Matthew R. Bernier
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Duke Energy Florida, LLC.

March 6, 2017

VIA ELECTRONIC FILING

Ms. Carlotta Stauffer, Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: *Analysis of IOUs' Hedging Practices; Docket No. 170057-EI*

Dear Ms. Stauffer:

Please find enclosed for electronic filing on behalf of Duke Energy Florida, LLC ("DEF"), DEF's Redacted Comments regarding the Hedging Workshop. DEF's Notice of Intent to Request Confidential Classification has been contemporaneously filed through the Commission's e-filing portal.

Thank you for your assistance in this matter. Please feel free to call me at (850) 521-1428 should you have any questions concerning this filing.

Respectfully,

s/Matthew R. Bernier

Matthew R. Bernier
Senior Counsel
Matthew.Bernier@duke-energy.com

MRB/mw
Enclosures

Duke Energy Florida, LLC
Docket No.: 170057
CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished via electronic mail this 6th day of March, 2017 to all parties of record as indicated below.

s/Matthew R. Bernier
Attorney

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Analysis of IOUs' hedging practices.	**Docket No. 170057-EI** **Filed: March 6, 2017**

DUKE ENERGY FLORIDA'S
POST-WORKSHOP COMMENTS ON NATURAL GAS HEDGING

Duke Energy Florida, LLC ("DEF" or "the Company") submits the following Post-Workshop Comments, requested by Florida Public Service Commission ("Commission") Staff at the conclusion of the Workshop conducted February 21, 2017. DEF's comments are organized pursuant to the three issues Staff identified at the Workshop:

I. Is it in the consumers' best interest for the utilities to continue natural gas financial hedging activities? (Issue 1A from Docket No. 160001-EI)

Whether or not the financial hedging of natural gas continues in Florida is a matter of policy that must be determined by the Commission. DEF has remained consistent in its position that managing fuel cost volatility via Commission-approved risk management activities provides benefits to customers, especially given the prevalence of natural gas in DEF's fuel mix. The Company's annual risk management plans ("RMP"), filed for Commission approval in the recurring fuel and purchased power cost recovery docket ("Fuel Docket"), have been designed to mitigate fuel cost volatility in a non-speculative fashion in accordance with the Commission's policy as expressed in Order Numbers PSC-02-1484-FOF-EI and PSC-28-0667-PAA-EI (the "Hedging Orders"). While DEF maintains that its risk management activities have successfully

mitigated fuel cost volatility, it recognizes that there have been opportunity costs to customers in the form of foregone opportunities to fully participate in downward market conditions. Ultimately, the proper balance between the benefits of hedging and the potential for opportunity costs must be struck by the Commission.

II. What changes, if any, should be made to the manner in which electric utilities conduct their natural gas financial hedging activities? (Issue 1B from Docket No. 160001-EI)

Assuming that Issue 1 discussed above is answered in the affirmative, the Commission must make a threshold determination of what it intends to accomplish with the continued financial hedging of natural gas. That is, the Commission must determine if the goal of financially hedging natural gas is to mitigate fuel price volatility as outlined in the Hedging Orders or to respond to the risk of cost increases in the natural gas markets while managing exposure to hedging costs as proposed by Mr. Gettings. Only after the Commission has determined the proper goal can an appropriate approach for meeting that goal be determined.

a. What changes, if any, should be made to the manner in which electric utilities conduct their natural gas financial hedging activities if the goal of hedging remains the mitigation of fuel cost volatility?

The Hedging Orders identify fuel price volatility mitigation for the benefit of customers as the goal of the IOUs' financial hedging practices. If that goal is retained, the Commission should approve financial hedging procedures structured in a similar manner as those approved in previous years. By approval of the IOUs' annual RMPs, the Commission has consistently found that the current hedging framework is a prudent method to meet this objective. Any alterations to that framework should be considered on an annual basis when the Commission reviews the IOUs' respective RMPs.

However, it is appropriate for the hedging programs to be reevaluated periodically and DEF understands the concerns over historical hedging costs. Those concerns and historical costs have to be viewed in the context of the historical period in which they occurred. For illustration, on July 3, 2008, the 2009, 2010, and 2011 forward market costs were approximately $12.67, $11.34, and $10.73,[1] respectively. However, actual NYMEX last day settlement prices for the applicable delivery months in 2009, 2010, and 2011 were $3.99, $4.39, and $4.04, respectively. Hence net aggregate hedge costs accrued over those time periods. In contrast, as of February 28, 2017 closing prices the forward market prices for 2018, 2019, and 2020 were approximately $2.93, $2.83, and $2.84, respectively. *See* Attachment A. The point of this illustration is to outline the current level of forward prices and how much lower they are relative to prior periods when forward hedging transactions were being executed and to outline that the forward market is currently at or near historically low prices. While it is possible that spot prices could ultimately settle lower than these forward prices, market entry is now at a significantly lower entry price and thus there is decreased hedge loss potential on a price basis given current price levels. Moreover, natural gas usage as a percentage of DEF's fuel mix (from owned generation) has increased from approximately 38% (2008) to 72% (2017 projection), meaning that natural gas price increases and volatility will have a correspondingly larger effect on customer bills.

