State of Florida

Public Service Commission

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-M-E-M-O-R-A-N-D-U-M-

DATE: March 1, 2017

TO: Carlotta S. Stauffer, Commission Clerk, Office of Commission Clerk

FROM: Michael C. Barrett, Public Utility Analyst IV, Division of Accounting & Finance MCB

RE: Docket No. 170057-EI - Analysis of IOUs' hedging practices

On February 21, 2017, representatives from Duke Energy Florida, LLC., Florida Power & Light Company, Tampa Electric Company, and Gulf Power Company (collectively, IOUs) attended a staff workshop and distributed the attached presentation, which is titled Joint IOU Presentation on Natural Gas Hedging.

Please place the attached presentation into the above-referenced docket file.

Joint IOU Presentation on Natural Gas Hedging

Out-of-The-Money (OTM) Call Options as an Alternative Form of Risk-Responsive Hedging

FPSC Workshop
February 21, 2017

Overview of Staff Proposal

- Labeled a Risk-Responsive Risk Management (RM) Plan, its main difference from current utility RM plans is the use of a Value-at-Risk (VaR) model to determine when to execute new hedges as well as when to liquidate, or protect with options, hedges currently held
- Requires the company to establish tolerances for cost increases and separate tolerances for hedge losses, and to formulate a strategy of prescribed responses to defend those tolerances against risk conditions in the market
- The potential for hedging losses is not eliminated

Components of Staff Proposal

- Gettings' Risk-Responsive Plan utilizes four types of natural gas hedges:
  - Programmatic – small amount of swaps executed throughout the calendar year regardless of market conditions; the type of hedges used in current RM plans
    - Purpose: Limit volume of hedges required under defensive strategy
  - Defensive – execute swaps after VaR model shows a cost tolerance is breached
    - Purpose: Provide protection against upside price movement with a defined loss threshold
  - Contingent – initiated after VaR model determines a hedge loss tolerance has been breached; strategies include suspension of new hedges, use of options to constrain hedge loss potential, and unwinding existing hedges
    - Purpose: Provide downside price movement coverage
  - Discretionary – buying hedges when prices are deemed attractive
    - Mr. Gettings does not encourage this type of hedging, but does not preclude it

New Hedging Goals

- Two new hedging goals are apparent in the Staff proposal :
  - Specify and constrain the cost threshold for upside price movement protection
  - Maintain participation in declining-price markets
- The Staff proposal involves the use of a complex model with significant administrative and implementation costs. Required knowledge and systems to review utility programs is substantial. Program includes multiple decision points and utility discretion, including triggers for simultaneous defensive and contingent hedging
- There are simpler methods to achieve these new goals

Alternative Risk-Responsive Approach

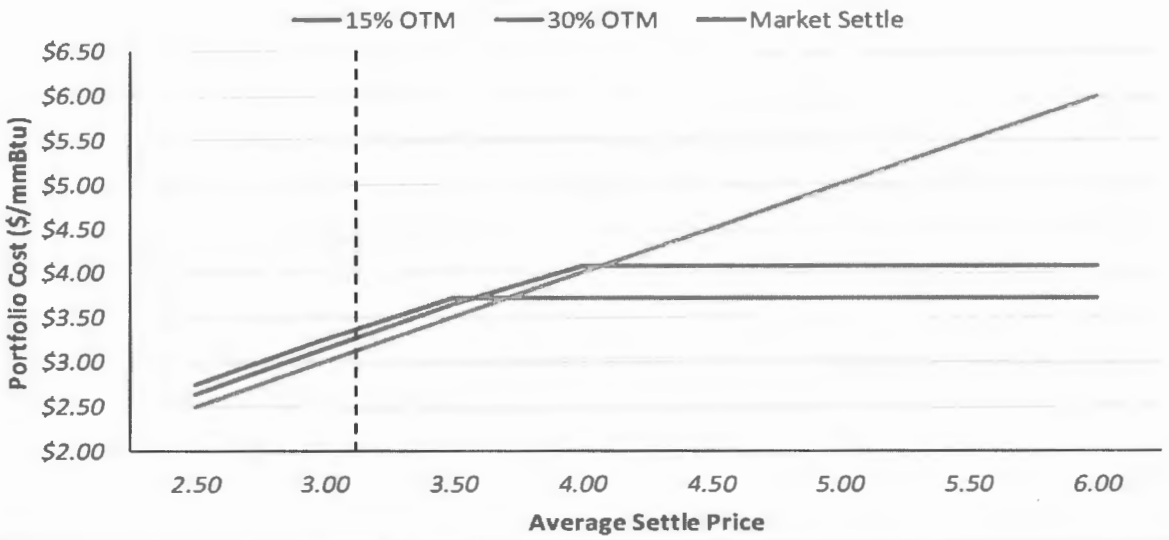
- Out-of-the-money (OTM) call option - financial instrument that requires the purchaser to pay an upfront premium in return for the ability to receive payment if the future price of an underlying asset rises above a strike price that is higher than the current market for that asset
- OTM call options are a risk-responsive natural gas hedging alternative
  - Use call options to protect against a defined level of upward price movement
  - Options expiring in the money provide price increase protection
  - Options expiring out of the money do not result in any additional costs beyond premium
  - Option costs are "insurance premiums" for protection against price spikes
  - Call option premium budget defined in RM plan
  - Premiums included in fuel expenses recovered through the fuel clause
  - Customers have 100% participation in downside price movements when market declines
  - OTM call options do not result in settlement losses when market prices go down

