



**OFFICE OF THE CITY AUDITOR**  
**COLORADO SPRINGS, COLORADO**

# 13-12 Colorado Springs Utilities Natural Gas Hedging Program Performance Audit

**August 2013**



# OFFICE OF THE CITY AUDITOR COLORADO SPRINGS, COLORADO

## 13-12 Colorado Springs Utilities Gas Hedging Program Performance Audit

August 2013

### **Purpose**

The purpose of this audit was to evaluate the effectiveness of the gas hedging program as measured by achievement of price stability and cost to the customer. We sought to provide an opinion on the reasonableness of the related policies and program results. In addition, various policies and procedures were reviewed for compliance.

### **Highlights**

We concluded that the hedging program created some price stability for customers, but it came at a significant price. RiskCentrix, an independent industry expert, concluded that the natural gas hedging program was reasonable or "falls appropriately in the range of programs typical for public utilities of similar size and risk profile." The program was operated in compliance with established, properly-approved policies.

From 1997 through 2012, Colorado Springs Utilities conducted a program to hedge the price of natural gas purchased for use by gas customers and for use in gas-fired electrical power plants. Over the 15 years the program was operated, Colorado Springs Utilities paid \$2.5 billion for natural gas. The hedging arrangements resulted in the cumulative price of natural gas to be \$208.3 million above market price. This resulted in cost being 8.56% greater than market over the life of the program. The program has been suspended by Colorado Springs Utilities.

The commodity market for natural gas has historically been one of the most volatile. To help smooth out pricing to customers and insulate them from the dramatic swings in the market, most utilities have engaged in similar financial hedging arrangements. The stated goal of the hedging program at Colorado Springs Utilities was to reduce volatility to customers. By hedging the majority of their gas purchases, the price of gas could be reasonably

*(Continued on page 2)*

### **Management Response**

Colorado Springs Utilities management was in general agreement with the observations and recommendations. See detailed responses in the report.

### **Recommendations**

1. In the event the natural gas hedging program is reinstated, the Office of the City Auditor recommends that Colorado Springs Utilities research and consider implementing enhanced quantitative financial methods, or similar metrics and tolerances levels, to assist with decision making regarding the gas hedging program.
2. Should the program resume, we recommend Utilities research and adopt clear, on-going reporting methods regarding hedging program results, bill impacts and program effectiveness.
3. We recommend that Colorado Springs Utilities restructure responsibilities for gas hedging to eliminate the identified conflict of interest.
4. We recommend that Colorado Springs Utilities Risk Management Committee develop and

*(Continued on page 2)*

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*(Highlights continued from page 1)*

predicted each year, therefore rates could be set to cover costs without frequently adjusting customer bills to match the market.

The market has gone through a period of dramatic change in the past decade. Technological advances in the production of gas reserves (hydraulic fracturing), reduction in demand due to unusually warm weather and the downturn in the economy have all contributed to sustained low market prices.

The particular financial tool (fixed/floating swaps) employed by Colorado Springs Utilities for most of their hedging did not allow them to participate in the rapid drop and sustained period of low prices. Fixed/floating swaps were used almost exclusively based on the threat that customer bills would experience large swings due to market fluctuations. Because prices were set in advance at relatively higher prices than when they settled, the final price paid for gas was often higher than market price.

With the help of RiskCentrix, we identified 5 recommendations for improvement in the event the hedging program is restarted. The complete RiskCentrix report is attached as Appendix A.

This is a complex topic and there are many contributing factors that should be evaluated in reviewing this program. The accompanying report attempts to provide readers with enough background information to make the issues and results understandable. We have also included a list of resources for further research.

*(Recommendations continued from page 1)*

maintain a decision and action item log.

5. We recommend that Colorado Springs Utilities complete the review and approval process for the QBD 00236 Natural Gas Risk Tolerances Policy and comply with the review and approval deadlines if the hedging program is resumed.

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# Office of the City Auditor Public Report

Date: August 14, 2013

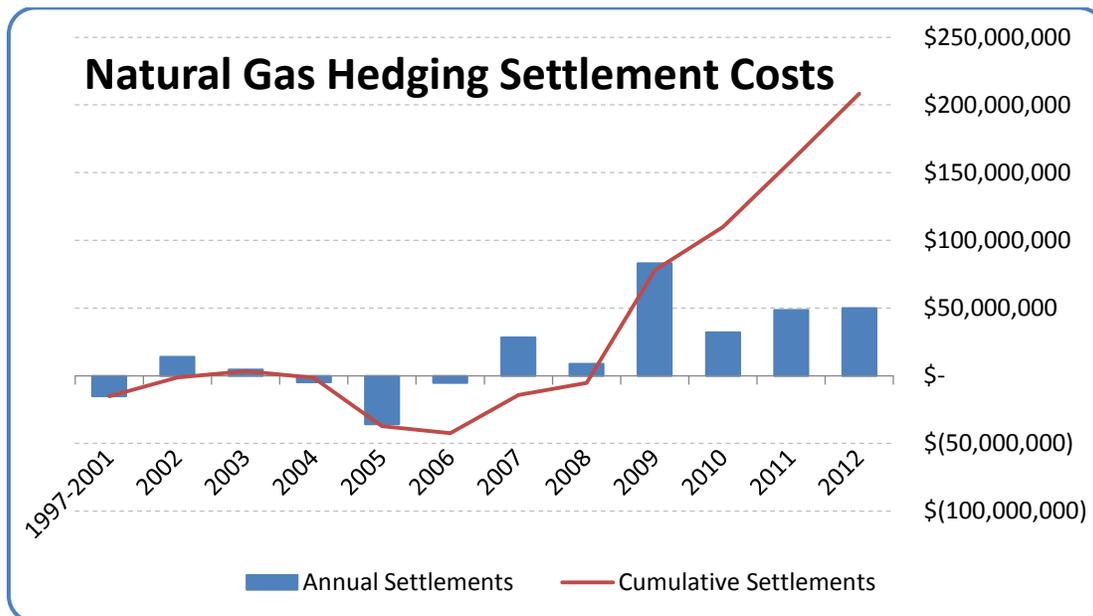
To: President King, President Pro-Tem Bennett, and Members of City Council

Re: 13-12 Colorado Springs Utilities Natural Gas Hedging Program Audit

Colorado Springs Utilities engaged in hedging of natural gas purchases to help ensure consistent pricing for its customers and insulate them from price spikes in a volatile market. As a result, from 1997 – 2012 the net hedge related cost of natural gas purchased by Colorado Springs Utilities and passed on to customers was \$208.3 million. The last hedge trade was placed on December 8, 2011 and Colorado Springs Utilities Risk Management Committee officially suspended the program April 12, 2012.

The program was designed to limit volatility, though it did not adequately adjust for the impact of sustained falling market price conditions. The 2008 financial crisis along with the emergence of shale gas development, and expanded gas infrastructure brought about a new world of gas supply resulting in sustained lower natural gas prices. These events and resulting price changes were not forecast by the industry or Colorado Springs Utilities. Accordingly in the early years when prices were volatile but consistently rising over time, the hedge program produced net savings. In recent years when market prices were falling and sustained at low levels, the program experienced net costs. From 1997 – 2006 the program experienced an overall net savings of \$42.5 million from hedging. However from 2007 – 2012 the costs were significant, totaling \$250.8 million.

In the chart below, positive numbers indicate net hedge settlement costs that were above market price.





## Office of the City Auditor Natural Gas Hedging Audit

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When compared to other Utilities, this was not an unusual result and there were many contributing factors, which should be considered in evaluating this program. The impact on the market due to shale gas development was significant and unpredicted in driving prices down and keeping them low.

The objective of this audit was to evaluate the effectiveness of the gas hedging program when compared to the stated goal of price stability and the cost impact to consumers. In addition, we sought to provide an opinion on the reasonableness of the related policies and program results. The audit included compliance testing with established operating policies. Our office independently engaged RiskCentrix as an industry expert to assess the reasonableness of the hedging program as compared to similar utilities and industry standards. With the assistance of RiskCentrix, we reviewed the available data and identified five recommendations for improvements in the event the program is restarted. RiskCentrix's complete report is attached to this report as Appendix A.

In conclusion, the hedging program resulted in some price stability for customers, but it came at a significant price. The program was operated in compliance with established, properly approved policies and these policies were neither unusual nor unreasonable for a utility of similar size to Colorado Springs Utilities. There was no industry standard to compare these results or operating parameters against. However, based on the experience and expertise of RiskCentrix, we conclude that the Natural Gas Hedging Program was reasonable or "falls appropriately in the range of programs typical for public utilities of similar size and risk profile."<sup>1</sup>

We appreciate the support we received from Colorado Springs Utilities in completing this audit. As always, feel free to contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Denny L. Nester".

Denny L. Nester, MBA, CPA, CIA, CFE, CGFM, CGAP  
City Auditor

Cc: Jerry Forte, Chief Executive Officer  
Bill Cherrier, Chief Planning and Financial Officer  
Bruce McCormick, Chief Energy Services Officer  
Dede Jones, General Manager of Financial Services  
George Luke, General Manager of Energy Supply  
David Maier, Manager of Enterprise Risk Management  
Janet Feltz, Manager of Portfolio Management  
Joe Holmes, Energy Supply Trader Supervisor

<sup>1</sup>Appendix A, Page 3, Executive Summary.

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## REPORT DETAILS

### PURPOSE AND SCOPE

The purpose of this audit was to evaluate the effectiveness of the gas hedging program as measured by achievement of price stability and cost to the customer. In addition, various policies and procedures were reviewed for compliance. Due to the highly technical nature of the gas hedging program and limited benchmarking data available, an independent industry expert was consulted to opine on the reasonableness of the program compared to other utilities.

The study period was the life of the program, 1997 through December 2012; however, some detailed data was not available for the entire time period due to system changes over the years. The audit reviewed financial and market data provided by Colorado Springs Utilities along with data developed independently by the auditors and the independent expert. We reviewed policies, procedures and management presentations related to the gas hedging program. The audit included interviews with appropriate personnel along with tests of records and other supporting documentation as were deemed necessary in the circumstances.

This audit reviewed natural gas hedging only. Colorado Springs Utilities also engages in hedging of interest rates, but those hedges were not included of the scope for this report.



