BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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IN THE MATTER OF ADVICE NO. 993-GAS OF PUBLIC SERVICE COMPANY OF COLORADO TO REVISE ITS COLORADO PUC NO. 6-GAS TARIFF TO INCREASE JURISDICTIONAL BASE RATE REVENUES, IMPLEMENT NEW BASE RATES FOR ALL GAS RATE SCHEDULES, AND MAKE OTHER PROPOSED TARIFF CHANGES EFFECTIVE FEBRUARY 24, 2022	)	**PROCEEDING NO. 22AL-_____G**

DIRECT TESTIMONY AND ATTACHMENTS OF JEFF R. LYNG

ON

BEHALF OF

PUBLIC SERVICE COMPANY OF COLORADO

January 24, 2022

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO**

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BEFORE THE PUBLIC UTILITIES COMMISSION

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DIRECT TESTIMONY AND ATTACHMENTS OF JEFF R. LYNG

I. INTRODUCTION, QUALIFICATIONS, PURPOSE OF TESTIMONY

Q. **PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

A. My name is Jeff R. Lyng. My business address is 1800 Larimer Street, Denver, Colorado 80202.

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

A. I am employed by Xcel Energy Services Inc. ("XES") as the Director of Energy & Environmental Policy. 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 operating 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. I am responsible for advising Xcel Energy's operating companies on state and federal energy and environmental policy, including climate-related topics. I have fifteen years of work experience in energy policy including in the Colorado Governor's Energy Office during Governor Ritter's Administration and with Colorado State University's Center for the New Energy Economy. I also have a graduate degree in Civil Engineering from the University of Colorado at Boulder. A more detailed description of my qualifications, duties, and responsibilities is set forth in my Statement of Qualifications at the conclusion of my Rebuttal Testimony.

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

A. Yes, I am sponsoring the following attachments:

- Attachment JRL-1 – Net-Zero Vision for Natural Gas; and
- Attachment JRL-2 – Natural Gas Use in the U.S. Building Sector in Global Low Carbon Pathways.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my Direct Testimony is to discuss Xcel Energy's (and the Company's) plans and strategy to reduce greenhouse gas ("GHG") emissions and how those plans and strategies relate to Colorado emissions reduction policies, as

well as our requests in this rate case and the continued need for the Company's natural gas system.

WHAT ARE THE PRIMARY GHG EMISSIONS ASSOCIATED WITH NATURAL GAS SERVICE?

Q. Natural gas service is primarily associated with two GHGs: methane and carbon dioxide. Methane can be emitted into the atmosphere through local distribution company ("LDC") upstream providers or through leaks on LDC distribution systems. Customers' use of natural gas through appliances in their homes and businesses emits carbon dioxide.

A.

Q. PLEASE SUMMARIZE HOW THE COMPANY'S NATURAL GAS DISTRIBUTION BUSINESS AND THE REQUESTS IN THIS CASE FIT WITHIN XCEL ENERGY'S VISION AND COLORADO'S EMISSIONS REDUCTION POLICIES.

A. As discussed in detail in my Direct Testimony, Xcel Energy and Colorado are transitioning toward a net-zero[1] future for both electric and natural gas utilities. Investment in the Company's gas system remains consistent with a low-emissions future. While we are working every day to ensure the structural integrity of our own gas distribution system and satisfaction of our obligation to serve our customers, even larger successes will need to come from encouraging emissions reduction efforts among our suppliers and customers throughout the natural gas

[1] The Intergovernmental Panel on Climate Change has stated "net zero emissions are achieved when anthropogenic emissions of GHGs to the atmosphere are balanced by anthropogenic removals over a specified period." *See* https://www.ipcc.ch/sr15/chapter/glossary/.

supply chain. The Company's natural gas system will continue to play a vital role, providing increasingly less GHG-intensive service and helping to facilitate the transition to net-zero. And there will continue to be a role for the Company's natural gas system once the transition to net-zero is complete.

II. PARTNERSHIP TO REDUCE GHG EMISSIONS

Q. WHAT IS DRIVING THE COMPANY'S EFFORTS TO REDUCE GHG EMISSIONS?

A. The Company's efforts are driven by our mission to serve the public interest as defined and shaped by the needs and priorities of our customers as well as the leadership of public policymakers and regulators. As a public utility, the Company has an obligation to ensure that its services are delivered safely, reliably, and affordably to all our customers. In more recent years, the specter of global climate change has expanded the Company's mission to also include reducing GHG emissions in concert with the initiatives and guidance of policymakers. Ultimately, we remain committed, as we must be, to the safe, reliable, and affordable delivery of the essential utility services we provide and we believe that can be accomplished in a manner that furthers the State's emissions-reduction policies.

Q. HOW ARE THE COMPANY'S CARBON REDUCTION EFFORTS RELATED TO ITS ENERGY PARTNERSHIP WITH THE STATE OF COLORADO?

A. The Company's carbon-reduction efforts are part of a long-standing clean-energy partnership with state policymakers and regulators that began nearly two decades ago and have resulted in over 100 clean energy bills becoming state policy in that time. Taken as a whole, collaboration on these policies has established Colorado and the Company as leaders in the clean energy transition.

Q. WHAT HAS XCEL ENERGY DONE THUS FAR TO REDUCE GHG EMISSIONS ACROSS ITS MULTI-STATE FOOTPRINT?

A. Xcel Energy's GHG reduction efforts to date have focused primarily on its electric utility operations. Those efforts are driven now by Xcel Energy's industry-leading commitment, made in 2018, to reduce carbon dioxide emissions across all jurisdictions from 2005 levels by 80 percent no later than 2030 and deliver carbon-free electricity by 2050.

