PACE

4401 Fair Lakes Court
Fairfax, VA 22033-3848 USA
Phone: 1.703.818.9100
Fax: 1.703.818.9108

Vantage Consulting, Inc.

21460 Overseas Hwy
Cudjoe Key, FL 33042
Phone 305-744-3440
Fax 305-744-3450

Analysis

Of

The Gas Purchasing Practices

And Hedging Strategies

Of

The New Jersey Major Gas Distribution Companies

Final Report

January 15, 2009

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EXHIBITS

I. EXECUTIVE SUMMARY

As with many energy commodities, the wholesale market price of natural gas has more than tripled since 2000 and has become substantially more volatile. This prevailing environment of higher and more uncertain prices is an ongoing challenge for gas utilities and their regulators nationwide. While utility rate increases of any magnitude can create a hardship for consumers, extreme price environments such as the spikes of the past decade can have severe and widespread economic welfare impacts. In New Jersey, the Board of Public Utilities (the Board or BPU) and the major gas utilities have, together, been at the forefront of mitigating price volatility on behalf of the State's consumers and are to be commended for their efforts to-date. In keeping with that proactive approach, this Report is the culmination of a Board-initiated effort to further improve the utilities' hedging practices.

Historically, the Board has actively encouraged gas-cost risk mitigation on the part of the State's natural gas utilities. In collaboration with the Board, the utilities have developed and deployed hedging programs during the past decade that have yielded significant measurable benefits to-date. Specifically, during the pronounced gas price spike subsequent to the hurricanes of 2005, the collective risk mitigation efforts of the four major gas utilities resulted in consumers avoiding an estimated $305 million in gas costs compared to prevailing market prices. Notwithstanding those results, the 2005 rise in prices – the third such acute rise since 2000 – prompted the Board to seek an in-depth, independent review and evaluation of the utilities' hedging programs.

Accordingly, in December 2005, the Board directed its Divisions of Audits and Energy to retain an outside contractor to evaluate how effectively the State's major gas utilities have mitigated volatile prices over the past several years and, moreover, whether those utilities' hedging programs can be improved. The four subject utilities – Public Service Electric & Gas (PSE&G), New Jersey Natural Gas (NJNG), Elizabethtown Gas (ETG), and South Jersey Gas (SJG) – serve a combined 2.6 million core residential and small commercial customers throughout the State. That customer base consumes approximately 260 billion cubic feet of natural gas annually, at an annual cost of $3 billion based on current prices (commodity cost only).

In January 2007, the Board issued a Request For Proposal (RFP) to perform an analysis of the gas purchasing practices and hedging strategies of the State's major Gas Distribution Companies (GDCs). Vantage Consulting, Inc., (Vantage) and its subcontractor Pace Global Energy Services, LLC., (Pace) were selected to perform this assignment.

Vantage and Pace performed a comprehensive review of the hedging activities of each of the four utilities covering the period 2001 to 2007.[1] That review included a transaction-by-transaction analysis of each utility's hedging program, as well as an evaluation of risk

[1]/ The 2001 timeframe comports with the utilities' filing of hedging programs in June 2001 pursuant to the Board's order on March 15, 2001.

management policies, control procedures, and organizational structure. Additionally, in support of our recommendations for improving the utilities' hedging programs, we simulated an alternative program design covering the same six-year historical period. Our findings and recommendations are summarized in this Executive Summary and presented in detail in our full report. Also, as required by the RFP, we held two comprehensive seminars on the strategic use of hedging instruments for BPU staff as well as separate seminars for each of the GDCs.

Vantage and Pace developed a number of specific recommendations for each utility as well as a framework for implementation. Each of the utilities responded to these recommendations, with varying degrees of comment. After reviewing the comments, it is clear that there are differences between Vantage and Pace, and the four utilities as to the best way to move forward. These are legitimate points of disagreement and are not to be dismissed. Later, in this Executive Summary, we provide a discussion of the issues and differences in approach raised by each utility. The ultimate resolution and actions taken will need to be addressed by the utilities, the BPU and other stakeholders.

Each utility provided proposed corrections in the body of the Report as well. Where possible, we modified the text to reflect these proposed corrections. In many cases we footnoted the comment to appropriately communicate the point of information.

A. WHAT IS HEDGING

CONTEXT – THE CASE FOR ROBUST HEDGING

The future price of the gas that utilities need to supply their customers is subject to market forces and is therefore uncertain. Utility rates, of which the wholesale price accounts for more than two-thirds, in turn, are also uncertain. Utilities cannot control market prices (nor can any market participant, for that matter). To the extent that future prices move away from current levels, consumers are exposed to that price risk.

"Hedging" refers to actions that constrain the future price that utilities are obligated to pay for the commodity; it is achieved through the use of various contractual arrangement or financial instruments (which we discuss later). Ascertaining today, some (or all) of the price that is to be paid in the future, has the effect of stabilizing costs relative to "floating" with the market. On balance, a more stable cost stream is desirable, but that is an ancillary benefit of our recommendations for improving the New Jersey GDC hedging programs.

The central aim of our recommendations is to promote greater mitigation of acute price spikes than is currently achieved by the GDCs' hedging programs. Importantly, this objective must be balanced with sufficient participation in market downturns. To do so, we recommend that the utilities' gas-cost mitigation programs embrace structured decision rules (which we refer to as "hedging decision protocols") that are responsive to transitory changes in prices and volatility. In addition, we recommend that the programs feature the well-controlled use of financial options to ensure adequate participation in falling markets. We believe these suggestions, coupled with complementary oversight procedures on the part of the Board, could be extraordinarily beneficial to consumers. Before delving into the structural details, it is useful to first establish two key principles that frame the need for modifying the GDCs' hedging programs.

TWO DIMENSIONS OF RISK

If greater price stability is the sole measure of a hedging program's effectiveness, it can be achieved by simply increasing the level of hedging. However, since market prices can rise *or* fall from current levels, increasing hedge levels increase the risk that the hedged price will settle unfavorably relative to market.

The first key principle, therefore, is that risk has two dimensions: there is the risk that market prices will move up when customer requirements are unhedged; and there is the risk that market prices will move down against already-hedged positions. Mitigating either of these dimensions of risk generally increases the other. That is, each hedge added to guard against rising prices increases the chance of an out-of-market situation. Likewise, foregoing hedging to avoid potential out-of-market outcomes leaves rates exposed to rising prices.

The implication of the two-dimensional nature of risk is abundantly clear: fear that hedges will settle above market deters hedging more aggressively to defend against rising prices. Utilities are particularly sensitive to this because of the concern of recovering the cost of out-of-market hedges (we note that the BPU has not disallowed above-market hedges to date, which is an important and positive foundation on which enhancements to the utilities programs can be developed). A robust risk-mitigation program should explicitly recognize *both* dimensions of risk and manage them to a reasonable balance. To do so requires deploying expertise, sophisticated governance, and likely some investment.

ASYMMETRY OF PRICE SWINGS

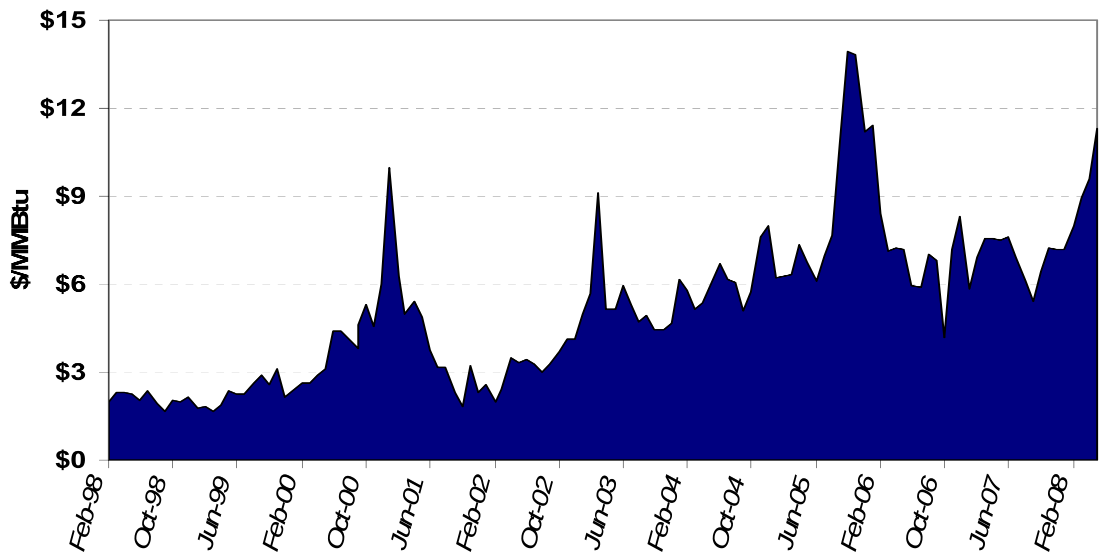
Given an understanding of the two dimensions of risk, one might conclude that hedging is effectively a "zero-sum game" – that is, favorable and unfavorable hedge settlements will offset over time. That premise would support maintaining a uniform hedge level throughout all price environments, something that is commonly observed in utility hedging programs across the country. However, the premise assumes that up and down movements of prices are symmetrical in terms of frequency and magnitude, which is incorrect.

The second key principle, then, is that price swings in the energy commodity markets are asymmetrical: price increases tend to dwarf price decreases. Commodity prices have a lower bound – zero in theory, but in practice some level at which production would contract[2] – but they are not similarly bound by an upper limit. Over time, we observe a skewed distribution of prices, where high prices are much more distant from the average

[2]/ We note that electricity prices can go below zero for short, transitional periods when the cost of shutting down a generator exceeds the marginal loss of producing the power below variable cost.

than low prices are (i.e., the "spikes" are more pronounced than the "troughs"). This phenomenon can be readily seen in the actual pattern of wholesale gas prices over the past several years, as depicted in the chart below.

Exhibit 1: Asymmetry of Natural Gas Prices – Pronounced Price Spikes

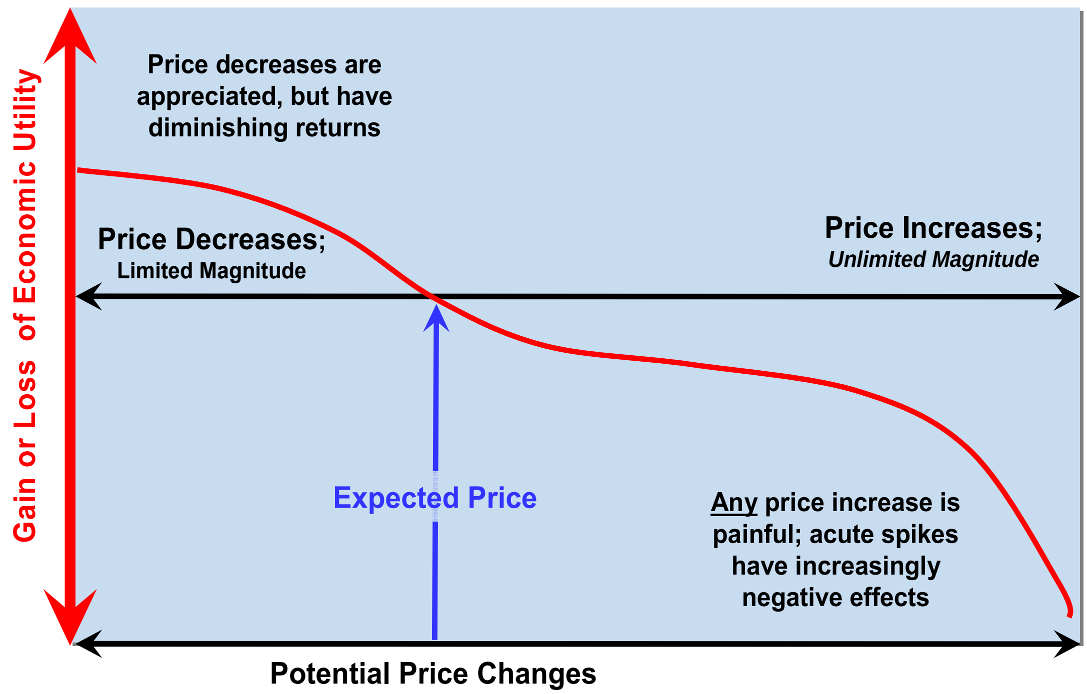


Source: NYMEX

While it is true that prices have fallen precipitously at times, this has only occurred after a spike as prices "return" to pre-spike levels. However, there are no comparable events where prices "plunged" several dollars below a previously sustained range of prices. Continued volatility in the natural gas market suggests that this pattern is likely to persist into the future, and potentially produce even more acute spikes. The other notable thing about the prices depicted above is that overall price levels have risen steadily in the past decade.

The implication of this price asymmetry is that the net economic effects of unmitigated price swings is decidedly negative, even if acute price spikes occur less frequently than price dips. The core issue is that consumers are hurt far more than helped by price volatility. Relative to normal expectations, the erosion of economic utility that occurs in extreme price environments well exceeds the benefits to consumers when prices are low.

Exhibit 2: Economic Impacts of Volatility are Negative



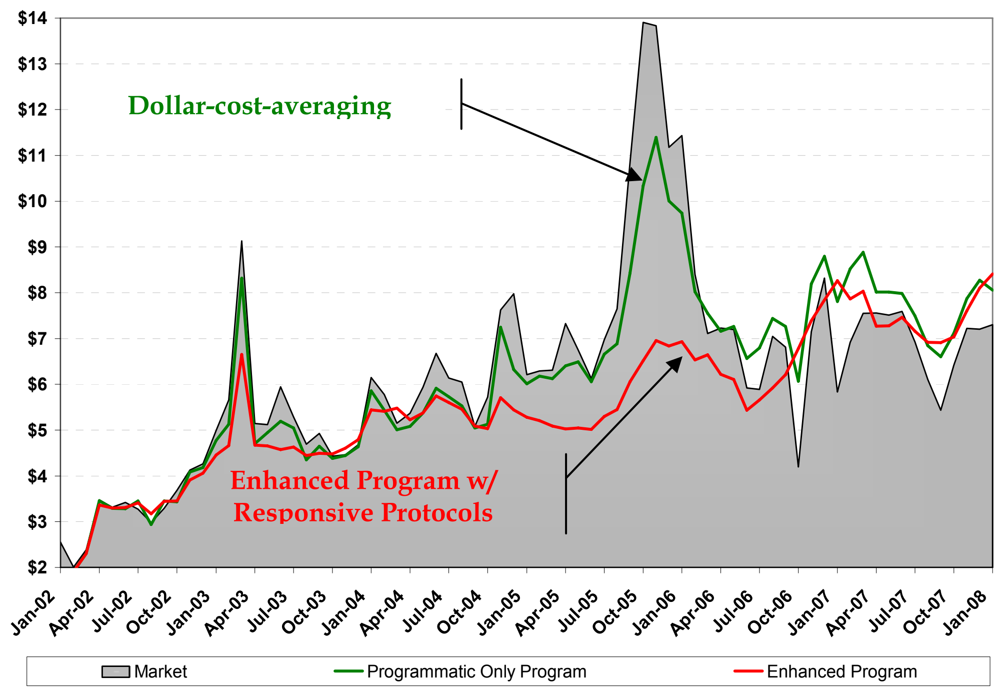
Source: Pace and Vantage

The combination of asymmetric price swings, overall rising prices, and the progressive economic harm that results, supports the need for robust utility hedging programs. While such programs may result in slightly higher customer bills during "normal" markets, the value of truncating intolerably high customer bills during extreme price spikes would, on balance, make the program enormously beneficial. Accordingly, our recommendations center on the need to improve the performance of the New Jersey gas utilities' hedging programs during acute price environments, balanced with preserving sufficient participation in falling markets.

RESPONSIVE HEDGING IS NEEDED

In a nutshell, the goal is to be more hedged in high price environments than in stable or falling price environments. To do so requires that the hedging program be *responsive* to changing market conditions. Our recommendations center on program design elements that will enable more responsive hedging on the part of the GDCs. The graphic below shows cost profiles from two approaches to hedging as they would have played out in the gas markets of the last half-dozen years. The green line represents the effect of a programmatic approach in which hedges are executed uniformly over time (i.e., dollar-cost-averaging). The red line reflects an enhanced program based on a combination of hedging decision protocols (HDPs) that respond to price and volatility increases, as well as market downturns. As can be seen, the responsive program achieves far greater price-spike mitigation and comparable, indeed better, performance during falling price environments.

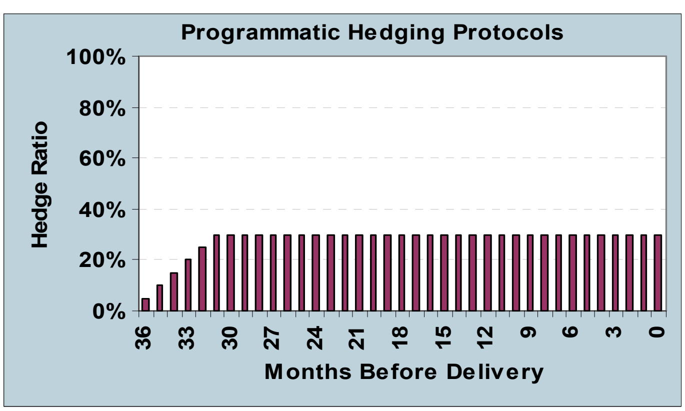
Exhibit 3: How Responsive Hedging can Promote Improved Price-Spike Mitigation



Source: Pace and Vantage

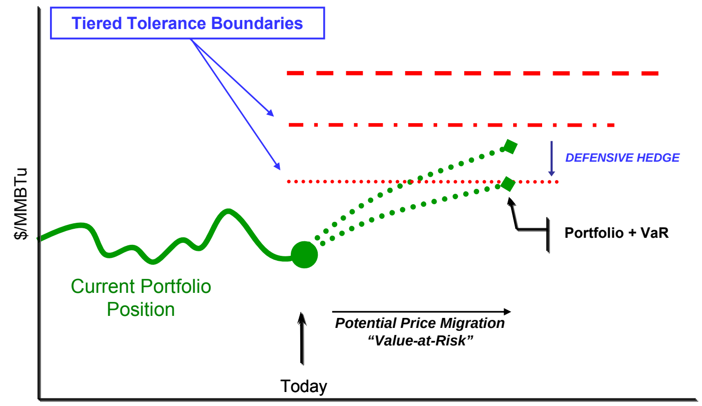
The elements of the enhanced hedging program are described briefly below. Our recommendations to the GDCs are to move toward adopting these elements in their entirety. However, we believe that a phase in of certain elements can produce improved results, and we have included such a phased approach with our recommendations.

The enhanced program (red line above) comprises four categories of hedging decision protocols. These "protocols" are structured decision rules that indicate when, how much, how far forward in time, and with what instrument to hedge.

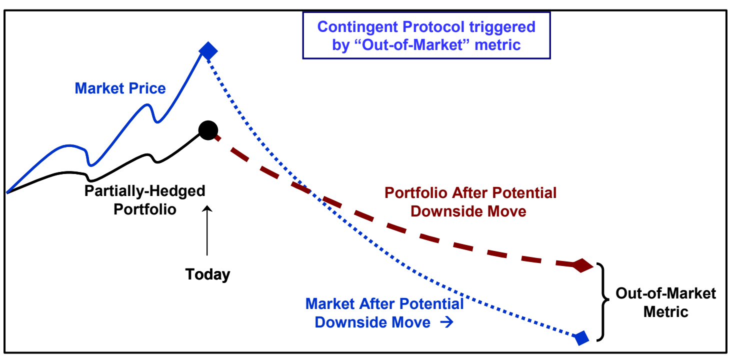


Programmatic Hedging Protocol. The programmatic protocol accumulates hedge positions on a dollar-cost-averaging basis well in advance of delivery, (36 months in the example shown). Their purpose is to attain minimum hedge coverage prior to the onset of acute volatility, enabling the risk manager to respond in a more measured, predictable way when volatility threatens tolerances.

Defensive Hedging Protocol. The defensive protocol executes hedges in response to measured volatility. When the combination of forward market prices and potential price increases, (determined by monitoring volatility) could produce unacceptable price levels, the defensive protocol mandates increasing hedges to preempt the outcome. To function effectively, the defensive protocol requires defined tolerance boundaries.



Discretionary Hedging Protocol. The discretionary protocol allows the disciplined exercise of market-timing to supplement programmatic hedges and further preempt the need to hedge defensively. They are subordinate to the Programmatic and Defensive protocols, which are mandatory.



Contingent Hedging Protocol. The contingent protocol monitors the potential for hedge positions to be above-market in excess of established tolerances. When triggered, this protocol calls for a shift to financial options to allow participation in future downward movement of prices. As with the defensive protocol, the contingent protocol requires monitoring volatility.

These protocols, deployed as a structured set, constitute a responsive hedging program that can improve the mitigation of price spikes balanced with participation in market downturns. In a well-balanced portfolio, each type of hedge contributes to risk mitigation. The relative emphasis on each protocol is determined on the utility's specific risk tolerances and financial expectations.

B. KEY FINDINGS

I-F1 Each of the four GDCs current hedging programs includes elements fundamental to sound risk management, including: basic programmatic (non-discretionary) hedging; the use of financial hedging tools by some of the GDCs; written procedures; and active risk management oversight committees.

These elements have been deployed to reduce customers' exposure to market prices, they also provide a foundation upon which improvements can be made.

I-F2 For the historical period analyzed, all four of the utilities' hedging programs narrowed the range of price outcomes compared to what would have occurred had they simply floated with the market.

Specifically, while the market observed a range (differential between high and low monthly settled prices) of $8.83/MMBtu, the four utilities realized a high-low differential of between $5.23/MMBtu and $7.93/MMBtu. All of the firms' programs likewise reduced the volatility of prices reflected in their BGSS rates, thereby achieving the stated goal of reducing volatility and stabilizing costs relative to market.

I-F3 Our research indicated deployment of hedging practices is varied across the country and even between different utilities within single states.

In this respect, we find that New Jersey has more uniformly promoted hedging across the major utilities. For those states/utilities where hedging activity is present and observable, we find structures similar to those in New Jersey: (i) non-discretionary, dollar-cost averaging to target hedge ratio is the prominent tactic; (ii) defensive or "stop loss" protocols are generally not applied; (iii) discretionary hedging is featured in certain programs; and (iv) several states have incentive mechanisms around the hedging programs. The following Exhibit summarizes our findings in a number of jurisdictions.

Exhibit 4 Representative Sample of Hedging Programs Across the U.S.

State	Utility	Regular Gas Cost Plans Required	Explicit Hedging Authorization	Dollar Cost Average	Target Hedge Ratio	Defensive Stop Loss	Discretionary Hedging	Incentives
RI	Nat'l Grid	Yes	Yes	Yes	Yes	No	Yes	Yes
CA	SoCal Gas	Yes	Yes	Yes	Yes	Unknown	Unknown	Yes
MI	MichCon	Yes	Yes	Yes	Yes	No	Yes	No
MA	Bay State	Yes	No	Unknown	Unknown	Unknown	Unknown	No
CT	CT Natural	Yes	Yes	Unknown	Unknown	No	Unknown	Yes
AR	Centerpoint	Yes	Yes	Yes	Yes	No	Yes	Yes

Source: Pace and Vantage

These utilities' rate impacts during the 2005-06 price spike ranged from 20% (AR) to 49% (MA). In the most recent (2008) filings that were available at the time of this Report, the lowest requested rate increase was 10% (National Grid, RI) while the highest was 35% (Bay State, MA).

I-F4 The NJ utilities' current hedging programs do not include protocols that monitor and respond to increasing prices and volatility, rather, they deploy a relatively consistent strategy in all market environments.

All of the New Jersey GDCs have target hedge ratios, all hedge up to 18 months in advance of delivery on a non-discretionary basis, and all used fixed-price instruments (futures, financial swaps/physical forwards).

I-F5 The GDCs have effective governance procedures in place as relating to their *existing* risk management programs.

Our findings are based on the existence of written policies, awareness and involvement of the firms' Boards, delegation of authorities, existence and conduct of risk management committees, separation of duties, auditing procedures (including observable compliance with those Sarbanes-Oxley requirements relevant to our scope), and evidence of compliance gleaned from our own spot check of transactions. The table below reflects our findings across several governance functions.

Exhibit 5: New Jersey GDCs Risk-Management Governance

	Role being Performed?				Codified in Procedures Documents?			
	PSE&G	NJNG	ETG	SJG	PSE&G	NJNG	ETG	SJG
Front Office								
Executing Trades	Y	Y	Y	Y	Y	Y	Y	Y
Trade Entry	Y	Y	Y	Y	Y	Y	Y	Y
Middle Office								
Reporting	Y	Y	Y	Y	Y	Y	Y	Y
Program Oversight	Y	Y	Y	Y	Y	Y	Y	Y
Credit Management	By ERMD	Y	Y	Y	Y	Y	Y	Y
Back Office								
Trade Confirmation	Y	Y	Y	Y	Y	Y	Y	Y
Reconciliation of trades	Y	Y	Y	Y	Y	Y	Y	Y
Accounting	Y	Y	Y	Y	Y	Y	Y	Y

Source: Pace and Vantage

I-F6 The objectives of the utilities' hedging programs, as codified in their risk management policies, lack certain elements and specificity inherent in a more robust approach.

Specifically, none of the GDCs defines tolerance thresholds or uses Value-at-Risk (VaR) monitoring metrics in its forward hedge program.[3] Furthermore, none of the GDCs'

[3]/ We note that NJNG and PSE&G utilize VaR metrics extensively in their respective storage optimization and corporate (enterprise) risk management programs.

hedging programs explicitly balance the mitigation of rising prices (upside risk) with the mitigation of out-of-market risk. To adopt a comprehensive, responsive hedging program, the GDCs' hedging procedures would need to specify tolerance thresholds, mandate monitoring of volatility metrics, define criteria for deploying discretionary hedges, and specify criteria for utilizing financial options. The portfolio monitoring functions would need to be separate from the front office execution.

I-F7 The state's BGSSP customers are exposed to potentially significant future bill impacts.

As determined by statistical analysis of the volatility of gas futures prices[4] performed in the summer of 2007, the potential increase in the GDCs' wholesale cost of gas, absent mitigation, is between 48% to 51% for 2009, (this includes the effect of the "natural hedge" from storage of one-quarter to one-half of the utilities' winter volume requirements). This potential wholesale gas cost increase, when coupled with existing distribution rate components, translates into potential customer-bill impacts of between 29% and 33% for 2009.[5]

I-F8 The Board has authorized NJNG and SJG to conduct storage optimization programs which provide for sharing of any savings the utility can generate from trading around its storage position relative to an established benchmark.

NJNG has an active and robust program which has enabled it to extract measurable value from its trading activity. Our findings on this issue are as follows.

- We conclude that the incentive mechanism has led to the extraction of value by NJNG that otherwise would not have occurred absent the incentive.
- NJNG's reported optimization values of $11.3 million in 2006 and $14.4 million in 2007 are material and are consistent with estimates of the extrinsic option value of NJNG's storage capacity given market volatility.
- NJNG's application of sophisticated techniques provides strong evidence of their capability to deploy such expertise. We believe that comparable expertise is readily accessible by all of the GDCs, and that the incentive featured in the storage optimization program is relevant to the fact that NJNG employs more robust techniques in its storage optimization program than in its forward hedging program.

[4]/ These results were produced by Monte Carlo simulations of forward prices as described in the body of the report. The percent increase values represent the 97.5% statistical confidence level, a standard measure used in risk quantification.

[5]/ ETG points out that the underlying data supporting the stated numbers was not available in the report and therefore ETG cannot validate the implied impacts.

- A significant driver of the overall cost of storage embedded in NJNG's rate structure is the benchmark price that is established when NJNG hedges the storage injection volumes that are designated for storage injection. For example, the estimated mark-to-market of the hedges that formed the benchmark for NJNG's 2006 storage program was $29 million. Notwithstanding the value extraction relative to the benchmark, there is currently no feature in the program that assures that the benchmark price will be minimized.

I-F9 <u>None of the GDCs use financial options in their *forward* hedge programs.</u>

Market conditions dictate the relative emphasis of fixed-price instruments and options that are needed to manage the two dimensions of risk (upside, or open-price risk and downside, or out-of-market risk). The more volatile the market, the more the pairing of upside and out-of-market tolerances will be simultaneously encroached, and the greater will be the need to use financial options. Thus, the choice of fixed-price instruments and options is neither arbitrary nor based on their stand-alone payout profiles, rather, the deployment of these instruments is directly a function of the need to defend both dimensions of risk given market conditions. The Exhibit below illustrates reasonable pairings of risk tolerances and the associated need for options. NJNG, SJG, and ETG point out that they have used options in their hedging strategies in the past.

Exhibit 6: How Risk Tolerances Relate to the Need for Financial Options

	Open Price Tolerance	Out-of-Market Tolerance	Option Budget
Reasonable Pairs	HIGH	LOW	ZERO
	MEDIUM	MEDIUM	ZERO
	LOW	HIGH	ZERO
	MEDIUM	LOW	MEDIUM
	LOW	LOW	HIGH

Source: Pace and Vantage

C. RECOMMENDATIONS

OVERALL RECOMMENDATIONS

We make the following specific recommendations for enhancing the design of the GDCs' hedging programs. These recommendations contemplate a comprehensive restructuring of those programs; we also offer a phased approach, described subsequently.

IV-R1 The GDCs should define program objectives that are clearer in terms of potential cost and out-of-market outcomes that are tolerable.

Not only is this fundamental to the utilities' deployment of hedges, explicit risk tolerance objectives should be a key basis upon which the programs' effectiveness is evaluated. The utilities' current practice of imposing targeted hedge volumes or hedge ratios does not promote a dynamic response to varied market conditions, (i.e. affords the same protection in rising above markets as in stable or falling ones).

IV-R2 The GDCs' programs should be structured to ensure a prudent level of hedges is accumulated earlier (i.e., further in advance of delivery) than is current practice.

None of the utilities regularly hedges beyond an 18-month horizon, whereas the enhanced program simulations bear out the benefit of a 24 to 36 month forward hedge horizon. (Given recent heightened volatility, we are now seeing a move to hedge out to a 48-month horizon). Extending the hedge horizon will serve to pre-empt hedging precipitously during the highly volatile conditions that arise as the time-to-delivery draws near. In addition, hedging over a longer time horizon will promote improved rate stability over multiple BGSS rate cycles.

IV-R3 The GDCs should deploy defensive hedging protocols based on Value at Risk[6] (VaR) metrics such that hedge positions are taken when volatility threatens tolerance thresholds, but *before* intolerable price levels are realized.

The lack of a protocol that mandates hedging in rising market conditions leads to greater unhedged positions during acute spikes. This recommendation is critical to achieving greater insulation of customer bills from extreme prices.

IV-R4 The GDCs should actively invoke objective, quantitative indicators to support discretionary hedging activity.

As a rule, GDC discretionary hedging activities are not governed by defined protocols, leading to either insufficient hedging in advance of high market settlements, or occasional over-hedging in advance of declining markets.[7]

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[6]/ Value at Risk (VaR) represents the potential near-term unfavorable migration in hedge opportunities for some future period's gas value at a specified confidence level.

IV-R5 The GDC's should also use Value-at-Risk metrics to monitor the potential magnitude of unfavorable hedge outcomes.

These "downside" VaR metrics should be combined with defined, contingent strategies that rely on options to mitigate out-of-market outcomes when the metric indicates the potential to exceed defined tolerances. As part of managing out-of-market risk, the utilities should specify an annual options budget to (potentially) be deployed based on measured market volatility.[8]

PHASED IMPLEMENTATION APPROACH

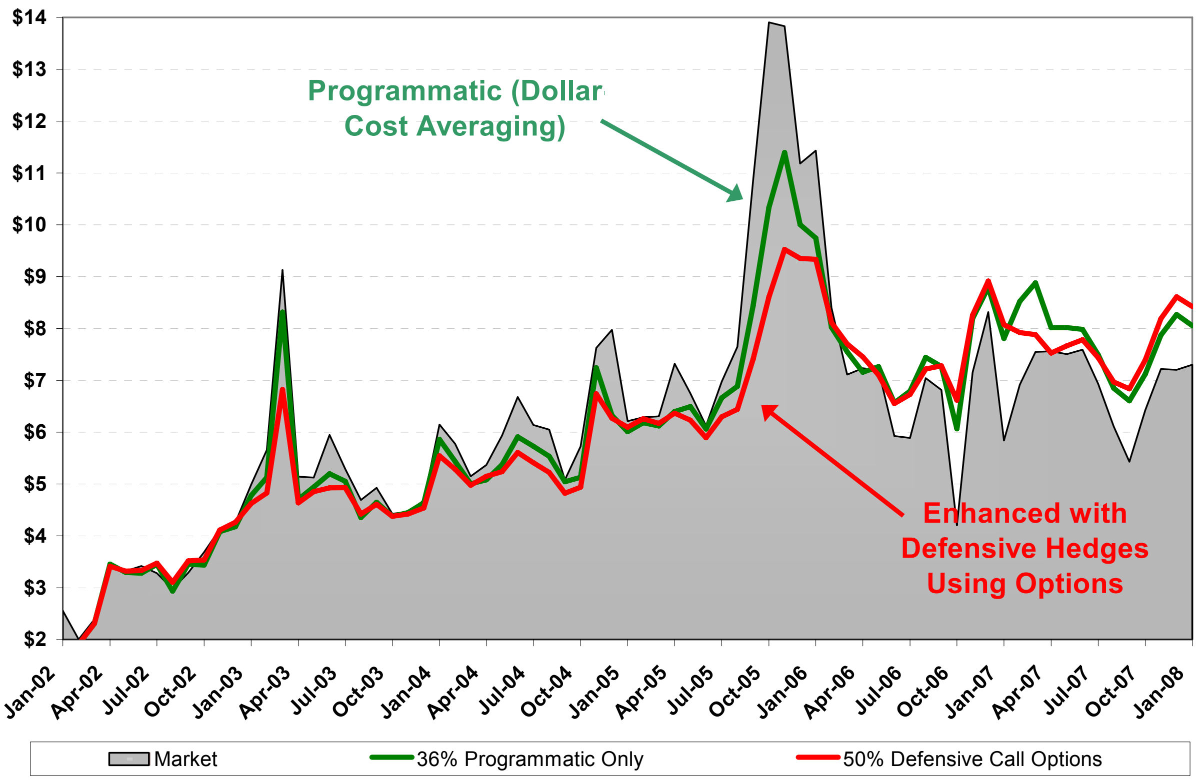
While we encourage the GDC's to adopt the above recommendations in total, we recognize the scale of change such modifications entail. Accordingly, we outline below an alternative, phased approach for implementing certain elements.

- Minimally, the GDC's should measure and monitor volatility on an ongoing basis to provide a basis for understanding the exposure of their portfolios. Volatility metrics are the best indicator of where prices *could* go, and are fundamental to defending against unfavorably high outcomes.
- The GDC's should adopt some form of defensive or stop-loss hedging protocol. Simply complementing the current, non-discretionary-only programs with a defensive mechanism will vastly improve the mitigation of acute price spikes.
- In tandem with adding a defensive element, we suggest the GDC's specify an options budget, as well as clear criteria as to when options would be deployed to protect against unfavorable hedge outcomes. One such structure, which we have modeled below, use call options for 50% of defensive hedges. The approach, while not always optimal in terms of premium requirements, has the benefit of improving upside risk mitigation while preserving downside participation.

7/ For example, Elizabethtown Gas has a sound and relatively sophisticated discretionary buying matrix within its procedures, but does not actively engage in discretionary hedging. As such, ETown's program is relegated to non-discretionary-only hedging.

8/ In this case VaR will reflect the potential downside movement of market prices against hedge positions that have already been executed.

Exhibit 7 Improved Price Spike Mitigation Using Options in Defensive Hedging



Source: Pace and Vantage

We recommend the following to the Board to promote enhanced hedging on the part of the state's natural gas utilities.

- Adopt a regulatory framework comprising guidelines for enhanced risk-mitigation programs on the part of the state's gas utilities. Those guidelines would describe key elements for acceptable risk management programs, and would address: the need for the utilities to specify risk tolerances; the need for the utilities to specify the hedging decision protocols to be deployed; including transaction criteria; and oversight procedures and where flexibility is envisioned for adjusting or temporarily suspending protocol compliance; (including the associated approvals and notices required).

- Institute a requirement that the GDCs file annually a Gas-Cost Risk Mitigation Plan (GCRM) that adheres to the guidelines established (as described above). Each Plan would be filed as part of the existing BGSS filing process. The Board's role would be to review the reasonableness of the filed risk tolerances and the compatibility of the program protocols with those tolerances.[9]
- Adopt clear standards regarding the cost-recovery of hedged positions. We recommend that compliance with a filed and reviewed GCRM Plan constitute strong evidence of prudent behavior.[10] Those standards would acknowledge a reasonable expectation for some level of unfavorable hedge mark-to-market outcomes. Likewise, compliance with the Plan in terms of mitigating out-of-market risk (contingent strategy) would provide evidence that the GDC was actively managing the potential for unfavorable settlements. Finally, in the event of an outcome outside of the prescribed (filed) tolerance bands, establish clear requirements of the GDCs to demonstrate that the outcome resulted from anomalous market conditions vis-à-vis non-compliance with Plan protocols.[11]
- We recommend that the Board consider utilizing incentives to promote increased investment and management focus on hedging, and to reward compliance commensurate with risk mitigation. We have proposed a specific structure that establishes an incentive opportunity for performance favorable to a benchmark hedging strategy, and that also provides a disincentive for unfavorable outcomes precipitated by non-compliant activities.[12]

9/ PSE&G Comments "If the GDCs were required to file an annual "GCRM" as described in the Draft Report, the Board's role should also include approval or modification of any such Plan. Please also see comments below regarding the "Regulatory Framework" section of the Draft Report."

10/ PSE&G comments "While the Company agrees that clear standards for cost-recovery are necessary, Board approval of the any such Plan would be necessary to provide the requisite degree of certainty for the GDCs."

11/ PSE&G comments "This sentence implies that the GDC has the burden of proof and possibly faces penalties, if the outcome of the hedging program is not good, even if the GDC follows the Plan. This is not appropriate. In addition, it is very difficult to prove that market conditions were "anomalous" for any given period of time, particularly given the recent volatility in many markets. Accordingly, PSE&G disagrees with this recommended criterion for measuring a GDC's performance."

12/ PSE&G comments "The Report does not spell out what specific form this "disincentive" would take. Nor is the Report clear as to the regulatory framework for any incentive/disincentive structure. Because PSE&G's primary goal in its BGSS residential hedging program is to mitigate price volatility, the Company generally does not support a framework that could result in penalties. The Company reserves its right to comment on any such incentive/disincentive proposals that may be proposed in future drafts of the Report."

COMPANY SPECIFIC RECOMMENDATIONS

In addition to the major findings and recommendations above, we provide additional recommendations that address other issues we were required to review. The comments from each utility are included at the end of each recommendation in a text box.

SJG Specific Recommendations

In general, we find that SJG's hedging program includes several elements fundamental to a sound risk management program. Our recommendations center on aligning those elements in a way that will produce more robust mitigation of price spikes and more stable cost outcomes going forward. The comparison of the simulation with SJG's existing program brings to light several design enhancements that SJG can make to its program. Described below are our recommendations for enhancing SJG's hedging program.

IV-R6 SJG should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.

SJG's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules.

IV-R7 SJG's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.

In SJG's existing program, hedging protocols are only defined for the forward 18-month horizon. While the existing program provides for placement of both Non-Discretionary and Discretionary hedges throughout the duration of this horizon, in practice, a limited amount of hedging occurs beyond the one-year horizon, meaning there is no assurance that adequate protection will be installed prior to the onset of acute volatility. As demonstrated by the simulation, an early programmatic hedge protocol effectively truncates exposure (VaR) in advance of the onset of acute volatility. As a result, defensive hedging actions are able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

IV-R8 SJG should establish clearly-defined Discretionary protocols/triggers, which are linked to forward-looking prices and quantitative indicators.

The current program's decision metrics regarding when, how much, and how far forward to hedge are not well defined. Moreover, we recommend that SJG implement Discretionary protocols for a minimum 18-month horizon in order to capture value opportunities over a longer market cycle and help stabilize rates over multiple BGSS cycles.

IV-R9 SJG should institute VaR-based defensive protocols such that hedge positions are taken when volatility threatens tolerance thresholds.

SJG's current program does not trigger defensive hedges on the basis of market movements and their impacts on SJG's portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

IV-R10 SJG should determine its hedging program modifications on the basis of multiple simulations of varying decision rules.

Such an exercise would enable SJG to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design. As part of the scope of this engagement, Pace and Vantage will work with each GDC and the Board to perform and evaluate such simulations.

Specific SJG Comments

South Jersey would like to commend the Vantage/Pace consulting Staff in addition to the BPU Staff and Rate Counsel for their professionalism and, diligence and support throughout the entire review process. The thoroughness of the Report and the results described therein, have validated that the four gas distribution companies (GDC) in New Jersey have implemented successful hedging programs which have provided substantial benefits to their customers. The Report also confirmed that each of the GDC's hedging program constrain elements that are fundamental to sound risk management and also have effective governance procedures in place. It is apparent from this Report that the efforts in New Jersey to actively promote and implement hedging activities have been successful in reducing volatility to our customer's rates. We believe this report provides a basis for South Jersey and each of the GDC's to continue their cost mitigation purchasing strategies while analyzing any future alterations which may be undertaken as the situation arises.

Specifically, South Jersey was pleased with the Report's "Key Findings" included in the confirmation that:

> South Jersey's current hedging program includes elements fundamental to sound risk management, including basic programmatic (non-discretionary) hedging, the use of financial hedging tools, written procedures, and active risk management oversight committees;
>
> For the historical period analyzed, South Jersey Gas Company's hedging programs narrowed the range of price outcomes compared to what would have occurred had they simply floated with the market;
>
> The GDC's have effective governance procedures in place as related to their existing risk management programs.

PSE&G Specific Recommendations

In general, we find that PSE&G's hedging program includes several elements fundamental to a sound risk management program, and that the program mitigated a material amount of cost exposure during the periods of increasing prices over the past six years. Our recommendations center on aligning those elements in a way that will produce more robust mitigation of price spikes and more stable cost outcomes going forward. The comparison of the simulation with PSE&G's existing program brings to light several design enhancements that PSE&G can make to its program. Described below are our recommendations for enhancing PSE&G's hedging program.

IV-R11 PSE&G should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.

PSE&G's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules.

IV-R12 PSE&G's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.

In PSE&G's existing program, hedging protocols are only defined for the forward 18-month horizon. While the existing program provides for placement of both Non-Discretionary and Discretionary hedges throughout the duration of this horizon, in practice a limited amount of hedging occurs beyond the one-year horizon, meaning there is no assurance that adequate protection will be installed prior to the onset of acute volatility. As demonstrated by the simulation, an early programmatic hedge protocol effectively truncates exposure (VaR) in advance of the onset of acute volatility. As a result, defensive hedging actions are able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

IV-R13 PSE&G should more clearly define its Discretionary protocols/triggers, and link them to forward-looking prices as opposed to historical indicators.