As stated above, whether to continue the policy of financially hedging natural gas is a decision for the Commission, but DEF believes it is appropriate to consider both historical outcomes and the current market environment when making that decision.

b. What changes, if any, should be made to the manner in which electric utilities conduct their natural gas financial hedging activities if the goal of hedging is modified to the dual purposes of responding to the risk of cost

[1] All prices are per MMBtu.

increases in the natural gas markets while also managing exposure to hedging costs?

If the Commission determines that the new goal of the financial hedging programs should be both mitigating against natural gas price level increases while mitigating potential hedge costs in the event prices decrease, the IOUs have developed a risk responsive approach that satisfies both goals but is far simpler to implement, execute, monitor, and review than the method described by Mr. Gettings (the "Gettings Approach").

i. The OTM Call Option Approach

The IOUs' proposed risk-responsive approach manages upside cost risk through the use of out-of-the money ("OTM") call options, which will establish a cap on prices for the hedged portion of the Company's projected fuel burn and allow customers to fully participate in downward price movements and trends. This approach could be implemented immediately upon approval by the Commission as OTM call options are financial instruments traded in the market based on prevailing market prices. Implementing this approach requires no new system investments or additional personnel costs. Finally, this approach has the benefit of facilitating straight-forward auditing and regulatory review.

A call option is a financial agreement that gives a buyer the right, but not the obligation, to buy a commodity at a specified strike price for a specific time period. This provides upside cost protection if the commodity (natural gas) price rises above the strike price. To execute the OTM call option strategy, DEF would solicit OTM call option quotes from various providers to obtain the most competitive pricing based on market conditions at the time.

Attachment B illustrates how OTM call options provide a risk-responsive natural gas hedging approach that both protects against a defined level of upward price movement and

provides customers with complete participation in downside price movements if the market price of natural gas settles below the strike price. When the hypothetical market price of natural gas (red line) crosses the strike price threshold (green dotted line, set for illustrative purposes at $3.50/MMBtu), the customers' cost for the amount of natural gas covered by the OTM call option (blue line) is capped at the strike price plus the cost of purchasing the option (referred to as the option premium). If the market price remains below the strike price the option is not called and customer costs are equal to the market price plus the cost of the options that have been executed. If market prices decline (e.g., months 9-12 on Attachment B), the customers receive the benefit of the decrease in prices. In a decreasing price market, the gross price of purchasing the options will be offset by customer savings realized by purchasing natural gas at cheaper market rates, resulting in the "net cost" of the options; stated another way, in a falling market environment, customers would experience no additional hedging costs beyond the cost of the OTM call options and would fully participate in the falling market prices. Therefore, the net cost paid to purchase the protection from increased natural gas prices is less than the gross cost of the options due to customer savings from purchasing cheaper natural gas at market.

Moreover, the OTM call option approach has the additional benefits of being easily audited and reviewed under the current framework. The IOUs would continue to file an annual RMP which would outline the proposed call-option budget for the ensuing hedging period (the length of which the companies could designate, subject to review, as is currently the case) and would continue to report their hedging results on the current timeline. Staff auditors would be able to review the amount of natural gas that was hedged using OTM call options, whether a company stayed within its budget (and if not, why not), and would be able to validate the reported results. As opposed to the Gettings Approach (discussed below), this would not require

auditors, interveners, or the Commission to review potentially hundreds of individual transactions and would not require or allow for improper hindsight review of a company's hedging decisions.

In sum, the OTM call option meets both of the stated goals, is straightforward in its design, implementation, and regulatory review, and is capable of being implemented immediately upon Commission approval. Attachment C provides an illustrative comparison of an OTM call option approach versus DEF's actual natural gas hedging results for 2005 through 2016. As shown, DEF's actual cumulative hedge costs over the period were $1,712 million as compared to $371.6 million to operate the OTM call option approach as described above. To give this some context: the costs would have been spread over a 12-year period, averaging approximately $30.9 million per year, and would have provided significant upside cost protection; moreover, this annual average total represents approximately 3% of DEF's 2017 projected natural gas budget and results in an estimated monthly bill impact of roughly $0.80 for a typical residential customer using 1000 kwh per month. Finally, it must be understood that hedging programs will have costs; the only way to completely avoid hedging costs is not to hedge.