Q. HOW IS THE COMPANY POSITIONING TO MEET THESE COMMITMENTS IN COLORADO?

A. The Company's vision for meeting the Xcel Energy carbon dioxide reduction commitment with respect to our electric utility is outlined in our Colorado Clean Energy Plan. The Colorado Clean Energy Plan proposes to add approximately 2,300 megawatts ("MW") of new wind, 1,600 MW of large scale solar and 400 MW of battery storage in this State. Under a settlement agreement achieved with several parties, the Company also proposes to stop using coal generation entirely by the end of 2034.[2]

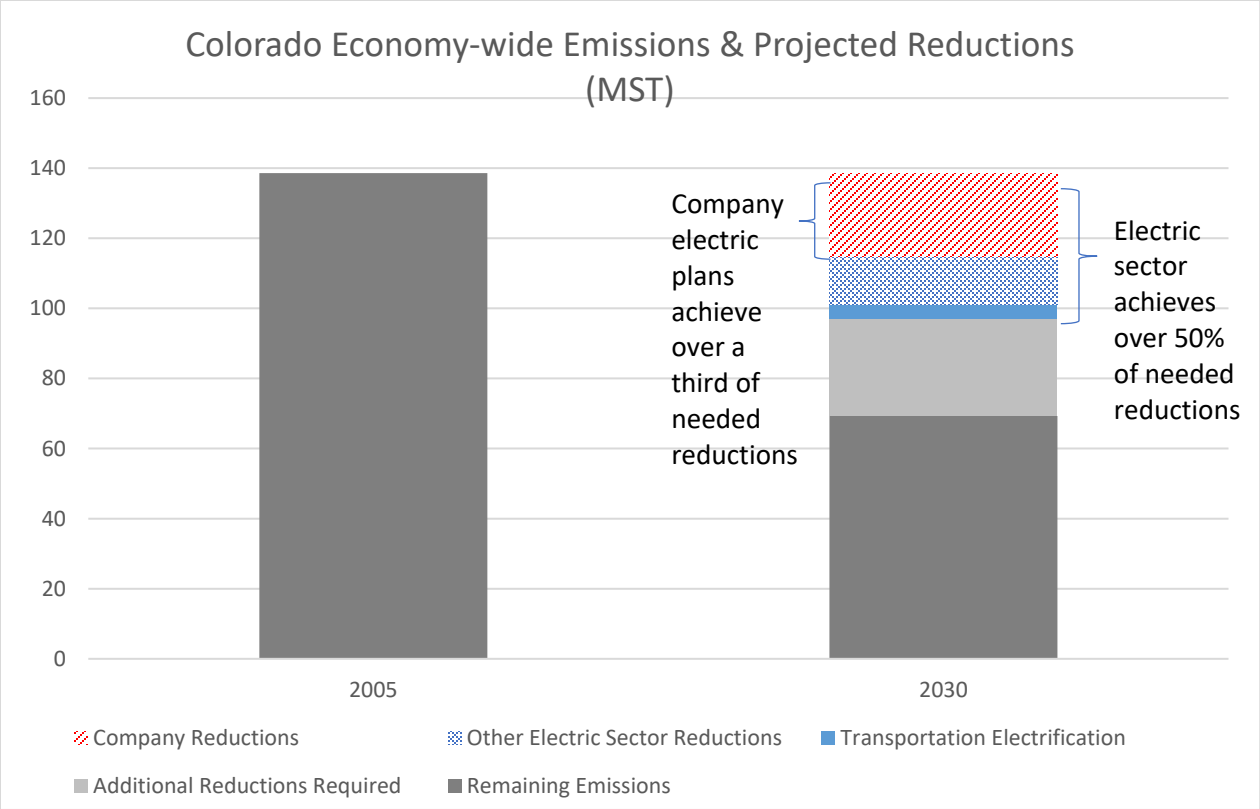
Q. DOES THE COMPANY'S COLORADO CLEAN ENERGY PLAN PUT IT ON TRACK TO MEET THE STATE'S CARBON DIOXIDE EMISSION GOALS?

A. Yes. Current law requires an 80 percent decrease in carbon dioxide emissions (from 2005 levels) by 2030.[3] If approved, our Clean Energy Plan would put the Company on track to achieve an approximate 85 percent reduction in electric utility carbon dioxide emissions by 2030, which exceeds Colorado's current targets and the Xcel Energy goal of 80 percent reductions by 2030. In fact, the Company's

[2] Proceeding No. 21A-0141E.
[3] C.R.S. § 25-7-105 (e)(VIII)(B).

electric utility in this State will, by itself, account for meeting over one third of Colorado's total state-wide GHG reduction goal for all sectors by 2030.

Figure JRL-D-1



Q.

A. **HAS THE COMPANY ALREADY MADE SIGNIFICANT PROGRESS TO REDUCE ITS CARBON DIOXIDE EMISSIONS?**

Yes. The Company already has reduced its carbon dioxide emissions by 46 percent from 2005 levels. Among other things, the Company has retired or scheduled early retirement of over 1,860 MW of coal generation in Colorado and is proposing to retire an additional 1,238 MW. The Company has also added over

3,800 MW of wind, 306 MW large-scale solar, and 643 MW of distributed solar generation to its system since 2005 in Colorado.

Q. IS XCEL ENERGY TAKING OTHER STEPS TO MEET ITS CARBON-REDUCTION COMMITMENTS?

A. Yes. Xcel Energy is working toward its goal of carbon-free electric service through efforts that include the Carbon-Free Technology Initiative[4] and the Low Carbon Resources Initiative,[5] which are focused on bringing new, 24/7 carbon-free generating technologies to the market.

Xcel Energy has also taken steps to reduce GHG emissions from the transportation sector through efforts to facilitate electric vehicle adoption and take advantage of significantly lower carbon electric service. To that end, Xcel Energy announced in 2019 its goal to get 1.5 million electric vehicles on the road by 2030. As part of that effort, the Company is working to invest over $110 million in electric vehicles, charging infrastructure, educational tools, and community outreach in Colorado over the next three years.

Q. PLEASE SUMMARIZE THIS SECTION OF YOUR DIRECT TESTIMONY.

A. Reducing GHGs is a core part of the Company's mission. We have worked in partnership with Colorado policy makers and regulators to advance the State's emissions reduction goals and remain committed to making significant and valuable contributions. We have already made substantial progress reducing carbon emissions in our electric utility operations and have undertaken efforts to

[4] https://www.carbonfreetech.org
[5] https://www.epri.com/thought-leadership/lcri

help reduce GHG emissions in the transportation section through electrification. As discussed in the next section of my Direct Testimony, our commitment to reduce GHG emissions extends to our natural gas business as well.