Decision Points for Call Option Approach

- Determine appropriate amount of price spike protection v. option premium cost
  - Greater protection against price increases comes with higher premium costs
    - Example: protection against a 15% price increase (15% OTM) will cost more than protecting against a 30% price increase (30% OTM)
  - Define the price increase the company is protecting, e.g., 15%, 20%, or 30%
  - Define target percentage of natural gas burn to be hedged, e.g., 80%, 60%, etc.
  - Specify the option premium budget
    - Option cost varies with expected market volatility
    - Option cost varies with underlying market price level, e.g., premium to protect x% price increase is higher at $6 gas than at $3 gas
- Define time period to be hedged
  - Longer time period hedged, higher premium costs

TECO Theoretical Application of OTM Calls

- Analysis replaced TECO's fixed swap hedging with hypothetical call option strategies at 15% or 30% OTM strike price



When market is below strike, portfolio cost is slightly above settle price

When market prices are higher, portfolio cost increase is limited

- - - - Represents average 2018 market prices as of Feb 2017

 Values are unaudited indicative estimates and are subject to change

TECO Hypothetical OTM Call Option Budget

- 15% or 30% OTM option strategy at different settle prices

Theoretical Market Settle Price ($/mmBtu)	Unhedged Natural Gas Expense ($)	15% OTM Call Options* ($/mmBtu)	15% OTM Call Options* ($)	30% OTM Call Options* ($/mmBtu)	30% OTM Call Options* ($)
2.50	180,880,275	2.75	198,612,502	2.64	191,313,847
3.00	217,056,330	3.25	234,788,557	3.14	227,489,902
3.50	253,232,385	3.72	269,487,049	3.64	263,665,957
4.00	289,408,440	3.72	269,487,049	4.08	295,025,979
4.50	325,584,495	3.72	269,487,049	4.08	295,025,979
5.00	361,760,550	3.72	269,487,049	4.08	295,025,979
5.50	397,936,605	3.72	269,487,049	4.08	295,025,979
6.00	434,112,660	3.72	269,487,049	4.08	295,025,979

* 100% of projected burn hedged, 1 year hedged, option premiums included in cost

TECO hypothetical option premium costs are approx. $10-18 million for 2018

 Values are unaudited indicative estimates and are subject to change

FPL Back Testing OTM Calls

- Analysis replaced FPL's traditional fixed price swap hedging approach with 15% OTM call options covering 60% of projected fuel burns for the year in review
- The OTM Call option strategy was compared to a representative risk-responsive hedging strategy
  - VaR driven risk-responsive strategy that consists of
    - 15% programmatic hedging
    - Defensive hedging up to 65% against price increases
    - Contingency protection by suspending hedging when prices decline and can require hedge sales also

 Values are unaudited indicative estimates and are subject to change

FPL OTM options hedging provides a viable hedge against upside price risk while providing market prices on the downside

FPL

Portfolio Cost ($/MMBtu)

