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October 12, 2022

VIA ELECTRONIC FILING

Jan Noriyuki, Secretary
Idaho Public Utilities Commission
11331 W. Chinden Blvd., Bldg 8,
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Boise, Idaho 83720-0074

Re: Case No. IPC-E-22-22
In the Matter of Idaho Power Company's Application to Complete the Study
Review Phase of the Comprehensive Study of Costs and Benefits of On-
Site Customer Generation & For Authority to Implement Changes to
Schedules 6, 8 and 84 for Non-Legacy Systems

Dear Ms. Noriyuki:

Attached for electronic filing is Idaho Power Company's Reply Comments in the
above-referenced matter. Please find the Affidavit of Kurt G. Strunk as Attachment 1 to its
Reply Comments.

If you have any questions about the documents referenced above, please do not
hesitate to contact me.

Very truly yours,

Lisa D. Nordstrom

LDN:sg
Attachments

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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF IDAHO POWER)	
COMPANY'S APPLICATION TO)	CASE NO. IPC-E-22-22
COMPLETE THE STUDY REVIEW PHASE)	
OF THE COMPREHENSIVE STUDY OF)	IDAHO POWER COMPANY'S
COSTS AND BENEFITS OF ON-SITE)	REPLY COMMENTS
CUSTOMER GENERATION & FOR)	
AUTHORITY TO IMPLEMENT CHANGES)	
TO SCHEDULES 6, 8, AND 84)	
_____)	

COMES NOW, Idaho Power Company ("Idaho Power" or "Company"), and pursuant to the Notice of Schedule, Notice of Workshops, and Notice of Comment Deadlines issued by the Idaho Public Utilities Commission ("Commission") in Order No. 35512, respectfully submits its reply comments in the above-referenced case as follows.

I. BACKGROUND

On September 21, 2022, the following parties submitted initial written comments pursuant to the Commission's scheduling order¹ in this matter: Commission Staff ("Staff"); Clean Energy Opportunities for Idaho ("CEO"); City of Boise; Idaho Conservation League ("ICL"); and Idaho Irrigation Pumpers Association, Inc. ("IIPA"). In addition, several members of the public submitted comments. The Company appreciates the opportunity to offer comments and continues to value the participation of the parties and the public in this docket.

The written comments submitted to date concerning the "2022 Value of Distributed Energy Resources Study" filed by Idaho Power ("VODER Study") raise a number of important issues, though in the interest of procedural efficiency, the Company intends to focus these reply comments on ICL's Initial Comment and, specifically, the Attachment thereto: Crossborder Energy's "Independent Review of Idaho Power's *Value of Distributed Energy Resources Study*" ("Crossborder Review"). Crossborder Energy is a California consulting firm hired by ICL, other environmental groups, and solar companies,² for the purpose of critiquing the VODER Study. With respect to issues raised in the written comments that are not addressed herein, Idaho Power intends to utilize its final response comments³ to clarify and refine aspects of the VODER Study, as explained

¹ Order No. 35512.

² Idaho Statesman, *Idaho Power wants to pay less for homeowners' rooftop solar, new report says* (September 29, 2022). ("Crossborder's report was paid for by the Idaho Conservation League, the Idaho Chapter of the Sierra Club, EGT Solar, Vote Solar, the Portneuf Resource Council, the Snake River Alliance, CED Greentech, Sunnova, Empowered Solar, the Climate Action Coalition of the Wood River Valley and the Idaho Organization of Resource Councils.")

³ Pursuant to Order No. 35512, the Company's final response comments are due October 26, 2022.

more fully in its initial comments, and will also address any outstanding issues and comments in the process. As such, the Company's silence at this stage on an issue or stance should not be construed as agreement with the position.

The Company conducted the VODER Study pursuant to the Study Framework that the Commission approved in Case No. IPC-E-21-21⁴ after considering more than 250 written public comments, oral testimony at a public hearing, and written comments filed by eleven parties to that proceeding. Notably, having reviewed the extensive record in that case, the Commission declined to order the VODER Study be conducted by a third party, finding that the Company itself was "best positioned to access and study the extensive data and issues specific to the Idaho Power system at a reasonable cost."⁵ As set forth more fully below, the wisdom of the Commission's determination is demonstrated by the review commissioned by ICL, which lacks an understanding and appreciation of the nuances of the Idaho regulatory environment and the particulars of the Company's system.

II. CROSSBORDER REVIEW OF THE IDAHO POWER VODER STUDY

The Company appreciates ICL's recognition of the Company's clear and detailed explanation of the analysis it conducted for the VODER Study and its continued commitment to industry, customer, and community involvement. Nevertheless, ICL has retained a consulting firm based in Berkeley, California, to critique the VODER Study filed by Idaho Power. Having assessed the Crossborder Review, associated workpapers, and

⁴ *In the Matter of Idaho Power Company's Application to Initiate a Multi-Phase Collaborative Process for the Study of Costs, Benefits, and Compensation of Net Excess Energy Associated with Customer On-Site Generation*, Case No. IPC-E-21-21, Order No. 35284 (Dec. 30, 2021).

⁵ *Id.* at 11.

related discovery responses, the Company has identified several flaws, which include assumptions and methodologies inconsistent with Idaho regulatory precedent and incongruous with the Commission-approved Study Framework.

As more fully set forth herein, the Crossborder Review not only falls short of being an “independent” review and fails to meet the Commission’s criteria⁶ for a comprehensive study, it contains arguments and conclusions that are misleading, inherently flawed, and directly conflict with prior Commission decisions. More specifically, the following components of the Crossborder Review, summarized as follows and addressed more fully herein, are problematic for the reasons stated and should be rejected as a result:

- 1) Avoided Energy Costs – The Crossborder Review incorrectly concludes that the data provided in the VODER Study is “outdated and inaccurate,” instead merely using more recent data and not introducing new or different avoided energy cost concepts than the VODER Study already considered demonstrates that Idaho Power’s examination was thorough and appropriate.
- 2) Avoided Generation Capacity – The Crossborder Review’s analysis of the avoided generation capacity is in direct conflict with the Commission-approved Study Framework. The analysis erroneously includes the capacity contribution of energy offset by the customer-generator behind the meter and proposes a method that does not rely on industry best practices or system-specific data. Additionally, the Crossborder Review does not select

⁶ Case No. IPC-E-21-21, Order No. 35284 at 9-32.

the lowest-cost selectable resource from the most recently acknowledged Integrated Resource Plan (“IRP”).

- 3) Avoided Transmission & Distribution Capacity – The Crossborder Energy estimates of Idaho Power’s avoided transmission and distribution investment are not accurate, are overstated, and are based on inappropriate implementation of marginal costing techniques.
- 4) Avoided Line Losses – The Crossborder Review’s line loss assumptions erroneously and arbitrarily double the line losses from Idaho Power’s most recent line loss study and are not based on Idaho Power’s system data.
- 5) Integration Costs – The Crossborder Review assumptions are inherently flawed as it relates to the applicability of the cases studied in Idaho Powers most recent integration study as discussed herein.
- 6) Fuel Hedging – The analysis and conclusions reached by the Crossborder Review demonstrate a lack of understanding of Idaho Power’s hedging practices and conflict with the Commission-approved Study Framework by attributing value to the energy consumed by the customer-generator behind the meter.
- 7) Avoided Costs of Carbon Emission – The Crossborder Review suggests including carbon emission costs that may – or may not – affect rates at some future point should be considered. The Crossborder Review directly conflicts with the Commission-approved Study Framework by including carbon emission costs that are not currently in customer rates.

8) Societal Benefits – The Crossborder Review itself notes that the Commission did not direct the Company to study societal benefits, and they may not be appropriate for inclusion in the Export Credit Rate (“ECR”). The Crossborder Review’s attempt to include those benefits should be rejected by the Commission.

1) Avoided Energy Costs

On the issue of avoided energy costs, the Crossborder Review incorrectly concludes that the data provided in the VODER Study is “outdated and inaccurate.”⁷ As directed by the Commission, the Company utilized the most recent data and information to develop possible avoided energy cost methodologies and presented those in the VODER Study. The Company did not, as inferred by the Crossborder Review, propose the values presented in the report be utilized as an approved ECR. Rather, the Company presented several methodologies that could be used to develop an ECR and be updated as appropriate. The Crossborder Review goes on to focus on the importance of incorporating recent higher energy prices into the avoided energy cost component of the ECR, erroneously concluding recent geopolitical events make the historical data included in the VODER Study “outdated and inaccurate.”

The VODER Study evaluated a range of methods, some of which rely on an actual market price such as the Intercontinental Exchange Mid-Columbia (“ICE Mid-C”) or Energy Imbalance Market Load Aggregation Point (“ELAP”), and one that relies on forecasted values (i.e., IRP forecast) to represent the avoided energy cost component of

⁷ Crossborder Review at 2.

the ECR.⁸ Depending on the price used as the basis for avoided energy, the timing of updates to the inputs for energy prices may vary.⁹ As stated in the VODER Study:

Idaho Power, stakeholders, and ultimately the Commission, must evaluate the benefits and potential impacts of leveraging a forecasted energy price or an actual market energy price. Both approaches have merit as a representative proxy for the value provided for avoided energy attributed to customer-generator exports.¹⁰

The Crossborder Review notes that energy prices in 2022 significantly increased compared to prior years and states: “Avoided energy costs should reflect more timely and accurate data than the IRP forecast or the three-year rolling averages used by IPC. For example, they could be based on EIM prices from the prior 12 months.”¹¹

The Crossborder Review incorrectly concludes that the VODER Study does not evaluate a real-time pricing option. For the VODER Study, a historical 3-year average of the ELAP price was used for illustrative purposes.¹² However, what the Crossborder Review overlooks is that the VODER Study suggests that the Commission could approve the use of actual market prices in real-time to “capture changes in market conditions resulting in higher or lower energy prices.”¹³ As a result, the energy input would not need to remain constant and “[i]nstead, Idaho Power’s billing system could apply actual market

⁸ VODER Study at 35 (June 2022).

⁹ *Id.* at 71.

¹⁰ *Id.*

¹¹ Crossborder Review at 2.

¹² VODER Study at 37 (“For purposes of the study, the value for the ECR uses a historically based indicative price based on a 3-year average of the ICE Mid-C Index.”), and 38 (“The value for the ECR, for purposes of the study, uses a historically based indicative price based on a 3-year average of the ELAP price.”).

¹³ *Id.* at 38.

prices for the given hour that the customer-generator's export occurs. The energy input would continually use the [market prices] to value exports in the billing period.”¹⁴ Therefore, inherent in the methods identified in the VODER Study, if the Commission selected an actual real-time market price method during implementation, the ECR would incorporate changes in market prices such as those mentioned in the Crossborder Review.

The intent of the VODER Study, as defined in the Study Framework, was to evaluate an array of methodologies and pricing inputs – not to presuppose a singular approach as suggested in the Crossborder Review. The fact that the Crossborder Review merely used more recent data and did not introduce new or different avoided energy cost concepts than the VODER Study already considered further demonstrates that Idaho Power's examination was thorough and appropriate. Crossborder's suggestions to the contrary are unavailing.

2) Avoided Generation Capacity

The Crossborder Review suggests the VODER Study under-quantified (1) the contribution capacity of distributed energy resources (“DER” or “DERs”) and (2) the avoided cost of generation capacity for the utility.¹⁵ The arguments that support these conclusions are misleading, inherently flawed, directly conflict with prior Commission decisions, and should therefore be rejected by the Commission.

¹⁴ *Id.* at 71.

¹⁵ Crossborder Review at 3.

Capacity Contribution of Distributed Energy Resources – ELCC

The Crossborder Review attempts to undermine the credibility of the avoided generation capacity quantified in the VODER Study by comparing the ELCC of the Company's existing and planned utility scale solar resources (62.3% from the 2021 IRP) and the Jackpot solar project (34.0% from the 2021 IRP)¹⁶ to the ELCC of customer-generator exports (7.62% from the VODER Study).¹⁷ The basis for comparing these values is flawed for a couple of reasons.

First, a utility-scale solar project, such as Jackpot solar, exports all produced energy to the grid. In contrast, customer-generator net exports are significantly reduced during the summer months as most energy is consumed by the customers on-site (i.e., behind the meter). The Crossborder Review incorrectly concludes that excluding the value of capacity associated with generation consumed on-site is an error that leads to an understated ELCC.¹⁸ The VODER Study's evaluation of only excess net energy is consistent with the Commission's decision in Case No. IPC-E-21-21: "We find it reasonable to base the capacity value on the energy exported rather than the total generator installed capacity."¹⁹ The Commission further noted, "it would be double counting to base the capacity value on anything more than the energy that is exported."²⁰ The analysis in the Crossborder Review of avoided generation capacity overlooks the

¹⁶ *In the Matter of Idaho Power Company's 2021 Integrated Resource Plan*, Case No. IPC-E-21-43, 2021 IRP Appendix C: Technical Report at 98.

¹⁷ VODER Study at 51.

¹⁸ Crossborder Review at 3.

¹⁹ Case No. IPC-E-21-21, Order No. 35284 at 18.

²⁰ *Id.*

Commission's determination. Energy consumed by the customer on-site will not be subject to the ECR and should not be incorporated into the calculation of avoided generation capacity (or other components of the ECR, as the Crossborder Review consistently does). The ECR is only intended to apply to the energy exported to the grid, thus invalidating the assumption and suggestion in the Crossborder Review.

Second, the Crossborder Review compared ELCCs of two other existing resources but failed to mention that the 2021 IRP lists the ELCC of future utility-scale solar as 10.2 percent.²¹ The results of the 2021 IRP demonstrate that the contribution from solar to high-risk hours declines as solar penetration increases in the absence of energy storage. Again, the 10.2 percent ELCC from the 2021 IRP analysis includes all generated energy produced by the plant and provided to the utility, not just net energy exports.

Capacity Contribution of Distributed Energy Resources – Peak Capacity Allocation Factor (“PCAF”)

The Crossborder Review suggests that the ELCC method is inferior because it introduces variability from year to year and instead suggests the use of the peak capacity allocation factor (“PCAF”) method.²² The Crossborder Review posits that the PCAF method “is a widely-used approach to determining the capacity contribution of solar” and is “simpler and more stable than the ELCC approach.”²³ However, that conclusion is not supported by industry literature, does not lead to an accurate valuation of the capacity

²¹ Case No. IPC-E-21-43, 2021 IRP at 53 and Appendix C: Technical Report at 99.

²² Crossborder Review at 3.

²³ *Id.* at 3-4.

contribution to Idaho Power's system, and therefore is inconsistent with prior Commission directives to conduct a comprehensive study *specific to the Idaho Power system*.²⁴

The Crossborder Review claims that the PCAF calculates the capacity contribution of solar during hours within 10 percent of the system peak resulting in a "more stable" capacity value.²⁵ However, the stability of the PCAF method referenced in the Crossborder Review ignores the impact of higher solar penetration on the system. This fatal flaw of the PCAF methodology resulted in the widespread adoption of ELCC to value capacity.²⁶

For background, the quantification of the capacity contribution of solar has evolved industry-wide as well as specifically on Idaho Power's system. For example, during the 2017 IRP, Idaho Power used a variant of the PCAF method by calculating the capacity contribution of solar during the top 150 load hours resulting in a capacity contribution of 28.4 percent for a fixed-tilt system that is oriented due south.²⁷ Recognizing that this method was limited and did not capture the impact of high solar penetration, Idaho Power's 2019 IRP transitioned to the 8,760 hour-based method developed by the National Renewable Energy Laboratory ("NREL").²⁸ To further capture the impact of higher DER

²⁴ IPC-E-21-21, Order No. 35284 at 11.

²⁵ Crossborder Review at 4.

²⁶ ELCC has quickly gained traction among ISOs and utilities. See Olson, A., Ming, Z., and Carron, B. (2021, August 30). *ELCC Concepts and Considerations for Implementation* [PowerPoint slides] at 12. 2021 NYISO Installed Capacity Working Group. https://www.nyiso.com/documents/20142/24172725/NYISO%20ELCC_210820_August%2030%20Presentation.pdf

²⁷ *In the Matter of Idaho Power Company's 2017 Integrated Resource Plan*, Case No. IPC-E-17-11, 2017 IRP at 37 and 130.

²⁸ *In the Matter of Idaho Power Company's 2019 Integrated Resource Plan*, Case No. IPC-E-19-19, 2019 IRP at 37.

penetration levels, Idaho Power, with the support of its Integrated Resource Plan Advisory Council (“IRPAC”), adopted the industry best standard, the ELCC method, for the 2021 IRP.²⁹

While the Crossborder Review claims that the PCAF method is “more stable and transparent than ELCCs,”³⁰ it fails to acknowledge that the PCAF method ignores the shift in high-risk hours toward sundown as penetration of renewable resources increases on the system. Instead, the PCAF method only uses the system load as the weighting factor for evaluating capacity contribution. The PCAF method calculates the capacity contribution independent of renewable penetration. As a result, the PCAF method result will not adequately account for changes in DER penetration on Idaho Power’s system.