III. XCEL ENERGY'S NATURAL GAS GHG REDUCTION VISION AND THE FUTURE OF THE NATURAL GAS SYSTEM

HAS COLORADO RECENTLY ENACTED BILLS DIRECTED TOWARD REDUCING GHG EMISSIONS FROM NATURAL GAS SERVICE?

Q. A. Yes. The Company has supported Colorado's nation-leading policies directed at reducing GHG emissions from natural gas use, which protect affordability and reliability while also spurring necessary innovation. For example, the Company worked with Colorado policymakers to support the Clean Heat goals in Senate Bill ("SB") 21-264 ("Clean Heat"). That legislation, enacted by the Colorado Legislature and signed by Governor Polis in 2021, establishes a comprehensive strategy for transitioning natural gas utility service to a low-carbon future with equitable cost protections for customers. It is a first-of-its-kind policy in the nation that establishes a solid framework for investments to reduce GHG emissions in the delivery and use of natural gas. I discuss Clean Heat in more detail later in this section of my Direct Testimony.

HAS XCEL ENERGY ADOPTED A STRATEGY FOR TRANSITIONING THE COMPANY'S NATURAL GAS UTILITY BUSINESS TO A LOW CARBON FUTURE CONSISTENT WITH COLORADO POLICY?

Q. A. Yes. Building on its success in the electric sector and initiatives to reduce emissions in transportation, Xcel Energy published an initial report in November 2020 outlining a comprehensive strategy to reduce emissions from the production,

delivery and use of natural gas.[6] More recently, on November 1, 2021, Xcel Energy announced its *Net-Zero Vision for Natural Gas*, which expands on our electric service commitments to include delivering natural gas service with net-zero GHG emissions by 2050, reliably and affordably. Our Net-Zero Vision for Natural Gas is provided as Attachment JRL-1 to my Direct Testimony.

Q. DOES THE NET-ZERO VISION FOR NATURAL GAS ADDRESS ALL GHG EMISSION SOURCES ASSOCIATED WITH THE COMPANY'S NATURAL GAS BUSINESS?

A. Yes. As one of its core components, our Net-Zero Vision addresses all three links of the natural gas supply chain, including: (1) upstream supplier methane emissions; (2) our own LDCmethane emissions; and (3) downstream, or customer, carbon dioxide emissions from the use of natural gas.

Q. DOES THE NET-ZERO VISION INCLUDE GOALS ON THE WAY TO ACHIEVING NET-ZERO GHG EMISSIONS IN 2050?

A. Yes. As the first steps on the way to net-zero emissions by 2050, our Net-Zero Vision has several interim 2030 components including: (1) net-zero methane emissions from the LDC itself; (2) a commitment to source only certified low methane emissions natural gas for both electricity generation and gas distribution; and (3) a combined net 25 percent reduction in all GHG emissions by 2030 (from 2020 levels). In this way, our vision leverages our buying power to significantly

[6] "Transitioning Natural Gas for a Low-Carbon Future," Xcel Energy Transitioning Natural Gas for a Low-carbon Future_Nov 2020.pdf

reduce methane emissions from our suppliers, continues to improve and mitigate methane emission from our own distribution system and, finally, provides a portfolio of voluntary programs that will enable our customers to manage and reduce their own carbon dioxide emissions.

Q. CAN XCEL ENERGY'S NET-ZERO VISION AND CONTINUED USE OF THE NATURAL GAS SYSTEM BE RECONCILED WITH THE TARGETS IN THE PARIS AGREEMENT?

A. Yes. We engaged Dr. Brian O'Neill,[7] Director of the Joint Global Change Research Institute, and a team from U.S. Department of Energy's Pacific Northwest National Laboratory to evaluate whether continued use of natural gas for building heating is compatible with the Paris Agreement's goal to limit global warming to well below 2-degrees Celsius (and preferably 1.5 degrees Celsius) compared to pre-industrial levels.

Q. PLEASE DISCUSS DR. O'NEILL'S EVALUATION.

A. Dr. O'Neill and his team prepared a report entitled *"Natural Gas Use in the U.S. Building Sector in Global Low Carbon Pathways"* (the "Report"). The Report evaluates the future use of natural gas for buildings in scenarios that achieve the current goal of the Paris Agreement. The full Report is provided as Attachment JRL-2 to my Direct Testimony. Overall, the Report shows pathways to achieving the Paris Agreement's climate goals. Those paths include the continued use of

[7] Dr. O'Neill is the same climate modeling expert who completed a study of our electric system. He is Director of the Joint Global Change Research Institute and was a Convening Lead Author for the Intergovernmental Panel on Climate Change's Sixth Assessment Report and an author on the United States' Fourth National Climate Assessment.

natural gas in residential and commercial buildings. In addition, the report summarizes three key findings related to the continued use of natural gas in buildings:

- Scenarios that limit global warming to Paris Agreement targets assume declining *but continuing* use of natural gas in residential and commercial buildings through 2050.
- Continued natural gas use spans a broad range of possible emissions reductions, or pathways, depending on the use of negative emissions technologies and reductions elsewhere in the economy.
- Natural gas use in buildings persists longer than fossil fuel use in other sectors of the economy, especially in colder states that are more dependent on natural gas for heating. This reflects in part the cost of retrofitting buildings to replace gas use.

A. The Natural Gas System Under Net-Zero Vision

Q. **WHAT IS THE ROLE OF THE NATURAL GAS SYSTEM UNDER XCEL ENERGY'S NET-ZERO VISION?**

A. The natural gas system will remain an important part of the overall energy mix under our Net-Zero Vision. Currently, we have approximately 1.4 million natural gas customers that rely on natural gas service to heat their homes and businesses. This statistic reflects the fact that natural gas currently remains the most efficient fuel for heating homes and businesses — especially in colder climates.

Moreover, natural gas systems are needed to deliver gas to power plants, which are vital resources to reliably integrating very high levels of intermittent renewable energy generation, especially as electric demand increases from electrification of transportation and other sectors.

Finally, the gas system will remain an essential delivery mechanism, not only for conventional natural gas, but also for the low and zero carbon resource alternatives needed to effectively address emissions reduction. Thus, there is a clear need for an affordable and highly reliable natural gas system.

