stranded asset that is not in the best interest of customers. An asset could become stranded
21 because in the free market of EVSE development, Black Hills will need to compete against
22 other charging developers and likely bear operating losses, as it establishes market share
23 in a competitive marketplace. Should Black Hills' EVSE facilities that it owns become

1 redundant or otherwise unnecessary in a competitive environment, then customers would
2 face the risk of funding an asset that provides little value and is stranded. This is a potential
3 risk for customers that the Company always seeks to avoid.

4 Second, at this early stage of EV adoption in the Company's Southern Colorado
5 service territory, the Company did not want to burden all of its customers with 100 percent
6 of the cost of the make-ready infrastructure and EVSE infrastructure. As discussed by
7 witness Mr. Harrington, the Company's customers are very sensitive to rate changes. The
8 Company thus is striving to find the right balance between accomplishing the goals of
9 increased EV adoption with the cost impact to all ratepayers. The EV charging rebates are
10 intended to provide enough incentive to stimulate the EVSE market for site hosts. In other
11 words, the Company will provide some, but not all, of the initial investment in the make-
12 ready and EVSE infrastructure.

13 Third, the majority of charging needs the Company estimates will occur in its
14 system can be addressed with Level 2 EVSE, as is shown in my Attachment TAC-2. These
15 chargers significantly reduce charging time compared to Level 1 chargers, by increasing
16 the voltage from 120 volts to 240 volts. Level 2 EVSE support charge rates of roughly 25
17 miles of range per hour, compared to only four miles of range per hour of level 1 charging.
18 The cost of Level 2 EVSE is relatively low, ranging from approximately \$500 for
19 residential chargers to \$3,000-\$6,000 per port for public chargers. The Company does not
20 perceive this cost as a significant barrier to entry for residential customers or site hosts that
21 justifies the Company's competing with others in the market for Level 2 EVSE.

22 Fourth, the ownership of the EVSE would require the Company to take on a new
23 administrative role, including managing agreements for property access and leases with

1 site hosts, while also dealing with all the administrative functions associated with the
2 Company's provision of a whole new business service. The Company is not desirous, at
3 this time, to take on these new administrative roles and requirements. The Company is far
4 better suited to leverage its existing expertise and core competencies through the
5 management of EVSE rebates, similar to its experience in facilitating rebates and
6 supporting businesses through its energy efficiency department.

7 **Q. IS IT ACCURATE TO STATE THAT THE COMPANY IS TAKING ON MORE OF**
8 **A FACILITATOR ROLE CONCERNING EV INFRASTRUCTURE, AS OPPOSED**
9 **TO A DEVELOPER ROLE.**

10 A. Yes. The Company extensively evaluated various roles it could undertake to assist in the
11 widespread adoption of EVs. Ultimately, it settled on a facilitator role, whereby the
12 Company will have the tools and programs available to its customers and EVSE developers
13 to assist them in expanding EV adoption. The Company will treat EV charging in a similar
14 manner as it treats other load, providing service in a non-discriminatory manner. The
15 Company asserts that other businesses and site hosts are better suited at this time to meet
16 the charging infrastructure needs of EV owners. The Company will not enter or otherwise
17 compete in the EVSE infrastructure business.

18 As discussed in the Direct Testimony of Mr. Grant Gervais, the Company always
19 seeks to ensure a safe and reliable electric grid. In that regard, and as I describe later, the
20 Company has developed an EV load forecast to assist its understanding of its system to
21 safely incorporate EV loads. The Company at this time does not anticipate negative
22 impacts to safety and reliability associated with EVs. Thus, the Company does not need to

1 have ownership or control of EVSE infrastructure to manage the demand and impacts on
2 its system associated with EVs.

3 The Direct Testimony of Mr. Michael Grubert also explains how the Company's
4 new EV charging rates will provide appropriate price signals to reduce potential demand
5 increases that could occur during peak period hours. These elements of the Ready EV Plan
6 support the Company's role of an EV facilitator, as opposed to an EVSE developer.

7 **Q. WOULD THE COMPANY CONSIDER OWNING EVSE IN THE FUTURE?**

8 A. Possibly. One scenario that could support the Company's development and ownership of
9 EVSE would be the failure of its EV rebates to meet public charging goals or to ensure
10 charging infrastructure that is located in geographically dispersed areas. Black Hills will
11 continue to monitor and evaluate if it would be beneficial and in the public interest for it to
12 own EVSE, such as to provide infrastructure to under-served areas or help encourage
13 electric vehicles in high density areas.