The current program's decision metrics regarding when, how much, and how far forward to hedge are not well defined. Moreover, we recommend that PSE&G implement Discretionary protocols for a minimum 18-month horizon in order to capture value opportunities over a longer market cycle and help stabilize rates over multiple BGSS cycles.

IV-R14 PSE&G should institute VaR-based defensive protocols such that hedge positions are taken when volatility threatens tolerance thresholds.

PSE&G's current program does not trigger defensive hedges on the basis of market movements and their impacts on PSE&G's portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

IV-R15 PSE&G should determine its hedging program modifications on the basis of multiple simulations of varying decision rules.

Such an exercise would enable PSE&G to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design. As part of the scope of this engagement, Pace and Vantage will work with each GDC and the Board to perform and evaluate such simulations.

Key PSE&G Comments on Report

PSE&G (the Company) appreciates the opportunity to provide comments on the Draft Report to the Board and its Consultants. Vantage and Pace performed a comprehensive review of the hedging activities of each of the four utilities covering the period 2001 to 2007. That review included a transaction-by-transaction analysis of each utility's hedging program, as well as an evaluation of risk management policies, control procedures, and organizational structure. The project, including discovery, interviews and meetings, was very well managed and productive. The Company has reviewed the Draft Report, including the findings and recommendations, and is pleased to provide these comments addressing PSE&G's most significant concerns about certain aspects of the Draft Report.

PSE&G is pleased that Vantage/Pace found, in their specific findings relating to PSE&G, that PSE&G has comprehensive governing policies in place and that BGSS Services is the single organization in the gas supply process that has direct accountability for the regulated utility services customer base.

In addition, the consultants found that the organizations in PSE&G ER&T that manage the gas supply and hedging efforts are fulfilling their responsibilities to the existing program in an effective and professional manner and that PSE&G has a strong internal audit program in place and supporting controls that assure a high level of compliance with the internal audit function contributing to a viable BGSS program via annual audits of PSE&G ER&T's implementation of its contract with PSE&G.

PSE&G also agrees with the Vantage/Pace findings that PSE&G has a comprehensive, enterprise risk management in place and a sound process by which it manages that program. A spot check of transactions suggests full compliance with complete and accurate transaction documentation readily available. PSE&G has made an aggressive effort, at both the Board and management levels, to achieve full compliance with Sarbanes-Oxley.

However, although Vantage/Pace found that PSE&G's hedging program includes several elements fundamental to a sound risk management program, and that the program mitigated a material amount of cost exposure during the periods of increasing prices over the past six years, Vantage/Pace also suggested that PSE&G should consider modifying its hedging practices in some areas.

First, the consultants are suggesting 24 to 36 months, with the possibility of 48 months, for the hedge horizon. PSE&G's current horizon is 18 months. The Company believes that making a change to the hedging horizon is a concept that should be considered. However, because of the volatile nature of the gas market, further review is needed to determine if a 36-month, or longer, hedging horizon is too long and too illiquid to offer practical benefits. PSE&G believes that a period greater than the current 18 months, such as 24 months, should be considered.

Second, the consultants state that defensive hedging protocols are a critical part of their program. The Company contends that the implementation of defensive hedging, as described in the Report, may not be the best strategy in today's volatile markets where volatility-triggered hedging purchases could occur more often than intended or desirable. However, some type of defensive mechanism, possibly used in conjunction with options, as described below, may be useful.

Third, a major recommendation of the consultants would add an additional defensive element by specifying an options budget to cover financial hedges. The Company believes this could be a useful component of any hedging program but does involve additional cost which would require Board approval before being passed on to customers. An annual expenditure of $10 million, while not a trivial amount, might be needed to provide a reasonable level of protection to the total gas portfolio. All of these concepts would need more thought and discussion internally and between PSE&G, Board Staff and Rate Counsel.

Elizabethtown Specific Recommendations

In general, we find that ETown's hedging program includes several elements fundamental to a sound risk management program. Our recommendations center on aligning those elements in a way that will produce more robust mitigation of price spikes and more stable cost outcomes going forward. The comparison of the simulation with ETown's existing program brings to light several design enhancements that ETown can make to its program. Described below are our recommendations for enhancing ETown's hedging program.

IV-R16 ETown should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.

ETown's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules.

Elizabethtown's current objectives are explicit (hedge 33% of applicable purchase requirements) and appropriate for the current program and provide a clear rule for decision making. To define potential cost and out-of–market would require time consuming guesswork that would assume either zero (or nearly zero) volatility in the market or the ability to know the future, neither of which are reasonable assumptions. If projections of cost and out-of-market outcomes were to be generated, they would need to be generated continuously in order to track the market and could easily create contradictory movement based on a rigid set of decision rules. Objectives should be flexible enough to allow for market fluctuations and still provide guidance. They should not be so rigid as to assume that the market can be conformed to fit within the parameters of the rules.

IV-R17 ETown's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.

In ETown's existing program, hedging protocols are only defined for the forward 18-month horizon. While the existing program provides for placement of both Non-Discretionary and Discretionary hedges throughout the duration of this horizon, in practice a limited amount of hedging occurs beyond the one-year horizon, meaning there is no assurance that adequate protection will be installed prior to the onset of acute volatility. As demonstrated by the simulation, an early programmatic hedge protocol effectively truncates exposure (VaR) in advance of the onset of acute volatility. As a result, defensive hedging actions are able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

Elizabethtown has recently implemented a change to its current hedge program that extends the hedge horizon further out in time. In particular, Elizabethtown now hedges 13 to 24 months forward of the current prompt month. This change should provide enhanced protection over the previous hedge horizon to avoid the residual impact of acute volatility. Unfortunately, as a consequence of transacting further forward from the prompt month, Elizabethtown has noticed an increase in the cost of the hedges relative to its prior program due to the reduced level of trading activity.

IV-R18 ETown should establish clearly-defined Discretionary protocols/triggers, with respect to when, how much, and how far forward to hedge are not well defined.

We note ETown has a relatively sophisticated matrix of indicators to support discretionary hedges, but does not fully employ it. We recommend that ETown implement Discretionary protocols for a minimum 18-month horizon in order to capture value opportunities over a longer market cycle and help stabilize rates over multiple BGSS cycles.

As part of a review of its hedging program, Elizabethtown has removed the discretionary protocol. Elizabethtown is considering a replacement structure that would potentially be based on pre-defined triggers. The scope, content and implementation of the replacement structure have not yet been defined. The concept is still in development and will be fully vetted with Senior Management prior to adoption.

IV-R19 ETown should institute VaR-based defensive protocols such that hedge positions are taken when volatility threatens tolerance thresholds.

ETown's current program does not trigger defensive hedges on the basis of market movements and their impacts on ETown's portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

Elizabethtown believes the defensive protocol to be a speculative structure with the potential to add hedge transaction unnecessarily. Elizabethtown believes comparable

outcomes can be achieved by adjusting its cost averaging protocol, namely by increasing the hedge ratio to a higher level and moving the hedge horizon further out in time. Both of these adjustments have recently been implemented.

IV-R20 ETown should determine its hedging program modifications on the basis of multiple simulations of varying decision rules.

Such an exercise would enable ETown to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design. As part of the scope of this engagement, Pace and Vantage will work with each GDC and the Board to perform and evaluate such simulations.

Elizabethtown is reviewing its hedging program and will consider modifications based upon a review of the model simulations.

Overall Comment by Elizabethtown

As stated in the Executive Summary of the Draft Report, the Board of Public Utilities (NJBPU or the Board), and the major utilities of New Jersey have been at the forefront of mitigating price volatility on behalf of the State's consumers. Elizabethtown notes that over twenty-five years ago, the NJBPU was one of the first regulatory bodies to implement a levelized gas adjustment clause. The clause is a form of price protection for the consumer in that it is set each year for a twelve-month period and adjusted for over and under-recoveries. It was designed to eliminate the "rip-saw" effect of monthly gas rate adjustments. Nearly ten years ago, in collaboration with the Board, each of the local gas distribution companies developed comprehensive hedge programs, which were designed to mitigate price volatility. Deployment of these programs has yielded measurable benefits to consumers since inception. Prompted by a precipitous rise in gas costs in 2005, the Board directed its Staff to evaluate how effectively the State's major gas utilities have mitigated volatile prices over the past several years and whether those programs can be improved.

Through an RFP process, the Board selected Vantage Consulting and Pace to perform a comprehensive analysis of the gas procurement policies and hedging strategies of the State's four gas distribution companies. Vantage and Pace performed a rigorous review of each company's hedging programs, including transaction–by-transaction analysis, management policies, control procedures and organizational structures. The review included an extensive discovery process including written data requests, as well as interviews and meetings with members of each company's management and members of the board of direction. The project culminated in a draft report detailing their review of four gas distribution companies hedging practices.

Key among the findings was that the hedging programs of *each of the four companies included the elements fundamental to sound risk management, including basic programmatic (non-discretionary) hedging, the use of financial hedging tools, written procedures and active risk management*. (Draft Report at p.7). For historical period analyzed, all four LDC's hedging programs narrowed the range of price outcomes compared to what would have occurred had they simply floated with the market.

NJNG Specific Recommendations

In general, we find that NJNG's hedging program includes several elements fundamental to a sound risk management program. Our recommendations center on aligning those elements in a way that will produce more robust and more predicable results going forward. The comparison of the simulation with NJNG's existing program brings to light several design enhancements that NJNG can make to its program. Described below is Pace's recommendations to NJNG for enhancing its natural gas hedging program.

IV-R21 NJNG should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.

NJNG's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules. Not only are they fundamental to the utilities' deployment of hedges, explicit risk tolerance objectives should be a key basis upon which the programs' effectiveness is evaluated.

NJNG believes that with the goal of price stability underlying financial risk activities, it is important that any hedging goals and program objectives be flexible and not rigidly prescriptive in order to be responsive to market volatility.

IV-R22 NJNG's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.

NJNG's current program mandates a 25% hedge ratio for the 7 – 18 month forward period by November 1 of each year, which must be augmented to 75% by the ensuing November 1 (largely through storage). As such, nearly all of NJNG's hedging activity occurs within a 12-month forward time horizon, leaving its costs exposed to acute volatility that takes hold in near-term horizons. We would recommend that NJNG's program be enhanced to establish an earlier hedge ratio – 24 or 36 months forward, to truncate its exposure to near-month volatility. Doing so would enable defensive hedging actions be able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

NJNG believes that our hedging program with the overriding goal of price stability should be flexible enough to respond appropriately to changing market conditions. Accordingly, we believe that the time frames within which actions occur are conservative, appropriate and successful. Additionally, during the period reviewed in this Audit, the Storage Incentive Program has been limited by approval periods of one year which precludes hedging out for a longer period of time.

IV-R23 NJNG should more clearly define its Discretionary protocols/triggers.

The current program's lacks clear decision rules regarding when, how much, and how far forward to hedge to capture value opportunities. Moreover, we recommend that NJNG implement Discretionary protocols for a minimum 18-month horizon in order to capture attractive prices over a longer market cycle and help stabilize rates over multiple BGSS cycles.

NJNG does use forward-looking prices and, in fact, runs models intended specifically to look at future price activity to manage BGSS price stability.

IV-R24 NJNG's should establish defensive or "stop-loss" protocols by deploying VaR metrics such that hedge positions are taken when volatility threatens tolerance thresholds.

NJNG's current program does not trigger defensive hedges on the basis of market movements and their impacts on NJNG's BGSS portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

The Risk Management Committee (RMC), which meets on a bi-monthly basis, reviews VaR and whether any open positions may impact BGSS price stability. The RMC has full authority to direct traders to modify their trading activity if it is deemed necessary.

IV-R25 NJNG should modify its hedging program modifications on the basis of multiple simulations of varying decision rules.

Such an exercise would enable NJNG to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design.

NJNG states that currently, simulations are run on anticipated gas costs and the impact of using various hedging tools is compared during that process. NJNG will consider making any such adjustment that is deemed appropriate within the context of the Risk Management Guidelines.

Overall Comments by NJNG

NJNG appreciates the extensive efforts involved in the preparation of this Report, knowing that Pace and Vantage have reviewed the various programs, strategies, qualifications, procedures and controls in each of the New Jersey gas distribution companies (GDCs) in addition to meeting with and interviewing numerous representatives at each company. Their work resulted in a comprehensive, statewide review of the GDCs' multi-billion dollar purchasing practices and hedging activities through 2007, providing an assessment of the programs' overall impacts and successes to date. Importantly, they found that the programs contain aspects that are fundamental to sound risk management and that effective governance procedures are in place. Compared to other states, New Jersey has more actively promoted hedging for GDCs and those programs have been successful in reducing the impact of volatility on customers' rates. It is clear that the collaborative efforts of the Staff of the New Jersey Board of Public Utilities (BPU), the Department of the Public Advocate, Division of Rate Counsel (Rate Counsel) and the GDCs ensured the establishment of utility-specific risk management programs that have mitigated the impacts of rising prices and the volatility in the natural gas market. The analyses and findings of the Pace/Vantage Report document provide a point from which each company can continue offering customer price protections going forward while considering potential modifications or program expansions as appropriate on a case-by-case basis.

Since the early 1990's, New Jersey GDCs have been encouraged to investigate and utilize various financial tools integral to effective hedging programs and that serve to mitigate the impacts of a volatile and rising natural gas market. With an underlying and constant focus on price stability, NJNG has successfully protected customers from extreme market increases while operating a flexible program that can also respond to lower market price opportunities. In that vein, the existing hedging programs have saved millions of dollars for natural gas customers. These efforts incorporate a necessary balance between structure and flexibility in order to be responsive to varying market conditions. The time frames for hedging activities included, for example in the NJNG Risk Management Guidelines, provide both needed financial protections and flexibility to respond to market volatility.

CONCLUDING REMARKS

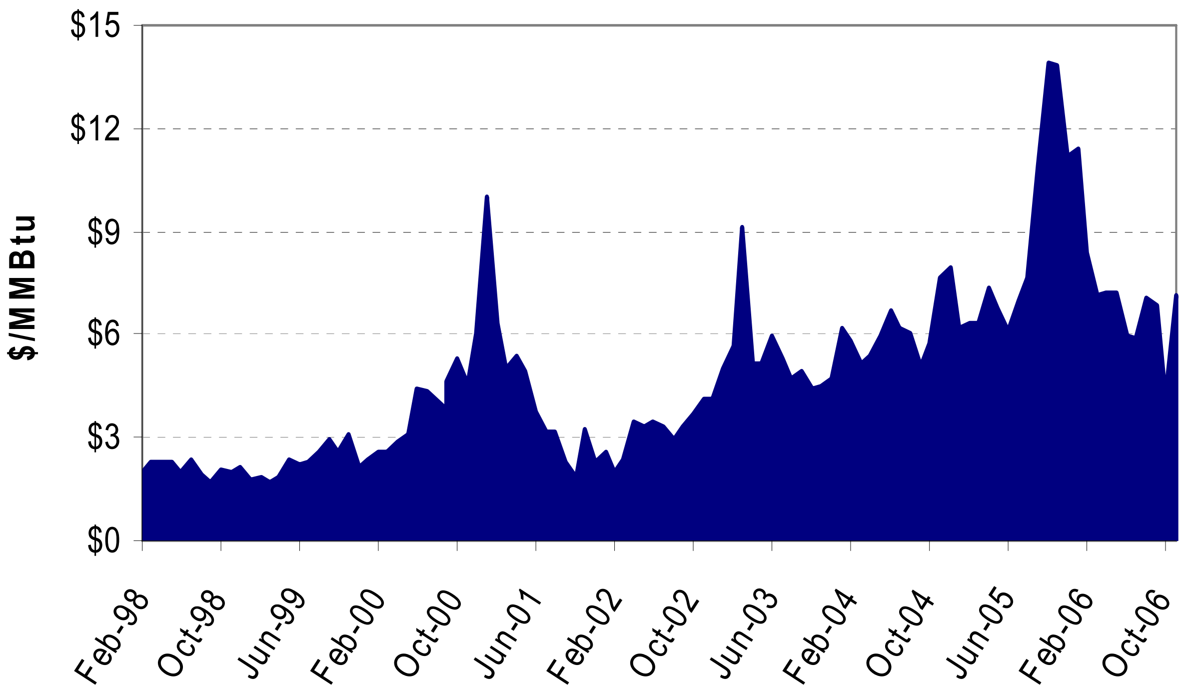
High and volatile gas prices are likely to persist and, absent of the application of enhanced mitigation techniques, will continue to impact the welfare of the state's BGSS customers. A well-structured set of hedging decision protocols, as evidenced by the results of the enhanced program simulations, can provide the NJ utilities and the Board with a high level of assurance that natural gas rates – and BGSS rates – will be contained within reasonable tolerances, particularly during extreme price environments. The implementation of enhanced programs is well within the capabilities of the GDCs and, we believe, is attainable provided the program enhancements are established in step with clearer standards for cost recovery of hedge outcomes.

II. ENHANCED GAS UTILITY COMMODITY-COST HEDGING PROGRAMS

A. BACKGROUND

An examination of natural gas prices over the last decade reveals a stark contrast in the behavior of prices before and after the year 2000. While natural gas observed relatively low and stable prices prior to 2000, since then the commodity has experienced significantly greater volatility and prices that have risen at a greater rate than the overall rate of inflation. The "anomaly" which was the 2000-2001 gas price spike is now "the norm." Exhibit 8 illustrates the reality of the current natural gas market.

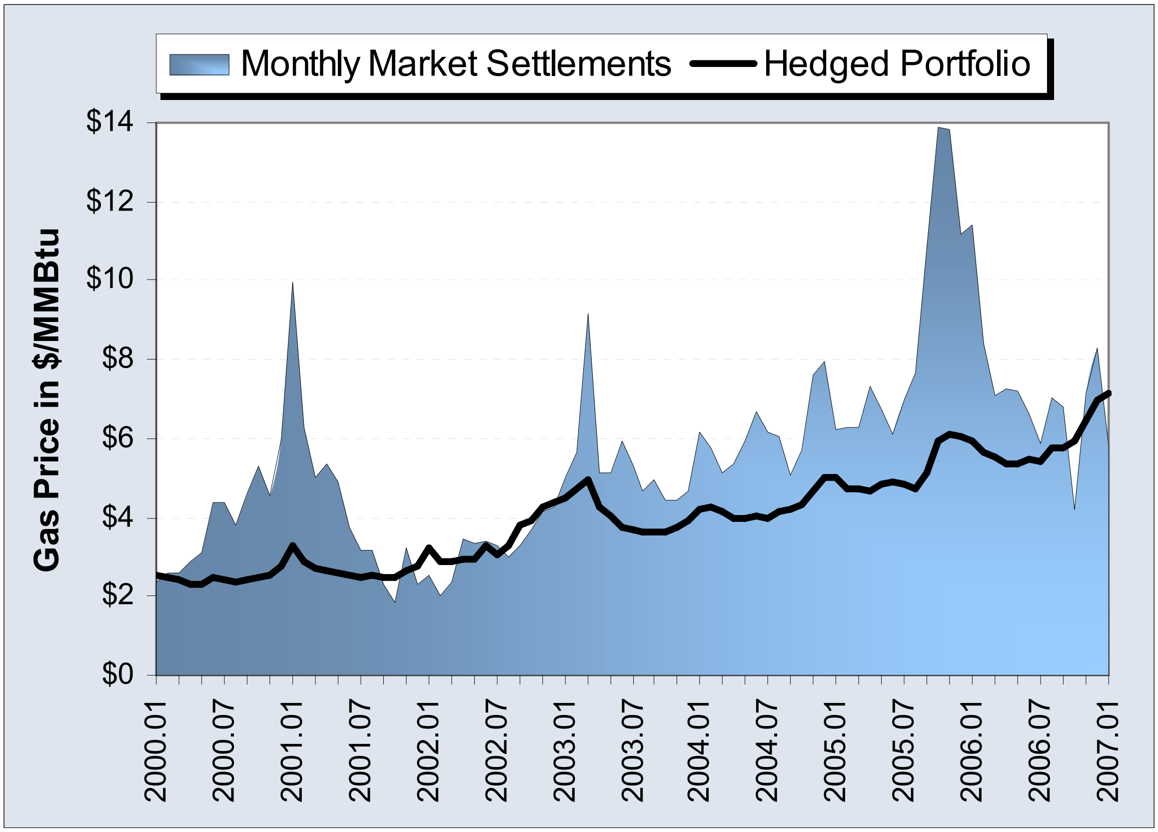
Exhibit 8: Natural Gas Historical Settlements (NYMEX)



Source: Pace and FIMI

As a result of today's highly volatile market, natural gas utilities face an even greater challenge in managing their commodity costs. There exists a critical need to protect portfolio exposure from runaway commodity costs that tend to drive customer dissatisfaction, inhibit economic development, lead to the accumulation of fuel-cost recovery balances and create cash flow lags, all the while diverting attention from long-term resource planning. One response to these problems is to liberally hedge in an effort to mitigate price spikes and reduce exposure to volatile spot prices. However, hedging to reduce future price uncertainty can also create out-of-market risk. This is the crux of the risk-management dilemma utilities face in today's natural gas market.

Exhibit 9: Fear of Comparatively Small Out-of-Market Outcomes Deter Robust Hedging



Source: Pace and NYMEX

When confronting these issues, utilities tend to steer clear of robust hedging programs from fear of out-of-market outcomes. However, the long-run benefits of an enhanced risk management program can far outweigh the negative costs incurred. Exhibit 9 above illustrates how a robust hedging program could have mitigated the effects of dramatic increases in natural gas prices to provide more stable portfolio results. As can be seen in the graph, a robust hedging program would have substantially reduced the pronounced price spikes that occurred in 2001, 2003 and 2005. It also illustrates that, while out-of-market outcomes are inevitable, a well designed program can lead to predictable, and largely positive financial results.

While "enhanced programs" regarding energy risk-mitigation strategies are not universally recognized, we have postulated and simulated robust strategies that incorporate planned responses to increasing volatility and deploy financial option strategies to secure participation in market downturns. We describe the elements and structure of this set of strategies in the body of this section of our report. We refer to this robust approach as an "Enhanced Program," which will serve as an important basis of reference for both our evaluation of the New Jersey GDCs' hedging programs and our recommendations for modifying those programs.

B. GOVERNANCE AND ORGANIZATIONAL APPROACH

II-F1 An effective risk management program requires a clearly defined business model with concrete objectives.

Building an enhanced program begins with establishing an Executive Risk Management Committee and a Governing Policy. The Governing Policy will address the philosophy, framework, and delegation of authorities necessary to govern the activities related to the utility's natural gas risk management program.

Accordingly, a formal document of Risk Management Policies and Procedures must be established which further describes the philosophy under which the utility will conduct its natural gas risk management activities, identifies organizational elements of the program, identifies the risk management tools and techniques that it will utilize to manage its risk exposures, and delineates controls and restrictions to be observed in conducting the program. The Policies and Procedures document provides definition to the program in an effort to ensure compliance and understanding of the program's objectives, activities, and required actions. It is important that the Policy and Procedures document addresses the following items:

1. Delegation of Authorities
2. Standards of Conduct
3. Risk Management Philosophy
4. Permissible Activities and Instruments
5. Quantification of Positions and Exposures
6. Management and Control

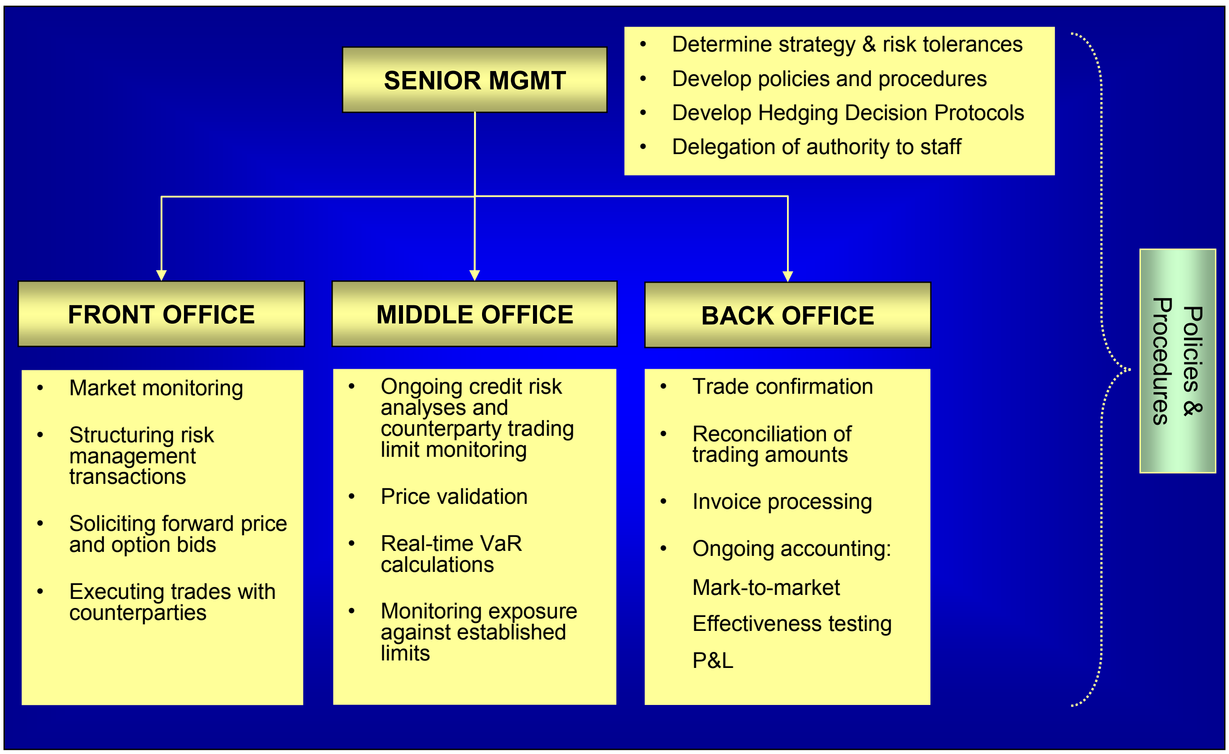
Also defined in the Policy and Procedures document will be the individuals and responsibilities of the Front, Middle, and Back Offices. Each office plays an important role in the management and execution of the program while providing checks and balances on the other offices. As is illustrated in the graphic below, each office has clearly defined roles and responsibilities and is essential to running and robust and compliant program. The main role of the Front Office is as deal originator and market monitoring. The Front Office is responsible for monitoring the program's metrics and taking any action required per defined procedures. The Front Office solicits market bids and executes trades with counterparties.

The Middle Office is responsible for the quantification of risk and the monitoring and control of hedging activities in conjunction with the Back Office. This includes validating market prices and monitoring credit exposure to existing and potential counterparties. The

Middle Office typically reviews executed transactions for compliance with policies and also measures the impact of hedges as well as the natural exposures being hedged.

Finally, the Back Office provides compliance support to both the Front and Middle Offices. The Back Office is responsible for trade confirmation, invoice processing, and effectiveness testing in support of applicable financial accounting standards, as well as reporting accounting results such as mark-to-market and position value.

Exhibit 10: Organizational Structure



Source: Pace and Vantage

II-F2 The organizational structure that corresponds to an enhanced program will provide for separate yet interdependent functions for Executive Management, Deal Origination, and Risk Control and Compliance.

Executive Management will define the financial objectives and will ratify cost and risk tolerances and the overall hedging strategy. The Deal Origination (Front Office) members will develop the portfolio strategy and execute the strategy ratified by Executive Management. The Risk Control and Compliance function (Middle and Back Offices) will require validating the portfolio strategy to existing controls and performing ongoing risk quantification and compliance review.

Exhibit 11 illustrates the business model appropriate to an enhanced risk management program (which we will describe in detail later in this section):

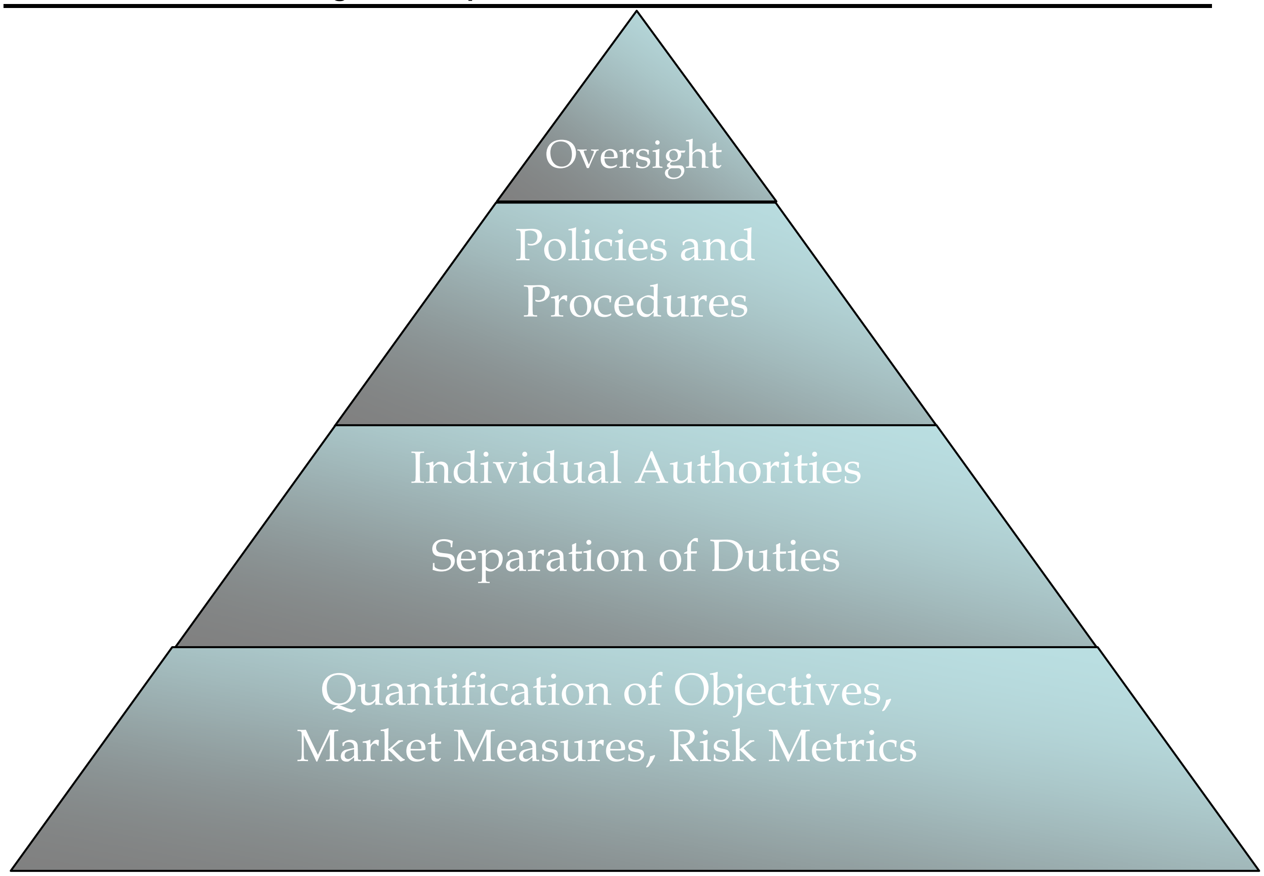
Exhibit 11: Risk Management Principles: Enhanced Program

Source: Pace

II-F3 <u>At the core of the risk management program is the quantification of objectives, market measures and risk metrics, which ultimately drive the development of hedging decision protocols ("HDPs") and all other portfolio management processes.</u>

Efficient and diligent execution of the "core" processes requires that individual authorities and separation of duties are established and defined in formalized Policies and Procedures. Organizational oversight is required to ensure that operations adhere to the governing Policies and Procedures and to ratify changes to the Policies and Procedures.

Exhibit 12: Risk Management Separation of Duties



Source: Pace

C. RISK CONCEPTS

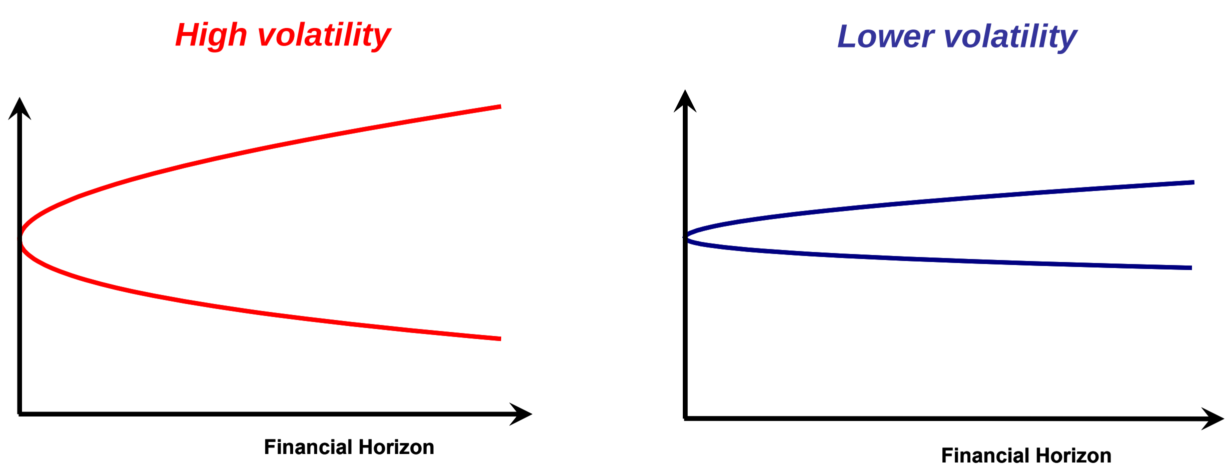
Implementing a risk management program that conforms to an enhanced program will require a thorough understanding of several key risk concepts, including volatility, probability of forward price migration, and confidence intervals; these concepts will be distilled into a Value-at-Risk (VaR) metric.

Volatility describes the magnitude by which commodity prices can be expected to move from their current levels. Volatility quantifies the risk, or uncertainty, associated with a commodity's future price. Statistically, it measures the relative change in prices over a given period (e.g., 10 days). Volatility can be calculated using changes in actual forward prices (termed "observed volatility") or derived from the price of options linked to the underlying commodity (termed "implied volatility").[13]

Volatility metrics are extrapolated to estimate, statistically, the potential dispersion of prices over time. Prices that observe high volatility are highly uncertain, and have a wide distribution of possible future prices. Prices with lower volatility exhibit comparatively lower price migration over time, and have a statistically narrower range of possible prices.

Exhibit 13 below provides a visual depiction of volatility's effect on the probabilistic distribution of future prices:

Exhibit 13: High v. Low Volatility: Probabilistic Distributions of Forward Prices



Source: Pace

The volatility of futures prices is influenced by the length of time that it affects a firm's economics, a concept referred to as the "holding period." At its maximum, the holding period refers to the entirety of time remaining until delivery, or the contract's settlement; in terms of active risk management, however, we will find it far more useful to think of the holding period as the time interval between which hedging needs are reviewed (e.g. weekly or in 10 day increments).

There is another important characteristic of volatility in real-world commodities – the closer to the actual delivery date, the more volatile the futures contracts become. The price of the natural gas futures contract for next month, for example, fluctuates far more than the price of the natural gas futures contract that is 24 months away. Exhibit 14 illustrates how the day-to-day price fluctuation of a typical futures contract intensifies as that delivery month draws nearer. The practical implication is that hedge opportunities for 2010 will tend to migrate less in each 10-day period than hedge opportunities for 2008.

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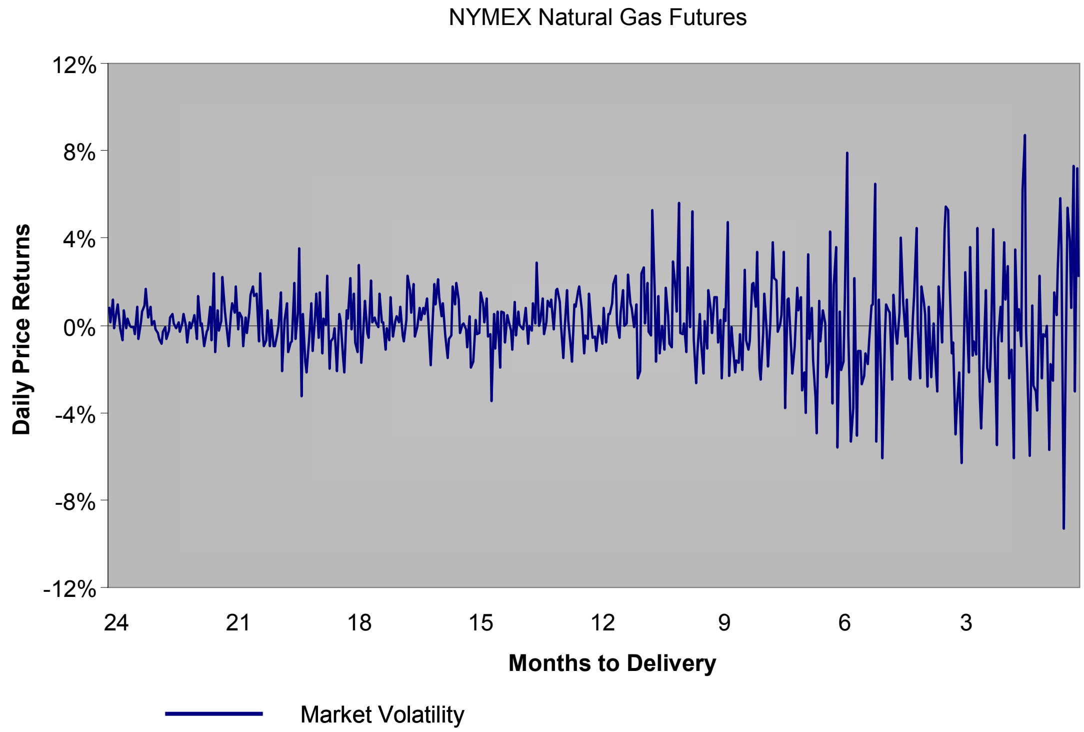
[13] Unless noted otherwise, our analysis, findings, and recommendations rely on observed volatility measures.

Exhibit 14: Volatility Increases as Time-to-delivery Decreases

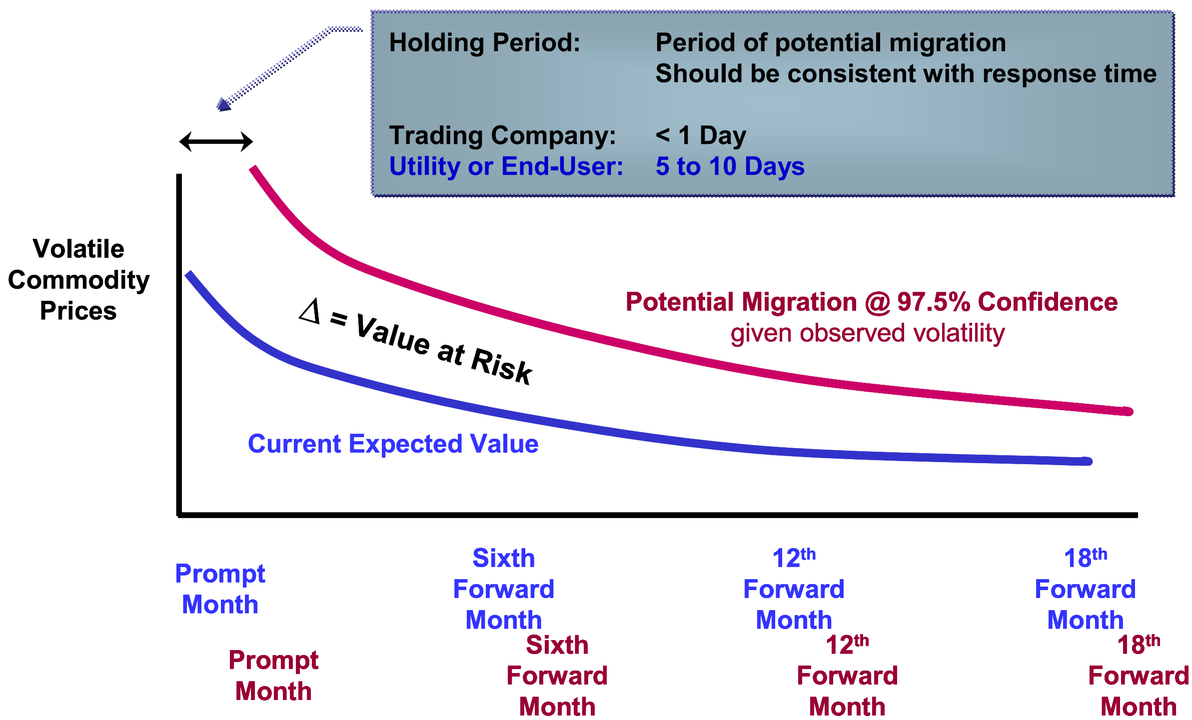


Source: Pace, Vantage and FIMI

From volatility, we derive an important risk metric: Value-at-Risk ("VaR"). Value-at-Risk is defined as the potential change in a commodity's cost (or hedge opportunity) that would result if volatile prices were to move unfavorably over a defined holding period; VaR is specified at some statistical level of confidence. For example, the potential increase in the next month's gas futures contract that could occur in the next 10 days at a 97.5% confidence level. On a portfolio basis, it allows us to identify the potential outlier cost that could be realized over a given time period. Observed volatility and relevant forward prices are used as parameters of the portfolio's future value to measure the VaR.

As mentioned, VaR considers a portfolio's performance over a specific horizon also referred to as the holding period. The holding period must be consistent with normal response time. A utility will typically measure VaR on a 5 to 10 day holding period because its hedge program is designed for something like a weekly response framework.

Exhibit 15: Risk Concepts: Value at Risk (VaR)



Source: Pace

Exhibit 15 above illustrates the concept of Value at Risk. The blue line corresponds to the current expected value (e.g., NYMEX contract values) of natural gas for the 18 forward months as indicated by today's forward curve. The red line, known as the Upper Price Confidence Band, represents the outlier values that could occur should volatility propagate to an extreme; the potential change in value – the "space" between the blue and red line – is the VaR. The magnitude of the VaR depends upon the chosen confidence level and holding period. The VaR of nearby forward months is greater than the VaR of more distant forward months because the former are more volatile than the latter.

D. HEDGING DECISION PROTOCOLS

Hedging Decision Protocols (HDPs) represent an execution plan which facilitates a disciplined response to the utility's measured exposures. Well-defined protocols constitute the basis for executives to delegate a scope of authorized (and somewhat mandated) activities to those who are responsible for executing hedges.

HDPs are hierarchal, emphasizing risk avoidance over the pursuit of prices deemed favorable as derived from one's market view. Accordingly, HDPs balance three activities: the accumulation of programmatic hedges, the defensive (VaR-based) hedging against undesirable cost (or earnings) levels, and the capture of attractive opportunities on a discretionary basis. Within the defensive protocol framework, a contingency plan is defined and deployed to manage out-of-market risk. These protocols specify the instruments to be used in the face of various risk conditions, the suggested proportion, the hedge horizon, and the entry and exit criteria.