Q. DOES COLORADO POLICY RECOGNIZE THE CONTINUED ROLE OF THE NATURAL GAS SYSTEM?

A. Yes. As I discuss in more detail later in my Direct Testimony, Clean Heat affirms the need for on-going use of the natural gas system because it explicitly allows a variety of emissions reductions measures that will continue to use the gas system, including hydrogen of various forms, renewable natural gas ("RNG"), and recovered methane, among others. The emissions reduction trajectory in Clean Heat also acknowledges the transition to a less GHG intensive system will take time and that the natural gas system will be needed as we continue to find the best pathway to emissions reductions.

Q. IS THE COMPANY CURRENTLY EXPLORING LOW AND ZERO-CARBON ALTERNATIVES TO NATURAL GAS?

A. Yes. The Company is exploring emerging low and zero-carbon alternatives and negative emissions technologies. These alternatives and technologies include

hydrogen blending, power-to-gas, RNG, and direct air capture as well as other options that may come to fruition in the next 30 years. Importantly, these technologies can be deployed at the distribution system level in tandem with various levels of customer demand side management ("DSM") and electrification over time, depending on levels of customer adoption.

Q. HOW DOES THE COMPANY'S NET-ZERO VISION, AND YOUR TESTIMONY, RELATE TO THIS RATE CASE?

A. Our Net-Zero Vision leverages the natural gas system. In addition, as described by other Company witnesses, this rate case, is about the costs needed to ensure the reliability, safety, and ongoing affordability of the gas system, with a significant portion of the costs in this case tied to system investments made since September 30, 2019. We believe this case, our vision and our efforts illustrate our strong partnership with Colorado to better our environment, and underscore how the gas distribution system will play a critical role in the efforts to reduce emissions. I discuss the role of the natural gas system, our plan for implementing the Net-Zero Vision and the relationship between Clean Heat and the Net-Zero Vision below.

Q. IS CONTINUED INVESTMENT IN THE NATURAL GAS SYSTEM CONSISTENT WITH MEETING THE STATE'S GHG EMISSION REDUCTION GOALS?

A. Yes, continued use of the natural gas system is consistent with meeting these goals, and ultimately essential to maintaining reliability and affordability throughout the transition to a net-zero carbon future. The Colorado economy-wide emissions targets, grounded in climate science, call for emissions reductions

across all sectors of 50 percent by 2030 and 90 percent by 2050. As economy-wide targets, they do not specify targets by sector or purport to specify the extent of natural gas use by customers across Colorado. Instead, the achievement of these economy wide targets will be executed through sector-specific policies that, taken as a whole, will achieve the necessary reductions. In the case of direct-use natural gas in buildings, that sector-specific policy is Clean Heat, which I discuss later in my Direct Testimony.

Q. ARE THE COMPANY'S REQUESTS IN THIS GAS RATE CASE CONSISTENT WITH THIS CONTINUED ROLE FOR THE NATURAL GAS SYSTEM UNDER THE NET-ZERO VISION?

A. Yes. Company witness Mr. Luke A. Litteken and other gas operations witnesses explain that the operational investments addressed in this case relate to the continued safe and reliable operation of our natural gas system and satisfaction of our obligation to serve our customers. It is essential that we continue to invest in modernizing and maintaining the natural gas system in order to provide affordable and reliable service, particularly given the magnitude of energy the gas system provides.

Q. DO ANY OF THE INVESTMENTS IN THIS PROCEEDING ALSO CONTRIBUTE TO THE OVERALL NET-ZERO VISION?

A. Yes. For example, as discussed by Mr. Litteken, the Company's system integrity investments and leak survey/leak repair work are driven by the need to keep gas in the pipes, which has the dual benefit of protecting public safety and reducing or

avoiding methane emissions, a key component of the Net-Zero Vision. I discuss below some of the additional steps the Company is taking to manage methane emissions, both upstream and on our own distribution system.

B. Implementation of Net-Zero Vision

WHAT IS THE COMPANY'S STRATEGY FOR IMPLEMENTING THE NET-ZERO VISION FOR NATURAL GAS SERVICE?

Q.

A. The Company's strategy starts with a broad focus on reducing GHG emissions in all portions of the natural gas service production and delivery chain, which consists of: (1) methane emissions from the production and transport of natural gas by the Company's suppliers; (2) methane emissions from the Company's own distribution facilities; and (3) carbon dioxide emissions from the combustion and use of natural gas by our customers. We believe a comprehensive approach that considers both of these emissions sources is essential to achieving our net-zero strategy. Accordingly, although the Company does not have direct management over the indirect upstream emissions of suppliers or the downstream emissions from customer usage, we have elected to include these emissions sources in our Net-Zero Vision and to manage their reduction. As part of this strategy, the Company will prioritize direct emissions reductions for the production, delivery, and use of natural gas. As noted, however, achieving a net-zero gas distribution system will require implementation of advanced technology to support emission mitigation and measurement, implementation of best management practices, and investment in

negative emissions technologies. Continuing technology development and innovation will further help achieve our vision.

WHY IS METHANE A KEY FOCUS OF THE NET-ZERO VISION?

Q. Methane is a particularly potent GHG, which has a disproportionate impact on climate compared to the same quantity of carbon dioxide emissions. In fact,

A. methane is 25 times more potent than carbon dioxide, pursuant to Colorado Regulation 22 and the GHG Inventory.[8] That is why the Company is pursuing a variety of strategies to manage methane emissions, as discussed below.

Q. WHAT ARE THE COMPANY'S PLANS AND STRATEGIES FOR REDUCING UPSTREAM METHANE EMISSIONS UNDER ITS NET-ZERO VISION?

A. Our overall strategy is to leverage our purchasing power with suppliers and marketers to drive methane emission reductions in their systems. As mentioned above, methane is a particularly potent GHG. Although we do not have direct management over our gas suppliers, we are confident that we can use our relationships and purchasing power to move them toward greater transparency and best practices for reducing emissions.

[8] "The Colorado GHG inventory uses the AR4 100-year time horizon GWP values for all calculations to align with Colorado and U.S. Environmental Protection Agency (EPA) GHG reporting." *Colorado 2021 Greenhouse Gas Inventory Update*, 2021, at page 2; See also Colorado Regulation 22 at page 3.