14
15 **VI. EV MARKET ANALYSIS**

16 **Q. HAVE YOU FORECASTED EVs AND DETERMINED HOW MANY PUBLIC**
17 **CHARGING PORTS ARE NEEDED TO SUPPORT EVs IN THE COMPANY'S**
18 **SERVICE TERRITORY?**

19 A. Yes. The Company has conducted a market analysis to estimate the long-term growth rates
20 of electric vehicles in our service territory, the amount of sales associated with these new
21 loads, and the amount of charging ports required to support them. I am sponsoring Hearing
22 Exhibit 102, Attachment TAC-2, detailing the results.

23 **Q. PROVIDE AN OVERVIEW OF THIS FORECAST.**

1 A. The Company projected EV growth and EVSE needs. The forecast indicates that EV
2 adoption will grow for the Company's service territory from just under 300 registered EVs
3 in our territory in 2020, to over 5,800 vehicles by the end of 2030. This adoption will
4 require over 240 Level 2 workplace and public chargers, along with 20 DCFCs to support
5 the vehicle forecast during the same period.

6 **Q. HOW DID THE TEAM DEVELOP THE VEHICLE FORECAST?**

7 A. The team used the average of two long-term growth forecasts for light duty EVs to develop
8 its expected number of vehicles on the road. The forecasted growth rates were provided
9 from Bloomberg New Energy Finance ("Bloomberg") and the Energy Information
10 Agency's ("EIA") Mountain Region sales forecast. These were applied to current electric
11 vehicles known to be registered within our service territory. The starting data was derived
12 from identifying Vehicle Identification Numbers ("VIN numbers") associated with electric
13 vehicles provided by the Colorado Energy Office at a zip code level corresponding to our
14 service territory.

15 **Q. WHAT IS THE RESULT OF THE VEHICLE FORECAST?**

16 A. Both the Bloomberg and EIA forecasts show substantial year-over-year percentage growth
17 rates. Averaging the forecasted growth rate from these two sources and applying that
18 average to the starting number of vehicles produces the following EV forecast included
19 here as Figure TAC-2.

Figure TAC-2: EV Growth

Year-End	Rate	Cumulative EVs
2020		536
2021	58%	846
2022	41%	1,192
2023	32%	1,574
2024	27%	2,004
2025	24%	2,484
2026	21%	3,007
2027	19%	3,587
2028	18%	4,237
2029	17%	4,977
2030	17%	5,821

Q. DOES THE EV FORECAST INCORPORATE AND RELY UPON ADDITIONAL INCENTIVES RELATED TO TAX CREDITS AND REBATES FOR THE FORECASTED GROWTH?

A. No. It is difficult to determine what impacts the Company's rebates, in conjunction with state and federal incentives, will have on consumer behavior and to our forecast going forward. However, we do believe an important aspect of the TEP is to attempt to exceed the number of public EVSE our forecast indicates are needed. Therefore, the Company can, at a minimum, have ample EVSE infrastructure in place to have a significant public presence and reduce range anxiety for those contemplating the purchase of an EV.