ii. The Gettings Approach

Mr. Gettings advocates a complicated risk-responsive financial hedging mechanism involving four components: programmatic hedges, defensive-response hedges, contingent-response hedges, and discretionary hedges (though programmatic and discretionary hedges are not the focus of his approach). In summary, Mr. Gettings' proposal requires the IOUs to establish action boundaries in the annual RMPs based on "customer pain thresholds" that would then be used to determine what hedging actions should occur in rising markets (defensive) or

falling markets (contingent). The action boundaries or triggers would be established annually by each company using various value at risk ("VAR") metrics for upward fuel price risk and for hedge loss risk in a downward moving market, and the company would manage each according to the risk conditions in the market.

In summary, as prices rise the hedge ratio would increase with the layering in of additional forward swaps (defensive protocol); as prices fall the hedge ratio could decline through either suspending hedging, unwinding hedges already in place, or instituting an option put strategy that essentially results in placing hedges against the existing hedges to minimize additional potential hedging costs (contingent protocol). Implementing this approach requires an interpretation of VAR metrics and inserts significantly more decision points and discretion on the timing and price levels necessary to execute the defensive or contingent risk responsive strategies. This is problematic as the discretionary actions and timing require a forward-view of where the market may actually settle; Mr. Gettings has outlined that VAR metrics do not predict direction of price changes or where prices will ultimately settle.[2] Also, in a White Paper filed with the Washington Utilities and Transportation Commission ("WUTC"), Mr. Gettings acknowledged that his approach does not guarantee more favorable costs than fixed-hedge ratio programs (similar to the current hedging practices), stating "Superficially, the costs look to be advantageous with the risk-responsive strategy, but cost reduction is not the goal and those results could be accidental." [3]

[2] *See, e.g.,* Gettings Testimony, Docket No. 160001-EI ("Gettings Testimony"), at p. 9, l. 19; p. 17, ll. 1-17.
[3] *See* Gettings, *Natural Gas Utility Hedging Practices and Regulatory Oversight* ("Gettings White Paper"), at p. 26, available at https://www.utc.wa.gov/docs/Pages/DocketLookup.aspx, last visited Mar. 3, 2017; *see also* Gettings Testimony, at p. 23, ll. 2-5 ("While comparative results [of simulations using the Gettings Approach] have been favorable compared to target volumes and the simulations illustrate this, the goal is not to 'beat the market' and it would be inconsistent to assert that these programs do so. In fact, the simulation results indicate that even the risk-responsive hedges were very slightly higher than market costs.").

A simplified example of how the approach would work is as follows: if the utility opts to do so, it would layer in a set amount of programmatic hedges using forward swaps (as with the current hedging practices), then the company would monitor the natural gas market using the VAR metrics. If the market volatility indicates a rising market, the utility would place defensive hedges, again using swaps. If the market volatility indicates downward movement, the utility would enter the contingent protocol (by either suspending hedging, unwinding the previously entered programmatic/defensive swaps, or buying put options using a predetermined option budget). This would continue with each new volatility measurement over the course of the year.

Additionally, the market could provide mixed signals such that the company would have to determine which is more important – protecting against upside price movement or guarding against potential hedge costs. In such a scenario, Mr. Gettings' testimony indicates he prefers guarding against price increases rather than hedging costs, opining that customers are more sensitive to increased costs in a rising price environment than they are to potential hedge costs (which are mitigated by the overall decrease in the cost of fuel) in a falling price environment.[4] However, later in his testimony Mr. Gettings appears to support avoiding hedging losses over providing upside price protection, stating "if no hedges are ever executed, no losses will be incurred, so if practical, the preference would be to hedge only when necessary."[5] Notwithstanding the desire to only hedge "when necessary," Mr. Gettings also acknowledges that "the ability to win at market timing is usually illusory."[6]

These seemingly inconsistent positions on which protocol should take precedence if both appear warranted by market signals illustrates another concern – how regulatory review of actions taken under the Gettings Approach would proceed. The discussion above illustrates that

[4] Gettings Testimony, at p. 5, ll. 1-13.
[5] *See id.* at p. 17, ll. 19-20.
[6] *See id.* at p. 17, l. 7.

attempting to achieve two non-complementary goals through an unnecessarily complicated system will result in multiple decision points each with multiple response options that could be selected. It is unlikely a company could design a plan ahead of time that would contemplate each eventuality that could arise and, therefore, there would be a substantial amount of judgment and potential discretion involved in implementing this approach. As such, regulatory review of utility actions under this approach could be extremely complicated and time-consuming and result in second-guessing of each decision (potentially hundreds of trades) with the benefit of perfect hindsight (a benefit the Company would not have in real-time when executing hedges for forward periods).[7]

To gain a better understanding of how a regulatory body would review activities taken under this approach, DEF has searched for jurisdictions that have adopted the approach or regulated utilities that are implementing the approach – to date DEF has neither located nor been directed to either.