Q. CAN YOU QUANTIFY THE POTENTIAL METHANE REDUCTIONS FROM CHANGES TO UPSTREAM OPERATIONS?

A. Yes. Conservatively, we estimate that Xcel Energy's current gas supply is delivered with a methane production emission rate of approximately 1 percent[9] (defined as unit of methane emission per unit of gas throughput), which equates to about 3 million short tons of carbon dioxide equivalent (CO2e) across all our jurisdictions. We believe there is an opportunity to reduce methane intensity for all our natural gas purchases to approximately 0.25 percent[10] by 2030, driving roughly a 75 percent emissions reduction.

Q. WHAT STEPS HAS THE COMPANY TAKEN TO ENCOURAGE SUPPLIERS TO DRIVE REDUCTIONS IN THEIR METHANE EMISSIONS?

A. Overall, we have set a goal to purchase natural gas only from suppliers with certified low emissions by 2030, for use both in the natural gas distribution system and electric generation.

We also have implemented important steps to enhance the availability of information and facilitate more transparency from our suppliers. To that end, Xcel Energy has actively engaged our suppliers to increase transparency and

[9] Estimate of upstream production emissions is based on the National Energy Technology Laboratory (NETL) basin level emission study (J. Littlefield, S. Roman-White, D. Augustine, A. Pegallapati, G.G. Zaimes, S. Rai, G. Cooney, and T.J. Skone, "Life Cycle Analysis of Natural Gas Extraction and Power Generation", National Energy Technology Laboratory, Pittsburg, April 5, 2019). The study finds that the mean emission rate for all basins studied is 1.24 percent, the Denver-Julesburg "DJ" basin is not included the NETL but we expect the DJ basin to be below the national average given the state methane regulations. We conservatively estimate an emission rate of approximately 1 percent for the DJ basin.

[10] We estimate the potential to achieve an emission rate of approximately 0.25 percent or less based on our pilot project with Crestone Peak Resources and Project Canary. This pilot is discussed later in my Direct Testimony, and this pilot is mentioned on page 14 of Xcel Energy's Net-Zero Vision for Natural Gas report available at Net-Zero-Vision-for-Natural-Gas.pdf (xcelenergy.com).

disclosures in relation to their methane emissions. For example, we actively participate in the Edison Electric Institute and American Gas Association's Natural Gas Sustainability Initiative to create consistent, sustainable disclosures among natural gas suppliers of methane emissions rates. Disclosure and standardization are critical steps in addressing emissions in the upstream production and transportation of natural gas.

Building on these efforts with suppliers, Xcel Energy asked its long-term natural gas supply bidders in the Spring of 2020 to provide information on their methane emission intensities and best practices for reducing remaining emissions. We furthered our effort to collect information on the methane intensity of our gas supply in the summer of 2021 by issuing a Request for Information ("RFI") on Certified Low-Methane Gas supply in our operating regions. Through the RFI we identified producers in our regions that are in the process of obtaining third-party certifications for their wellhead facilities, which will demonstrate methane emissions intensity well below the national average. We collected information on volume availability and pricing for this certified gas. We anticipate buying more gas with low emissions certifications as such gas becomes available in our operating regions.

Q. **WHAT IS THE COMPANY'S STRATEGY TO REDUCE METHANE EMISSIONS FROM ITS OWN LOCAL DISTRIBUTION FACILITIES?**

A. The Company and Xcel Energy as a whole have long been committed to reducing methane emissions from our natural gas delivery business, including our

distribution network and transmission, storage, and processing operations. Under our Net-Zero Vision, we are committed to reducing direct methane emissions in our Colorado distribution system from roughly 200,000 tons today[11] to net-zero by 2030. As Mr. Litteken discusses in his Direct Testimony, efforts like leak avoidance and detection, managing venting during routine maintenance, and reduced third-party damages to our infrastructure all support reductions in methane emissions. These same efforts support the robust nature of the system, making it increasingly viable infrastructure for transporting new forms of gas with reduced GHG footprints. We expect additional investments will be needed going forward in order to achieve the Net-Zero Vision and to meet Colorado's Clean Heat targets.

Q. IS XCEL ENERGY TAKING OTHER STEPS TO REDUCE EMISSIONS FROM ITS OWN FACILITIES?

A. Yes. We are participating in a variety of voluntary industry leadership programs to continue to advance best management practices and enhance our reporting, including the following three initiatives: EPA's Natural Gas STAR program, EPA Methane Challenge, and Our Nation's Energy (ONE) Future. The Company's participation in these initiatives is addressed by Mr. Litteken in his Direct Testimony.

[11] Derived from U.S. EPA Subpart W reporting.

Q. WHAT EFFORTS IS THE COMPANY UNDERTAKING TO REDUCE GHG EMISSIONS ASSOCIATED WITH CUSTOMER USE OF ITS NATURAL GAS SERVICE?

A. Although we do not have direct control over the combustion of natural gas by our customers, we recognize that we have an important role to play in undertaking efforts to help our customers manage their own emissions reductions. These efforts to reduce customer emissions align with our gas energy efficiency programs which have grown year over year. Our efforts to date are in three areas, including (1) conservation; (2) beneficial electrification; and (3) low-carbon fuel supplies. I discuss each of these in more detail below.

Q. PLEASE DISCUSS THE COMPANY'S EFFORTS TO REDUCE GHG EMISSIONS FROM NATURAL GAS USE THROUGH CONSERVATION.

A. Since many customers will continue to choose natural gas for their heating and other needs, we work continuously to ensure they have access to the most efficient options available while we simultaneously seek to drive the market toward more advanced solutions. Energy efficiency improvements are achieved through a combination of sophisticated equipment controls, more efficient equipment and building envelope upgrades. Energy efficiency not only reduces emissions, but also reduces customer costs.

Q. WHAT IS THE ROLE OF BENEFICIAL ELECTRIFICATION IN ACHIEVING GHG EMISSION REDUCTIONS FROM CUSTOMER NATURAL GAS USE?

A. Xcel Energy has one of the most aggressive carbon reduction goals in the electricity industry. More recently, as I mentioned previously, we have attempted to leverage our electric sector reductions to also reduce GHG emissions in the transportation sector. Accordingly, we have committed to electrifying 1.5 million vehicles in the coming years and have invested substantial resources to realize that goal. Therefore, we are positioned well to help customers determine if it would be in their interest to transition to electric options for their heating and other home or business needs, as well as their transportation needs.