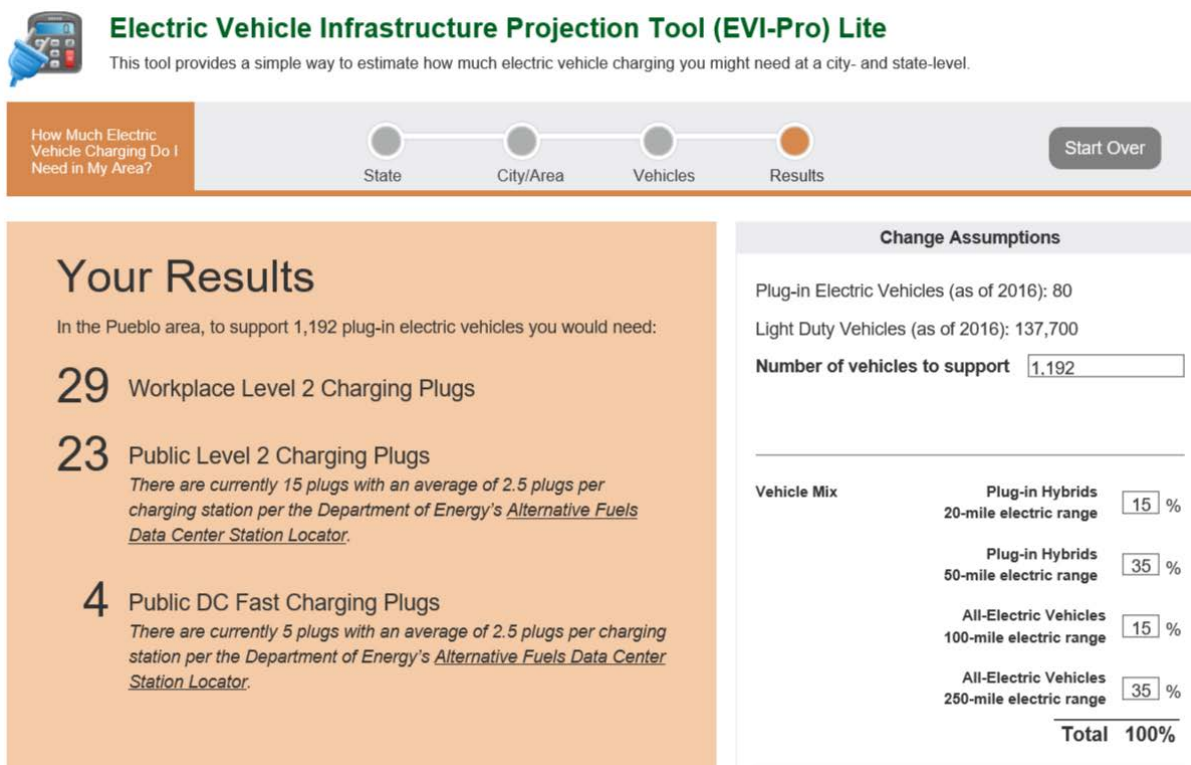
Q. HOW DID THE COMPANY DETERMINE THE NUMBER OF CHARGING PORTS NEEDED TO MATCH THE VEHICLE FORECAST?

A. The Company relied upon the forecasting tool known as the "Electric Vehicle Infrastructure Projection Tool" from the U.S. Department of Energy¹. This tool relies on

¹ <https://afdc.energy.gov/evi-pro-lite>

the inputs of number of vehicles expected in the Pueblo metro area and then calculates based upon that input how many chargers are needed to support them. A screen shot of the website for illustrative purposes is include here as Figure TAC-3.

Figure TAC-3: EVI-Pro Lite Snapshot



Q. PLEASE PROVIDE THE RESULTS OF THE COMPANY’S FORECAST AND THE ASSOCIATED NUMBER OF CHARGING PORTS NEEDED TO MEET THAT FORECAST.

A. Below is Figure TAC-4 showing the Company’s forecast of the number of charging ports, which is also provided in Attachment TAC-2.

1

Figure TAC-4: Forecast of EVSE

Year	Workplace	Public	DCFC
2020	14	11	2
2021	21	17	3
2022	29	23	4
2023	38	31	6
2024	49	39	7
2025	61	48	9
2026	73	58	11
2027	87	68	13
2028	103	80	15
2029	120	92	17
2030	140	106	20

2 **Q. DID YOU FORECAST HOW MANY RESIDENTIAL REBATES WOULD BE**
3 **PROCESSED AND, IF SO, WHAT WAS THE BASIS FOR YOUR FORECAST?**

4 A. Yes. We assumed that 75 percent of all new EV owners would apply for and receive a
5 residential rebate. We arrived at that number as it closely matches a study conducted by
6 the Center for Sustainable Energy that reviewed the State of California's Clean Vehicle
7 Rebate Program's participation rates.² The resulting number of forecasted residential
8 rebates is included in Attachment TAC-2.

9 **Q. DO YOU BELIEVE THAT THE RESULTING FORECAST IS REASONABLE?**

² <https://cleanvehiclerebate.org/sites/default/files/attachments/2015-10%20CVRP%20Participation.pdf>

1 A. Yes, but it is also optimistic. The forecast is based on reasonable assumptions of EV
2 growth, and then it translates that growth into a reasonable assumption of EVSE necessary
3 to support that growth. The resulting forecast of EVSE shows a dramatic and significant
4 increase of EVSE in the Company's service territory. The Company does not know
5 whether this increase will result. However, creating this forecast based on reasonable
6 assumptions assisted the Company in creating a budget for Ready EV that is based on an
7 expected large growth of EVSE.