The relative emphasis and design of each component (programmatic, defensive, discretionary, and contingent) should be customized to the objectives of the utility. Doing so requires an explicit articulation of objectives. We will deal with objectives in some detail later, but they must be unambiguous and they must be consistent with what the market allows; to provide context, illustrative objectives might be:

- Manage the effect of gas price volatility such that the year-over-year increase in retail rates is no higher than 5%, given a 97.5% statistical confidence; and/or
- Limit hedges to assure, with 97.5% confidence, that natural gas costs will not diverge unfavorably from market by more than 2% of the aggregate Cost-of-Service

The component protocols that comprise a full set of HDPs are described further in the following section.

1. **Programmatic Hedges:** (a.k.a. Dollar-Cost Averaging): These are accumulated as forward hedge positions (e.g., up to 36 months forward) in a systematic manner prior to the onset of severe volatility. Their purpose is to attain specified minimum hedge coverage prior to heightened volatility and to constrain the range of outcomes to enable the risk manager to respond in a more measured, predictable way when volatility threatens tolerance boundaries.

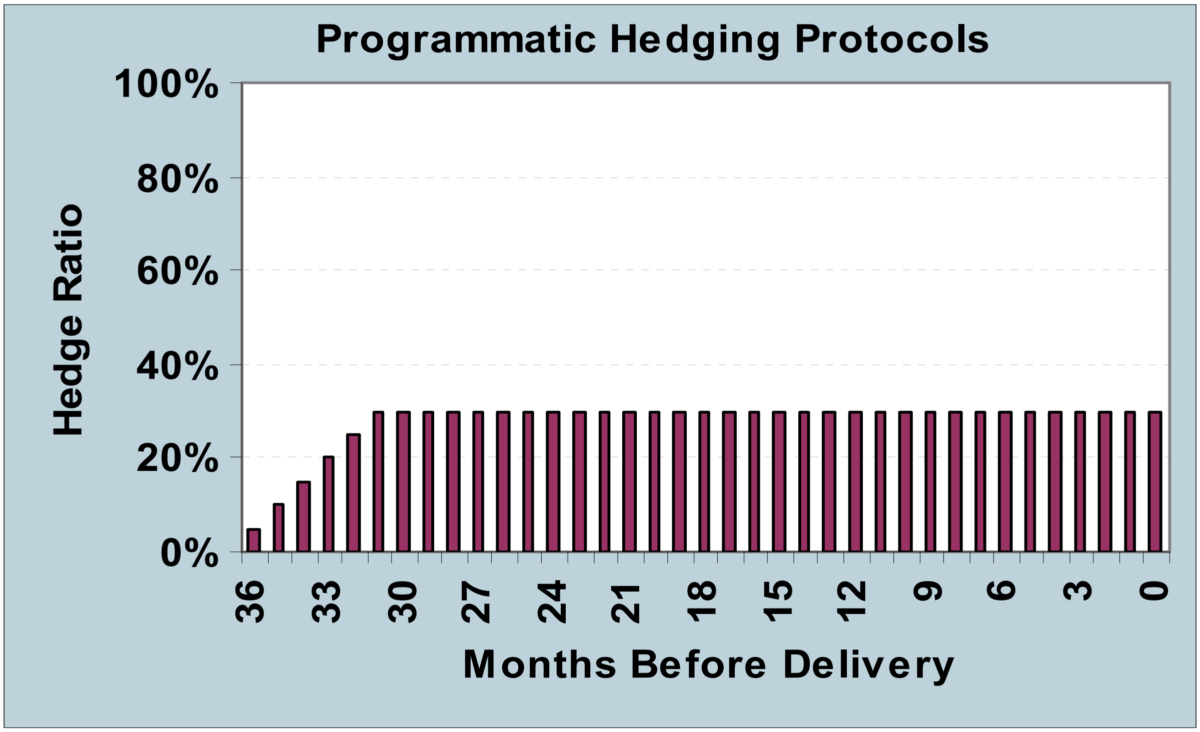
   Programmatic Hedges eliminate volatility by focusing on the longer-term horizon where prices are more stable. Since volatility is asymmetrical (the size of upside price movements is typically far greater than downside movements), Programmatic Hedges tend to eliminate more egregious bad prices compared to foregone opportunities.

   Gas markets cycle between very exuberant prices and very depressed prices. Those extremes are most noticeable in the prompt month (nearest NYMEX forward contract) and near-term adjacent months. Volatility 24 to 36 months forward is always far less pronounced, so hedges placed in these outer periods tend to avoid price extremes. This represents the philosophical basis for Programmatic Hedges.

Exhibit 16 illustrates a sample design of Programmatic Hedging Protocols for a 36-month horizon. Here Programmatic Hedges are placed systematically beginning with the 36th forward month until each month reaches a determined Programmatic Hedge Ratio, in this case 30% of the expected natural gas load.

Importantly, the horizon for programmatic hedges (and/or discretionary hedges) needs to be of sufficient tenure to assure that some portion of the portfolio's hedged positions are accumulated during a trough in the price cycle. In other words, in a market that exhibits major peak-to-peak price cycles as long as 24 months, limiting potential hedges to a nine month horizon could result in all hedges being executed at high prices.   So the hedge horizon must be significantly longer in order to assure that sufficient positions can be accumulated during price troughs.

Exhibit 16: Example of Programmatic Hedging Protocols

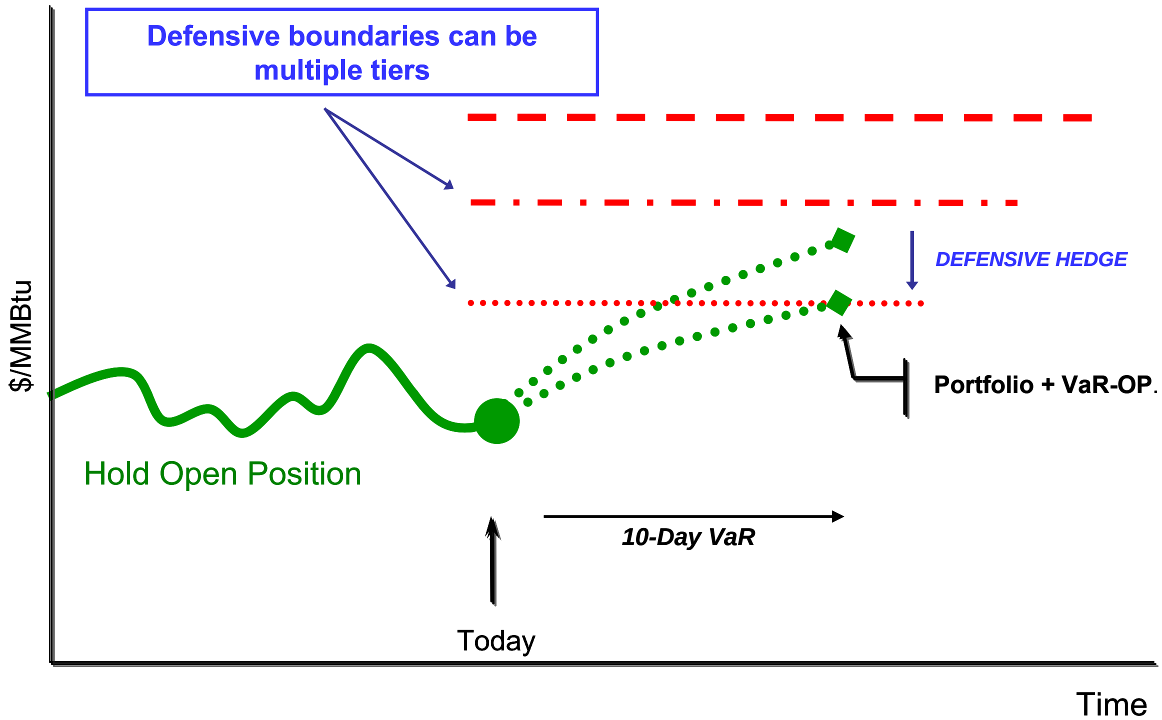


Source: Pace and Vantage

2. **Defensive Hedges**: These hedges are executed in response to measured volatility and the prospect that the combination of forward market prices plus potential price migration (volatility) could produce unacceptable forward price levels prior to the next review period.

   Defensive Hedges are a necessary element in assuring that intolerable outcomes are never realized. While they also tend to exploit the asymmetrical nature of prices, they are by their nature placed at times when intolerable prices are approaching. Well structured HDPs will follow Defensive Hedges rigorously, but not require the execution of a large number of defensive hedges. The Programmatic and Discretionary hedges pre-empt the need to rely on Defensive Hedges except for those instances when price run-ups threaten upside boundaries despite already established hedges.

Exhibit 17: Defensive Hedging Protocols



Source: Pace and Vantage

Exhibit 17 illustrates how Defensive Hedging Protocols function. The green circle represents today's portfolio price, and the upper dotted path represents potential migration of the portfolio price over the next 10 days. The red lines represent an upward cascade of defensible price levels ending with the top one that approaches a management-imposed intolerable limit. When the portfolio price plus the VaR (Upper Price Confidence Band) encroaches an established boundary, a Defensive Hedge is required in order to decrease the portfolio's open market exposure and return that exposure to a tolerable bound. Multiple-tiered Defensive Protocols are employed to assure that defensive hedges are not accumulated precipitously; this protects against rapid accumulation of hedges that might later turn out to be out-of-market. Typically, in a well-designed program, hedges executed to defend the uppermost price boundary are done with confidence, because by the time they executed the portfolio already exhibits a very favorable mark-to-market related to earlier programmatic, discretionary, and lower-tier defensive hedges.

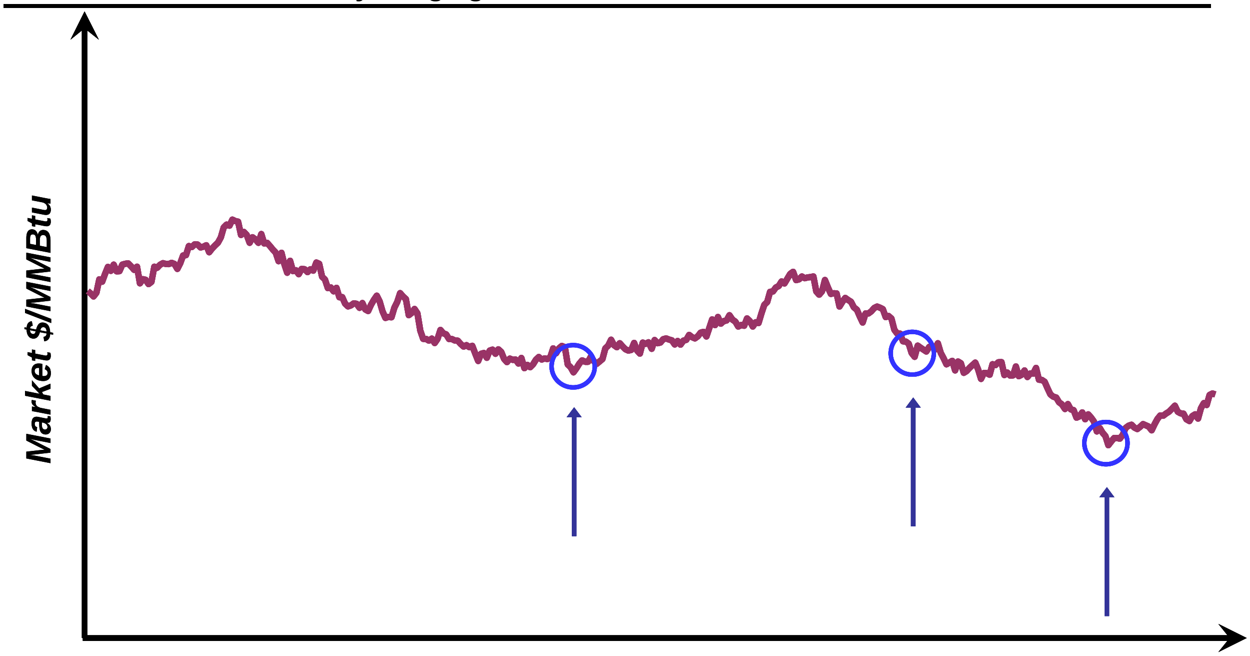
3. **Discretionary Hedges**: Discretionary Hedges, also referred to as "market-timing" hedges, are subordinate to Programmatic and Defensive Hedges in that the later two are mandatory. Discretionary Hedges are also subordinate to the observance of out-of-market tolerance as measured by the Out-of-Market Metric; so they should never be speculative or whimsical. They should be executed in bite-sized volumes and driven by disciplined market-timing considerations. Yet, they are critical to the

overall success of the risk management plan because Discretionary Hedges, when properly deployed, preempt the need for defensive hedges later. In a properly balanced program, the aggressiveness of market-timing criteria should be calibrated to be compatible with the tightness of Defensive Boundaries. In other words, a large tolerance for upside price exposure can facilitate more selective Discretionary Hedge criteria, but a tight set of Defensive Boundaries should be paired with a greater willingness to make only moderately attractive Discretionary Hedges.

The cost-effectiveness of Discretionary Hedges is somewhat dependent on market intelligence, and their value can be enhanced by the ability to draw actionable inferences that are superior to the average market participants' choices. The most effective programs place an emphasis on rigorous modeling, both quantitative and fundamental, to identify market opportunities.

Exhibit 18 depicts an example of Discretionary Hedging based on a market-timing model, where the blue circles represent anticipated attractive market opportunities.[14]

Exhibit 18: Discretionary Hedging Protocols



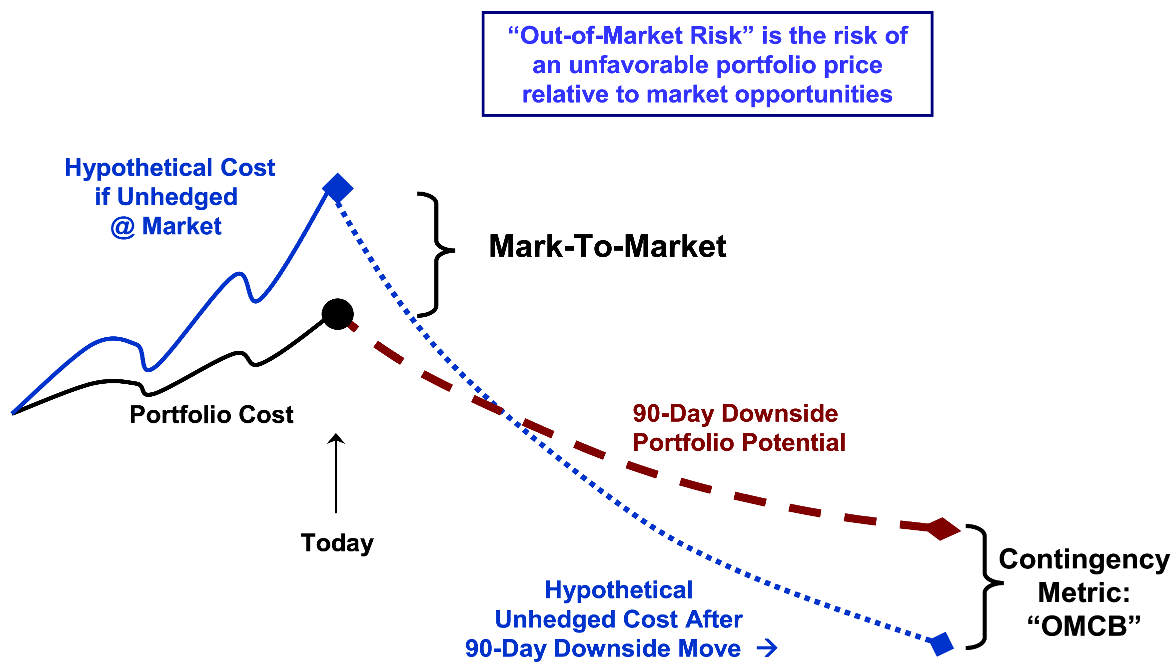
Source: Pace and Vantage

[14] There are numerous quantitative, or "technical", models that can be used to support market timing of positions. A detailed description of such models, however, is beyond the scope of this report.

- Contingent Protocols: Contingent Protocols, as the name implies, are dependent on the existence of certain conditions. The "contingency metric" monitors the potential for positions to be out-of-market in excess of established tolerances. It is illustrated graphically in Exhibit 19. Typically, the Contingent Protocol calls for a shift to options when the potential for out-of-market outcomes is anticipated; options allow participation in further downward movement of forward prices.

The contingency metric takes into account the portfolio's current mark-to-market and utilizes a VaR approach to measure the value by which a positive mark-to-market could evaporate or a negative mark-to-market could be exacerbated. When the mark-to-market less the downside VaR (in aggregate, the out-of-market potential), referred to as the Out-of-Market Confidence Band, encroaches on the established boundary, a change of strategy is warranted. Because the effects of any options strategy must be phased in, the contingency metric normally utilizes a VaR reflecting a longer holding period, typically 90 trading days or four months.

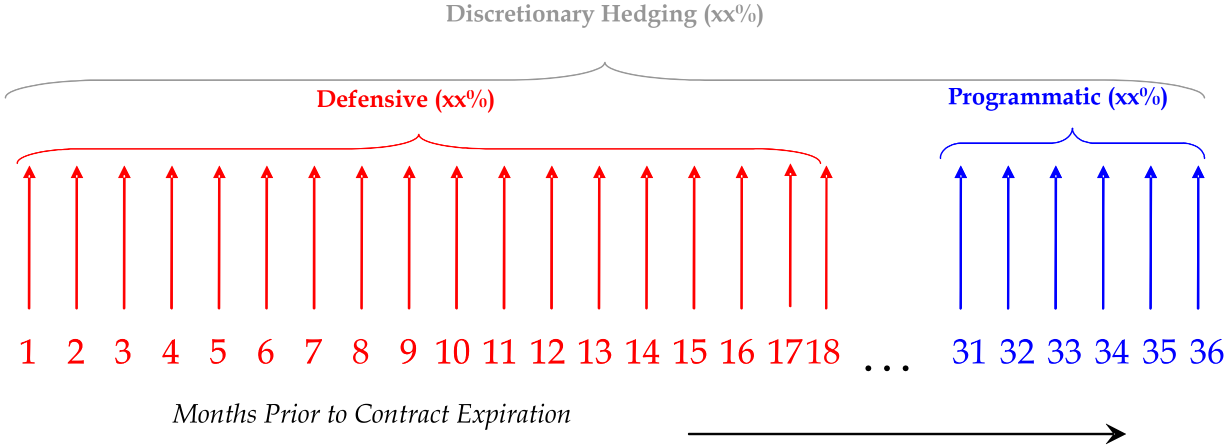
Exhibit 19: Contingency (Out-of-Market) Metric



Source: Pace and Vantage

In a well-balanced portfolio, each type of hedge contributes to risk mitigation. The balance between Programmatic, Defensive, and Discretionary hedges will match the utility's financial expectations and risk appetite through its HDPs design. A well-structured set of HDPs, taken as a whole, provide the utility with a high level of assurance that its natural gas costs will remain within expectations, while also substantially increasing the probability of superior cost performance. Exhibit 20 below depicts a sample timeline and interdependency of the different Hedging Decision Protocols:

Exhibit 20: Sample Hedging Decision Protocols Timeline



Source: Pace and Vantage

The HDPs must also specify the financial and physical tools/instruments necessary to effectively manage the portfolio as well as the volumes and terms of the hedges. The design of these elements, as well as the entry criteria for each of the four segmented HDPs (Programmatic, Defensive, Discretionary, and Contingent), can be done most effectively through the simulation of numerous alternatives, and the evaluation of simulated results in light of clearly articulated objectives. Those objectives, in turn, must be related to the utility's tolerances and how it wishes to modify its natural risk profile.

E. DEVELOPING A RISK PROFILE

An enhanced program framework has as its starting point the definition and rigorous quantification of the energy portfolio's exposure to market volatility. Containment of this exposure must be firmly grounded in the reality of what that exposure is in order to best meet the objective of risk management.

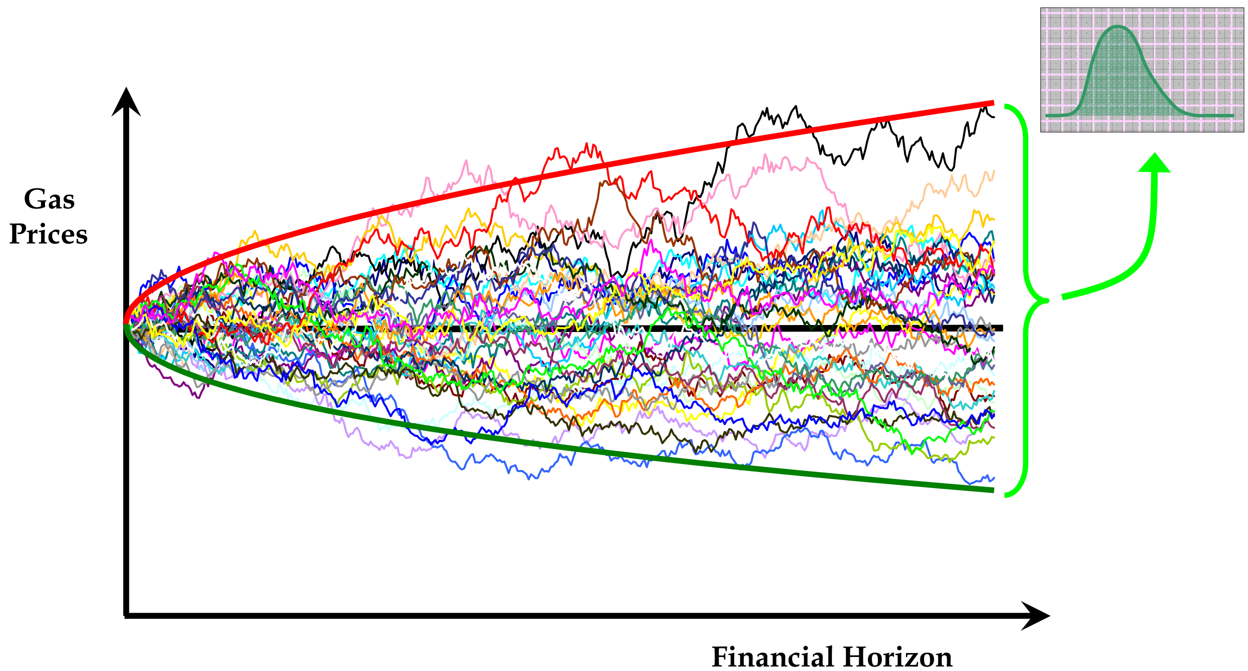
Risk profiling involves the creation of probability distributions of volatile cost elements that can affect a firm's costs (or earnings). By relying on rigorous quantification of these elements, risk profiling is superior to single-point estimates for decisions characterized by uncertainty – in this case, natural gas prices and their impact on the utility's rates. Future decisions are facilitated greatly by a more comprehensive understanding of the exposure the utility faces relative to gas price volatility, as well as variability of loads and supply sources. Throughout the industry this portrayal is referred to simply as the utility's Risk Profile.

The first phase is to measure, quantify and determine the impact of natural gas prices on customer rates through sophisticated software and modeling techniques. Specifically, this analysis includes the following steps:

- Identify the specific parameters that influence the utility's natural gas exposure and financial impacts (e.g., contract pricing provisions, trading limits, City Council ordinances)
- Simulate the behavior of market prices using both historical information as well as market expectations to determine the impact to the utility's financial condition, customer bill impacts, or Rates at Risk (RaR)

Exhibit 21: Monte Carlo Simulation

Propagation of price migration to generate *Probability Distribution*



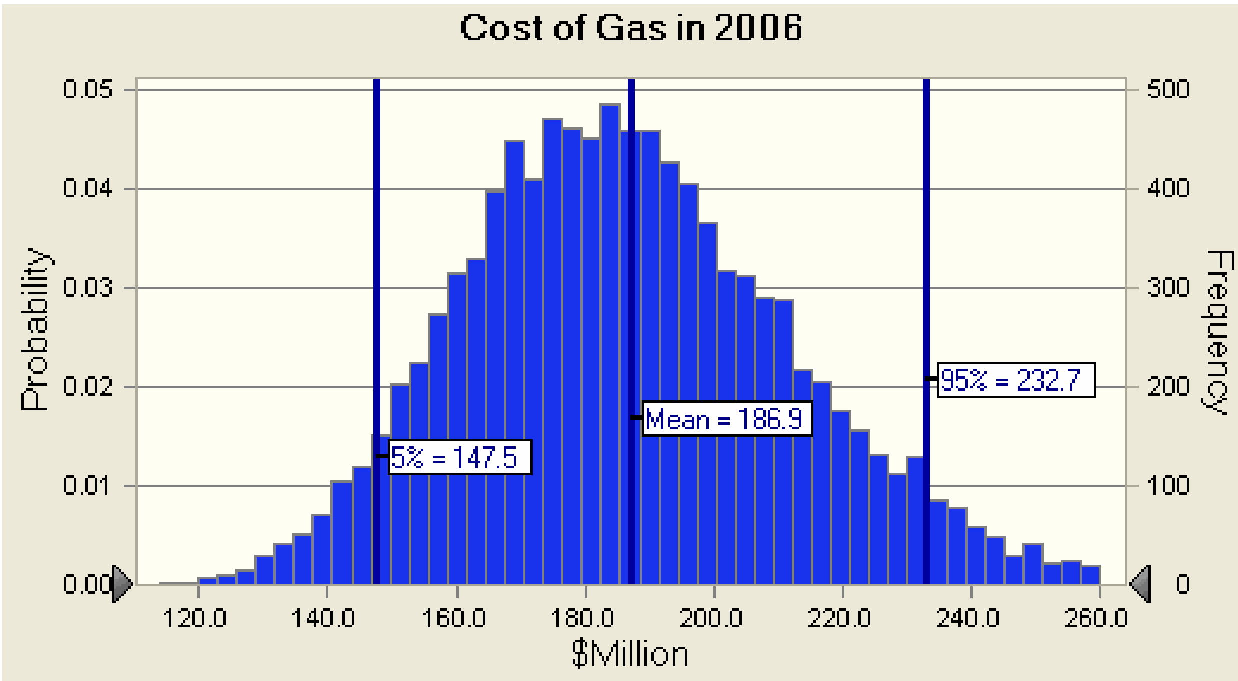
Source: Pace and Vantage

Exhibit 21 illustrates how the Monte Carlo method of simulation is used to develop a probabilistic distribution of future prices. Several hundred or thousand iterations are typically run, each of which prices follows a random path as reflective of the volatility characteristics of the price stream. The upper (red) and lower (green) bands represent confidence levels used to eliminate unlikely price outliers.

To start this first phase, enhanced programs require holding a comprehensive discussion among a utility's key management and staff to better understand their natural gas portfolio as well as their retail rate structures and customer load.

In developing the Risk Profile, it is necessary to incorporate the most significant cross-effects of correlations among the variables that most significantly impact financial exposure. In performing this analysis the preference is to use market and actual data, followed by empirical data where available, supplemented by model simulations where necessary.

Exhibit 22: Portfolio Cost Probabilistic Distribution



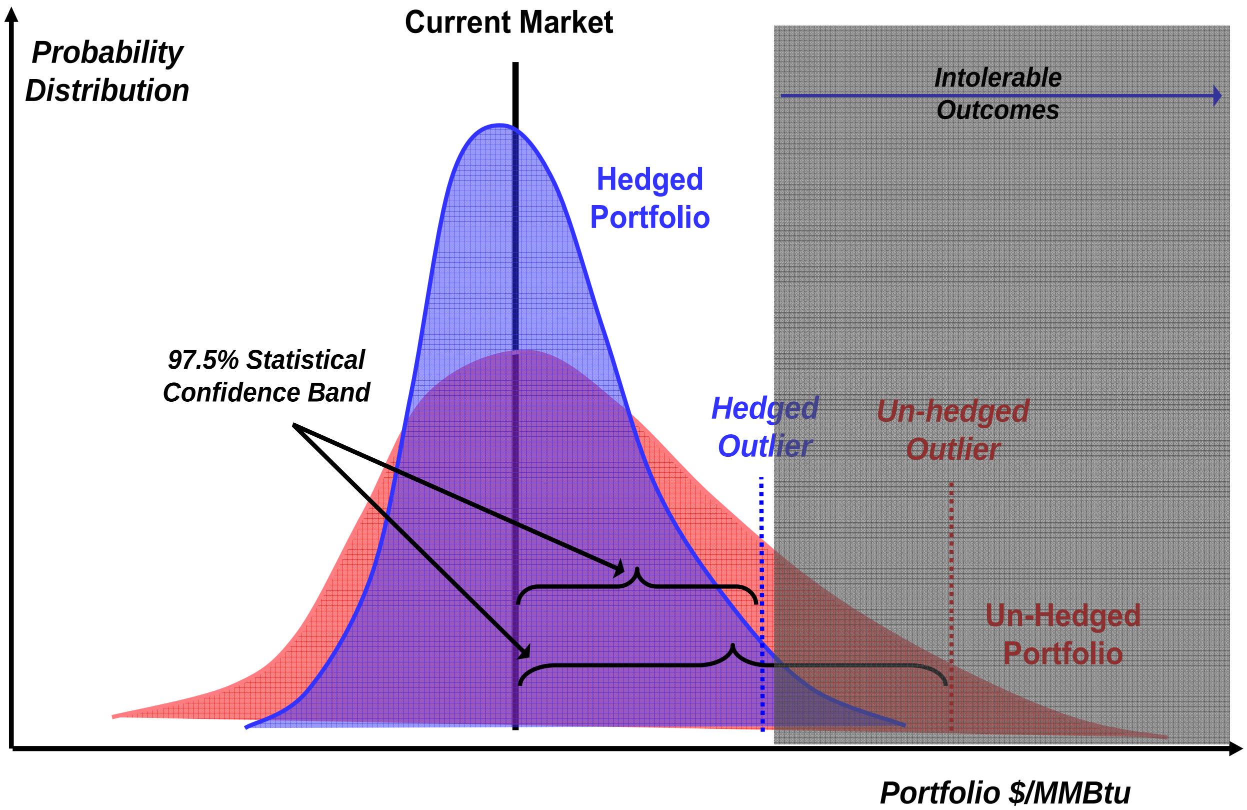
Source: Pace and Vantage

Exhibit 22 above illustrates a probabilistic distribution of a utility's natural gas portfolio cost. It uses the commodity prices propagated through the Monte Carlo simulation (see Exhibit 21) to measure the total portfolio cost under each scenario. This provides a context that facilitates a better understanding of the utility's risk exposure and provides for more concrete objective setting.

Having completed the assessment of risk exposures in the Risk Profile phase, this next phase establishes reasonable boundaries that management will impose on its exposure to its energy commodity risks. These boundaries will later serve as the goal posts for HDPs designed to assure risk containment at a given level of statistical confidence. Some examples of objectives might be:

- Manage the effect of gas price volatility such that the year-over-year increase in retail rates is no higher than 5%, given a 97.5% statistical confidence; and/or
- Manage volatility, with 97.5% confidence, to constrain the potential for unfavorable gas cost outcomes to no worse than $9.00 per MMBtu; and/or
- Limit hedges to assure, with 97.5% confidence, that natural gas costs will not diverge unfavorably from market by more than 2% of Cost-of-Service

Exhibit 23: Setting Explicit Boundaries through Statistical Quantification of Risk Exposure



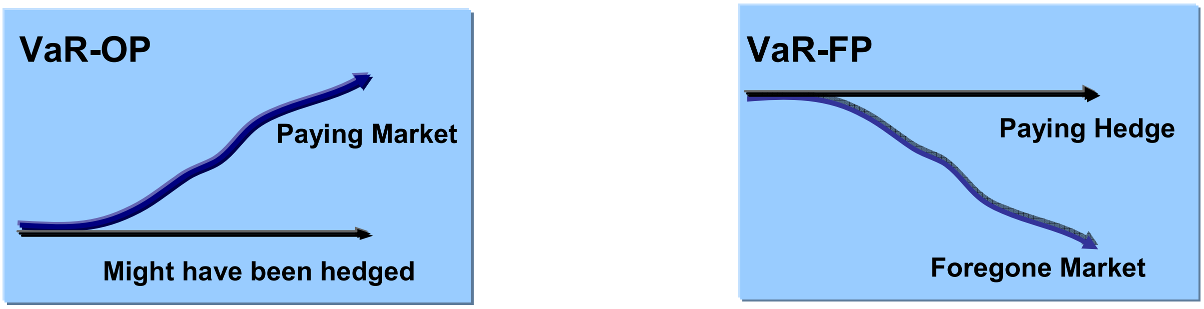
Source: Pace and Vantage

Exhibit 23 shows how setting reasonable management boundaries constrain the distribution of outcomes of an un-hedged portfolio by eliminating intolerable outcomes.

Enhanced programs demand that utilities view risk in multiple dimensions and impose design boundaries accordingly. Those parameters include:

- Open Position Risk: The risk of market price movements resulting in rate increases and/or earnings reduction related to uncovered positions. (VaR-OP)
- Fixed Position Risk: The risk of fixed hedges diverging from market, i.e. foregone opportunity cost of not floating with the market. (VaR-FP)
- Contingent Risk: The risk of unfavorable contingencies and compound contingencies impacting earnings and/or rates. For example, a single credit default could be limited in size by diversifying transactions among numerous counterparties.

Exhibit 24: Open Position Risk (VaR-OP) vs. Fixed Position Risk (VaR-FP)



Rates Exposure **Prudency Exposure**

Source: Pace and Vantage

In the Exhibit 24 above, VaR-OP (left) is the risk resulting from holding open gas positions which are susceptible to higher market Prices in the future. VaR-FP (right) is the risk associated with holding fixed positions that could result in overpaying for Gas if market prices were to decline.

F. OPTIMIZING HDPS THROUGH SIMULATION

Finalization of program objectives and tolerance boundaries is best achieved through the simulation of possible hedging strategies; that is, testing varying combinations of programmatic, defensive, discretionary, and contingent protocols against real market conditions. Simulation is essential to the development of a robust risk management program as it facilitates an understanding of how effectively the protocols work in combination, and demonstrates what results different sets of HDPs would produce under a range of market conditions.

Due to the complex nature of simulating a natural gas portfolio over multiple years, requiring iterative calculations of price returns, Value-at-Risk based metrics for both open and fixed positions; mark-to-market on existing fixed positions, and comprehensive portfolio metrics, accurately performing HDP simulation requires sophisticated software applications. The simulation exercise models varying types and combinations of instruments (swaps, options, collars, consistent with the trading limits and policies established by the utility), in varying proportions, tenure, and using different entry and exit criteria. Each set of HDPs tested is measured for overall cost effectiveness of the portfolio, rate impacts, and risk reduction (open-position and fixed-position VaR) relative to specified objectives.

A utility will test the effectiveness of alternative sets of HDPs against a range of applicable historical data or by using simulated data that best reflect the market variability. This exercise models varying types and combinations of instruments (swaps, options, collars, consistent with the trading limits and policies established by the utility), in varying proportions, tenure, and using different entry and exit criteria. Each set of HDPs tested must be measured for overall prices effectiveness of the portfolio, and for rate impacts and risk reduction (VaR) relative to specified objectives. An example of the portfolios and their performance are shown in Exhibit 25 below.

Exhibit 25: Example HDPs Simulation

Protocol	I	II	III	IV	V	VI	VII	VIII
Programmatic	Swaps			Swaps	Swaps	Swaps	Swaps	
Defensive	Swaps	Swaps	Swaps	Swaps	Swaps	Collars	Calls	Collars
Discretionary		Swaps		Swaps	Swaps	Swaps	Swaps	Swaps
Monetization of Hedges					25%	25%	25%	25%

Results Summary

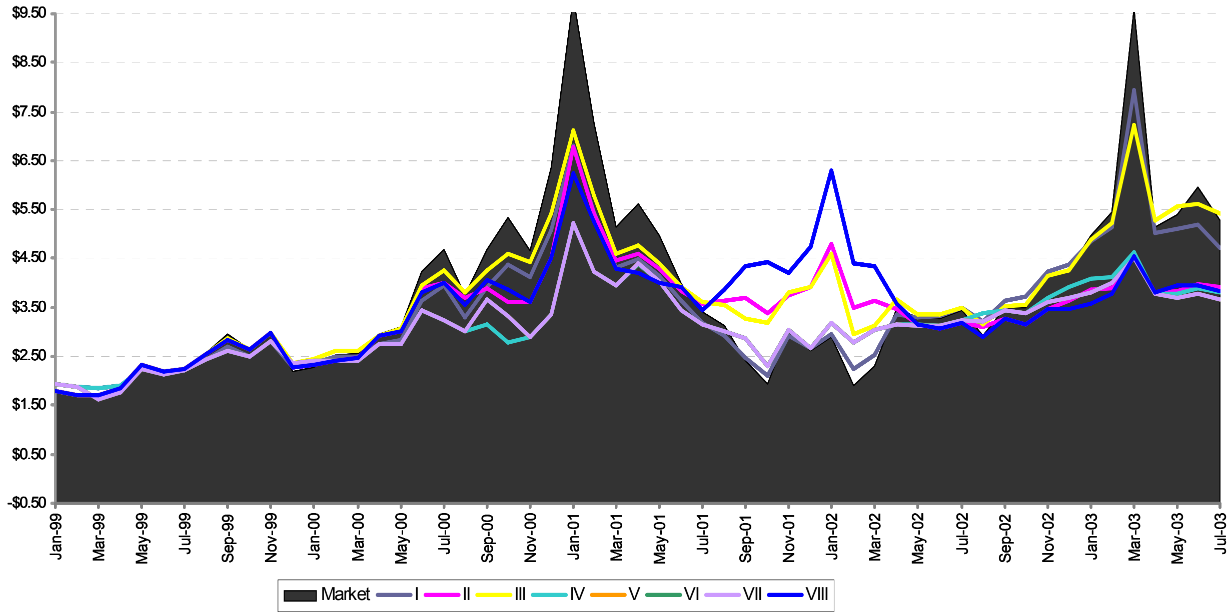
Protocol	I	II	III	IV	V	VI	VII	VIII
Market ($/MMBtu)	$ 3.79	$ 3.79	$ 3.79	$ 3.79	$ 3.79	$ 3.79	$ 3.79	$ 3.79
Average protocol price for the period ($/MMBtu)	$ 3.40	$ 3.39	$ 3.64	$ 3.08	$ 3.07	$ 3.07	$ 3.07	$ 3.48
Savings for the period	10%	10%	4%	19%	19%	19%	19%	8%
Average fixed position risk for 12 m. fwd period	$ (0.05)	$ (0.05)	$ 0.06	$ (0.14)	$ (0.17)	$ (0.17)	$ (0.17)	$ (0.04)
Average open position risk for 12 m. fwd period	$ 0.23	$ 0.18	$ 0.25	$ 0.14	$ 0.15	$ 0.15	$ 0.16	$ 0.19
Average Hedge for 12 m. fwd period	31.9%	15.3%	15.3%	52.7%	31.7%	31.7%	31.7%	31.7%

Savings, by year

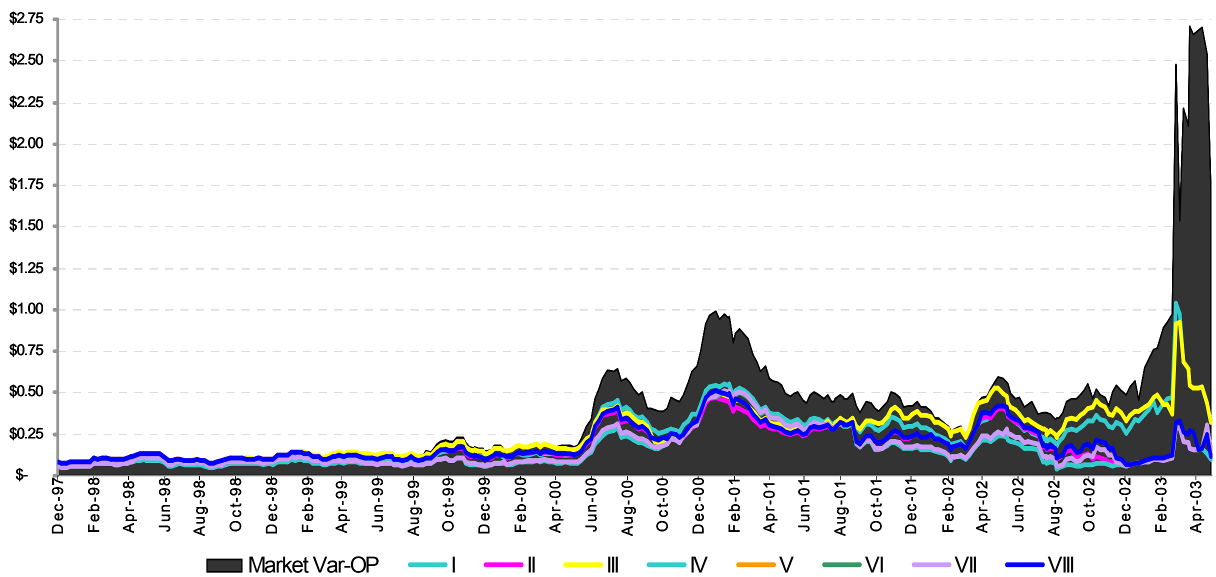
Protocol	I	II	III	IV	V	VI	VII	VIII
1999	1%	0%	0%	1%	2%	2%	2%	0%
2000	12%	14%	6%	26%	24%	24%	24%	14%
2001	15%	4%	3%	21%	21%	21%	21%	1%
2002	-4%	-6%	-11%	-1%	0%	0%	0%	-14%
2003	9%	33%	6%	33%	35%	35%	35%	34%

* Past performance is not indicative of future results

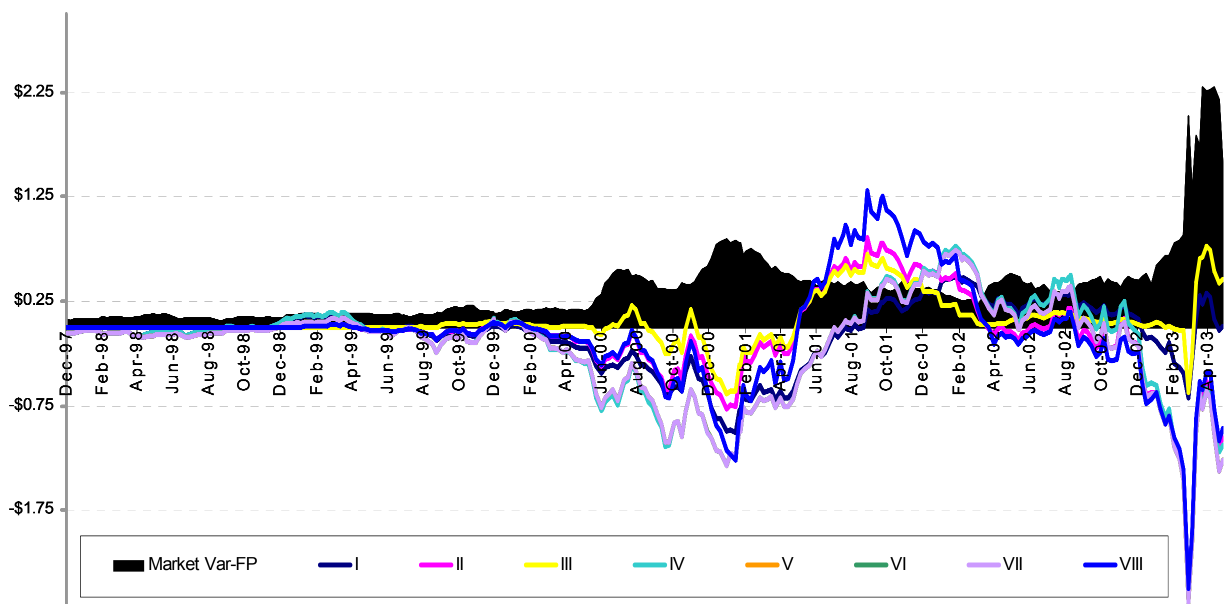
Market Price v. Portfolio Price



Market VaR-OP v. Portfolio Var-OP



Market Downside Potential v. Portfolio VaR-FP



Source: Pace

While there is no assurance that the simulated results will be predictive of future performance, it is reasonable to believe that the simulations will provide a relevant perspective on the types of decisions a utility is likely to encounter in volatile markets.