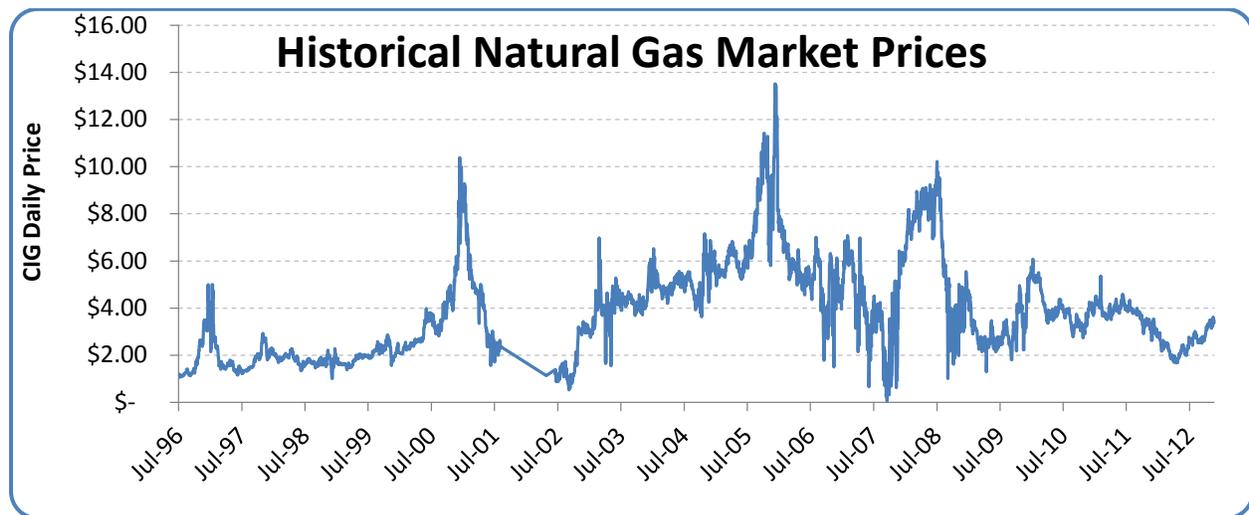
## BACKGROUND

Hedging is a complex topic. In the background section of our report, we hope to provide useful information for educational purposes to help explain how hedging programs operate and why. We also report on the particular implementation of the gas hedging program at Colorado Springs Utilities and the results as assembled during this audit.

### WHAT IS HEDGING?

Hedging in the context of this report is a financial arrangement made between two parties intended to limit risk. The risk Colorado Springs Utilities sought to mitigate was market price volatility. The natural gas market has historically been very volatile and by keeping prices as steady as possible the concept was that customer bills would not directly experience large swings due to market fluctuations. In this way, it was considered a risk management tool, or could be thought of as a type of insurance.

As shown in the following chart, the market has historically experienced dramatic price swings. The prices shown are for the Colorado Interstate Gas (CIG) daily price—the market that Colorado Springs Utilities typically trades in.



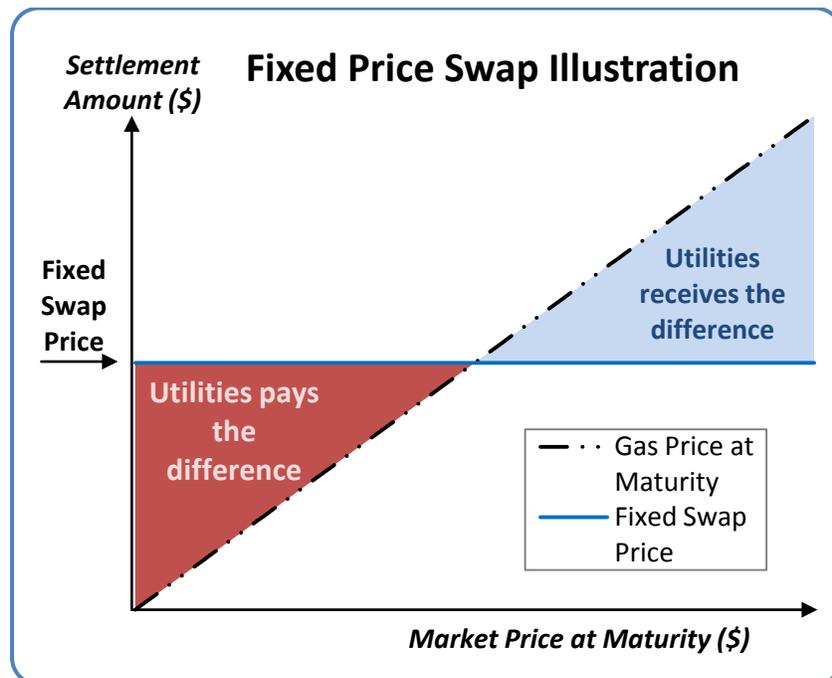
### MARKET INFLUENCES

Natural gas is a commodity that is traded in open markets. Colorado Springs Utilities purchases its physical gas supply from producers and the physical gas is delivered to customers via pipelines. The market price can be influenced by many factors – weather related supply and demand, number of wells, changes in technology (fracking) and import/export of gas from the US. Historically natural gas has been one of the most volatile commodities. Utilization of hydraulic fracturing to produce natural gas from shale gas deposits has had a dramatic impact on the market that was not anticipated.



### HOW HEDGING WORKS

The hedges are agreements, or “trades”, made with a financial firm (the counterparty) to fix a future price for a certain amount of gas to be purchased on a certain date. When the agreed upon date arrives, physical gas is purchased on the open market and the hedge deal is “settled.” If the agreed upon fixed price is higher than the market price, it is said to be out of the money and Colorado Springs Utilities pays the difference to its counterparty. If the agreed upon fixed price is lower than the market price, the counterparty pays the difference to Colorado Springs Utilities.



These settlements are netted on a monthly basis and are included as part of fuel cost in the GCA calculation. The combined hedge settlement and physical purchase price for natural gas will either increase or reduce the annual cost of purchased gas. It is important to stress that the goal of the program is not to beat the market or to ensure the lowest possible price. The goal is to limit the risk that the price will change dramatically. By “fixing” the price with a hedge, the price for that volume of gas will be known in advance. The benefits include price certainty for ratemaking and budget development along with less dramatic price swings for customers.

The fixed price is determined based on the forward price curve, which represents the cumulative activity of all buyers and sellers at any one point in time. Forward prices change daily as the market moves up and down and other events drive supply and demand.

### TYPES OF HEDGES

There are a variety of hedging instruments. The above description is for a financial or fixed/floating swap. A fixed price is swapped for the floating market price. This fixed/floating swap was the type of



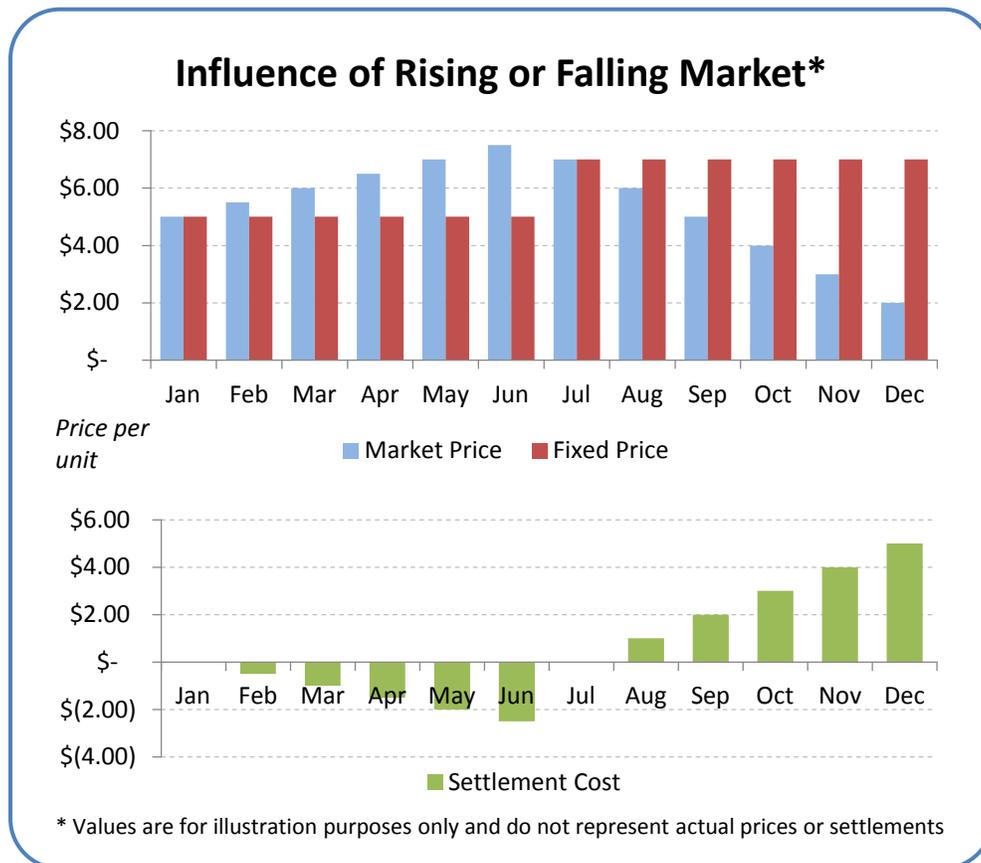
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hedge Colorado Springs Utilities used most frequently during the study period. Of the 1,741 trades reviewed 1,507, or 87%, were swaps.

Options are another type of trade used sparingly by Colorado Springs Utilities. When placing an option, there is an upfront cost to initiate the trade. This premium is paid when the trade is arranged. When the time comes to complete the transaction, the “option” exists of going through with the trade or allowing it to expire.

There are advantages and disadvantages to all types of trades. The swap agreement fixes the future price, and it does not require an upfront investment. If the goal is to keep prices steady, swaps offer the best protection. Options have an upfront expense, but the risk of being out of the money is limited. A swap typically helps protect against market price increases. Conversely, in a downward market, swaps will typically cost more than market when they are settled.

As the hypothetical example in the chart below illustrates, during times of increasing market prices, the settlement amounts were primarily favorable because the fixed price was agreed to at a time when the prices were relatively low and then they increased. However, as market prices declined, the settlement costs begin to climb as the trades become unfavorable.





TIMING OF HEDGES

A financial swap is for a certain amount of gas, as of a certain date, and for delivery in a certain time period (month). The program in place at Colorado Springs Utilities included hedging time horizons from 18 to 36 months in the future. In other words, during periods when the policy dictated a 36 month hedge horizon, trades were made beginning in November 2006 for gas to be delivered (and the trade settled) in November 2009.

The hedges were not all placed in one month for delivery 36 months in the future. Instead, hedges were layered over time and accumulated up to the pre-determined total volume. For example, if it was determined that 80% of the forecast volume for November 2009 should be hedged; trades would be entered into beginning as early as November 2006, for a portion of the total 80% required. By the time November 2009 arrived, total hedged volumes should have accumulated to 80% of forecast volumes. The remaining 20% would be purchased as needed at the market price.

By building up the hedges in this way, Colorado Springs Utilities was able to predict with reasonable certainty what the price would be for most of their gas purchases for the coming year.

WHO HEDGES AND WHY?

According to an annual survey by the American Gas Association, financial instruments were used by most utilities to hedge at least a portion of their supply purchases. The percentage utilizing hedging ranged from a low of 55% in 2001 to a high of 92% in 2010.<sup>2</sup>

| % of Utility Companies Engaged in Financial Hedging |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|
| 2001  | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| 55%   | 70%  | 87%  | 88%  | 85%  | 89%  | 90%  | 92%  | 81%  |

The stated objective for these utility companies, including Colorado Springs Utilities, was price stability. This goal can also be stated as price certainty or a reduction in price volatility. With no hedging program, daily gas purchases would be made at the prevailing market price. This increases the potential for the customer to experience wide swings in price, which could result in customer dissatisfaction.

CAN HEDGES BE CHANGED?

