BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

IN THE MATTER OF THE APPLICATION OF DOMINION ENERGY UTAH FOR APPROVAL OF A NATURAL GAS CLEAN AIR PROJECT AND FUNDING FOR THE INTERMOUNTAIN INDUSTRIAL ASSESSMENT CENTER	Docket No. 19-057-33

DIRECT TESTIMONY OF KERRY E. KELLY, PE PH.D.

FOR DOMINION ENERGY UTAH

DEU Exhibit 3.0

December 31, 2019

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Kerry E. Kelly. My business address is 50 S. Central Campus Drive, MEB Room 3290, Salt Lake City, Utah.

Q. By whom are you employed and what is your position?

A. I am employed by the University of Utah as an Assistant Professor in the Department of Chemical Engineering. I am the principal investigator for several research projects that study the links between air quality and energy, including projects sponsored by the National Science Foundation, the National Institutes of Health National Institute of Environmental Health Sciences (NIEHS), and the Utah Division of Air Quality. I also served eight years on Utah's Air Quality Board, and I currently serve on Utah's Air Quality Policy Board.

Q. What is the purpose of your testimony in this Docket?

A. The purpose of my testimony is to: 1) Describe how efficiency technologies, such as combined heat and power, can affect Utah's air quality and climate impacts; and 2) compare the costs of the proposed CHP project discussed by Dr. Powell to air pollution control strategies that are being implemented in the State of Utah.

II. CHARACTERISTICS OF COMBINED HEAT AND POWER TECHNOLOGIES FOR ENERGY EFFICIENCY

Q. What are Utah's greatest air quality challenges and what causes these?

A. Utah faces three key air quality challenges. First, Utah's Wasatch Front experiences periodic episodes of elevated fine particulate pollution matter (PM2.5) during the winter.[1]

[1] https://deq.utah.gov/air-quality/pm-2-5-serious-sips-2017-2019

Because of these episodes, the US EPA classifies Utah's Wasatch Front and Cache Valley as non-attainment regions for failure to meet the 24-hour fine particulate matter ambient air quality standard.[2] These pollution episodes are caused by a combination of local emissions, mountainous topography, and meteorology. During winter, cold air settles in our mountain valleys, and warm air traps this cold air as well as all the pollution. Locally, this is known as an "inversion". The only realistic strategy for addressing these pollution episodes is to reduce direct emissions of $PM_{2.5}$ and $PM_{2.5}$ precursors (NOx, SOx, VOCs, and NH4). Recent emission reductions have been leading to improvements in air quality in these nonattainment areas although population growth and the accompanying emissions will likely continue to put pressure on these constrained airsheds.

Second, Utah's Uinta Basin's experiences elevated levels of ozone during the winter, and it is currently classified as a non-attainment area for ozone.[3] [4] The topography, meteorology, and emissions from oil and gas development have led to elevated levels of ozone. Researchers, the state, and oil and gas developers have been working to understand and address the causes of winter-time ozone in this region.

Third, Utah's Wasatch Front will likely be declared as nonattainment for ozone in the near future because of EPA's new ozone standard. Utah's Wasatch Front experiences elevated levels of ozone during the summer, and this is a result of sunlight, warm temperatures, and regional and local emissions of NOx, CO and VOCs.

[2] https://www.epa.gov/green-book/green-book-8-hour-ozone-2015-area-information
[3] https://deq.utah.gov/air-quality/ozone-in-the-uinta-basin
[4] https://www.epa.gov/green-book/green-book-8-hour-ozone-2015-area-information

Q. How can CHP affect Utah's air quality?

A. As described in Dr. Powell's testimony, CHP is more efficient than generating heat and electricity separately, and overall CHP leads to lower emissions of GHGs, $PM_{2.5}$, NOx, and VOCs. However, only approximately 18% of Utah's electricity generation occurs in the greater Wasatch Front,[5] and CHP projects must be carefully evaluated to ensure that emissions in non-attainment regions are considered. For example, although a CHP plant may result in lower air emissions overall, it could result in greater emissions within a non-attainment area. Current emission control strategies and proposed controls on a CHP plant, such as selective catalytic reduction (SCR) for NOx control, need to be considered as part of any project evaluation.

III. COST/BENEFIT

Q. In your role as a member of Utah's Air Quality Board, what metrics were considered in requiring control technologies during the development of state implementation plans (SIPs)?

A. In my experience, Utah's Air Quality Board evaluated emission reduction strategies in terms of technical and economic feasibility as well as enforceability. In recent state implementation plans (SIPs),[6] technically feasible control measures ranged in cost from approximately $5,000 to $70,000 per ton of emission reductions. For the PM2.5 SIP, emission reductions included the total of PM2.5 direct emissions and PM2.5 precursors. Utah's Air Quality Policy Board has adopted a complementary strategy in ranking legislation with a potential to reduce emissions. The Air Quality Policy Board considers giving priority to actions that: have high-quality estimates of emission reductions, are

[5] https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid
[6] The US EPA requires the state to develop SIPs to meet National Ambient Air Quality Standards (NAAQS) for regions that exceed NAAQS..

likely to be effective, reduce the most dangerous emissions, are cost effective, have a low regulatory burden, and may have complementary cost or emission benefits.

Q. As a member of Utah's Air Quality Board and Air Quality Policy Board did you have any experience reviewing the costs of clean air rules, regulations, legislation, and initiatives?

A. Yes. The Utah Department of Air Quality typically prepared cost estimates of proposed rules, regulations, legislation, and initiatives. The Air Quality Board reviewed these estimates as well as public comments as part of their decision-making process. The Air Quality Policy Board considered these cost estimates as a key component of their legislative ranking process.

Q. Dr. Powell has indicated that the proposed CHP project would remove 253 tons of NOx annually and 95,000 tons of CO2 annually. When comparing these savings with the $13.5 million cost being requested in this docket for CHP, how does this compare to air quality strategies being implemented in the State?

A. According to Dr. Powell's cost estimates and a 25-year life of the CHP plant, the total cost of the NOx reductions would be approximately $15,000 per ton ($2,000 per ton of STEP funds), which is substantially below the top end of $70,000 per ton of emission reductions projects required during recent PM2.5 SIPs.[7] The installation of the SCR as part of the proposed CHP project will result in a reduction in the plant's NOx emissions in the Salt Lake nonattainment area, which would benefit air quality in this constrained airshed. The reduction in fuel consumption and the corresponding CO_2 reductions from the project would also be beneficial for the state.

[7] https://deq.utah.gov/air-quality/control-strategies-serious-area-pm2-5-sip

Q. Does this conclude your testimony?

A. Yes.

State of Utah)

) ss.

County of Salt Lake)

I, Kerry E. Kelly, being first duly sworn on oath, state that the answers in the foregoing written testimony are true and correct to the best of my knowledge, information and belief. The exhibits attached to the testimony were prepared by me or under my direction and supervision, and they are true and correct to the best of my knowledge, information and belief. Any exhibits not prepared by me or under my direction and supervision are true and correct copies of the documents they purport to be.

Kerry E. Kelly

SUBSCRIBED AND SWORN TO this 3rd day of January, 2020.

LEORA N. ABELL
Notary Public - State of Utah
Comm. No. 701704
My Commission Expires on
Aug 19, 2022

Notary Public