The Crossborder Review also ignores that the ELCC is a well-documented method that can be found in a variety of system reliability literature and reports.³¹ The North American Electric Reliability Corporation (“NERC”) states: “Simplified approaches should be benchmarked and calibrated to the rigorous ELCC calculations to ensure the validity of the approximation.”³² The Company’s research found that the ELCC is the preferred method throughout the industry to calculate the capacity contribution of variable energy

²⁹ Case No. IPC-E-21-43, 2021 IRP at 51.

³⁰ Crossborder Review at 4.

³¹ Roy Billinton and Ronald N. Allan, *Reliability Evaluation of Power Systems*, Springer (1996).

³² Milligan, M. (2011, April 12). *Methods to Model and Calculate Capacity Contributions of Variable Generation for Resource Adequacy Planning (IVGTF1-2)* [PowerPoint Slides]. Joint NERC-UWIG Workshop, Kansas City. <https://www.nrel.gov/docs/fy11osti/51485.pdf>

resources.³³ While the PCAF method may result in a consistently higher value, it is entirely unrelated to the benefit of customer-generator exports on Idaho Power's system. The Crossborder Review suggestion³⁴ to use the PCAF method is in direct conflict with the Commission's directive in Order No. 35284 to utilize "system specific data" for "determining how exports for customer-generators will avoid the cost and provide benefits" to Idaho Power's system.³⁵

Avoided Cost of Capacity

The Crossborder Review states that "the VODER Study assumes, without explanation, that a gas-fired combustion turbine ("CT") is [Idaho Power's] marginal source of generation capacity."³⁶ The explanation for selecting the avoided levelized fixed cost of a simple cycle combustion turbine is stated on page 72 of the VODER Study: "the levelized fixed cost of the avoided resource is determined in Idaho Power's IRP."³⁷

For avoided capacity calculations, the Company believes it is most appropriate to utilize the lowest levelized cost of capacity. An August 2022 Commission order upheld

³³See, e.g., Milligan, M. and Porter, K. (2018, June 1-4). *Determining the Capacity Value of Wind: An Updated Survey of Methods and Implementation* [Paper presentation]. WindPower 2008, Houston, Texas. <https://www.nrel.gov/docs/fy08osti/43433.pdf>;

Olson, et al., 2021.

https://www.nyiso.com/documents/20142/24172725/NYISO%20ELCC_210820_August%2030%20Presentation.pdf; and

Levitt, A. (2021, April 20). *How Effective Load Carrying Capability ("ELCC") Accreditation Works* [PowerPoint slides]. PJM Planning Committee Special Session – CIR for ELCC. <https://www.pjm.com/-/media/committees-groups/committees/pc/2021/20210420-special/20210420-item-03b-how-effective-load-carrying-capability-works.ashx>

³⁴ Crossborder Review at 3-4 and 6.

³⁵ Case No. IPC-E-21-21, Order No. 35284 at 11.

³⁶ Crossborder Review at 4.

³⁷ VODER Study at 72, referencing the 2021 IRP at 109 (Figure 8.5 Levelized Capacity (Fixed) Costs in Millions of 2021 Dollars per kW per Month). The capacity cost of a SCCT is lower than that of any battery storage resource.

this approach as reasonable, where the Commission stated: “We find it fair, just, and reasonable that the resource(s) used as a surrogate to determine avoided capacity cost be identified using the lowest-cost selectable resource from the most recently acknowledged IRP at the time of [power purchase agreement] execution.”³⁸

Finally, while no discussion or justification is presented, Table 1 of the Crossborder Review proposes to increase the avoided generation capacity cost by an amount equal to Idaho Power’s 2021 Planning Reserve Margin (“PRM”). To assume the PRM should inflate the avoided generation capacity cost shows a lack of understanding of the purpose of the PRM and how it pertains to the planning process.

The PRM is a value calculated during the IRP process and used in the Long-Term Capacity Expansion (“LTCE”) model to ensure reliable portfolios are produced. The PRM has no relation to the avoided capacity of a single resource. As such, the valuation of avoided generation capacity should not be included in the calculations for the cost of avoided generation capacity. More information on the PRM’s purpose and how it is derived can be found in the Planning Margin section on page 116 of Idaho Power’s 2021 IRP.

3) Avoided T&D Capacity

The Crossborder Review assumes that because the VODER Study “reports very low avoided costs for transmission and distribution (“T&D”) capacity deferrals,”³⁹ those values have been under-quantified. The Crossborder Review arguments that support

³⁸ *In the Matter of Idaho Power Company’s Application for Approval of a Replacement Contract with Micron Technology, Inc. and a Power Purchase Agreement with Black Mesa Energy, LLC*, Case No. IPC-E-22-06, Order No. 35482 at 17 (Aug. 1, 2022).

³⁹ Crossborder Review at 4.

these conclusions are misleading, counter to industry best practices, directly conflict with prior Commission decisions, and should be rejected by the Commission as a result.

The Crossborder Review relies on a method specific for cost allocation – the National Economic Research Associates (“NERA”) regression model. The NERA regression model compares T&D investments found in FERC Form 1 to changes in peak demand. The Crossborder Review refers to the NERA model as a method “U.S. utilities have long used to calculate T&D capacity costs for ratemaking,”⁴⁰ vaguely inferring that the NERA regression model is commonly used as a basis to establish rates that customers are charged for service. The Crossborder Review then makes a blatant mischaracterization by suggesting that “[t]he NERA regression model determines **avoided T or D costs**”⁴¹ – a categorically flawed assertion.

Upon evaluating the Crossborder Review, the Company contacted Kurt G. Strunk, Managing Director at NERA, and asked if NERA would be willing to assess the Crossborder Review to determine the reasonableness of its “analysis.” The Company met twice with Mr. Strunk to answer clarifying questions about the method presented in the VODER Study. Included as Attachment 1 to these comments is an affidavit received from Mr. Strunk, concluding that “Crossborder Energy’s estimates of Idaho Power’s avoided T&D investment attributable to behind the meter solar exports are not accurate, are

⁴⁰ *Id.* at 5.

⁴¹ *Id.* (emphasis added).

overstated, and are based on an inappropriate implementation of marginal costing techniques.”⁴²

It is also important to note that the Commission previously directed the Company to “evaluate, for use, examples from the Lawrence Berkeley National Lab” (“LBNL”) when valuing this element of the ECR.⁴³ The LBNL Locational Value of Distributed Energy Resources Report states the following:

...a marginal cost approach provides a general relationship between peak loads and distribution costs, but which are not necessarily directly avoidable by DERs. In the present worth method, future investment costs are tied to peak load in specific locations where there are opportunities to defer specific upgrades. These estimates better reflect the marginal avoided distribution costs of DERs than estimates of system marginal cost.⁴⁴

The VODER Study relies on a location-specific project method,⁴⁵ which, as the LBNL points out, provides a better estimate of the T&D deferral costs.

While the NERA method should not have been considered relevant to quantify avoided T&D, the Crossborder Review did not attempt to evaluate whether the results of the VODER Study were reasonable – a fact that undercuts the credibility of the analysis. Idaho Power cannot avoid many of the T&D investments included in the Crossborder Review, much less defer, due to the addition of DERs. The following list provides a few

⁴² Attachment 1, Strunk Affidavit at 7.

⁴³ IPC-E-21-21, Order No 35284 at 19.

⁴⁴ Frick, Natalie Mims, et al. *Locational Value of Distributed Energy Resources* at 16 (2021).

⁴⁵ VODER Study at 55-57.

examples of T&D investment classifications that DERs cannot defer but were erroneously included in the Crossborder Review:

- Asset Maintenance and Replacement: Idaho Power's infrastructure is aging, and many of the lines installed decades ago are being maintained or replaced. Exported energy from customer generation does not defer this large category of T&D investment. The Crossborder Review claims that "replacement projects are demand-related,"⁴⁶ and the implied assertion that DER would delay such projects, is emphatically false.
- New Service: T&D projects are often the result of new or incremental load in new locations. Line extensions, service transformers, and other interconnection equipment are required to serve these new customers where no infrastructure existed previously. Exported energy from customer generation, even if nearby, does not replace the need for this new infrastructure.
- Road Widening Projects: The population growth in Idaho, especially in the Treasure Valley, has led to many road widening projects by the highway districts. Those road projects result in the relocation and rebuilding of lines to accommodate the new rights-of-way. Exports from customer generation cannot defer or replace relocation projects.

⁴⁶ Crossborder Review at 5.

- Grid Modernization: Idaho Power is improving system communications and technology to better transition from the grid of the past (i.e., one-way power flow; separate generation and distribution resources) to the future (i.e., two-way power flow with distributed loads and resources). For example, Idaho Power has implemented an Integrated Volt-VAR Control (“IVVC”) system, which remotely monitors the voltage and volt-amp reactive (“VAR”) flow on distribution lines and uses that information to control the operation of equipment remotely. This IVVC system allows the distribution system to respond to changes in magnitude and direction of energy flow and maintain quality service. These grid modernization projects and changes help the system accommodate customer generation. Far from being deferrable, the need for these projects increases with additional customer generation.

Another miscalculation within the Crossborder Review is that its assumptions are based on customer generation at system peak rather than on the exported energy at the local peak time. The local peaks of distribution circuits vary considerably, ranging from 7 am to 11 pm depending on local loads and whether the location is winter or summer peaking. A method using the system peak time can under- or over-estimate the local exported energy compared to the local peak exported energy values. As a result, Crossborder Review's suggested method does not accurately represent the local exported energy required to defer a growth project. On the contrary – and achieving a

more credible result – the VODER Study used the expected exports for the time of each individual local peak.⁴⁷

While the Crossborder Review correctly asserts that the VODER Study spreads customer generation penetration evenly across Idaho Power's service area, it incorrectly concludes that this spread deflates the value of T&D deferral.⁴⁸ The method used to quantify the value of T&D deferral in the VODER Study represents how additional customer generation can come online anywhere on the system and capture the local and varying nature of T&D deferral value.

Customer-generator DER exported energy is most effective at deferring projects "on the edge," meaning the loading threshold at which an upgrade is initiated is barely exceeded and in areas where load growth is minimal. The spread of customer-generator exports over the system allows the deferral of some projects that otherwise would not be deferred. Analyzing the specific project deferrals that led to the T&D deferral value indicates that the value is overstated due to this spread, contrary to the Crossborder Review's claim that the value is diminished in the VODER Study.

To test the claim in the Crossborder Review, Idaho Power reviewed two methods. The first method looked at the top 10, 20, and 30 locations by highest aggregated customer generation nameplate capacity. The Company found either that those locations are not where deferrable T&D projects exist or that the aggregated amount of DER in those areas were not enough to defer the projects. The second method looked at the specific areas where the project deferrals that led to the T&D deferral value occurred and

⁴⁷ VODER Study at 55.

⁴⁸ Crossborder Review at 4-5.

found that by considering customer generation systems at these locations, the T&D deferral value is diminished. Therefore, most customer generation projects on Idaho Power's system would not have deferred T&D investment over the 20-year analysis timeframe, including historical and projected T&D growth investments.

Energy Efficiency and Demand Response Have No Associated Energy Exports

The Crossborder Review includes energy efficiency (“EE”) and demand response (“DR”) in the T&D deferral analysis. The analysis double-counts and artificially inflates the T&D deferral value by including these components. EE and DR are evaluated and compensated separately and are out of scope within this docket.

Further, per the Commission's direction, "the main purpose of the study is to value the customer-generators' **exports** to the system."⁴⁹ EE and DR do not produce or export energy to the system. There is no evidence that the Crossborder Review focused on exports only in their assessment; its focus on the total DER production shape – not the shape of net usage or exports – invalidates the evaluation. For these reasons, the approach used in the VODER Study better aligns with the Commission-approved Study Framework in Case No. IPC-E-21-21 and the Commission should reject the Crossborder Review.

4) Avoided Line Losses

The Crossborder Review states: “In the absence of an up-to-date study of marginal line losses, it is reasonable to double IPC’s system average resistive line losses from 2012, to 11.6%, to capture the higher marginal losses avoided by new DER resources.”⁵⁰

⁴⁹ IPC-E-21-21, Order No. 35284 at 13.

⁵⁰ Crossborder Review at 8.

This suggestion shows a clear lack of understanding of basic distribution and transmission planning. Perhaps most concerning, the Crossborder Review erroneously and arbitrarily inflated the line losses by 100 percent. Idaho Power's service area has experienced significant load increases in the past ten years. However, the Crossborder Review, and the 2011 white paper it based its recommendation on, ignore that to serve new customers, the utility upgrades and builds new distribution and transmission facilities to accommodate that load growth. As a result, the current flow in individual conductors (which causes line losses) is relatively consistent over time. Therefore, suggesting an increase to line losses of 100 percent is irrational.

To illustrate the irrational logic of doubling losses, Table 1 shows the Company's total system losses over time, as reported annually on page 401a on the Company's FERC Form 1.

Table 1
Idaho Power Total System Losses (2011-2021)

Year	Total Losses (MWh)	Total Energy (MWh)	Total Loss %
2021	1,076,855	17,821,743	6.042%
2020	1,059,618	17,775,017	5.961%
2019	1,146,823	18,534,459	6.188%
2018	1,267,436	18,717,595	6.771%
2017	1,256,411	17,963,014	6.994%
2016	1,181,741	16,563,370	7.135%
2015	1,051,718	16,570,347	6.347%
2014	1,144,985	17,457,771	6.559%
2013	1,157,469	17,460,117	6.629%
2012	1,253,953	17,522,531	7.156%
2011	1,226,910	18,596,264	6.598%

As shown in the column titled "Total Loss %" in Table 1, the Company's system-wide losses remain relatively consistent year-to-year and, if anything, appear to be on a downward trend. Line losses have not doubled.

In the white paper referenced in the Crossborder Review, the average losses increase as the total system load increases. As shown in Table 1, Idaho Power's average line losses have not increased between 2011 and 2021 – contradicting the assumptions leveraged in the Crossborder Review. The Crossborder Review again includes all energy generated instead of only using net exports to the grid as directed by the Commission in the Study Framework. The exports to the grid are lower during the system peak when customers consume most of the energy generated by the system. While the Crossborder Review erroneously leverages FERC Form 1 data in its T&D Deferral evaluation, it disregards this data for its assessment of the avoided line loss value – which reasonably represents actual conditions on Idaho Power's system. The Crossborder Review's line loss assumptions are not based on Idaho Power's system data and should be rejected by the Commission.

5) Integration Costs

In 2020, the Company completed a Variable Energy Resource ("VER") Integration Study in parallel with the conclusion of the 2019 IRP. The VODER Study determined that Case 1 from the VER Integration Study was the most representative of the Company's current system.⁵¹ Case 1 includes the addition of about 250 megawatts ("MW") of solar over today's current penetration and determines an integration cost associated with the

⁵¹ VODER Study at 63-67, Appendix 4.15.

incremental solar of \$2.93 per MWh.⁵² The Crossborder Review states: "The scenario whose resource mix most closely resembles the subsequent 2021 IRP's preferred plan is Case 9 – the High Solar with 200 MW Storage case. This scenario shows much lower integration costs of \$0.64 per [megawatt-hour ("MWh")]."⁵³

The Crossborder Review includes a critical error in the logic related to the appropriate VER Integration Study case to use for an ECR. Case 9 was a sensitivity case to determine the incremental integration cost for 794 MW of solar coupled with 200 MW of four-hour storage above Case 1.

The integration costs for Case 1 and Case 9 from the VER Integration Study cannot be directly compared. The integration cost of \$2.93 per MWh from Case 1 was the calculated incremental cost for adding 251 MW of additional solar beyond the 310 MW of solar on Idaho Power's system in 2020.⁵⁴ The integration cost of \$0.64 per MWh for Case 9 is the calculated incremental integration cost to integrate 794/200 MW of coupled solar/battery beyond the 251 MW of utility solar added in Case 1.⁵⁵ The Case 9 value as applied in the Crossborder Review incorrectly applies the VER Integration Study costs and should be rejected by the Commission.

The VER Integration Study Case 1 best represents the Company's current system. As required by the Commission, the VODER Study utilized the most recent information available with the expectation that the Company would update the various components

⁵² *Id.*

⁵³ Crossborder Review at 8.

⁵⁴ VODER Study Appendix 4.15 at 29-31 and 44 (E3 report pages 19-21 and 34).