	Market Settle	65% Risk/Resp Program	60% Options 1 Year hedge (includes cost of Options)	Difference in Average Annual Cost
2011	$4.05	$4.47	$4.32	$ (0.15)
2012	$2.79	$3.52	$2.92	$ (0.60)
2013	$3.65	$3.92	$3.80	$ (0.11)
2014	$4.41	$4.28	$4.46	$ 0.18
2015	$2.66	$3.27	$2.78	$ (0.49)
2016	$2.46	$2.57	$2.58	$ 0.01
Average	**$ 3.34**	**$ 3.67**	**$ 3.48**	**$ (0.19)**

Note: All prices are for the combined portfolio (Hedged+Unhedged

- Results show significant differences in costs when prices decline
  - In a rising price environment results are more 'tied'

 Values are unaudited indicative estimates and are subject to change

FPL OTM options budget varies significantly from year to year due to changes in levels and volatilities of the futures prices

FPL

OTM Call Options Program Budget

	Market Settle	60% Options 1 Year hedge (includes cost of Options)	60% Options Option Cost Dollars 1 Year hedge	60% Options Option price $/Mmbtu 1 Year hedge
2011	$4.05	$4.32	$143,012,315	$ 0.27
2012	$2.79	$2.92	$87,293,390	$ 0.15
2013	$3.65	$3.80	$81,694,820	$ 0.16
2014	$4.41	$4.46	$65,532,945	$ 0.12
2015	$2.66	$2.78	$64,438,095	$ 0.11
2016	$2.46	$2.58	$65,361,170	$ 0.11
Average	**$ 3.34**	**$ 3.48**	**$ 84,555,456**	**$ 0.15**

Note: All prices are for the combined portfolio (Hedged+Unhedged

 Values are unaudited indicative estimates and are subject to change

DEF Illustrative Annual Option Budget Cost: Back Testing Results

Illustrative Assumptions: Out of the Money Call Option Strategy Executed for Prompt Year Only

- OTM call options used to execute risk responsive approach
- Target percentage of forecasted natural gas usage hedged from Jan through Dec for prompt year
- Percentage of target hedged with strike prices at x% OTM higher than market
- Percentage of target hedged with strike prices at y% OTM higher than market
- No programmatic hedges
- These call options protect against price increases above established cost price threshold

Year Hedged	Market Settle	Estimated Gross OTM Option Cost (MM$)	Estimated Option Cost/MMBtu
2013	$3.65	$49.1	$0.22
2014	$4.41	$41.5	$0.19
2015	$2.66	$32.8	$0.15
2016	$2.46	$33.6	$0.15
Average	**$3.295**	**$39.2**	**$0.1784**

* Assumptions made to illustrate estimated gross annual out of the money call option costs for a risk responsive strategy and not intended to represent final analysis. Above is based on historical actual volatility and settled prices for the periods of 2013 through 2016.

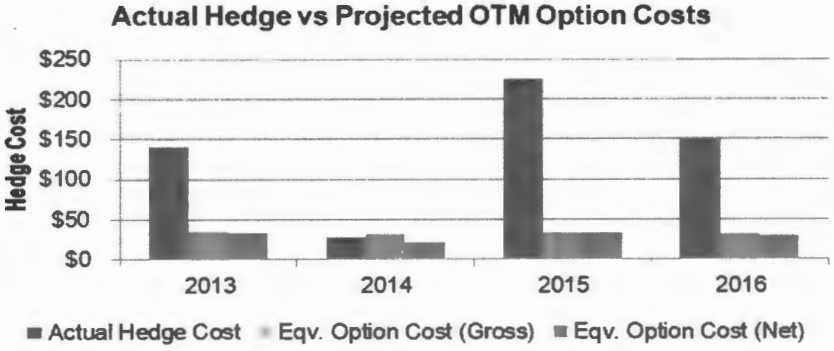
Values are rounded, unaudited indicative estimates, not final analysis and are subject to change

DEF Illustrative Annual Option Cost vs. Historical Programmatic Costs

Illustrative Assumption: Out of the Money Call Option Strategy Executed for 3 Year Rolling Period