However, the WUTC did open a docket in 2013 to review the hedging practices of the local natural gas distribution companies ("LDC") within its jurisdiction. In January of 2014, the WUTC held a workshop in which Mr. Gettings provided comments and, in July of 2015, Mr. Gettings filed a Whitepaper that largely mirrors his testimony in Docket No. 160001. Based on the publicly available information approximately 3.5 years have passed since the opening of the docket and the WUTC has yet to issue an order or guidance, nor has any utility implemented Mr. Gettings' approach as a result of that process. One LDC, Avista Utilities, filed comments stating it has developed and is evaluating a prototype model to evaluate the programmatic and defensive components of Mr. Gettings' approach; notably, it appears that Avista is evaluating but has not

[7] During workshop discussions, Mr. Gettings indicated that one area in which hedging results should be evaluated is their relationship to an "economic efficiency frontier," but the assumptions that could be or would be used in an after-the-fact review of an "economic efficiency" metric have not been defined.

implemented the prototype nor does it have any current plans to implement the contingent protocols (i.e., the component that is intended to mitigate against potential hedge costs).[8]

As a general observation, after three years of review, one would expect the WUTC would have moved forward with implementation of the program unless some questions remain regarding its implementation. It is also possible that implementation of this approach is simply a lengthy process. In fact, DEF and the other IOUs agree that implementation of the Gettings approach would require at least two years. During that time, DEF would either re-assign or hire a dedicated quantitative employee to perform the constant market-variable monitoring required under this approach, provide a dedicated support employee that would have to study the resulting metrics to assist with designing a RMP, and then project testing would need to occur to allow for confidence in the ability to implement the approach. Given the typical timeframe for filing a RMP in the Fuel Docket, an actionable RMP would not likely be ready for filing until the 2019 docket, with implementation beginning in 2020. Due to the novel nature of this approach, DEF may also need to hire an external consultant to perform independent evaluations of the Company's "mock" hedging performance during project testing and its "live" performance after implementation. As discussed above, DEF has not been able to locate any regulated utilities that are operating the program and therefore the pool from which experienced consultants could be selected may be limited.

iii. OTM Call Option Approach versus the Gettings Approach

With an understanding of the proposed risk-responsive approaches, it is useful to compare the two. Distilled to its essence and holding everything else constant, the Gettings approach works as follows[9]:

[8] *See* Avista Utilities' Comments, WUTC Docket No. UG-132019 (May 18, 2016), available at: https://www.utc.wa.gov/docs/Pages/DocketLookup.aspx, last visited Mar. 3, 2017.

- Price Rises –> VAR Rises –> Raise Hedge Ratio
- Price Falls –> VAR Falls –> Lower Hedge Ratio
- Volatility Rises –> VAR Rises –> Raise Hedge Ratio
- Volatility Falls –> VAR Falls –> Lower Hedge Ratio

As the delivery date approaches, in theory, the hedge ratio approaches one (1) if prices have been rising through the upside VAR thresholds or zero (0) if prices have been falling through the downside VAR thresholds (assuming a hard cost loss limit has been established that would trigger action under the contingent protocol). Volatility has diminishing significance to decision-making as time moves toward delivery (e.g., one week from the beginning of the delivery period a two-percentage (2%) point change in volatility will have a much smaller impact on VAR than it would have had 12 months earlier).

Moments for deliberation and possible action in Mr. Gettings' approach are set at specific VAR threshold points. Those threshold points are meant to reflect "customer pain" levels, but since these levels are neither observable nor estimable, there is no real guidance provided in setting the levels.[10]

The IOU recommended OTM option strategy takes into account the fact that an option has an implicit hedge ratio with respect to the underlying asset (in this case, natural gas). In finance literature this is referred to as "delta", but it is exactly analogous to a hedge ratio which, for an OTM call option, varies as follows:

- Price Rises –> Hedge Ratio Rises
- Price Falls –> Hedge Ratio Falls
- Volatility Rises –> Hedge Ratio Rises
- Volatility Falls –> Hedge Ratio Falls

[9] U.S. Dollar interest rate should also have an impact on VAR, but at such a low level it is safely ignored.
[10] Although there is no guidance provided in setting threshold levels, logic suggests that the more the better. That is, since movements of price or volatility are constantly altering exposure and given that there is no reason to believe that customer pain is discontinuous in price, the more frequent the response, the better.