⁵⁵ *Id.*

of the ECR periodically. The Company does expect to add 131 MW of storage in 2023. This incremental storage and other incremental resources will be factored into the next VER Integration Study, and the Company would update the Integration Cost component of the ECR at that time as ordered by the Commission

6) Fuel Hedging

The Crossborder Review reaches several incorrect conclusions about fuel hedging, suggesting a \$11.70 per MWh benefit associated with fuel hedging.⁵⁶ The analysis and conclusions reached by the Crossborder Review demonstrate a lack of understanding of Idaho Power's hedging practices, are misguided, flawed, and should be rejected by the Commission.

The severe flaw in considering a fuel hedge benefit for customer exports is that there is minimal grid reliability risk regarding resource adequacy when solar energy is generated during the day due to the increasing penetration of solar generation across the West. There is minimal price risk if there is no resource adequacy risk. If there is little price risk, there is no reason for the Company to hedge to protect against run-away pricing – a primary purpose of the Company's risk management policies.

Idaho Power's Energy Risk Management Standards and Variable Energy Resources

The Idaho Power Energy Risk Management Standards ("ERMS") adopted pursuant to the Idaho Power Energy Risk Management Policy is on file with the Commission.⁵⁷ Per Idaho Power's ERMS, hedges are transacted based on average

⁵⁶ Crossborder Review at 11.

⁵⁷ *In the Matter of Idaho Power Company's Interim and Prospective Hedging, Resource Planning, Transaction Pricing, and IDACORP Energy Solutions (IES) Agreement*, Case No. IPC-E-01-16.

heavy load (“HL”) and light load (“LL”) positions. Natural gas hedges are applied to fix a deficit or long position on an average MW basis. Physical index-priced gas is subsequently purchased to fulfill the financial hedge. The physical natural gas can be shaped to meet a net-load profile, where less gas is consumed during low net-demand hours and generation is ramped up in high net-demand hours. The financial hedges provide price certainty for all hours, including net-peak hours, and reduce exposure to the volatile spot market price.

The shape of the variable energy resources from customer-generators does not fit the required hedge profile per Idaho Power’s ERMS for 16 hours of peak power. The spot price of power or gas over net-peak hours can be expensive and difficult to procure, given liquidity and transmission constraints in the short-term markets. Suppose natural gas term hedges are reduced based on forecasted customer generation. In that case, Idaho Power would have greater exposure to serving net-peak load where shortfall energy must be purchased in the volatile and more expensive spot markets – resulting in increased power supply costs for all customers. Due to the increased exposure to the spot market during the net-peak hours when customer generation is low, exported energy from customer-generators is not a hedge or a substitute for a bona fide natural gas hedge. As a result, customer-generator exports on Idaho Power’s system often occur in the midday hours when it is generally less valuable, rather than the highest net-peak hours, when it would be most needed – resulting in no reduction in pricing risk during the morning and evening net-peak load.

A Market-Based Avoided Cost Methodology & Increased Exposure to Market Volatility

The Crossborder Review concludes that a “[fuel hedging] benefit will be reduced to the extent that the ECR is linked directly to electric market prices that are driven by natural gas prices.”⁵⁸ In response to Idaho Power’s Request for Production No. 22 included as Attachment 2 to these Reply Comments, ICL stated the following regarding fuel hedging value for an ECR:

...for each of the electricity market-based export credit rates listed above [ICE Mid-C Index Price and ELAP Price], which are dependent on natural gas market prices, there is little or no fuel hedge value...**it is the behind the meter solar generating serving the customer’s load that provides a hedge** against the gas-cost sensitive utility supply costs that otherwise would have to be incurred by IPC. To be conservative, and to recognize that IPC proposed export credit rates will fluctuate with natural gas prices, **we removed exports from the fuel hedge value.** (emphasis added)

It appears that the position of ICL in the above response, consistent with the Crossborder Review, believes that there should be no fuel hedge value associated with exports.

Also, the Commission should reject the suggestion to include a fuel hedge value as part of the ECR because the Commission previously stated the following regarding energy offset behind the meter:

Capacity and energy offset by customer generation behind the meter is not measured. This does not mean that the value is not realized by the on-site generator. Net-metering customers get 1:1 kWh benefit for all energy produced and used behind the meter. Therefore, it would be **double counting** to base the capacity value on **anything more than the energy that is exported.**⁵⁹

⁵⁸ Crossborder Review at 11.

⁵⁹ Case No. IPC-E-21-21, Order No. 35284 at 18 (emphasis added).

Therefore, contrary to the Crossborder Review, the ECR should not include the value for energy that is generated and consumed behind the meter.

If exporting customers are to be paid actual market prices, the Company's general body of customers would pay those actual market prices to compensate exporting customers for the exported energy. A hedge eliminates direct exposure to market prices; therefore, for the Crossborder Review to suggest that non-exporting customers pay exporting customers both (1) actual market prices *and* (2) a fuel hedge benefit amount would effectively double-count or over-compensate customer-generators to the detriment of non-exporting customers. The Crossborder Review is inherently flawed by attributing value to the energy consumed by the customer-generator behind the meter and should be rejected by the Commission.

7) Avoided Costs of Carbon Emission

While the Crossborder Review acknowledges the Commission's directive to evaluate all "benefits and costs that are quantifiable, measurable, and avoided costs **that affect rates**,"⁶⁰ the Crossborder Review takes that directive one step further. The Crossborder Review concludes that avoided carbon emission costs are costs "that **will affect IPC's rates**,"⁶¹ and those costs should be included in the VODER Study. This is not a simple distinction without a difference. Idaho Power believes the Commission language was clear that only costs that currently affect rates – not those that may or may not affect rates at some future point – should be reasonably considered.

⁶⁰ *Id.* at 27 (emphasis added).

⁶¹ Crossborder Review at 12 (emphasis added).

The Crossborder Review assumes that because Idaho Power utilizes a carbon price adder in its IRP, it is appropriate to include a benefit in the ECR.⁶² This assumption is misguided. The carbon price adders included in Idaho Power's IRP have historically been included to assess the risk of adding carbon-emitting generation to the system. However, it is essential to note that these adders have not traditionally been included in the first several years of the IRP planning horizon to reflect the implementation delay that would occur between the passage of the hypothetical federal legislation and the effective date of the rules once promulgated. For example, in the 2021 IRP, these price adders were not present in the first two years of the plan, and for the 2023 IRP, carbon adders were discussed with the IRPAC, and it aligned with the position that the new carbon adder forecast will start in 2027 (the fifth year of the planning horizon). Finally, there are no current indications that a state or federally imposed carbon adder are imminently forthcoming. These carbon price adders are only appropriately included in an ECR if and when they materialize as actual costs impacting Idaho Power customer rates.

8) Societal Benefits

The Company agrees with the Crossborder Review on the following: "The Order did not direct IPC to study [Societal Benefits of Distributed Solar Generation], and such benefits may not be appropriate for inclusion in the ECR."⁶³ Therefore, the Crossborder Review's attempt to include those benefits should be rejected by the Commission. If the social cost of carbon were measurable, as the Crossborder Review claims, then sources shouldn't generate different results as identified in its review.

⁶² *Id.* at 5-6 and 12.

⁶³ *Id.* at 13.

Measurability issues aside, the critique commits the logical fallacy that the Company should pay more for these benefits. If all these benefits can be obtained from a solar power purchase agreement or a utility self-build solar facility, then paying more for the same benefits would not be in the best interest of Idaho Power's customers.

III. THE COMMISSION SHOULD REJECT THE CROSSBORDER REVIEW

Idaho Power understands and appreciates the deep convictions held by many on the issue of customer on-site generation and appreciates the robust participation by stakeholders in these regulatory proceedings. The Company welcomes the constructive feedback and input it has received to date with respect to the VODER Study that will help to refine and clarify issues moving forward. It is concerned, however, with the perpetuation of misinformation that has followed its release of the VODER Study and the subsequent Crossborder Review. Critical thinking on these issues is crucial to achieve an outcome that is fair to all customers, including those with on-site generation.

As set forth above, the recommendations and conclusions in the Crossborder Review are unavailing insofar as they are unsupported and/or based on mistaken premises and their reliability is further undermined when one considers the genesis of the report, which was funded in part by solar interests, many of whom may benefit financially if the Company and its customers continue to overpay for on-site generation.

Despite the title of Attachment A to ICL's Initial Comment, the consultant hired to author the review cannot reasonably be said to be "independent." Mr. Beach has been involved in at least three proceedings before this Commission over the last decade offering direct and rebuttal testimony on behalf of two environmental advocacy entities: the Idaho Conservation League and the Idaho chapter of the Sierra Club. In response to

the comprehensive study of the costs and benefits of on-site generation filed by the Company in this docket (the VODER Study), which spanned over 100 pages and included over 30 appendices, ICL again retained Dr. Beach to represent its interests and critique the Company's work. The result was the 21-page Crossborder Review, which recommends a significant increase to each component of the ECR consistent with his prior advocacy.

Notably, the cursory critique authored by Crossborder Energy fails to satisfy the minimum criteria established by the Commission for purposes of ensuring credibility and fairness in studying the costs and benefits of distributed on-site generation. The Commission mandated several criteria⁶⁴ for the Company's VODER Study, including the following, which presumably would also apply to others conducting similar evaluations:

- The data must use the most current data possible, and the data must be readily available to the public, and in the Commission's decision-making record.
- The study must be written so it is understandable to an average customer, but its analysis must be able to withstand expert scrutiny.

The data relied on in the Crossborder Review is not readily available to the public, hindering the ability to verify and vet facts and sources. While the VODER Study filed by the Company was accompanied by all workpapers and analysis relied upon in its development, ICL did not file any workpapers with the Crossborder Review. ICL did not make the information publicly available, nor did it enter those workpapers into the Commission's decision-making record.

⁶⁴*In the Matter of the Petition of Idaho Power Company to Study the Costs, Benefits, and Compensation of Net Excess Energy Supplied by Customer On-Site Generation*, Case No. IPC-E-18-15, Order No. 34509 at 9 (Dec. 20, 2019).

The lack of transparency in the Crossbody Review is concerning in its own right but it is important to note it also undermines the Commission's requirement that the analysis be able to withstand expert scrutiny. As more fully explained above, upon examining the Crossborder Review, a NERA representative provided a sworn affidavit concluding the methodology relied upon by the Crossborder Review (referenced therein as "the NERA method") was inappropriately relied upon for the purpose of quantifying an avoided T&D value.

In addition, the Crossborder Review does not reflect the nuances of Idaho's regulatory scheme or the particulars of the Company and is not tailored to address Idaho Power specific issues. As a result, the proposed recommendations cannot be said to be determinative of what is most reasonable for Idaho Power's customers and are of limited utility in informing implementation decisions.

IV. CONCLUSION

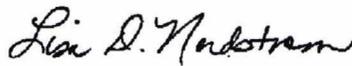
Idaho Power is legally obligated to provide safe, reliable, and fair-priced service to its customers.⁶⁵ As a regulated utility, Idaho Power routinely conducts complex studies to inform Commission decisions in ratemaking matters such as this. It has a vested interest in ensuring the information it puts forth is fair and credible to support its ability to reliably meet its electric service obligation to the public with retail rates that are equitable among similarly situated classes and commensurate with the services being provided.

The Crossborder Review is misleading, inherently flawed, directly conflict with prior Commission decisions, and should therefore be rejected by the Commission. Idaho

⁶⁵ Under Idaho's regulatory mandate and model, the Company has an obligation to provide adequate, efficient, just, and reasonable service on a nondiscriminatory basis to all those that request it within its certificated service area. Idaho Code §§ 61-302, 61-315, 61-507.

Power recommends Commission-approval of the VODER Study, contingent on revisions and modifications as will be outlined in the Company's Final Comments on October 26, 2022. The Company anticipates it will continue to receive valuable insight moving forward that may identify further areas to hone and that can be incorporated into the revised VODER Study to be filed by the Company with its final comments on October 26, 2022. The revised VODER Study will not include any substantive modifications but will aim to clarify and refine the information therein based on the guidance received throughout the review process in order to provide a solid foundation on which the Parties can make recommendations for potential modifications to its on-site generation offerings for the Commission's consideration in the next phase of this proceeding.

DATED at Boise, Idaho, this 12th day of October 2022.



LISA D. NORDSTROM
Attorney for Idaho Power Company

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on the 12th day of October 2022, I served a true and correct copy of Idaho Power Company's Reply Comments upon the following named parties by the method indicated below, and addressed to the following:

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Stacy Gust

Stacy Gust, Regulatory Administrative Assistant

**BEFORE THE
IDAHO PUBLIC UTILITIES COMMISSION
CASE NO. IPC-E-22-22**

IDAHO POWER COMPANY

ATTACHMENT 1

**IN THE MATTER OF IDAHO POWER COMPANY'S APPLICATION TO COMPLETE
THE STUDY REVIEW PHASE OF THE COMPREHENSIVE STUDY OF COSTS AND
BENEFITS OF ON-SITE GENERATION & FOR AUTHORITY TO IMPLEMENT
CHANGES TO SCHEDULES 6, 8, AND 24**

Case No. IPC-E-22-22

BEFORE:

THE IDAHO PUBLIC UTILITIES COMMISSION

**AFFIDAVIT OF KURT G. STRUNK
ON BEHALF OF
IDAHO POWER COMPANY**

October 12, 2022

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Kurt G. Strunk, being duly sworn, deposes and says:

I. INTRODUCTION AND QUALIFICATIONS

1. I have personal knowledge of the facts herein and if called to testify could and would testify competently hereto.
2. My name is Kurt G. Strunk. I am a Managing Director at National Economic Research Associates (“NERA”). My business address is 1166 Avenue of the Americas, New York, NY, 10036.
3. I have nearly thirty years of experience consulting with energy sector clients, governments, and regulators on energy-sector matters. In my work, I routinely support public utilities on costing and pricing, including the performance and review of marginal cost studies, the use of marginal cost studies for ratemaking and for pricing services provided by behind-the-meter generators.
4. I currently lead NERA’s Marginal Cost Working Group, founded in 1982, which offers utilities a forum to analyze critical costing issues and ratemaking. While the group’s original objective was to advance marginal cost estimation techniques and pricing applications, the focus of the meetings has expanded over time to include planning for renewable resources, strategies for smart metering infrastructure, alternative regulatory methods for distribution, transmission cost allocation, and design of pilots for innovative rate design and implementation - such as critical peak pricing and peak time rebates.
5. My work for electric utilities has included the estimation of avoided costs attributable to distributed energy resources. For example, as part of New York’s Reforming the Energy Vision (“REV”) program, I implemented a marginal-cost based approach to determining appropriate compensation to distributed energy resource owners for avoided (or deferred) transmission and distribution investment. Exhibit A contains a more detailed statement of my qualifications.

II. PURPOSE OF AFFIDAVIT

6. Idaho Power Company (“Idaho Power” or the “Company”) asked that I review a portion of a study carried out by Crossborder Energy (“Crossborder”), which purports to rely on the “NERA regression method” to estimate avoided transmission and distribution costs attributable to distributed energy resources. The Idaho Conservation League included Crossborder’s analysis as part of its comments filed in this docket on September 21, 2022. Crossborder is critical of Idaho Power’s approach to calculating avoided transmission and distribution costs in its Value of Distributed Energy Resources Study (“VODER Study”) and calculates avoided costs that are significantly higher than those in the Idaho Power VODER Study.
7. The purpose of this affidavit is to address Crossborder’s regression approach that it attributes to NERA. In addition to addressing the Crossborder analysis, I offer general comments on the approach taken by Idaho Power. My affidavit is structured as follows:
 - In Section III, I summarize my conclusions.
 - In Section IV, I describe the approach taken by Idaho Power to identify any avoidable or deferrable transmission and distribution investment associated with the addition of distributed energy resources in the Company’s service territory. I describe how the approach taken by Idaho Power is consistent with NERA’s established marginal cost estimation techniques.
 - In Sections V and VI, I offer my opinions on the analysis performed by Crossborder purporting to rely on NERA methods. I describe how the approach taken by Crossborder is inconsistent with NERA’s established marginal cost estimation techniques and overstates avoided transmission and distribution costs associated with exports from distributed energy resources.