Once these agreements are entered into they require a financial penalty to terminate the hedge. It is also possible to effectively “unwind” hedges if they are unfavorable by placing offsetting positions. In the case of a swap, the offsetting position would be for Colorado Springs Utilities to enter into the floating (market) side of the swap in the hope that it will settle more favorably than the original fixed

<sup>2</sup> American Gas Association, *LDC Supply Portfolio Management During the 2006 to 2011 Winter Heating Seasons*,

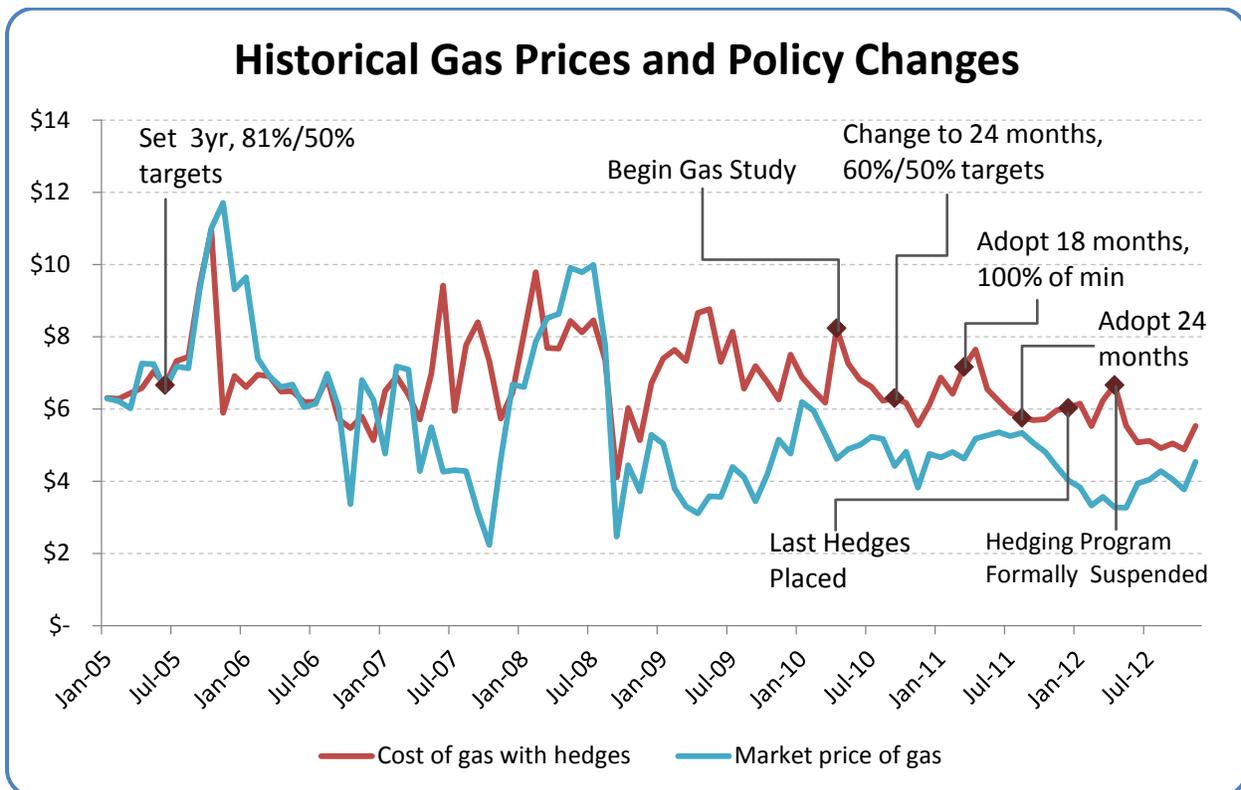


swap. In our analysis we found only 40 offsetting swaps representing 3% of all swapped volumes had been placed out of the 1,507 total executed swap transactions reviewed.

Options can also be used to help offset existing hedges, allowing for participation in falling prices, but they carry an upfront premium cost. As stated earlier, options represented only a small fraction of all trades made during the audit period.

### COLORADO SPRINGS UTILITIES GAS HEDGING PROGRAM HISTORY

Since the natural gas hedging program began in 1997, there have been several modifications made to the specific implementation practices, but the primary goal has always been reduction in price volatility. To accomplish this goal a pre-determined percentage of the total volume of gas forecasted to be used was hedged to fix the price using swaps. The volumes prescribed to be hedged changed over time. At one point, the volumes were specified as 50% of summer and 81% of winter projected average use. Most recently, the volumes were specified as 100% of historical minimum usage for summer and winter. The duration or time horizon for these swaps ranged from 18 months to 36 months. Policies were reviewed and approved by the Risk Management Committee (RMC).



In April 2010, a cross-departmental team was organized to study the hedging program and evaluate the performance based on program volatility reduction. Preliminary results were presented in September 2010 to the Officer Team and modifications to the program were implemented. The changes included



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shortening the time horizon for hedges, reducing the volume to be hedged, eliminating storage volumes from the hedging forecast and analysis of the use of options as a financial hedge tool.

In December 2010, the hedging program was temporarily suspended while the study team completed its analysis. Some options were placed in February 2011 and swaps resumed beginning in April 2011.

The final study results were presented in March 2011 to the RMC. Additional modifications to the program were recommended including changes to the volumes and duration. The study also assessed the cost of volatility reduction by comparing it to market benchmarks and examined the impact of the program on liquidity. This evaluation provided an understanding of the sources of volatility and impacts on current program management. The identified sources of volatility included forecasting errors and errors in hedging for storage volumes.

The recommendations of the study team included implementation of an "Analytical Hedging Strategy" and requiring an annual review of the program. The analytical hedging strategy that was recommended was designed to provide the energy trading group with enterprise financial information concerning collateral positions with counterparties, mark to market projections and ECA /GCA balance positions that would be helpful as the energy trading group determined if swaps or options would be the most cost beneficial for the next trading period.

On December 8, 2011, the last swaps were placed for settlement in 2013. The program was officially suspended by the RMC in April 2012. The study team was unable to develop a compelling case to continue hedging given the existing market price levels. The decision was made to closely monitor the market and analyze the impact on potential market moves to determine when to resume hedging.

In September 2012, the study team reviewed potential natural gas hedge strategies. The team felt that an economic recovery would be needed to drive demand before prices would increase. Several scenarios were considered, but the program remained suspended.



**PROGRAM RESULTS**

The net financial impact of the natural gas hedging program has been an increase in the cost of gas above the prevailing market price. As stated above, settlement amounts can be either positive or negative and can be thought of as savings or cost on a particular transaction. As a municipally owned utility, Colorado Springs Utilities does not seek to make a profit, but rather to cover their expenses through fair, competitive rates. Achieving the lowest possible price or “beating” the market through market timing was not a goal of the program and is not considered an appropriate goal for a municipally owned utility.

The direct cost of hedging can be seen in the general ledger account for net settlements. Net settlements for a given month are added to the price paid for gas purchased, plus several other expenses required to transport and deliver gas to customers, to arrive at the total cost of gas. The cost of gas and the net settlements by year are shown below.

| <b>Natural Gas Costs and Hedging Settlements</b>                        |                        |                        |                          |  |
|---|------------------------|------------------------|--------------------------|--|
| <b>Year</b>   | <b>Cost of Gas</b>     | <b>Settlement Cost</b> | <b>Total Cost of Gas</b> | <b>Settlement as a % of Total Cost</b> |
| <b>1997-2001<sup>3</sup></b>  | \$436,642,641          | -\$15,198,008          | \$421,444,633            | -3.61%                                 |
| <b>2002</b>   | \$74,358,314           | \$14,018,241           | \$88,376,555             | 15.86%                                 |
| <b>2003</b>   | \$128,719,462          | \$4,533,259            | \$133,252,721            | 3.40%                                  |
| <b>2004</b>   | \$184,193,167          | -\$4,891,749           | \$179,301,418            | -2.73%                                 |
| <b>2005</b>   | \$236,744,270          | -\$35,780,380          | \$200,963,890            | -17.80%                                |
| <b>2006</b>   | \$222,047,868          | -\$5,182,029           | \$216,865,840            | -2.39%                                 |
| <b>2007</b>   | \$176,309,565          | \$28,350,926           | \$204,660,492            | 13.85%                                 |
| <b>2008</b>   | \$211,411,534          | \$8,794,452            | \$220,205,986            | 3.99%                                  |
| <b>2009</b>   | \$143,741,392          | \$83,153,744           | \$226,895,136            | 36.65%                                 |
| <b>2010</b>   | \$157,776,329          | \$32,068,201           | \$189,844,530            | 16.89%                                 |
| <b>2011</b>   | \$148,898,620          | \$48,543,244           | \$197,441,863            | 24.59%                                 |
| <b>2012</b>   | \$105,236,987          | \$49,867,954           | \$155,104,941            | 32.15%                                 |
| <b>Total</b>  | <b>\$2,226,080,151</b> | <b>\$208,277,856</b>   | <b>\$2,434,358,006</b>   | <b>8.56%</b>                           |
| <b>Note: Figures above are for gas and electric divisions combined.</b> |                        |                        |                          |  |

Price stability was the goal and this was achieved through hedging two to three years in advance for a majority of the forecasted demand. Only the portion of gas to be purchased without the support of a financial hedge was considered at risk and would have an unknown final price.

<sup>3</sup> Due to system changes, detailed results by year were not available for 1997 – 2001.



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There are other methods to measure price stability or volatility which involve statistical analysis of data using the standard deviation of prices. RiskCentrix concluded that there was a reduction in volatility during the study period; however, the reduction in volatility came at a significant price.

Based on our research and on the opinion of RiskCentrix, these results were not unusual compared to other utilities that were also engaged in hedging of this type during this time period. RiskCentrix states that there is no established prudence standard that would provide a firm benchmark to judge these results against.

### CUSTOMER IMPACT

The total cost of gas, including settlement costs, was passed on to natural gas customers as a component of the Gas Cost Adjustment (GCA). The GCA rate can be changed multiple times per year as gas costs fluctuate. Rates are stated as per cubic foot (Ccf). The data below represents impact to natural gas customers only and does not include results of hedging for electrical division usage.

| Natural Gas Hedge Cost per Unit   |                      |   |                                  |
|---|----------------------|---|----------------------------------|
| Year  | Sales Volume in Ccf  | Hedging Settlements Cost<br>(Gas Division Only) | Hedging cost<br>per Ccf of sales |
| <b>2003</b>   | 238,982,511          | \$ 4,533,259                                    | \$ 0.0190                        |
| <b>2004</b>   | 240,158,215          | \$ (4,891,749)                                  | \$ (0.0204)                      |
| <b>2005</b>   | 238,328,327          | \$ (35,780,380)                                 | \$ (0.1501)                      |
| <b>2006</b>   | 233,898,612          | \$ (7,608,155)                                  | \$ (0.0325)                      |
| <b>2007</b>   | 248,734,218          | \$ 20,077,106                                   | \$ 0.0807                        |
| <b>2008</b>   | 252,825,844          | \$ 7,733,092                                    | \$ 0.0306                        |
| <b>2009</b>   | 248,327,203          | \$ 75,853,780                                   | \$ 0.3055                        |
| <b>2010</b>   | 233,915,220          | \$ 28,083,950                                   | \$ 0.1201                        |
| <b>2011</b>   | 238,674,749          | \$ 41,334,118                                   | \$ 0.1732                        |
| <b>2012</b>   | 206,268,207          | \$ 40,087,946                                   | \$ 0.1943                        |
| <b>10 Yr. Total</b>   | <b>2,380,113,107</b> | <b>\$ 169,422,967</b>                           | <b>\$ 0.0712</b>                 |
| <b>Note: Data represents natural gas customer impact only. Sales Volume data was not available prior to 2003.</b> |                      |   |                                  |

Typical Bill usage is a standard method of comparing rates. The impact to the typical bills using the 10 year average cost of hedging shown above can be calculated as follows.

| The Cost of Price Stability |                                   |  |  |
|-----------------------------|-----------------------------------|--|--|
|                             | Residential Typical<br>Use 60 Ccf | Small Commercial Typical<br>Use 1240 Ccf | Large Commercial Typical<br>Use 12,400 Ccf |
| <b>Monthly Cost</b>         | \$ 4.27                           | \$ 88.27                                 | \$ 882.67                                  |
| <b>Annual Cost</b>          | \$ 51.25                          | \$ 1,059.20                              | \$ 10,591.99                               |
| <b>10 Year Cost</b>         | \$ 512.52                         | \$10,591.99                              | \$105,919.91                               |



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## CONCLUSION

The objective of this audit was to evaluate the effectiveness of the gas hedging program as measured by achievement of price stability and cost to the customer. While price stability (or more precisely, price predictability) was achieved as the cost for a majority of required gas volumes was fixed in advance, the cost to the customer was significant. Our review showed that proper procedures were in place and there was no indication that policies had been violated. There was no industry standard to compare these results or operating parameters against. However, based on the experience and expertise of RiskCentrix, we conclude that the Natural Gas Hedging Program was reasonable or “falls appropriately in the range of programs typical for public utilities of similar size and risk profile.”<sup>4</sup>

With the assistance of RiskCentrix, we have identified five recommendations that we believe should be considered by Colorado Springs Utilities if the gas hedging program is resumed.

