–BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH–

IN THE MATTER OF THE APPLICATION OF ROCKY MOUNTAIN POWER FOR AUTHORITY TO INCREASE ITS RETAIL ELECTRIC UTILITY SERVICE RATES IN UTAH AND FOR APPROVAL OF ITS PROPOSED ELECTRIC SERVICE SCHEDULES AND ELECTRIC SERVICE REGULATIONS	))))))))))	**DOCKET NO. UT 20-035-04** **Exhibit No. DPU 12.0 SR**

FOR THE DIVISION OF PUBLIC UTILITIES

DEPARTMENT OF COMMERCE

STATE OF UTAH

Surrebuttal Testimony of

Robert J. Camfield

November 6, 2020

INTRODUCTION

Q. Would you please state your name and business address?

A. My name is Robert J. Camfield. My business address is 800 University Bay Drive, Suite 400, Madison, Wisconsin 53705.

Q. By whom are you employed and in what capacity?

A. I am employed by Christensen Associates Energy Consulting, LLC (CA Energy Consulting) in the capacity of Senior Regulatory Consultant.

Q. Are you the same Robert Camfield who provided direct and rebuttal testimony in this case?

A. Yes.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Division of Public Utilities of the Utah Department of Commerce (the Division).

Q. What is the purpose of your surrebuttal testimony?

A. My testimony provides comments in response to the rebuttal testimony of Rocky Mountain Power (RMP or the Company) and stakeholders in the current proceeding. My surrebuttal testimony responds to rate design issues addressed in the rebuttal testimony of the following witnesses:

Witness Meredith on behalf of RMP

Witness Nelson on behalf of the Office of Consumer Services (OCS).

WITNESS MEREDITH ON BEHALF OF ROCKY MOUNTAIN POWER

Q. Do you have comments with respect to the rebuttal testimony of Company witness Meredith?

A. Yes. I wish to respond to four areas of Mr. Meredith's rebuttal testimony which focused on my direct testimony. The identified areas are as follows:

1. Concerns with respect to changes in net margins as a consequence of the potential implementation of the Company's proposal to restructure volumetric price tiers of the residential tariff. (lines 557-572)

2. Methodology to estimate marginal costs. (lines 371-388)

3. My interpretation of the proposed changes to the Company's Tariff 23. (lines 716-722)

4. Proposed application of a two-part pricing structure, as applied within RMP's real-time pricing tariff option. (lines 1192-1205)

Each area is discussed separately below.

Q. Please continue, beginning with the first identified area, methodology underlying the proposed collapse of volumetric pricing tiers in the Company's residential tariff.

A. As detailed in my direct testimony, the Company's analysis of the proposed restructuring of the volumetric price tiers within the residential tariff does not account for impacts on net margins. In his rebuttal testimony, Mr. Meredith acknowledges the presence of net margins, and that net margins would change, should the Company implement the proposed changes to tier structure. Net margin is the difference between the revenues and economic costs associated with the provision of service, where economic costs are based on marginal or avoided costs. Changes in prices induce changes in residential consumption, causing net margins to change.

Net margins, best estimated in hourly frequency for both loads and costs, are net revenues. For the relevant tariff—here, RMP's residential tariff—net margins as well as changes in net margins reflect the composition of customer segments served; net margins realized by the Company will likely vary among the various class segments, perhaps significantly, and can rise or fall as a consequence of changes in volumetric prices which, in turn, have an impact on consumption levels. We cannot say how net margins are likely to change for the residential class as a whole in the absence of technical analysis.

The overall objective of retail tariff design is implementation of volumetric and non-volumetric price terms, including energy, demand, and customer charges, that satisfy defined criteria including resource efficiency, equity and fairness, and coverage of the total costs associated with the provision of services. Net margins which, as mentioned,

reflect estimates of marginal costs, are essential to tariff design particularly in the case of a legacy structure which is undergoing major redesign. The extent to which tariff prices satisfy rate design objectives and criteria cannot be gauged in the absence of an understanding of marginal costs and net margins.

The Company's several proposed tariff design changes are advanced without the use of this capability, as noted by Mr. Meredith in his rebuttal testimony. Hence, we're unable to say how well the Company's proposed tariff redesign satisfies the identified objectives.