Optimization of the hedge portfolio paves the way for formulating HDPs designed to protect a utility's objectives and boundaries. Enhanced programs in risk management call for three dimensions of Hedging Decision Protocols, plus a contingency metric.

G. FORMALIZING HDPS

Selection of HDPs will be based on a combination of cost and risk containment that best aligns with the risk objectives of the utility. Based on the findings of its portfolio analysis, the utility will implement an appropriate portfolio and strategy, including a formalized set of HDPs with a "roadmap" of how to deploy them, specifying what type of instrument to deploy, with what tenure, in what proportions, using which specific entry and exit criteria.

Upon ratification of the HDPs, the utility must review its risk management procedures and provide the necessary edits to align the procedures with the adopted HDPs.

H. DEPLOYMENT OF RISK MANAGEMENT SYSTEM AND PROGRAM OVERSIGHT

Monitoring HDPs will require the employment of a comprehensive risk management system and the establishment of a risk management oversight committee. The utility will deploy a risk management system to perform daily price discovery and risk management functions, including tracking open exposures, quantifying volatility, tracking hedge transactions and marking them to market, measuring risk against the utility's objectives, and quantifying required hedges under the Hedging Decision Protocols.

PROGRAM EXECUTION AND OVERSIGHT

1. Daily all market values, portfolio forward price values, hedge transactions, mark-to-market, and risk characteristics are to be made available on the system. This will also include a report of any hedging actions required under pre-ratified HDPs. Sample reports are described subsequently.

2. Utility personnel will place any transactions with their approved counterparty or on the NYMEX via a brokerage account.

3. When transactions are executed, these actions will follow:

    a. Either the utility's "trader" or another agreed representative will enter the transaction into the system.
    b. The counterparty, having standing instructions, will forward a confirmation to the utility's trader and a designee of the utility's Accounting Department.
    c. The utility's will have a designated representative (not from the front office) verify accurate entry of the hedge transaction.
4. Updated reports should be available via the system on a near-real-time basis.

ACCESS TO A RISK MANAGEMENT SYSTEM

The utility will need regular access to a risk management system to measure and monitor its risk exposure. This system must allow the utility to constantly monitor its risk position and the possible effect of adverse price migration on its financial targets. The system will also be used to perform What-If scenario analysis, which is a valuable tool in proactive planning for plausible market movements. The system will calculate the risk exposure as a consequence of price volatility. It will allow the utility to make effective hedging decisions and protect its expected earnings or customer rates.

POSITION TRACKING

A best practice program requires that a utility track its hedge positions from different perspectives, from a higher level, such as total natural gas for the next 12 months, to a more detailed level, such as natural gas by month, by location, and by facility. Positions are composed of open volumes as well as hedged volume and related price levels, thus it is critical for any risk management system to have up-to-date volume forecasts, hedges and market prices. Maintaining the system requires validated market prices, volatilities, correlations and the appropriate calculations to support VaR based risk metrics. The system must receive real-time price quotations from relevant data providers. The utility will be responsible for keeping its hedge positions updated to reflect correct volumes and transactions. Reports must show the breakdown between fixed, open, capped and floored positions, including the total mark-to-market value of the portfolio.

DEAL CAPTURE

The system must support easy deal capture for (in this case) natural gas transactions. Supported transaction types must include fixed-price hedges (swaps, forwards, futures) and options (calls, puts, caps and floors). Users can enter transactions directly into the system or the system can be setup to receive data directly from another deal capturing system.

RISK QUANTIFICATION

Value at Risk ("VaR") is a statistical measure of how much a position or portfolio can change in value over a certain time horizon called the holding period.15 VaR may be measured in two directions:

- The possible increase in forward natural gas costs for a given open or un-hedged volumetric requirement (VaR-OP = VaR of an Open or short Position).
- The possible decrease in forward natural gas prices against a given fixed or hedged position (VaR-FP = VaR of a given Fixed or hedged Position).

The system must calculate risk using the value-at-risk (VaR) concept for a specified holding period and confidence level (such as 97.5% confidence).

A best practice system would include a "what-if" analysis tool to help make effective risk management decisions. For example, the user will be able to vary his or her natural gas position and see the corresponding effect on the utility's overall portfolio risk exposure. This tool is especially important in being proactive and anticipating market movements.

REPORTING

The risk management system must offer a comprehensive set of reports that can be subdivided into the following groups depending on the utility's financial and risk management objectives:

Company-Wide Risk Assessment of Natural Gas

These are higher-level reports that show the company-wide operating projection and risk assessment for a given period in terms of strategic objectives, such as net income or customer bills. They require as input, some items that are not related to risk management

[15] Holding Period represents the time between risk reviews. For example if, with a specified confidence, 2004 forward gas prices are statistically estimated to be capable of a $0.50 move upward over the next five days, then the applicable holding period for that calculation of VaR is five days.

such as depreciation and administrative expenses. In the case of full fuel-pass-through utilities, the main focus of these reports is typically to determine the company's rates-at-risk.

Fuel Forward Positions

These are more detailed reports, intended for a more frequent use and closer fuels position management. These reports include fuels portfolio price summary, volume summary, options summary and deal capture.

Contingent-Event Risks

This group of reports is different from other groups in that the focus is not solely price risk, but other types of risk that include the effects of price risk, such as plant trip risk and counter party abrogation risk (credit risk).

I. THE ROLE OF STORAGE IN AN ENHANCED FRAMEWORK FOR NATURAL GAS UTILITY PROCUREMENT & HEDGING

INTRODUCTION AND BACKGROUND

For decades, underground natural gas storage has played a key role in maintaining the reliability and capabilities of the natural gas transmission and distribution infrastructure throughout North America. Storage is an especially critical component to meeting firm demand in highly temperature-sensitive regions, including those served by the New Jersey gas distribution companies. From the standpoint of a gas distribution company's portfolio, storage supplements long-haul pipeline capacity for meeting peak-season demand, and allows the company to meet some of that demand with gas purchased at typically lower summer prices (referred to as a "natural hedge"). [16]

Depending on the objectives of the storage holder, the operational benefits of underground storage can include daily and monthly imbalance protection, supply curtailment/disruption protection, and day-to-day and seasonal commodity price protection. Recently, storage assets have been increasingly valued as options in the marketplace because of the ability to use storage to capture price spreads (arbitrage) in a highly volatile commodity market. That is, gas can be "cycled" – quickly moved into and out of certain types of storage – to take advantage of differentials in commodity prices between locations or time periods.

Within the context of an enhanced program hedging framework, it is important to note that the natural hedge provided by storage is of only limited tenure because of the requirement to cycle storage seasonally in accordance with load obligations. Injections are procured only about six months before withdrawals on average. So when optimizing the design of Hedging Decision Protocols, it is often advantageous to hedge the price of injection

[16] That is not to say that storage gas is free from price exposure. In the context of a Risk Profile, volatility of prices for storage injections are a component of distribution companies' overall exposure.

volumes unless the rest of the program is designed to assure a high accumulation of programmatic and/or discretionary hedges prior to storage injections.

This segment of the report addresses the different uses of natural gas storage – least-cost resource planning, supply dispatch optimization, and value extraction (arbitrage) – with an emphasis on the appropriate use of storage given the obligation of an LDC to meet firm load obligations.[17] The different types of physical natural gas storage facilities available in the marketplace are described, as well as the operating characteristics and typical uses of each. Next, the value drivers for storage are then discussed, including how storage can be used to capture "intrinsic" and "extrinsic" value from gas commodity price differentials. These value drivers are examined in detail to provide a frame of reference for analyzing and evaluating the New Jersey GDCs use of storage relative to overall least-cost planning and commodity risk management.

USES OF NATURAL GAS STORAGE

The uses of natural gas storage can broadly be classified into three categories. They are, in order of priority:

1. Least-Cost Resource Planning (Strategic Portfolio Design)
2. Optimizing Physical Supply Dispatch (Tactical Portfolio Operations)
3. Forward Value Extraction (Capturing Arbitrage Opportunities)

Each of these is discussed in further detail below.

Least-Cost Resource Planning (Strategic Portfolio Design)

Least-cost (or "best-cost") portfolio planning is the highest-priority application of storage for gas distribution companies, and the strategic objective of ensuring supply reliability at the lowest reasonable cost takes precedence over the other value opportunities storage can provide an LDC. The value of storage in least-cost resource planning derives from the need to satisfy demand requirements that are seasonal (temperature-sensitive) in nature. Constructing a portfolio to promote the lowest reasonable cost requires gas distribution companies to identify the mix of pipeline, storage, and peaking/on-system resources that best meets demand and optimizes total expected portfolio costs over long planning horizons (typically five or more years).[18]

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[17] For example, the use of storage by the New Jersey GDCs to pursue arbitrage opportunities is clearly subordinate to the primary objectives of least-cost planning and dispatch optimization (in the same way that discretionary Hedging Decision Protocols are subordinate to defensive protocols in commodity hedging).

[18] In an enhanced program framework, this resource planning effort would employ stochastic, rather than deterministic inputs. That is, the resource decision-process would be based on probabilistic range of outcomes reflective of the variability of inputs, rather than one that has static assumptions

In portfolio design, storage can promote lower total overall costs by enabling the holder to avoid fixed costs associated with holding year-round, long-haul pipeline capacity or other more expensive options. In addition, storage provides variable (commodity) cost savings by enabling gas distribution companies to meet a portion of winter demand with gas purchased at summer prices. Production area storage can also provide a measure of supply security against contingent event risks such as freeze-offs, hurricanes, or other disruptions in producing regions.

Within the context of commodity risk mitigation, the primary benefit of storage is in supplanting peak-priced supplies with off-peak priced supplies to meet winter demands. The typical seasonal spread between summer and winter spot prices captured by storage is referred to as "intrinsic value," and is discussed in more detail in the value drivers section. In terms of an enhanced program risk management framework, the winter dispatch of gas that has been purchased in the summer has the effect of reducing cost outcomes across the entire probability distribution (i.e., shifts the risk profile illustrated in Exhibit 5 to the left relative to a portfolio that does not have storage). Further, to the extent that summer prices are less volatile than winter prices, the overall probability distribution is narrowed relative to a portfolio that does not have storage.

Optimizing Supply Dispatch

Once a portfolio is defined at the strategic level,– and the fixed costs are in effect sunk for a given time horizon, such as a winter season – the value of storage becomes more tactical, as it can serve several functions in optimizing the physical dispatch of supplies to promote lowest reasonable cost objectives.

Storage provides operational value and cost savings by enabling the holder to manage scheduled supply volumes (nominations) relative to demand on a day-to-day basis, thereby avoiding pipeline imbalance penalties, the need to resell gas into the marketplace below cost, or other variable costs. At times storage can also facilitate the capture of short-term price differentials such as between weekends and weekdays. This will be discussed in more detail in the value drivers section.

Gas held in storage can also provide the dispatcher a supply option, the variable cost of which can be evaluated against current spot prices, other flowing supplies, or replacement costs. However, for gas distribution companies, the availability of this "optionality" is subject to a number of physical and contractual constraints. For example, at any point in a winter, the distribution company must ensure resource adequacy given the potential for a peak day to occur or for peak demand conditions to prevail for the balance of the season. Thus, the available storage capacity and volume is constrained by a "design-forward" planning parameter. In addition, storage operators impose ratchets, minimum inventory, and must-turn provisions on storage holders, further restricting the availability of storage for capturing favorable commodity price differentials.

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for commodity prices, load variability, and so on. A resource planning process that considers the variability (risk) of these key drivers has been referred to as Risk Integrated Resource Planning.

Thus, within an enhanced framework of procurement and hedging, extracting the pure option value of storage is subordinate to meeting physical load obligations, and subject to the operational restrictions imposed by tariffs.

Forward Value Extraction

Storage can also be viewed as a long position in a portfolio of "spread options"; that is, price differentials or spreads between forward months. Those spreads are largely seasonal, but price differentials between cash (spot) and forward prices may hold value as well. The forward value generated by storage is largely a function of natural gas market volatility and the correlation of price movements from month-to-month.

The opportunity to extract forward value has increased markedly with the increase in the volatility of commodity prices. For gas distribution companies, utilizing storage for arbitrage is subordinate to the primary objective of ensuring reliable delivery of gas at the lowest reasonable cost. Accordingly, forward value extraction is an activity conducted in a way that is subordinate to an LDC's broader portfolio management strategy. Yet, the techniques for capturing price differentials (for cost mitigation purposes) can add value in circumstances where storage capacity is not otherwise constrained by demand obligations and tariff restrictions.

TYPES OF NATURAL GAS STORAGE

There is approximately 400 underground natural gas storage facilities located throughout the U.S., with a total working gas of approximately 4 trillion cubic feet (Tcf) with a combined deliverability of 84 Bcf/d.[19] Storage facilities can be broadly classified into three groups (Exhibit 27):

- Depleted Reservoirs
- Salt Caverns
- Aquifers

Depleted Reservoir

Depleted oil and gas production fields and reservoirs are the most prevalent form of underground natural gas storage in the U.S., and are concentrated in the Northeast and Midwest market regions. Due to their characteristically long withdrawal period and low cycling ability, depleted reservoir storage facilities are well-suited to complementing long-haul pipeline capacity in a portfolio designed to meet seasonal demands. Tactically, the summer-injection/winter withdrawal utilization profile of reservoir storage enables the holder to extract intrinsic value (seasonal spreads) in the course of typical operations.

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[19] Source: Energy Information Administration.

Salt Caverns

Naturally occurring salt formations are leached to form natural gas storage facilities. These geological formations are well suited for natural gas storage since they allow little natural gas to escape prior to being extracted. Due to the higher deliverability of salt cavern facilities the unit cost of gas deliverability associated with this type of storage is less than that of a depleted reservoir facility. Salt cavern storage is also well-suited to respond to the daily and even hourly needs of customers, and the rapid cycling of the storage capacity makes salt caverns an attractive choice for marketers interested in capturing extrinsic value in the market.

Salt cavern storage is not typically a significant part of a gas distribution company's delivery capacity in the Northeast or Midwest regions. There are two reasons for this. First, since salt cavern storage is located generally near the production areas of the Gulf Coast, there is little opportunity for avoiding long-haul pipeline capacity costs to deliver the gas to the market region. Secondly, as will be described later, the relatively short cycles (10 days withdrawal) minimizes amount of intrinsic (seasonal spread) value that the storage can contribute to meeting winter season load requirements. Accordingly, for gas distribution companies, the primary use of salt cavern storage is to provide supply security in producing regions that are exposed to occasional supply disruptions.

Aquifers

The geology of an aquifer is similar to that of a depleted reservoir, but they are less valuable. Aquifers are the most expensive type of underground natural gas storage facility, and require the greatest percentage of base gas to operate, so they are usually only developed in areas where there are no depleted wells or salt caverns. Similar to reservoir storage, aquifers are generally operated for a single winter withdrawal period or to meet peak demands.

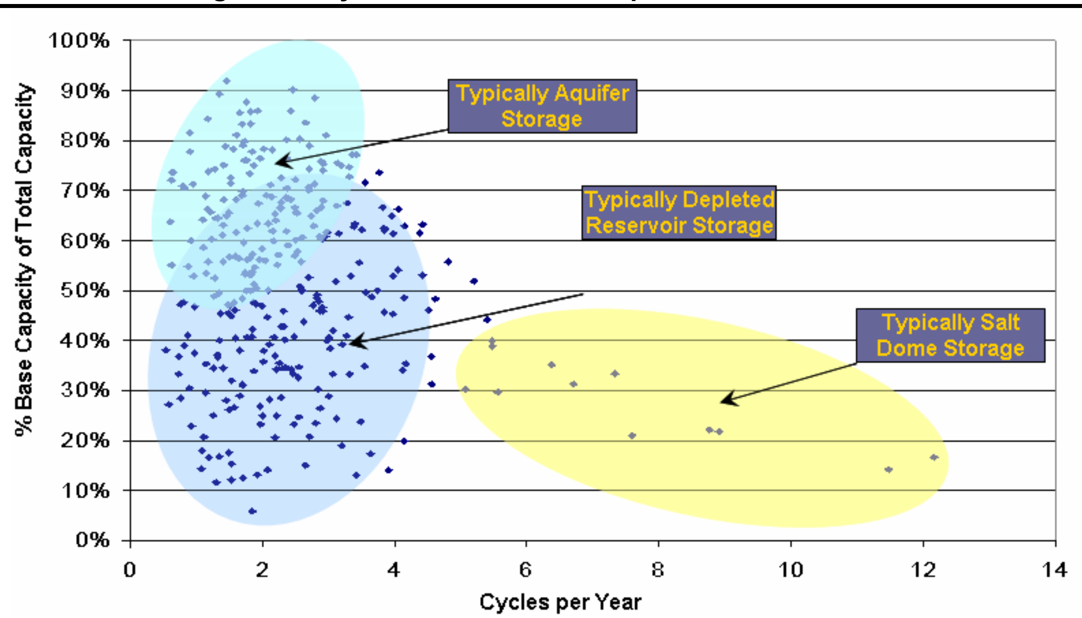
Exhibit 26 compares the physical and operating characteristics of the two most prevalent types of natural gas storage facilities – Salt Cavern and Depleted Reservoir. Exhibit 27 compares the cycling and base gas requirements for each type of storage.

Exhibit 26: Comparison of Salt Cavern and Depleted Reservoir Facilities

Attribute	Salt Cavern	Depleted Reservoir
# of wells	1 - 3	10 -100+
Delivery per well (MMcf/day)	300 - 600	5 -10
Working Gas (% of Total)	65%	22 - 50%
Typical Withdrawal Cycle	10 Days	100 –150 days
Typical Demand Charge ($/Mcf/Month)	$0.12-.$0.28	$0.03-$0.10
Typical Cycle Charge ($/Mcf)	$0.01 - $0.02 commodity 1% - 1.5% fuel	similar
Uses	Trading, Balancing, Price Protection	Reliability, Price Protection

Source: Pace and Vantage

Exhibit 27: Storage Field Cycles vs. Base Gas Requirements



Source: Pace, Solution Mining Institute

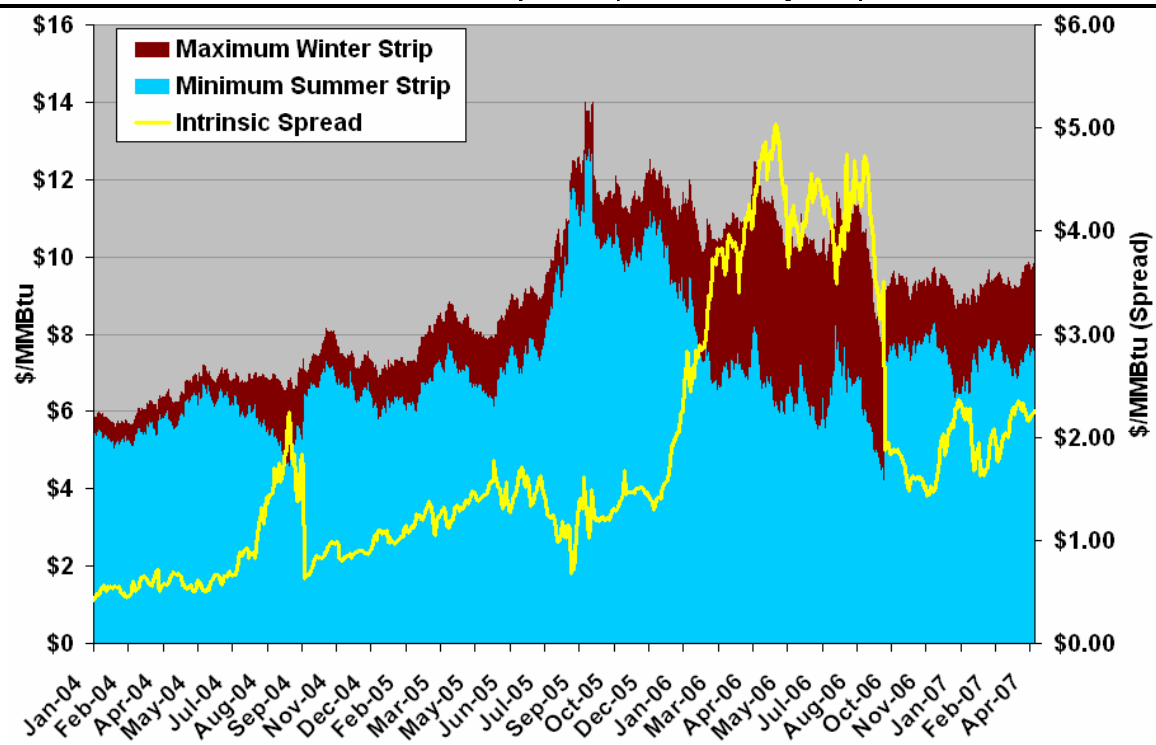
High-deliverability salt projects provide value-extraction benefits that increase with the number of turns or cycles per year. If all opportunities for injection and withdrawal are successfully exploited, the total value extraction (intrinsic plus extrinsic) of the multiple-turn facility will be several times the intrinsic-only value of a single-turn reservoir facility.

VALUE DRIVERS FOR NATURAL GAS STORAGE

Intrinsic Value

Intrinsic value constitutes the value of storage in capturing seasonal differences between prices in the forward curve. Specifically, it is the difference between the two prices in a pair of forward prices, after accounting for carrying costs.[20] Historically, the time spreads have been significantly higher than the true carrying cost of the commodity, as shown in Exhibit 28, thus making storage economically advantageous.

Exhibit 28: Historical Gross Intrinsic Spreads (NYMEX Henry Hub)



Source: Pace and Vantage

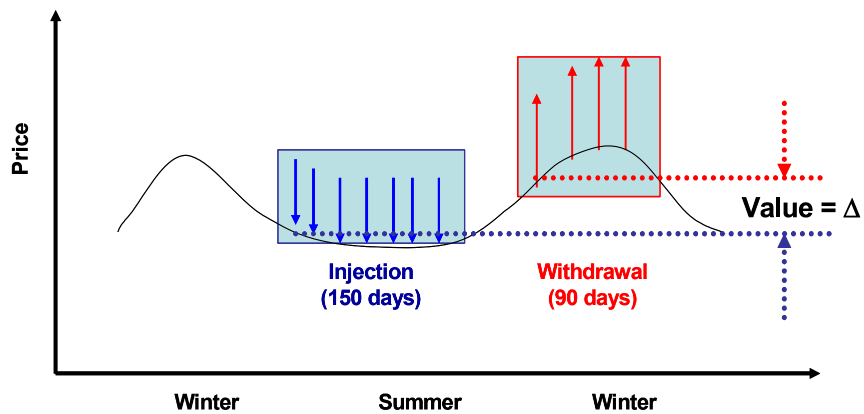
The seasonal spreads for 2006 were elevated relative to historical levels due to the supply disruptions caused by the hurricanes of 2005. The intrinsic spread between winter prices and summer prices moved from approximately $0.80/MMBtu in November 2004 to more than $5.04/MMBtu in April 2006. In theory, if no scarcity of storage capacity existed, then market spreads can be fully arbitraged, such that price differentials would reflect the true

[20] The decision to purchase gas now (summer) to avoid purchasing gas at a later, higher price (winter) creates an immediate cash outflow that would have been deferred by waiting to purchase the gas when needed. Therefore, the carrying cost on the cash outlay must be netted from the price spread to determine the net economic benefit.

cost of the economic carrying charge of the time spread. Exhibit 29 provides a depiction of the intrinsic value of storage for a reservoir (low-cycle) storage facility.

Exhibit 29: Intrinsic Value – Low Cycling

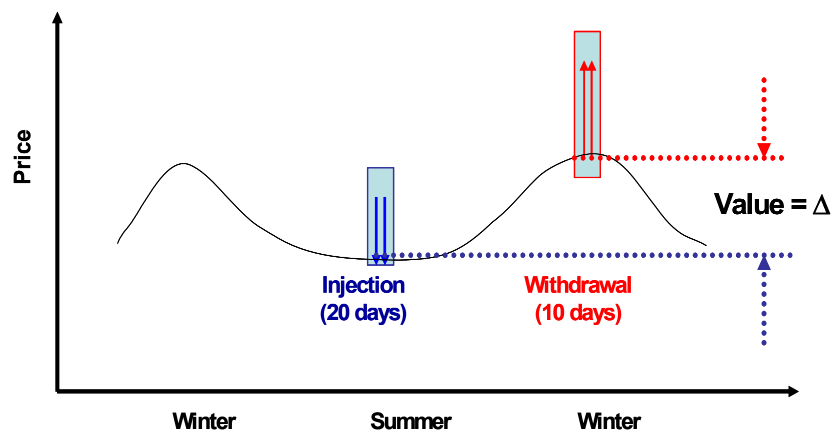
Value = Avg. Winter – Avg. Summer – Variable Cost



Source: Pace and Vantage

By contrast, a high-cycling storage field (salt cavern storage) cannot capture a comparable level of intrinsic value because of the shorter withdrawal period. If intrinsic value was the only value driver for storage a high-cycling salt cavern storage field would likely sit idle (capacity either entirely full or entirely empty) for months as shown in Exhibit 30 below.

Exhibit 30: Intrinsic Value – High Cycling



Source: Pace and Vantage

The difference in the potential intrinsic value that can be captured demonstrated in Exhibits 29 and 30 illustrate a key reason why reservoir storage is an advantageous storage vehicle for gas utilities.

Extrinsic Value

Given the high level of liquidity in natural gas markets – in particular, the Henry Hub cash and futures markets, aggressive daily trading strategies can result in much higher "merchant" value for storage. Otherwise idle[21] storage capacity can by used to support more active trading to capture additional value incremental to intrinsic value or what is commonly referred to as "extrinsic value."

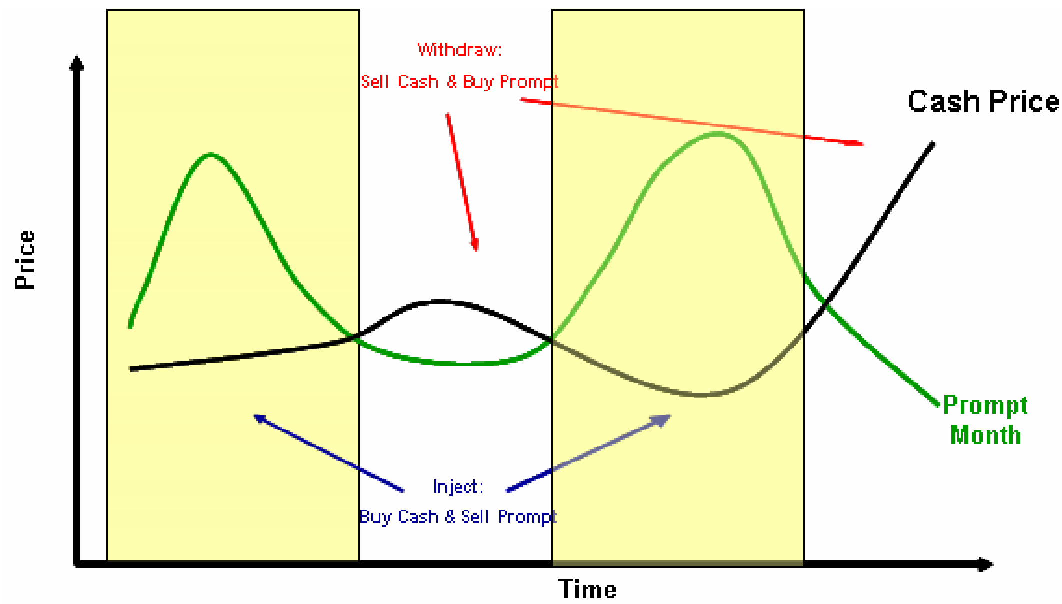
With extrinsic value, the owner of storage capacity can arbitrage among different monthly contracts by buying gas (a long position) during periods when prices are relatively low and selling gas (a short position) during periods when the prices are high and taking inventory positions to bridge the time gap in delivery obligations. This capability constitutes a certain form of spread option and can be valued accordingly provided the opportunities are unconstrained by withdrawal/injection rates and beginning/ending inventory levels. Under a dynamic pricing environment, physical storage is essentially a compound option on a series of future calls and puts on the underlying natural gas commodity.

An example of how storage can be utilized to capture extrinsic value is what is referred to as "cash-to-prompt" trading strategy. When the cash (spot) price on a given day is below the prompt month forward price (net of variable cost), gas is injected simultaneous with selling

[21] For a gas distribution company, storage that is idle in any instant may not be available to pursue extrinsic value extraction, as the storage may be committed to serve potential load obligations on a forward-looking basis.

forward the prompt month. On the other hand, when the spot price is higher than the prompt forward price, then gas is withdrawn from storage for sale in the cash market and hedged by buying the prompt month forward. Exhibit 31 illustrates a "Cash to Prompt" trading strategy:

Exhibit 31: Cash-to-Prompt Trading Strategy



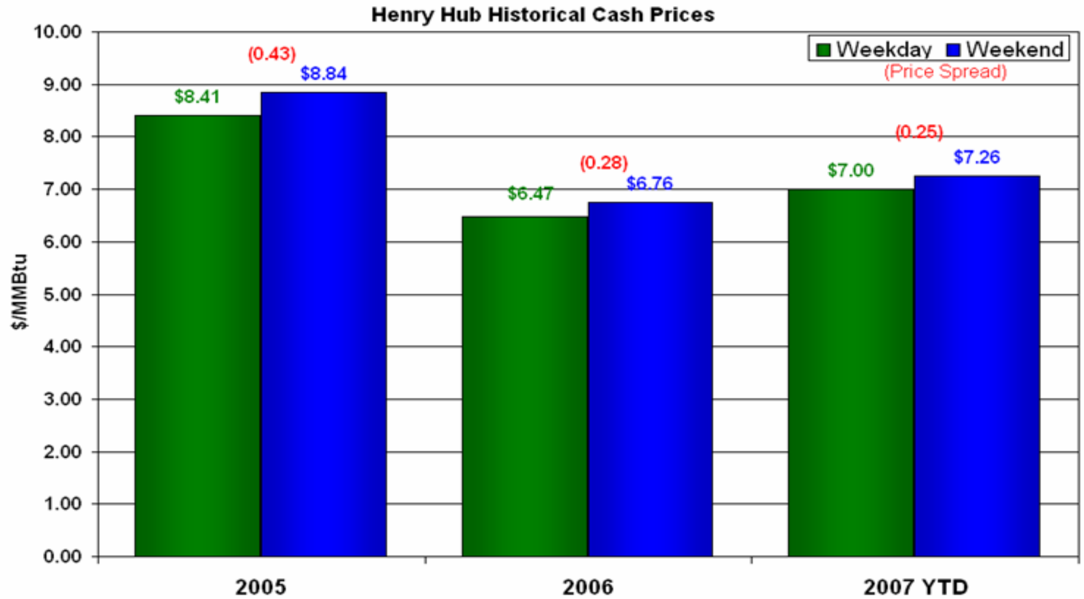
Source: Pace and Vantage

While there are numerous other trading strategies which can derive extrinsic value, they are beyond the scope of this report. The critical point is that extrinsic value cannot be extracted from storage capacity that is otherwise committed to meet the firm demand obligations. Accordingly, in a well-designed gas distribution portfolio, there is minimal opportunity for a gas distribution company to secure extrinsic value.

Capturing Price Spreads Within Portfolio Operations

Within the context of optimizing the dispatch of a gas distribution company portfolio, storage can be deployed effectively to take advantage of short-term price differentials between periods or locations. An example of this is the spread between weekend and weekday spot prices, as illustrated in Exhibit 32 below:

Exhibit 32: Operational Value: Weekend vs. Weekday Spread



Variable Costs associated with Storage		
Transport Cost to Storage	=	$0.100
Fuel to Storage @ 1.5%*	=	$0.090
Storage Injection Usage	=	$0.010
Storage Withdrawal Usage	=	$0.000
Total Cost of Using Storage	=	**$0.200**

Source: Pace and Vantage

* Calculated using $6.00/MMBtu Henry Hub price.

Over the past three years, weekend prices have been on an average $0.32/MMBtu less than weekday prices. The variable costs associated with using storage are significantly lower than the weekend price differential thus providing the operational cost savings for the market participant. During periods of extreme weekend price depression the value of storage can be significant. The value is driven largely by intra-day and intra-month load and price variability.

SUMMARY

In the highly volatile and liquid natural gas commodity market, storage is an effective vehicle for capturing value opportunities in commodity prices. For a gas distribution company, those opportunities are largely housed in the intrinsic value of capturing favorable seasonal price spreads. Importantly, the mitigation of winter prices (by purchasing in the summer and injecting into storage) on average lessens, but does not eradicate the price exposure of those volumes. Therefore, quantifying an overall risk profile – from which tolerance boundaries and hedging decision protocols can be developed – must accurately reflect the volatility of summer injection volumes.

In addition, the tenure of the "natural hedge" provided by storage – typically one injection/withdrawal cycle – needs to be examined in the context of optimizing Hedging

Decision Protocols, which typically call for the accumulation of programmatic and/or discretionary hedges much earlier to adequately diversify positions and prevent reliance of defensive hedges as delivery obligations approach and volatility increases.

The more sophisticated trading activities that capture extrinsic value from forward price differentials (spreads) can be pursued to improve overall cost and risk-reduction, but are subject to the constraints of meeting load as well as the tariff restrictions imposed by storage operators.

III. RISK PROFILES OF NEW JERSEY GDCS

A. SECTION SUMMARY

[*Note: the analysis contained in this Risk Profile section was performed in October 2007 and relied on then-current data, including each GDC's historical data and market prices as of September 2007. Consequently, the analysis pertaining to Fiscal Year 2008 is of limited applicability as part of the year has come to pass. Additionally, since market conditions have changed since that time, the quantified results contained in this report would likely differ if the analysis were reconstructed today. Nonetheless, the implications of the original Risk Profile analyses are still highly intuitive and serve to demonstrate that all four New Jersey GDCs are exposed to significant market risk.*]

The New Jersey GDCs and their BGSS customers are exposed to significant future bill impacts owing to the acute volatility in natural gas prices that has persisted since 2000. Notwithstanding the "natural hedge" from storage of one-quarter to one-half of the GDCs' winter load requirements, our statistical analyses[22] indicate the potential for a 27% to 32% increase in GDCs' wholesale commodity costs in 2008, and a 48% to 51% increase in 2009.[23]

III-F1 The NJNG analysis indicates a 42% probability that realized commodity prices in 2009 will exceed the expected (i.e., statistical median) cost outcome by at least 5%; similarly, there is a 27% probability that NJNG's realized commodity costs in 2009 will be at least 15% higher than currently expected.[24]

Exhibit 33 below summarizes the probability that unmitigated forward commodity prices will be significantly higher than current expectations. The Risk Profiles of the other GDCs' portfolios yielded comparable results:

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[22] These results were produced by Monte Carlo simulations of forward prices as described in the body of this report. Note that the 2008 price distributions reflected the fact that storage costs for the 2007-08 winter were already historical (known) at the time of our analysis; the 2009 price distributions reflect the more comprehensive, going-forward commodity price risk.

[23]These values represent the two standard-deviation, or 97.5% confidence level, outcomes within the distributions. The 97.5% confidence level is a standard measure of risk quantification.

[24] / ETG points out that it was unable to review the underlying data supporting the various tables and graphs (Exhibits 33-35) and therefore cannot validate.

Exhibit 33: Probability of Wholesale Commodity Cost Increases in 2008 and 2009

	NJNG		PSEG		Etown		SJG	
% Increase from Expected Price	2008	2009	2008	2009	2008	2009	2008	2009
5% or Greater	36.4%	42.0%	36.8%	41.8%	38.3%	42.6%	37.6%	41.6%
10% or Greater	25.5%	34.5%	25.9%	35.0%	28.9%	35.3%	27.2%	34.0%
15% or Greater	16.4%	27.4%	17.3%	28.7%	20.3%	28.8%	18.7%	27.3%

Source: Pace and Vantage

When translated to BGSS customer bill impacts, these potential commodity price outcomes likewise produce a wide range of possible outcomes. The histograms shown in Exhibit 34 below depict the distribution of 2009 bill impact outcomes for each of the four GDCs:

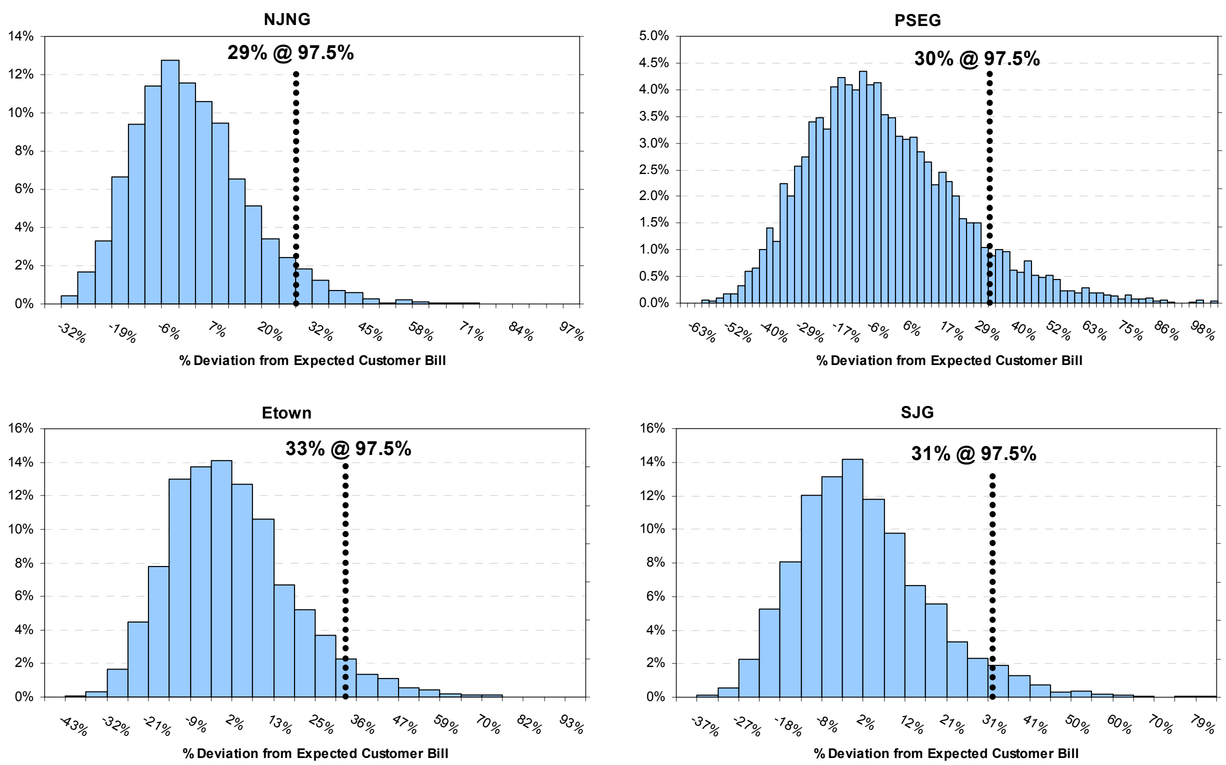


Exhibit 34: 2009 Probabilistic Distribution of Customer Bill Impact
Source: Pace and Vantage

As indicated in Exhibit 33 above, the potential 2009 BGSS bill impacts, at a 97.5% confidence level, range from 29% to 33%. Apart from the pronounced impacts at the tails of the distribution, there is a significant probability of bill impacts exceeding levels customers would likely find tolerable, as summarized in Exhibit 35 below:

Exhibit 35: Probability of Customer Bill Impacts in 2008 and 2009

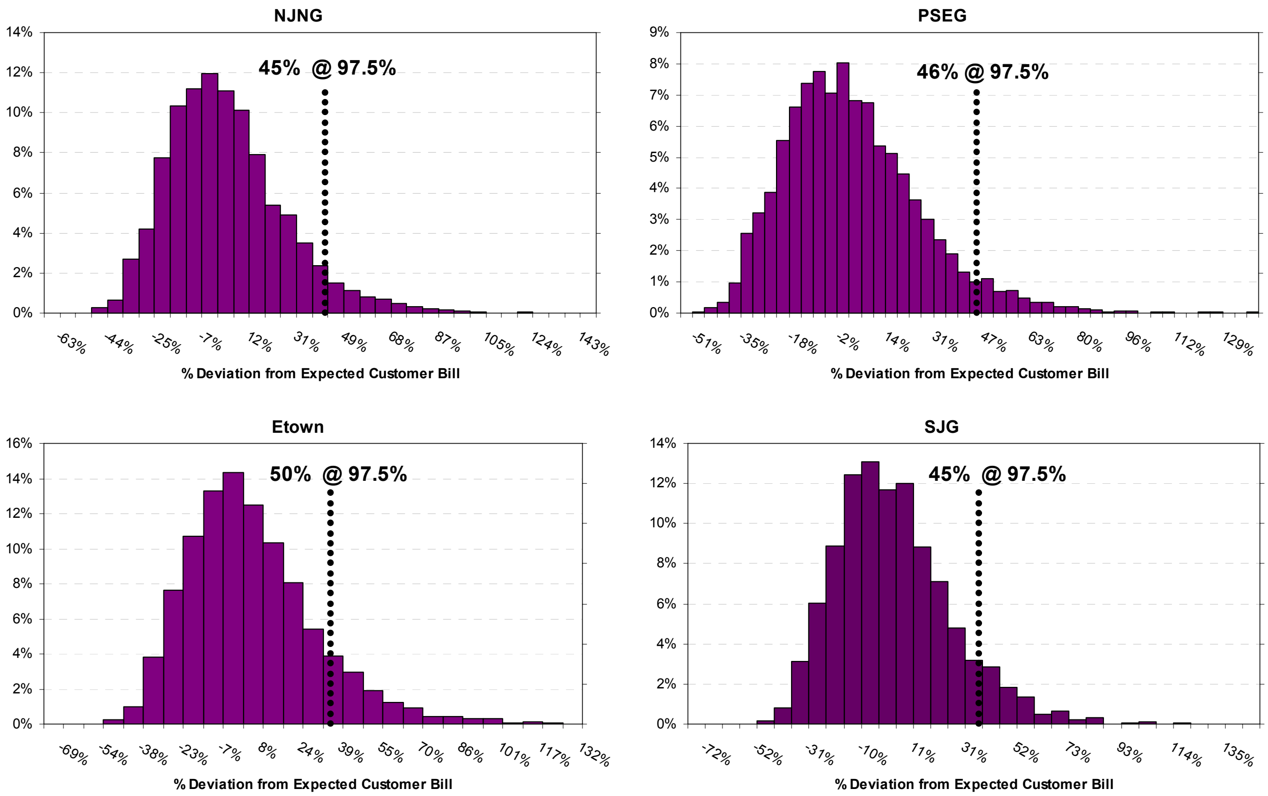
	NJNG		PSEG		Etown		SJG	
% Increase from Expected Bill	2008	2009	2008	2009	2008	2009	2008	2009
5% or Greater	28.5%	37.2%	28.3%	37.0%	33.4%	38.4%	29.7%	36.5%
10% or Greater	13.1%	25.4%	14.1%	26.3%	20.3%	28.2%	16.4%	25.7%
15% or Greater	5.7%	17.2%	6.6%	17.6%	11.5%	19.7%	7.8%	17.9%

Source: Pace and Vantage

As indicated by Exhibit 35 above, there is more than a 25% probability that BGSS customers will experience in 2009 bill impacts of 10% or greater relative to current price expectations, and nearly a 20% probability of bill impacts of 15% or greater.