With broad insight across energy sectors, we carefully select options that truly represent *beneficial* electrification. This helps achieve goals consistent with current and emerging state policies, which include reducing emissions, keeping customer bills low and optimizing use of the power grid. While electrification reduces natural gas customers' emissions, we want to maintain customers' ability to select the fuel that best meets their needs. Maintaining a voluntary approach allows us to work collaboratively with our customers to avoid the negative impacts that can result from an overly aggressive approach to electrification. Those negative impacts can include higher customer costs, significant and costly grid build-out, equity concerns, and in some cases higher emissions.

Q. WHAT IS BENEFICIAL ELECTRIFICATION ACCORDING TO COLORADO STATUTE?

A. While I am not a lawyer, as a result of my role, I am aware that the term "beneficial electrification" is defined in § 40-1-102(1.2)(a), C.R.S., as follows (as a result of SB 21-246):

> Beneficial electrification" means converting the energy source of a customer's end use from a nonelectric fuel source to a high-efficiency electric source, or avoiding the use of nonelectric fuel sources in new construction or industrial applications, if the result of the conversion or avoidance is to:
>
> (I) Reduce net greenhouse gas emissions over the lifetime of the conversion or avoidance; and
>
> (II) Reduce societal costs or provide for more efficient utilization of grid resources.

SB 21-246 also allows the Company to implement cost-effective beneficial electrification plans that support voluntary customer adoption of beneficial electrification measures (§ 40-3.2-109 (2)(a), C.R.S.), and, among other things, contains a requirement that the Company file an application for a beneficial electrification plan with the Colorado Public Utilities Commission ("Commission") on or before July 1, 2022 (§ 40-3.2-109 (2)(b), C.R.S.). Notably, there are no beneficial electrification targets contained in SB 21-246.

Q. IS IT FEASIBLE TO ELECTRIFY THE ENTIRE NATURAL GAS SYSTEM THROUGH BENEFICIAL ELECTRIFICATION (OR OTHERWISE)?

A. No. Moreover, full electrification is not required by Colorado statute. As discussed above in connection with the report prepared by Dr. O'Neill, reducing GHG emissions from natural gas service in the building sector is very difficult and

will not happen as quickly as it will in other sectors. And while electrification will likely contribute significantly to reducing GHG emissions from natural gas service over time, there are at least three major challenges associated with fully electrifying natural gas uses.

First, full electrification would require significant build-out of the electric system. For example, on the 2020 maximum daily output day, our gas system delivered 1,931,888 MMBtu,[12] which is equivalent to 23,500 MW of electric generation needed to produce the same output. This rough calculation suggests that replacing this energy with electricity could require roughly three times Public Service's 2021 peak electrical capacity need.[13] This additional load would be on top of the substantial additional load expected from electric vehicles. While heat pump efficiency gains could reduce the additional load from electrifying gas usage, the impact on resource planning, customer costs and system reliability would be enormous. Among other things, full electrification could also reduce the value of adding new solar energy to the system due to a much lower load-carrying capacity during winter nights as compared to summertime afternoons and potentially lead to significant land use or other constraints associated with expanding the footprint of the electric system.

Second, it will be difficult to achieve the full value proposition for electrification – e.g., GHG reduction and customer costs savings, etc. – until

[12] Source: Public Service Company of Colorado Form 10-K, page 7.
[13] (((1,931,888 MMBtu * 1,000,000 Btu/MMBtu ÷ 3413 Btu/kWh) ÷ 1000 kWh/MWH) ÷ 24 hours/day) = 23,584 MW. 2021 Company peak capacity need is 7,814 MW.

electrification technology costs decline. These factors should improve over time, but a voluntary approach that begins with pilot programs and scales as this value proposition improves will help keep customer bills low and achieve emissions reductions.

Finally, a transition to full electrification would be a costly transition for customers. In addition to the home retrofit investments customers would need to make, a transition in the near term would lower revenues on the utility's gas system without commensurate reductions in the costs of maintaining the system, while simultaneously increasing electric demand and electric utility capital costs. Income-qualified households would be disproportionally impacted and left with the costs of maintaining the remaining gas system.

Q. HAS THE COMPANY STARTED IMPLEMENTING BENEFICIAL ELECTRIFICATION PROGRAMS THROUGH ITS DEMAND SIDE MANAGEMENT PROGRAMS?

A. Yes. The Company began implementing several beneficial electrification programs through our DSM programs in the 2021-2022 biennial filing. Through DSM, we can help customers reduce costs and provide the technical assistance they need to switch to electric alternatives.

Q. WHAT KIND OF BENEFICIAL ELECTRIFICATION OFFERINGS IS THE COMPANY MAKING AVAILABLE AS PART OF ITS DSM PROGRAMS?

A. In its 2021/2022 DSM Plan,[14] the Company will offer incentives for: (1) heat pump water heaters, including an option to take advantage of renewable energy generation; (2) dual fuel central air source heat pumps (with natural gas service) as well as ground source heat pumps; and (3) all-electric residential, commercial and industrial new construction applications. The Company is also in the process of developing an income-qualified beneficial electrification pilot that will engage with implementers, stakeholders and industry partners to promote the holistic electrification of end uses like space heating, water heating, and other applications. We anticipate that this pilot will commence in Q1 2022. We plan to scale these and other programs as we learn more about customer adoption, as technology improves and as the market develops. Success will require active participation from many diverse stakeholders, including our customers, policymakers, advocates, and others.

Q. ARE THERE CURRENTLY TECHNOLOGY LIMITATIONS TO AIR SOURCE HEAT PUMPS FOR STAND-ALONE SPACE HEATING IN THE COMPANY'S SERVICE TERRITORY?

A. Yes. Air source heat pump ("ASHP") technology operational efficiency and capacity for even cold climate heat pumps is known to decrease in low temperatures (when the greatest heating demand occurs), and operation in these

[14] Approved by the Commission in Proceeding No. 20A-0287EG.

conditions without an alternate heating system such as electric resistance or natural gas is not recommended. These current technical limitations erode the ability to use this technology during peak winter demand days, although we do see great opportunity with this technology to meet Spring and Fall heating demand when paired with a primary heating source backup. On those peak winter days, these systems shut off, providing no heating service to the premise. Further, there is currently no widely accepted third party performance standard for ASHP at temperatures below 5° F, making standardized evaluations challenging. We anticipate technology will improve over time. However, we believe it is not ready today as a stand-alone for heating-dominated climates such as Colorado.