8 Though the forecast is reasonable, it is also optimistic. This is the case due to the
9 dramatic turmoil in the economy stemming from the COVID-19 pandemic and associated
10 stay at home orders. The Company does not know what precise impact COVID-19 will
11 have on EV growth and EVSE needs, but the ongoing impacts of COVID-19 suggest that
12 forecasts created prior to the pandemic (such as the ones used by the Company) may have
13 overstated projections. That being said, if there is a quick recovery to the economy, then
14 these concerns would reduce.

15 Overall, the assumptions, the underlying EV forecasts, and resultant EVSE
16 forecasts are within a range of reasonableness for an approximation of expected widespread
17 adoption of EVs over time. This forecast or a lower forecasted amount do not change the
18 underlying intent of Ready EV to increase the adoption of EVs by addressing issues such
19 as range anxiety by making larger amounts of EVSE available in the Company's service
20 territory and within a reasonable budget.

VII. REBATE VENDOR SELECTION

Q. CAN YOU EXPLAIN WHAT SPECIFIC EVSEs WILL BE AVAILABLE FOR THOSE CUSTOMERS SEEKING AN EV REBATE?

A. Yes. Currently, Ready EV has qualified two EVSE companies' chargers. These companies are ChargePoint and Enel X. The list of the EVSE models eligible for rebate is provided in Figure TAC-5.

Figure TAC-5: Eligible Rebates

QUALIFIED ELECTRIC VEHICLE CHARGERS			
Manufacturer	Model	Description	Rebate Amount
ChargePoint	CPH50-NEMA6-50-L23	16A-50A, NEMA 6-50 plug, 7010.4 mm (23') charging cable	Up to \$500
ChargePoint	CPH50-NEMA14-50-L23	16A-50A, NEMA 14-50 plug, 7010.4 mm (23') charging cable	Up to \$500
Enel x	Juicebox Pro 32	32A NEMA 14-50 plug or hardwire	Up to \$500
Enel x	Juicebox Pro 40	40A NEMA 14-50 plug or hardwire	Up to \$500
Enel x	Juicebox Pro 80	80A NEMA 14-50 plug or hardwire	Up to \$500

QUALIFIED ELECTRIC VEHICLE CHARGERS				
Manufacturer	Model	Description	Rebate Amount (Public and Workplace Charging)	Rebate Amount (Governmental and Nonprofit)
Chargepoint	CT4011-GW1	Single Output Bollard Unit 208/240V @30A with cord management	Up to \$2,000/Per Port	Up to \$3,000/Per Port
Chargepoint	CT4013-GW1	Single Output Wall Mount Unit-208/240V @30A with cord management	Up to \$2,000/Per Port	Up to \$3,000/Per Port
Chargepoint	CT4021-GW1	Dual Output Bollard Unit 208/240V @30A with Cord Management	Up to \$2,000/Per Port	Up to \$3,000/Per Port
Chargepoint	CT4023-GW1	Dual Output Wall Mount Unit 208/240V @30A with Corp Management	Up to \$2,000/Per Port	Up to \$3,000/Per Port
Chargepoint	CT4025-GW1	Dual Output Bollard Unit 208/240V @30A with Cord Management 23' cord	Up to \$2,000/Per Port	Up to \$3,000/Per Port
Chargepoint	CT4027-GW1	Dual Output Wall Mount Unit 208/240V @30A with Corp Management 23' cord	Up to \$2,000/Per Port	Up to \$3,000/Per Port
Enel X	JuiceBox Pro 32C	32A, 7.7 KW plug or hardwire	Up to \$2,000/Per Port	Up to \$3,000/Per Port
Enel X	JuiceBox Pro 40C	40A 9.6 KW plug or hardwire	Up to \$2,000/Per Port	Up to \$3,000/Per Port

Q. HOW DID THE COMPANY ENGAGE WITH AND QUALIFY EV CHARGING VENDORS?

A. The Company undertook research to explore qualified vendors that would be willing to participate in Ready EV. The Company found during its research that several EVSE vendors were not responsive to our initial outreach efforts. In addition, during its research,

1 the Company consulted with other fellow utilities regarding their experiences in working
2 directly with EVSE vendors.