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<sup>4</sup> Appendix A, Page 3, Executive Summary



## OBSERVATIONS, RECOMMENDATIONS AND RESPONSES

### OBSERVATION 1 - PROGRAM POLICIES DID NOT INCLUDE SUFFICIENT METRICS OR TOLERANCES FOR DECISION MAKING

The policies used by Colorado Springs Utilities to guide program reporting, decision making and trading activities did not include analytical metrics or tolerances that may have been helpful in mitigating settlement losses.<sup>5</sup>

Executive Limitation -11 Enterprise Risk Management dictates that the CEO must 'use appropriate risk management techniques for acquisition or sale of energy that limits Springs Utilities exposure to price volatility.'

The policies set by the Energy Risk Management Plan for the purpose of reducing customer price volatility established the volume and timeframe of gas purchases to be hedged. Hedges were placed in intervals (layered) leading up to the total volume to be settled in a given period. Generally speaking, gas price swaps (hedges) were entered into every two months for a certain volume of gas units for a date two to three years in the future. The difference between the hedge price of gas and the market price of gas at the time of physical delivery is referred to as the hedge settlement. This approach is sometimes referred to as a programmatic hedging program. Per RiskCentrix, this approach, and the corresponding result, was not unusual for utility companies at the time and of similar size to Colorado Springs Utilities.

The programmatic approach focused only on setting price certainty through hedge transactions, thereby reducing price volatility. There were no other pre-determined tolerances set, such as specifying a limit on total hedge settlement costs. Employing limits on volatility and cost may have alerted management earlier that the pre-set hedging program may merit review. As stated earlier in this report the program was designed to limit volatility, though it did not adequately adjust for the impact of sustained falling market price conditions. In 2010, recognizing the high cost of hedge settlements, the Risk Management Committee temporarily suspended the program while they researched issues. However, no measurements, thresholds or responses were established to manage these competing objectives. Regular analysis was not performed to determine the impact of the program on customer bills. Some analysis was done on an ad-hoc basis to study volatility and cost impact, but these metrics were not routinely reported.

Per RiskCentrix, more sophisticated program approaches (employed by a small number of utilities) utilized quantitative financial metrics and tolerance levels. Identifying and managing risk within pre-determined tolerances is sometimes referred to as Value at Risk (VAR). VAR can be described as "the expected loss for an adverse market movement with a specified probability over a particular period of

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<sup>5</sup> Per the Colorado Springs Utilities 2013 Annual Operating Plan, page 4, Hedging is defined as a "Method to reduce the risk of loss caused by price fluctuation."



time.” In layman’s terms, VAR is a calculation that attempts to assess how much total risk a company has taken over any given period.<sup>6</sup>

Typical objectives and measurements might be:

- 1) Constrain costs to an explicit tolerance boundary with high confidence (e.g.95%) and
- 2) Constrain unfavorable divergence from market with high confidence (e.g.98%) to an explicitly articulated tolerance boundary.<sup>7</sup>

In RiskCentrix’s experience, use of a quantitative program approach achieved results within stated goals and helped other utility companies minimize unexpected settlement losses. See Appendix A for more details.

### AUDITOR’S RECOMMENDATION

In the event the natural gas hedging program is reinstated, the Office of the City Auditor recommends that Colorado Springs Utilities research and consider implementing enhanced quantitative financial methods, or similar metrics and tolerance levels, to assist with decision making regarding the gas hedging program. See Appendix A, RiskCentrix’s report, pages 16 -17 for details. Program results should be monitored on a regular and frequent basis, including the impact on customer bills. Analysis and decisions regarding hedging should include the possibility of not placing hedges as a viable alternative. Relevant hedging policies and procedures should be rewritten to address any changes in the approach to monitoring program results and forward decision making.

### COLORADO SPRINGS UTILITIES RESPONSE

Utilities agrees with the recommendation and has taken action over the last 24 months to improve the program. In March 2011, a proposal was made to the Risk Management Committee by Energy Supply and Enterprise Risk Management to adopt a much more analytical approach to hedging decisions executed within any new program. A study was undertaken in late 2010 following the recommendations associated with a previous natural gas hedging study presented to the Officer Team in September of 2010. The study recognized the deficiencies in the previous program that attempted to hedge in a ratable fashion to achieve set hedge ratios while relying predominantly on swaps. While this program was beneficial in a natural gas pricing environment that consisted of numerous price movements both higher and lower than long-term averages, the significant technological changes in natural gas exploration and production and corresponding protracted price weakness necessitated changes to the existing program and any new program contemplated.

It is important to note that hedging activities were suspended in 2011 and continue to be in suspension as this evaluation progresses. While this presents some price risk to Utilities customer base, we feel the

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<sup>6</sup> Bob Shively & John Ferrare, *Understanding Today's Natural Gas Business*

<sup>7</sup> Appendix A, Page 10



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risk of proceeding with a program that does not adequately reflect a rigorous analytical approach to the hedging decision as well as the impact to customer bills presents a greater risk than not hedging.



**OBSERVATION 2 – PROGRAM STATUS AND RESULTS WERE NOT COMPREHENSIVELY COMMUNICATED**

The status and results of the hedging program were not clearly communicated to the Utilities Board. While we did not find any non-compliance with established policies and procedures concerning this reporting scheme, we believe reporting to the Utilities Board could be more comprehensive and clear.

For example, EL-11 reports used the phrase “As of...the total natural gas hedge portfolio mark to market is ...in favor of Colorado Springs Utilities’ counterparties.” In describing the decision to suspend the hedging program, the EL-11 report states “...in an effort to more effectively balance price certainty with current weak market conditions, Utilities has suspended hedging activities...”<sup>8</sup> This report did not reveal the total to date settlement costs incurred by the hedge program. The report did contain mark to market valuations, which are measurements of the fair value of the hedges at a point in time and are required financial accounting and reporting elements of Governmental Accounting Standards Board (GASB) pronouncements. The mark to market valuation, though, does not represent closed or settled financial statement transactions.

Further, the monthly report to the Risk Management Committee (RMC) included ECA/GCA updates, mark to market position, and collateral postings. The total cumulative settlement cost plus the projected mark to market position of the program was reported to the RMC in June and July 2009 and April 2010. The cumulative settlement cost plus the projected mark to market position has not been presented at the RMC since April 2010. The full program cost and the success or failure of the program objective to reduce volatility was not obvious from the information provided. Likewise, the impact on typical customer bills was not calculated or reported, except in aggregate as it relates to the ECA and GCA position. Both the Risk Management Committee and the Utilities Board need detailed financial impact information surrounding the significant program results for decision making purposes.

Certain information concerning the hedging program was communicated in compliance with various policies and procedures which tended to focus, appropriately, on enterprise liquidity. However, the communication did not have equal focus on the program effectiveness or financial statement impacts.

We did not review compliance with GASB 53 and other financial reporting standards because it was not within the scope of this audit. We relied on the work of the external auditors who reviewed financial statement compliance.

The presentation of derivatives in the financial statements is complex. Some of the information is reported in aggregate for both interest rate and gas derivatives. Further, since the net settlement costs are considered a component of gas purchases, the total settlement amount is not reported separately.

<sup>8</sup> Governance Monitoring Report, Item IV-E, presented to Utilities Board August 15, 2012.



### AUDITOR'S RECOMMENDATION

In the event gas hedging resumes, the Office of the City Auditor recommends that Colorado Springs Utilities research and adopt clear, on-going reporting methods regarding hedging program results, bill impacts and program effectiveness. Except as required for financial statement presentation, results should be broken out, whenever possible, to illustrate the impacts of the gas hedging program separate from the interest rate hedging program.

### COLORADO SPRINGS UTILITIES RESPONSE

Utilities agrees with the recommendation to provide more clarity on the impact of the hedging program to the Utilities Board and other external entities. This will be done through more clear and frequent communications to the Board via presentations specifically addressing the natural gas hedging program and through the ongoing EL-11 communications. While Utilities feels that the EL-11 communications were effective in addressing future risks to counterparty collateral and enterprise liquidity, hedging program effectiveness involving an historical perspective should be addressed via specific presentations to the Utilities Board.

Utilities agrees that program costs were not routinely communicated in the monthly position report to the RMC, however, such costs were reported to both the RMC and the Officer team in 2010 which led to the significant program changes identified in the RiskCentrix report and confirmed in the OCA's review. As documented in several communications in 2010, program costs were projected to reach \$180 million by the end of 2012 given then current program practices. As the potential cost of the program had been identified and understood, the focus of the RMC turned to directing that appropriate program modifications take place.



**OBSERVATION 3 – HEDGE STRATEGY DECISIONS AND REPORTING LACKED SUFFICIENT SEGREGATION OF DUTIES**

Enterprise Risk Management (ERM) actively participated in formulating the gas hedging strategy while also having responsibility for monitoring and reporting on the program to the RMC. This arrangement did not provide for adequate segregation of duties. Independence could have been impaired with this relationship because it could be difficult for ERM to report negative results of a strategy that ERM helped to design.

The various responsibilities involved in a hedging program are typically separated by department to limit the risk of conflicts of interest, errors and irregularities. Our review showed that written policies and procedures described the various steps, decision points and tasks assigned to the energy trading (front office), risk management (middle office) and accounting (back office) personnel. Colorado Springs Utilities was in compliance with these policies and procedures; however, improvements could be made.

**AUDITOR'S RECOMMENDATION**

The Office of the City Auditor recommends that Colorado Springs Utilities restructure responsibilities for gas hedging to eliminate the identified conflict of interest. The RiskCentrix report, Appendix A, page 9, point 7, also recommends improvement to segregation of duties.