Regarding this issue, the rebuttal testimony of Mr. Meredith makes mention of the long run, which I interpret to mean that net margins will not change in the short run. This point raises the issue of what distinguishes long-run from short-run perspectives of the response of consumer electricity demand to prices. The notion of what constitutes long- and short-run quantity responses to prices reaches back decades and the original studies of Houthakker and other researchers provide a useful starting point. Empirical evidence of the sensitivity of electricity demand to prices changes is contained in a fairly deep literature, suggesting that electricity consumers respond to prices. Nonetheless, price response is an outstanding issue and, generally speaking, my analyses and regulatory reviews of utility forecast methods lead me to conclude that the response of electricity consumption to prices is pretty much exhausted within two years. Regardless, changes in net margins as a result of the implementation of the Company's proposed compression of the tier structure of the residential tariff are relevant.

Q. You have mentioned Mr. Meredith's rebuttal comments with respect to your interpretation of Tariff 23. Please respond.

A. Mr. Meredith claims that I have misinterpreted the Company's proposed changes to Tariff 23. The issue is RMP's proposed customer charges. Mr. Meredith is correct, and I acknowledge I have apparently misinterpreted the Company's proposed changes to its Tariff 23.

Q. Mr. Meredith indicates that the Division's recommendations to consider selected changes to the Company's marginal cost methodology, contained in your direct testimony, should be addressed in upcoming regulatory processes focused on marginal costs. Please respond to the approach advanced by Mr. Meredith.

A. I concur with Mr. Meredith's proposed approach for consideration of marginal costs and, potentially, changes in methodology. The process should provide a forum in which interested parties can discuss and propose marginal cost methodology, including definition, conceptual design, and issues regarding estimation. At the outset, key issues are 1) forward timeframe over which estimates are prepared, 2) granularity of marginal cost estimates over time and space, and 3) algorithms for recognition of capacity costs within volumetric marginal costs (i.e., load-related marginal costs) and, 4) potential inclusion of carbon damage costs. In my view, it is beneficial to discuss such issues separately from a rate application.

. **Q. Mr. Meredith's rebuttal testimony responds to your recommendation of consideration of a two-part tariff structure, for the Company's proposed real-time pricing options. Please provide comments.**

A. Mr. Meredith indicates that a two-part tariff structure is not currently appropriate for the Company's proposed real-time pricing option. The Company's perspective, expressed by Mr. Meredith, does not provide substantive reasoning for this position, and stands in contrast to the empirical evidence. The real-world experience with the two-part tariff for electricity services began during the early to mid-1990s and, for a number of years, served as a core element of the Electric Power Research Institute's Market Management Program. Since then, the two-part tariff structure has assumed a number of forms including the peak-time rebate variant of critical-peak pricing usually offered to residential customers—and small- and modest-sized commercial customers—as well as real-time pricing options made available to large consumers. Moreover, experience with the two-part structure reaches well-beyond retail electricity markets. Specifically, applications of two-part pricing can be found in power supply contracts, and have assumed such forms as contracts for differences, which are widespread within financial and commodity markets. The parallel between two-part electricity pricing and contracts for differences has been discussed in electricity journals by the senior staff of major investment banking entities.

The overwhelmingly positive experience, evidenced by wide-scale application of the two-part approach, reflects well-founded and easily understood structure that the one-part

pricing proposed by the Company simply cannot match. As discussed in my direct testimony, the two-part tariff structure contains essential features which adhere closely to well accepted tariff design principles, including: 1) full coverage of the all-in costs of electricity services (revenue requirements), 2) resource efficiency gains inherent in short-run marginal cost-based pricing, 3) preservation of equity and fairness implicit in the baseline tariff package of service providers, and 4) the provision of insurance, providing stability in customer bills from one month to another. In addition, implementation of two-part tariff options is straightforward.

Q. Please discuss further. What are the mechanics of two-part pricing, and how does it work?

A. As mentioned, two-part pricing, implemented as a two-part real-time pricing ("RTP") tariff option, is straightforward and arguably easier than implementing a one-part tariff. The procedures are as follows:

1. Identify billing determinants, carried out at the time the RTP option is selected by the customer. Typically, billing determinants reflect the historical loads of each individual customer. In the context of two-part pricing, these billing determinants are referred to as customer baseline loads (CBL). CBLs typically constitute monthly billed demands and hourly consumption patterns which represent the customer's normal level of consumption, as reflected in historical recorded load data.

2. Convey hourly energy prices to customers. Once on the RTP option, RMP will convey hourly day-ahead hourly prices to RTP customers. Note that this procedural step is precisely the same under either one-part or two-part RTP tariff options.

