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Before the Public Service Commission

of the State of Missouri

Surrebuttal Testimony

of

Aaron Doll

July 2017

Empire District
A Liberty Utilities Company

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AARON DOLL
ON BEHALF OF
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION
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SURREBUTTAL TESTIMONY
OF
AARON DOLL
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION
CASE NO. EO-2017-0065

I. INTRODUCTION

Q. ARE YOU THE SAME AARON DOLL WHO PROVIDED DIRECT TESTIMONY IN THIS CASE ON BEHALF OF THE EMPIRE DISTRICT ELECTRIC COMPANY ("EMPIRE" or "COMPANY")?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY IN THIS CASE BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION ("COMMISSION")?

A. The purpose of my surrebuttal testimony is to respond to the rebuttal testimonies of the Office of the Public Counsel ("OPC") witnesses Lena Mantle, John Riley, and Charles Hyneman.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. OPC has failed to provide evidence of imprudence on the part of Empire with regard to its Fuel Adjustment Clause ("FAC") costs for the audit period, and OPC continues to evaluate Empire's hedging program based on "perfect information" rather than the information available at the time hedges were placed. My surrebuttal testimony also addresses these important points:

1) Empire has maintained compliance with its Risk Management Policy ("RMP"), which includes a flexible and comprehensive approach to managing risks associated with natural gas procurement for electric generation;

2) Empire's RMP provides a structural framework while allowing for strategy adjustments to be made without overhauling the entire policy;

3) "Losses" and "gains" are relative terms used in comparison to a settled market price, not absolutes;

4) OPC has provided no proof that Empire ignored information and made reckless hedging transactions;

5) History and commodity literature shows us the natural gas market will change at some point, requiring utilities to be prepared for volatility rather than reactive; and

6) Empire's hedging program has provided effective management of price volatility risk, in addition to other risks, when evaluated over the 15-year life of the program.

Empire stands behind its hedging program, as defined in the RMP. Empire is always willing to listen to alternative policy suggestions, including those regarding hedging and the mitigation of various risks, but it would be imprudent for Empire to cease all hedging activities as urged by OPC.

Q. ON PAGE 2, LINE 16, OF HIS REBUTTAL TESTIMONY, MR. HYNEMAN STATES THAT YOU ARE AN AUDITOR. IS THIS CORRECT?

A. No. I am not an auditor and I did not claim to be one in previous testimony. My qualifications and experience are discussed on page 1 of my direct testimony.

II. AUDIT, REVIEW, AND DEFINITION OF PRUDENCE

Q. ON PAGES 5 AND 6 OF HIS REBUTTAL TESTIMONY, MR. HYNEMAN EXPRESSES HIS OPINION REGARDING THE COMMISSION REQUIRING STAFF TO USE GAAS IN ITS FAC PRUDENCE REVIEWS. DO YOU SHARE THIS SAME OPINION?

A. If the Commission would like to consider changing this practice going forward, Empire recommends a collaborative process involving all stakeholders. Throughout his rebuttal testimony, Mr. Hyneman asserts that the Commission's and Staffs reviews are not stringent enough. Staff and the Commission, like Empire, are operating within the current laws and regulations. A utility's FAC prudence review is not the proper venue for utility-wide practice changes.

Q. MR. HYNEMAN STATES THAT HE BELIEVES STAFF SHOULD BE REQUIRED BY THE COMMISSION TO PERFORM BOTH FAC PRUDENCE REVIEWS AND FAC COST AUDITS OF MISSOURI ELECTRIC UTILITIES. DO YOU AGREE?

A. If the Commission would like to consider changing this practice going forward, Empire recommends a collaborative process involving all stakeholders. As part of the conclusion of this proceeding, Empire suggests that the Commission open a docket to consider a mechanism for Commission and/or stakeholder review and approval of each electric utility's hedging strategy. Prior review and express approval would prevent the types of unfounded allegations being made in this case from being made in future proceedings. It appears that the industry is again in a situation like the one that lead to the Commisson opening a hedging working docket in 2013. The hedging working docket is discussed in the surrebuttal testimony of Empire witness Rob Sager.