**COLORADO SPRINGS UTILITIES RESPONSE**

Utilities agrees with the OCA's recommendation that clear segregation of duties should exist between Enterprise Risk and Energy Supply. The activities of ERM from late 2008 through the current period focused on evaluating the effectiveness of the existing program, which was designed in 2004, well before the actual creation of the ERM group as it is known today. In late 2008, ERM determined that the appropriate level of program decisions and performance analytics did not exist in any functional area and began to actively engage Energy Supply in the development and analysis of the appropriate analytics required to more effectively execute the designed policy. Both parties realized that this may have infringed upon strict segregation of duties protocol but felt the continued engagement of both parties was necessary to adequately analyze the program and recommend the appropriate changes to enhance program effectiveness.

Going forward, appropriate activities will be defined and delineated between Enterprise Risk and Energy Supply and documented in policy and practices, clearly segregating program policy and monitoring activities from program design, implementation and execution activities.



**OBSERVATION 4 – RISK MANAGEMENT COMMITTEE DECISIONS AND ACTION ITEMS WERE NOT ADEQUATELY DOCUMENTED**

The decisions made and action items generated during the Risk Management Committee (RMC) meetings were not well documented. During our review we were supplied with the presentations and minutes associated with the monthly RMC meetings along with some ad hoc meetings regarding the hedging program.

We noted that decisions were not well documented. Action items were not clearly assigned nor reported on at the next meeting. No running log of action items, decisions and resolution was maintained. No history existed to show the evolution of the hedging program.

Maintenance of decision and action item logs would help ensure accuracy in reporting, facilitate effective meetings and ensure that promised changes were actually implemented.

**AUDITOR'S RECOMMENDATION**

The Office of the City Auditor recommends that Colorado Springs Utilities Risk Management Committee develop and maintain a decision and action item log.

**COLORADO SPRINGS UTILITIES RESPONSE**

Utilities agrees that more complete documentation can be provided on meeting decisions and follow up action items. Rather than creating a separate decision and action item log, we would propose the RMC meeting minutes be formatted to include all of this information and the RMC presentations include a recap of previous action items and the status of those items. This would maintain the information in a single data base and tie closely with the ongoing RMC discussions.



**OBSERVATION 5 – THE NATURAL GAS RISK TOLERANCES POLICY HAD NOT BEEN UPDATED IN THE REQUIRED TIME FRAME**

Our review found that the Natural Gas Risk Tolerances Policy related to the gas hedging program had not been updated in a timely fashion.

Specifically, QBD 00236 had an approved date of July 20, 2006 and a review period of 3 years. The meeting minutes of the June 10, 2009, RMC Meeting approved a proposal to update the QBD. A draft of the updated document with a "submitted for review" date of April 10, 2012 was found in the draft QBD data base. As of April 17, 2013 the draft had not been approved. The Energy Traders were following the processes in the unapproved draft QBD until trading for the hedge program was suspended.

**AUDITOR'S RECOMMENDATION**

The Office of the City Auditor recommends that Colorado Springs Utilities complete the review and approval process for the QBD 00236 Natural Gas Risk Tolerances Policy and comply with the review and approval deadlines if the hedging program is resumed.

**COLORADO SPRINGS UTILITIES RESPONSE**

The OCA is correct in the finding that the Natural Gas Risk Tolerances Policy is out of date. It was ERM's view, along with Energy Supply, that a more effective way to communicate natural gas hedging volume levels and tolerances would be to make those levels a part of the monthly Natural Gas Hedging Committee meetings. As a result, the hedge volume requirements were moved out of this policy document and are now being communicated via the monthly hedging meetings. This is a more robust practice and eliminates the need to change this QBD policy document any time hedging volume requirements change. It was an oversight on ERM's part to leave this document in the QBD data base in its current form. The policy will be cancelled and deleted from the QBD database.



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## ATTACHMENTS

### GLOSSARY

|   |   |
|---|---|
| CIG   | Colorado Interstate Gas Company, a subsidiary of Kinder Morgan, the natural gas pipeline company exclusively serving Colorado Springs Utilities.  |
| City Gate                                   | The point where natural gas enters the Colorado Springs Utilities system. Colorado Springs Utilities has five City Gates in its system.   |
| Collateral Posting                          | Money provided in conjunction with a hedging contract obligation to secure its performance when the mark to market of the hedge position with the counterparty is in excess of a pre-established threshold.   |
| Counterparty                                | When entering into a financial hedge transaction, the counterparty is the other organization with whom the arrangement is made. Colorado Springs Utilities works from a pre-determined list of eligible counterparties that meet their requirements.  |
| Credit Risk                                 | The risk that, in a financial or physical transaction, the counterparty will not perform in accordance with its contractual commitments.  |
| Derivatives                                 | Financial instruments whose value is based on a commodity or other security, e.g., futures, options, swaps, and forwards.   |
| Energy Services Division                    | The staff members responsible for execution and management of all energy sale, purchase, and transmission activities, marketing, and data gathering. They ensure daily compliance with the risk management policy and timely responses to issues arising from day-to-day operations.                    |
| ECA   | Electric Cost Adjustment. The cost adjustment to the customer bill used to compensate for increases and decreases in market prices.   |
| ERM (Enterprise Risk Management) Department | The staff members responsible for monitoring compliance with the risk management policy. They identify and recommend energy portfolio hedging tolerances and other risk limits, ensure that risks for all transactions have been identified and can be valued, and monitor for breakdowns in processes. |



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|-------------------------------|---|
| Financial Services Department | The staff members responsible for accounting, settling, tracking, and reporting transactions. They also prepare financial statement disclosures and maintain controls over cash or other assets in custody, including investment decisions on funds in trading and broker accounts.   |
| Forward Price Curve           | Graphical depiction of the future value of one commodity at one location over time.   |
| GCA                           | Gas Cost Adjustment. The cost adjustment to the customer bill used to compensate for increases and decreases in market prices.  |
| Hedging                       | The purchase and sale of securities or assets to reduce a firm's price risk relative to a position that the firm has or intends to take in the physical market.   |
| Mark to Market                | Currency valuation of a trade, security or portfolio based on available comparative trade prices in the open market within a stated time frame.   |
| MMbtu                         | One million (1,000,000) British Thermal Units. This is a standard volume measurement for natural gas.   |
| Normal Weather Volumes        | Projected sales volumes at City Gate assuming normal weather conditions.  |
| Option                        | A contractual agreement between two counterparties, where the writer (seller) grants a right to the buyer, for a fee (premium) to buy or sell a commodity, security, or asset at a given price (strike price) on a specific date ("European" option) or on or before a specific date ("American" option).   |
| Physical Market               | The cash market in which the actual commodity (natural gas) is bought and sold.   |
| Premium                       | The price paid for an option or instrument with an option-like feature.   |
| Ratable                       | Figured at a certain rate; proportional. In the context of the gas hedging program this refers to the practice of placing hedges over time for gas delivered in a certain month in the future. For example if the plan was to hedge 100,000 units for delivery in November a ratable approach could be to hedge 10,000 units each month from February through November to achieve the 100,000 unit total. |



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|---|---|
| RMC   | Colorado Springs Utilities Risk Management Committee  |
| Speculation                                     | The purchase, holding, and sales of stocks, commodities, futures, currencies, collectibles, real estate, or any valuable thing to profit from fluctuations in its price as opposed to buying it for use. There is price risk in speculation. Speculation represents one of three market roles distinct from hedging and arbitrage. Speculation is not allowed for Colorado Springs Utilities.   |
| Storage<br>(Underground<br>Natural Gas Storage) | The utilization of subsurface facilities for storing natural gas that has been transferred from its original location for the primary purposes of conservation, fuller utilization of pipeline facilities and more effective and economic delivery to markets. Storage services are utilized to allow more even purchases of natural gas throughout the year despite variation in end-use demand. Storage service is also a critical element in peak period deliverability. |
| Swap  | A contractual agreement between two counterparties to exchange fixed for floating payments on a given quantity of a commodity or security.  |
| Targeted Hedge<br>Volumes                       | The total volume of gas purchases planned to be hedged in any given period (month or heating season). The targeted hedge volumes changed over the life of the program from 60/81% of forecasted usage to 100% of historical minimum usage.  |
| Volatility                                      | The degree to which the price of a commodity or security fluctuates around some average value. It is usually measured as the variance or standard deviation of the price.   |



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# Office of the City Auditor Natural Gas Hedging Audit

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APPENDIX A - REVIEW OF COLORADO SPRINGS UTILITIES' NATURAL GAS HEDGING PROGRAM BY MICHAEL GETTINGS, SENIOR PARTNER, RISKCENTRIX, LLC.



RiskCentrix, LLC  
*Clarity in a World of Uncertainty*

Review of Colorado Springs Utilities'  
Natural Gas Hedging Program

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Authored by Michael Gettings, Senior Partner

June 27, 2013



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## Introduction

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RiskCentrix was hired by the City of Colorado Springs' Office of City Auditor ("OCA") to assist with the audit of Colorado Springs Utilities' ("CSU") natural gas hedging program ("Program"). RiskCentrix' focus was to review the appropriateness of the Program design and its economic performance. Specifically, RiskCentrix was asked to provide input as to the reasonableness of the Program vis-à-vis industry norms, and in that context, the reasonableness of results. Further, since CSU had suspended the Program, RiskCentrix was asked to discuss what program changes might be appropriate under current circumstances.

In conducting its review RiskCentrix relied on interviews of CSU personnel; reviewed policies; reviewed management presentations to the risk management committee ("RMC"), and reviewed the registry of hedges to inspect the transactions that were executed over the period. Generally speaking, financial results of hedge activities were compiled and reported by the OCA team, and RiskCentrix used those numbers in making its assessments. Where analysis was performed to quantify implications, RiskCentrix did so independently based on the data supplied by OCA.

## Executive Summary

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RiskCentrix found that CSU's Program falls appropriately in the range of programs typical for public utilities of similar size and risk profile. The Program generally has sought a net volatility reduction by way of securing a planned hedge ratio for a term of between 18 and 36 months with the RMC approving strategy and target hedge ratios based on recommendations of management and staff. The Program makes use of quantitative analysis to an extent comparable to a broad middle section of its peers. Over the period, RiskCentrix found that the aggregate actual hedge ratio attained was conforming to the RMC-approved plans. Monthly variations were observed and those are discussed in the "Findings" section below.

RiskCentrix performed a simulation of ratable hedge accumulation beginning with 2004 through March of 2012; the Program was suspended in April 2012. The simulated ratable hedge strategy resulted in a \$215 million increase to the hypothetical cost of gas, inclusive of all settled periods through year-end 2012. Actual results attained by the Program were a \$205 million increase in the cost of gas for the same period. So RiskCentrix concluded that actual performance was marginally better than a ratable hedge accumulation.



Having said that, an examination of shorter periods within the overall study period identified opportunities for improvement; some have been addressed by management and one should be investigated. Three have been addressed by management.

- Monthly hedge accumulation indicated substantial variations in the rate of hedging; RiskCentrix was advised by CSU staff that prior to Program suspension they were moving to a more ratable hedging strategy.
- Another problem, already addressed, related to the tracking of hedges for storage injections; in the early years physical injection volumes were deferred to the withdrawal month, but the hedge volumes were tracked against the injection month. This practice distorted monthly hedge ratios. RiskCentrix did not perform any forensics on the accounting, but was advised that the problem has been addressed, and in November of 2010 the RMC-approved hedge strategy began excluding storage volumes from the plan.
- Finally, forecast sales dropped significantly after the financial crisis of 2008. As forecast sales did not materialize, hedges executed in anticipation of those requirements resulted in higher hedge ratios than planned for some months.