Given these constraints, the Company is nevertheless actively working to better understand and advance ASHP technology. We have begun offering rebates for ASHP for space heating for the first time under our 2021/2022 DSM Plan, as I mentioned above. We are also funding a variety of efforts to test heat pump technologies. For example, in collaboration with the National Renewable Energy Laboratory, we are conducting a lab and field test of ASHP in Colorado in order to better understand their field performance and the customer experience and satisfaction with the technology. We believe such research is needed to fully understand the future potential of this technology.

Q. PLEASE DISCUSS THE COMPANY'S EFFORTS WITH RESPECT TO LOWER CARBON FUEL SUPPLIES.

A. As discussed above, we anticipate that the natural gas system will be needed, even as we achieve net-zero emissions in the decades to come. Furthermore, some energy uses will likely remain dependent on natural gas because they are extremely difficult to electrify, too costly and unaffordable for many customers, or simply contrary to customer preference for natural gas in relation to certain specific end uses. Thus, we intend to provide solutions that reduce the GHG emissions footprint of natural gas through alternatives that include RNG, more advanced hydrogen, and power-to-gas solutions. We anticipate these alternatives will include a mix of RNG from sources such as landfills, dairy farms, and wastewater treatment facilities, along with hydrogen produced from clean electricity. Allowing alternative fuel supply options helps customers reduce their carbon emissions without incurring the costs and other burdens associated with replacing heating systems or other appliances.

Q. **DO THESE GAS SUPPLY ALTERNATIVES AVOID EMISSIONS OTHER THAN CARBON DIOXIDE?**

A. Yes. In addition to displacing fossil natural gas from our system, RNG also has an added benefit of avoided methane emissions from other sources. In this regard, RNG serves as a negative-emissions option as well as strategy for reducing customer carbon dioxide emissions. For example, methane from dairy production can be captured to produce RNG as low-carbon gas for customers while also avoiding harmful methane emissions that would have otherwise occurred. Hydrogen can be produced using renewable or nuclear electricity on the electric

system and then injected into the natural gas system, reducing the carbon intensity of natural gas supplied to our customers.

Q. CONSISTENT WITH THE FOREGOING EFFORTS AND IN LIGHT OF ITS NET-ZERO VISION, IS THE COMPANY INVOLVED IN ANY OTHER PILOTS?

A. Yes. Given the real technology challenges to achieving emissions reductions in the natural gas sector, we know we need to pilot technologies aggressively and effectively so that we may quickly scale the ones that work. I provide a snapshot of two such pilots below. Information on these pilots and other efforts can be found our Net-Zero Vision report included as Attachment 1 to my Direct Testimony.

1. Participation in the HyBlend Multi-Utility Research Project

Xcel Energy is participating in HyBlend, a research project led by National Renewable Energy Laboratory and the Gas Technology Institute to address the technical barriers associated with blending hydrogen in natural gas infrastructure. This two-year project started in the fall of 2021 with $15 million in funding contributed by the Department of Energy Office of Energy Efficiency and Renewable Energy and 20 participating utilities. The project will utilize expertise from utilities, research consortia, academia, and national labs to determine if hydrogen can be safely blended in existing natural gas systems to reduce the carbon intensity of fuel delivered to customers.

2. Certified Natural Gas ("CNG") Pilot Program

In May of 2021, Xcel Energy announced its first purchase of CNG for the distribution system in Colorado. The gas methane intensity is certified and monitored by Project Canary and produced by Crestone Peak Resources. The Company began this pilot in June of 2021 and has been purchasing a small volume of gas from Crestone Peak Resources that has been certified by Project Canary to have low-methane intensity (<0.25 percent). The pilot currently provides enough gas to heat about 20,000 homes per day. The Colorado School of Mines will conduct a third-party assessment of the avoided methane emissions associated with this gas procurement.

C. Clean Heat and the Company's Net-Zero Vision

Q. WHAT DOES CLEAN HEAT REQUIRE AND CONTEMPLATE FOR GHG EMISSIONS REDUCTIONS IN THE NATURAL GAS SECTOR?

A. Clean Heat charts a thoughtful pathway for emissions reductions in the natural gas sector, which is at the very beginning of the journey to a low-carbon future. The policy establishes the following GHG reduction targets from a 2015 baseline for gas distribution utilities in relation to both the distribution and use of natural gas: *4 percent by 2025 and 22 percent by 2030.* Future targets will be set based on the market and technology information gathered in these initial compliance periods. Importantly, it allows for a wide variety of measures to reduce GHG emissions, including gas DSM, recovered methane, green hydrogen, beneficial electrification, pyrolysis, and "any technology that the commission finds cost-effective and that the Division finds results in a reduction in carbon emissions from the combustion

of gas in customers end uses or meets a recovered methane protocol approved by the Air Quality Control Commission."[15] Many of these measures require maintenance of the gas system. Given the lack of widespread availability of low-cost emissions reductions options, the flexibility and breadth of eligible measures included in Clean Heat is important because it allows a utility to propose a variety of measures, depending on the costs and availability, and also implement new technologies as they become available.

Q. DOES THE COMPANY'S NET-ZERO VISION AND RELATED IMPLEMENTATION STRATEGY ALIGN WITH CLEAN HEAT?

A. Yes. Our Net-Zero Vision aligns well with Clean Heat in relation to the scope of the GHG emissions, the magnitude of GHG emission reductions expected, and the breadth of strategies or mechanisms to achieve those reductions. In line with Clean Heat, our Net-Zero Vision:

- Applies to all GHG emissions associated with natural gas service, including our own LDC methane emissions and downstream customer carbon dioxide emissions consistent with Clean Heat, while also encompassing upstream supplier emissions, which are not included in Clean Heat.
- Sets a net-25 percent GHG emissions reduction target for 2030 from 2020 levels, which aligns with Clean Heat's 22 percent reduction target from 2015 levels, but goes further by setting a net-zero GHG emissions goal for 2050.

[15] §40-3.2-108 (2)(c)(VI). The Air Quality Control Commission is also referred to herein as the "AQCC."