Q. PLEASE RESPOND TO MS. MANTLE'S STATEMENT FROM REBUTTAL TESTIMONY ON PAGE 3 LINE 22 THAT EMPIRE HAS NEVER BEEN FOUND PRUDENT AND RATHER HAS ONLY NOT BEEN FOUND TO BE IMPRUDENT.

A. OPC's arguments provide confusion around the real issue. On page 4, lines 6-17, of Mr. Hyneman's direct testimony, he sets forth his understanding of the prudence standard from the Commission's Report and Order in Case GR-2004-0273. The excerpt cited in Mr. Hyneman's testimony includes the language "…the standard adopted by the commission recognizes that a utility's costs are presumed to be prudently incurred, and that a utility need not demonstrate in its case-in-chief that all expenditures are prudent." Based on OPC's own understanding of the prudence standard, it appears that if no imprudence was found, then prudence is presumed. The real question is not whether no imprudence is the same as prudence, but rather whether Empire has ever been found to be imprudent in its FAC prudence reviews. The answer to this question is no.

III. OPC'S MISREPRESENTATION OF RMP AS A BUDGETING TOOL

Q. WHAT ISSUE DO YOU TAKE WITH MR. HYNEMAN SUMMARIZING YOUR POSITION ON EMPIRE'S HEDGING PROGRAM AS SIMPLY "A BUDGETING TOOL"?

A. On page 5, line 24, of my direct testimony, I state that "(h)edging insulates both the customers and the utility from rapid price variances and allows for consistent budgeting and planning by both parties." Mr. Hyneman unfairly parsed my statement to make it seem that Empire's hedging activity was solely for purpose of budgeting rather than what I describe as protecting **both the customer and utility** from adverse price movement, which allows for more consistent budgeting and planning for both parties. Furthermore, in the next paragraph (page 20, lines 15-16), Mr. Hyneman states that Empire's hedging program "…may be beneficial to shareholders as it may act to manage and smooth out annual earnings." However, on the next page (page 21, line 4), Mr. Hyneman declares that "[Empire's] shareholders have zero exposure to hedging losses." I am not sure how Mr. Hyneman can reconcile his own opposing opinions, all of which are without evidence, but it certainly supports the notion that OPC has not provided any evidence of Empire's imprudence.

Q. MR. HYNEMAN APPEARS INCREDULOUS REGARDING YOUR STATEMENT THAT HEDGING ALLOWS FOR EMPIRE CUSTOMERS TO BUDGET AND PLAN. IS EMPIRE'S ASSERTION THAT HEDGING ALLOWS CUSTOMERS TO BUDGET AND PLAN UNUSUAL?

A. No, not at all, which is why I am perplexed by this statement as much as anything else in OPC's testimony in this case. As stated in Empire witness Blake Merten's surrebuttal testimony, approximately 40% of Empire's generation is sourced from natural gas generators. I don't believe that OPC or Empire argues with the fact that natural gas hedging ought to provide insulation to price spikes. In fact, as referenced on page 4, lines 20-21, above, Mr. Hyneman states that a "natural gas hedging policy ought to protect ratepayers from rapid increases in utility rates due to rapid increases in fuel costs." Mr. Hyneman clearly draws a straight line from utility rates to fuel costs, yet he seems puzzled by the notion that steady utility rates would enable an individual to plan and budget.

<u>IV. OPC'S MISCONCEPTIONS REGARDING NATURAL GAS MARKETS AND FORECASTS</u>

Q. MR. HYNEMAN REFERS TO THE CURRENT NATURAL GAS MARKET AS NON-VOLATILE. IS THIS AN ACCURATE DESCRIPTION OF THE CURRENT MARKET?