III. SUMMARY OF CONCLUSIONS

8. My conclusions are as follows:

- The regression method employed by Crossborder is one of several methods suggested by NERA in the “Grey Books” prepared in the 1970s as part of a nationwide effort by the Electric Power Research Institute, the Edison Electric Institute, the American Public Power Association, and the National Rural Electric Cooperative Association, for the National Association of Regulated Utility Commissioners.¹
- The regression method was developed nearly fifty years ago in connection with ratemaking based on *long-run* marginal costs, when the topic of marginal cost pricing for electric utilities was fairly new. The regression method was not designed for measuring the specific avoided costs of specific load reductions and does not fit all situations well. It was suggested as a tool for estimating the long-run marginal cost of distribution investment but was not suggested for use in long-run marginal costing of transmission investment.²
- The regression method is not a technique that has been used in the last three decades by me, the current director of NERA’s Marginal Cost Working Group, or by any NERA experts in the United States, including Dr. Hethie Parmesano, former director of NERA’s Marginal Cost Working Group. During this period, NERA’s experts have not relied on the regression method in marginal cost analyses presented to state regulatory commissions in the United States as part of general rate cases or in connection with pricing for behind-the-meter generation.
- Idaho Power has developed and presented a method of quantifying the specific impact of solar installations on planned investment and relating those impacts to specific quantities of exported energy. It is reasonable for Idaho Power to use an analysis that

¹ See, for example, *Electric Utility Rate Design Study*, “How to Quantify Marginal Costs: Topic 4,” National Economic Research Associates, Inc. March 10, 1977.

² “... the lumpy nature of transmission investment ... seems not to lend itself to a time series regression analysis.” *Id.*, p. 66.

models explicit savings to price a specific program; this approach is more targeted than a generalized measure of incremental cost captured in the Crossborder regression analysis. Furthermore, as I detail below, the Crossborder regression analysis contains significant flaws.

- Crossborder relies on a simple regression of load versus investment to attribute transmission and distribution investments to load growth. Replacement projects should not be incorporated in marginal costing as replacements are not avoidable due to exports from behind-the-meter generation. An old transmission or distribution line that needs to be replaced will need to be replaced irrespective of how much additional export energy is injected into the grid. Crossborder overstates avoided costs by including all transmission and distribution investments reported in the Form 1 filed with the Federal Energy Regulatory Commission (“FERC”) and by relying on a very simple time-series regression to attribute only load-growth related investment as a marginal cost. Given that replacement investments and load both grow over time and will be correlated with each other, this is an unreliable method of removing replacement-related costs from marginal cost estimation.
- The planned investment projects that Idaho Power identified as deferrable are projects specifically tied to load growth or reliability projects with a growth element inherent in them. Idaho Power’s analysis appropriately excludes replacement projects, consistent with NERA’s preferred approach to marginal costing for transmission and distribution.
- It is unreasonable for Crossborder to apply the regression analysis in the manner it was applied to distribution. A large amount of FERC Form 1 distribution plant is associated with customer-related costs. While NERA developed a variety of options for measuring demand-related distribution marginal costs, all excluded customer-related costs. Crossborder’s distribution cost analysis cannot be used as it does not exclude customer-related costs from the regression. Additionally, Crossborder does not control for growth in the number of customers when applying the regression method.

- In its analysis of avoided distribution cost, Crossborder inappropriately relies upon system loads as inputs to its regressions. Such an approach does not properly capture the causal relationship between load and investment. NERA typically examines the distribution substation loads (not system loads) when analyzing marginal distribution investment. We do so because it is load on the distribution substation that triggers the need for new investment in the distribution system.
9. In sum, although Crossborder Energy relies on one of the approaches documented by NERA in the 1970s for estimating distribution marginal costs, the implication that the regression is NERA's preferred marginal cost technique is incorrect. I find that Crossborder Energy's estimates of Idaho Power's avoided transmission and distribution investment attributable to behind-the-meter solar exports are not accurate, are overstated, and are based on an inappropriate implementation of marginal costing techniques.

IV. IDAHO POWER'S TREATMENT OF AVOIDED TRANSMISSION AND DISTRIBUTION IN THE VODER STUDY IS REASONABLE AND CONSISTENT WITH ESTABLISHED TECHNIQUES IN MARGINAL COSTING

10. I have reviewed Idaho Power's approach to estimating avoided transmission and distribution capacity costs as part of the VODER study.³ My review indicates that:
- Idaho Power analyzes historical and planned transmission and distribution capacity projects from 2007-2026, which includes 15 years of historical data and 5 years of forecast data.
 - Idaho Power appropriately focuses on transmission projects that are undertaken to meet load growth or reliability projects with an inherent growth element.
 - Idaho Power's approach relies on identifying transmission and distribution capacity project deferral based on revised peak loads that are determined based on coincident hours from variable energy resources' expected output at peak times.

³ Idaho Power Company, 2022 Value of Distributed Energy Resources Study, p. 53. ("VODER Study")

- The deferral value is calculated based on the deferred project cost and the number of years of deferral.⁴
11. NERA considers Idaho Power's approach to be valid, reasonable, and consistent with established NERA marginal costing practices as it evaluates incremental transmission and distribution capacity projects against coincident hours variable energy resource exports to defer planned transmission and distribution capacity projects. NERA observes that Idaho Power has developed and presented an analysis of the specific impact of distributed energy resources on planned investment and relates those impacts to specific quantities of exported energy.
 12. Idaho Power's approach, which uses a specific analysis to price a specific program, is the most targeted analysis possible and is most consistent with the established goal that pricing should reflect cost causation. Crossborder Energy's suggested use of a generalized measure of *long-run* marginal cost is not needed, particularly in light of the substantial problems in the implementation of the study.
 13. NERA understands Idaho Power's approach relies significantly on the utility's engineering team that has examined transmission and distribution projects in the capital plan to determine which projects are associated with load growth and also includes reliability projects with a growth element to them. Idaho Power has appropriately excluded replacement projects. Such an approach is consistent with NERA's preferred approach to marginal costing.
 14. Crossborder complains that Idaho Power evaluates its avoided transmission and distribution investments using the level of penetration of distributed resources that currently exists on the system. Crossborder seems to suggest that Idaho Power should assume a much higher level of penetration and a confluence of potential distributed energy resource types that work together to reduce demand. This is speculation and would result in an Export Credit Rate that does not reflect the current realities of the grid. As is customary, Idaho Power will be in

⁴ *Id.*, pp. 55-56.

a position to update its analysis if and when it observes materially higher levels of distributed resource penetration in its service territory.

15. Crossborder complains that Idaho Power assumes distributed energy resources are spread evenly across its system. It was reasonable for Idaho Power to allow distributed energy resources to have an equal potential impact on the grid even in locations that may to date have had no exposure to distributed energy resources.

V. **CROSSBORDER'S CHARACTERIZATION OF THE NERA REGRESSION METHOD IS MISLEADING**

16. A reader of the Crossborder report might reasonably infer that the regression method Crossborder uses is NERA's current preferred method and is in widespread use by NERA experts. This is not the case. The regression method is not a technique that has been used in the last three decades by me, the current director of NERA's Marginal Cost Working Group, or by any NERA experts working on regulatory matters in the United States, including Dr. Hethie Parmesano, former director of NERA's Marginal Cost Working Group.
17. The regression method is one of several methods suggested by NERA in the "Grey Books" prepared in the 1970s.⁵ It is a method developed for estimating marginal demand-related distribution investment nearly fifty years ago in connection with ratemaking based on *long-run* marginal costs, when the topic of marginal cost pricing for electric utilities was fairly new.
18. The regression method was not designed for measuring the specific avoided costs of specific load reductions and does not fit all situations well. It is preferable in the context of a VODER Study to measure the specific avoided costs and price the program based on those costs.

⁵ See, for example, *Electric Utility Rate Design Study*, "How to Quantify Marginal Costs: Topic 4," National Economic Research Associates, Inc. March 10, 1977.

19. NERA does have a preferred approach to marginal costing of transmission and distribution, and I have applied that approach in a number of states. The Idaho Power approach, focusing on specific projects that are either growth-driven projects or reliability-driven projects with a growth component, aligns with NERA's preferred method.
20. Crossborder's approach is not NERA's preferred method.

VI. CROSSBORDER'S IMPLEMENTATION OF THE REGRESSION METHOD CONTAINS MULTIPLE FLAWS AND LEADS TO OVERSTATEMENT OF AVOIDED TRANSMISSION AND DISTRIBUTION COSTS ATTRIBUTABLE TO DISTRIBUTED ENERGY RESOURCES

21. Intervenor Idaho Conservation League retained Crossborder Energy ("Crossborder") to carry out an independent critique of Idaho Power's VODER Study.⁶ Idaho Conservation League includes the written Crossborder review in its Initial Comments filed on September 21, 2022.
22. Crossborder finds that Idaho Power "...reports very low avoided costs for transmission and distribution capacity deferrals on IPC's grid." Crossborder's concerns regarding Idaho Power's approach relate to their use of what Crossborder terms a "'bottom up' method," what it claims is Idaho Power's assumption of no growth in solar exports in future years and deferrals only taking place in the near future.⁷
23. As an alternative approach, Crossborder uses what it terms a "'top down approach that U.S. utilities have long used to calculate marginal T&D capacity costs for ratemaking." Crossborder refers to this alternative approach as a NERA regression method, which uses long-term data to calculate marginal transmission and distribution capacity costs by regressing incremental transmission and distribution investment costs on peak load.⁸ Crossborder justifies its approach by noting that transmission and distribution infrastructure must expand to serve peak demands as load grows in addition to potential infrastructure

⁶ Independent Review of the Idaho Power Company's *Value of Distributed Energy Resources* Study. Crossborder Energy, September 21, 2022. ("Crossborder Report")

⁷ *Id.*, p. 4.

⁸ *Id.*, p. 5.

upgrades related to reliability concerns.⁹ Using data from 1996 to 2025, Crossborder fits a simple linear regression model with cumulative transmission additions as the dependent variable and system peak load as the independent variable.¹⁰

A. Crossborder is using a long-run costing approach, not one that necessarily captures the current state of the grid

24. As noted, the approach used by Crossborder is a technique that was suggested in connection with long-run marginal cost ratemaking. In the Grey Books, NERA made clear that the objective of the analysis was focused on the long run: “it is important in designing rates for an individual utility to use its **long-run marginal cost of supplying electricity** as a cost standard.”¹¹ (emphasis added.) In my work at NERA since the early 1990s, we have focused on short-run costs in order to recognize situations where the system is not in equilibrium conditions. In these situations, short-run marginal cost estimation leads to the most efficient price signal to consumers of electricity. In practice, however, the most common use of marginal cost studies is to influence rate design. Marginal cost studies do not affect revenue requirements and do not interfere with a utility’s opportunity to recover prudently-incurred costs under *Hope* and *Bluefield* and the protections that are provided to consumers of electricity through the implementation of just and reasonable rates.¹²
25. Importantly, even if long-run were the right approach in the instant matter, the implementation of the model by Crossborder does not lead to reasonable estimates of long-run marginal transmission and distribution costs. Furthermore, the Crossborder analysis does not yield estimates that represent costs that can currently be avoided as a result of exports from behind-the-meter distributed energy resources.

⁹ *Ibid.*

¹⁰ *Id.*, pp. 5-6. Note that on p. 5, Crossborder states that it uses data on “...peak load growth” but in Figure 2 on p. 6, the x-axis is labelled with “Peak Load (MW)”. In addition, the workpaper provided by Crossborder uses peak load, as measured in MW, not peak load growth, as measured year-on-year in percentage terms, as stated in the text of the Crossborder Report.

¹¹ NERA Grey Books, Topic 1.3, p 100.

¹² *Federal Power Commission et al v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) and *Bluefield Water Works & Improvement Co. v. Public Service Comm’n*, 262 U.S. 679 (1923).

B. Crossborder overstates avoided transmission and distribution costs by including replacement projects

26. Crossborder uses all transmission and distribution plant additions as reported by Idaho Power to the FERC on its Form 1. The Form 1 data incorporates all types of investment in plant and is not limited to demand-related investment. Crossborder's estimated avoided costs include the costs of replacing old equipment with new equipment, a process that cannot be deferred or avoided as a result of more behind-the-meter solar generation.
27. Crossborder argues: "Even replacement projects are demand-related in that they are necessary to keep the grid's capacity from declining."¹³ Yet, this is not the correct perspective for marginal costing. Marginal cost identifies investment needed to serve incremental loads. Replacement projects cannot serve incremental loads. Particularly with respect to additional exports from behind-the-meter solar facilities, no quantity of new behind-the-meter solar can trigger an avoided cost for replacement projects.
28. NERA's Grey Book documents that it is inappropriate to include replacement projects:
- ... expenditures not related to increased demand, such as expenditures for the replacement of retirements or road widenings, must not be included when calculating marginal demand-related distribution investment.¹⁴
29. In relying on FERC Form 1 data, Crossborder is unable to delineate which transmission and distribution investments are driven by load growth, by reliability, or by a need for replacement. As noted, the NERA marginal cost method does not incorporate replacement projects, and only incorporates reliability projects when they have a growth element. NERA understands that Idaho Power's approach appropriately focuses on load-growth-related projects and reliability projects with a growth element.
30. The fact that Crossborder includes replacement projects and relies on a simple regression to identify the relationship between investment and load leads to an overstatement in its estimation of avoided transmission and distribution costs.

¹³ Crossborder Report, p. 5.

¹⁴ NERA Grey Books, Topic 4, p. 8.

C. Crossborder overstates avoided distribution costs by including customer-specific costs

31. As noted, Crossborder uses the FERC Form 1 distribution plant balances over 25 years to identify avoided demand-related distribution investment. This is problematic because the FERC Form 1 data on distribution plant include customer-related costs. Although NERA developed a variety of options for measuring demand-related distribution marginal costs, all exclude customer-related costs. Crossborder's distribution cost analysis cannot be used as it does not exclude customer-related costs from the regression.
32. Additionally, Crossborder does not control for growth in the number of customers when applying the regression method. Because a large amount of distribution cost is associated with customer growth, it is important to understand how much of the Form 1 plant balances are driven by customer growth. The Crossborder analysis ignores these details. A specification that controls for customer growth would need to be structured carefully to avoid issues of multicollinearity that may make the model's results unusable.

D. Crossborder inappropriately relies on system loads when estimating avoided distribution investment

33. In its regressions, Crossborder inappropriately uses system loads to represent the causal driver of distribution investment. Such an approach does not properly capture the causal relationship between load and investment at the distribution level. NERA typically examines the distribution substation loads (not system loads) when analyzing marginal distribution investment. We do so because it is load on the distribution substation that triggers the need for new investment in the distribution system. System peak load cannot be coincident with all of the peak loads on the substations and distribution lines that require investment. It is therefore more appropriate to use the substation-specific load data.

E. Crossborder offers no intuitive explanation of its regression results

34. The Crossborder regressions are based on the relationship between cumulative investment and system peak load. Crossborder's results for both transmission and distribution predict

negative values of investment at load levels below 2,400 megawatts. Crossborder offers no intuitive explanation for this negative investment value and the associated negative y-intercept in its linear model.

35. For the reasons outlined herein, the Crossborder regressions do not yield a valid estimate of the specific costs that can be avoided as a result of exports from behind-the-meter distributed energy resources. Rather, the Crossborder results represent an overstatement of avoided costs because Crossborder includes costs that should be excluded for marginal costing purposes.

Further affiant sayeth naught.

A handwritten signature in black ink, appearing to be 'Kurt G. Strunk', written in a cursive style.

Executed on October 12, 2022

KURT G. STRUNK **Managing Director**

Mr. Strunk is an expert in applied finance and energy matters with over 25 years of experience in international arbitration, complex commercial litigation, and regulatory proceedings. Mr. Strunk is recommended as a leading energy expert by *Who's Who Legal*. He has been retained as an expert to testify in arbitrations, before the Federal Energy Regulatory Commission, US Tax Court, US Federal Court, and US Bankruptcy Court, the National Energy Board in Canada, as well as state and provincial public utilities boards in the US and Canada. His testimonies have addressed construction delay, asset and contract valuation, breach-of-contract damages, the proportionality of stipulated liquidated damages provisions, cost of capital and discount rates, just and reasonable rates, regulatory accounting, prudence, cost of service, regulatory reform, pipeline access, retail market issues, as well as trading and risk management.

In the oil and gas sectors, Mr. Strunk has consulted on rate matters, mergers and acquisitions, restructurings, contract disputes, valuation, trading, risk management, and product pricing. He has valued oil and gas assets and contracts in litigated disputes on behalf of major firms in the petroleum sector. He advised sellers of LNG in disputes with buyers (prior to international arbitration) and performed extensive quantitative analysis around appropriate prices and damages in the event of breach. He has served as an expert in regulatory hearings relating to pipeline tariffs in Canada and the United States. He has also carried out studies of the reasonableness of gas supply agreements in various jurisdictions and quantified damages in connection with the early termination of such agreements.

In electric power, Mr. Strunk has advised governments, regulators, and energy companies on industry structure, regulation, and sector reform in North America, South America, Europe, Australia, Asia and Africa. In generation, his assignments often involve analysis of new power generation resources and contracts. He has advised on the development of independent power contracts, fuel supply arrangements and competitive solicitations across the globe. He served as a key member of NERA's team advising on electric sector reform and power market design in Mexico, a project he carried out in the Spanish language. He routinely values electricity sector companies and assets in the context of disputes and advisory assignments.