As the delivery date approaches, the hedge ratio for a call option approaches one (1) if the option is in-the-money or zero (0) if the option is out-of-the-money. Also, as time passes the hedge ratio becomes less sensitive to changes in volatility and price comes to dominate.

Thus, the OTM strategy accomplishes the same outcomes as the Gettings Approach with a few notable differences:

1. Hedge ratio adjustments are automatic and continuous rather than manual and periodic (i.e., when thresholds are breached).
2. The cost of the strategy is known at execution.
3. Auditing and control are simplified.
4. There is minimal expected cost of implementation (systems, transaction costs, tracking and monitoring positions, etc.) as current systems and business processes are sufficient.

Finally, it is tempting to compare the two approaches and conclude that the Gettings Approach, while more costly to implement, control and monitor, has the advantage of not involving the cost of purchasing options. In fact, while it is strictly true that no option costs need to be incurred immediately, this is very misleading. To prove this fact would require a technical explanation of the derivation of the Black-Scholes option pricing model, but the validity can be demonstrated by reference to a simple "No Arbitrage" condition.

A "No Arbitrage" condition holds that the markets do not provide opportunities to consistently generate profits by taking off-setting positions in identical strategies. In this case, if the Gettings Approach could be implemented at the limit (continuously managed, as with a call option), it would be possible to sell call options, keep the proceeds, and hedge the associated risk without incurring any costs. This would result in a continuous source of infinite profits. Since Mr. Gettings' methods do not involve any market understanding or financial theory that is unknown to the market, it is improbable he has uncovered such an arbitrage. Hence, the expected cost of his approach can be no lower than, and potentially considerably higher than, the OTM strategy. In fact, DEF's back-testing of the Gettings Approach, the OTM call option

approach, and the historical hedging practices shows that over the period 2006-2011 (the period for which Mr. Gettings provided data), the OTM call option approach proved more beneficial to customers (i.e., less costly). See Attachment D.

c. What changes, if any, should be made to the manner in which electric utilities conduct their natural gas financial hedging activities if the goal of hedging is modified to attempt to track the natural gas market?

In short, if the Commission determines the proper goal for the continued financial hedging of natural gas is to attempt to track or replicate the market price of natural gas, the Commission should order a stop to hedging. The best method to track the market price of any commodity is simply to purchase that commodity at market price. Attempting to trade financial instruments in response to fluctuations in the market with the goal of replicating the market price of the underlying commodity is not a hedging program, it is a speculative trading portfolio. Moreover, there is no logical reason to do so because it requires substantial monitoring and decision points to achieve a goal that can be met without any effort beyond simply purchasing the commodity at market.

However, if the goal is to design a program that tracks the market price of natural gas while also protecting against the risk of natural gas price increases (i.e., the first prong of the dual purpose approach discussed in section II.b.), then the best method to accomplish this goal is the OTM call option approach discussed above. As shown in Attachment B and discussed in section II.b.i., customers are exposed to the market price of natural gas for all price points below the call option strike price. If the market price settles above the option strike price, the option would settle in the money and customers would get the financial credit to fuel costs, and benefit through the amount of gas hedged for which the option was purchased at that price (plus the cost of the call options purchased) regardless of the market price of natural gas.

III. If changes are made to the conduct of natural gas hedging activities, what regulatory implementation process is appropriate?

DEF does not believe that any changes are necessary to the regulatory implementation process regardless of what, if any, changes are made to the conduct of natural gas hedging activities.

If the Commission determines it is appropriate to continue financially hedging natural gas, the current process followed in the annual Fuel Docket should be retained. Under that framework a utility files a risk management plan outlining its hedging parameters and its appropriateness and reasonableness is an issue determined by the Commission in the Fuel Clause proceeding. Each intervening party to the proceeding is free to question the components of the plan and, to the extent they deem it necessary, propose alternatives to or variations of those components. Each spring and summer each utility reports results of the actions taken under its plan; so long as the utility has operated within the bounds of its Commission-approved plan, it is allowed recovery of those costs. Any gains are passed through to customers in the form of lower bills.

This same framework can continue to be applied if the Commission orders changes to the manner in which hedging policies are conducted, though it could also be modified slightly if necessary (e.g., if the Commission determined more frequent reporting was necessary). To the extent a risk-responsive approach (either the OTM call option or the Gettings Approach) is adopted, the necessary components could simply be included in each company's RMP and the merits of each would continue to be an issue for Commission determination. In short, this framework has served the Commission well, is familiar to all the parties, and does not need to be changed.