A. No, not in my opinion.

Q. PLEASE EXPLAIN.

A. Volatility is relative, and the volatility that is experienced in today's natural gas market is less than the volatility experienced 10-15 years ago. However, a relative dampening of volatility should not be confused with an absence of volatility. Furthermore, it is easy to fall into the trap that OPC is setting regarding current prices being a perfect harbinger of future prices. In a Utility Dive article (Appendix AD-1) published on July 19, 2017, it is argued by commodity experts at the National Association of Regulatory Utility Commissions ("NARUC") summer meetings that volatility is being primed to increase due to an underestimation of future demand that is a direct result of the lower prices being reflected in the natural gas market. Andrew Weissman, the founder of EBW analytics, informed the audience at NARUC that the lower natural gas prices attract an increase in demand. Mr. Weissman goes on to describe increases in natural gas generating facilities, pipeline exports to Mexico, and the primary driver of increased demand which is liquefied natural gas (LNG) exports. Mr. Weissman provides support for the increased LNG export capability by pointing to the more than $40 billion in LNG export facilities currently being built. Mr. Weissman cautions that even though the United States is among the most agile with regard to drilling, the lag between increased demand and expansion in supply will likely lead to sharp price spikes. The arguments made by Mr. Weissman are no different than the Fortnightly article appended to Mr. Hyneman's testimony or the

Enerknol article appended to Mr. Riley's testimony, in that lower natural gas prices cycle and lower prices will result in increased demand.

Q. ON PAGE 7, LINES 21-24, OF MR. RILEY'S REBUTTAL TESTIMONY HE INSISTS THAT EMPIRE WAS IGNORING READILY AVAILABLE NATURAL GAS PRICE FORECASTS PREDICTING LOWER FUTURE PRICES. IS THIS TRUE?

A. No. Once again, Mr. Riley is creating confusion where there should be none. On page 8, lines 3-9, of his rebuttal testimony, Mr. Riley describes a December 2011 EIA forecast predicting lower prices for 2012, which would average to $3.70/MMBTu. Although Empire did not purchase any natural gas in December 2011, Mr. Riley intimates that this information was the type that would be ignored by Empire. The reality is that the NYMEX forward curves from December 2011 reflected similar pricing to this EIA forecast. Table AD-1 below, which is culled from Empire's Gas Position Report, provided to OPC in response to OPC DR 1327, clearly depicts that the NYMEX forward prices in December 2011 for 2012 delivery <u>were in line with the EIA forecast</u>, and lower in most of the cases. Again, on page 8, lines 15-22, Mr. Riley makes the same claim that an EIA forecast estimating Henry Hub natural gas for 2014 is expected to average $3.84/MMBTu and that Empire was ignoring this sort of information. Again, Empire did not transact for any hedges in November 2013, and the NYMEX forward curves in November 2013 for 2014 delivery also reflect nearly the same prices as the EIA forecast, as indicated in table AD-2 below. Furthermore, waiting until November or December to determine the outlook for the next year would not give an entity an opportunity to hedge if natural gas costs were estimated to increase. On page 11 of his rebuttal testimony, Mr. Riley continues this practice of attempting to provide evidence of "reckless behavior" on the part of Empire when he mistakenly describes positions transacted in 2011 that were actually an aggregate of positions transacted from 2010 to 2011 and which are described on pages 3-5 of my rebuttal testimony. Mr. Riley points to an EIA forecast providing an "average" 2015 figure that is certainly not intended to represent the July 2015 and August 2015 positions of which he is critical (summer months tend to be higher priced). Mr. Riley further indicates on page 11, line 20, that forecasts estimated that natural gas prices were not supposed to reach the $5.44/MMBTu[1] level until 2026. Although his Figure 16 on page 9 lines 6-22 support this claim, it is also worthy to note this information was published in June of 2012, which is 6 to 18 months after those positions were executed.

Q. PLEASE SUMMARIZE THE INACCURACIES OF MR. RILEY'S STATEMENT THAT EMPIRE WAS IGNORING READILY AVAILABLE NATURAL GAS PRICE FORECASTS PREDICTING LOWER FUTURE PRICES.