- OTM call options used to execute risk responsive approach
- Hedging starts in January of each year for the rolling 3 years with established targets for Prompt Year 1 (Months 1 through 12), Prompt Year 2 (Months 13 through 24), Prompt Year 3 (Months 25 through 36). Target notional hedge percentage for each year consistent with previous filing
- Target hedge percentages executed at strike prices at x% OTM higher than market
- Target hedge percentages executed at strike prices at y% OTM higher than market
- No programmatic hedges

		Historical	Equivalent Options Hedge	
Year Hedged	Volume Hedged MMBtu (x1MM)	Hedge Cost MM$	Options Premiums Gross (MM$)	Options Cost Net (MM$)
2013	123	$141	$34	$33
2014	121	$28	$32	$21
2015	139	$226	$33	$33
2016	147	$150	$32	$30



Values are rounded to nearest million, unaudited indicative estimates, not final analysis and are subject to change.

DEF Illustrative Out of the Money Option Gross Cost 2018 / 2019

- OTM call options used to execute risk responsive approach
- Percentage of forecasted natural gas usage for prompt year if all hedged at current market option pricing
- Percent of target hedged with strike prices at x% OTM higher than market
- Percent of target hedged with strike prices at y% OTM higher than market
- Current forecasted natural gas burns for 2018
- Current forecasted natural gas burns for 2019
- Assumes no programmatic hedges (although DEF has existing legacy swaps / collars for 2018)

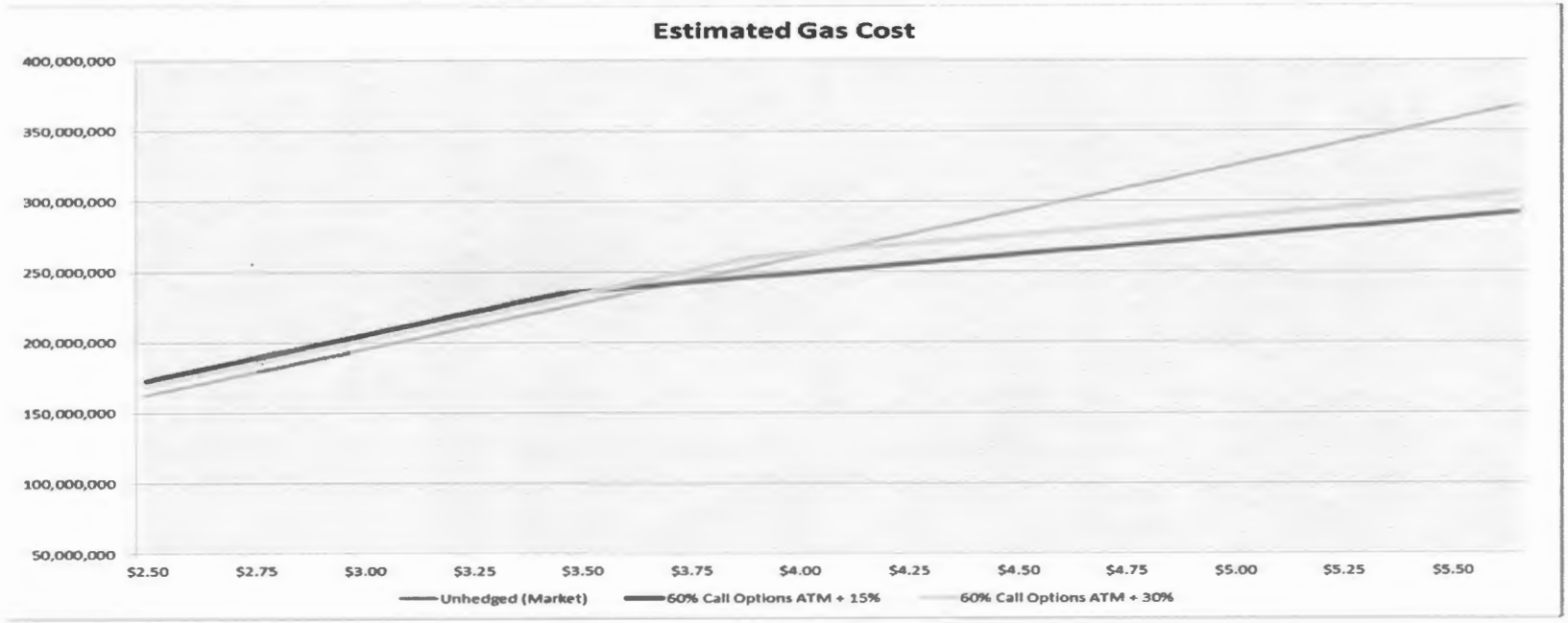
DEF estimated OTM call options costs for calendar strip if strategy executed at 2/15/17 indicative market prices:

- Approximately $27.3 million for 2018
- Approximately $30.1 million for 2019

Values are indicative estimates, not final analysis and are subject to change.