The greatest opportunity for improvement would require some incremental investment in expertise, systems, and management time. Some public utilities at the larger end of the spectrum, particularly those with higher risk profiles or highly sensitive stakeholder environments, have adopted quantitative finance programs. The largest advantage to such a program is that it does not strive to simply reduce volatility; it manages two risk tolerances instead. Volatile commodity prices offer two types of potential pain: potential cost increases or potential out-of-market settlements. By routinely monitoring risk metrics using quantitative finance methods it is possible to manage each risk to a different tolerance and confidence level. Such a program is described briefly in the “Findings” section.

## Findings

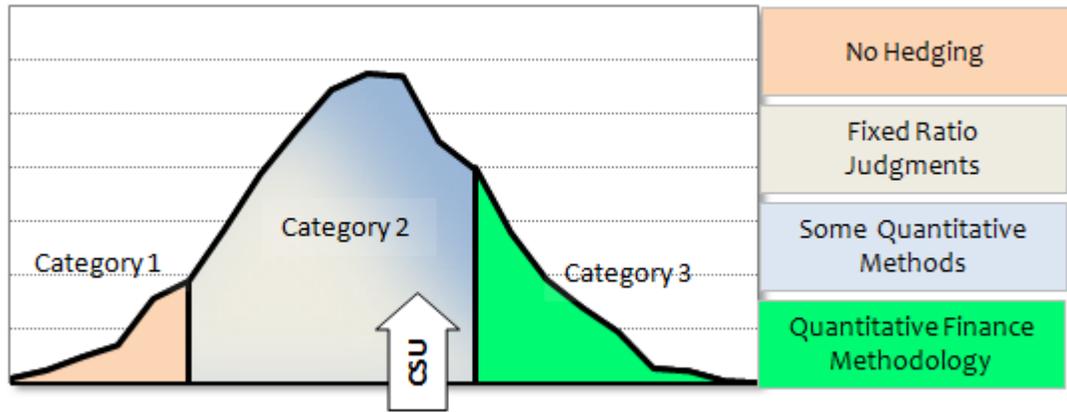
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Observations regarding CSU's hedging program follow:

1. The Program is governed by a policy and is subject to oversight by CSU's risk management committee; it is designed in a manner that is generally consistent with public utilities of similar size and risk profile; CSU's size and risk profile are such that a step up to a quantitative-finance program should be considered.

The following graphic shows the distribution of peer programs and where CSU's Program fits in the distribution:

Figure 1: Where CSU Fits Among Large Public Utility Hedge Programs



This chart is explained more thoroughly in the “Background” section of this report.

2. The Program sought an objective of reducing volatility exposure for customers; it did not seek profit and loss objectives, but cost stability. The first objective as stated in the Energy Risk Management Policy was “Provide stable and competitively priced commodity supply of electricity and natural gas to wholesale and retail customers, while maintaining the reliability standards for the appropriate service.”

While this objective is typical of similarly situated utilities, it implicitly requires reconciliation of two competing objectives; cost stability and competitive prices are often competing goals with opposite risk exposures. Cost stability motivates additional hedging (more risk of market divergence), while competitive pricing typically avoids material divergence from market prices. This conflict should be resolved with explicit objectives as to tolerance for both risks.

3. As tallied by OCA, the Program has resulted in gas costs exceeding market values by 8.6% since inception. RiskCentrix concluded that these results were slightly better than the unfavorable settlements that would have resulted from a ratable accumulation of hedges over the period.



RiskCentrix simulated a simple ratable swap accumulation where, on the first trading day of each month over ninety-nine months ending in March of 2012,<sup>1</sup> hedges were executed in equal volumes for each of the next 12 monthly futures contracts. Settlements were valued at first-of-month CIG<sup>2</sup> prices for all settled periods through year-end 2012. The analysis indicated that simulated settlement results would have added \$215 million to the cost of gas; that number is marginally higher than the unfavorable settlements actually experienced indicating Program economics were slightly better than a ratable accumulation.

4. The Program provided mitigation in extreme market-cost years. Between 2002 and 2012 the highest unmitigated cost of gas was \$237 million in 2005 and the Program mitigated that cost by \$36 million resulting in a net cost of \$201 million. The lowest cost year was 2002, and hedges added \$14 million to reach a net cost of \$88 million. The worst year in terms of hedge settlements was 2009, following the financial crisis, when net unfavorable settlements totaled \$83 million; in that year the unmitigated cost was \$143 million, \$20 million lower than the \$163 million annual average unmitigated cost for the entire period.
5. Hedge ratios were, in aggregate, consistent with policy which only specified hedge ratios by summer and winter periods. Beginning with January 2008 to suspension of the Program,<sup>3</sup> hedges precisely equaled target levels. However there were substantial variations when hedge ratios were examined on a monthly basis. Of the 52 months in this period, 60% (31 months) were over-hedged while 40% were under-hedged.

CSU attributed this to two non-Program issues. The first was forecast variances driven by the economic downturn following the financial crisis and the loss of certain commodity customers to transportation service. As Program volumes dropped, the hedge ratio increased. The second attribution was a change in the way storage volumes were tracked by month. Until recent years, CSU assigned storage hedge volumes to the month of injections whereas the associated gas supply was deferred to the withdrawal month. This created dislocations in monthly hedge ratios.

Reasons aside, industry practice would typically seek hedge targets by delivery month as over-target and under-target monthly hedges often do not balance to yield desired results; CSU should execute hedges in a way that attains monthly ratio targets.

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<sup>1</sup> The Program was suspended in April 2012.

<sup>2</sup> Colorado Interstate Gas

<sup>3</sup> The period for which monthly forecast data was available.



Also the pace of hedge accumulation was not specified by the RMC. Hedge targets were specified as aggregates by season, but apparently the pace of accumulation was left to the discretion of the front office. The following chart, compiled by OCA, shows the history of hedge targets.

Figure 2: Hedge Targets

| Effective Date | Maximum horizon       | Summer Volume                              | Winter Volume                              |
|----------------|-----------------------|--|--|
| <b>6/2005</b>  | 36 months             | 50% of forecast                            | 81% of forecast                            |
| <b>11/2010</b> | 24 months             | 50% of forecast, less storage requirements | 60% of forecast, less storage requirements |
| <b>3/2011</b>  | 18 months             | 100% of historic minimum                   | 100% of historic minimum                   |
| <b>10/2011</b> | 24 months             | 100% of historic minimums                  | 100% of historic minimums                  |
| <b>4/2012</b>  | Hedging was suspended |  |  |

The pace of hedge accumulation can be an important factor in the effectiveness of a hedge program. If a program is aimed at simple volatility reduction, a ratable accumulation would provide diversity of entry points, avoiding the risk of disproportionate commitments in high-priced periods. More sophisticated programs hedge in response to the risk of exceeding tolerance boundaries; these will be described later as Category 3 programs.

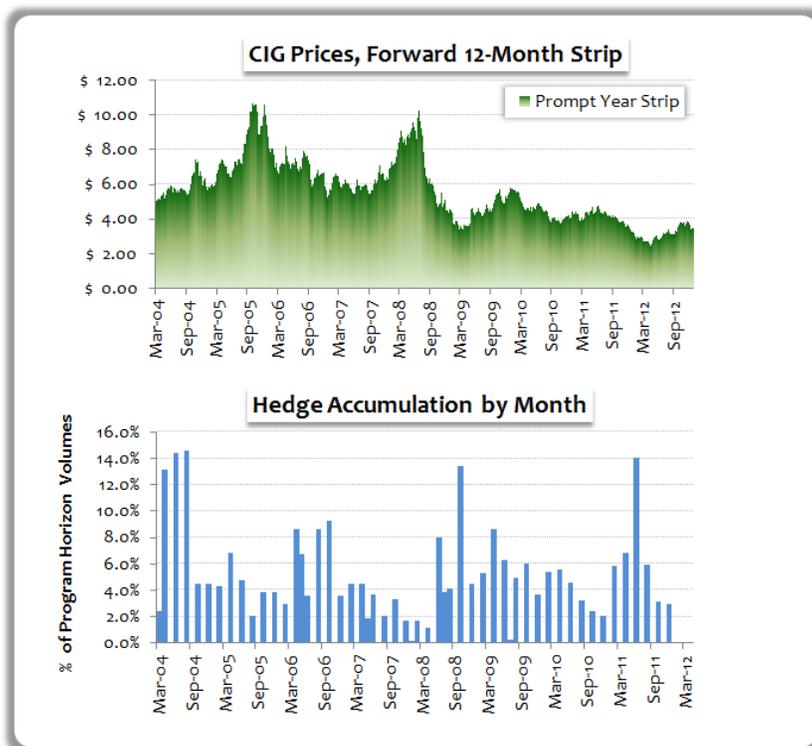
A program that combines simple hedge ratio targets without specifying a ratable accumulation or prescribing responses to risk metrics runs the risk that the front office might depend on market-timing criteria as the primary determinant of hedge execution. The economic consequences of wrong timing could then dominate the results.

In this case, the economic effect of non-ratable hedge accumulation was not an economic disadvantage as indicated by the simulation referred to earlier. Further



supporting this, a review of the hedge accumulation versus 12-month-forward CIG prices indicates that hedges were not concentrated in any spiking markets. The following figure shows hedge accumulations beneath an aligned plot of CIG's 12-month-forward prices. It can be seen in the graphic that hedge accumulation during the price spikes of 2008 and 2005 was at a more modest pace than adjacent time periods. It might be inferred that front-office discretion was at work here and that could have contributed to the marginal improvement over ratable results.

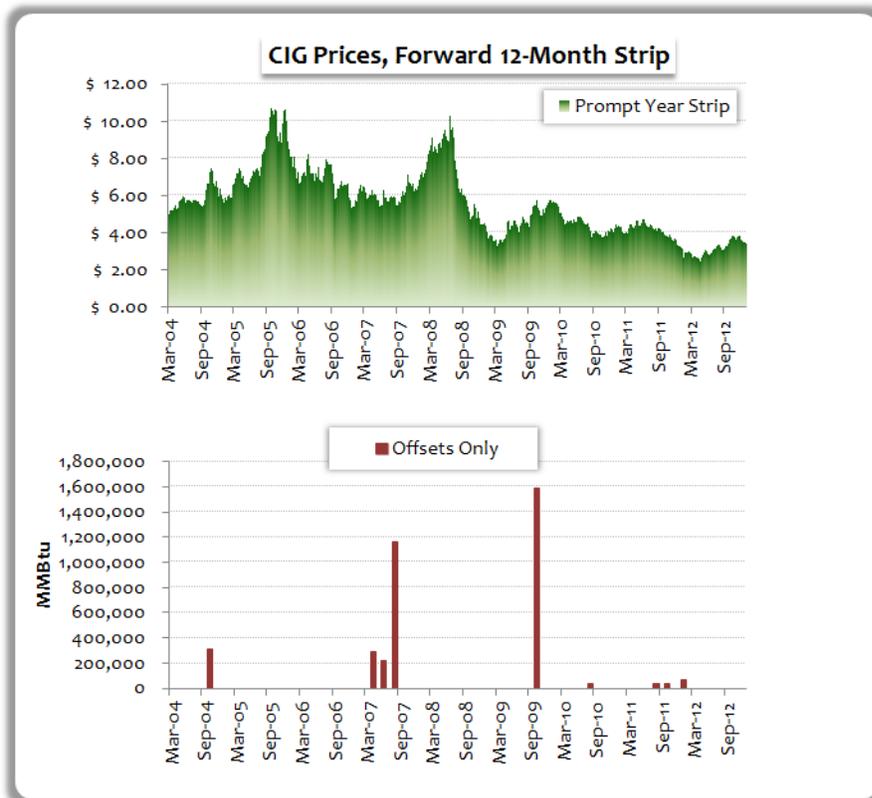
Figure 3: Hedge Accumulation and Forward Prices



6. The Program, when deemed appropriate, included contingent responses aimed at mitigating unfavorable settlements. Responses included executing offsetting hedges and overlaying put options to stem unfavorable outcomes. This is a reasonable practice more common and usually more effective with companies using quantitative finance methodologies to measure risk. In this case, the decision to enter these hedges was based on judgment of the front office.