A. In summary, Mr. Riley selectively provides forecasts which are meant to estimate natural gas prices for an entire year to critique an individual transaction in a higher priced month. Mr. Riley often times provides EIA forecasts in months in which Empire does not have any transactions, and concludes that these forecasts provide support for his position that Empire was ignoring information and procuring positions "outside of the money". Furthermore, Mr. Riley does not even validate these objections with the NYMEX forward curves of a similar time frame, which often times show future prices similar to or lower than the EIA forecasts. This is continued

[1] John S. Riley Direct Testimony, Schedule JSR-D-3

evidence that OPC is not movitated to fairly and prospectively evaluate Empire's hedging activity, but rather prefers to critique in hindsight.

AD-1

	NYMEX Futures Prices (NG) As Of:				
Future Months	12/2/2011	12/9/2011	12/16/2011	12/23/2011	12/31/2011
1/1/2012	3.584	3.317	3.127	3.114	3.084
2/1/2012	3.613	3.353	3.174	3.147	2.989
3/1/2012	3.621	3.367	3.204	3.184	3.016
4/1/2012	3.660	3.411	3.263	3.249	3.079
5/1/2012	3.699	3.455	3.308	3.302	3.131
6/1/2012	3.742	3.497	3.353	3.351	3.182
7/1/2012	3.796	3.547	3.407	3.410	3.243
8/1/2012	3.826	3.573	3.434	3.439	3.276
9/1/2012	3.830	3.577	3.437	3.442	3.283
10/1/2012	3.867	3.613	3.471	3.477	3.322
11/1/2012	4.011	3.750	3.608	3.616	3.479
12/1/2012	4.297	4.027	3.881	3.894	3.757
Average	3.796	3.541	3.389	3.385	3.237

Average of average
3.469

AD-2

	NYMEX Futures Prices (NG) As Of:				
Future Months	11/1/2013	11/8/2013	11/15/2013	11/22/2013	11/29/2013
1/1/2014	3.591	3.616	3.708	3.811	3.954
2/1/2014	3.598	3.624	3.713	3.811	3.957
3/1/2014	3.587	3.615	3.703	3.801	3.944
4/1/2014	3.571	3.600	3.685	3.777	3.902
5/1/2014	3.598	3.626	3.708	3.795	3.915
6/1/2014	3.635	3.661	3.742	3.825	3.940
7/1/2014	3.673	3.699	3.780	3.860	3.971
8/1/2014	3.688	3.716	3.794	3.873	3.983
9/1/2014	3.679	3.709	3.784	3.862	3.970
10/1/2014	3.693	3.724	3.796	3.876	3.985
11/1/2014	3.758	3.790	3.856	3.938	4.043
12/1/2014	3.898	3.927	3.979	4.057	4.162
Average	3.664	3.692	3.771	3.857	3.977

Average of average
3.792

V. OPC'S MISREPRESENTATION OF LIBERTY UTILITIES COMPANY'S GAS HEDGING PROGRAM CHANGES

Q. ON PAGE 24 OF HIS REBUTTAL TESTIMONY, MR. HYNEMAN INTRODUCES THE STATE OF NEW HAMPSHIRE PUBLIC UTILITIES

COMMISSION (NHPUC) DOCKET NO. DG-13-133, LIBERTY UTILITIES (ENERGYNORTH NATURAL GAS CORP) D/B/A LIBERTY UTILITIES, PETITION TO CHANGE HEDGING AND FIXED PRICE OPTION PROGRAMS. IS THIS THE CORRECT DOCKET NUMBER?

A. No. The case was filed under NHPUC Docket DG-14-133.

Q. AT THE TIME OF THE FILING OF THE CASE ABOVE WAS LIBERTY UTILITIES A PARENT COMPANY OF EMPIRE?

A. No. Liberty Utilities did not complete the acquisition of Empire until January 1, 2017.

Q. WAS LIBERTY UTILITIES A PARENT COMPANY OF EMPIRE DURING THE AUDIT PERIOD?

A. No. The audit period was from March 2015 – August 2016. Liberty Utilities did not complete the acquisition of Empire until January 1, 2017.