While the hedging program recommendations contained in this report focus on mitigating risks stemming from wholesale price volatility, we also analyzed the compound risk of price and weather uncertainty that the GDCs and their BGSS customers face. Because of the correlation effects of load and prices – i.e., higher consumption owing to cold weather coinciding with higher market prices, and vice-versa – the composite price-load Risk Profile exhibits a wider (i.e., more uncertain) distribution than if only price risk is considered. This is depicted in Exhibit 36 below:

Exhibit 36: 2009 Probabilistic Distribution of BGSS Bill Impact With Load Uncertainty



Source: Pace and Vantage

The analysis that follows in the body of this section details the development of unhedged probabilistic price and bill impact distributions for each of the four GDCs.

B. INTRODUCTION

The need for a robust hedging program stems from the price risk to which the New Jersey GDCs and their BGSS customers are exposed. The prevailing potential for 20% and greater annual rate/bill impacts calls for far more volatility containment than would a comparatively more stable price environment. As such, developing a structured program of when, how, and how much to hedge needs to be founded on a sound understanding of the magnitude of risk each GDC faces.

Further, assessing the effectiveness of each GDC's hedging program – both existing and prospective – requires the context of what undesirable outcomes the program is preventing. For example, a program that contains price volatility to no more than a 5% year-over-year rate change is far more robust in an environment that has the potential for 35% increases than one in which a 10% increase is the extreme. Thus, the context of the market environment is integral to the Board's evaluation of the reasonableness of each GDC's risk tolerance boundaries, as well as the effectiveness of program implementation.

Quantifying this exposure is referred to as developing a Risk Profile. In this section we present the Risk Profile of each of the four New Jersey GDCs for the next two years (2008 and 2009), as well as a description of the methodology employed to develop each Risk Profile. The analyses demonstrate, quantitatively, the inherent price risk to the GDC portfolios at both the wholesale commodity cost level and the BGSS customer bill impact level (either of these measures is a reasonable basis upon which to develop risk tolerances and hedging decision protocols).

Commodity costs are dependent upon a multitude of supply and demand factors that create uncertainty in market prices, and they represent the central at-risk component within the overall BGSS retail rate structure. In developing the GDC's Risk Profiles, wholesale commodity price risk was modeled using Monte Carlo simulations of observed volatilities and forward market price levels. Each GDC's specific storage utilization was integrated into its Risk Profile to reflect the partial insulation from peak winter gas prices that storage provides. The resultant commodity cost price distributions were then converted to BGSS customer bill impacts.

Supplemental to the primary probabilistic bill-impact distributions, load variability was integrated in order to generate probabilistic customer bill impacts inclusive of the correlated effects of both price and load uncertainty. While the composite price-load distributions provide a more comprehensive view of the rate impacts that customers face, the scope of the hedging programs addressed in our recommendations are in mitigating the wholesale price component. Nonetheless, the supplemental risk profiles provide a context for understanding the magnitude to which price and load uncertainties contribute to customers' overall exposure.

The balance of this chapter describes the methodology used to determine the Risk Profiles for each of the GDCs, followed by a detailed, company-by-company description of the results.

C. SUMMARY OF RISK PROFILE METHODOLOGY

FORWARD PRICE PROPAGATION

The first process in developing a Risk Profile is the propagation of forward prices. Forward price propagation is a statistical method used to generate a series of possible price paths, each of which represents the cost curve that the New Jersey GDCs may face for the time period in question – i.e., their potential Weighted Average Commodity Cost of Gas (WACCOG) for 2008 and 2009. This process entails analyzing the historic cost structure of the GDCs' commodity purchases and identifying a forward market index that can serve as a proxy for those commodity purchases. Once a proxy is identified, the mathematical relationship between each company's realized commodity costs and the proxy is determined through statistical analysis. This relationship is then used as a predictor of that company's future commodity costs given the behavior of the proxy.

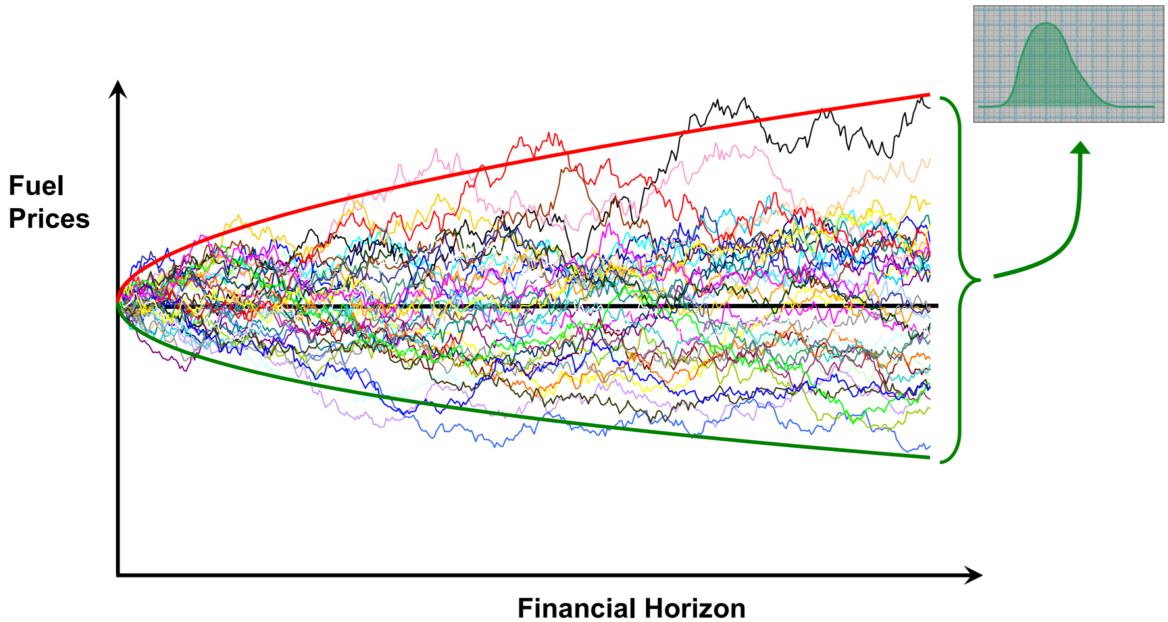
An examination of the NYMEX Henry Hub futures settlements (Henry Hub) and each GDC's realized commodity prices revealed a strong correlation between the two price series.[25] That is, the Henry Hub forward curve is an effective proxy which can be translated into a corresponding forward price curve unique to each GDC. The relationship estimated for each GDC was determined through a regression analysis of the Henry Hub settlements and the GDCs realized commodity costs, which also took into account the seasonality of natural gas prices.

Propagating forward Henry Hub prices entails calculating volatilities and monthly cross-correlations for the Henry Hub forward price curve. These parameters, which are based on historical price relationships, ultimately served as inputs to a Monte Carlo Simulation of future prices. There are two important components of the historical volatilities: (1) the seasonality of volatility and (2) the term-structure of volatility. In order to capture these two components the volatility input consists of a matrix that relates the seasonal effect and the increase in volatility as a particular forward contract approaches expiration (i.e., volatility increases as time to expiry decreases). The final parameter in each Monte Carlo simulation was the coefficient of the relationship between the Henry Hub price and the GDC-specific portfolio price.

The Monte Carlo simulation is a stochastic (non-deterministic) process that generates randomized draws of forward price propagations given the volatility and correlation inputs previously mentioned. Five-thousand iterations were executed for each GDC using its unique forward price curve and Henry Hub volatilities and correlations, thereby generating a probabilistic distribution of outcomes and corresponding confidence bands. Exhibit 37 below demonstrates how the price paths are propagated to develop a probabilistic price distribution.

[25] The correlation between HH prices and each GDC's costs were determined through regression analysis of both nominal price levels and price returns. Price returns are the relative change in prices from one period to the next, and are calculated as the natural log (ln) of ($Price_t$ / $Price_{t-1}$) While price level correlations indicated how prices are related over time, the correlation of price returns reveal the strength of the relationship between the *change* in prices.

Exhibit 37: Development of Probabilistic Price Distributions: Monte Carlo Simulation



Source: Pace and Vantage

Thus, the result of the Monte Carlo simulation for each GDC was a statistically robust probabilistic distribution of monthly wholesale commodity costs reflective of the actual behavior of the forward curve of the key underlying pricing index (the Henry Hub).

STORAGE

III-F2 The computed winter months' portfolio prices for NJNG reflected approximately 45% on prior summer prices (i.e., the weighted-average of April-October prices) and 55% on propagated winter prices.[26]

In order to translate the monthly cost distributions generated by the Monte Carlo simulation into annualized distributions, the next step was to incorporate a basic storage capacity model into the commodity cost analysis. Because each GDC has a different portfolio of storage assets, it is necessary to accurately reflect the appropriate storage capacities into each Risk Profile. Essentially, this modeling adjusts the price distributions for that portion of winter gas load which is served by purchasing off-peak season gas and injecting into storage prior to winter. In winter months, the realized portfolio cost of gas is therefore a blend of already-established summer prices and current-month prices. The historical

[26] / NJNG states that this is incorrect. The NJNG Storage is generally about 70% of a normal winter sales forecast (Periodic BGSS) with the balance reflected in flowing gas. Additionally, there is no hedging for the volumes associated with monthly BGSS, transport customers and off-system sales.

injection/withdrawal behaviors of each GDC were analyzed in order to mold the results of the commodity cost simulation to more accurately capture their portfolio price inclusive of storage.

Additionally, it is significant to note that the storage price component used in the analysis for the 2007-2008 winter (Nov 2007- Mar 2008) was based on realized market settlements from April 2007 through September 2007 and simulated prices for October 2007. Therefore, there is limited variability in the portfolio price distribution for the nearest winter season. By contrast, portfolio prices for the 2008-2009 winter were based entirely on simulated prices for both the storage (Apr 2008 - Oct 2008) and "open" winter components. This additional uncertainty results in wider price distributions for 2009.

The effect of storage on each of the four GDCs portfolio cost distribution narrows the potential range of outcomes for the highly volatile winter months and is highlighted in their respective Risk Profiles.

COST DISTRIBUTIONS

The final step in constructing the Risk Profiles was to develop bill-impact distributions to demonstrate the possible range of outcomes to which the BGSS customers face as a function of the distribution of the GDCs' commodity costs. This entailed overlaying expected BGSS volumes (i.e., expected load based on normal weather) with the portfolio price distribution generated earlier to produce a total portfolio commodity cost distribution given normal load. The portfolio commodity cost distribution was then translated into an average BGSS customer bill based on each GDC's number of customers and non-commodity rate components. The average BGSS customer bill distribution provides the basis for understanding the relative impacts of price volatility at the customer level.

SUPPLEMENTAL ANALYSIS – INCORPORATING LOAD VARIABILITY

In addition to a probabilistic distribution of per-MMBtu portfolio prices, a supplemental Risk Profile was performed that models potential load variability in the GDCs' portfolios as a function of weather uncertainty. Modeling the composite price-load risk profile provides a basis for understanding the overall customer bill impact distribution, as well as the relative contribution of price uncertainty to the overall cost impact risk the GDCs and their customers face.

The methodology applied to the development of a future monthly load distributions was similar to that of the forward price propagation. Regression analyses of each GDC's historical sendout volume and heating degree days across its service territory was performed to determine a set of parameters for each calendar month. The variability in the GDCs' sendout as a result of variable weather was captured using six years of actual load and degree day data. The resulting coefficients were then used to generate probabilistic distributions for each GDC's monthly load using the most recent BGSS filings as the expected outcome.

It is useful to provide a context of the weather variability that was used to generate the GDCs' load variability effects on the overall probabilistic bill distributions.

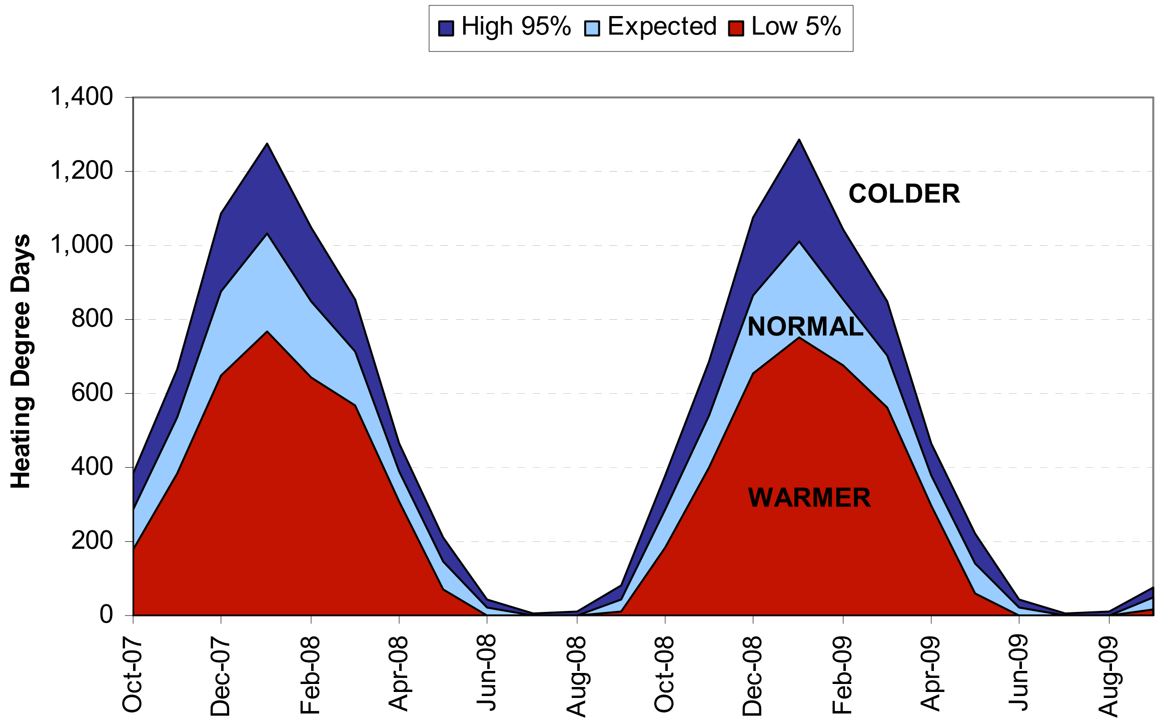
Exhibit 38 and Exhibit 39 below depict the distribution of heating degree days for the New Jersey GDCs on which the loads distributions were based.

Exhibit 38: Normal and Two-Standard Deviation High & Low Weather Parameters

Month	Warmer	Normal	Colder
Oct-07	179	285	383
Nov-07	385	534	666
Dec-07	647	875	1089
Jan-08	766	1030	1273
Feb-08	646	849	1046
Mar-08	568	713	851
Apr-08	308	389	464
May-08	69	148	213
Jun-08	0	19	43
Jul-08	0	1	4
Aug-08	0	2	9
Sep-08	10	45	79
FY 2008	3,579	4,891	6,120

Month	Warmer	Normal	Colder
Oct-08	186	287	380
Nov-08	399	541	684
Dec-08	657	867	1073
Jan-09	749	1014	1288
Feb-09	674	856	1044
Mar-09	561	702	851
Apr-09	295	381	468
May-09	60	140	223
Jun-09	0	20	43
Jul-09	0	1	4
Aug-09	0	2	10
Sep-09	14	47	78
FY 2009	3,594	4,858	6,144

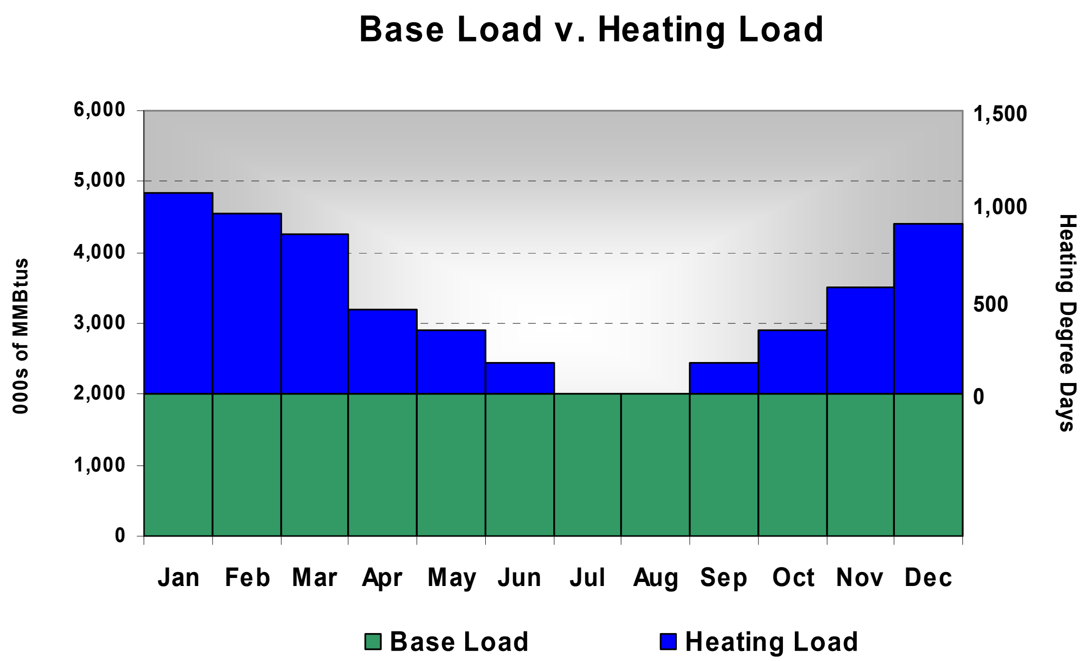
Exhibit 39: Variability in State of Heating Degree Days



Source: Pace and Vantage

The three weather parameters outlined above are intended to illustrate the general range of heating degree days used in this supplemental analysis. These values are intrinsically linked to each GDC's sendout through its specific consumption-per-degree-day factor. Exhibit 40 illustrates, generically, the portion of the overall load that is subject to this relationship:

Exhibit 40: Base Load/Heating Load Relationship



Source: Pace and Vantage

The combined commodity-load portfolio distributions, including the sensitivity analyses conducted on the heating degree days ("HDDs"), reveal a wider range of outcomes than did the distribution of bill impacts in which load was held constant. These supplemental bill impact distributions provide a quantitative context for understanding how much of the total uncertainty in future customer bills can be addressed through a robust commodity hedging program.[27]

[27] / NJNG points out that there is no mention of the potential uncertainty stemming from customer migration from BGSS or changes in usage patterns of BGSS customers. Additionally, there is no recommendation on how to specifically address the impact of variable loads.

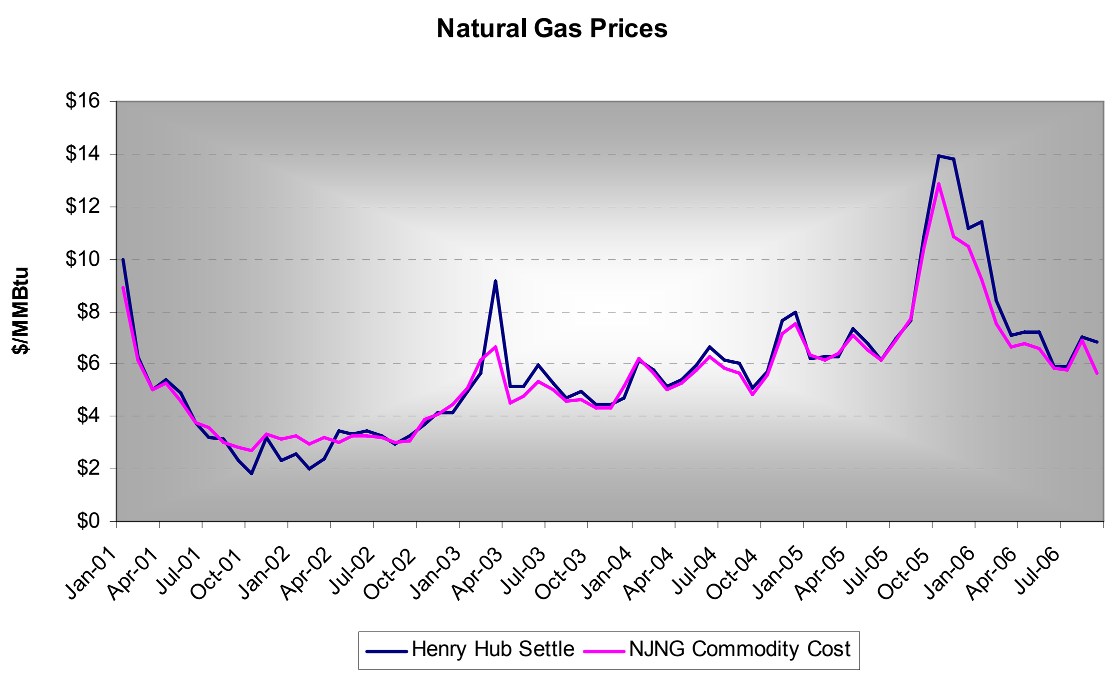
D. NEW JERSEY NATURAL GAS RISK PROFILE

PRICE LEVELS AND CORRELATIONS

III-F3 Henry Hub is a good proxy for use in developing forward prices and forward price distributions of New Jersey Natural's realized commodity cost.[28]

The results of the of NJNG commodity cost historical analysis shows that Henry Hub and New Jersey Natural Gas price levels correlated 98% from 2001-2006. Henry Hub and New Jersey Natural Gas price returns correlated 82% over the same time period

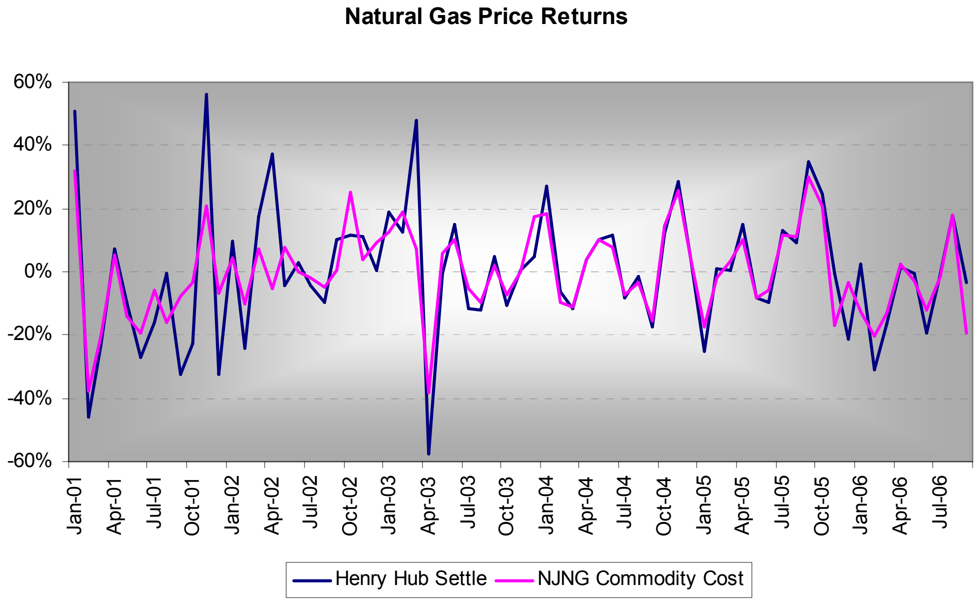
Exhibit 41: NJNG Prices



Source: Pace and Vantage

[28] / NJNG has not been able to correlate the information in many of the charts and graphs throughout this Draft Report with our specific data. For example, the charts in this section are the results of Pace/Vantage simulations, assumptions and analysis that NJNG has not reviewed. It is possible that since NJNG only hedges for the Periodic BGSS customers, not total sendout, the simulations may be based on incorrect assumptions.

Exhibit 42: NJNG Price Returns

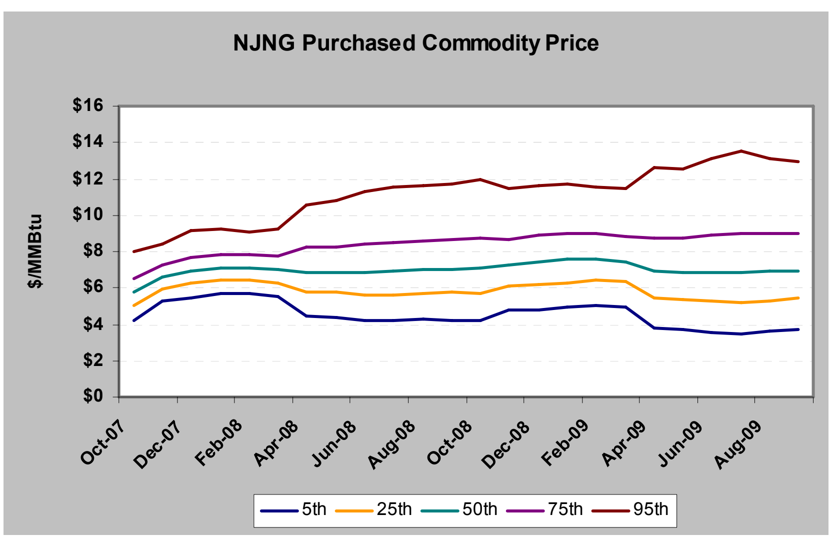


Source: Pace

PROBABILISTIC PRICE DISTRIBUTIONS

Exhibit 43 below shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with NJNG's future monthly gas costs.

Exhibit 43: NJNG Purchased Gas Price Distribution: Confidence Bands



Source: Pace and Vantage

Exhibit 44 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

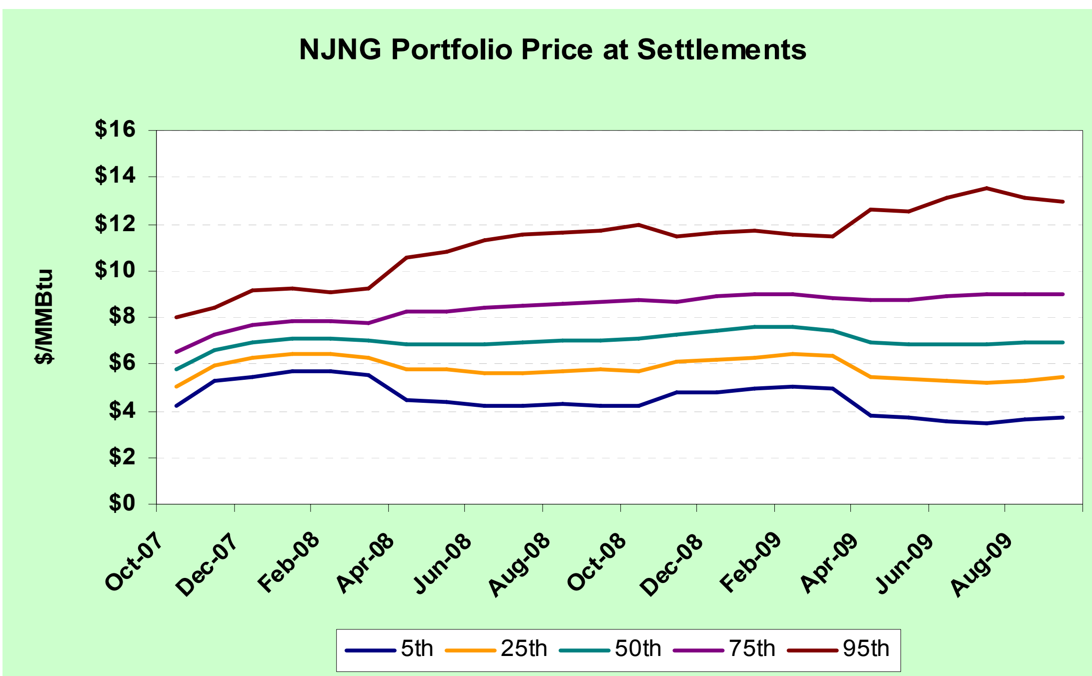
Exhibit 44: WACCOG Excluding Storage

	FY 2008	FY 2009
-2σ	$5.09	$4.81
Mean	$7.26	$7.92
+2σ	$9.93	$12.05

Source: Pace and Vantage

Exhibit 45 below shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with NJNG's future Portfolio Price at settlements. Winter portfolio prices were weighted 44% to the previous summer prices (April-September 2007 actuals; October 2007 simulated; April-October 2008 simulated) and 56% to simulated monthly settlements.

Exhibit 45: NJNG Portfolio Price at Settlements: Confidence Bands



Source: Pace and Vantage

Exhibit 46 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

Exhibit 46: WACCOG Inclusive of Storage

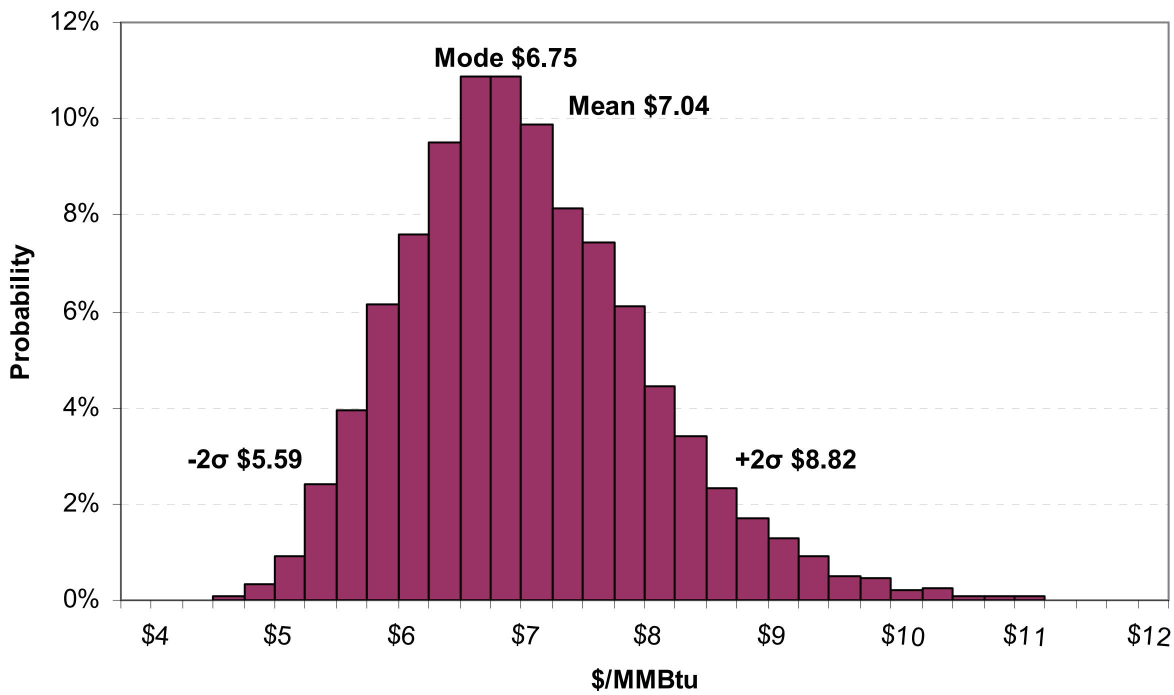
	FY 2008	FY 2009
-2σ	$5.59	$5.04
Mean	$7.04	$7.65
+2σ	$8.82	$11.04

The effect of incorporating its utilization of storage gas on NJNG's commodity cost distribution is; for:

- 2008: 95% High Outlier reduced from $9.93 to $8.82; ± 2σ Range reduced by $1.61/MMBtu
- 2009: 95% High Outlier reduced from $12.05 to $11.04; ± 2σ Range reduced by $1.21/MMBtu

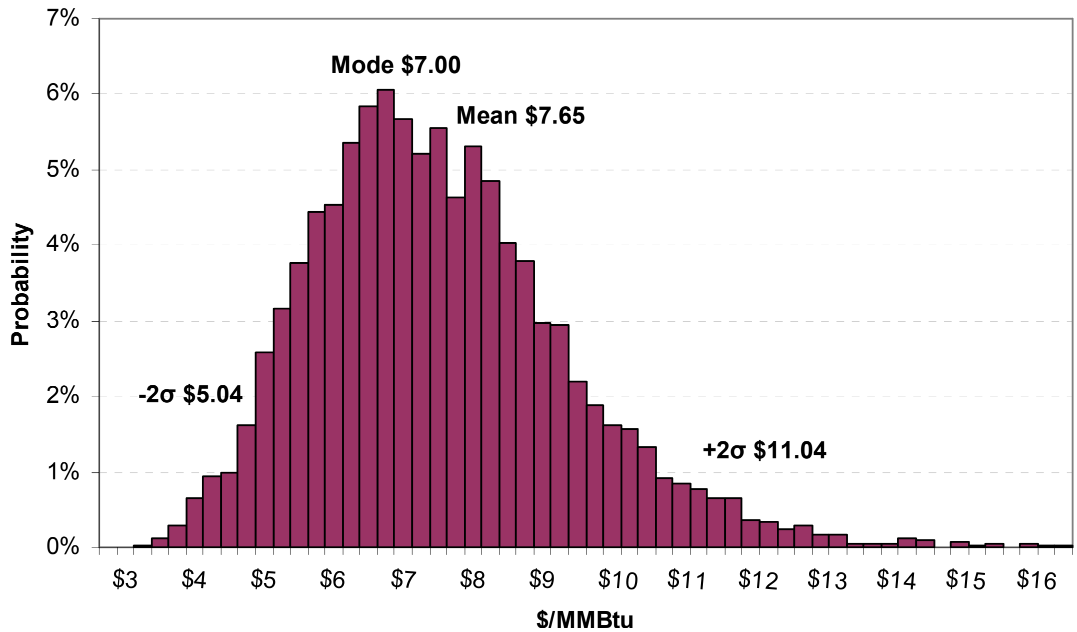
Exhibits 47 and 48 depict histograms of the entire distribution of NJNG's Portfolio Price for fiscal years 2008 and 2009, respectively.

Exhibit 47: NJNG 2008 Portfolio Price Probabilistic Distribution



Source: Pace and Vantage

Exhibit 48: NJNG 2009 Portfolio Price Probabilistic Distribution



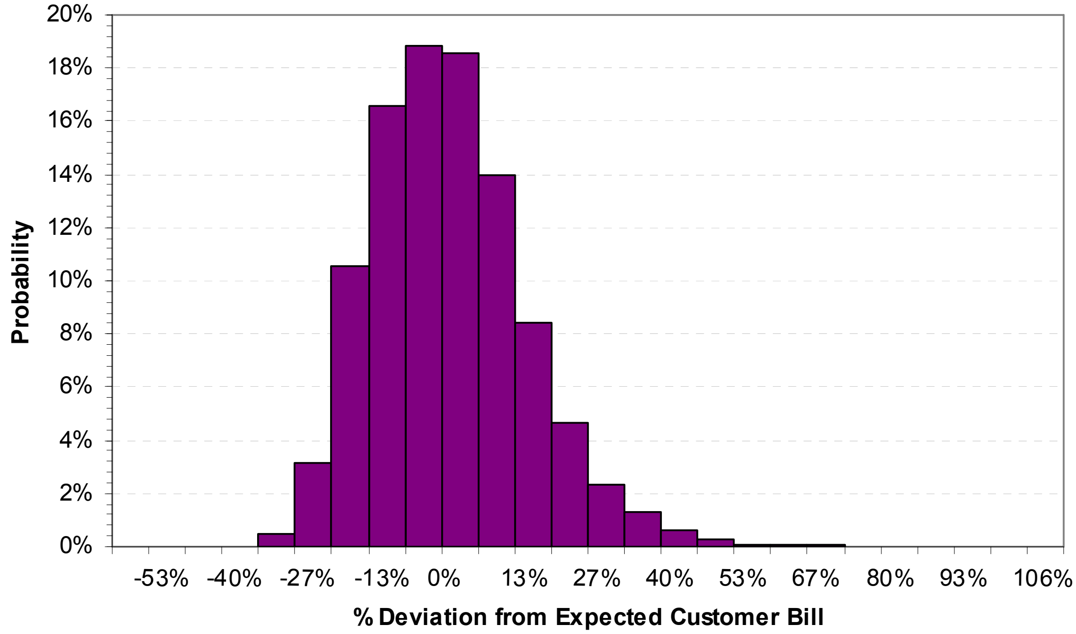
Source: Pace and Vantage

CUSTOMER BILL DISTRIBUTION

Uncertain Weather

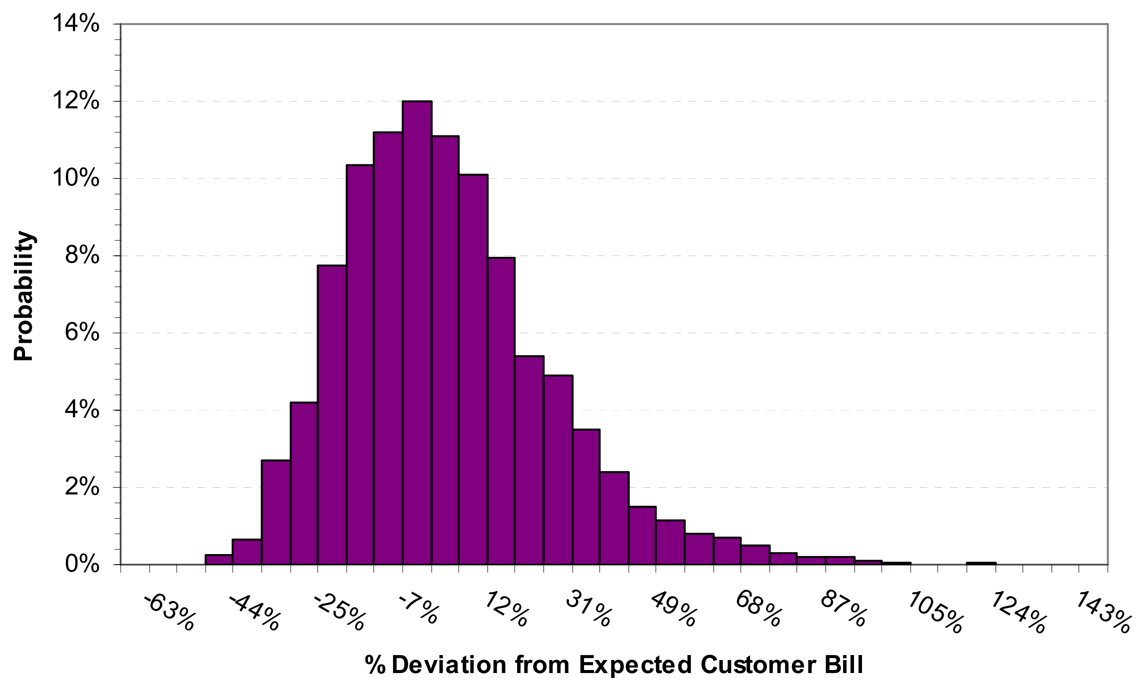
Exhibit 49 and 50, respectively, show the 2008 and 2009 distribution of outcomes expressed as the percentage difference from the expected customer bill accounting for uncertain weather conditions.

Exhibit 49: NJNG 2008 Customer Bill Distribution



Source: Pace and Vantage

Exhibit 50: NJNG 2009 Customer Bill Distribution



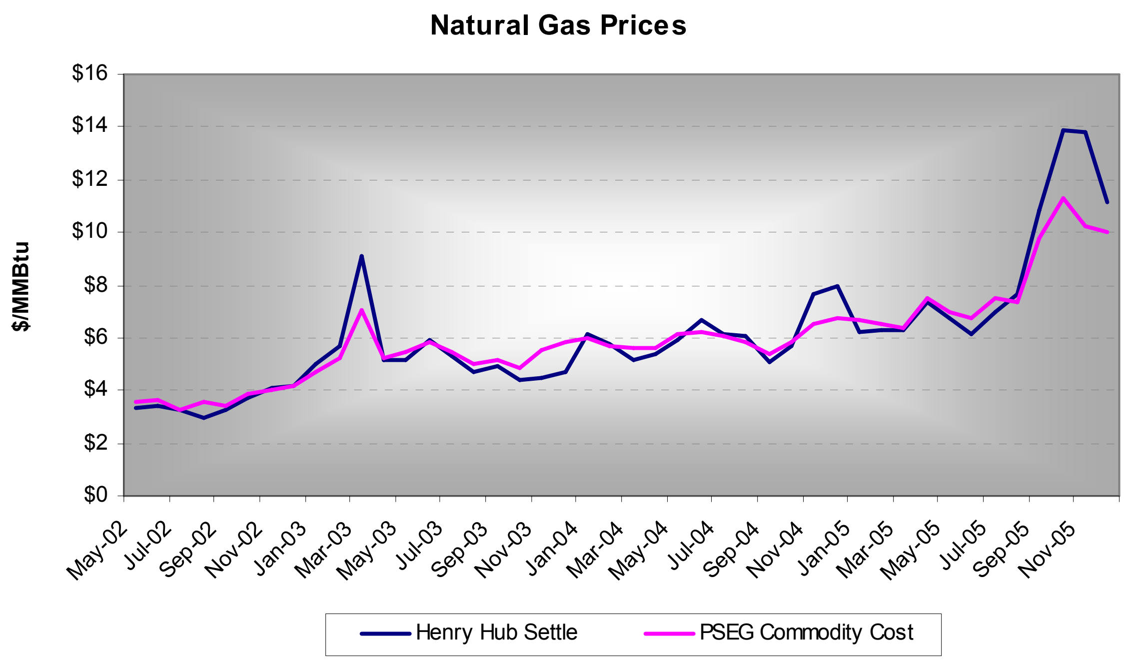
Source: Pace and Vantage

E. PUBLIC SERVICE ELECTRIC AND GAS RISK PROFILE

PRICE LEVELS AND CORRELATIONS

III-F4 The results of the of PSE&G commodity cost historical analysis show Henry Hub and Public Service Electric & Gas price levels correlated 96% from 2002-2006.