Gulf Illustration of Call Option Strategy ("call only")

- Gas costs are expected to track market until market prices reach strike price of call options
- Said another way, customers fully participate on the downside unlike legacy swap program
- Customers are protected from upside price spike risks



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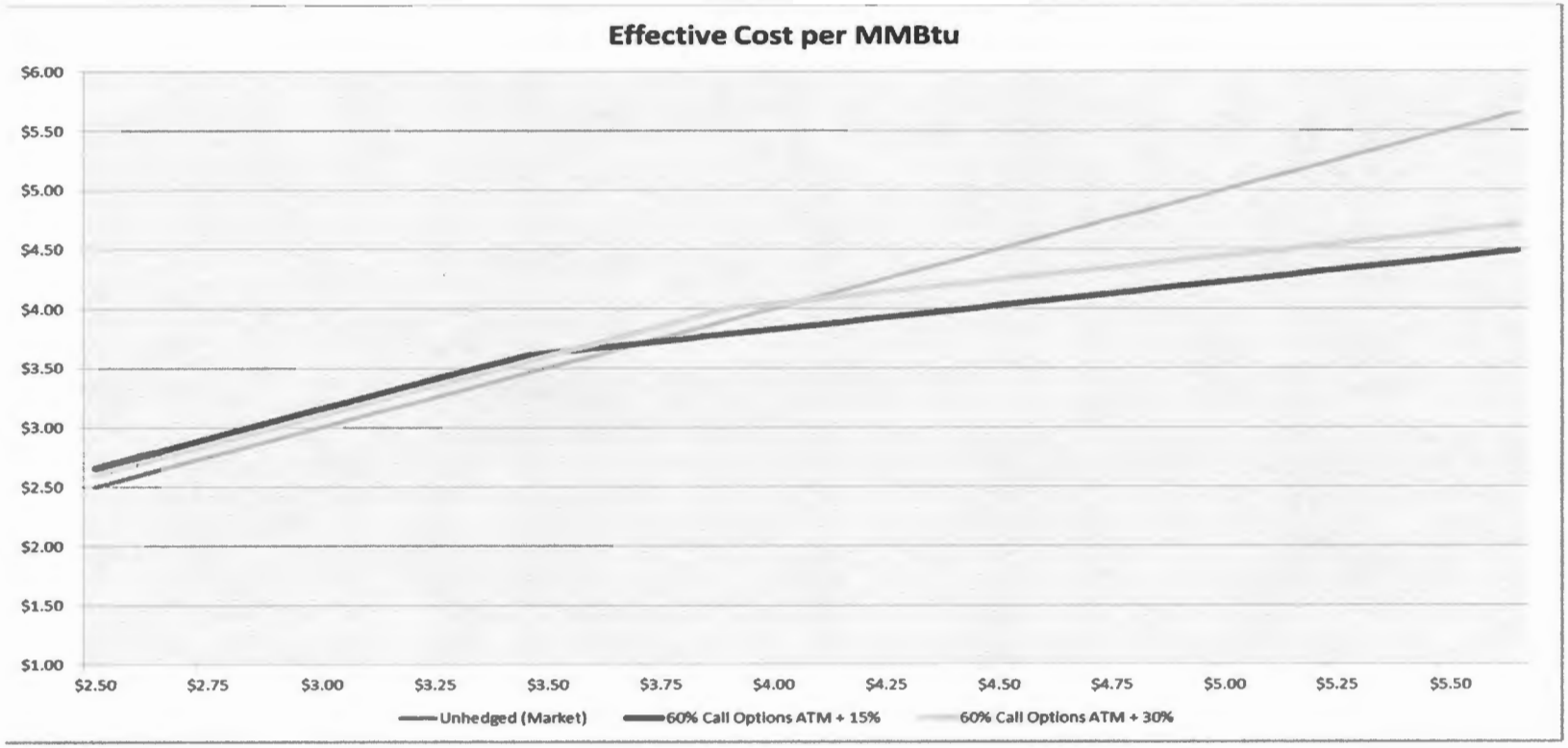
Gulf Illustration of Call Option Strategy ("call only")