Respectfully submitted this 6th day of March, 2017.

s/Matthew R. Bernier

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Duke Energy Florida, LLC
Docket No.: 170057
CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished via electronic mail this 6th day of March, 2017 to all parties of record as indicated below.

s/Matthew R. Bernier
Attorney

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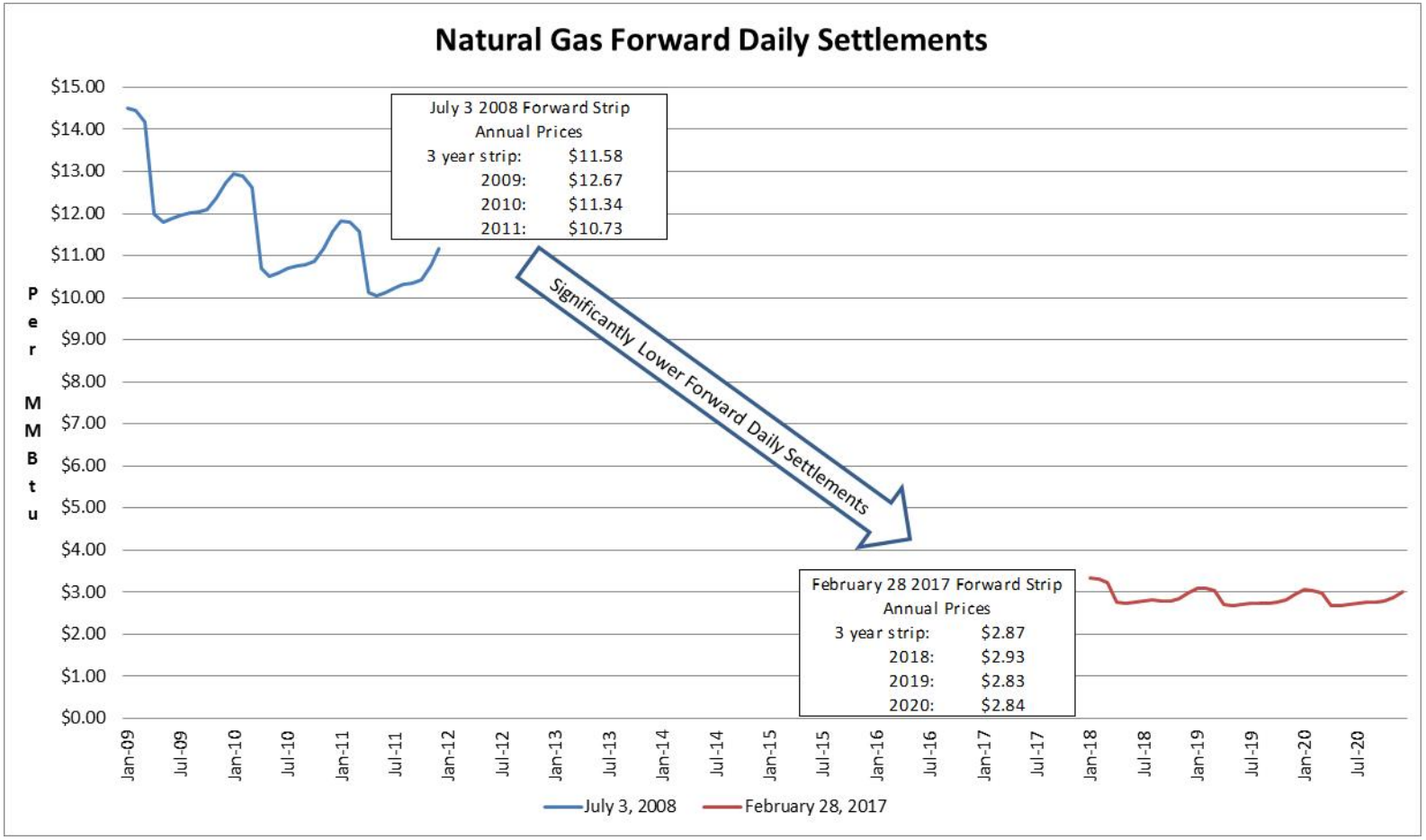
Natural Gas Forward Daily Settlements
$15.00
$14.00
$13.00
$12.00
$11.00
$10.00