3 **Q. WHAT PROCESS DID THE COMPANY CONDUCT TO SELECT VENDORS?**

4 A. The Company conducted a process whereby we had discussions with several vendors. The
5 Company interviewed these vendors and received product demonstrations.

6 The EVSE vendors were selected pursuant to the following due diligence process:
7 (1) the Company's establishment of defined requirements, (2) conducting of phone
8 interviews with EVSEs, (3) on-site meetings with EVSEs, when possible, (4) reference
9 checks with peer utilities on the EVSEs, and (5) a final ranking process was undertaken
10 based on scoring the ability to meet certain utility defined requirements. The defined
11 requirements used were the following: price, product offerings, utility partnership
12 experience, service territory fit, and customer charging experience.

13 The Company recognizes the importance of vendor selection and meeting customer
14 desires in program implementation as Ready EV progresses to further maturity. The
15 Company will continually evaluate vendors given the ongoing evolution of this market,
16 examining options to qualify additional vendors. The Company fully intends to continue
17 engaging with EVSE manufacturers as part of the on-going stakeholder engagement
18 process, which is discussed in the Direct Testimony of Mr. Michael Harrington.

19 **Q. BESIDES PROVIDING THE EQUIPMENT ELIGIBLE FOR REBATES, WHAT**
20 **ELSE WILL THE VENDORS PROVIDE THE COMPANY?**

21 A. The vendors will also play an important part in providing EV charging data that the
22 Company will be able to use to gain insights into its customers' charging behavior. Both
23 of the Company's qualified vendors have agreed to provide charging data. This charging

1 data is especially important because the Company's proposed residential EV rate is a whole
2 house rate, which will not be separately metered. Because the qualified vendors have
3 agreed to provide charging data, the Company will gain specific insights into the charging
4 behavior of its residential customers.

5 By limiting at the outset qualified vendors to only these two vendors, the Company
6 will be better able to manage the significant administrative burdens and costs associated
7 with acquiring and analyzing the charging data. Going forward, the Company will be able
8 to use the data to further shape the scope of its EV program offerings.

9 **Q. WILL THE QUALIFIED VENDORS CHARGE THE COMPANY FOR THEIR**
10 **COSTS IN PROVIDING CHARGING DATA TO THE COMPANY?**

11 A. Yes. The Company expects the qualified vendors to assess fees for their provision of
12 charging data to the Company. These costs are necessary components of the Ready EV
13 Plan. The Company needs the EV charging data to learn and adapt to its customers'
14 charging behaviors to better inform its Ready EV programs. The overall costs charged by
15 the qualified EV vendors during the first TEP is estimated to total \$10,000 annually for
16 Black Hills Corporation's three electric utilities. The Company is proposing that one-third
17 of this cost be allocated to the TEP budget. BHC's other two utilities will also utilize the
18 charging data to inform potential EV charging tariffs in their future rate cases. The cost
19 split for the data is just and reasonable as each will be using the data for similar purposes.

20 **Q. WHY IS IT IMPORTANT FOR THE COMPANY TO QUALIFY EVSE VENDORS**
21 **WHO ARE ELIGIBLE FOR COMPANY PROVIDED REBATES?**

22 A. It is important for the Company to know and understand the type of equipment being
23 installed in its service territory. The Company is offering rebates for certified equipment

1 that has been vetted. Customers are essentially paying for the rebates. Thus, it is important
2 that the EVSEs are a high-quality product that meet the Company's standards. In addition,
3 the Company wants its customers to have a positive EV charging experience from the
4 marketing to initial purchase of EVSE, through install, and post-operational support. The
5 site hosts will own and operate the EVSEs, and they are looking to the Company for its
6 knowledge, support, and advice on how best to incorporate EVSE.

7 **Q. CAN CUSTOMERS INSTALL EVSE FROM OTHER VENDORS?**

8 A. Yes, customers can purchase and install EVSE from any vendor as they so choose.
9 However, to be eligible for the Company provided rebate and for the reasons listed above,
10 a customer must choose one the selected vendors.