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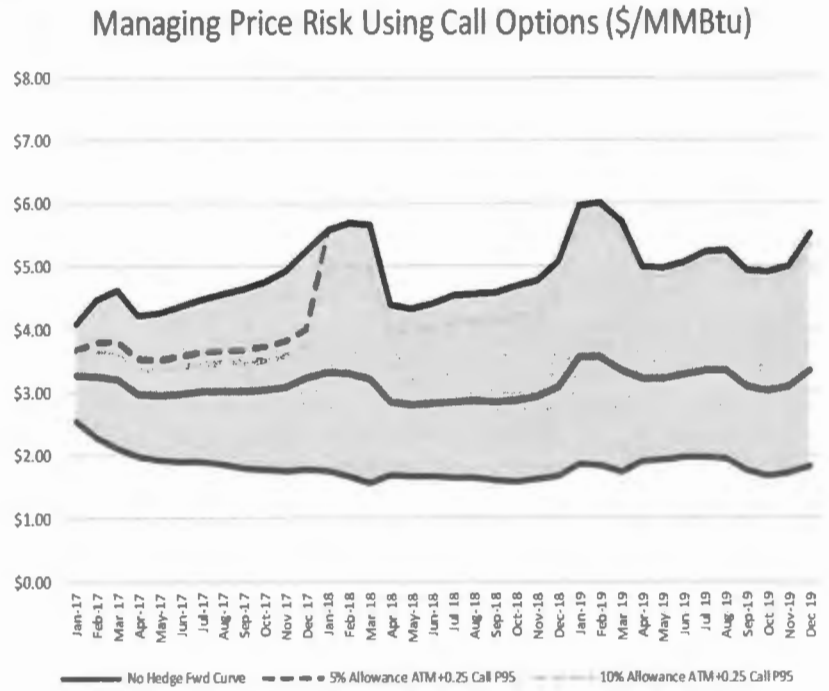
Gulf Simulated Scenarios for Call Option Strategy ("call only")

- Prices are expected to remain in the shaded area between the two red lines 90% of the time
- Purple and yellow dotted lines represent an "improvement" to the upper limit using call options



2017 Budget	$190

Allowance Scenario	5%
Total Allowance	9.51

Year	Spending Curve	Spending Premiums	Hedge Ratio	Price Ceiling at 90% Confidence	
				Before Hedges	After Hedges
2017	100%	$9.51	70%	48%	20%
2018	0%	$0.00	0%	63%	63%
2019	0%	$0.00	0%	61%	61%
Total	100%	$9.51			

Allowance Scenario	10%
Total Allowance	19.02

Year	Spending Curve	Spending Premiums	Hedge Ratio	Price Ceiling at 90% Confidence	
				Before Hedges	After Hedges
2017	60%	$11.41	84%	48%	14%
2018	30%	$5.71	31%	63%	46%
2019	10%	$1.90	9%	61%	56%
Total	100%	$19.02			

Values are unaudited indicative estimates and are subject to change

OTM Call Option Variables Stated in RM Plans

- Commission reviews and approves company-specific variables submitted in RM plans
  - Hedged price level, e.g., 15% price increase
  - Time period to hedge
  - Percent of projected natural gas burn to hedge
  - Option premium budget
    - Request Commission approval if mid-year budget change is required

Reporting

- Reporting could follow typical fuel docket schedule
  - April 1 – hedging activity true-up filing showing program results and costs for the previous calendar year
  - August 1 – annual RM plan update
  - Mid-August – current-year hedging activity report
- OTM call option variables to report
  - Volume of NG hedged
  - Strike prices
  - Option premiums

Transition to New Plan

- Transition from prior years' approved hedging strategies:
- Changes require a transition period to implement the new plan
  - Fixed price swaps approved in previous years' RM plans may still be in place at beginning of new plan
  - Those swaps would be separate from OTM option plan goals and budget
- First year of implementation may require modifications, e.g. timing or volume hedged
  - Companies would propose any such differences in RM plans for Commission review and approval