3. Compute invoices of RTP customers at the end of the billing period. The invoice involves the two billing components: the baseline bill and RTP-based tariff component, often referred to as the "incremental energy charge." The baseline bill applies the price components of the customer's standard tariff, including the monthly charges for energy, demand, and riders covering fuel and other tariff features, to the customers' billing determinants which constitute the CBL.

The hourly day-ahead prices are essentially short-run marginal cost-based wholesale prices (or internal costs of service providers). Day-ahead hourly prices can also include operating reserves and capacity cost proxies, adjustments for marginal line losses and, possibly, transmission tariff charges. The hourly day-ahead prices are applied to the hourly incremental and decremental loads of participating customers, measured as the difference between actual metered loads and the loads which constitute the CBL.

The virtue of the two-part approach is that the customer faces efficient short-run marginal cost-based prices including scarcity rents, line losses and, if carried out properly, adjusted charges for ancillary services and transmission where relevant. These efficient price signals can reach very high levels during timeframes when

capacity is comparatively scarce, as reflected in supply-demand balance conditions, thus encouraging customers to reduce loads; conversely, hourly prices can assume very low levels under conditions where capacity is fairly plentiful, reflecting ample supply. Importantly, the incremental and decremental charges resulting for load differences—i.e., the differences between actual loads and baseline loads—reflect wholesale prices. A two-part tariff structure simultaneously attains key tariff design objectives including resource efficiency and adequate revenue flows simultaneously. The proposed one-part pricing approach advanced by the Company does not yield this general result, primarily for reasons identified in my direct testimony: overall average cost-based price levels are retained.

Q. Could a two-part RTP tariff option impose harm on RMP's other customers and customer classes, in the form of higher prices?

A. No. The two-part pricing fully satisfies hold harmless criteria. In this respect, the two-part option provides a clear advantage: one-part options such as the approach advanced by RMP has an impact on other customers and customer classes, channeled primarily through conventional cost allocation procedures.

WITNESS NELSON ON BEHALF OF THE OFFICE OF CONSUMER SERVICES

Q. Do you have comments with respect to the Testimony of Office of Consumer Services Witness Nelson?

A. Yes. I wish to respond to comments of Mr. Nelson regarding the section of my direct testimony focused on RMP's proposed changes to the Company residential tariff—essentially, the compression of volumetric price tiers from three tiers to two. Specifically, Mr. Nelson concurs with my observations with respect to RMP's proposed changes to the tier structure, and further states that my testimony does not provide a solution to the identified issue. (lines 599-615)

As expressed in direct testimony, my concerns are centered on the incomplete analysis which underlies the proposed reduction in the number of tiers, within RMP's residential tariff. The Company did not utilize estimates of marginal costs within its process of developing the proposed two-tier volumetric prices. On this point, Mr. Meredith acknowledges that the Company did not employ marginal costs in the preparation of its proposed tariff filing. In short, the Company provides little guidance to the Utah Public Service Commission and stakeholders with respect to resource efficiency associated with proposed tariff design changes—arguably, a methodological oversight. It is important because, going forward, resource efficiency objectives will assume increased significance within electricity tariff design.

In response to Mr. Nelson's concerns, I outline below a process for determining the proposed price tiers, including the block prices and tier boundary. The proposed process, in my view, would potentially resolve the identified issue. Such a solution is anchored in analytics which utilize marginal costs to estimate net margins, while accounting for

customer load responses to proposed volumetric price changes. The analysis process is as follows:

1. Gather sample hourly load data for the residential class. Observed historically, these hourly data need to be weather normalized in a manner that preserves elements of typical variation within the monthly timeframes.
2. Estimate and assemble scenarios of forward-looking short-run marginal costs, taking account of capacity costs within power delivery services where appropriate.[1]
3. Select price elasticity of demand metrics. Focusing on long-run response, contemporary empirical studies suggest elasticities are likely to reside in the range of -0.13 – -0.30.[2]

[1] Though it is an empirical issue, marginal capacity costs for power delivery are likely to be modest, perhaps less than $15/kW-year.