11
12 **VIII. FLEET ELECTRIFICATION**

13 **Q. ANOTHER ASPECT OF THE READY EV PLAN IS FLEET ELECTRIFICATION.**
14 **WHAT IS THE COMPANY DOING TO CONVERT FLEETS WITHIN ITS**
15 **SERVICE TERRITORY?**

16 A. Black Hills desires to address the electrification of public transit and fleets in its service
17 territory with new and innovate programs. However, Black Hills needs more time to
18 thoroughly understand the needs of its customers as pertains to electrifying public transit
19 and fleets within its service territory.

20 Fleet vehicle electrification will need to address multiple challenges. Examples of
21 these challenges include the following:

- 22 • High cost of electric fleet vehicles, such as busses, as compared to traditional fleet
23 vehicles;
- 24 • Limited EV options for medium and heavy-duty vehicles;

- 1 • Higher cost charging infrastructure to address the needs of fleets;
- 2 • Limited experience of fleet operations in maintaining and managing EVSE;
- 3 • High demands of fleet EVSE may require significant utility infrastructure upgrades;
- 4 • Differing rate design needs for EV charging, as some fleets may not be able to take
- 5 advantage of off-peak pricing;
- 6 • Fleet charging demands may require consideration of on-route charging options;
- 7 • Impacts to utility system peak demands associated with fleet charging; and
- 8 • Rapidly changing electric vehicle technologies.

9 Fleet electrification will require robust coordination not only by Black Hills, but
10 also with fleet operators, facility managers, energy managers, sustainability managers, fleet
11 operations staff, and others to successfully transition to an electric fleet. At the same time,
12 Black Hills will need to understand and gain insight into its customers' fleet electrification
13 plans to determine cost effective solutions to address needs, as well as to effectively
14 manage and plan its impact on its distribution system.

15 **Q. IT SOUNDS AS IF THE COMPANY IS IN THE NASCENT STAGE OF A FLEET**
16 **ELECTRIFICATION PLAN. WHAT IS THE COMPANY'S PROPOSAL?**

17 A. The Company is just beginning to assess the size of this market and possible solutions and
18 challenges as previously mentioned above. Black Hills is thus not proposing at this time
19 to launch a fleet electrification proposal. Black Hills will use its first TEP to further explore
20 the development of electric vehicle fleet pilots. As Black Hills continues to learn from its
21 first TEP with Ready EV, it can apply those lessons to new programs to address future
22 electric fleet conversions and integration.

23 **Q. COULD BLACK HILLS LAUNCH A FLEET ELECTRIFICATION PROPOSAL**
24 **DURING THE COURSE OF ITS FIRST TEP?**

25 A. Yes. Working in the stakeholder engagement process, Black Hills could launch a new fleet
26 electrification proposal. Mr. Harrington discusses how the Company envisions changes to

1 its TEP could be incorporated following the stakeholder engagement process.
2 Alternatively, it could work on the specifics of similar proposals with stakeholders and
3 propose new fleet proposals during its next TEP.

4 **Q. PLEASE DESCRIBE SOME EXAMPLES OF FLEET PROGRAMS THE**
5 **COMPANY COULD LAUNCH IN THE FUTURE.**

6 A. The Company could undertake the following pilot programs during the TEP:

- 7 • Conduct a customer needs assessment, permitting Black Hills to: understand which
8 of our customers have vehicle fleets, where those vehicles are in our system, how
9 many vehicles operate at those sites, what decarbonization goals our customers
10 have set, how to create customer-specific fleet electrification plans, and assess how
11 to ensure continued safe and reliable electric service when integrating fleet charging
12 infrastructure;
- 13 • Launch programs with transportation network and car share companies to create
14 opportunities that encourage drivers to use electric vehicles and educate their riders
15 when they are riding in an electric vehicle;
- 16 • Develop new rebate programs to reduce costs to fleet operator investments in
17 charging infrastructure;
- 18 • Develop fleet-specific electric vehicle charging rates;
- 19 • Launch a school bus pilot, wherein assistance is provided to schools in their efforts
20 of acquiring electric busses and charging infrastructure; or
- 21 • Alter communication and marketing plans to increase customer awareness in
22 electrical vehicle fleet options.

23 Black Hills asserts that new fleet electrification programs should be developed and vetted
24 through the stakeholder engagement process.