Exhibit 51: PSE&G Prices

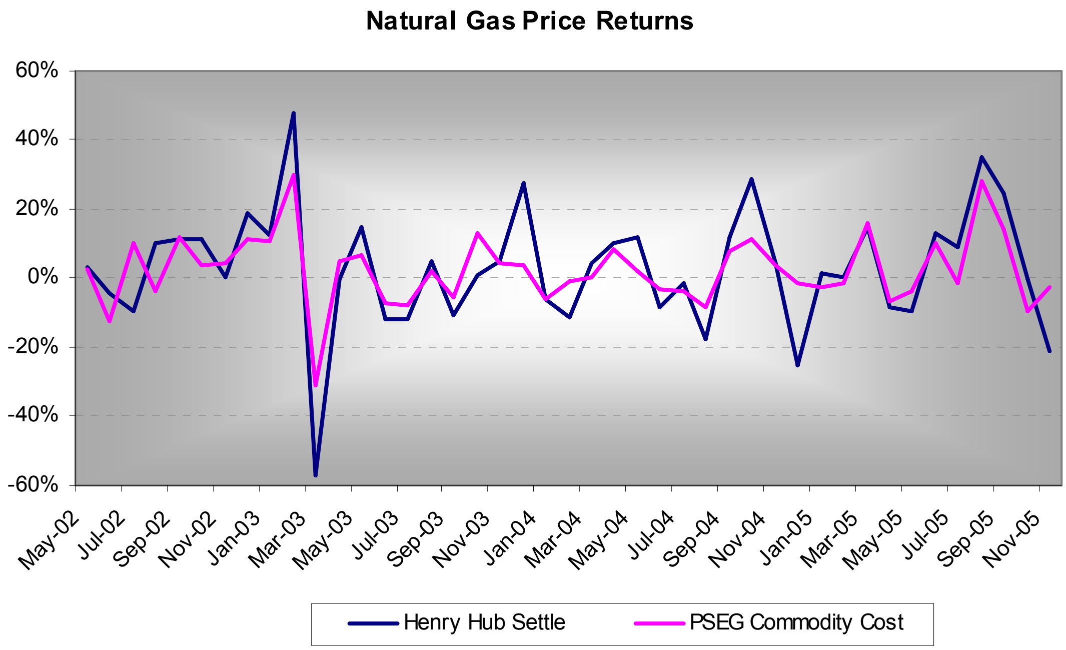


Source: Pace and Vantage

III-F5 Henry Hub and Public Service Electric & Gas price returns correlated 83% over the same time period.

Conclusion: Henry Hub is a good proxy for use in developing forward prices and forward price distributions of Public Service Electric & Gas' realized commodity cost.

Exhibit 52: PSE&G Price Returns

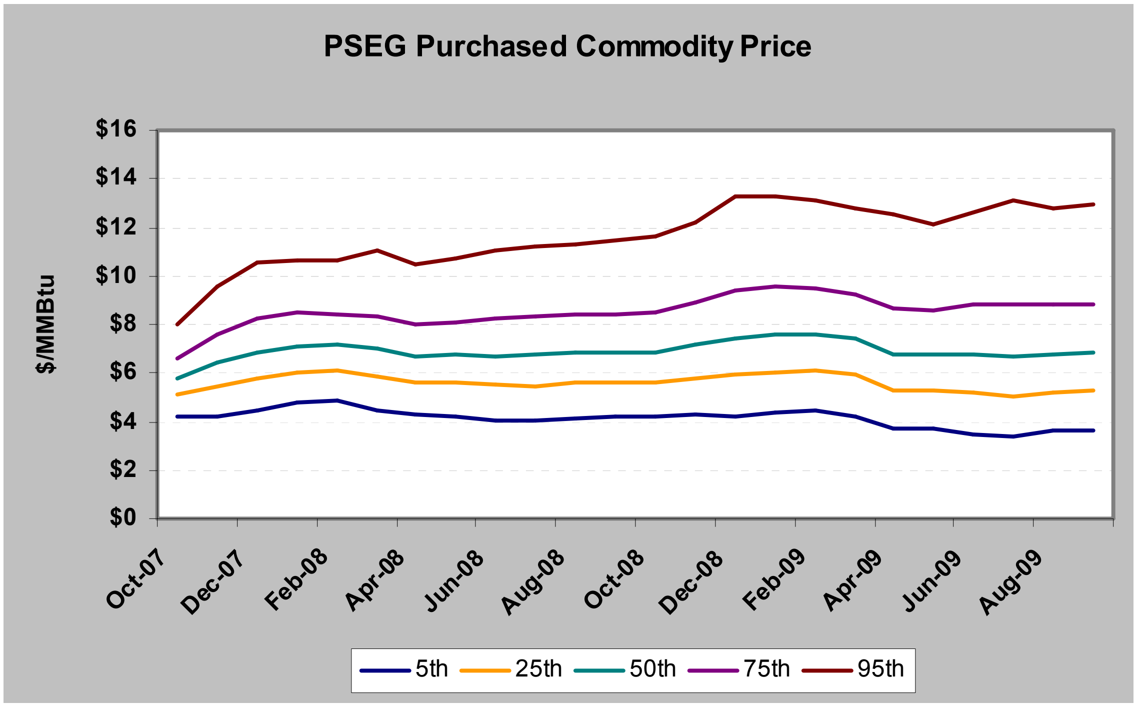


Source: Pace and Vantage

PROBABILISTIC PRICE DISTRIBUTIONS

Exhibit 53 below shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with PSE&G future monthly gas costs.

Exhibit 53: PSE&G Purchased Gas Price Distribution: Confidence Bands



Source: Pace and Vantage

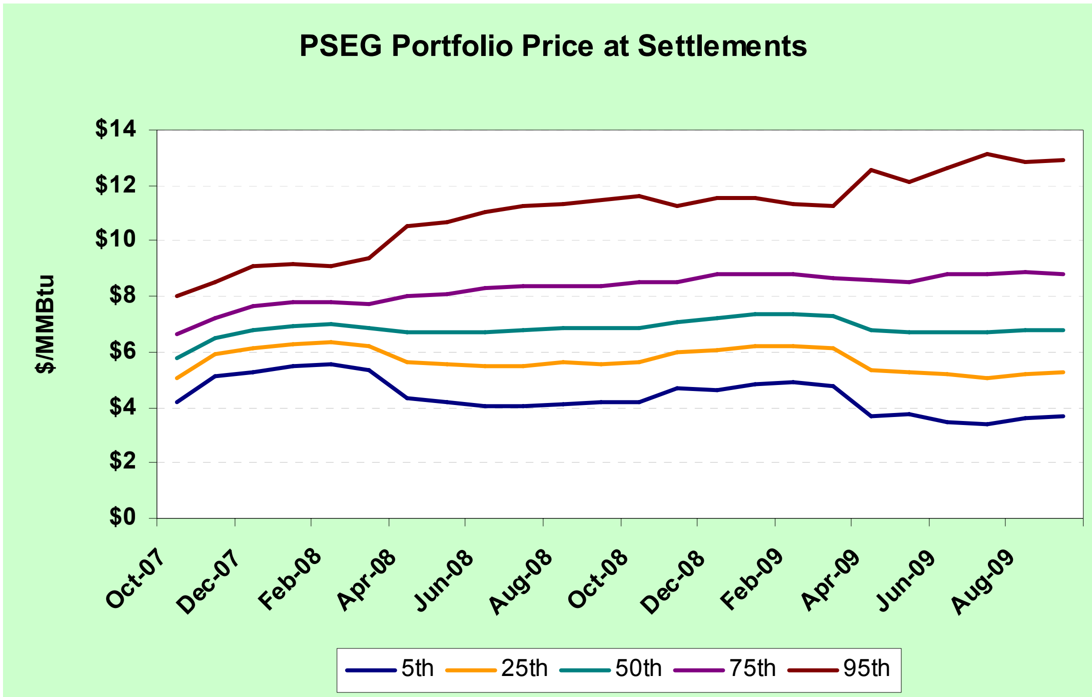
Exhibit 54 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

Exhibit 54: WACCOG Excluding Storage

	FY 2008	FY 2009
-2σ	$4.96	$4.72
Mean	$7.08	$7.75
+2σ	$9.74	$11.80

Exhibit 55 below shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with PSE&G's future Portfolio Price at settlements. Winter portfolio prices were weighted 40% to the previous summer prices (April-September 2007 actuals; October 2007 simulated; April-October 2008 simulated) and 60% to simulated monthly settlements.

Exhibit 55: PSE&G Portfolio Price at Settlements: Confidence Bands



Source: Pace and Vantage

Exhibit 56 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

Exhibit 56: WACCOG Inclusive of Storage

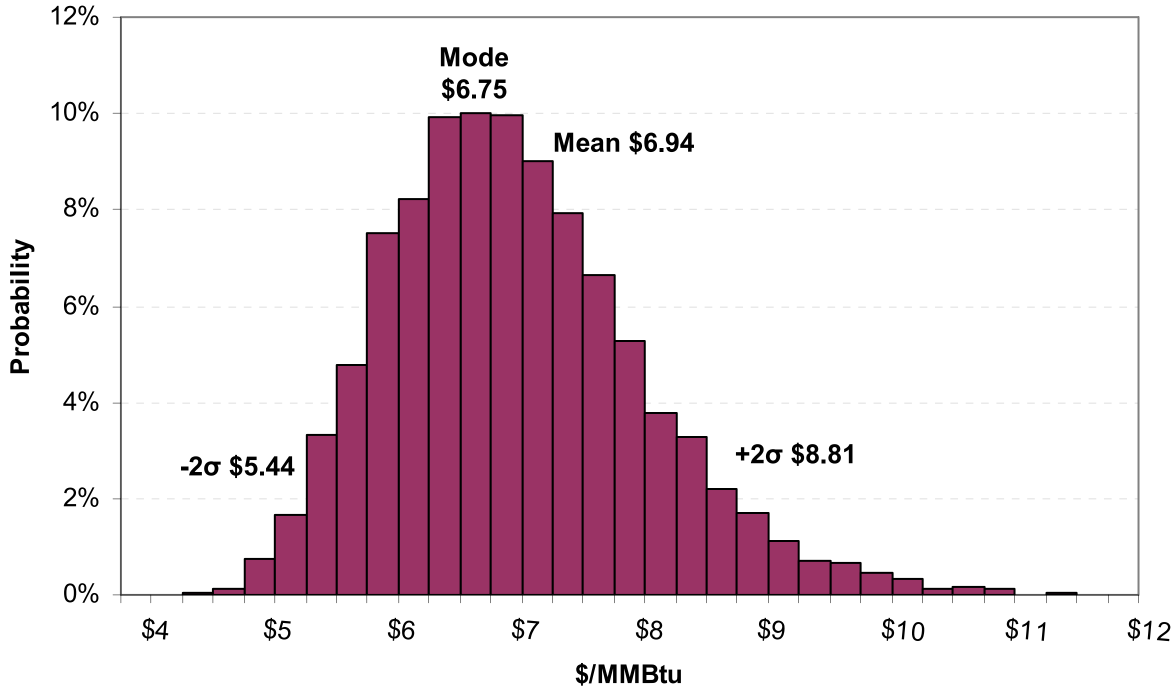
	FY 2008	FY 2009
-2σ	$5.44	$4.90
Mean	$6.94	$7.50
+2σ	$8.81	$10.94

The effect of incorporating its utilization of storage gas on PSE&G's commodity cost distribution is as follows:

- 2008: 95% High Outlier reduced from $9.74 to $8.81; ± 2σ Range reduced by $1.41/MMBtu
- 2009: 95% High Outlier reduced from $11.80 to $10.94; ± 2σ Range reduced by $1.04/MMBtu

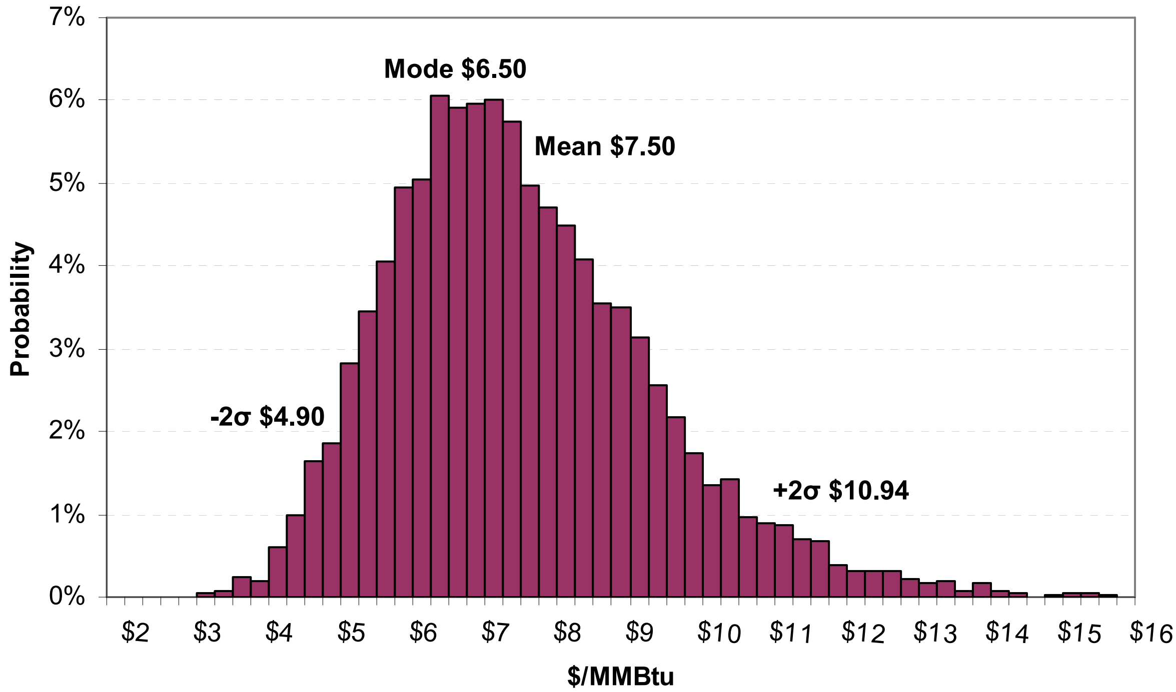
Exhibits 57 and 58 depict histograms of the entire distribution of PSE&G's Portfolio Price for fiscal years 2008 and 2009, respectively.

Exhibit 57: PSE&G 2008 Portfolio Price Probabilistic Distribution



Source: Pace and Vantage

Exhibit 58: PSE&G 2009 Portfolio Price Probabilistic Distribution



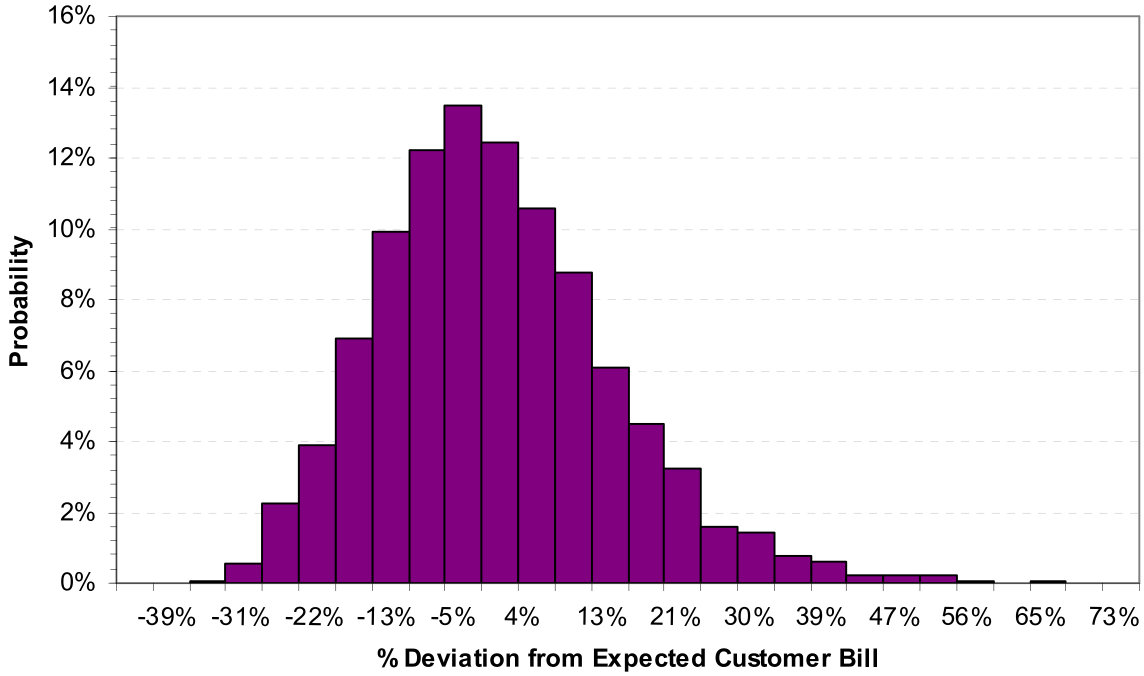
Source: Pace and Vantage

CUSTOMER BILL DISTRIBUTION

Uncertain Weather

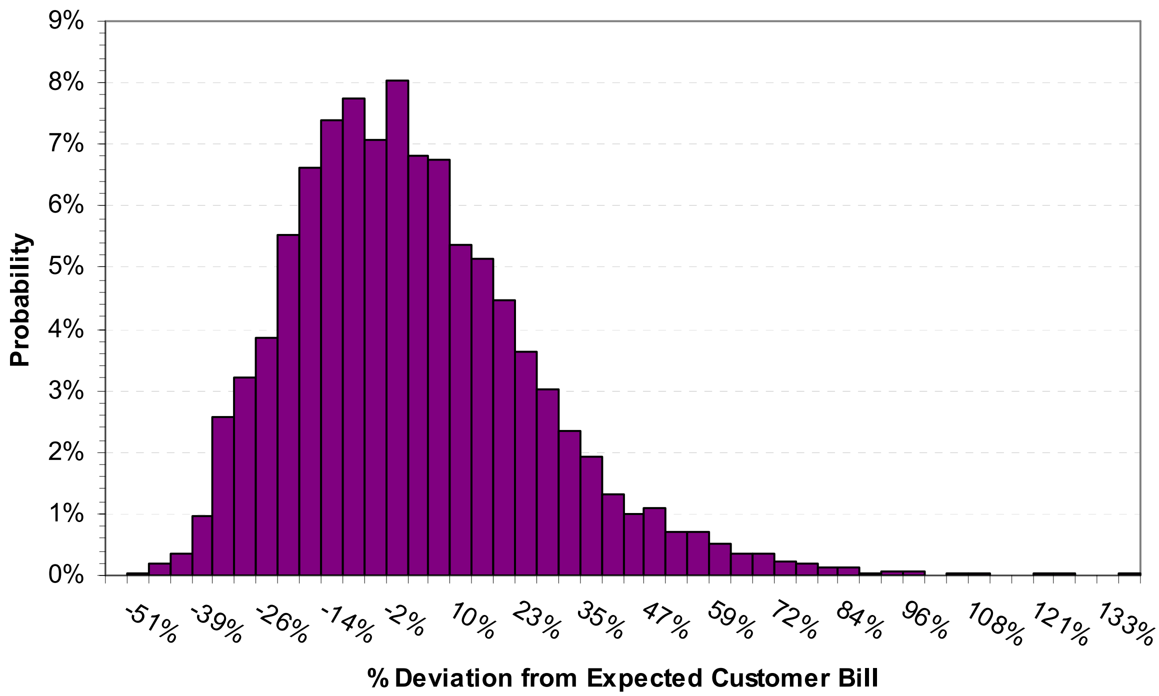
Exhibits 59 and 60, respectively, show the 2008 and 2009 distribution of outcomes expressed as the percentage difference from the expected customer bill accounting for uncertain weather conditions.

Exhibit 59: PSE&G 2008 Customer Bill Distribution



Source: Pace and Vantage

Exhibit 60: PSE&G 2009 Customer Bill Distribution



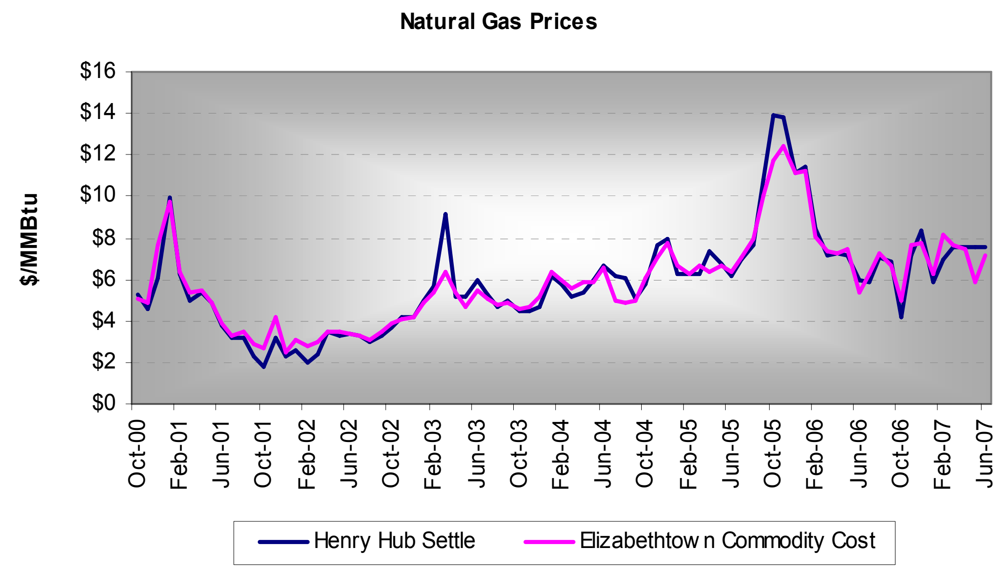
Source: Pace and Vantage

F. ELIZABETHTOWN GAS RISK PROFILE

PRICE LEVELS AND CORRELATIONS

III-F6 The results of the of Elizabethtown Gas commodity cost historical analysis indicate Henry Hub and Elizabethtown price levels correlated 97% from 2002-2006.

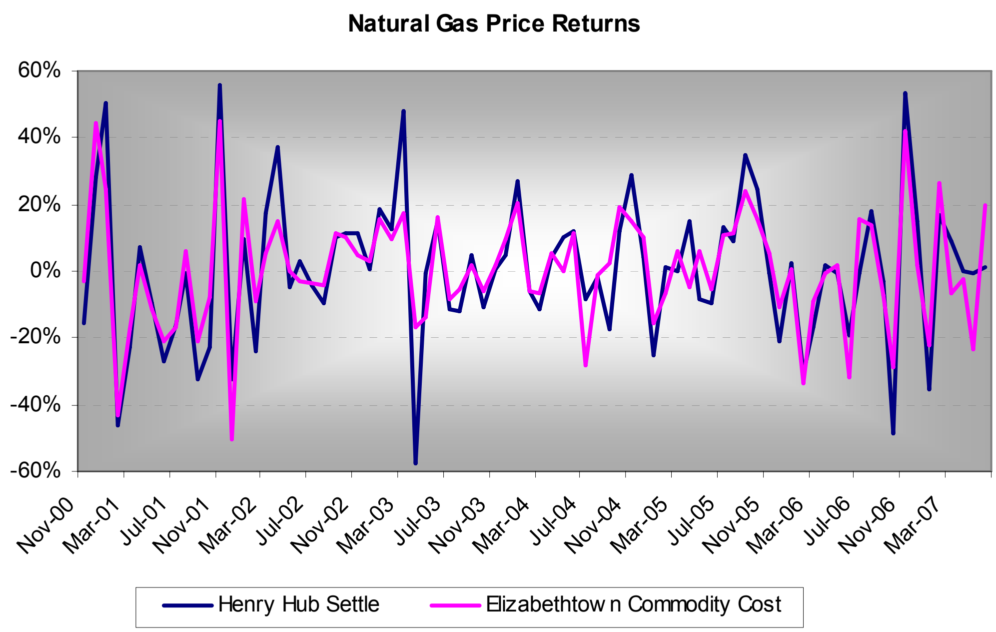
Exhibit 61: Elizabethtown Prices



Source: Pace and Vantage

III-F7 <u>Henry Hub and Elizabethtown Gas price returns correlated 84% over the same time period.</u>

Exhibit 62: Elizabethtown Price Returns



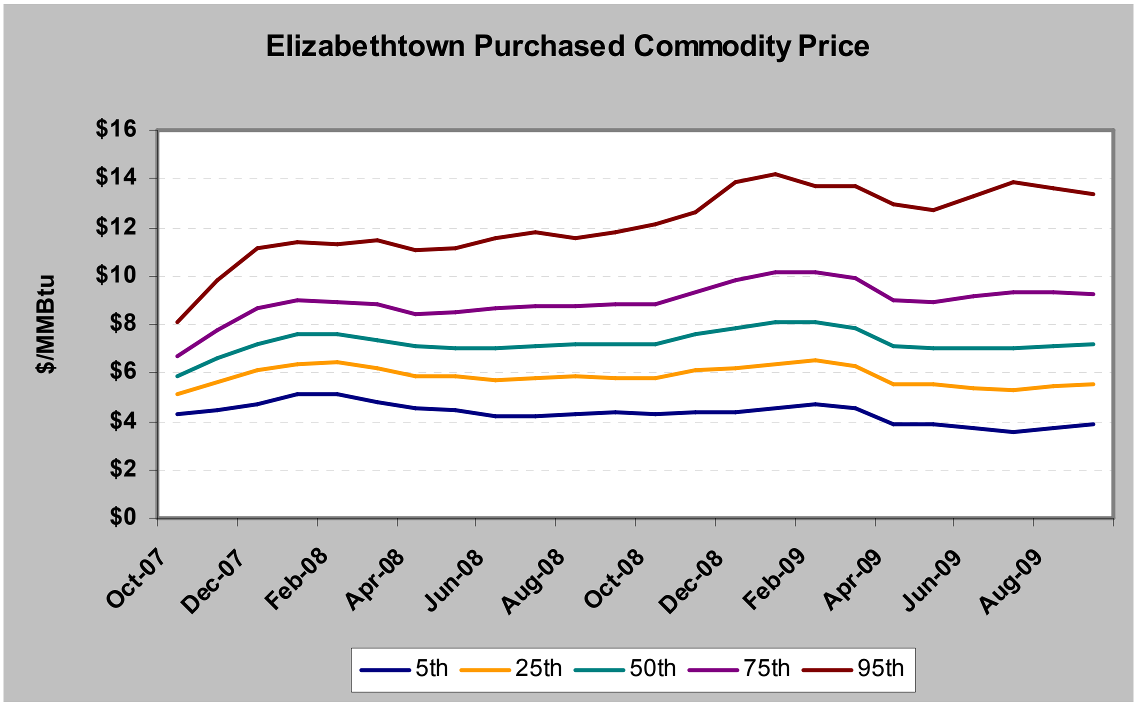
Source: Pace and Vantage

Conclusion: Henry Hub is a good proxy for use in developing forward prices and forward price distributions of Elizabethtown Gas' realized commodity cost

PROBABILISTIC PRICE DISTRIBUTIONS

Exhibit 63 shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with Elizabethtown's future monthly gas costs.

Exhibit 63: Elizabethtown Purchased Gas Price Distribution: Confidence Bands



Source: Pace and Vantage

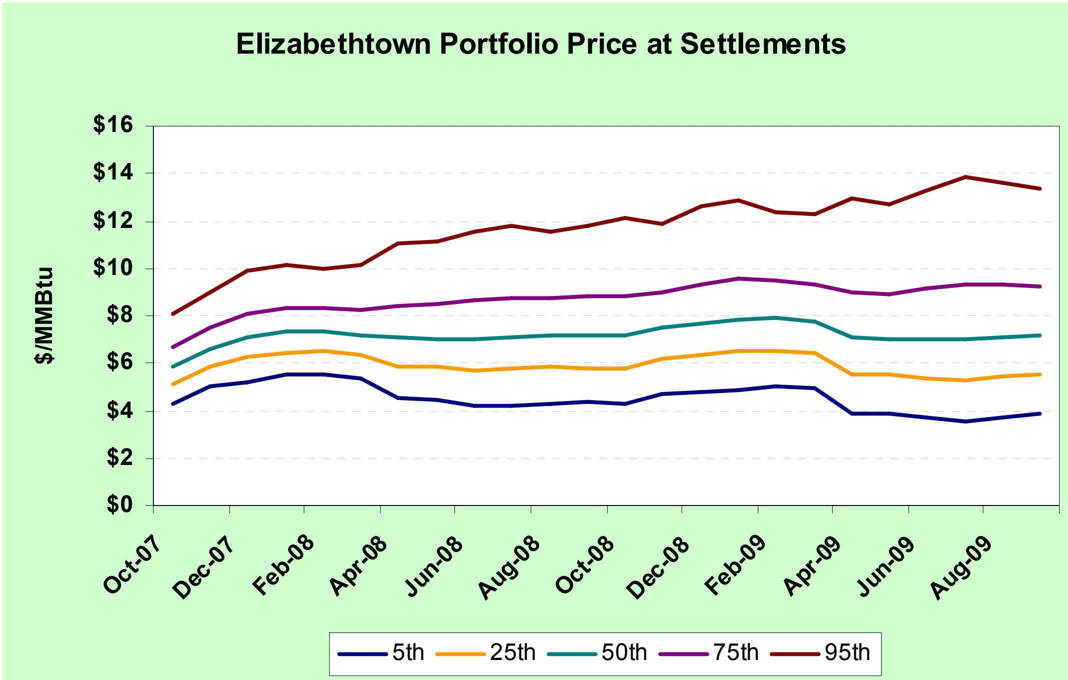
Exhibit 64 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

Exhibit 64: WACCOG Excluding Storage

	FY 2008	FY 2009
-2σ	$5.23	$4.96
Mean	$7.43	$8.14
+2σ	$10.16	$12.30

Exhibit 65 shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with Elizabethtown's future Portfolio Price at settlements. Winter portfolio prices were weighted 28% to the previous summer prices (April-September 2007 actuals; October 2007 simulated; April-October 2008 simulated) and 72% to simulated monthly settlements.

Exhibit 65: Elizabethtown Portfolio Price at Settlements: Confidence Bands



Source: Pace and Vantage

Exhibit 66 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

Exhibit 66: WACCOG Inclusive of Storage

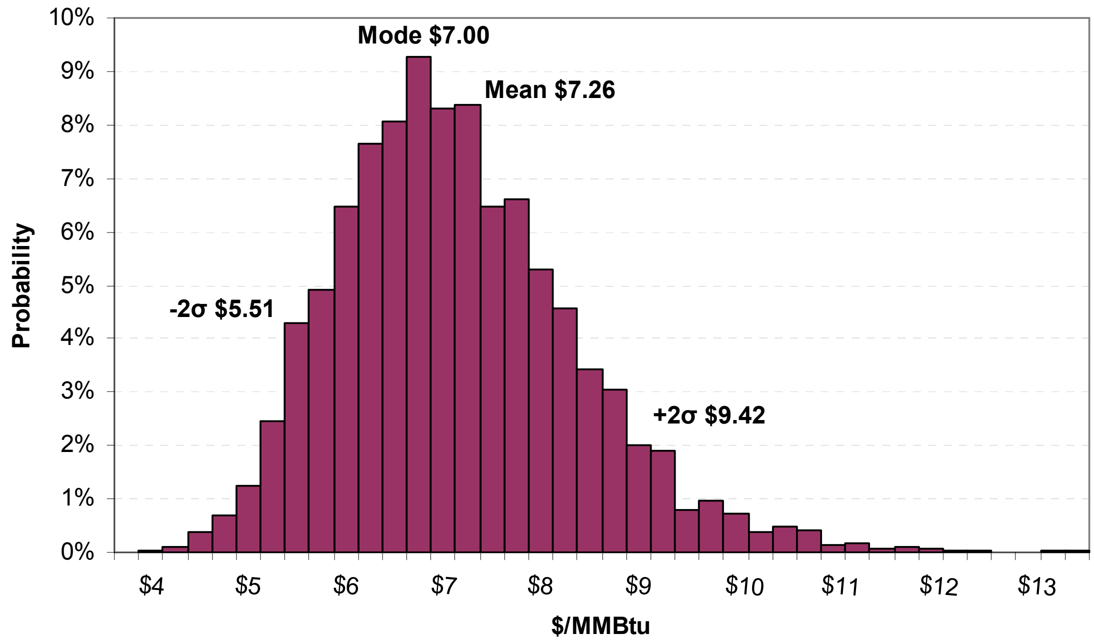
	FY 2008	FY 2009
-2σ	$5.51	$5.13
Mean	$7.26	$7.95
+2σ	$9.42	$11.62

The effect of incorporating its utilization of storage gas on Elizabethtown's commodity cost distribution is as follows:

- 2008: 95% High Outlier reduced from $10.16 to $9.42; ± 2σ Range reduced by $1.02/MMBtu
- 2009: 95% High Outlier reduced from $12.30 to $11.62; ± 2σ Range reduced by $0.85/MMBtu

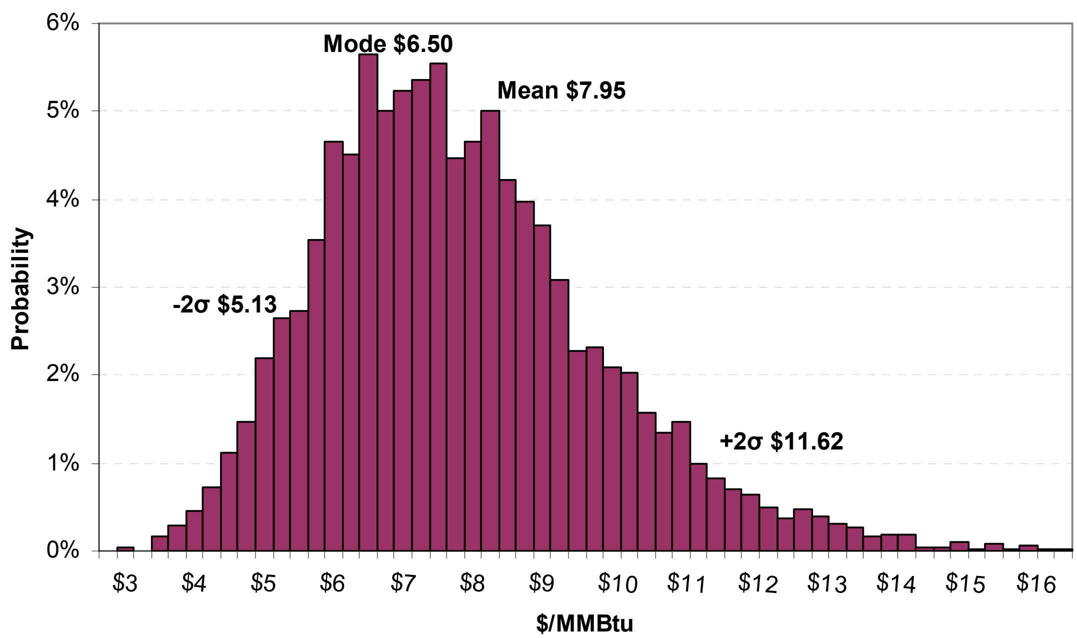
Exhibits 67 and 68 depict histograms of the entire distribution of Elizabethtown's Portfolio Price for fiscal years 2008 and 2009, respectively.

Exhibit 67: Elizabethtown 2008 Portfolio Price Probabilistic Distribution



Source: Pace and Vantage

Exhibit 68: Elizabethtown 2009 Portfolio Price Probabilistic Distribution



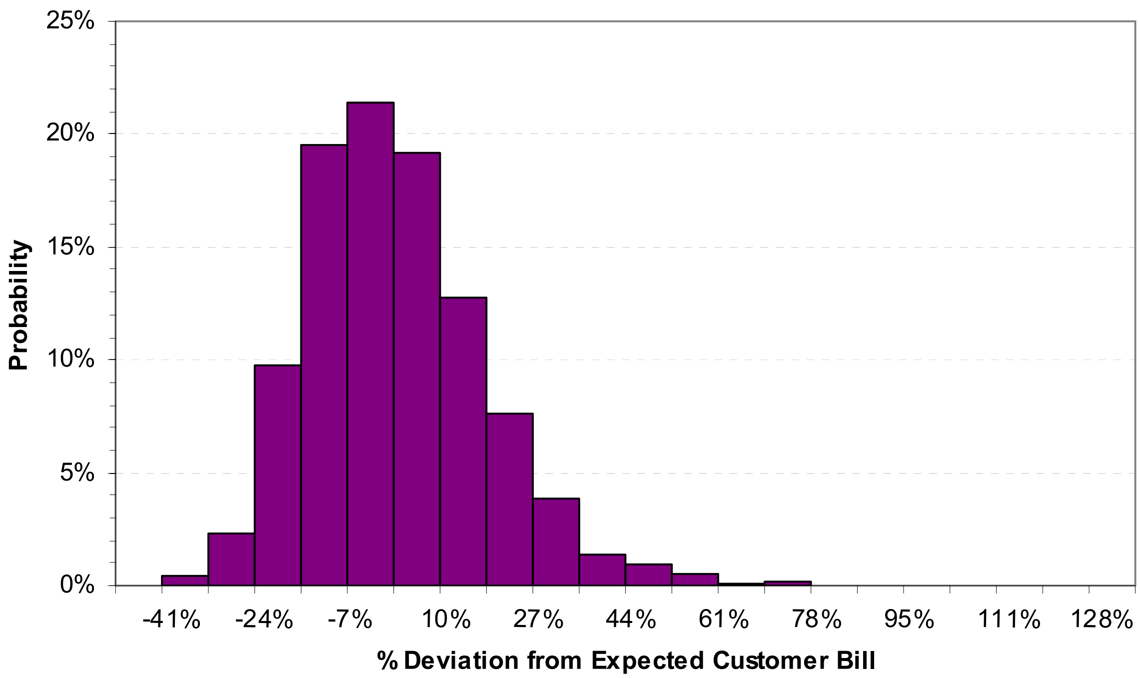
Source: Pace and Vantage

CUSTOMER BILL DISTRIBUTION

Uncertain Weather

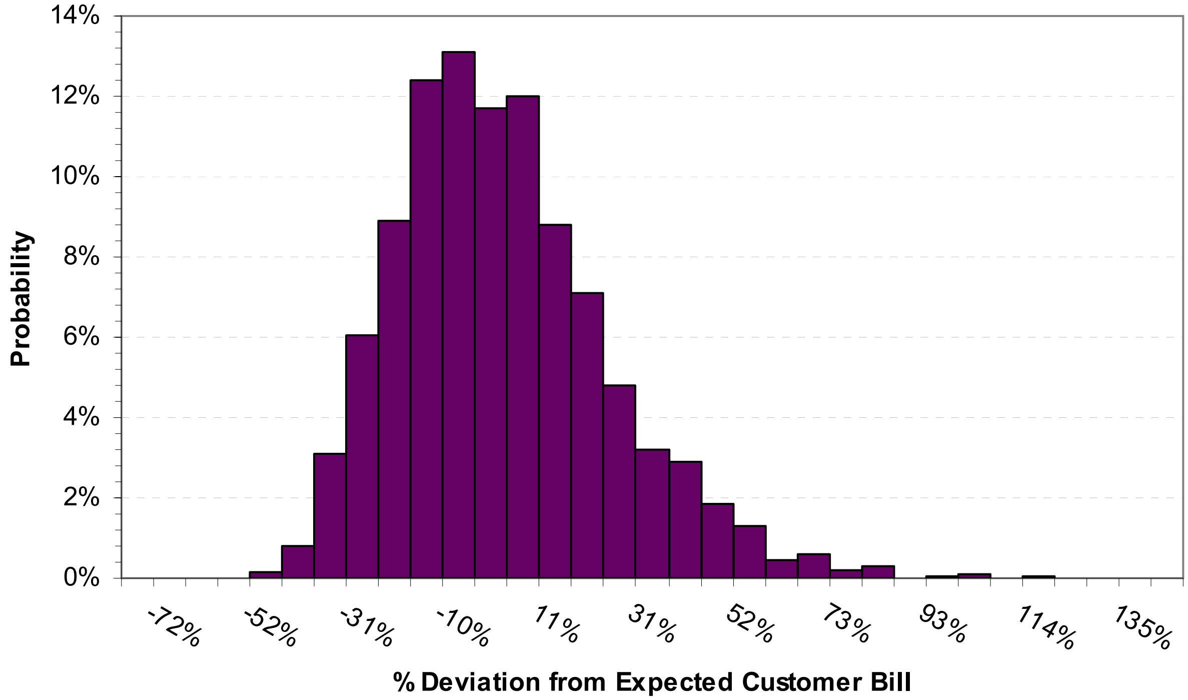
Exhibits 69 and 70, respectively, show the 2008 and 2009 distribution of outcomes expressed as the percentage difference from the expected customer bill accounting for uncertain weather conditions.