Figure 4: Offsetting Hedges and Forward Prices



Again, if CSU were to reinstate the Program quantitative finance methods with related hedge decision structures would provide a firmer foundation for these decisions.

7. The enterprise risk group which includes the middle office has been an active participant in strategy formulation; particularly since the suspension of the Program, the evaluation of new Program structures has been conducted by a team including the front office and the enterprise risk group. If the Program is reinstated, it will be important to separate the middle office from strategy formulation and hedge decisions; a middle office serving as co-developer of hedge strategy would find it difficult to provide independent perspective to management.
8. RW Beck was commissioned to do a limited review of certain CSU board and CEO-related policies in 2011. In their findings RW Beck opined on the risk management program. They found that “The risk management techniques employed by Colorado Springs Utilities are appropriate for limiting exposure [to] price volatility.” While



RiskCentrix did not review the underlying support for RW Becks conclusion, our findings seem to be consistent.

9. CSU suspended any new hedging in April of 2012 in order to evaluate improvements to the Program that might be more appropriate to the newly evolved marketplace. RiskCentrix would recommend the use of quantitative finance methods deployed by some large utilities, particularly those with higher risk profiles or highly motivated stakeholders.
  - o In such a hedging system the single goal of "volatility reduction" would be more specifically articulated as two separate market-compatible objectives:
    1. Constrain costs to an explicit tolerance boundary with high confidence (e.g. 95%), and
    2. Constrain unfavorable divergence from market with high confidence (e.g. 98%) to an explicitly articulated tolerance boundary.

Note, under such a system, if CSU's risk tolerances are asymmetrical, unfavorable settlements might be more constrained and might be managed to a higher statistical confidence than cost increases or vice versa.

- o The front office would design a strategy of pre-planned metrics-based hedge responses to constrain outcomes to the specified tolerance boundaries. Typically intermediate boundaries and related hedge rules are also specified to accomplish a gradual hedge accumulation and lower risk of unfavorable settlements. The middle office would validate the strategy and it would be presented to the RMC for approval.
- o By frequently quantifying volatility, which varies over time, CSU staff could estimate the risk of upside cost exposures and the risk of unfavorable forward mark to market in manageable time intervals. Typically these would be measured for a finite "holding period" – for example one month. Such metrics, in conjunction with prescribed hedge responses specified in a strategy approved by the RMC, would empower the front office to hedge only when necessary to defend boundaries.
- o The middle office would monitor risk as well as compliance with the RMC-approved strategy and Program controls.



- At each RMC meeting reports would indicate the potential hedge opportunities that might be available one-month later and whether or not any cost tolerance boundary might be threatened. Similarly the potential migration in forward mark to market would indicate if the market divergence boundary might be threatened. Staff would report on these metrics as well as the responses that were executed per the RMC-approved strategy.

These enhancements would require modest investment in expertise and systems, but CSU's size, risk profile, and the tolerance of its stakeholders are approaching a level where this is probably warranted.

## Background

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This background information is offered to provide context. Background comments have been organized in three sections: CSU Background, Industry Norms, and Characteristics of Energy Risk Management.

### *CSU Background*

CSU began hedging natural gas in 1997 in an effort to dampen the volatility of natural gas costs ultimately borne by customers. The Program only applies to those volumes where CSU is responsible for the customers' commodity supply and related pricing or electric generation. The Program has been conducted using swaps<sup>4</sup> and options<sup>5</sup> and has been governed by a policy that specifies authorities and controls for the Program. The Program's stated goal was to reduce natural gas price volatility. Consistent with industry practices it was not conceived, nor conducted as a profit-and-loss activity, i.e., the favorable or unfavorable hedge settlements were accounted for as decrements or increments to the cost of gas respectively.

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<sup>4</sup> A swap is a financial contract that effectively fixes the cost of gas through a financial counterparty. For example, CSU might agree to pay a counterparty \$4.00/MMBtu (the "futures" price) times a specified volume, in exchange for the counterparty paying CSU the final-settlement price in Jan-2014 times that volume; that final settlement is variable and unknown at the time of the contract. If prices rise CSU would receive a payment for the difference; if prices fall CSU would pay the difference. The financial settlement, whether favorable or unfavorable, would then be applied to the cost of physical gas for that delivery month.

<sup>5</sup> Options bought by CSU require a fixed premium payment in order to assure that CSU receives only favorable settlements when prices move; those premiums can be substantial. Premiums depend on the volatility of gas prices and the time remaining to the delivery month among other things.



Prior to RiskCentrix beginning its review, OCA advised that while perceptions of the Program were generally favorable during its early years, questions had been growing as natural gas prices collapsed. The price declines had been particularly steep in recent years with the economic turmoil following the 2008 financial crisis and the emergence of new drilling technologies driving growth of shale gas supplies which tipped the balance of supply over demand.

In response to those falling prices, CSU “unwound” some of its hedges by executing offsetting swaps, effectively negating any further mark-to-market migration for those offset positions. Finally, CSU suspended new hedging activities in April of 2012 until they could ascertain how the Program might be modified to more effectively deal with the dramatic evolution of natural gas markets.

### *Industry Norms*

There is no broadly recognized GAAP-like standard for how to establish a hedge strategy or why to make hedge decisions. There is no bright line as to what constitutes a prudent structure. There are standards as to program controls, but hedge decisions are intrinsically tied to the hedging entity’s objectives and those are dependent on a host of factors which can vary dramatically from one entity to another. CSU’s circumstances most closely align with large public power (and gas) utility companies. This segment of the industry has been used here as the peer-group comparison for determining the appropriateness of CSU’s Program; the author has had extensive experience with these companies.

Natural gas prices have been notoriously volatile for decades and most utilities have conducted some form of risk mitigation program aimed at protecting customers from extreme spikes in prices. Industry-wide these programs have utilized futures contracts, swaps and options that were first introduced by the New York Mercantile Exchange (NYMEX) in 1991. The following graphic shows the wide range and radical variations of monthly prices for natural gas at Henry Hub which is the most utilized NYMEX supply reference in the United States. Note the unpredictable nature of these prices; even seasonality is not predictable as evidenced by the spring/summer price spike in 2008.

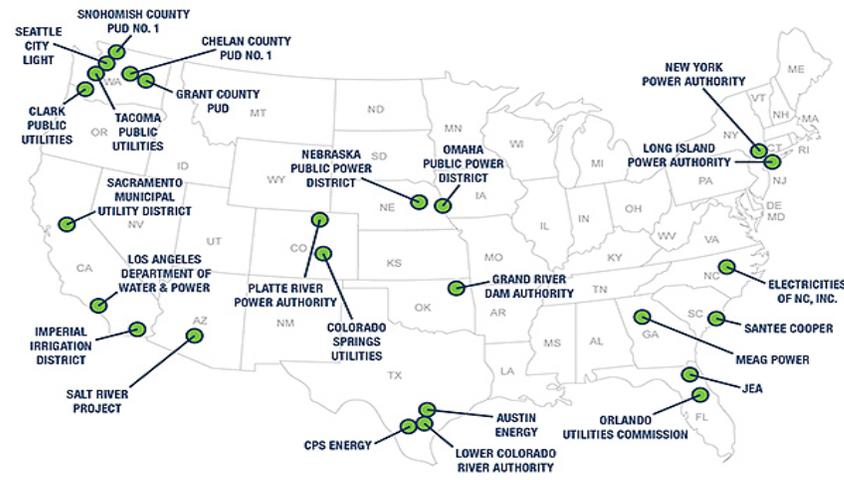


Figure 5, Historical Natural Gas Futures Prices (\$/MMBtu)



For the purpose of benchmarking, the following map of large public power utilities is offered for reference. CSU is one of the utilities included in this segment.

Figure 6, Large Public Power Entities



Hedging programs deal in competitive markets and information as to specific strategies is often guarded even by public entities, so there is no reliable survey delineating the precise nature of these utilities' programs. However the author has had a decade-plus history of



interaction with about half of these, and has reviewed or modified, directly or indirectly<sup>6</sup>, the programs of about a dozen of them while holding ex-officio seats on three executive risk committees listed here. The following observations are offered from that perspective.

These utilities' risk programs span a range of structures. They can generally be classified in three groups:

- Category 1. No hedging;
- Category 2. Hedge to a predetermined ratio with some quantitative analysis, or
- Category 3. Hedging in response to explicitly quantified and monitored risk metrics

Figure 1 has been offered as an estimation of the deployment of these program categories and how they are distributed across this segment of utilities.

While cost pass through is an industry norm, utilities typically run hedging programs on behalf of their customers. Like CSU's program, those who do not hedge are usually in that position for a transient period while they reevaluate the program in light of unfavorable hedge settlements. In one case a program was terminated, but most entities are very concerned with a permanent unhedged position because customer dissatisfaction is likely to run rampant if prices triple as they have during high-price periods. There can be secondary impacts as well. Potential price spikes, if unhedged, not only hurt in terms of customer satisfaction, but they can also affect a firm's reputation, competitiveness with respect to economic development, and the relationship with regulatory or government oversight.

As to the second and largest category, Category 2, most utilities hedge to a management-determined ratio as CSU did prior to the Program's suspension. The choice of such a structure is typically driven by recognition that commodity price risks are only a part of the cost structure and are naturally mitigated to some extent, either by diverse generation (e.g., coal), storage capacity, or other factors. Since more sophisticated programs require some incremental investment in expertise and systems, many firms reach a judgment that reducing exposure to volatility by gradually accumulating a predetermined hedge position is the appropriate choice.

Category 3 is typically pursued by large entities with a naturally high risk profile and the scale to support more comprehensive programs, or those who have experienced heightened

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<sup>6</sup> Direct consulting assignments with eight of these utilities; consulting with a program manager or consultant for others.



stakeholder sensitivity to past results. These programs deploy quantitative finance principles to measure and monitor risk, and then respond to specific circumstances in a pre-planned manner.

As stated earlier, there is no prudence threshold with respect to program structure among these choices. The programs deploying the most sophisticated methods on the right side of the graphic represent utilities with the highest risk profiles or highest stakeholder sensitivity and they choose to invest more in program design and execution. For example, utilities with the largest energy requirements, little or no coal, high energy transportation/transmission costs, and big price exposures to natural gas and purchased power have been likely to invest more in risk mitigation methods; they have been early adopters of new methods.