[2] Representative historical and contemporary studies include: Noel Uri, "A Dynamic Demand Analysis for Electrical Energy by Class of Customer", *Atlantic Economic Journal* (1976); estimated price elasticity: -0.61. Ruth Maddigan, Wen Chern, Colleen Rizy, "Rural Residential Demand for Electricity", *Land Economics* (1983); elasticity estimates across regions: -01.32 – -0.223. T..D. Mount, L.D. Chapman, T.J. Tyrrell, "Electricity Demand in the United States: An Econometric Analysis", *Oak Ridge National Laboratory* (1973); estimated elasticity: -1.21. Robert Halvorsen, "Demand for Electric Energy in the United States", *Southern Economic Journal* (1976); estimated elasticity: -0.974. Jan Acton, Bridger Mitchell, Ragnhild Mowill, "Residential Demand for Electricity in Los Angeles: An Econometric Study of Disaggregated Data", *Rand Corporation*, 1976; price elasticities: -0.06 – -1.03, and averaging -0.70. Daniel Hansen, Steven Braithwait, "Trends in Regional U.S. Electricity and Natural Gas Price Elasticities", Christensen Associates Energy Consulting (2009); estimated elasticities: -0.24 – -0.32. Robert Camfield, "Testimony on Behalf of Florida Public Service Commission" (2014); estimated price elasticities: -0.17 – -0.25. Koichiro Ito, "Do Consumers Respond to Marginal or Average Price? Evidence from Nonlinear Electricity Pricing", *Energy Institute at Haas*, 2010; reported elasticities for average and marginal prices: -0.087 – -0.121. Mark Rebman, "The Residential Energy Savings Effect of a 2-Step Inclining Block Electricity Rate", *International Energy Program Evaluation Conference*, 2011; the estimates of price elasticity: -0.054 – -0.111.

Three generalizations can be drawn from the various studies cited above. First, estimates of price elasticity of electricity demand appear to be somewhat lower over recent years, when compared to earlier decades reaching back as early as mid-twentieth century. This is particularly the case of the industrial class. We conjecture that this observation is, in part, a reflection of changes in the composition of the sector for most electric utilities. Second, cross sectional analysis, often accepted as the basis for measuring long-term elasticities of demand, are typically higher than results obtained from time series data. Third, analysis of micro data for the residential class, over

4. Determine net margins for the sample loads under the status quo residential tariff, given estimates of marginal costs. Scale these results, including revenue flows and net margins, to the population of residential customers served under the Company's residential tariff.
5. Determine, or set forth, an initial set of scenarios of block prices and tier boundaries, for a two-tier residential tariff structure.[3]
6. Calculate impacts, including revenue flows, net margins, and changes in consumer benefits measured as consumer surplus, where the impacts account for changes in monthly consumption based on price response elasticities (step 3). Iteratively work through alternative price—tier boundary combinations, searching for gains in net benefits. Select price—tier boundary scenario(s) that satisfy defined criteria: revenue sufficiency, load changes, net margins, and changes in net consumer benefits. The determination of prices, tier boundaries, revenues, and margins are reached in each solution. Net benefits to consumers can be viewed as an objective within a problem of constrained optimization: solve for the maximum of consumer benefits subject to the satisfaction of net margin and fairness-equity constraints.

contemporary years, may imply comparatively low sensitivity of consumption to price changes (e.g., recent results by Ito in 2010).

[3] Lower first-tier prices coupled with comparatively high consumption boundaries implies comparatively high second-tier prices. Consumption patterns within RMP's residential class are revealed in load research samples of hourly loads. When coupled with a couple of scenarios of tier prices, these load data, scaled to the levels of consumption of market segments of the class, provide a means to determine the initial scenarios of prices and tier boundaries.

Q. This process of residential tariff design appears to be complicated. What are the resources required to carry out the above analytics?

A. Implementation of analytical procedures for carrying the analysis outlined above is straightforward. Much of the work is concentrated in gathering and organizing sample load data which, experience suggests, are often incomplete. Forward-looking scenarios of marginal costs appear to be currently available to the Company, or are easily developed. Once load and marginal cost data are available, analysis is straightforward. Results of model simulations, covering a number of alternative scenarios, can be obtained in a few days. The basic issue confronting the Utah Public Service Commission and parties to the proceeding is that RMP's analysis underlying its proposed tariff changes is incomplete, leaving the core issues of preservation of net margins and customer net benefits unaddressed.

Q. Should the proposed prices and tier boundary, for a two-tier residential tariff, be determined exclusively according to the analytics which you describe?

A. No. Rate design analytics carried out with models serve to inform and guide the tariff design process. Analysis obtained from models should be assessed according to well accepted rate design criteria, where the end result is gauged according to fairness and equity to residential consumers, satisfaction of revenue coverage requirements, and market efficiency. New tier prices in combination with customer charges should yield revenue flows that closely approximate overall class and tariff targets, determined by accepted cost allocation methods.

Q. Does this conclude your testimony?

A. Yes, it does.