Mr. Strunk's assignments often require that he determines the appropriate return on equity capital for energy firms. He has calculated and supported required rates of return for power generators, gas distribution utilities, electric distribution and transmission companies, and other energy firms in the context of traditional tariff reviews for regulated entities, litigation and advisory work. Mr. Strunk frequently collaborates with NERA's Securities and Finance Practice. He has addressed liability and damages in broker-dealer disputes, and in securities class actions.

Education

- 1997 **INSEAD (The European Institute of Business Administration),
Fontainebleau, France**
MBA, with Distinction, 1997
- 1993 **VASSAR COLLEGE,
New York, USA**
B.A., Economics, General and Departmental Honors

Career Details

- 1993-present **NERA ECONOMIC CONSULTING**
Current position Managing Director, New York
- 1992 **GÉNÉRALE DE BANQUE**
Research Assistant, Brussels

Languages

English: mother tongue
French: fluent
Spanish: fluent

Project Experience

EXPERT TESTIMONY

- 2022 **NV Energy**
Cost of Capital
Oral Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, on the cost of capital. September 28, 2022.
- 2022 **NV Energy**
Cost of Capital
Rebuttal Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, presenting analysis on the cost of capital. September 21, 2022.
- 2022 **NV Energy**
Cost of Capital
Direct Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, presenting analysis on the cost of capital. June 1, 2022.
- 2022 **Federal Energy Regulatory Commission**
Affidavit addressing the proposed resolution of the Buy-down Payment methodology for terminating the Wholesale Electric Service Contract between Tri-State Generation and Transmission Association and its members and the initiation of a new partial-requirements contract. May 18, 2022.
- 2022 **Federal Energy Regulatory Commission**
Oral Testimony before the Federal Energy Regulatory Commission addressing just and reasonable Contract Termination Payments under the Wholesale Electric Service Contract between Tri-State Generation and Transmission Association and its members. May 11-12, 2022.
- 2022 **Federal Energy Regulatory Commission**
Deposition Testimony before the Federal Energy Regulatory Commission addressing just and reasonable Contract Termination Payments under the

Wholesale Electric Service Contract between Tri-State Generation and Transmission Association and its members. April 5, 2022.

2022

Federal Energy Regulatory Commission

Rebuttal Testimony on behalf of United Power, Inc. before the Federal Energy Regulatory Commission, addressing just and reasonable Contract Termination Payments under the Wholesale Electric Service Contract between Tri-State Generation and Transmission Association and its members. March 25, 2022.

2022

Federal Energy Regulatory Commission

Oral Testimony before the Federal Energy Regulatory Commission addressing Order 888 unbundling and Mansfield and 7-factor tests for direct assignment of downstream delivery facilities. March 18, 2022.

2022

NV Energy

Gas Trading / Prudence

Direct Testimony before the Nevada Public Utilities Commission, on behalf of Nevada Power Company, examining whether the trades in its natural gas trading book were prudent. March 1, 2022.

2022

NV Energy

Gas Trading / Prudence

Direct Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, examining whether the trades in its natural gas trading book were prudent. March 1, 2022.

2022

Federal Energy Regulatory Commission

Answering Testimony on behalf of United Power, Inc. before the Federal Energy Regulatory Commission, responding to a proposed mark-to-market approach to determine Contract Termination Payments under the Wholesale Electric Service Contract between Tri-State Generation and Transmission Association and its members. February 4, 2022.

2022

Federal Energy Regulatory Commission

Direct Testimony on behalf of United Power, Inc. before the Federal Energy Regulatory Commission, presenting a Balance Sheet Approach to determine Contract Termination Payments under the Wholesale Electric

Service Contract between Tri-State Generation and Transmission Association and its members. January 7, 2022.

2021

Confidential Electric Cooperative

Deposition testimony before the International Institute for Conflict Prevention & Resolution regarding the valuation of a bespoke call option. November 30, 2021.

2021

PennEnergy Resources

Expert Report on behalf of PennEnergy presenting a quantum of upstream oil and gas damages in American Arbitration Association (AAA) Case Number 012100025943, September 23, 2021.

2021

Federal Energy Regulatory Commission

Affidavit on behalf of United Power, Inc. before the Federal Energy Regulatory Commission, presenting a Balance Sheet Approach to determine Contract Termination Payments under the Wholesale Electric Service Contract between Tri-State Generation and Transmission Association and its members. September 22, 2021

2021

Federal Energy Regulatory Commission

Affidavit on behalf of United Power, Inc. before the Federal Energy Regulatory Commission, presenting analysis of the appropriate fee to be paid by United Power to terminate its wholesale supply contract with Tri-State Generation and Transmission Cooperative, Inc. and to liquidate its equity interest in Tri-State. August 3, 2021.

2021

Public Service Commission of South Carolina

Oral Testimony on behalf of Cherokee County Cogeneration Partners, LLC before the Public Service Commission of South Carolina, presenting analysis on avoided cost calculations and economic and policy goals of PURPA. July 26, 29-30, 2021.

2021

Nova Scotia Utilities Review Board

Oral Testimony on behalf of the Alternative Resource Energy Authority and the Berwick Electric Commission addressing policies toward the

competitive power market and interaction with utility system planning and ratemaking. June 17-18, 2021.

2021

Public Service Commission of South Carolina

Rebuttal Testimony on behalf of Cherokee County Cogeneration Partners, LLC before the Public Service Commission of South Carolina addressing contracts with Qualifying Facilities under the Public Utility Regulatory Policies Act. June 14, 2021.

2021

Nova Scotia Utilities Review Board

Rebuttal Testimony on behalf of the Alternative Resource Energy Authority and the Berwick Electric Commission examining NSPI's application and the specific policies it proposes for the Backup and Top-Up ("BUTU") rate. June 2, 2021.

2021

Federal Energy Regulatory Commission

Direct Testimony on behalf of United Power, Inc. before the Federal Energy Regulatory Commission, outlining the ratemaking principles and policies that should govern the rates of Tri-State Generation & Transmission Association.
May 20, 2021.

2021

Public Service Commission of South Carolina

Direct Testimony on behalf of Cherokee County Cogeneration Partners, LLC before the Public Service Commission of South Carolina, presenting analysis on avoided cost calculations and economic and policy goals of PURPA.
May 3, 2021.

2021

Backup/Top-up Tariff Testimony, Nova Scotia Municipal Utilities

Expert witness in connection with the application of Nova Scotia Power Incorporated to amend its Wholesale Market Backup / Top-up Service

Tariff.
April 16, 2021.

- 2021** **NV Energy**
Gas Trading / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Nevada Power Company, examining whether the trades in its natural gas trading book were prudent. March 1, 2021.
- 2021** **NV Energy**
Gas Trading / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, examining whether the trades in its natural gas trading book were prudent. March 1, 2021.
- 2020** **Wisconsin Public Service Commission**
Return of Equity
Surrebuttal Testimony before the Wisconsin Public Service Commission on behalf of Verso Corporation and Verso Minnesota Wisconsin LLC addressing the fair return on equity for Consolidated Water Power Company. October 26, 2020.
- 2020** **Wisconsin Public Service Commission**
Return of Equity
Rebuttal Testimony before the Wisconsin Public Service Commission on behalf of Verso Corporation and Verso Minnesota Wisconsin LLC addressing the fair return on equity for Consolidated Water Power Company. October 20, 2020.
- 2020** **Wisconsin Public Service Commission**
Return of Equity
Direct Testimony before the Wisconsin Public Service Commission on behalf of Verso Corporation and Verso Minnesota Wisconsin LLC

addressing the fair return on equity for Consolidated Water Power Company. October 6, 2020.

- 2020** **NV Energy**
Cost of Capital
Rebuttal Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, presenting analysis on the cost of capital. September 18, 2020.
- 2020** **North Carolina Utilities Commission**
Regulatory Policy
Oral Testimony before the North Carolina Utilities Commission, on behalf of Apple, Facebook and Google, presenting analysis on various regulatory matters. August 28, 2020.
- 2020** **NV Energy**
Cost of Capital
Direct Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, presenting analysis on the cost of capital. June 1, 2020.
- 2020** **NV Energy**
Cost of Gas / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Nevada Power Company, presenting analysis on whether its natural gas commodity trading was consistent with prudent utility practice. March 1, 2020.
- 2020** **NV Energy**
Cost of Gas / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, presenting analysis on whether NV Energy's natural gas commodity trading was consistent with prudent utility practice. March 1, 2020.
- 2019** **Municipal Light & Power, Chugach Electric Association, Inc.**
Acquisition
Oral Testimony before the Regulatory Commission of Alaska on behalf of Chugach Electric Association, Inc., addressing the acquisition of Municipal Light & Power by Chugach Electric and post-acquisition tariff structures. November 5, 2019.

- 2019** **Southwestern Electric Power Company**
Prudence of Investment in Power Generation Facilities
Sur-Surrebuttal testimony before the Arkansas Public Service Commission on behalf of Southwestern Electric Power Company addressing the prudence of certain investments in coal-fired power generation facilities. October 2, 2019.
- 2019** **Central Maine Power Company**
Marginal Cost Study
Oral Testimony before the State of Maine Public Utilities Commission on behalf of Central Maine Power Company in its 2018 Distribution Rate Case, addressing time-of-use pricing, marginal cost estimation and cost recovery for distribution network investment. October 2, 2019.
- 2019** **NV Energy**
Cost of Capital
Rebuttal Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, addressing the cost of capital for the Company's electric division. September 19, 2019.
- 2019** **Municipal Light & Power, Chugach Electric Association, Inc.**
Acquisition
Oral Testimony before the Regulatory Commission of Alaska on behalf of Chugach Electric Association, Inc., addressing the acquisition of Municipal Light & Power by Chugach Electric. September 5 & 6, 2019.
- 2019** **Corporate Commission of Arizona**
Oral Testimony on behalf of Grand Canyon State Electric Cooperative Association, Inc. before the Corporate Commission of Arizona towards contracts with Qualifying Facilities. August 27, 2019.
- 2019** **Central Maine Power Company**
Cost Study for Electric Distributor
Surrebuttal Testimony before the State of Maine Public Utilities Commission on behalf of Central Maine Power Company in its 2018 Distribution Rate Case, addressing the theory of electric utility costing and the implementation of a cost study for the distribution network. August 22, 2019.

- 2019** **Municipality of Anchorage (ML&P), Chugach Electric Association**
Reasonableness of Proposed Merger
Reply Testimony Before the Regulatory Commission of Alaska addressing the acquisition of Municipal Light & Power by Chugach Electric. August 2, 2019.
- 2019** **Chugach Electric Associate Inc.**
Cost of Capital
Oral Testimony Before the Regulatory Commission of Alaska addressing the cost of capital for Chugach Electric. July 15, 2019.
- 2019** **NV Energy**
Cost of Capital
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, addressing the cost of capital for the Company's electric division. June 3, 2019.
- 2019** **Avangrid NY**
Marginal Cost Study
Direct Testimony before the New York State Public Service Commission on behalf of New York State Electric & Gas Corporation, providing marginal cost estimates for purposes of informing reasonable electric and gas distribution rates. May 20, 2019.
- 2019** **Avangrid NY**
Marginal Cost Study
Direct Testimony before the New York State Public Service Commission on behalf of Rochester Gas & Electric Corporation, providing marginal cost estimates for purposes of informing reasonable electric and gas distribution rates. May 20, 2019.
- 2019** **Central Maine Power Company**
Marginal Cost Study
Rebuttal Testimony before the State of Maine Public Utilities Commission on behalf of Central Maine Power Company in its 2018 Distribution Rate Case, addressing time-of-use pricing, marginal cost estimation and cost recovery for distribution network investment. April 25, 2019.

- 2019** **Municipality of Anchorage (ML&P), Chugach Electric Association Reasonableness of Proposed Merger**
Pre-filed direct testimony on behalf of Chugach Electric Association, Inc. before the Regulatory Commission of Alaska supporting Chugach's proposed acquisition of ML&P from the Municipality of Anchorage. Testimony addresses the valuation of ML&P, the reasonableness of the purchase price, forecast synergy savings, market pricing for a related Power Purchase Agreement, and the tangible benefits that will accrue to ratepayers as a result of the merger. April 1, 2019.
- 2019** **Public Service Company of New Mexico Reasonableness of Power Purchase Agreement**
Affidavit before the Federal Energy Regulatory Commission including a benchmarking analysis of a solar power purchase agreement under FERC's *Edgar* and *Ocean States* standards. March 15, 2019.
- 2019** **NV Energy Cost of Gas / Prudence**
Direct Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, addressing the reasonableness of the Company's natural gas trading. March 1, 2019.
- 2019** **Southwestern Electric Power Company Prudence of Investment in Power Generation Facilities**
Direct Testimony before the Arkansas Public Service Commission on behalf of Southwestern Electric Power Company addressing the prudence of the company's investments in the Dolet Hills Power Plant. February 28, 2019.
- 2018** **PacifiCorp Cost of Capital**
Rebuttal Testimony before the California Public Utilities Commission, on behalf of PacifiCorp, on the cost of capital in the Company's rate case, November 20, 2018.
- 2018** **LS Power Company Generation Capacity Market Design**
Reply Affidavit (w/Willis Geffert), on behalf of LS Power Associates, L.P., before the Federal Energy Regulatory Commission, addressing flaws

in the existing capacity market construct in the PJM Interconnection.
November 6, 2018

2018

LS Power Company

Generation Capacity Market Design

Affidavit (w/Willis Geffert), on behalf of LS Power Associates, L.P., before the Federal Energy Regulatory Commission, addressing flaws in the existing capacity market construct in the PJM Interconnection. October 2, 2018.

2018

Maui Electric Company

Power Generation Costs, Incentives, Fuel Adjustment Clauses

Rebuttal Testimony before the Hawai'i Public Utilities Commission on behalf of Maui Electric Company, Inc., addressing matters pertaining to its fuel costs and Energy Cost Adjustment Clause, June 22, 2018.

2018

PacifiCorp

Cost of Capital

Direct Testimony before the California Public Utilities Commission, on behalf of PacifiCorp, on the cost of capital in the Company's rate case, April 12, 2018.

2018

Hawaiian Electric Company

Power Generation Costs, Incentives, Fuel Adjustment Clauses

Affidavit before the Hawai'i Public Utilities Commission on behalf of Hawaiian Electric Company, Inc., addressing matters pertaining to Hawaiian Electric's Energy Cost Adjustment Clause, April 10, 2018.

2018

North Carolina Utilities Commission Raleigh

Tax, Regulatory and Utility Financial Matters

Supplemental testimony before the State of North Carolina Utilities Commission Raleigh, presenting opinions on various tax, economic,

regulatory and financial matters in the Duke Energy Carolinas General Rate Case, March 20, 2018.

- 2018** **Hawaiian Electric Company**
Power Generation Costs, Incentives, Fuel Adjustment Clauses
Supplemental Testimony before the Public Utilities Commission of Hawaii, presenting opinions on fuel costs and energy cost adjustment clauses, February 14, 2018.
- 2018** **North Carolina Utilities Commission Raleigh**
Regulation and Utility Finance
Pre-filed testimony before the State of North Carolina Utilities Commission Raleigh, presenting opinions on various economic, regulatory and financial matters in the Duke Energy Carolinas General Rate Case, January 23, 2018.
- 2018** **Hawaiian Electric Company**
Power Generation, Incentive Ratemaking, Fuel Adjustment Clauses
Rebuttal Testimony before the Public Utilities Commission of Hawaii, addressing fuel costs and the appropriateness of the current and proposed Energy Cost Adjustment Clause (“ECAC”), January 05, 2018.
- 2017** **Nevada Power Company**
Cost of Capital
Oral testimony before the Public Utilities Commission of Nevada on behalf of Nevada Power Company presenting his analysis and conclusions on the cost of capital. November 1, 2017.
- 2017** **Energía Limpia de Guatemala, S.A.**
EPC Contracts, Liquidated Damages, Power Industry Practices
Oral Testimony before the ICC Court of Arbitration, ICC Case No. 21361/RD, on behalf of Energía Limpia de Guatemala, S.A., addressing

the proportionality of liquidated damages in a turnkey EPC contract, October 25, 2017.