$9.00
$8.00
$7.00
$6.00
$5.00
$4.00
$3.00
$2.00
$1.00
$0.00
Per MMBtu
July 3 2008 Forward Strip
Annual Prices
3 year strip: $11.58
2009: $12.67
2010: $11.34
2011: $10.73
Significantly Lower Forward Daily Settlements
February 28 2017 Forward Strip
Annual Prices
3 year strip: $2.87
2018: $2.93
2019: $2.83
2020: $2.84
Jan-09
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Jan-11
Jul-11
Jan-12
Jul-12
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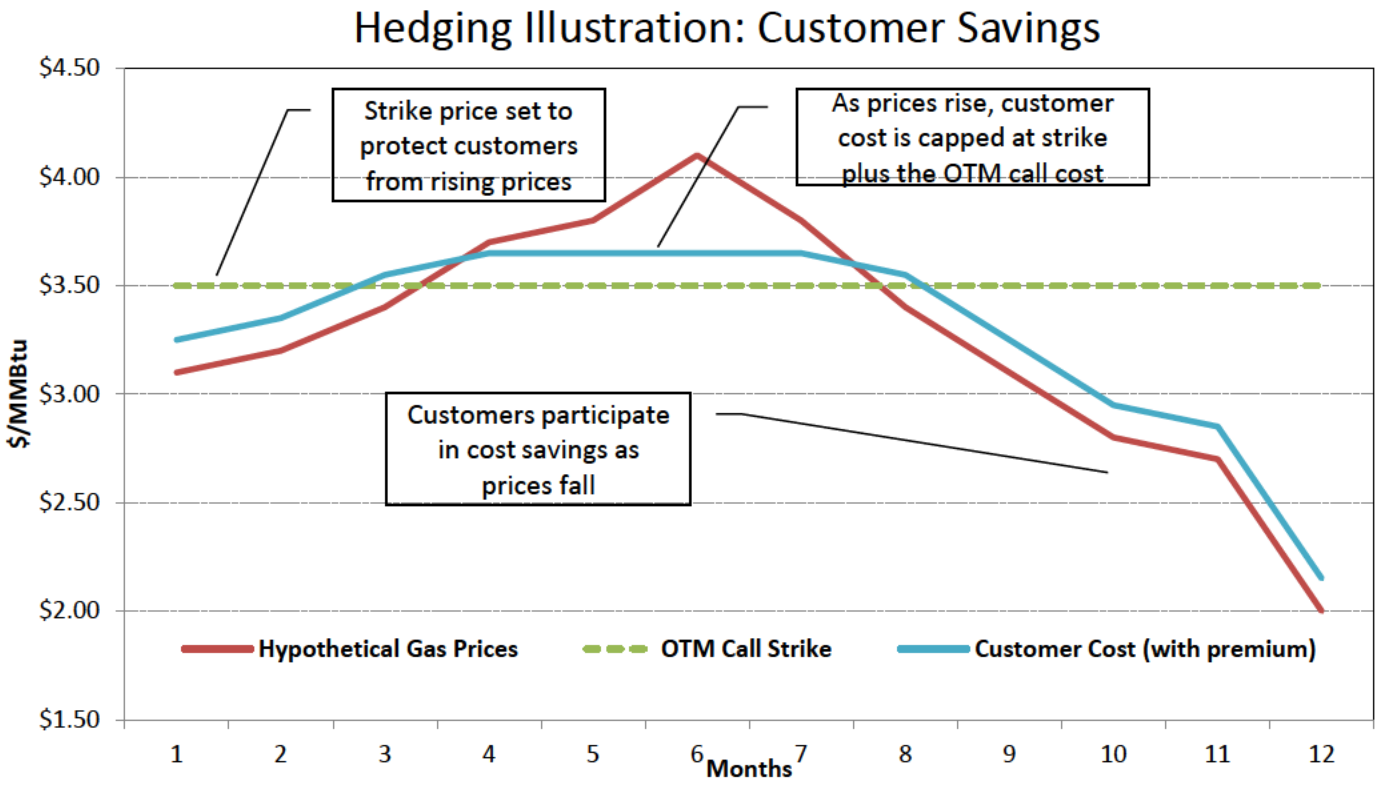
July 3, 2008
February 28, 2017