25 **Q. WHAT IS THE COMPANY'S PLAN REGARDING ITS OWN FLEET?**

26 A. Black Hills Corporation's fleet department has undertaken a review of the enterprise's
27 electrification opportunity and believes that the opportunity exists to convert 75% of its car
28 and SUV fleet of 50 vehicles and 80% of its over 200 light duty trucks during the next five
29

1 years. However, the Company's fleet budget is significantly smaller and likely will not
2 see any near-term replacements as it has a very limited fleet budget and few light duty
3 trucks and cars that need replacement. The Company does plan to convert several of its
4 bucket trucks such that the auxiliary items like the bucket will be battery powered. This
5 will lower the diesel consumption for the fleet as well as reduce noise when operating in
6 residential neighborhoods.

7
8 **IX. EV EMPLOYEE ENGAGEMENT PROGRAM**

9 **Q. WHAT IS THE COMPANY'S EV EMPLOYEE ENGAGEMENT PROGRAM?**

10 A. The EV Employee Engagement Program will build a base of employees knowledgeable
11 about electric vehicles with the goal of increasing their purchase or leasing of EVs.
12 Employees are the front lines to customers and as electric vehicle advocates, they will share
13 their enthusiasm with customers, friends and family. Such a program is important to the
14 overall goal of accelerating EV adoption. This internal grassroots effort will support and
15 encourage employees to demonstrate to their communities that the Company and its
16 employees are key resources for customers' EV charging needs. The engagement program
17 will demonstrate the Company's leadership and support for transportation electrification
18 and innovative product offerings. Additionally, Black Hills will benefit from being able to
19 use this employee base as one living focus group for future EV programs and services.

20 **Q. WHAT DOES THE COMPANY INTEND FOR THE EV EMPLOYEE**
21 **ENGAGEMENT PROGRAM TO ACHIEVE?**

22 A. The employee engagement program will initially be focused on education and training for
23 Company employees. Early engagement efforts will be focused on education related to the

1 Ready EV Plan, latest industry updates, as well as testimonials from employees who
2 already drive electric. As the employee engagement and dealership engagement plans
3 advance simultaneously (discussed below), there will be opportunities created for
4 employees and local dealerships to network regarding the latest EV models on the market.
5 Also, as the Ready EV Plan continues to gain momentum, employees will hear from
6 residential and business customers related to their experiences in participating in EV
7 programs. Overall, the EV Employee Engagement Program will act as another tool to
8 assist the Company in promoting the widespread adoption of EVs by ensuring its
9 employees have the information they need to spur EV adoption and share those lessons
10 learned with the Company.

11
12 **X. EV DEALERSHIP ENGAGEMENT PROGRAM**

13 **Q. PLEASE EXPLAIN THE COMPANY'S PLANS FOR DEALERSHIP**
14 **ENGAGEMENT.**

15 A. As part of the Ready EV program, Black Hills is proposing to develop partnerships with
16 local dealerships and will demonstrate how the utility can become a trusted resource with
17 dealerships. Not only must the Company provide sufficient EV information to its
18 customers, but it also needs to provide information to dealerships to ensure that they are
19 properly advising on the full scope of implications associated with the purchase of an EV.

20 **Q. WHY IS EV DEALERSHIP ENGAGEMENT NEEDED?**

21 A. The engagement is needed because dealerships can be resistant to selling EVs. There are
22 several reasons behind this resistance. One reason is low profitability of EV sales and
23 initial investments being too burdensome with EVSEs, special tools or equipment, new

1 processes, and technician training. In addition, many dealerships recognize the limited on-
2 going service and maintenance costs for EVs and are concerned about decreases in routine
3 maintenance revenue. Finally, the lack of basic consumer information is a reason for
4 hesitancy in having EV inventory available. Customers tend to have many more questions
5 about an EV compared to a traditional internal combustion engine vehicle, requiring more
6 time and energy from an already busy sales force. Understanding these unique challenges,
7 listening to concerns, and providing resources and support to local dealerships'
8 management and salespeople is the best way for the Company to form partnerships and
9 begin to bridge this gap.

10 **Q. WHAT ACTIONS WILL THE COMPANY TAKE AS PART OF ITS EV**
11 **DEALERSHIP ENGAGEMENT PROGRAM?**

12 A. The Company will provide information on Ready EV programs, utility tariffs and rates,
13 and other pertinent information to local dealerships. In addition, Black Hills will attempt
14 to facilitate stakeholder engagements with the dealership associations in Colorado to
15 educate the organizations about Ready EV programs. Finally, as part of the overall
16 dealership engagement strategy, the Company could engage with nonprofits such as, Plug
17 in America, Center for Sustainable Energy, and Forth, who are well-versed in offering
18 dealership training.