- Adopts a comprehensive, multi-sector/multi-technology approach to reducing GHG emissions associated with natural gas service. Consistent with the breadth of options included in Clean Heat, the Company understands that reducing GHG emissions in the natural gas sector will require us to leverage a broad array of resource alternatives and technologies, including low-methane natural gas supply, electrification, RNG, hydrogen, and power-to-gas, along with negative emissions options such as direct air capture, bioenergy with carbon capture and newer technologies and alternatives as they are developed.

Q. HOW DOES THE COMPANY'S NET-ZERO VISION EXPAND ON THE CLEAN HEAT FRAMEWORK IN YOUR VIEW?

A. The Company's Net-Zero Vision aligns with the Clean Heat framework and expands upon it by: (1) including targets on methane emissions reductions; (2) setting net reduction targets beyond 2030; and (3) pursuing net-zero GHG emissions throughout Xcel Energy's multi-state gas utility footprint in the Upper Midwest as well as Colorado. This tracks Xcel Energy's multi-jurisdictional approach to carbon reduction in our electric utility operations.

Q. CAN YOU PLEASE EXPAND ON HOW THE NET-ZERO VISION'S INTERIM 2030 TARGETS FOR METHANE DIFFER FROM THE CLEAN HEAT STANDARD REQUIREMENTS?

A. Yes. The primary difference is that our interim goal creates a specific target of net-zero methane emissions on the LDC, in addition to a combined GHG reduction

target of 25 percent by 2030. Clean Heat classifies reduction in methane from the LDC in the category of "recovered methane," which also includes sources such as bio-methane, RNG, and coal mine methane.

WHY DOES XCEL ENERGY'S NET-ZERO VISION PRIORITIZE METHANE EMISSIONS REDUCTION?

Q. We believe it is important to prioritize methane emissions reduction given methane's global warming potential and its importance in meeting state and federal policy goals. Methane has a global warming potential of 25 times that of carbon dioxide emissions, following the Colorado Regulation 22 and the GHG Inventory cited above. Therefore, by continuing our focus on methane emissions reductions first, we can achieve a meaningful near-term environmental benefit. Further, we believe that some methane emission reduction measures are available at reasonable costs today without requiring actions by our customers. By contrast, many of the carbon dioxide reduction measures require customer action and may not be readily available in the market at a cost and performance level acceptable to customers.

A.

WHAT IS THE WORK AHEAD TO IMPLEMENT CLEAN HEAT?

We are at the beginning of the Clean Heat transition and there is much work to be done to ascertain the scope of gas utility Clean Heat Plans and long-term strategies to achieve GHG emission reduction targets for upstream purchases, LDC systems, and end-use customers. Neither the Commission nor the AQCC have completed their rulemakings pursuant to Clean Heat. The Commission

rulemakings must prioritize removing the fuel-switching incentive prohibition from DSM rules while simultaneously working to adopt the Clean Heat standard rules. The AQCC also must prioritize a rulemaking for recovered methane protocols.[16] According to the legislative timeline, the final rules governing Clean Heat Plans would not be completed until December 2022. With the Clean Heat Plans not required to be submitted until August 2023 for a 2025 target, the Commission would be evaluating the investments thereafter.

Through the development and implementation of Clean Heat and our Net-Zero Vision, we will learn far more about the level of customer adoption, technology costs and other factors that will directly inform Clean Heat GHG reduction goals for 2040 and beyond. At this time, however, we can only base our decisions on current information, technology, and trends, and it would be imprudent to speculate how these trends may evolve over the next 30 years.

[16] SB 21-264, enacted as the following statutes: § 40-3.2-108(5)(a), C.R.S (removal of fuel-switching incentive prohibition from DSM rules); § 25-7-105(1)(e)(X.4), C.R.S (Air Quality Control Commission recovered methane protocol rulemaking); and § 40-3.2-108(5)(b), C.R.S. (Commission Clean Heat Plan rulemaking).

IV. CONCLUSION

Q. DO YOU HAVE ANY CONCLUDING THOUGHTS FOR THE COMMISSION'S CONSIDERATION?

A. We are excited to continue our partnership with Colorado stakeholders, policymakers and regulators in our combined effort to continue Colorado's leadership in effectively addressing climate change while continuing to ensure that the essential electric and gas utility services we provide remain safe, highly reliable, affordable, and equitable across the areas we serve. As we work to further reduce GHG emissions associated with our natural gas service, it is important to recognize the importance of continuing to invest in the system used to deliver that essential service on which so many Coloradans rely.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Statement of Qualifications

Jeff R. Lyng

As the Director of Energy & Environmental Policy, I am responsible for advising Xcel Energy's operating companies on energy and environmental policies at the state and federal levels that will continue the company's leadership in the clean energy transition while keeping customer bills low[17]. My primary responsibilities are threefold. First, to advise on the policies and programs that will achieve Xcel Energy's goal of 80% carbon dioxide reduction by 2030 and aspiration to deliver carbon-free electricity by 2050. Second, to design a low methane, low carbon strategy that will enable our customers to reduce the GHG impact of the natural gas they use in their homes and business. Finally, to support the Company's Environmental, Social and Governance reporting including GHG emissions accounting.

I joined the company in February, 2018. In previous roles prior to joining Xcel Energy, I served as a Senior Policy Advisor at the Center for the New Energy Economy at Colorado State University, Director of Market Development and Regulatory Affairs for Opower (an energy efficiency company) and as Renewable Energy Policy Manager in the Governors Energy Office in Governor Bill Ritter's Administration.

I hold a Master of Science degree in Civil Engineering from the Building Systems Program at the University of Colorado at Boulder and a Bachelor of Science Degree in

[17] Xcel Energy Inc.'s operations include the activity of four wholly owned utility subsidiaries that serve electricity and natural gas customers in eight states. These utility subsidiaries, referred to as operating companies, are Northern States Power-Minnesota serving electric and natural gas customers in Minnesota, North Dakota, and South Dakota; Northern States Power-Wisconsin serving electric and natural gas customers in Wisconsin and Michigan; Southwestern Public Service Company serving electric customers in Texas and New Mexico; and Public Service serving electric and natural gas customers in Colorado.

Ecology from the State University of New York College of Environmental Science and Forestry.