Q. IS THE ABOVE MENTIONED NHPUC CASE COMPARABLE TO EMPIRE'S FAC PRUDENCY REVIEW?

A. No. The New England area of the country faces different challenges in their gas market than the Midwest due to geographical and infrastructure differences. Furthermore, the NHPUC reviews and approves gas hedging plans prior to implementation. Therefore, deviations from strategies require a filing to request approval. Currently, the Commission does not specifically approve of an electric utility's hedging plans. Rather, the utility's policies and strategies are considered and evaluated during various rate proceedings, as well as File No. EW-2013-0101, the investigatory docket to review the hedging policies and procedures of Missouri's electric utilities which is mentioned above. It should be noted that Empire is in favor of the Commission implementing a mechanism for electric utilities to present hedging plans to stakeholders for review and approval, prior to their implementation, to forestall prudency questions related to overall policies in differing market conditions.

Q. ON PAGE 25 LINE 2 OF HIS REBUTTAL TESTIMONY, MR. HYNEMAN STATES LIBERTY UTILITIES PROPOSED TO STOP NATURAL GAS HEDGING. DID LIBERTY UTILITIES REQUEST TO STOP NATURAL GAS HEDGING?

A. No. On page 2 of Liberty Utilities witness Francisco C. DaFonte's direct testimony, he states, "The purpose of my testimony is to present the Company's proposal to **modify** its existing commodity hedging program to better stabilize the cost of natural gas supplies acquired to serve its customers." Mr. DaFonte goes on to say on page 3, "The Company's current program which was approved by Commission Order 25,094, uses various financial risk management tools and underground storage in order to provide more price stability in the cost of gas to firm sales customers and to fix the cost of gas for participants in the Company's Fixed Purchase Option Program. It is not intended to achieve reductions in customers' overall gas costs."

Q. HOW DID LIBERTY UTILITIES MODIFY THEIR STRATEGY?

A. Liberty Utilities determined the NYMEX/Henry Hub hedges, settled at a location in Louisiana, were not as addressing the differences in market conditions and volatility in New England in contrast to the comparatively stable conditions in Louisiana. The difference in price between the Henry Hub location and other locations is often referred to as basis differential. As a result, Liberty Utilities began to use hedges against the basis differential to be more effective against price fluctuations in their delivery area.

Q. DOES THE STATEMENT ABOVE ALIGN WITH EMPIRE'S CURRENT HEDGING STRATEGY?

A. Yes. Empire's RMP also allows for various financial tools to be utilized for the purpose of providing price stability. Empire would have been able to take the same actions with no adjustment to the RMP, due to the broad framework and various instruments currently defined in the RMP.

VI. OPC'S MISREPRESENTATIONS RELATED TO EMPIRE'S DATA REQUEST RESPONSES

Q. ON PAGE 23 LINE 8 OF HIS REBUTTAL TESTIMONY, MR. HYNEMAN SAYS EMPIRE WAS NOT RESPONSIVE TO OPC'S REQUEST FOR INFORMATION RELATED TO ITS NATURAL GAS HEDGING POLICIES AND PROCEDURES FROM PRIOR TO THE REVIEW PERIOD. IS THIS TRUE?

A. No. Empire has received numerous data requests from OPC. As of July 20, 2017, Empire had responded with nearly 1 Gigabyte of data in documentation, work papers, and responses. Objections were filed on a portion of the questions for various reasons but were generally due to overlybroad, irrelevant, and burdensome requests. Subject to its objections, however, Empire provided nearly all information requested. As of June 22, 2017, when rebuttal testimony was filed, all data requests received were answered with the exception of one part of one question for which the Commission granted relief to Empire in an order issued May 3, 2017, in this docket.