Exhibit 69: Elizabethtown 2008 Customer Bill Distribution: Normal Weather



Source: Pace and Vantage

Exhibit 70: Elizabethtown 2009 Customer Bill Distribution: Normal Weather



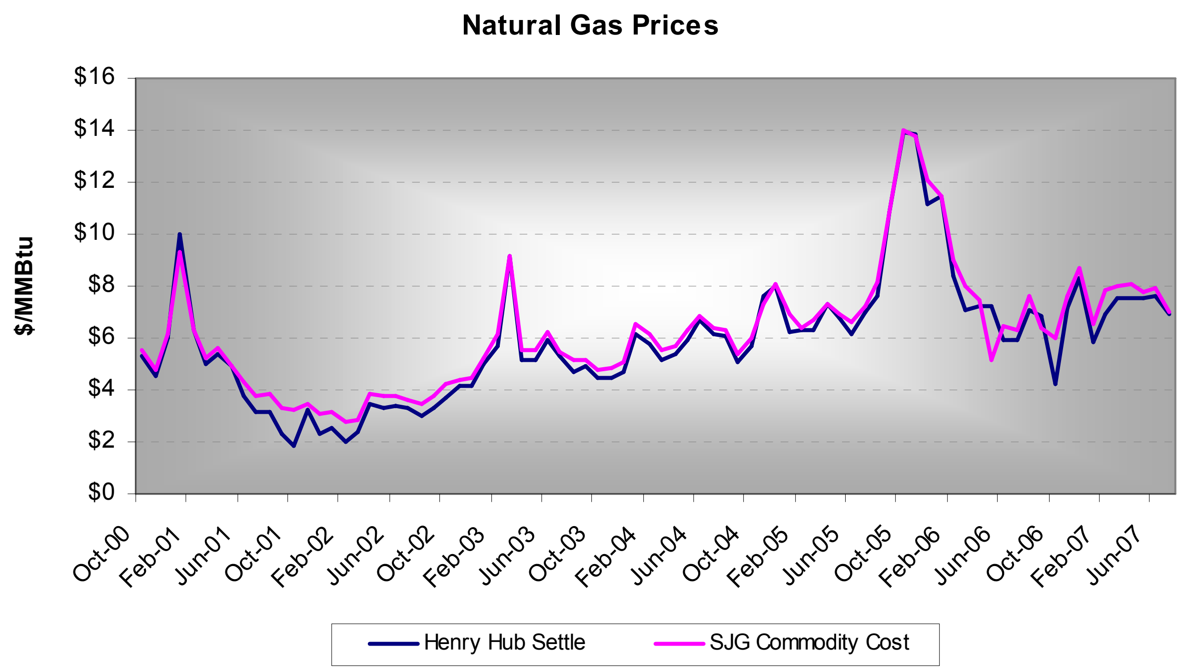
Source: Pace and Vantage

G. SOUTH JERSEY GAS RISK PROFILE

PRICE LEVELS AND CORRELATIONS

III-F8 The results of the of SJG commodity cost historical analysis indicate Henry Hub and South Jersey Gas price levels correlated 98% from 2001-2006.[29]

Exhibit 71: SJG Prices

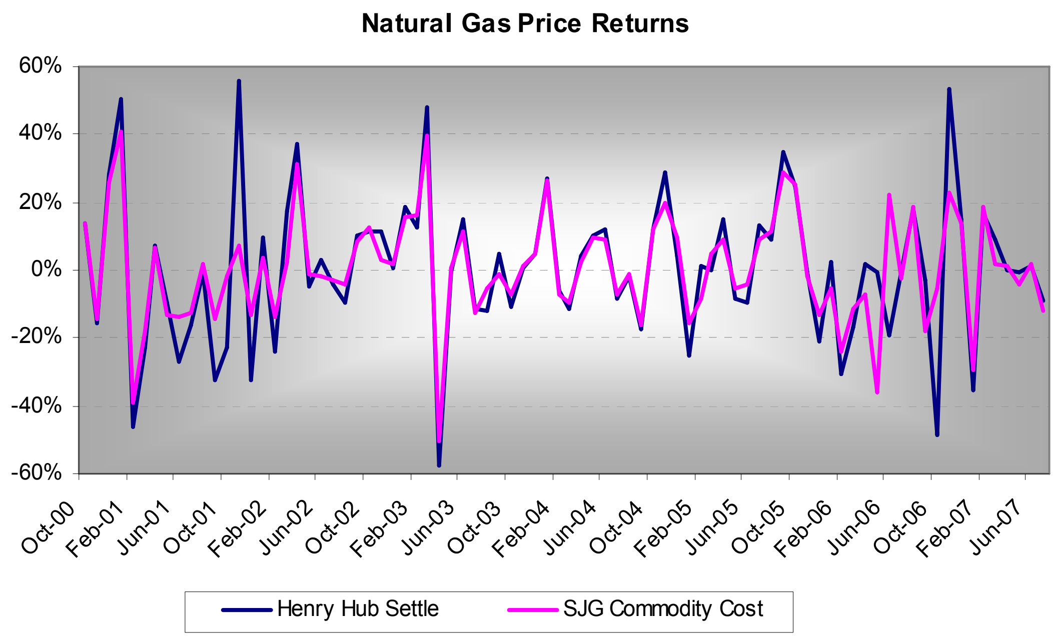


Source: Pace and Vantage

[29] / SJG in their comments raises the question that they could not verify information in the graphs below and believe some of the pricing and volumetric data could be misrepresented.

III-F9 <u>Henry Hub and South Jersey Gas price returns correlated 84% over the same time period.</u>

Exhibit 72: SJG Price Returns



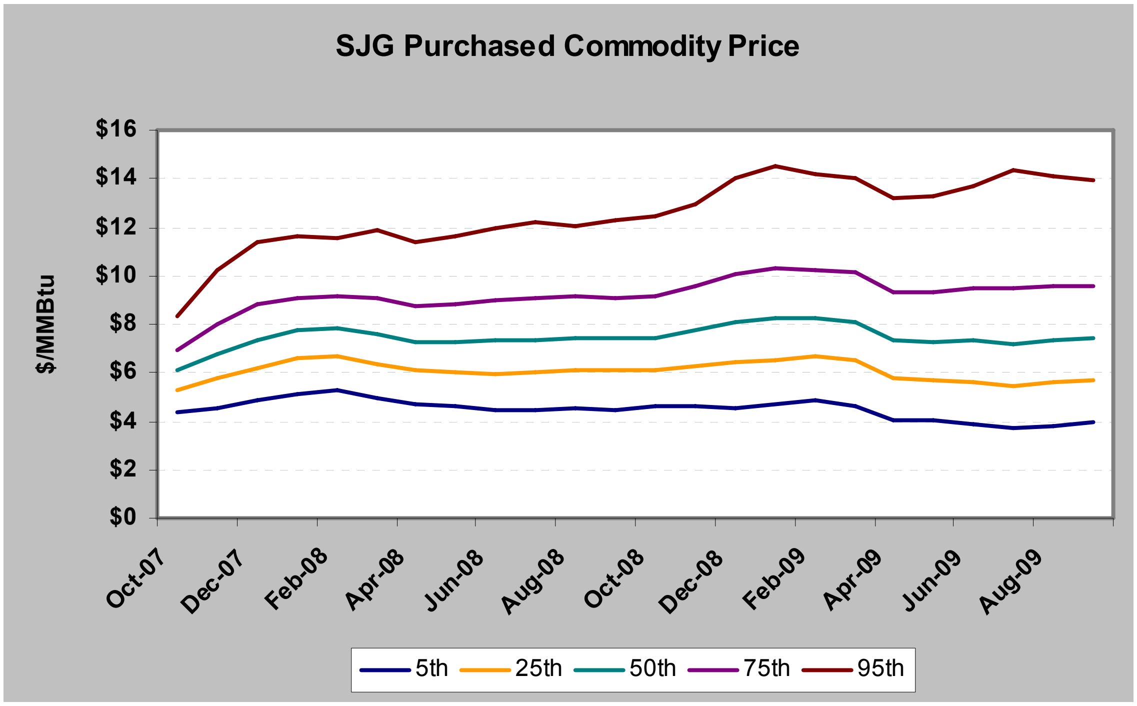
Source: Pace and Vantage

Conclusion: Henry Hub is a good proxy for use in developing forward prices and forward price distributions of New Jersey Natural's realized commodity cost.

PROBABILISTIC PRICE DISTRIBUTIONS

Exhibit 73 shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with SJG's future monthly gas costs.

Exhibit 73: SJG Purchased Gas Price Distribution: Confidence Bands



Source: Pace and Vantage

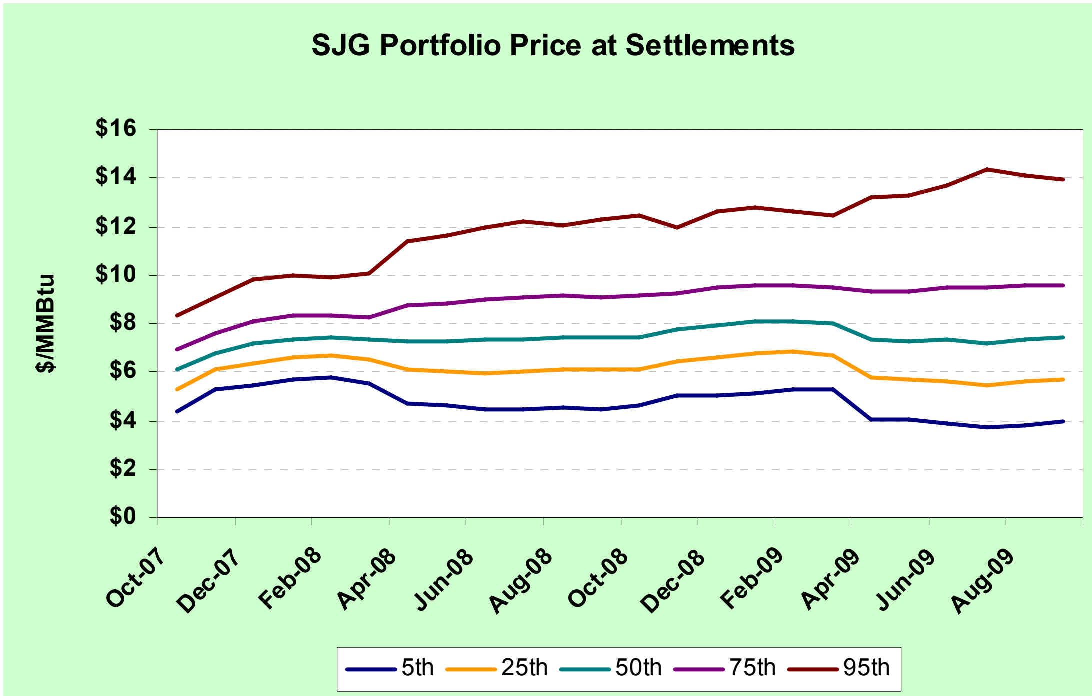
Exhibit 74 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

Exhibit 74: WACCOG Excluding Storage

	FY 2008	FY 2009
-2σ	$5.35	$5.15
Mean	$7.65	$8.38
+2σ	$10.48	$12.76

Exhibit 75 shows the 5th, 25th, 50th, 75th and 95th percentile confidence bands associated with SJG's future Portfolio Price at settlements. Winter portfolio prices were weighted 35% to the previous summer prices (April-September 2007 actuals; October 2007 simulated; April-October 2008 simulated) and 65% to simulated monthly settlements.

Exhibit 75: SJG Portfolio Price at Settlements: Confidence Bands



Source: Pace and Vantage

Exhibit 76 displays the WACCOG for fiscal years 2008 and 2009 at selected statistical confidence intervals.

Exhibit 76: WACCOG Inclusive of Storage

	FY 2008	FY 2009
-2σ	$5.68	$5.34
Mean	$7.40	$8.16
+2σ	$9.47	$11.94

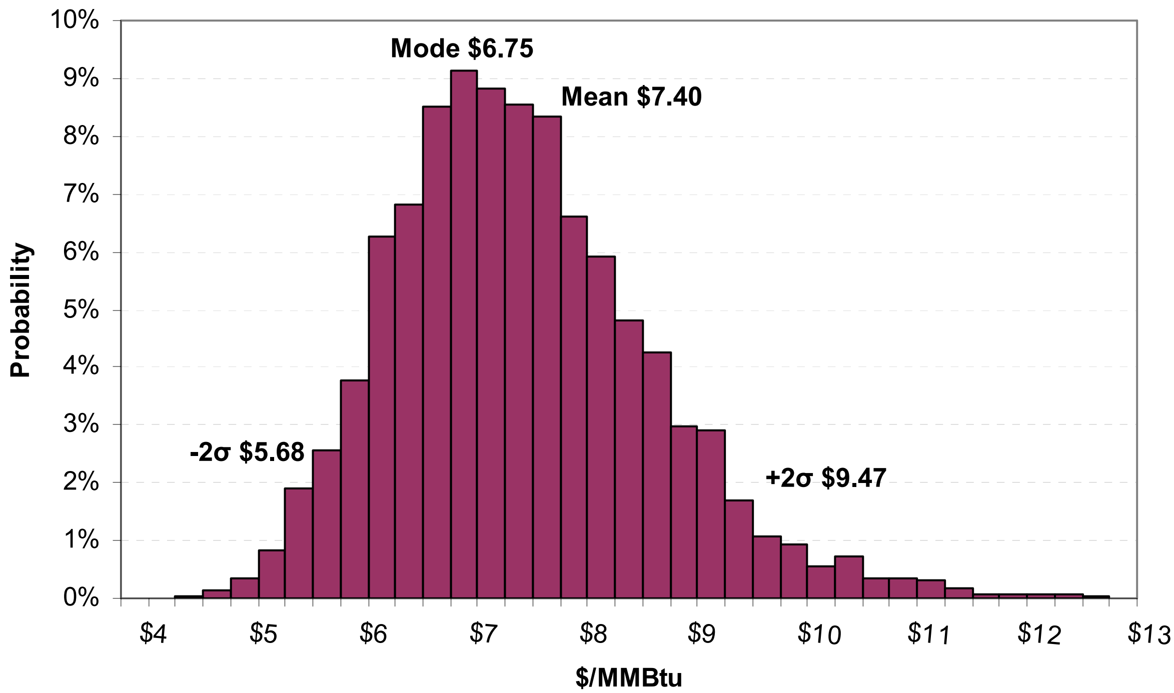
The effect of incorporating its utilization of storage gas on SJG's commodity cost distribution is as follows:

- 2008: 95% High Outlier reduced from $10.48 to $9.47; ± 2σ Range reduced by $1.34/MMBtu

- 2009: 95% High Outlier reduced from $12.76 to $11.94; ± 2σ Range reduced by $1.01/MMBtu

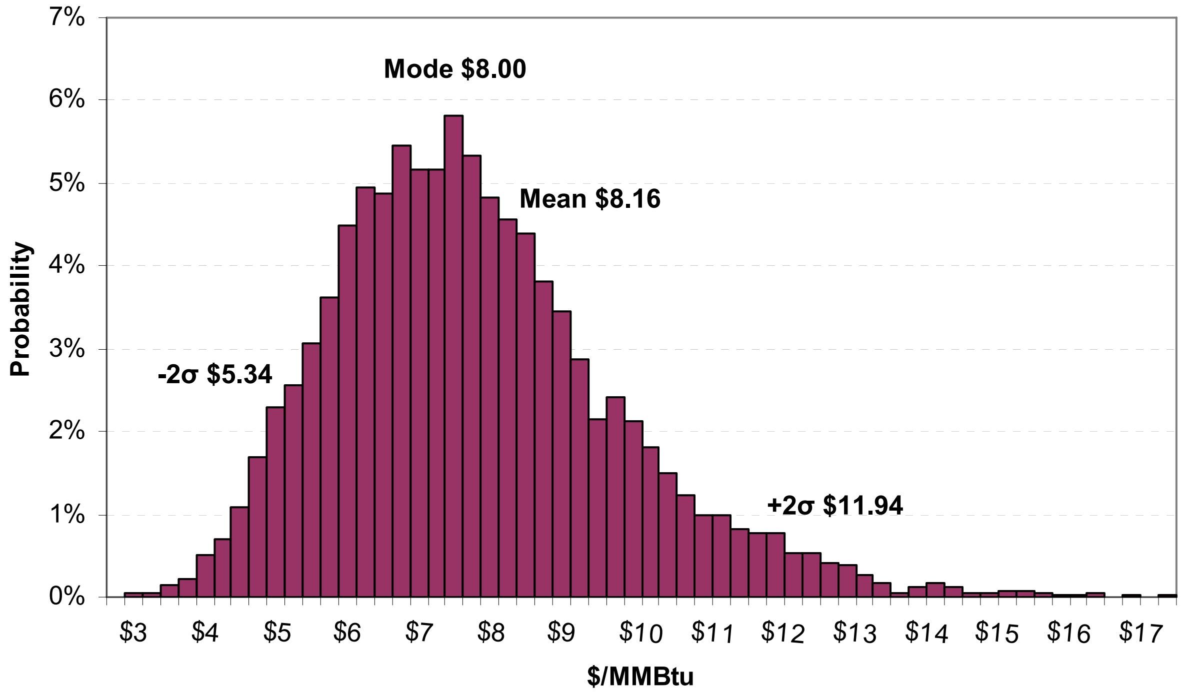
Exhibits 77 and 78 depict histograms of the entire distribution of SJG's Portfolio Price for fiscal years 2008 and 2009, respectively.

Exhibit 77: SJG 2008 Portfolio Price Probabilistic Distribution



Source: Pace and Vantage

Exhibit 78: SJG 2009 Portfolio Price Probabilistic Distribution



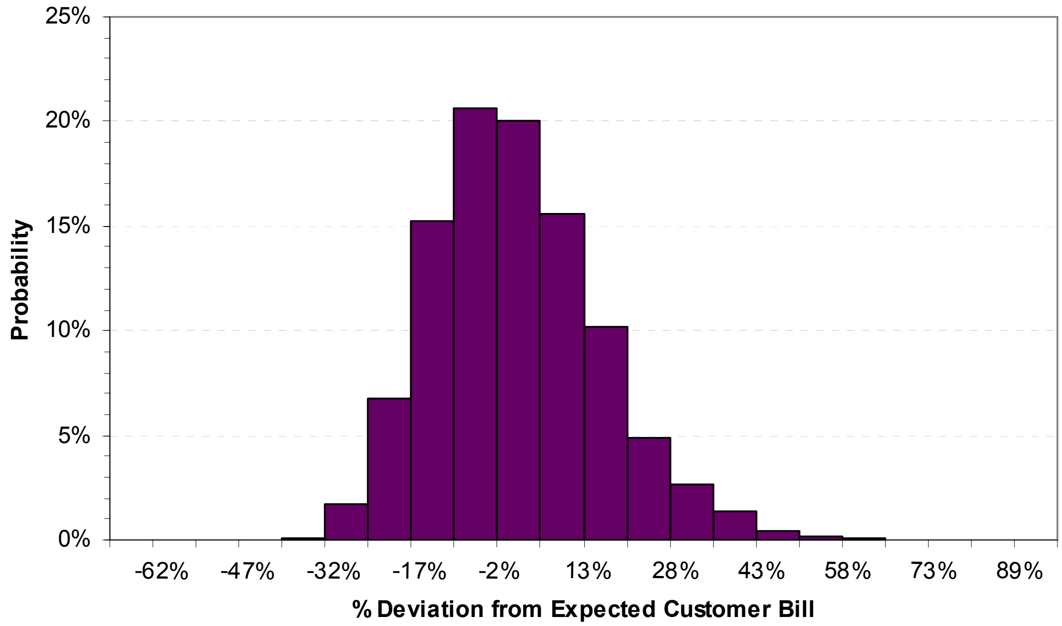
Source: Pace and Vantage

CUSTOMER BILL DISTRIBUTION

Uncertain Weather

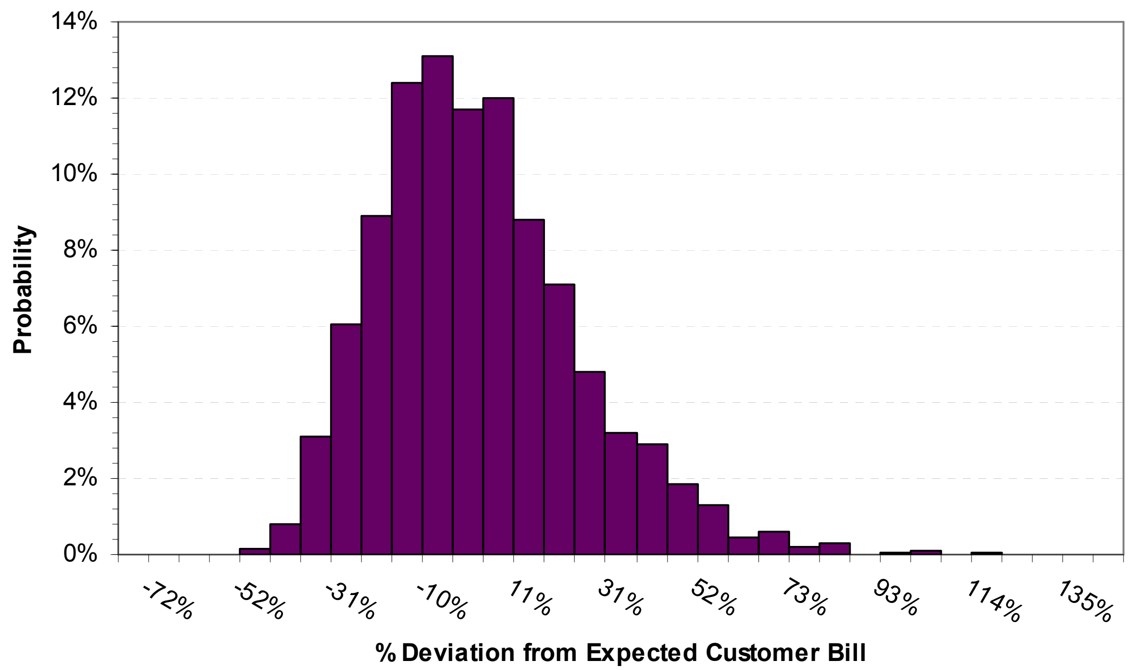
Exhibits 79 and 80, respectively, show the 2008 and 2009 distribution of outcomes expressed as the percentage difference from the expected customer bill accounting for uncertain weather conditions.

Exhibit 79: SJG 2008 Customer Bill Distribution



Source: Pace and Vantage

Exhibit 80: SJG 2009 Customer Bill Distribution



Source: Pace and Vantage

IV. RISK PROFILES OF NEW JERSEY GDCS' HEDGING ACTIVITIES

A. CHAPTER SUMMARY

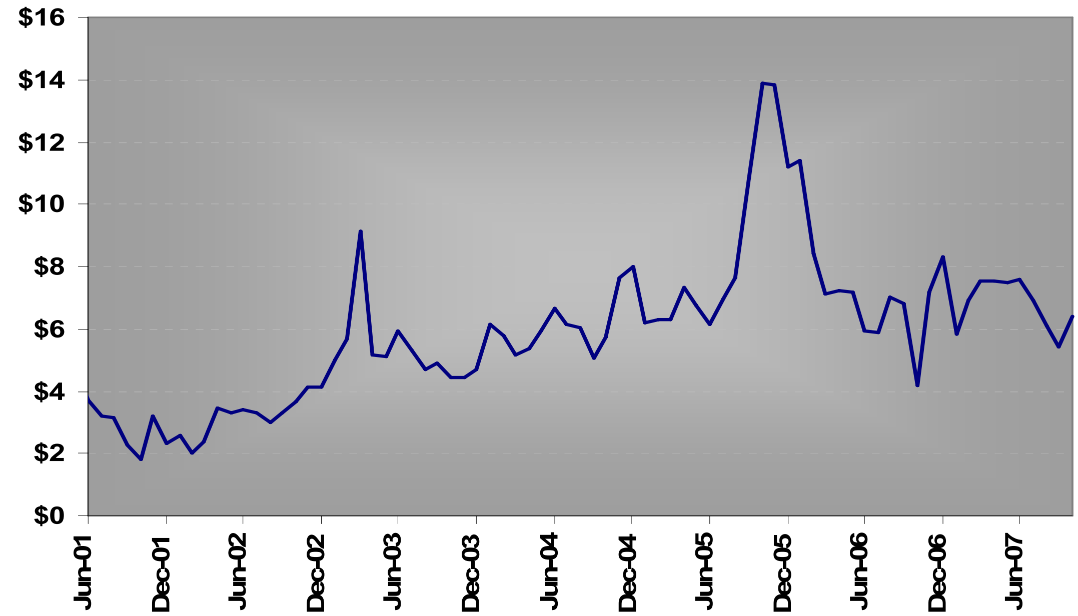
The Board seeks to understand how effectively the New Jersey gas utilities' existing hedging programs have mitigated volatile market prices over the past six years and, moreover, whether those programs can be modified to improve risk mitigation and promote greater rate stability for the utilities' BGSS customer base. Pace and Vantage analyzed in detail the hedging activities of each of the four GDCs (PSE&G, NJNG, SJG and Elizabethtown) from the period 2001 to mid-2007.[30] In addition, simulation of an enhanced hedging program was performed covering the same time period to provide empirical support to our recommendations for modifying the GDCs hedging programs. Our findings and recommendations are summarized below.

HISTORICAL PRICE ENVIRONMENT

For context, it is useful to acknowledge the pricing environment that existed over the review period. In addition to persistent volatility, the 2001 to 2007 period featured pronounced price spikes, notably in March 2003 and a greater spike subsequent to the hurricanes of 2005. As depicted in Exhibit 81 below, actual monthly market settlements were likewise highly dispersed, ranging from $1.83 per MMBtu in October 2001 to $13.91 per MMBtu in October 2005:

[30] The 2001 timeframe comports with the utilities' filing of hedging programs in June 2001 pursuant to the Board's order on March 15, 2001

Exhibit 81: NYMEX Natural Gas Settlement Prices, 2001-2007



Source: Pace, Vantage and NYMEX

Similarly, forward prices – which represent hedge opportunities at any moment in time – exhibited an average annual volatility of 35% over the period.[31] We find that this tumultuous pricing history provides an excellent basis for understanding the performance of the GDCs' hedging programs through a wide range of pricing scenarios. Importantly, and as evidenced by the GDCs' risk profiles, the natural gas market is sufficiently volatile that significant commodity-price swings are likely to continue, and the most pronounced events during the review period should be viewed as indicative of the acute sensitivity of the prevailing marketplace.

HEDGING OBJECTIVES

Before delving into the results of our analysis, we should discuss the purpose of hedging in a bit more detail. In the dramatically rising environment of recent years, any reasonably-designed hedging program would have reduced costs – and cost outcomes are the natural metric to look at when comparing programs, particularly in a rapidly rising price environment.

The purpose of hedging programs is to diminish customer pain that results from intolerable price increases, particularly price spikes. In this report we will discuss this in terms of volatility reductions and cost savings in high-price environments, but the purpose is to

[31] This volatility metric reflects the potential annual increase in wholesale market prices that would be experienced at the one standard deviation level.

reduce customer pain. One could argue that any hedging program would have a zero-sum outcome in the long term; some might argue that in the long run, hedged costs might exceed those resulting from exclusive reliance on the spot market. Those arguments miss some critical points discussed briefly below:

- First, the loss of economic utility (i.e., "customer pain") is not directly proportionate to price changes. A 5% price increase, while significant, might not be severely disruptive, but a 50% price increase could be a dramatic problem to many customers. In anecdotal terms, a 5% price change causes a budget adjustment, but a 50% increase might turn small business profits into significant losses or cause senior citizens to forgo heating their homes.
- Prices do not vary equally to the upside and the downside. Downside gas price movements are constrained; they will not (usually) fall to zero, and are unlikely to fall below some minimum cost of production for any sustained period. Upside gas prices are not similarly constrained; indeed, from late 2001 to late 2005 they increased by 400% to 500%.

The combination of these two effects argues for robust hedging. Even if the net effect of that program were neutral or even slightly higher costs during "normal" times – a proposition not supported by empirical evidence over the last ten years – the public welfare value of truncating customer pain during extreme price spikes would on balance make the program enormously beneficial. Accordingly, our recommendations are weighted toward improving the performance of the GDCs' hedging performance through acute price environments.

REDUCTION OF VOLATILITY ACHIEVED BY UTILITIES' CURRENT HEDGING PROGRAMS

Each utility's current program includes elements fundamental to sound risk management, including basic discretionary and non-discretionary hedging protocols, the use of financial hedging tools, written procedures, and active risk management committees. These basics, encouraged by the Board's policies, have allowed a degree of volatility mitigation, but as importantly they provide a foundation upon which enhancements can be made.

A stated objective common to each utility's hedging program is to reduce volatility, thereby producing a more stable cost structure and promoting "reasonable rates" for customers. As indicated in Exhibit 82 below[32], all of the firms' narrowed the range of price outcomes compared to what would have occurred had they simply floated with the market:

[32] Data for Elizabethtown Gas was available only back to 2004; therefore, the table reflects the period for which common data was available for all four firms. Our analysis of the 2001-2004 period shows comparable reductions in volatility over that period for PSE&G, NJNG, and SJG.

Exhibit 82: GDCs' Realized Prices Relative to Market, 2004-2007

	REALIZED PRICES/MMBTU		
FIRM	LOW	HIGH	RANGE
PSEG	$4.79	$10.02	$5.23
NJNG	$3.56	$11.49	$7.93
Etown	$4.76	$12.64	$7.88
SJG	$5.19	$12.99	$7.80
Market (NYMEX)	$5.08	$13.91	$8.83

Source: Pace, Vantage and NYMEX

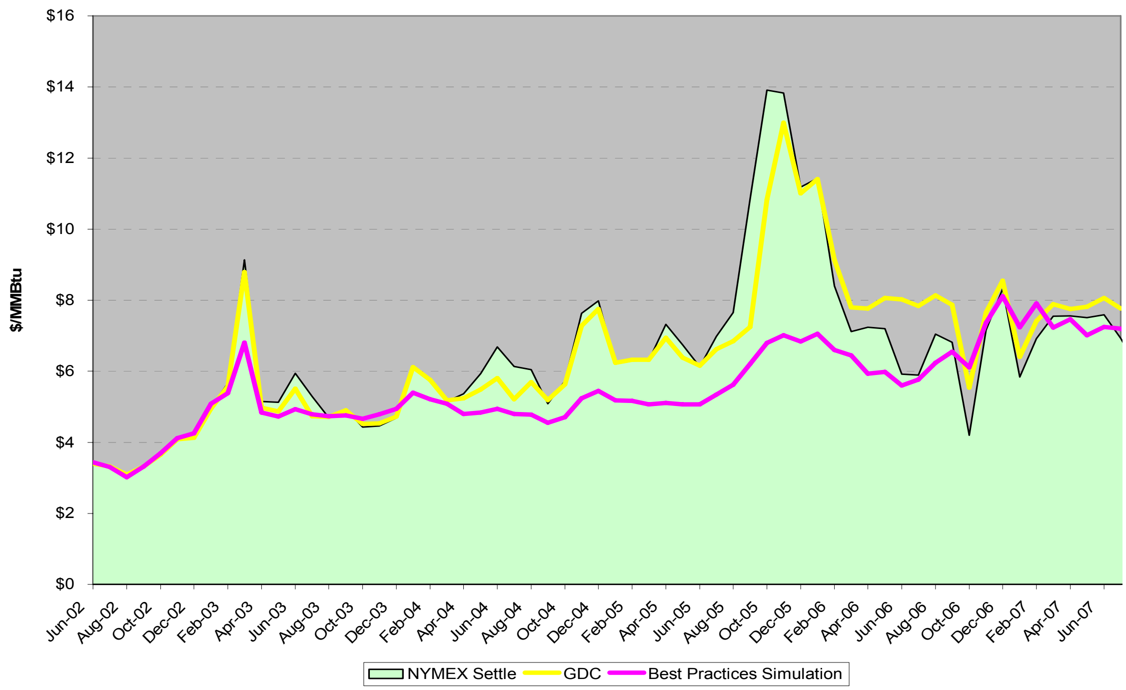
In addition, each firm's program reduced the volatility of prices reflected in their BGSS rates. Accordingly, each of the four utilities achieved the stated goal of reducing volatility and stabilizing costs relative to the market.

PROGRAM PERFORMANCE RELATIVE TO ENHANCED PROGRAM

As a basis of reference, an enhanced hedging program was simulated over the same six-year time period as our analysis of the GDC programs. The simulation modeled a set of programmatic, defensive, discretionary, and contingent hedging decision protocols over the 2001–2007 period as applied individually to each GDC's monthly volume requirements. The simulation is instructive as to the magnitude by which the utilities' current programs can be improved, and provides a basis for recommending specific enhancements. The results of the simulation relative to the utilities' actual results are depicted in Exhibit 83 below. Note that the simulation truncates more of the extreme price spikes than did the representative GDC program while avoiding prolonged or acute out-of-market outcomes:[33]

[33] / PSE&G comments "The Draft Report provides no detail or explanation of what Vantage/Pace modeled in this simulation. As such, the Company is unable to evaluate the claimed results, or make any determination whether the consultants' conclusions have any validity."

Exhibit 83: Enhanced Program vs. Representative GDC Program and Market Settlements



Source: Pace and Vantage

IV-F1 <u>One of our central findings is that the GDCs' current programs do not monitor and then respond to steeply rising prices; rather they deploy the same, by-rote, strategy in extreme markets as in stable and falling markets.</u>

Therefore, they could be refined to produce more optimal cost mitigation during price spikes. For example, during the pronounced spike subsequent to hurricane Katrina in 2005, the GDCs programs produced an aggregate mark-to-market (savings) of $305 million. While this represents a commendable mitigation of costs, the enhanced program simulation produced a substantial savings over-and-above the GDCs' programs for the same period. The difference is primarily attributable to the defensive hedging protocols included in the enhanced approach, an element absent from the utilities' programs. That issue will be addressed later in this section. [34]

Relative to the enhanced program, we conclude that the GDCs can refine their hedging programs to produce even more robust containment of the wholesale price risk to which their BGSS rates are exposed (particularly during price spikes).

[34] / NJNG states that this is incorrect. NJNG is constantly monitoring the market, whether rising or declining, and determines the best approaches at that time.

RECOMMENDED ENHANCEMENTS TO GDCS PROGRAM DESIGN

While the GDCs have in place certain key elements to sound risk management, better alignment and enhancement of those elements is needed to promote more robust risk and cost mitigation.

A well-structured set of hedging decision protocols, as evidenced by the results of the enhanced program simulation, can provide the NJ utilities and the Board with a high level of assurance that natural gas costs – and BGSS rates – will be contained within reasonable tolerances, while also substantially increasing the probability of superior cost performance during extreme price environments.

We have identified the following specific recommendations for enhancing the design of the GDCs' hedging programs.

IV-R1 The GDCs should define program objectives that are clearer in terms of potential cost and out-of-market outcomes that are tolerable.

Not only is this fundamental to the utilities' deployment of hedges, explicit risk tolerance objectives should be a key basis upon which the programs' effectiveness is evaluated. The utilities' current practice of imposing targeted hedge volumes or hedge ratios does not promote a dynamic response to varied market conditions, (i.e. affords the same protection in rising above markets as in stable or falling ones).

IV-R2 The GDCs' programs should be structured to ensure a prudent level of hedges is accumulated further in advance of delivery than is current practice.

None of the utilities regularly hedges beyond an 18-month horizon, whereas the enhanced program simulations bear out the benefit of a 24 to 36 month forward hedge horizon. (Given recent heightened volatility, we are now seeing a move to hedge out to a 48-month horizon). Extending the hedge horizon will serve to pre-empt hedging precipitously during the highly volatile conditions that arise as the time-to-delivery draws near. In addition, hedging over a longer time horizon will promote improved rate stability over multiple BGSS rate cycles.

IV-R3 The GDCs should deploy defensive hedging protocols based on Value at Risk[35] (VaR) metrics such that hedge positions are taken when volatility threatens tolerance thresholds, but *before* intolerable price levels are realized.

The lack of a protocol that mandates hedging in rising market conditions leads to greater unhedged positions during acute spikes. This recommendation is critical to achieving greater insulation of customer bills from extreme prices.

[35]/ Value at Risk (VaR) represents the potential near-term unfavorable migration in hedge opportunities for some future period's gas value at a specified confidence level.

IV-R4 The GDCs should actively invoke objective, quantitative indicators to support discretionary hedging activity.

As a rule, GDC discretionary hedging activities are not governed by defined protocols, leading to either insufficient hedging in advance of high market settlements, or occasional over-hedging in advance of declining markets.[36]

IV-R5 The GDC's should also use Value-at-Risk metrics to monitor the potential magnitude of unfavorable hedge outcomes.

These "downside" VaR metrics should be combined with defined, contingent strategies that rely on options to mitigate out-of-market outcomes when the metric indicates the potential to exceed defined tolerances. As part of managing out-of-market risk, the utilities should specify an annual options budget to (potentially) be deployed based on measured market volatility.[37]

A well-structured set of hedging decision protocols, as evidenced by the results of the enhanced program simulation, can provide the NJ utilities and the Board with a high level of assurance that natural gas costs – and BGSS rates – will be contained within reasonable tolerance, while also substantially increasing the probability of superior cost performance, particularly during extreme price environments.

In order to determine what set of hedging decision protocols is best suited to each GDCs load profile and risk tolerances, simulations of varying combinations of programmatic, defensive, discretionary, and contingent protocols is recommended. As part of the scope of this engagement, Pace and Vantage will work with each GDC and the Board to perform and evaluate such simulations.

COMPLEMENTARY REGULATORY FRAMEWORK

Modifications to the design of the GDCs' hedging programs need to be accompanied by a complementary regulatory framework.[38] Indeed, from a policy standpoint, reducing the impact of severe price impacts should be a goal for which there is alignment of interests among the utilities, their BGSS customers, and the Board. This is particularly important for the reasons discussed in Paragraph 2, "Hedging Objectives".

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[36] For example, Elizabethtown Gas has a sound and relatively sophisticated discretionary buying matrix within its procedures, but does not actively engage in discretionary hedging. As such, ETown's program is relegated to non-discretionary-only hedging.

[37] In this case VaR will reflect the potential downside movement of market prices against hedge positions that have already been executed.

[38] The formulation of such a framework is a key component of this overall assignment and is underway. Its final form will be forthcoming in the Final Report.

The storage incentive programs in effect for SJG and NJNG have prompted comparatively more robust deployment of risk management tools and skills. This response is instructive in terms of the effectiveness of appropriately-designed incentive mechanisms.

We would expect that an incentive mechanism, tied to a requirement that utilities file explicit tolerances and risk mitigation plans and then comply with those plans, would yield material economic utility to the state's BGSS customers.

B. SJG CURRENT HEDGING PROGRAM

INTRODUCTION

The Board retained Pace and Vantage to evaluate South Jersey Gas' (SJG) natural gas hedging activity covering the period 2001 to present, and to provide recommendations as to how SJG might improve the structure of its program. This report encapsulates our findings and recommendations on these questions, and is organized into two sections.

The first section comprises our review of SJG's hedging activities over the period, including a recap of the plan's stated objectives and design elements, as well as an analysis of the plan's performance. As part of that analysis, the report focuses in on the design elements of SJG's program that we identified as most critical to the outcomes it produced.

The second section contains our recommendations to enhance SJG's hedging program. In doing so, the recommendations section first provides, as a basis of reference, a simulation of a enhanced program hedging program over the same time period of our review of SJG's program. The results of the simulation provide empirical support to our recommendations for modifying SJG's hedging program.

SJG'S HEDGING PROGRAM OBJECTIVES AND DESIGN

As a first step of our analysis, we reviewed a number of documents and data sources relevant to SJG's hedging activities since 2001, including SJG's hedge transaction registers, BGSS filings, quarterly hedge reports, financial and physical natural gas transactions Risk Management Policy and Procedures, and Commodity Purchasing Guidelines; in addition, information was gleaned through interviews with several SJG front- and middle-office personnel, as well as management.

According to the Commodity Purchasing Guidelines, the stated objectives of SJG's hedging program are as follows:

- Management of price risk through diversity of purchase and use of financial hedging instruments, in order to add stability to customer gas costs.
- To supplement the management of price risk which is obtained through the "natural" hedge arising from the use of storage

With the aim of achieving the above program goals, SJG's hedge plan has two general categories of hedging decision rules (hereinafter termed "protocols"). The first category is termed "Non-Discretionary", which is intended to ensure a minimum hedge ratio through programmatic hedging transactions regardless of market price. The second category of hedging protocols, referred to as "Discretionary" protocols, is intended to capture favorable pricing opportunities in the market, as oftentimes advised by an outside consultant's market-timing tool.

SJG'S PROGRAM PERFORMANCE

In analyzing the performance of SJG's hedging program, we initially determined the weighted-average cost of SJG's natural gas portfolio for each month in the review period under its hedge program relative to what SJG would have incurred had it simply floated with the market. This measure provides a broad indicator of the program's overall cost efficiency, and is instructive in identifying how the program responds under different market conditions.

Overall, SJG's hedged portfolio produced an aggregate weighted-average cost of gas for the period of $6.27 per MMBtu, or approximately equal to the aggregate market settlements of $6.23 per MMBtu.[39] However, during the January 2002 to January 2006 period, during which market settlements featured substantial year-over-year increases and a pronounced spike, SJG's hedging program yielded a $19.6 million positive mark-to-market (savings).

In addition to providing BGSS customers some insulation during that period of steeply rising prices, SJG's hedged portfolio was also more stable than the market settlements (i.e., achieved a narrower range of prices). As shown in Exhibit 84 below, the month-to-month volatility of SJG's hedged portfolio since 2001 was 38%, compared to 45% for the market.

Exhibit 84: SJG Hedged Portfolio Reduction in Volatility vs. Market Settlements

	REALIZED PRICES/MMBTU		
	LOW	HIGH	VOLATILITY
SJG	$1.91	$12.99	38%
Market (NYMEX)	$1.83	$13.91	45%

Source: Pace and Vantage

Accordingly, SJG's hedging program met its stated objective to manage volatility on behalf of customers.

While these results are evidence of some success with SJG's hedging program, the program can be improved to produce substantially greater volatility reduction and mitigation of price spikes. This will be supported empirically later in the "Simulation of Enhanced Program" section. In this respect, two important observations are gleaned from the hedged portfolio's performance relative to market settlements during the 2001-2007 time frame.

The first is that the program produced a comparatively low hedge ratio (i.e., low insulation against market volatility) during periods in which prices rose sharply, including the period

[39] The cost-per-MMBtu values are weighted by SJG's actual monthly volumetric requirements.

in which prices reached historic highs. Ideally, the hedge ratio should increase *in response to* increasing volatility, *but before* the onset of intolerably high prices. Specifically, from September 2005 to January 2006, when market settlements were sustained above $10.00 per MMBtu, SJG's hedge ratio was below 20% in three of those five months, with an overall hedge ratio of 28% for that five-month period.[40] This outcome runs counter to the true (but unarticulated) goal of the program: to insulate SJG and its customers from intolerable price spikes.

Secondly, SJG's Discretionary protocol was deployed erratically during the period. In particular, very little in terms of discretionary hedges were accumulated in advance of the acute five-month price period described above (which would have greatly augmented savings), whereas high levels of discretionary hedges were accumulated during that period for delivery in 2006, nearly all of which were substantially out-of-the-money.

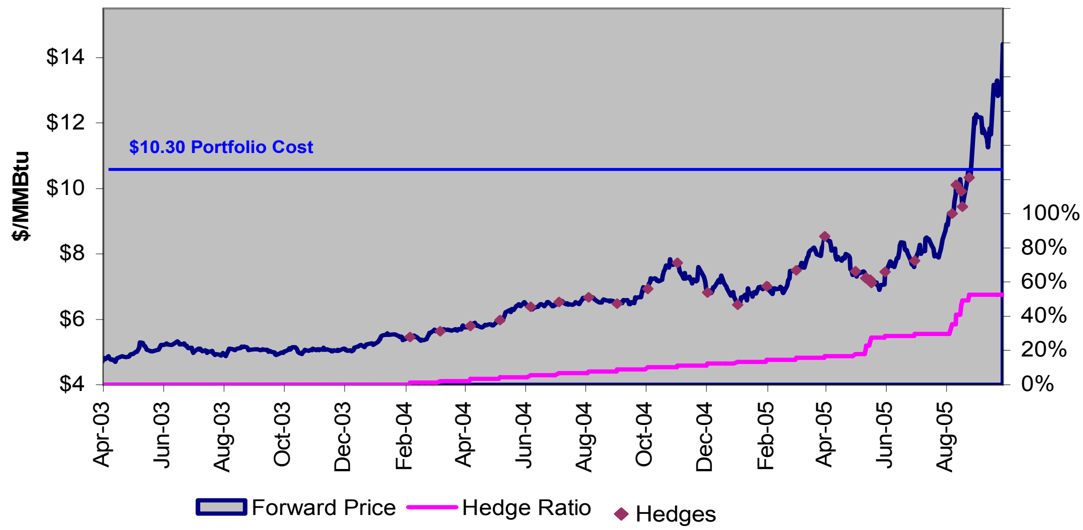
In highlighting these periods, our purpose is not to accentuate the less desirable outcomes produced by the program but rather to provide a context for analyzing and improving the program's design elements as relating to these results. The sections that follow present our analysis of how SJG's hedging protocols produced these results.