Hedging Illustration: OTM Call Options for Dual Purpose

Customers participate in savings as natural gas prices fall and their exposure to rising prices is capped with call options. Chart illustrates the variation in customer cost (for hedged portion of fuel burn) as hypothetical gas prices rise and fall above/below the strike price.

- As prices rise, customer cost is capped at strike price plus cost of the OTM cost
- As prices fall, customers participate in cost savings minus the OTM cost



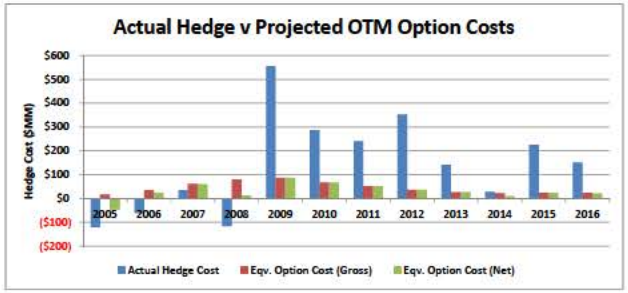
Attachment C
DEF's Comments re Hedging Workshop

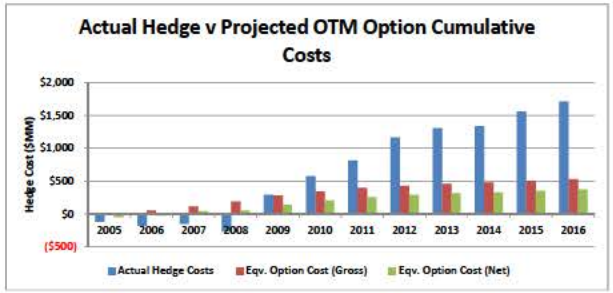
Year Hedged	NYMEX Price $/MMBtu	Historical Actual Volumes: Volume Consumed MMBtu (x1MM)	Volume Hedged MMBtu (x1MM)	Percent Hedged	Historical Actual Hedge Costs: Hedge Cost MM$	Cumulative Hedge Costs MM$	Cost of Options for Equivalent Volume Hedged: Options Premiums (Gross) MM$	Options Cost (Net) MM$	Cumulative Option Gross MM$	Cumul. Option Net MM$
2005	$ 8.62	71	43	61%	($122)	($122)	$15.87	($45.53)	$15.87	($45.53)
2006	$ 7.23	78	56	72%	($62)	($184)	$35.31	$23.96	$51.18	($21.56)
2007	$ 6.86	99	72	73%	$34	($149)	$60.93	$60.88	$112.11	$39.32
2008	$ 9.03	130	98	76%	($117)	($266)	$78.42	$11.27	$190.54	$50.59
2009	$ 3.99	159	122	77%	$556	$290	$86.63	$86.52	$277.16	$137.11
2010	$ 4.39	201	112	56%	$286	$576	$66.75	$66.69	$343.92	$203.80
2011	$ 4.04	200	123	61%	$241	$817	$52.08	$52.08	$395.99	$255.88
2012	$ 2.79	204	136	67%	$351	$1,168	$36.01	$35.60	$432.01	$291.47
2013	$ 3.65	189	123	65%	$141	$1,309	$27.17	$26.06	$459.17	$317.54
2014	$ 4.41	199	121	61%	$28	$1,337	$22.60	$9.68	$481.77	$327.21
2015	$ 2.66	227	139	61%	$226	$1,562	$23.51	$23.51	$505.28	$350.73
2016	$ 2.46	245	147	60%	$150	$1,712	$23.62	$21.59	$528.91	$372.32
Total	$ 5.01	2,003	1,295	65%	$1,712	$1,712	$528.91	$372.32	$528.91	$372.32

This sheet compares historical hedge costs against option hedge costs (gross and net)

Gross cost is the total of purchase prices for options purchased to hedge a given year

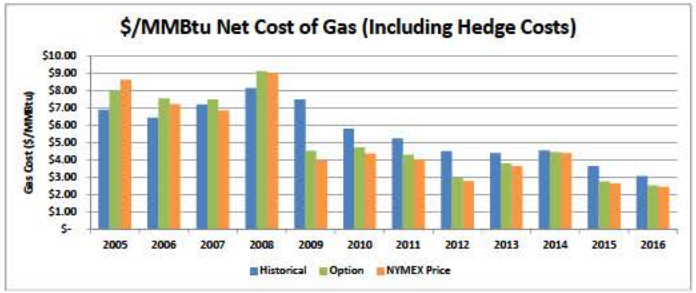
Net cost is the gross cost less the total value of in-the-money options at expiration for any given year





Price of Gas Net Hedging Costs

Year Hedged	NYMEX Price $/MMBtu	Actual Historical Net of Hedges $/MMBtu	Projected Cost Net of Options $/MMBtu
2005	$ 8.62	$ 6.90	$ 7.97
2006	$ 7.23	$ 6.43	$ 7.53
2007	$ 6.86	$ 7.21	$ 7.47
2008	$ 9.03	$ 8.14	$ 9.12
2009	$ 3.99	$ 7.49	$ 4.53
2010	$ 4.39	$ 5.81	$ 4.72
2011	$ 4.04	$ 5.24	$ 4.30
2012	$ 2.79	$ 4.52	$ 2.96
2013	$ 3.65	$ 4.40	$ 3.79
2014	$ 4.41	$ 4.55	$ 4.46
2015	$ 2.66	$ 3.66	$ 2.77
2016	$ 2.46	$ 3.07	$ 2.55



Attachment D

DEF's Comments re Hedging Workshop

Pages 1 through 3

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in their entirety