Q. ON PAGE 23 LINE 11 OF HIS REBUTTAL TESTIMONY, MR. HYNEMAN STATES, "THIS REFUSAL TO PROVIDE RELEVANT INFORMATION TO THE OPC REFLECTS A SIGNIFICANT AND FUNDAMENTAL LACK OF

UNDERSTANDING ON THE PART OF EMPIRE ABOUT THE APPROPRIATE NATURE AND DESIGN OF A FAC PRUDENCE AUDIT." DID EMPIRE REFUSE TO PROVIDE ANY RELEVANT INFORMATION?

A. No. Empire expended significant employee time and resources in an effort to provide the OPC with all requested information. As stated above, as of the filing of rebuttal testimony, only one portion of one request was not answered, and this was due to the relief granted to Empire by the Commission.

Q. REFERENCING MR. HYNEMAN'S STATEMENT IDENTIFIED IN THE PREVIOUS QUESTIONS, PLEASE RESPOND TO THE ALLEGED "SIGNIFICANT AND FUNDAMENTAL LACK OF UNDERSTANDING ON THE PART OF EMPIRE."

A. Empire appreciates the role OPC plays in service to its customers and hates to state that the lack of understanding appears to be on the part of OPC, not Empire. Based on the questions asked in the numerous data requests, it appears OPC is confused regarding the fundamentals of natural gas procurement and the financial tools available. Data requests such as "Define natural gas forward curve" as well as requests to evaluate prudency of hedging based on an image of one set of monthly prices provide indication that OPC does not understand the dynamic nature of natural gas prices on a daily, hourly, and even minute by minute basis. Likewise, a hedging program cannot be evaluated based only on price. Other considerations, as discussed in Mr. Sager's surrebuttal testimony on page 2, must be considered to ensure Empire has fuel to generate electricity.

Q. ON PAGE 23 LINE 22 OF HIS REBUTTAL TESTIMONY, MR. HYNEMAN STATES, "WITHOUT THIS DATA, OPC COULD NOT PERFORM A BASIC

PRUDENCE AUDIT REVIEW OF THE INFORMATION KNOWN BY MANAGEMENT…" IS THIS STATEMENT MISLEADING?

A. Yes. As stated in the previous questions and answers, as of the filing of rebuttal testimony, all data requested was provided to OPC with the single exception of information the Commission determined should not be produced. In addition, it should be noted that this prudence review docket was opened on September 6, 2016. Staff and OPC sent their initial data requests in September and October. OPC, however, only sent five data requests in the six months prior to February 28, 2017, when Staff issued the audit report. As stated in Mr. Hyneman's rebuttal testimony on page 12, line 25, OPC began its focus on FAC prudence audits in relation to natural gas hedging in early 2016. OPCs concerns regarding natural gas hedging practices are also well documented in the rebuttal testimony of OPC witness Riley in File No. ER-2016-0023. OPC had ample time to submit data requests and perform analysis in the six months after this file was opened, yet the burden is placed on Empire to provide vast amounts of data in a short period of time. Empire has expended a great deal of employee resource time to accommodate OPC's requests and lack of planning, yet OPC continues to malign the Company as unresponsive.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes.

Utility DIVE

FEATURE

NARUC 2017: Are the days of cheap natural gas numbered?

Higher demand for gas could spark greater price volatility and spell bad news for the climate, analysts said.

By **Gavin Bade** • July 19, 2017

If there's one defining feature of the modern U.S. electricity sector, it's low gas prices.

Since advances in fracking and horizontal drilling lowered the price of gas at the beginning of the decade, the fuel has taken the sector by storm. Last year, gas surpassed coal as the top power generation resource, and the low prices have enabled the coal-to-gas switching that's responsible for most U.S. CO2 emission reductions to date.