- 2017** **Nevada Power Company**
Cost of Capital
Rebuttal testimony before the Public Utilities Commission of Nevada on behalf of Nevada Power Company presenting on the cost of capital, September 26, 2017.
- 2017** **Energía Limpia de Guatemala, S.A.**
EPC Contracts, Liquidated Damages, Power Industry Practices
Pre-filed Expert Report before the ICC Court of Arbitration (w/Willis Geffert), ICC Case No. 21361/RD, on behalf of Energía Limpia de Guatemala, S.A., addressing the proportionality of liquidated damages in a turnkey EPC contract, September 15, 2017.
- 2017** **Hawai‘i Electric Light**
Power Generation, Incentive Ratemaking, Fuel Adjustment Clauses
Rebuttal Testimony before the Hawai‘i Public Utilities Commission, on behalf of Hawai‘i Electric Light, addressing alternative incentive mechanisms for the Company’s power generation fleet, fuel costs, and the reasonableness of the Company’s proposed ECAC, June 23, 2017.
- 2017** **Southwestern Electric Power Company**
Prudence of Investment in Power Generation Facilities
Oral Testimony before the Public Utility Commission of Texas on behalf of Southwestern Electric Power Company addressing the prudence of the company’s investments in the Dolet Hills Power Plant, June 15, 2017.
- 2017** **NV Energy**
Cost of Capital
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Nevada Power Company, addressing the cost of capital for the Company, June 5, 2017.
- 2017** **Southwestern Electric Power Company**
Prudence of Investment in Power Generation Facilities
Rebuttal Testimony before the Public Utilities Commission of Texas, on behalf of Southwestern Electric Power Company, addressing the prudence

of retrofit investments in certain electricity generation facilities, May 19, 2017.

- 2017** **North Carolina Utilities Commission**
Power Contract Design, Financing New Power Plants
Direct Testimony before the North Carolina Utilities Commission, on behalf of North Carolina Sustainable Energy Association, addressing the biennial determination of avoided cost rates for electric utility purchases from qualifying facilities, March 28, 2017.
- 2017** **NV Energy**
Cost of Gas / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, addressing the reasonableness of the Company's natural gas trading, March 1, 2017.
- 2016** **NV Energy**
Cost of Capital
Rebuttal Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, addressing the cost of capital for the Company's electric and gas divisions, September 23, 2016.
- 2016** **Hawai'i Electric Light**
Power Generation, Incentive Ratemaking, Fuel Adjustment Clauses
Direct Testimony before the Hawai'i Public Utilities Commission, on behalf of Hawai'i Electric Light, addressing alternative incentive mechanisms for the Company's power generation fleet, fuel costs, and the reasonableness of the Company's proposed ECAC, September 19, 2016.
- 2016** **NV Energy**
Cost of Capital
Certification Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, addressing the cost of capital for the Company's electric and gas divisions, August 2, 2016.
- 2016** **NV Energy**
Cost of Capital
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, addressing the cost of capital for the Company's electric and gas divisions, June 6, 2016.

- 2016** **PacifiCorp**
Cost of Capital
Oral Testimony before the Washington Utilities and Transportation Commission, on behalf of PacifiCorp, on the cost of capital in the Company's expedited rate filing (Docket UE-152253), May 2, 2016.
- 2016** **Confidential Client**
Damages under Wind Power Purchase Agreement
Expert Report in arbitration on the valuation of damages under a PPA backed by a wind farm, with a particular focus on the reasonableness of the liquidated damages cap, April 25, 2016.
- 2016** **Municipality of Anchorage (ML&P), Chugach Electric Association**
Valuation of Gas Field and Reasonableness of Acquisition Price
Oral Testimony before the Regulatory Commission of Alaska on the reasonableness of the proposed acquisition of ConocoPhillips' working interest in the Beluga River Unit, April 19, 2016.
- 2016** **PacifiCorp**
Cost of capital
Rebuttal Testimony before the Washington Utilities and Transportation Commission, on behalf of PacifiCorp, on the cost of capital in the Company's expedited rate filing (Docket UE-152253), April 7, 2016.
- 2016** **NV Energy**
Cost of Gas / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, addressing the reasonableness of the Company's natural gas purchases, March 1, 2016.
- 2016** **Alliance to Protect Nantucket Sound**
Financing of off-shore wind farm
Oral Testimony before the Energy Facilities Siting Board of the Commonwealth of Massachusetts on the financeability of the Cape Wind project, January 25, 2016.
- 2015** **PacifiCorp**
Cost of capital
Direct Testimony before the Washington Utilities and Transportation Commission, on behalf of PacifiCorp, on the cost of capital, November 24, 2015.

- 2015** **Chugach Electric Association, Inc.**
Regulatory principles for cost allocation
Oral testimony before the Regulatory Commission of Alaska, addressing the regulatory treatment of gas found by Cook Inlet Natural Gas Storage Alaska LLC, August 31, 2015.
- 2015** **Baltimore Gas & Electric Company**
Risks and rate of return for retail electricity business
Oral Testimony before the Maryland Public Service Commission, *in the Matter of Baltimore Gas & Electric's Application to Recover Cash Working Capital for Standard Offer Service*, Case No. 9221, August 5, 2015.
- 2015** **Baltimore Gas & Electric Company**
Risks and rate of return for retail electricity business
Rebuttal Testimony before the Maryland Public Service Commission, *in the Matter of Baltimore Gas & Electric's Application to Recover Cash Working Capital for Standard Offer Service*, Case No. 9221, July 22, 2015.
- 2015** **Chugach Electric Association, Inc.**
Regulatory principles for cost allocation
Pre-filed testimony before the Regulatory Commission of Alaska, addressing the regulatory treatment of gas found by Cook Inlet Natural Gas Storage Alaska LLC, June 5, 2015.
- 2015** **ATX Southwest, LLC.**
Cost of Capital
Direct Testimony before the Federal Energy Regulatory Commission, on behalf of ATX Southwest, addressing return on equity, May 28, 2015.
- 2015** **Chugach Electric Association, Inc.**
Cost of Capital
Responsive Testimony before the Regulatory Commission of Alaska, addressing return on equity for the Enstar Natural Gas Company, May 15, 2015.
- 2015** **Baltimore Gas & Electric Company**
Risks and rate of return for retail electricity business
Testimony before the Maryland Public Service Commission, *in the Matter of Baltimore Gas & Electric's Application to Recover Cash Working Capital for Standard Offer Service*, Case No. 9221, April 22, 2015.

- 2015** **NV Energy**
Cost of Gas / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, addressing the reasonableness of the Company's natural gas purchases, March 1, 2015.
- 2014** **PacifiCorp**
Cost of capital
Oral Testimony before the Washington Utilities and Transportation Commission, on behalf of PacifiCorp, on the cost of capital in the Company's general rate case, December 16, 2014.
- 2014** **PacifiCorp**
Cost of capital
Rebuttal Testimony before the Washington Utilities and Transportation Commission, on behalf of PacifiCorp, on the cost of capital in the Company's general rate case, November 21, 2014.
- 2014** **PacifiCorp**
Cost of capital
Direct Testimony before the Washington Utilities and Transportation Commission, on behalf of PacifiCorp, on the cost of capital in the Company's general rate case, including the effects of transitioning away from coal, April 30, 2014.
- 2014** **Nevada Power Company**
Cost of capital
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Nevada Power Company, on the cost of capital in the Company's general rate case, April 30, 2014.
- 2015** **NV Energy**
Cost of Gas / Prudence
Direct Testimony before the Nevada Public Utilities Commission, on behalf of NV Energy, addressing the reasonableness of the Company's natural gas purchases, March 1, 2014.
- 2013** **Sierra Pacific Power Company**
Cost of capital
Oral testimony, before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, on the cost of capital for the gas and electric divisions in the Company's general rate case, October 7, 2013.

- 2013** **Sierra Pacific Power Company**
Cost of capital
Rebuttal Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, on the cost of capital for the gas and electric divisions in the Company's general rate case, September 25, 2013.
- 2013** **Market Area Shippers**
(Gaz Métro, Union Gas and Enbridge Gas Distribution)
Contract Renewal Alternatives for Regulated Pipeline Service
Pre-filed Expert Report, with Jeff Makhholm, before the National Energy Board of Canada, in the Matter of TransCanada's Application for Tariff Amendments, Hearing Order RH-001-2013, July 26, 2013.
- 2013** **Sierra Pacific Power Company**
Cost of capital
Direct Testimony before the Nevada Public Utilities Commission, on behalf of Sierra Pacific Power Company, on the cost of capital for the gas and electric divisions in the Company's general rate case, June 4, 2013.
- 2013** **NV Energy Operating Companies**
Cost of capital
Direct Testimony before the Federal Energy Regulatory Commission, on behalf of NV Energy Operating Companies, on the appropriate rate of return for the consolidated transmission system, May 31, 2013.
- 2013** **Public Intervenor**
Wholesale Margins for Regulated Motor Fuels and Heating Oil
Oral testimony before the New Brunswick Energy and Utilities Board, *In the Matter of an Application by Irving Oil Marketing GP and Irving Oil Commercial GP requesting an increase in the wholesale margins for motor fuels and heating oil*, January 29, 2013.
- 2013** **Public Intervenor**
Power sector modelling, deferral account policy, financial analysis
Oral testimony before the New Brunswick Energy and Utilities Board, *In the Matter of the Point Lepreau Nuclear Generating Station Deferral Account and Section 143.1 of the Electricity Act*, January 15, 2013.
- 2012** **Baltimore Gas & Electric Company**
Potomac Electric Power Company
Power Purchase Agreements, Retail electric competition
Oral testimony before the Maryland Public Service Commission *In the Matter of Whether New Generation Resources Are Needed to Meet Long-*

- Term Demand for Standard Offer Service*, Case No. 9214, November 26, 2012.
- 2012** **Public Intervenor**
Modelling of coal and oil plants, deferral account, financial analysis
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board *In the Matter of the Point Lepreau Nuclear Generating Station Deferral Account and Section 143.1 of the Electricity Act*, November 26, 2012.
- 2012** **Nevada Power Company**
Cost of capital
Pre-filed testimony before the Federal Energy Regulatory Commission in the Nevada Power Company's Transmission Rate Case, October 31, 2012.
- 2012** **Public Intervenor**
Wholesale margins for regulated motor fuels and heating oil
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board *In the Matter of an Application by Irving Oil Marketing G.P. and Irving Oil Commercial G.P. Requesting an Increase in the Wholesale Margins for Motor Fuels and Heating Oil*, October 26, 2012.
- 2012** **Nevada Power Company**
Prudence of gas costs for 2012
Pre-filed Expert Report before the Nevada Public Utilities Commission *In the Nevada Power Company's 2012 Deferred Energy Filing*, March 1, 2012.
- 2012** **Sierra Pacific Power Company**
Prudence of gas costs for 2012
Pre-filed Expert Report before the Nevada Public Utilities Commission *In the Nevada Power Company's 2012 Deferred Energy Filing*, March 1, 2012.
- 2011** **Public Intervenor**
Power system loss factors, OATT, transmission regulatory policy
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board *In the Matter of a Review of the Proposed Change to the New Brunswick System Operator's Real Power Loss Factor*, October 31, 2011.
- 2011** **John Hancock**
Risk analysis of European power plant leveraged lease
Oral Testimony before the U.S. Tax Court, on behalf of plaintiff in *John Hancock Life Insurance Company and Subsidiaries v. Commissioner of Internal Revenue*, October 24, 2011.

- 2011** **John Hancock**
Risk analysis of European power plant leveraged lease
Rebuttal Expert Report before the U.S. Tax Court, on behalf of plaintiff in *John Hancock Life Insurance Company and Subsidiaries v. Commissioner of Internal Revenue*, August 19, 2011.
- 2011** **John Hancock**
Risk analysis of European power plant leveraged lease
Pre-filed Expert Report before the U.S. Tax Court on behalf of plaintiff in *John Hancock Life Insurance Company and Subsidiaries v. Commissioner of Internal Revenue*, July 8, 2011.
- 2011** **Public Intervenor**
OATT, transmission regulatory policy
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board, *in the Review of the Proposed Changes to the New Brunswick System Operator's Open Access Transmission Tariff*, February 21, 2011.
- 2011** **Public Intervenor**
Power system loss factor, OATT, transmission regulatory policy
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board, *in the Review of the New Brunswick System Operator's Proposed Change to its Loss Factor*, February 3, 2011.
- 2011** **Baltimore Gas & Electric Company**
Risks and rate of return for retail electricity business
Oral testimony before the Maryland Public Service Commission, *in the Matter of Baltimore Gas & Electric's Application to Recover Cash Working Capital for Standard Offer Service*, Case No. 9221, January 20, 2011.
- 2010** **Baltimore Gas & Electric Company**
Risks and rate of return for retail electricity business
Pre-filed Expert Report before the Maryland Public Service Commission, *in the Matter of Baltimore Gas & Electric's Application to Recover Cash Working Capital for Standard Offer Service*, Case No. 9221, September 17, 2010.
- 2010** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Oral testimony before the New Brunswick Energy & Utilities Board, in the *Enbridge Gas New Brunswick Rate Case*, March 30, 2010.

- 2010** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board, *in the Matter of Enbridge Gas New Brunswick Rate Case*, March 12, 2010.
- 2009** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Oral testimony before the New Brunswick Energy & Utilities Board, *in the Review of Matters related to the Regulation of Enbridge Gas New Brunswick*, October 23, 2009.
- 2009** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board, *in the Matter of the Annual Financial Review of Enbridge Gas New Brunswick Limited Partnership*, August 21, 2009.
- 2009** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Oral testimony before the New Brunswick Energy and Utilities Board, *in the Matter of the Annual Financial Review of Enbridge Gas New Brunswick Limited Partnership*, September 15, 2009.
- 2009** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Pre-filed Expert Report before the New Brunswick Energy and Utilities Board, *in the Matter of a Review of Matters Related to the Regulation of Enbridge Gas New Brunswick Limited Partnership*, September 21, 2009.
- 2009** **The City of New York**
Cost of service, incentives and taxi lease rates
Oral testimony in the District Court for the Southern District of New York in *Metropolitan Taxicab Board of Trade et al. v. The City of New York et al.*, on the issue of whether the Taxi and Limousine Commission's new maximum lease rates constitute a fuel efficiency and emissions mandate that would be preempted by Federal law, May 20, 2009.
- 2009** **The City of New York**
Cost of service, incentives and taxi lease rates
Pre-filed expert Report in the United States District Court for the Southern District of New York in *Metropolitan Taxicab Board of Trade et al. v. The City of New York et al.*, on the issue of whether the Taxi and Limousine Commission's new maximum lease rates constitute a fuel efficiency and emissions mandate that would be preempted by Federal law, May 18, 2009.

- 2009** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Oral testimony before the New Brunswick Energy and Utilities Board, *In the Matter of the examination of the formula for Enbridge Gas New Brunswick's market-based rate*, April 23, 2009.
- 2009** **Public Intervenor**
Greenfield gas distributor, cost of service, just and reasonable rates
Pre-filed Report before the New Brunswick Energy and Utilities Board, *In the Matter of the examination of the formula for Enbridge Gas New Brunswick's market-based rate*, March 26, 2009.
- 2009** **Public Intervenor**
Cost of service, ISO management, OATT transmission policy
Oral testimony before the New Brunswick Energy and Utilities Board, *In the Matter of the application of the New Brunswick System Operator for changes to its Charges, Rates and Tolls*, March 18, 2009.
- 2009** **Public Intervenor**
Cost of service, ISO management, OATT transmission policy
Pre-filed Report before the New Brunswick Energy and Utilities Board, *In the Matter of the application of the New Brunswick System Operator for changes to its Charges, Rates and Tolls*, February 24, 2009.
- 2008** **Allegheny Power, Baltimore Gas & Electric**
Integrated resource planning, competitive retail electric markets
Oral testimony before the Maryland Public Service Commission, *in the Matter of the Commission's Investigation Of Investor-Owned Electric Companies' Standard Offer Service for Residential and Small Commercial Customers in Maryland*, Case No. 9117, December 15, 2008.
- 2008** **Allegheny Power, Baltimore Gas & Electric**
Integrated resource planning, competitive retail electric markets
Pre-filed Report before the Maryland Public Service Commission, *in the Matter of the Commission's Investigation Of Investor-Owned Electric Companies' Standard Offer Service for Residential and Small Commercial Customers in Maryland*, Case No. 9117, October 1, 2008.
- 2008** **Public Intervenor**
Ratemaking for greenfield gas distributor
Oral testimony before the New Brunswick Energy and Utilities Board, *In the Matter of an application by Enbridge Gas New Brunswick for changes to its Charges, Rates and Tolls*, March 27, 2008.