19
20 **XI. COMPANY STAFFING NEEDS**

21 **Q. THE READY EV PLAN HAS MANY ASPECTS TO MANAGE. WHAT IS THE**
22 **PLAN TO MANAGE AND PROVIDE STAFF TO ADMINISTER AND OVERSEE**
23 **THE GROWTH OF READY EV?**

1 A. The Ready EV Plan does have many facets to manage to ensure it will successfully increase
2 EV awareness and adoption for the benefit of all customers and stakeholders. Currently,
3 the Company is managing EV efforts through various legacy members of the original team
4 that assisted in designing the plan. Going forward, the Company will have a dedicated full-
5 time employee to oversee the various aspects of the Ready EV Plan. This employee will
6 split time between working on EV matters between the three states in which BHC has
7 electric utilities. The employee will separately account for time charged to Colorado
8 matters, allowing the employee to split its EV work with the other BHC electric utilities.

9 In addition, to implementing Ready EV, the Company will continue to rely upon
10 various other internal experts, as these legacy team members and outside consultants are
11 needed to execute on the actions outlined in the Ready EV Plan. We will continue to
12 evaluate the program requirements, the budget, and adoption rates as the Ready EV Plan
13 implementation progresses and increase staffing as necessary to ensure the plan's success.

14 **Q. WHAT IS THE ESTIMATED COST OF THE NEW EMPLOYEE TO SUPPORT**
15 **THE READY EV PLAN?**

16 A. The Company estimates the cost of the employee plus benefits, to be approximately
17 \$80,000 annually. The Company expects that approximately 75% of the employee's time
18 will be spent on the Colorado Ready EV Plan and related TEP requirements. The budget
19 for the employee costs in the Ready EV Plan is thus \$60,000.

20 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

21 A. Yes.

Appendix A

Statement of Qualifications

T. Aaron Carr

I received a Bachelor of Science degree in Business Administration from the University of Wyoming in 1996 and a Masters of Business Administration from the University of South Dakota in 2001. I joined Black Hills Corporation in 2000. While at BHC, I have had roles as a Corporate Development Analyst, Risk Analyst, Senior Manager of Budgets and Forecasts, and Director of Corporate Development. In my current role as Director of Energy Innovations, which I have held since 2018, I have led numerous projects related to renewable energy development, the design and development of BHC's electric vehicle plan, projects designed to promote the beneficial use of electrification, and other key strategic growth initiatives. I have previously sponsored testimony in the states of Nebraska and Wyoming.

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO

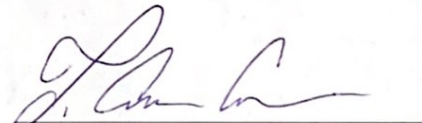
PROCEEDING NO. 20A - __E

IN THE MATTER OF THE VERIFIED APPLICATION OF BLACK HILLS COLORADO ELECTRIC, LLC FOR APPROVAL OF ITS TRANSPORTATION ELECTRIFICATION PLAN, READY EV, FOR PROGRAM YEARS 2021 – 2023 AND FOR RELATED TARIFF APPROVALS.

State of South Dakota)	Affidavit Adopting
) SS.	Direct Testimony and Attachments
County of Pennington)	

T. Aaron Carr being duly sworn, states that he is the T. Aaron Carr whose Direct Testimony and Attachments in the above-captioned proceeding accompany this Affidavit.

T. Aaron Carr further states that such Direct Testimony is a true and accurate statement of his answers to the questions contained therein, and that he does adopt those answers as his sworn Testimony in this proceeding. T. Aaron Carr further states that such Attachments that accompany his Direct Testimony are true and accurate.


T. Aaron Carr

On April 28, 2020, appeared T. Aaron Carr, not in my physical presence but rather appearing remotely by means of communication technology from 1140 Settlers Creek Pl., Rapid City, South Dakota 57701, known to me to be the person who executed the foregoing instrument, and acknowledged that he executed the same as his free act, and deed.


Notary Public



My Commission Expires: My Commission Expires June 22, 2023