At the summer meetings for the National Association of Regulatory Utility Commissions (NARUC) in San Diego this week, Suzanne Lemieux, manager of midstream operations for the American Petroleum Institute, put the supply boom into stark relief. Looking back at the 2012 EIA Annual Energy Outlook — an influential yearly energy report from the federal government — she said gas production over the past five years has exceeded even its most aggressive predictions.

"We've been able to outpace even the highest [estimated] case in production and that is largely due to the competitive nature of the oil and gas industry," she said.

Looking ahead, Lemieux said EIA's most recent projections see a continuation of cheap to moderately-priced gas for decades to come, cementing its role as a central generation resource: "Out to 2040, we still see a spread of between $3.40 to $5 [per mmBtu], so out to 2040 with available resources we still see an extremely competitive resource that we're able to extract."

But those EIA estimates rely on some faulty assumptions, according to Andrew Weissman, founder of EBW Analytics, a market research firm.

“What studies do that I think is important to understand is essentially they assume you already know how much [gas] we're going to need, so producers can plan ahead of time,” he said. “What actually happens with natural gas prices though already ... is that there are important portions of demand that can't be regularly predicted ... and that can cause very high levels of price volatility.”

Weissman cautioned conference attendees that coming changes in the export market and consumption from gas generators could create conditions for intense price spikes in the near future. And as that gas consumption increases, his brother — Steve Weissman of the Center for Sustainable Energy — warned that expanded use of the resource could push the U.S. over its two-degree carbon budget.

Volatility on the horizon

Even given the explosive growth of natural gas production in this decade, EBW’s Weissman said "we’re still at an early stage of the unprecedented growth in natural gas produced in the U.S.”

“We're likely to see at least a 20 bcf/day increase over the period of the next few years — it could be greater — triggered by increases across the board,” he said. “A lot of it is baked in with new combined cycle [gas generation] units being built right now and ... pipeline exports to Mexico, but perhaps the most important part is we are starting to see explosive growth in U.S. LNG export capability.”

There are more than $40 billion in new LNG export facilities currently being built, Weissman said — a stark contrast to a decade ago, when U.S. gas companies were configuring import terminals to bring in the resource from abroad.

While questions remain about how many facilities will be completed and what their utilization rates will be, “there's no question that there will be a tremendous increase in the demand for natural gas and we could see even more growth further down the line," he added.

That could pose a problem for generators and gas utilities alike. Already, Weissman said, natural gas is prone to price volatility because it is expensive to store and most storage facilities exist to smooth out seasonal shifts in demand. Because winter demand for gas is difficult to predict — mostly contingent on weather — it's easy for demand to outpace local supplies and lead to higher prices.

U.S. gas production is among the most nimble drilling industries in the world, but even it would take "the better part of a year" before it could respond to tight winter supplies with enhanced production, "so you may for a period of many months have sharp price spikes."

The coming increases in gas demand driven by LNG exports could "multiply this volatility several-fold," Weissman said.

Just two years from now, Weissman said NARUC could be holding panel discussions about "the severe price spikes in 2019" due to high demand for LNG and a cold winter worldwide.

While it's just a hypothetical scenario, Weissman said you could see a situation where the primacy of U.S. LNG would mean that during periods of high domestic demand, "the local distribution utilities would have to bid against national energy companies around the world for scarce supply, driving up prices."

Exacerbating the issue is the continued difficulty in siting natural gas infrastructure — particularly pipelines, which are stalled in New England due to citizen opposition — and the need for more gas storage, Weissman said.

"We do not have a plan to build all the natural gas pipeline infrastructure we're going to need for the market to function typically by later in this decade," he said, "and that could lead to price spikes and regional variations in gas prices."

The climate question

EBW's Weissman said gas can "play a major role" in moving to a deeply decarbonized grid, along with renewables, nuclear and other resources. But his brother, a senior policy advisor for the Center for Sustainable Energy and a former Administrative Law Judge for the California PUC, warned that the coming increase in gas demand could scuttle those climate efforts.