- 2008** **Public Intervenor**
Ratemaking for greenfield gas distributor
Pre-filed Report before the New Brunswick Energy and Utilities Board, *In the Matter of an application by Enbridge Gas New Brunswick for changes to its Charges, Rates and Tolls*, March 10, 2008.
- 2007** **Public Intervenor**
Prudence, just and reasonable standard, affiliate transactions
Oral testimony before the New Brunswick Energy and Utilities Board, *In the Matter of an application by the NBP Distribution & Customer Service Corporation (Disco) for changes to its Charges, Rates and Tolls*, December 18, 2007.
- 2007** **Public Intervenor**
Nuclear power plant Cost of Service
Pre-filed Report before the New Brunswick Board of Commissioners of Public Utilities, *In the Matter of an application by the NBP Distribution & Customer Service Corporation (Disco) for changes to its Charges, Rates and Tolls*, December 7, 2007.
- 2007** **Public Intervenor**
Prudence of power generation costs
Pre-filed Report before the New Brunswick Board of Commissioners of Public Utilities, *In the Matter of an application by the NBP Distribution & Customer Service Corporation (Disco) for changes to its Charges, Rates and Tolls*, November 5, 2007.
- 2007** **Public Intervenor**
Prudence of power generation costs
Oral testimony before the New Brunswick Energy and Utilities Board, *In the Matter of an application by the NBP Distribution & Customer Service Corporation (Disco) for changes to its Charges, Rates and Tolls*, June 21, 2007.
- 2007** **Public Intervenor**
Prudence of power generation costs
Pre-filed Report before the New Brunswick Energy and Utilities Board, *In the Matter of an application by the NBP Distribution & Customer Service Corporation (Disco) for changes to its Charges, Rates and Tolls*, June 14, 2007.
- 2006** **Brookfield Energy Marketing Inc.**
Valuation of power purchase agreement and power plant

Deposition testimony before the United States Bankruptcy Court for the District of Maryland, on behalf of Brookfield Energy Marketing Inc., *In re: USGen New England, Inc.*, Debtor, Case No. 03-30465, May 22, 2006.

- 2006** **Brookfield Energy Marketing Inc.**
Valuation of power purchase agreement and power plant
Rebuttal Report before the United States Bankruptcy Court for the District of Maryland, on behalf of Brookfield Energy Marketing Inc., *In re: USGen New England, Inc.*, Debtor, Case No. 03-30465, May 5, 2006.
- 2006** **Brookfield Energy Marketing Inc.**
Valuation of power purchase agreement and power plant
Expert Report before the United States Bankruptcy Court for the District of Maryland, on behalf of Brookfield Energy Marketing Inc., *In re: USGen New England, Inc.*, Debtor, Case No. 03-30465, March 29, 2006.
- 2006** **Public Intervenor**
Application of the prudence standard to affiliate transactions
Oral testimony before the New Brunswick Board of Commissioners of Public Utilities, *In the Matter of an application by the NBP Distribution & Customer Service Corporation (Disco) for changes to its Charges, Rates and Tolls*, March 14, 2006.
- 2006** **Public Intervenor**
Application of the prudence standard to affiliate transactions
Pre-filed Report with Eugene Meehan before the New Brunswick Board of Commissioners of Public Utilities, *In the Matter of an application by the NBP Distribution & Customer Service Corporation (Disco) for changes to its Charges, Rates and Tolls*, January 31, 2006.
- 2005** **Dayton Power & Light Company**
Retail pricing for default service customers and option valuation
Oral testimony at hearings in Ohio Public Utilities Commission Case No. 05-276-EL-AIR, November 8 and 14 2005.
- 2005** **Dayton Power & Light Company**
Retail pricing for default service customers and option valuation
Deposition testimony in Ohio Public Utilities Commission Case No. 05-276-EL-AIR, November 8, 2005.
- 2005** **Dayton Power & Light Company**
Retail pricing for default service customers and option valuation
Testimony in Ohio Public Utilities Commission, in Support of Stipulation filed in support of Dayton's proposed settlement Case No. 05-276-EL-AIR, November 4, 2005.

2005

Dayton Power & Light Company

Retail pricing for default service customers and option valuation

Rebuttal testimony in Ohio Public Utilities Commission, application of financial options pricing techniques to assess the reasonableness of Dayton's proposed provider-of-last-resort charges, Case No. 05-276-EL-AIR, October 31, 2005.

2004

Board of Public Utilities

Cost of capital

Pre-filed testimony with Cindy Ma before the Board of Public Utilities, Newfoundland and Labrador, Canada, on "The Cost of Capital for Automobile Insurance Firms," October 13, 2004.

CONSULTING EXPERT EXPERIENCE

- 2020-present** **Confidential Client**
Exit from Generation & Transmission Cooperative
Expert on appropriate buyout payment for a member to leave its transmission and generation cooperative.
- 2019-present** **United Power**
Exit from Generation & Transmission Cooperative
Expert on appropriate buyout payment for United Power to leave the Tri-State Transmission and Generation Cooperative.
- 2019-2020** **Confidential Client**
Decommissioning of coal-fired power plant
Expert addressing the net cost of decommissioning a coal-fired power plant and regulatory cost recovery mechanisms.
- 2019** **Confidential Client**
Cost of Capital
Expert in dispute related to the financial structure and cost of capital for a FERC-regulated pipeline.
- 2019** **Confidential Client**
Financial Structure Analysis
Expert in dispute related to the financial structure of assets owned by a midstream oil and products company.
- 2016** **Confidential Client**
Valuation of Solar Generation Facilities
Expert in dispute related to the valuation of rooftop solar facilities. Provided valuation options to counsel to evaluate the reasonableness of the claimed tax basis and Section 1603 cash grant.
- 2014** **GazProm**
Dispute over Value of Gas Fields
Expert in dispute related to the value of development and production of gas in Russia for export to the US and re-gasification via an import facility in Corpus Christi, TX.
- 2014** **Confidential Client**
Offshore Exploration and Production Permit Arbitration
Expert in dispute related to an agreement between two firms to develop an offshore gas field in New Zealand in arbitration at the ICC International Court of Arbitration.

- 2014** **Confidential client**
Breach of contract damages valuation for gas supply agreement
Valued damages in a breach-of-contract dispute regarding gas supply in Western Australia.
- 2013–2016** **Gaz Métro**
Cost Recovery of Gas Distribution System Upgrade
Advised client on regulatory merits of ratemaking for distribution system upgrade. Performed survey of ratemaking policies for similar upgrades in other jurisdictions in connection with proceeding before Provincial regulator.
- 2014-2015** **Confidential Client**
Gas Supply Agreement Negotiation
Advise on cost of service and LNG contract price issues in Western Australia.
- 2014- 2015** **Alliance Pipeline**
Restructuring of services and tolls
Advised on Alliance’s restructuring proposal in a matter before the National Energy Board. Supervised modelling of pipeline tolls and assessment of natural gas pipeline market power.
- 2014-2015** **Gazprom OAO**
Civil dispute involving gas field development and LNG importation
Supervised modelling of LNG netback prices and damage calculations in preparation for a jury trial before a Tarrant County, Texas District Court. Consulted with respect to a dispute between a U.S oil company and Russian oil company regarding ownership of a Russian gas field, tortious interference, and trade secret misappropriation with regards to a plan to import LNG into the United States in the mid-2000s.
- 2014** **FortisBC Energy Inc**
Tolling for pipeline in Canada
Analyzed toll methodology and advised on regulatory issues related to a tolling proposal of NGTL’s North Montney Mainline, an extension of the existing NGTL Alberta System.
- 2014** **Royal Bank of Canada**
Gas Supply Agreement Dispute
Served as consulting expert in a gas supply agreement dispute between RBC and three municipal gas distributors in Nevada and Iowa. Case involved analysis of Basel III regulations, capital requirements, commodity swaps and interest rate swaps.

- 2013** **Confidential client**
Valuation and pricing analysis
Performed valuation and pricing analysis for oil pipeline dispute in Texas. Provided advice to outside counsel throughout litigation.
- 2012-2014** **ATCO Gas & ATCO Electric**
Cost of Service / Capital Trackers
Provided expert review of ATCO Gas and ATCO Electric's capital tracker proposals, including a survey of capital trackers in other jurisdictions.
- 2012-2013** **Confidential client**
Valuation of oil pipeline company and its hedging positions
Performed valuation of oil pipeline company and its hedging positions in litigation involving an alleged breach of fiduciary duty. Provided advice to outside counsel throughout litigation.
- 2012-2013** **Confidential client**
Approaches to regulatory accounting and cost-of-service regulation
Contributed to study assessing benefits of various approaches to regulatory accounting and cost-of-service regulation for pipelines.
- 2011-2013** **Confidential client**
Possible outcomes of power contract (PPA) disputes
Analyzed potential litigation and settlement outcomes in a series of power contract disputes. Provided advice to outside counsel.
- 2011-2012** **Confidential client**
Oil pipeline cost of service and depreciation policies
Advised counsel to a shipper in an intrastate oil pipeline company rate case before the Kansas Corporation Commission.
- 2011** **Confidential client**
Antitrust aspects of a proposed pipeline merger
Analyzed antitrust aspects of oil pipeline combinations in connection with a proposed merger. Provided advice to outside counsel.
- 2010-2011** **Confidential client**
Valuation of generation assets
Performed valuation of power plant in context of alleged expropriation.
- 2010** **Hydro Québec, Canada**
Grid connection and upgrade cost policy
Analyzed grid connection and upgrade cost policy. Evaluated existing policy to allocate costs of grid upgrades to generation developers and system users. Suggested modifications to policy. Prepared benchmarking

analysis comparing the company's practices to those of over a dozen other entities in North America.

- 2008** **Confidential client**
Allegations of energy market manipulation
Advised on the evaluation of allegations of energy market manipulation in the context of electricity trading in RTO-managed markets.
- 2007** **Confidential client**
Valuation of valuation of long-dated oil warrants
Performed valuation of long-dated oil warrants priced off Venezuelan crude oil in context of damages calculation.
- 2006** **Confidential client**
Damages valuation in securities class action
Valued damages in a securities class action related to the bankruptcy of an energy retailer.
- 2003-2004** **Confidential client**
Bid process advantages: generation pricing and transmission costs
Contributed to testimony on behalf of a large electric utility regarding an affiliate transaction that resulted from a competitive solicitation.
Testimony before FERC focused on whether the affiliate was advantaged during the bid process, both with respect to generation pricing and electric transmission cost.
- 2003** **Confidential client**
Valuation, economic, accounting, and hedging analysis
Performed valuation, economic, accounting, and hedging analysis of a gas-fired power plant in an international arbitration matter.
- 2002** **Confidential client**
Prudence of forward power purchases
Contributed to testimony on behalf of an electric utility regarding the prudence of forward power purchases during the Western power crisis.
- 2002-2003** **Pacific Gas & Electric**
Valuation of Damages Due to Gas Pipeline Capacity Withholding
Performed analyses of damages from withheld pipeline capacity into California. Analyses led to \$1 billion settlement.
- 2002-2003** **Confidential client**
Prudence of forward power purchases
Contributed to testimony regarding the prudence of Department of Water Resources's forward power purchases during the Western power crisis.

- 2002** **Confidential client**
Electric and gas hedging strategies for its generation assets
Contributed to testimony on behalf of an energy marketing and trading firm regarding electric and gas financial hedging strategies for its generation assets, including an examination of the nature of competition among energy marketing and trading firms and strategies.
- 2001–2002** **Pacific Gas & Electric Company**
FERC refund and other related proceedings
Analysis and support to a California utility in the context of the FERC refund and other related proceedings, 2001-2002.
- 2001–2002** **Pacific Gas & Electric Company**
Value of a long-term affiliate power sales agreement
Contributed to testimony before FERC relating to the value of a long-term affiliate power sales agreement. Involved analysis and valuation of over 100 long-term power contracts (PPAs) in the context of this benchmarking analysis.
- 2001** **Confidential client**
Valuation of a passive equity interest
Contributed to testimony on behalf of a leading US energy company regarding the valuation of a passive equity interest in an IPP project in El Salvador.
- 2001** **Baltimore Gas & Electric Company**
Business separation of Constellation Energy Group
Contributed to testimony submitted to the Public Service Commission of Maryland on the business separation of Constellation Energy Group.
- 1998** **Baltimore Gas & Electric Company**
Valuation of generation assets
Performed valuation of Baltimore Gas & Electric Company's hydro, nuclear, coal and gas-fired generation assets in the context of stranded cost calculations during restructuring, 1998.
- 1995–1996** **Confidential client**
Analysis of market concentration
Performed HHI analyses to support testimony presenting a competitive assessment of the Western electric generation market in the US, 1995-1996.
- 1994–1995** **Confidential client**
Damages valuation in securities class action
Estimated losses and alleged damages for several mutual funds that invested in derivative securities.

- 1994–1995** **Confidential client**
Damages valuation in securities class action
Estimated losses and alleged damages for several mutual funds that invested in derivative securities.
- 1994** **Goldman Sachs**
Default risk studies on fixed income instruments
Prepared default risk studies on fixed income instruments for counsel to Goldman Sachs in a broker/dealer arbitration.
- 1994** **Confidential client**
Damages valuation in securities class action
Consulted to counsel for an infomercial company on materiality, liability, and damages in a shareholder class action suit.
- 1993** **Confidential client**
Damages valuation in securities class action
Assessed materiality and damages in a 10b-5 class action against a major pharmaceutical company.

ADVISORY PROJECTS

- 2020** **Offshore Wind Auction**
Due Diligence for Bidder
Provided strategic advice and due diligence relating to the competitive landscape for past and upcoming offshore wind auctions.
- 2020** **Acquisition of Gas LDC**
Due Diligence for Investor Group
Provided strategic advice and due diligence relating to the financial valuation of a gas LDC and prospective acquisition.
- 2017-2019** **Valuation of Vertically-Integrated Electric Utility**
Due Diligence for Prospective Acquirer
Retained by an electric utility to advise on valuation of a target utility acquisition. Assisted client in developing reasonable offers to acquire the target electric utility. Advised utility during negotiations.
- 2017** **Investment in Coal-Fired Power Plant**
Due Diligence for Owner
Retained by a confidential owner. Provided strategic advice and due diligence relating to the financial valuation of owners interest and prospective sale.
- 2017** **Marginal Cost Study for Value of Distributed Resource**
Due Diligence for Prospective Acquirer
Retained by NYSEG and RG&E to perform a marginal cost study to estimate key components of the value stack, to be paid to solar and other distributed energy resources,
- 2017** **Leveraged Lease tied to Coal-Fired Power Plant**
Due Diligence for Prospective Acquirer
Retained by a confidential acquirer to evaluate a target utility-related investment. Provided strategic advice and due diligence relating to the financial valuation and post-acquisition benefits.
- 2016** **Utility Merger**
Due Diligence on Merger Benefits
Retained by a confidential acquirer to evaluate merger benefits in the context of the combination of two adjacent electric utilities. Provided strategic advice and due diligence relating to merger benefits.
- 2016** **Wind Power Transaction**
Due Diligence for Prospective PPA Offtaker

- Retained by a confidential offtaker to evaluate the costs, benefits and risks associated with a prospective long-term power purchase transaction backed by a wind farm.
- 2016** **Electric Utility Acquisition**
Due Diligence for Prospective Acquirer
Retained by a confidential equity investor to evaluate key inputs for the acquirer's valuation model of an electric utility. Advised investor on key elements of the valuation.
- 2015** **Ministry of Energy, Mexico**
Restructuring of the Mexican power and gas sectors
Served as leader for several work streams performed on behalf of the Mexican Ministry of Energy implementing energy sector restructuring. Advice included the design of a competitive spot market, the development of green power auctions (solar and wind), basic service supply pricing, electricity transmission pricing, upstream gas pricing, pipeline rates and the development of a regulatory framework for the sector.
- 2015** **Southern Star Central Gas Pipeline**
Due Diligence for Prospective Acquirer
Retained by a confidential equity investor to evaluate regulatory and investment risk associated with the prospective acquisition of an interest in Southern Star. Analyzed likely outcomes in the pipeline's upcoming rate case, and their implications for the valuation of the target.
- 2015** **Independent Electricity System Operator (IESO)**
Reasonableness of 6,300 MW Power Transaction
Retained by IESO in Ontario, Canada, to prepare, together with a team of NERA experts, an Opinion as to the Fairness of the Amended and Restated Bruce Power Refurbishment Implementation Agreement.
- 2015** **ESKOM, South Africa**
Regulatory Strategy for Cost Recovery
Retained by ESKOM to advise on regulatory strategy, treatment of coal-plant operation and associated fuel costs, delays in unit online dates, prudent utility practice, and other regulatory issues.
- 2015** **Bermuda Electric, Bermuda**
Regulatory Strategy, Cost of Service, and Tariffs
Advised on regulatory strategy. Developed costing and pricing model for Bermuda Electric.
- 2014** **Hawaiian Electric Company**
Fuel Adjustment Clause and Oil Hedging

Retained by Hawaiian Electric Company to provide analysis regarding the efficiency incentives embedded in the company's fuel adjustment clause (ECAC). Analyzed the possibility of hedging oil price volatility through commercially-available contracts.