The estimate is also not a static one. The energy risk management landscape has been evolving over about 20 years, and the methods deployed have become gradually more sophisticated as practitioners and the risks themselves have evolved.

### *Characteristics of Energy Commodity Risk Management*

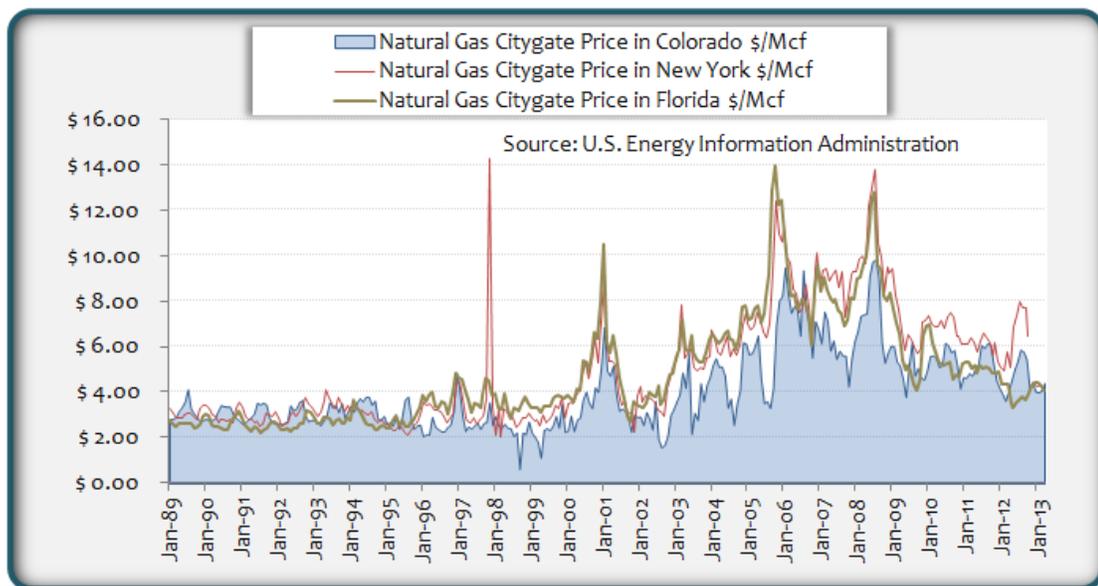
In utility operations, risk is two-sided. Unhedged costs can ramp up dramatically, and that might motivate a utility to fix costs. On the other hand, fixing prices can result in above-market gas costs. Customers' feel pain when costs rise and they feel pain when costs are above market. The last decade has exhibited two major price cycles where gas prices have doubled in six to eight months and then fell by more than half over the subsequent period (See Figure 5 above), so the range of potential pain could be substantial in both directions. Good utility hedging programs strive to balance these competing risks in a way that attempts to meet customers' needs. Programs in the middle section (Category 2) of Figure 1 typically try to balance these considerations by choosing an appropriate hedge level, avoiding precipitous hedge accumulation, and monitoring mark-to-market risk. In some cases they also use options, paying a premium for one-sided, only-favorable settlements. Somewhat less often, utilities will offset existing hedges by establishing counter positions when out-of-market settlements threaten to become large. These activities contribute to the efficacy of programs and, to some extent, will be used as references in drawing conclusions regarding CSU.

## Final Observations

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1. Mark to market, collateral needs, and other metrics were monitored by staff and routinely reported to the RMC. Some quantitative methods were deployed including stress testing, certain risk metrics, collateral contingency planning, statistical distributions for volume expectation, etc.
2. As indicated in Figure 1, CSU is situated such that the assessment of more comprehensive hedge protocols is appropriate. CSU is located in a relatively low-cost region of the country; see Figure 7 comparing Colorado city gate prices to those in New York and Florida. Yet, that same graphic shows how the variability of gas prices has grown over the last decade. Given CSU's size, the growing volatility of natural gas prices, and the growing sensitivity of its stakeholders to the two-edged risks of cost increases and unfavorable divergence from market, CSU should evaluate the merits and investment necessary to implement a quantitative finance based hedging program.

Figure 7: Comparison of Natural Gas City Gate Prices, CO v. NY & FL



The key attribute of such a program would be to focus on the two-sided impacts of volatility individually; i.e., the risk of cost increases as well as the risk of out-of-market



settlements. Specific tolerance boundaries for each risk would be articulated, and then Value at Risk metrics would be deployed to measure and monitor the risk of outcomes reaching those boundaries over a management horizon called a holding period.<sup>7</sup> In other words, at each RMC meeting, reports would indicate the potential migration in forward costs (for a multi-year hedge horizon) and the potential migration in mark to market between the then-current measurement and the one that could evolve by the next monthly meeting. Hedge decision guidelines would be pre-planned, delineating hedge responses suitable to risk conditions that might emerge threatening the tolerance boundaries.

Such a program would be more robust than a simple net-volatility reduction; it would be effective under a broader range of circumstances because it would only hedge when appropriate to defend (or prepare to defend) upside cost tolerance. By monitoring upside risk, it would stand ready to hedge when needed, but by hedging more selectively it could enjoy greater participation in market downturns. Further, if price downturns threatened out-of-market boundaries, CSU would have pre-planned responses adding structure to its contingent decisions.

To be clear, such a program enhancement is not a panacea. It would offer more robust performance (i.e., superior goal attainment under a wider range of environments) at the cost of incremental investment in expertise, systems and management time. However, given the foregoing discussion, an assessment of the merits of such a program would be appropriate.

----- End of Report -----

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<sup>7</sup> The holding period could be the time span between RMC meetings or a shorter period if hedge response times are shorter.



## Michael A. Gettings

### SeniorPartner

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Industry Experience: 30 + years

#### Qualifications and Experience:

Mr. Gettings is the Senior Partner at RiskCentrix, LLC. In reverse chronological order his career has included:

- 16 years as executive consultant in the energy field, including commodity risk management and risk-cognizant strategic planning with an emphasis on utilities' needs (RiskCentrix and Pace Global)
- 10 years as founder and president of a natural gas marketing and trading company (O&R Energy)
- 10 years in utility ratemaking and financial/economic analysis (Orange and Rockland Utilities)

As a consultant Mr. Gettings has participated as an ex officio member on the executive risk management committees of numerous utilities, including some of the nation's largest public power companies. He established numerous utility and industrial risk mitigation programs and added clarity and discipline to many more. He founded the Risk and Utilities Division of Pace Global consisting of risk consulting and advisory services, risk systems integration, and utility strategy development. Mr. Gettings has been an advisor to the executive suite of numerous utilities, Fortune 500 industrials, and wholesale trading companies.

Earlier in his career, following the deregulation of gas markets, Mr. Gettings started O&R Energy, a gas trading and marketing firm, and guided that company through its extraordinary growth as third-party gas supply emerged as a major factor in the energy industry. Perhaps more important to today's environment, following the advent of the NYMEX futures exchange in the early 1990's, Mr. Gettings established a hedging program at O&R Energy which positioned him as an early adopter and ultimately as an expert in the field of risk mitigation.

Finally, his experience in the fields of trading and risk mitigation is supplemented by an early grounding in utility ratemaking, regulatory affairs, and financial analysis for a combination electric and gas utility that operated in three states (NY, NJ, PA).

Examples of Mr. Gettings' relevant experience include:

- Consulted on numerous strategic issues, particularly in the utility industry, including areas related to risk mitigation, resource planning, rating agency issues, acquisitions, ratemaking and regulatory implications, etc.
- Directed development of a rigorous and customizable structure of hedging decision protocols for energy risk mitigation and links to related corporate-level strategic objectives. These protocols consist of programmatic, defensive, and discretionary hedging rules which provide a covenant between executives and hedging managers, thus enabling responsive but well-conditioned risk mitigation tied to P&L, cost-of-service, or other objectives.
- Developed an Enterprise-wide Risk Management (“ERM”) approach that linked parametric and contingent-event risk assessments into a financial management process. Related ERM perspectives into development of rating agency storyboards.
- Initiated the development of various trading and risk management tools including proprietary market timing models and models to simulate performance against historical or postulated price environments.
- Initiated the development of web-based information systems for the routine measurement of risk, and tied these systems to business perspectives relating market risks to overarching corporate objectives such as earnings, competitiveness, etc. In addition, developed customized application of these tools to various client cultures and risk appetites.
- Founded and presided over natural gas marketing and trading company. As president of O&R Energy, was responsible for strategy and oversight related to commercial sales and trading activity of approximately \$1 billion annually. Also initiated and negotiated the sale of an interest to a major oil company.
- For utilities and industrial concerns, drafted and saw through to board of directors' ratification, risk policy and procedure documentation.
- Provided expert witness testimony in legislative, regulatory, and civil proceedings. Topics have included:
  - In the risk domain: strategy formulation, economics and risk of long term commitments, policies and procedures, trading incentives, evaluation of hedge structures, quantification of damages, etc.
  - In the non-risk domain: ratemaking support, capital project economics, off-shore wind power economics, marginal and embedded cost assessments, load research and forecasting, etc.

**Boards:**

Mr. Gettings serves or has served on the boards of directors of RiskCentrix, Pace Global, O&R Energy, Atlantic Morris Broadcasting, and related holding companies. He serves or has served as ex officio member/advisor to the Executive Risk Management Committees of Long Island Power Authority, New York Power Authority, Duquesne Light Company, and numerous industrial or power development firms.

**Education:**           MBA – Finance, Pace University  
                              BS Mechanical Engineering, Manhattan College

# CITY COUNCIL'S OFFICE OF THE CITY AUDITOR

## COLORADO SPRINGS, COLORADO

### **About our Office**

The mission of the Office of the City Auditor is to provide City Council with an independent, objective and comprehensive auditing program for operations of the City. Our auditing program includes:

- Evaluating the adequacy of financial controls, records and operations
- Evaluating the effectiveness and efficiency of organizational operations
- Providing Council, management and employees objective analysis, appraisals, and recommendations for improving systems and activities

The Office of the City Auditor is responsible for auditing the systems used by the City of Colorado Springs and its enterprises, including Colorado Springs Utilities. We perform a variety of audits for these entities, including financial audits, performance audits, contract audits, construction audits, and information system audits. We also perform follow-up on a periodic basis to monitor and ensure management actions have been effectively implemented.

### **Authorization and Organizational Placement**

Our audits are conducted under the authority of Chapter 1, Article 2, Part 7 of the Colorado Springs City Code, and more specifically parts 703, 705 and 706 of the Code. The Office of the City Auditor is structured in a manner to provide organizational independence from the entities it audits. This independence is accomplished by the City Auditor being appointed by and reporting directly to the City Council.

### **Audit Standards**

The audit was conducted in a manner that meets or exceeds the International Standards for the Professional Practice of Internal Auditing, a part of the Professional Practices Framework promulgated by the Institute of Internal Auditors, with the exception of the requirements under standards 1312 and 1321 to obtain an external quality assurance review once every five years. We do not believe this non-compliance impacted the quality of our audit.

The audit included interviews with appropriate personnel and such tests of records and other supporting documentation as deemed necessary in the circumstances. We reviewed the internal control structure and compliance tests. Sufficient competent evidential matter was gathered to support our conclusions.