No one has pinpointed a time when they expect natural gas demand to begin to decrease, CSE's Weissman said, and the continued build-out of gas infrastructure to meet it could mean more economic and political pressure to keep gas use rising.

"The history of the U.S. does not support the notion that as we move toward renewable energy that we're naturally going to put fossil fuels in the rearview," he said. "We have to be more affirmative about how we're going to get to that point if that's where we're going to go."

The problem is that while gas has contributed to carbon mitigation to date, it is still an emitting resource. And if the U.S. wants to move to a deeply decarbonized grid, gas will soon become an impediment, rather than a facilitator to that goal, assuming its carbon is not captured.

Using EIA estimates for gas demand out to 2050 — which tend to be conservative — Weissman said the resource could account for the U.S.'s entire carbon budget.

Assuming the U.S. wants to hit an economywide decarbonization target of 80% by 2050, "the question is what would that level of gas consumption do in terms of meeting a share of the overall budget of GHG emissions in 2050," Weissman said. "The answer is — just from smokestack emissions alone, natural gas would take all of the available GHG emissions. Nothing left for agriculture, transportation or anything else."

There are already some researchers who think we've already hit the point where gas could inhibit decarbonization. Writing in the journal *Applied Energy* last year, Oxford researchers said that due to the long life of fossil fuel assets, "no new investment in fossil electricity infrastructure (without carbon capture) is feasible from 2017 at the latest" if we are to hit the targets of the Paris climate accord.

Weissman said the situation may be even more dire. While most studies assume a 25 to 30 year life for natural gas assets, many plants on the system today "are far in excess of that age in terms of operation."

He said his team looked at the lifespan of natural gas plants in California, trying to ascertain how long a typical generator could stay online.

"The question was if someone was to step forward today and say to you we're thinking of building a natural gas plant, what should you have in mind in terms of how long there's going to be economic and political pressure to keep that plant operating?" he said. "What we found was that if combined cycle units of the future are behaving in the same way that these plants have historically behaved, you should expect that ... even in the best of circumstances ... you can expect that plant to be operating beyond 2050."

That's bad news for the climate, Wiessman said, and regulators should take those implications into account when they evaluate siting for new natural gas infrastructure. "Even if that's all you do, having that [perspective] available and to reflect on that as you make new infrastructure decisions and new rate setting decisions should help ... increase the extent to which we move from just hoping the market is going to take care of natural gas for us and start to more directly plan."

Not all the attendees at the NARUC gas panel were keen to heed Weissman's call for a planned drawdown in natural gas consumption. Maine PUC Commissioner Bruce Williamson argued that market forces are responsible for the current boom in gas production and clean energy. "God help us" if regulators try to plan the transition, he said, triggering applause around the room.

Weissman replied that while markets sparked the gas boom, relying on them to guide the rest of the transition will mean "it's pretty likely we're going to continue to use fossil fuels."

"I think what's going to happen is the more go about renewables, for instance, the lower the price is going to be for fossil fuels," he said. "There's going to continue to seem to be an economic imperative to continue to use fossil fuels because we will be concerned that if we don't, we will drive up the price of electricity, for instance, unnecessarily. So, yes, I think the planning is a way to break this pattern that we've been seeing."

AFFIDAVIT OF AARON J. DOLL

STATE OF MISSOURI)
) ss
COUNTY OF JASPER)

On the 28th day of July, 2017, before me appeared Aaron J. Doll, to me personally known, who, being by me first duly sworn, states that he is the Director Electric Procurement of The Empire District Electric Company and acknowledges that he has read the above and foregoing document and believes that the statements therein are true and correct to the best of his information, knowledge and belief.

Aaron J. Doll

Aaron J. Doll

Subscribed and sworn to before me this 28th day of July, 2017.

ANGELA M. CLOVEN
Notary Public - Notary Seal
State of Missouri
Commissioned for Jasper County
My Commission Expires: November 01, 2019
Commission Number: 15262659

Angela M. Cloven

Notary Public

My commission expires: 11/01/2019.