2014

Confidential Client

Pricing Principles for Domestic Gas Reservation Policy

Formulated a methodology to determine a schedule of reasonable prices using a cost of service approach for gas that the company is obligated to market under the domestic gas supply policy in Western Australia.

2012/2013

Atlantic Path 15

Due Diligence Study for Confidential Potential Buyer

Performed regulatory due diligence in connection with the potential acquisition of Atlantic Path 15 transmission assets. Evaluated the regulatory climate at FERC and analyzed FERC decisions from prior rate cases, with a focus on allowed rate of return. Used NERA rate-of-return models to replicate the FERC methodology and to predict the rate-of-return to be allowed by FERC in the next rate case.

2013

Energy trading entity

Price risks and electricity transmission development

Retained by energy trading entity to perform an independent study of price risks and electricity transmission development in the ERCOT market.

2013

Electric industry client

Reactive power compensation

Retained by electric industry client to analyze electricity transmission tariffs and reactive power compensation in competitive electric markets.

2012/2013

New Mexico Natural Gas Company

Due Diligence Study for Confidential Acquirer

Performed regulatory due diligence in connection with the potential acquisition of New Mexico Natural Gas. Assessed hurdles to getting the transaction approved by regulatory authorities. Analyzed recent rate actions by the state commission and the likely outcomes of future cases. Advised on key inputs into the acquirer's financial model.

2012

Oil industry client

Regulation benchmarking in downstream oil sector

Retained by oil industry client to advise on margins and to perform an international benchmarking of the regulation of the downstream oil sector.

2012

Hawaiian Electric Company

Hedging and rate stabilization

- Retained by Hawaiian Electric Company to provide analysis regarding hedging of fuel oil and diesel fuel purchases in order to stabilize customer rates.
- 2011** **Confidential client**
Implications of CFTC proposed definition of swap dealer
Advised on margin, capital and reporting implications of CFTC proposed definition of swap dealer under Dodd Frank.
- 2010** **Confidential client**
Leveraged lease transaction
Provided litigation support services with respect to a dispute over a leveraged lease transaction.
- 2010** **Confidential client**
Valuation, risk assessment and analysis of offtake contract options
Performed detailed valuation, risk assessment and analysis of offtake contract options for a hydroelectric power plant.
- 2009** **Potomac Edison Company**
Capital investment planning
Performed least-cost capital investment planning on behalf of the Potomac Edison Company.
- 2009** **Government of New Brunswick, Canada**
Advised on electric utility valuation
Advised Government of New Brunswick on the valuation of the vertically-integrated, provincially-owned electric utility, NB Power, in connection with the potential sale to Hydro Québec. Developed a financial and rate model reflecting the New Brunswick regulatory system and performed valuations for a stand-alone and merged case and performed numerous valuations of the benefits to the acquirer. Developed key inputs for the valuation, including the Point Lepreau Nuclear Generation Station. Coordinated development of fairness opinion.
- 2009** **Energy East**
Cost of capital
Advised on rate-of-return issues for electricity distributors in New York State.
- 2008** **Confidential client**
Contract design
Advised on design of structured contract for new renewable power plant, new electricity transmission lines and associated RFPs.

- 2008** **Commission for Energy Regulation**
Review of SOLR tariffs
Advise the Commission for Energy Regulation on the review of SOLR tariffs in the Republic of Ireland.
- 2008** **Comisión Nacional de Energía**
Market mechanisms for distributions to serve default customers
Advised on design and implementation of market mechanisms by which Spanish electric utilities buy energy to serve default customers.
- 2006–2009** **Hawaiian Electric Company**
Hedging options for fuel
Performed economic and accounting analysis of hedging options for low sulfur fuel oil, diesel and fuel oil on behalf of Hawaiian Electric Company.
- 2004–2010** **Commonwealth Edison and Ameren’s Illinois utilities**
Competitive procurement for power supply
Advised Commonwealth Edison and Ameren’s Illinois utilities on the design of a competitive procurement for short- and long-term power supply, including the contractual framework for energy purchases, 2004 to 2010.
- 2004–Present** **New Jersey and Maryland distribution utilities**
Mark-to-market issues and credit policies
Advised several utilities in the Eastern Interconnection on mark-to-market issues and credit policies.
- 1999–2008** **New Jersey distribution utilities**
Contract design and implementation
Worked with credit representatives of New Jersey distribution utilities on contract design and implementation of the contract credit terms. Coordinated the utilities’ responses to changes to the forms of letters of credit proposed by bidders; oversaw bidder credit qualification process; managed approval process for alternate guaranty instruments, and served as advisor to utilities when contract interpretation issues arose, 1999 to 2008.
- 1999–2008** **FirstEnergy Companies**
Competitive procurement for power supply
Advised the FirstEnergy Companies on the design of a competitive procurement for intermediate term power supply, including the contractual framework for energy purchases, 2004-2005.

- 2003** **Commission for Energy Regulation**
Hedging agreement and a power plant construction agreement
Advised the Commission for Energy Regulation in Ireland on the structure of a long-term hedging agreement and a power plant construction agreement; assisted with the development of the hedging contract and the tender documentation; performed bid evaluation.
- 2002** **Sierra Pacific Resources**
Risk management strategies
Advised a major west coast utility in the US on the development of its risk management policy and procedures; reviewed past trading and risk management strategies; and performed an assessment of its risk measurement and reporting techniques, including credit risk management policy.
- 2000** **Ministry of Energy, México**
Mexican IPP solicitation program
Advised on the development of the Mexican IPP solicitation program, including transaction structure (IPP v. BLT v. BOT), credit risk management, model contracts, and bid evaluation (the Comisión Federal de Electricidad has procured as much as 2000 MW per year of long-term power supply from IPPs).
- 2000** **Comisión Federal de Electricidad, Mexico**
Credit and collateral requirements for a power purchase agreement
Advised the Comisión Federal de Electricidad in Mexico on credit and collateral requirements for an-asset backed power purchase agreement with an IPP based in Mexico, including advice on the development of comparable credit and collateral requirements for an import transaction that was to be made on a firm basis with liquidated damages.
- 1998–2000** **Ministry of Energy, Mexico**
Restructuring and privatization of the Mexican electricity sector
Consulted to the Mexican Ministry of Energy on the restructuring and privatization of the Mexican electricity sector, the design of a competitive spot market, and the policy of IPP solicitations, electricity transmission pricing, upstream gas pricing and the development of a regulatory framework for the sector.
- 1998–1999** **Ministry of Energy, Mexico**
Assessing competition in restructured Mexican electric generation
Contributed to study assessing competition in restructured electric generation market in Mexico.
- 1999** **Swiss Re**
Novel insurance packages to hedge electric price and operations risk

Assisted Swiss Re in the development of the modeling for the creation of novel insurance packages to hedge electric price and operations risk, 1999.

- 1998 Iberdrola S.A., Spain**
Seminars on the deregulated markets for gas and electricity in the US
Designed and conducted a series of three training courses for representatives of Iberdrola S.A. (Spain's principal private utility), which consisted of seminars on the deregulated markets for gas and electricity in the US, followed by a series of interviews with large utilities, IPPs, and energy marketers. Courses were designed to provide the European traders with an understanding of best practices employed by energy traders in the US, with respect to risk management (credit, market, and operational), 1998.
- 1998 C.E.L.P.E, Brazil**
Risk management and energy trading
Assisted in training senior management of Iberdrola's Brazilian subsidiary C.E.L.P.E. in the area of risk management and energy trading.
- 1998–2000 Baltimore Gas & Electric Company**
Sector restructuring
Consultant to Baltimore Gas & Electric Company on sector restructuring.
- 1998–1999 Baltimore Gas & Electric Company**
Valuation of electric power assets
Assisted in developing market value estimates of Baltimore Gas & Electric Company's generation fleet, including Calvert Cliffs Nuclear Power Plant.
- 1998 Confidential Client**
Generation and fuel strategy
Participated in the development of a generation and fuel strategy for a large merchant generator and energy trader.
- 1996 Iberdrola, S.A, Spain**
Restructuring of the electricity sector
Consultant to Iberdrola, S.A. on issues relating to the restructuring of the electricity sector in Spain.
- 1996 Confidential client**
Investment strategy
Consultant to a major southeastern electric utility on investment strategy in the US including valuation of various targets.
- 1996 Confidential client**
Competitive analysis of electric generation

Performed competitive analysis of electric generation market for utilities in eastern US.

- 1996** **New York State Electric and Gas Company**
Restructuring of the electricity market in New York State
Consultant to the New York State Electric and Gas Company on issues relating to the restructuring of the electricity market in New York State.
- 1995–1996** **New York Power Authority**
Sector restructuring
Consultant to senior management of the New York Power Authority on issues relating to the New York Competitive Opportunities Docket.
- 1995** **Southern California Edison Company**
Proposed restructuring of California’s electric services industry
Consultant to Southern California Edison Company on issues relating to the California Public Utilities Commission’s Proposed Policies Governing Restructuring California’s Electric Services Industry and Reforming Regulation.

Publications and Presentations

- 2019** **Republic of Indonesia**
Presentations to Perusahaan Gas Negara, BHP Migas (regulator), and the Ministry of Energy and Mineral Resources of the Republic of Indonesia addressing the design and solicitation of natural gas distribution concessions. October, 2019.
- 2019** **Republic of Indonesia**
Presentations to Perusahaan Gas Negara and BHP Migas (regulator) addressing connection policies and market development strategies for greenfield natural gas distributors. October, 2019.
- 2019** **Florence School of Regulation**
Specialised Training on the Regulation of Gas Markets
Gas Sector Regulation: The US Experience
March 2019.
- 2019** **Electricity Journal**
Could Mexico’s Capacity Market Design Lead to Gaming by Generators?
March 2019.

- 2018** **Perusahaan Gas Negara
Specialized Training**
Conducted specialized training course on the design and award of energy-sector concessions.
December 2018.
- 2018** **Center for Research in Regulated Industries
Eastern Conference**
Mexican Capacity Market Design and Market Power Potential
June 2018.
- 2018** **Florence School of Regulation
Specialised Training on the Regulation of Gas Markets**
Gas Sector Regulation: The US Experience
March 2018.
- 2017** **Electricity Journal**
Beyond net metering: A model for pricing services provided by and to distributed generation owners, such as rooftop solar.
April 2017.
- 2017** **Law Seminars International Electric Utility Rate Case Conference**
Beyond Net Metering: Ratemaking Challenges from Distributed Generation.
Las Vegas, March 16 2017.
- 2017** **Public Utilities Fortnightly**
Interest Rates After the Election: What They Mean for Public Utility Returns.
January 2017.
- 2016** **Perusahaan Gas Negara, Jakarta, Indonesia**
Provided in-depth training on regulatory practice and tariff design for gas pipelines and distribution companies.
December 2016.
- 2016** **Electricity Journal**
Low interest rates and unprecedented stock market volatility: What they mean for your next rate case.
January-February 2016.
- 2016** **An Economic Analysis of the Acquisition of ConocoPhillips' Interest in the Beluga River Unit, A Report Prepared for Chugach Electric Association, Inc. and Anchorage Municipal Light and Power, March 11, 2016.**

- 2016** **Law Seminars International, 12th Annual National Conference on Current Issues in Electric Utility Ratemaking**
Policy Options to Address Cross Subsidies from Self Generation, March 14, 2016
- 2016** **International Arbitration Group of International Law Firm**
Applications of Economic Analysis in International Arbitration (with a focus on the Energy Sector)
New York, January 12, 2016
- 2015** **The Electricity Journal**
Low interest rates and unprecedented stock market volatility:
What they mean for your next rate case
December 2015
- 2015** **Utility Regulation Conference: Rate Case, ROE, and Reliability**
Brave New World for Return on Equity
Washington DC, December 10-11, 2015
- 2015** **Law Seminars International, Energy in the Northeast**
Energy Sector Developments and the Cost of Capital
Boston, September 29, 2015
- 2015** **Law Seminars International, Rate Case Conference**
A Brave New World for Return on Equity
Las Vegas, March 5, 2014
- 2014** **Law Seminars International, Rate Case Conference**
Current Challenges in Determining Appropriate Rates of Return for Public Utilities
Las Vegas, February 28, 2014
- 2014** **National Energy Agency (China) and representatives of the State Grid**
Regulatory Accounting and the FERC Uniform System of Accounts
Beijing, January 16, 2014
- 2012** **Agencia Nacional de Petroleo, Gas Natural e Combustiveis (Brazil)**
Natural Gas Pipeline Regulation in the United States (training course)
Rio de Janeiro, September 18-19, 2012
- 2012** **Center for Research in Regulated Industries Eastern Conference**
Optimal Capital Structures for Regulated Public Utilities: When Does an Imputed Debt Ratio Make Sense for Ratemaking Purposes?
Eastern Conference, Delaware May 18, 2012
- 2012** **Energy Policy Briefing Note**

- The Real Costs of Eliminating Unsecured Credit Lines and Requiring Cash Collateral in OTC Swaps Markets
Co-author: Sharon Brown-Hruska, March 13, 2012
- 2012** **Law Seminars International, Electric Utility Rate Case Conference**
Marginal Cost Pricing for Rate Design
Las Vegas, February 2, 2012.
- 2012** **Center for Research in Regulated Industries**
Advanced Workshop in Regulation and Competition
Gas Pipeline Overearning Investigations
Newark, New Jersey, January 13, 2012.
- 2011** **Working Group of Commercial Energy Firms**
Cost-Benefit Analysis of the CFTC's Proposed Swap Dealer Definition
December 20, 2011.
- 2011** **Law Seminars International, Renewable Energy in the Pacific Northwest**
Abundant Low-Cost Natural Gas? A Driver of Market Activity
August 4, 2011.
- 2011** **Public Utilities Fortnightly**
Zone of Reasonableness: Coping with Rising Profitability a Decade after Restructuring
July 2011.
- 2011** **Law Seminars International, Electric Utility Rate Case Conference**
Rate Design Issues Among Customer Classes
Las Vegas, February 10, 2011.
- 2011** **Advanced Workshop in Regulation and Competition, Center for Research in Regulated Industries**
Decoupling and the Cost of Equity
Newark, New Jersey, January 14, 2011.
- 2010** **New York State Bar Association, Business Law Section Committee on Public Utility Law**
Getting Renewables to Market: The Importance of Transmission Ratemaking Policy
New York, July 24, 2010.
- 2009** **Law Seminars International Conference, Renewable Energy in New England**
Getting Renewable Power to Market
Boston, June 25, 2009.

- 2008** **Report for Baltimore Gas & Electric and Allegheny Power**
Evaluation of Longer-Term Procurement Plans
October 1, 2008.
- 2008** **Electricity Journal**
The Continuing Rationale for Full and Timely Recovery of Fuel Price
Levels in Fuel Adjustment Clauses
July 2008.
- 2008** **Energy in the Southwest Conference**
Natural Gas as a Fuel: Will There Be Enough? At What Prices?
July 22, 2008.
- 2007** **NERA Economic Consulting**
The Line in the Sand: The Shifting Boundary Between Markets and
Regulation in Network Industries.
Coauthor.
- 2007** **Electric Utility and Natural Gas Interdependency**
Managing Risk in Interdependent Gas and Power Markets
Houston, March 6, 2007.
- 2004** **Electricity Journal**
FERC Imposes New Constraints on Utility Procurement
October 2004.
- 2003** **Northeast Gas Storage and Supply Strategies**
Can Your Capital Structure Handle Today's Market, Credit and Liquidity
Risks?
Boston, June 17, 2003.
- 1996** **World Bank**
Regulatory and institutional reforms in the Chinese power sector
Contributor, 1996.
- 1993** **World Development**
Political Economy, Convergence and Growth in Less Developed Countries
Coauthor, 1993.

August 2020

**BEFORE THE
IDAHO PUBLIC UTILITIES COMMISSION
CASE NO. IPC-E-22-22**

IDAHO POWER COMPANY

ATTACHMENT 2

REQUEST FOR PRODUCTION NO. 22: Please explain the fuel hedging value that exists under each of the following avoided energy inputs for an Export Credit Rate (“ECR”):

- a) Integrated Resource Plan – Idaho Power Price
- b) ICE Mid-C Index Price
- c) Energy Imbalance Market Load Aggregation Point (“ELAP”) Price

Response

a-c) A fuel hedging value exists for any supply source whose cost that is not linked directly to volatile natural gas prices. Thus, for each of the electricity market-based export credit rates listed above, which are dependent on natural gas market prices, there is little or no fuel hedge value. Electricity market prices are directly impacted by natural gas market prices. Rather, it is the behind the meter solar generation serving the customer’s load that provides a hedge against the gas-cost sensitive utility supply costs that otherwise would have to be incurred by IPC. To be conservative, and to recognize that IPC proposed export credit rates will fluctuate with natural gas prices, we removed exports from the fuel hedge value.