PROGRAM PERFORMANCE – OCTOBER 2005

October 2005 was the highest monthly market settlement of the review period, and is therefore instructive about understanding the effectiveness of SJG's program in mitigating the impact of severe price spikes. For October 2005, SJG's program yielded a 53% hedge ratio and a $10.84/MMBtu weighted-average cost of gas. As compared to the market settlement of $13.91/MMBtu, the portfolio's fixed positions produced a $5.5 million favorable mark-to-market (savings). At the same time, however, October 2005 was also one of the highest monthly portfolio prices SJG experienced during the program's history because of the 47% unhedged position.

[40] / SJG comments that it had an average of 60% of monthly sendout hedged for the months referenced when physically hedged volumes are (properly) included.

Exhibit 85: October 2005: SJG Accumulation of Hedge Positions



Source: Pace and Vantage

Tracking the program's protocols mechanically, we look first at the Non-Discretionary protocols, as those protocols enable hedge positions up to 18 months in advance of delivery. For October 2005, Non-Discretionary hedges were placed beginning February 2004 through July 2005 at a rate of 2 contracts per month. Therefore, by August 2005 SJG had accumulated roughly a 20% hedge ratio for its 1.8 Bcf volume requirement.

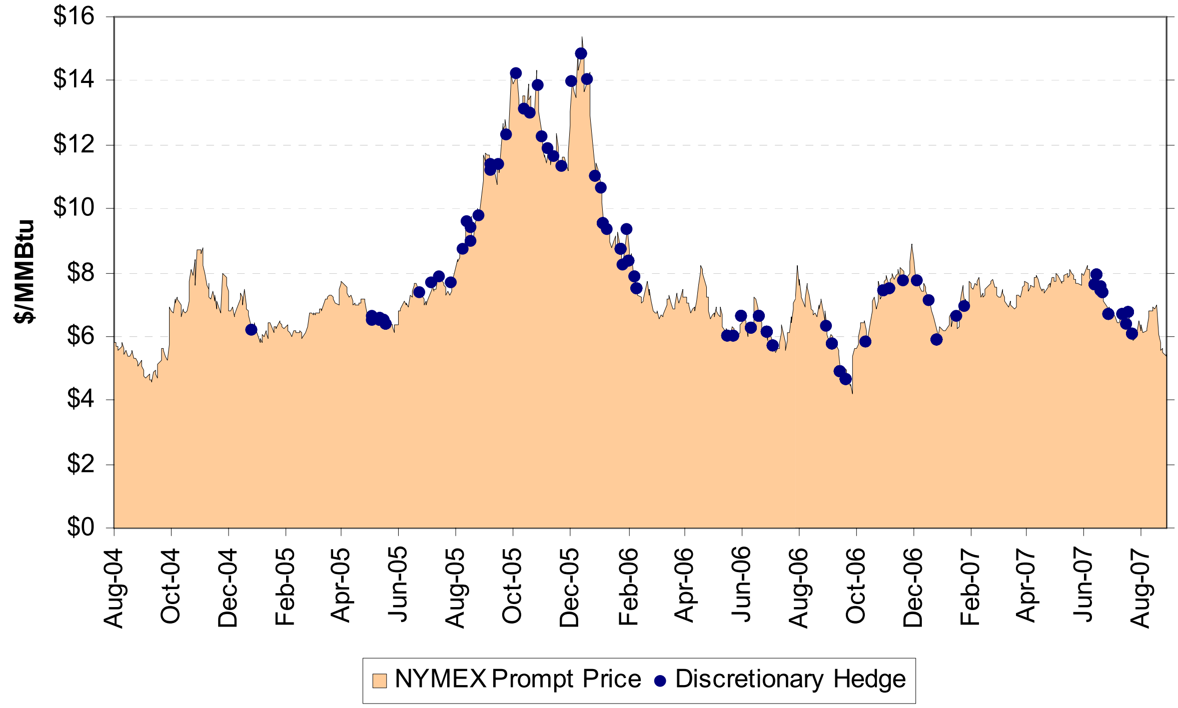
During the same period in which Non-Discretionary hedges were transacted, SJG executed a series of four Discretionary hedges totaling 17 contracts in May 2005 (five months ahead of delivery) and another four rounds equating 41 contracts in August 2005 (two months before delivery). Overall, SJG accumulated a 53% hedge ratio, meaning that 47% of its position remained open to the market for the last two months until delivery (when the contract price essentially doubled).

While the majority of hedges made for October 2005 matured in-the-money as a result of that month's high settlement, a program which establishes hedges *earlier* would have produced even more cost mitigation for customers. In addition, the presence of a defensive protocol to preempt the precipitous rise in the October 2005 contract would have mandated that SJG hedge even more of its volumes during the final months before the contract settled.

DISCRETIONARY PROTOCOLS

Part of the reason SJG's program did not accumulate a higher hedge ratio during the September 2005 to January 2006 period is that the level of discretionary hedges was relatively low throughout. Indeed, SJG's deployment of discretionary hedges was somewhat erratic during the period, as indicated in Exhibit 86 below. We believe SJG's execution of Discretionary hedges is infrequent and inconsistent because it lacks formalized protocols to guide these hedge decisions. Therefore, it is not compelled to hedge at all beyond its Non-Discretionary requirements, regardless of the prevailing price environment.

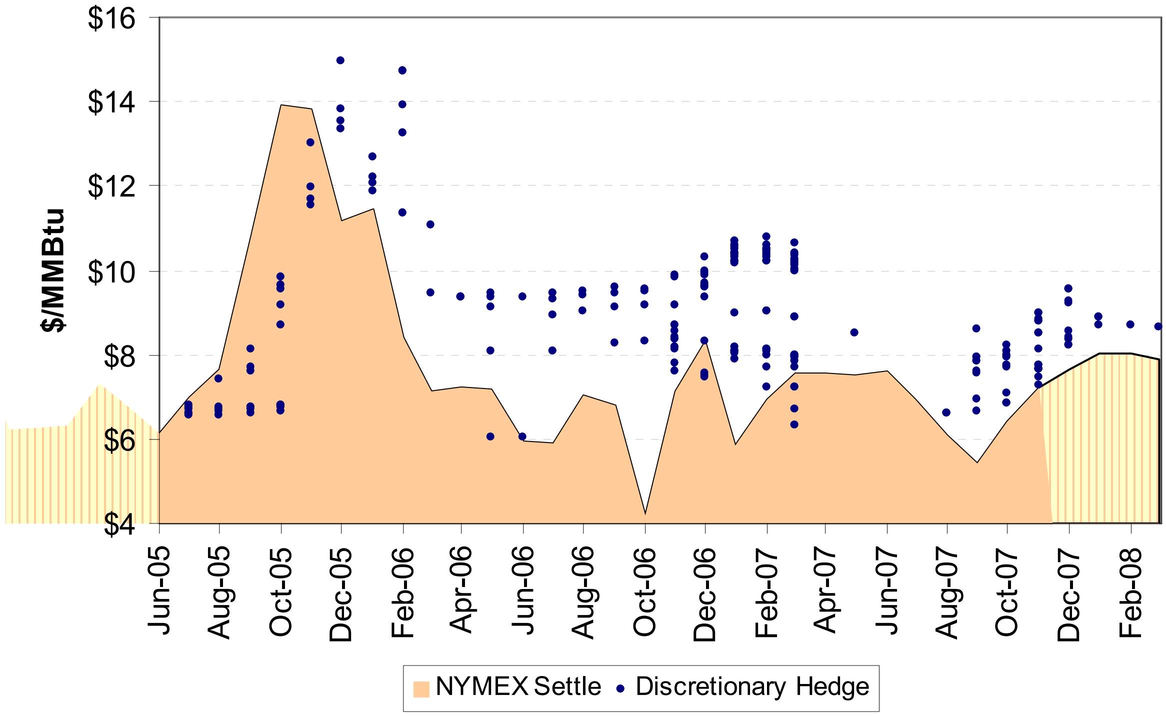
Exhibit 86: SJG Historical Discretionary Hedges



Source: Pace and Vantage

Another opportunity to enhance SJG's discretionary hedging relates to the hedge horizon. While SJG occasionally places longer-term Discretionary hedges (more than 9 months forward), in general, SJG tends not to execute Discretionary hedges beyond six months out on the forward curve; for the period analyzed, 74% of all Discretionary hedges fell within the first six-month period. Thus, SJG is executing hedges at during the most volatile portion of the curve, where divergence of market settlements from current forward prices is apt to move substantially. One of the less desirable results of this is that these hedges often settle significantly out of the money, and can be costly if deployed in large proportions. Exhibit 87 below depicts the sustained out-of-market outcomes resulting from SJG's discretionary hedges since 2005.

Exhibit 87: SJG Discretionary Hedges vs. Market Outcomes



Source: Pace and Vantage

For the short term, it is appropriate to monitor the behavior of the market's forward curve as a technical indicator of hedge opportunities. While the accuracy of forward curves suffers from an implicit tendency of market participants to overreact to very short term news or events – what is referred to as market "sentiment" – forward prices also include the most complete range of market information, including expectations about future market conditions.

A enhanced approach to supporting discretionary buy triggers within a hedging program will deploy models that incorporate both technical indicators that capture the "sentiment" effects in the forward curve *and* long-term fundamental indicators such as supply and demand trends.

SIMULATION OF ENHANCED PROGRAM

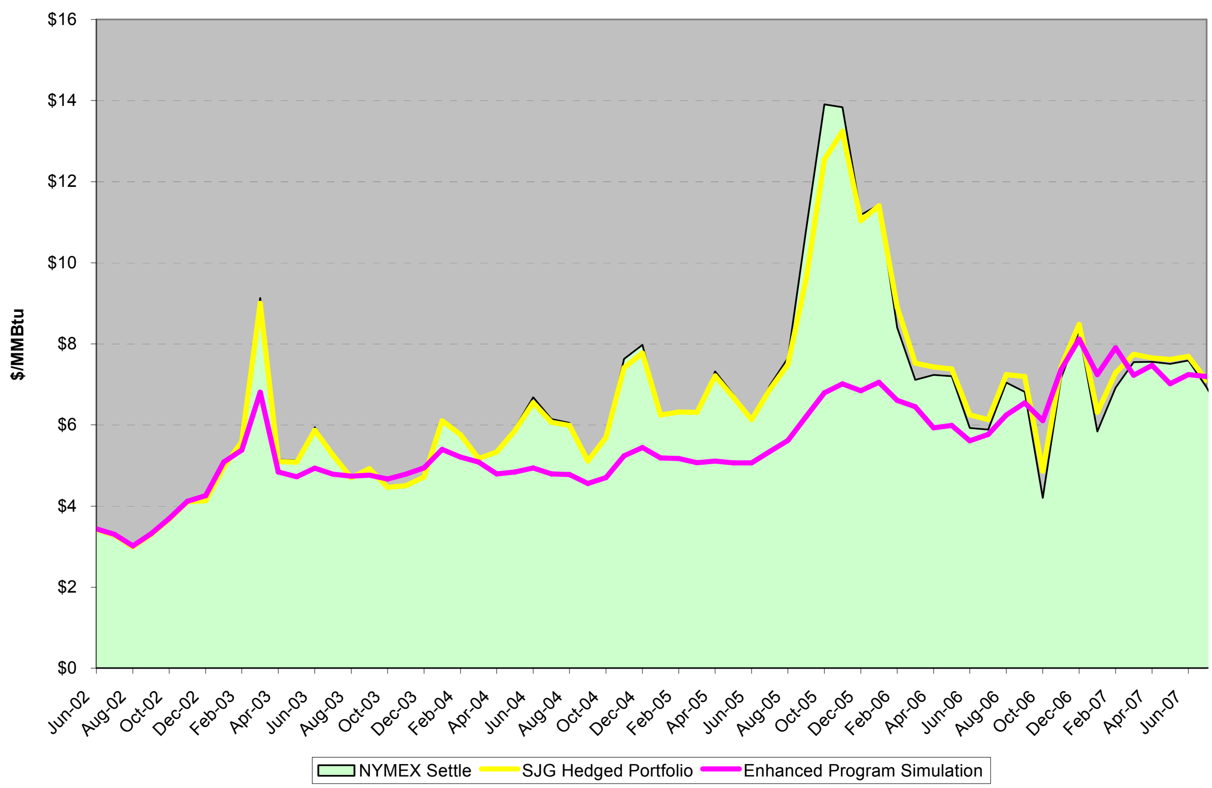
To demonstrate the mechanics and effectiveness of the enhanced hedging framework – and to provide a basis of comparison with SJG's current hedging practices – a simulation of a enhanced framework of hedging decision protocols was performed for the same time frame as our analysis of SJG's hedging program. The simulation modeled a set of programmatic, defensive, and discretionary, and contingent hedging decision protocols over the 2001 – 2007 period as applied to SJG's monthly load requirements. Of note, the simulation reflects but one of any number of possible combinations of programmatic, defensive, and discretionary, and contingent hedging decision protocols.

The simulation was performed by the use of a computer (MatLab) program that deploys the specified hedging decision protocols (identified above) against the actual history (daily) of forward prices that occurred during the period of the simulation. That is, the simulation's algorithms execute the decision rules to determine if hedging actions are needed in response to each day's forward price data, the attendant VaR-OP and VaR-FP, and a quantified discretionary buying indicator.

SIMULATION RESULTS

As depicted in Exhibit 88 below, the simulated hedging program produced significantly different results over the 2001-2007 time frame than did SJG's program. The simulated program yielded a weighted-average cost of gas of $5.37/MMBtu as compared to SJG's actual weighted-average cost of $6.27/MMBtu.

Exhibit 88: Enhanced Program Simulation vs. SJG Hedged Portfolio



Source: Pace and Vantage

Of note, the simulation's use of contingent protocols (the deployment of options to mitigate out-of-market risk) is observed in the participation of market downturns in October 2006 and January 2007.

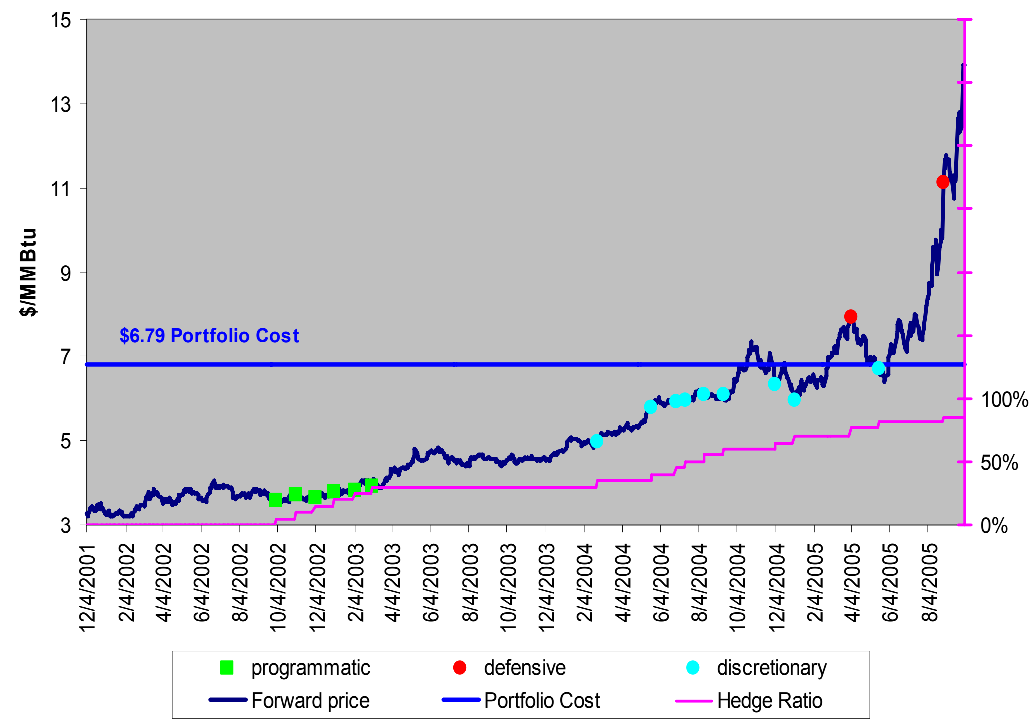
As was done in evaluating SJG's program, the simulated hedging program's mechanics will be demonstrated by deconstructing the October 2005. The purpose of these analyses is to identify how design elements of the simulated program work to produce different results than SJG's program for a critical price-spike period.

ANALYSIS OF SIMULATION RESULTS – OCTOBER 2005

Overall, the simulated hedging program produced an 85% hedge ratio and a weighted-average cost of gas of $6.79 per MMBtu for October 2005, compared with a market settlement of $13.91/MMBtu. As weighted by SJG's volume requirements, this translates to a $12.7 million mark-to-market. For reference, SJG's actual results for October 2005 were a 53% hedge ratio, an aggregate cost of $10.84/MMBtu, and a mark-to-market of $5.5 million.

Exhibit 89 below tells much of the story of why the simulated portfolio produced a lower average cost. First, the simulation's programmatic protocol established an early 30% hedge ratio by taking positions from October 2002 through March 2003 in 5% increments (i.e., the first hedges were taken as much as 36 months in advance of delivery). The programmatic hedges were then supplemented by six (6) discretionary hedges that were triggered before October 2004 (the 12-month-forward horizon). Accordingly, the simulated program accumulated a 60% hedged position a full year in advance of delivery. This is a prime driver of the difference between the simulation and SJG's actual results. Two additional discretionary hedges were triggered in the 2004-2005 winter. In response to the short-lived price rise in the spring of 2005, the program executed its first defensive hedge; subsequently, the program executed one additional discretionary hedge and one additional defensive hedge to bring the overall hedge ratio to 85%.

Exhibit 89: Simulation – October 2005



Source: Pace and Vantage

But for the early hedge ratio established by the programmatic and discretionary protocols, the program would have hedged much more aggressively on a defensive basis both in the fall of 2004 as well as during the steep run-up in the summer/fall of 2005. Also, as Exhibit 89 displays clearly, the program filled the hedge ratio with a balance of discretionary and defensive hedges once October 2005 was within the one-year horizon.

SJG SPECIFIC RECOMMENDATIONS

In general, we find that SJG's hedging program includes several elements fundamental to a sound risk management program. Our recommendations center on aligning those elements in a way that will produce more robust mitigation of price spikes and more stable cost outcomes going forward. The comparison of the simulation with SJG's existing program brings to light several design enhancements that SJG can make to its program. Described below are our recommendations for enhancing SJG's hedging program:

IV-R6 <u>SJG should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.</u>

SJG's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules.

IV-R7 <u>SJG's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.</u>

In SJG's existing program, hedging protocols are only defined for the forward 18-month horizon. While the existing program provides for placement of both Non-Discretionary and Discretionary hedges throughout the duration of this horizon, in practice, a limited amount of hedging occurs beyond the one-year horizon, meaning there is no assurance that adequate protection will be installed prior to the onset of acute volatility. As demonstrated by the simulation, an early programmatic hedge protocol effectively truncates exposure (VaR) in advance of the onset of acute volatility. As a result, defensive hedging actions are able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

IV-R8 <u>SJG should establish clearly-defined Discretionary protocols/triggers, which are linked to forward-looking prices and quantitative indicators.</u>

The current program's decision metrics regarding when, how much, and how far forward to hedge are not well defined. Moreover, we recommend that SJG implement Discretionary protocols for a minimum 18-month horizon in order to capture value opportunities over a longer market cycle and help stabilize rates over multiple BGSS cycles.

IV-R9 SJG should institute VaR-based defensive protocols such that hedge positions are taken when volatility threatens tolerance thresholds.

SJG's current program does not trigger defensive hedges on the basis of market movements and their impacts on SJG's portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

IV-R10 SJG should determine its hedging program modifications on the basis of multiple simulations of varying decision rules.

Such an exercise would enable SJG to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design. As part of the scope of this engagement, Pace and Vantage will work with each GDC and the Board to perform and evaluate such simulations.

C. PSE&G CURRENT HEDGING PROGRAM - OVERVIEW

INTRODUCTION

[*Note: In the most recent years of the period examined, as well as under current practice, PSE&G executes its hedging program via physical forward purchases, as opposed to financial swaps or futures While the settlements of PSE&G's hedges for the purposes of our analysis are measured relative to the Henry Hub natural gas index (against which swaps or futures would be indexed), we recognize that physical forwards can be transacted at any number of non-Henry Hub points. Accordingly, our analysis represents a reasonable approximation of the actual value of PSE&G's forward positions.*]

The Board retained Pace and Vantage to evaluate Public Service Electric & Gas' (PSE&G) natural gas hedging activity covering the period 2001 to present, and to provide recommendations as to how PSE&G might improve the structure of its program. This report encapsulates our findings and recommendations on these questions, and is organized into two sections.

The first section comprises our review of PSE&G's hedging activities over the period, including a recap of the plan's stated objectives and design elements, as well as an analysis of the plan's performance. As part of that analysis, the report focuses in on the design elements of PSE&G's program that we identified as most critical to the outcomes it produced.

The second section contains our recommendations to enhance PSE&G's hedging program. In doing so, the recommendations section first provides, as a basis of reference, a simulation of a enhanced hedging program over the same time period of our review of PSE&G's program. The results of the simulation provide empirical support to our recommendations for modifying PSE&G's hedging program.

PSE&G'S HEDGING PROGRAM OBJECTIVES AND DESIGN

As a first step of our analysis, we reviewed a number of documents and data sources relevant to PSE&G's hedging activities since 2001, including PSE&G's hedge transaction registers, BGSS filings, quarterly hedge reports, ER&T Risk Management Policy, and Risk Management Committee Guidelines. In addition, clarifying information was gleaned through interviews with several SJG front- and middle-office personnel, as well as company management.

The explicit objective of PSE&G's gas hedging program is to reduce market volatility and contribute to the provision of reasonable rates. In addition, based on PSE&G's ER&T Risk Management Policy, the company's broader risk management objectives mandate that PSE&G pursue the following:

Capacity Acquisition

Continually acquires, optimizes, and maintains a portfolio of transportation and storage capacity as required to economically satisfy PSE&G's forecasted load requirements within established annual and peak day planning criteria.

Contracts for capacity with minimal term provisions in order to take advantage of changing market conditions that continuously develop.

Storage Management

Hedges the summer-winter price spreads associated with a portion of the estimated BGSS-F portion of the forecasted normal year storage usage.

Operates its storage capacity portfolio in response to actual weather conditions to maintain reliability of service to BGSS customers.

Maintains sufficient storage capacity to meet the firm customers' needs in a colder than normal year.

With the aim of achieving the above goals, PSE&G's hedge plan features two types of hedging decision rules (hereinafter termed "protocols"). The first protocol is termed "Non-Discretionary", which is intended to ensure a minimum hedge ratio through the layering in of programmatic hedging transactions over time. The second type of protocols, referred to as Discretionary, or "Value Buying", is intended to capture favorable pricing opportunities in the market.

PROGRAM PERFORMANCE

In analyzing the performance of PSE&G's hedging program, we initially determined the weighted-average cost of PSE&G's natural gas portfolio for each month in the review period under its hedge program relative to what PSE&G would have incurred had it simply floated with the market. This measure provides a broad indicator of the program's overall cost efficiency, and is instructive in identifying how the program responds under different market conditions.

Overall, PSE&G's hedged portfolio produced an aggregate weighted-average cost of gas for the period of $6.45 per MMBtu, or approximately equal to the aggregate market settlements of $6.38 per MMBtu.[41] However, during the January 2002 to January 2006 period, during which market settlements featured substantial year-over-year increases and two pronounced spikes, PSE&G's hedging program, yielded a $209.7 million positive mark-to-market (savings).

[41] The cost-per-MMBtu values are weighted by PSE&G's actual monthly volumetric requirements.

In addition to providing BGSS customers some insulation during that period of steeply rising prices, PSE&G's hedged portfolio was also more stable than the market settlements (i.e., achieved a narrower range of prices). As shown in Exhibit 90 below, the month-to-month volatility of PSE&G's hedged portfolio over the six-year period was 25%, compared to 45% for the market.

Exhibit 90: PSE&G Hedged Portfolio Reduction in Volatility vs. Market Settlements

	REALIZED PRICES/MMBTU		
	LOW	HIGH	VOLATILITY
PSEG	**$3.40**	**$10.02**	**25%**
Market (NYMEX)	**$2.01**	**$13.91**	**45%**

Source: Pace and Vantage

Accordingly, PSE&G's hedging program met one of its stated objectives to reduce volatility and promote reasonable rates for BGSS customers.

While these results are evidence of some success with PSE&G's hedging program, the program can be improved to produce substantially greater volatility reduction and mitigation of price spikes. This will be supported empirically later in the "Simulation of Enhanced Program" section. In this respect, two important observations are gleaned from the hedged portfolio's performance relative to market settlements during the 2001-2007 time frame.

The first is that the program produced a comparatively low hedge ratio (i.e., low insulation against market volatility) during periods in which prices rose sharply, including the period in which prices reached historic highs. Ideally, the hedge ratio should increase *in response to* increasing volatility, *but before* the onset of intolerably high prices. Specifically, from September 2005 to January 2006, when market settlements were sustained above $10.00 per MMBtu, PSE&G's hedge ratio was as low as 42%, with an overall hedge ratio of 59% for that five-month period. This outcome runs counter to the true (but unarticulated) goal of the program: to insulate PSE&G and its customers from intolerable price spikes.

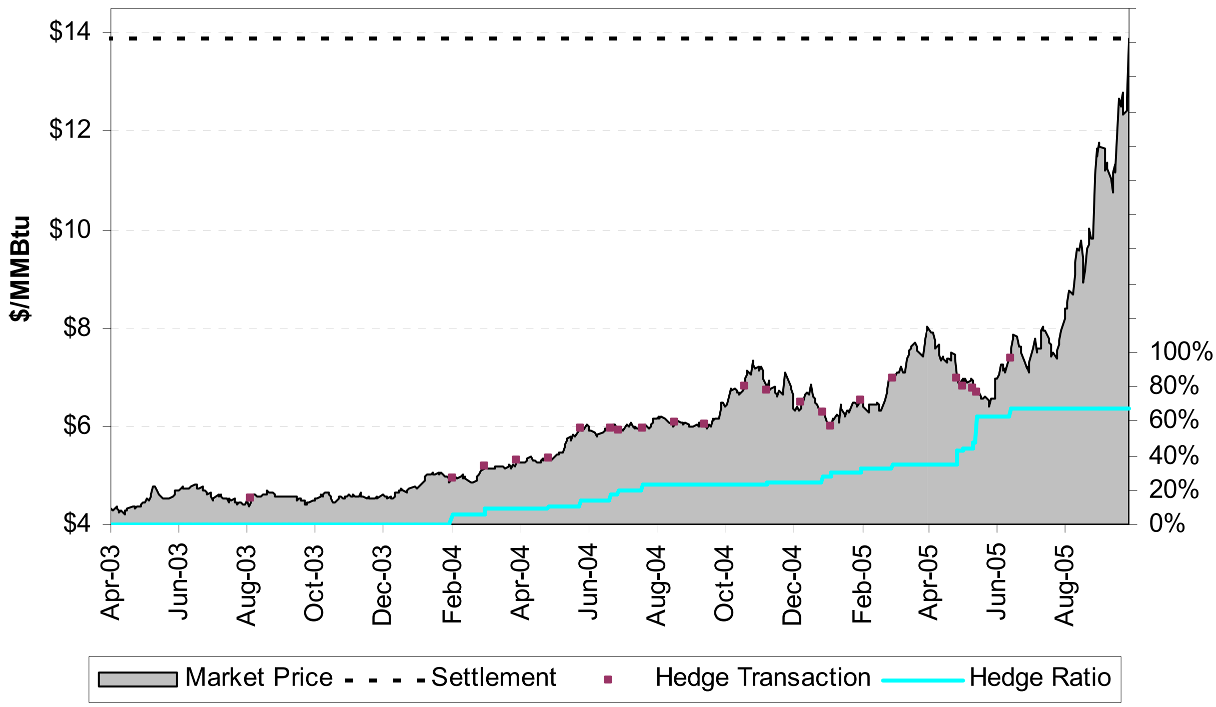
Secondly, PSE&G's program produced a comparatively high level of high-priced, fixed positions as market settlements subsequently declined through 2006. Ideally, the program would be designed to accumulate hedges in a way that mitigates unfavorable outcomes in market declines – that is, in moderate increments and with some emphasis on periods of low volatility.

In highlighting these periods, our purpose is not to accentuate the less desirable outcomes produced by the program but rather to provide a context for analyzing and improving the program's design elements as relating to these results. The sections that follow present our analysis of how PSE&G's hedging protocols produced these results.

PROGRAM PERFORMANCE – OCTOBER 2005

October 2005 was the highest monthly market settlement of the review period, and is therefore instructive about understanding the effectiveness of PSE&G's program in mitigating the impact of severe price spikes. For October 2005, PSE&G's program yielded a 67% hedge ratio and an $8.71/MMBtu weighted-average cost of gas. As compared to the market settlement of $13.91/MMBtu, the portfolio's fixed positions produced a $46 million favorable mark-to-market (savings). At the same time, however, October 2005 was also one of the highest monthly portfolio prices PSE&G experienced during the program's history because of the 33% unhedged position.

Exhibit 91: October 2005: PSE&G Accumulation of Hedge Positions



Source: Pace and Vantage

Tracking the program's protocols mechanically, PSE&G's Non-Discretionary protocols mandate hedge positions commencing at least 18 months in advance of delivery. For

October 2005, the placement of Non-Discretionary hedges was initiated in February of 2004 and continued on a "relatively ratable basis" through July 2005.[42]

Because PSE&G's hedging protocols are guided by volumetric targets with specific "time triggers", Non-Discretionary and Discretionary are interdependent and are used in combination to achieve the minimum target hedged volumes. This feature of PSE&G's program, in addition to the nature of its hedge transactions (purchase of physical gas in strips), leads to a blending of Non-Discretionary and Discretionary hedges, and therefore isolating hedges of each type is not practical. Nonetheless, we know that by October 2004, PSE&G had accumulated a 23% hedge position with a year remaining until delivery. From the six-month period of July 2004 through December 2004, PSE&G was relatively inactive and only added to its hedge position by 2%. The most aggressive period of hedging for October 2005 occurred in May 2005 when PSE&G increased its fixed position by approximately 19%. While the timing of that sizeable round of hedges was favorable since market prices had just recently subsided from a brief spike in the early spring of 2005 and thereafter began a steep climb, PSE&G was still highly exposed to prices on the most volatile portion of the forward curve. PSE&G executed its final hedge in June 2005, arriving at its ultimate hedge ratio of 67%.

Notably, the absence of a defensive protocol resulted in no hedges being executed by PSE&G while forward prices more than doubled during the last four months of the October 2005 contract settle. As a result of the 33% unhedged position, PSE&G's October 2005 weighted-average portfolio price increased to $8.71/MMBtu. Subsequent months during the fall 2005 price spike saw PSE&G's weighted-average price rise even higher – topping out at $10.02 per MMBtu in January 2006 – as a result of similar hedging patterns.

SIMULATION OF ENHANCED PROGRAM

To demonstrate the mechanics and effectiveness of the enhanced hedging framework – and to provide a basis of comparison with PSE&G's current hedging practices – a simulation of a enhanced framework of hedging decision protocols was performed for the same time frame as our analysis of PSE&G's hedging program. The simulation modeled a set of programmatic, defensive, and discretionary, and contingent hedging decision protocols over the 2001 – 2007 period as applied to PSE&G's monthly load requirements. Of note, the simulation reflects but one of any number of possible combinations of programmatic, defensive, and discretionary, and contingent hedging decision protocols.

The simulation was performed by the use of a computer (MatLab) program that deploys the specified hedging decision protocols (identified above) against the actual history (daily) of forward prices that occurred during the period of the simulation. That is, the simulation's algorithms execute the decision rules to determine if hedging actions are needed in response

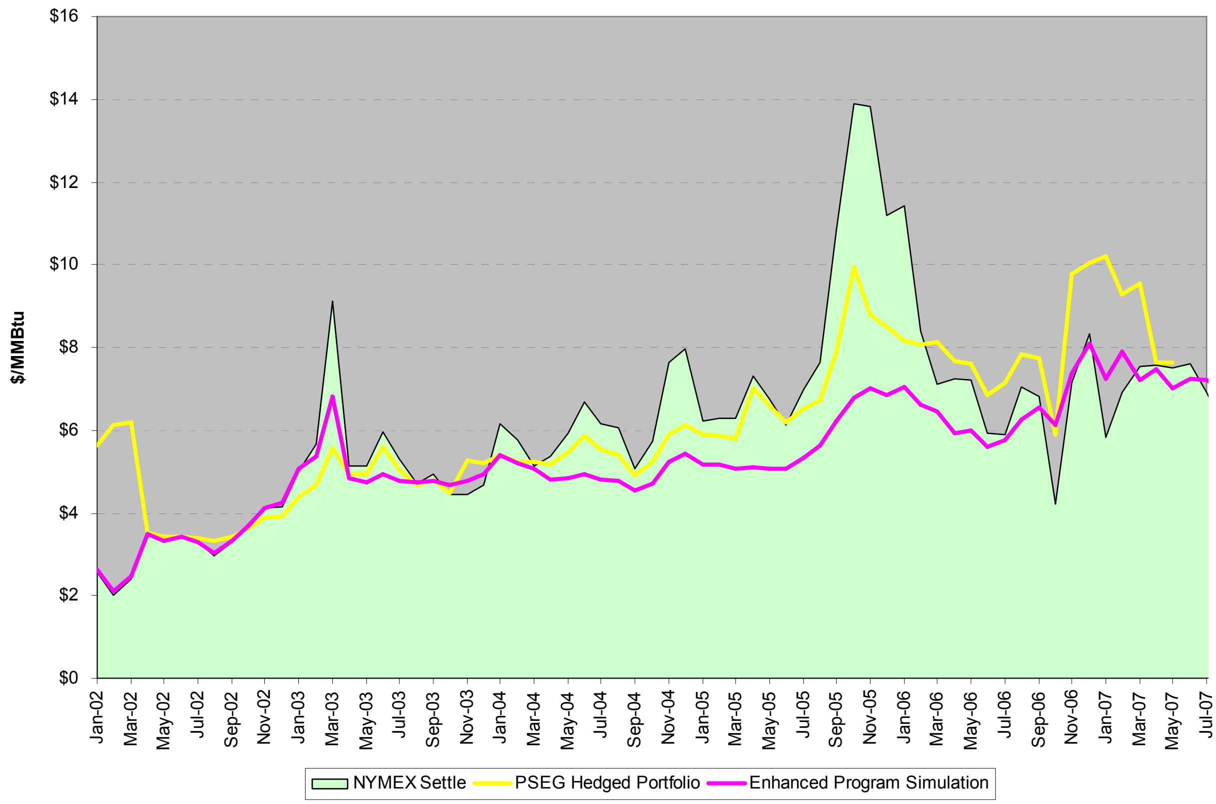
[42] The timing for placement of Discretionary hedges is so described by PSE&G in its Risk Management Policy for BGSS.

to each day's forward price data, the attendant VaR-OP and VaR-FP, and a quantified discretionary buying indicator.

SIMULATION RESULTS

As depicted in Exhibit 92 below, the simulated hedging program produced significantly different results over the 2001-2007 time frame than did PSE&G's program. The simulated program yielded a weighted-average cost of gas of $5.47/MMBtu as compared to PSE&G's actual weighted-average cost of $6.45/MMBtu.

Exhibit 92: Simulated Hedging Program 2001-2007



Source: Pace and Vantage

Of note, the simulation's use of contingent protocols (the deployment of options to mitigate out-of-market risk) is observed in the participation of market downturns in October 2006 and January 2007.

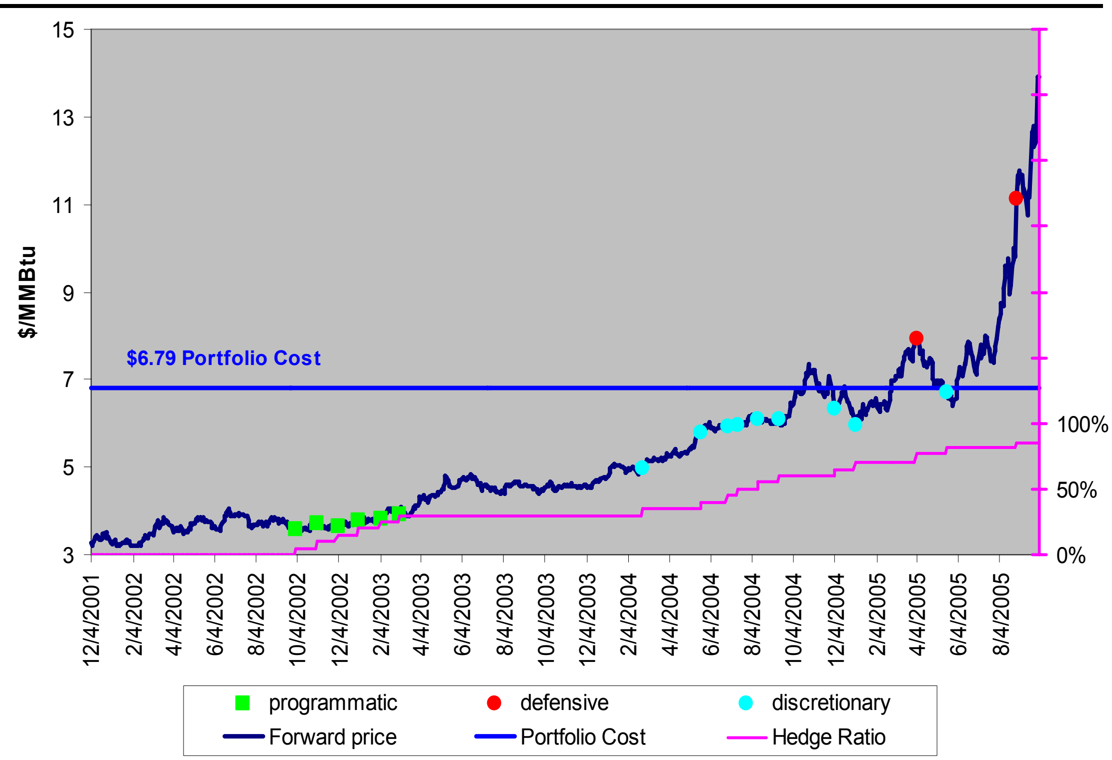
As was done in evaluating PSE&G's program, the simulated hedging program's mechanics will be demonstrated by deconstructing the October 2005. The purpose of these analyses is to identify how design elements of the simulated program work to produce different results than PSE&G's program for a critical price-spike period.

ANALYSIS OF SIMULATION RESULTS – OCTOBER 2005

Overall, the simulated hedging program produced an 85% hedge ratio and a weighted-average cost of gas of $6.79 per MMBtu for October 2005, compared with a market settlement of $13.91/MMBtu. As weighted by PSE&G's volume requirements, this translates to a $63.3 million mark-to-market. For reference, PSE&G's actual results for October 2005 were a 67% hedge ratio, an aggregate cost of $8.71/MMBtu, and a mark-to-market of $46 million.

Exhibit 93 below tells much of the story of why the simulated portfolio produced a lower average cost. First, the simulation's programmatic protocol established an early 30% hedge ratio by taking positions from October 2002 through March 2003 in 5% increments (i.e., the first hedges were taken as much as 36 months in advance of delivery). The programmatic hedges were then supplemented by six (6) discretionary hedges that were triggered before October 2004 (the 12-month-forward horizon). Accordingly, the simulated program accumulated a 60% hedged position a full year in advance of delivery. This is a prime driver of the difference between the simulation and PSE&G's actual results. Two additional discretionary hedges were triggered in the 2004-2005 winter. In response to the short-lived price rise in the spring of 2005, the program executed its first defensive hedge; subsequently, the program executed 1 more discretionary hedge and 1 more defensive hedge to bring the overall hedge ratio to 85%.

Exhibit 93: Simulation – October 2005



Source: Pace and Vantage

But for the early hedge ratio established by the programmatic and discretionary protocols, the program would have hedged much more aggressively on a defensive basis both in the fall of 2004 as well as during the steep run-up in the summer/fall of 2005. Also, as Exhibit 93 displays clearly, the program filled the hedge ratio with a balance of discretionary and defensive hedges once October 2005 was within the 1-year horizon.

PSE&G SPECIFIC RECOMMENDATIONS

In general, we find that PSE&G's hedging program includes several elements fundamental to a sound risk management program, and that the program mitigated a material amount of cost exposure during the periods of increasing prices over the past six years. Our recommendations center on aligning those elements in a way that will produce more robust mitigation of price spikes and more stable cost outcomes going forward. The comparison of the simulation with PSE&G's existing program brings to light several design enhancements that PSE&G can make to its program. Described below are our recommendations for enhancing PSE&G's hedging program:

IV-R11 <u>PSE&G should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.</u>

PSE&G's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules.

IV-R12 <u>PSE&G's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.</u>

In PSE&G's existing program, hedging protocols are only defined for the forward 18-month horizon. While the existing program provides for placement of both Non-Discretionary and Discretionary hedges throughout the duration of this horizon, in practice a limited amount of hedging occurs beyond the one-year horizon, meaning there is no assurance that adequate protection will be installed prior to the onset of acute volatility. As demonstrated by the simulation, an early programmatic hedge protocol effectively truncates exposure (VaR) in advance of the onset of acute volatility. As a result, defensive hedging actions are able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

IV-R13 <u>PSE&G should more clearly define its Discretionary protocols/triggers, and link them to forward-looking prices as opposed to historical indicators.</u>

The current program's decision metrics regarding when, how much, and how far forward to hedge are not well defined. Moreover, we recommend that PSE&G implement Discretionary protocols for a minimum 18-month horizon in order to capture value opportunities over a longer market cycle and help stabilize rates over multiple BGSS cycles.

IV-R14 PSE&G should institute VaR-based defensive protocols such that hedge positions are taken when volatility threatens tolerance thresholds.

PSE&G's current program does not trigger defensive hedges on the basis of market movements and their impacts on PSE&G's portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

IV-R15 PSE&G should determine its hedging program modifications on the basis of multiple simulations of varying decision rules.

Such an exercise would enable PSE&G to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design. As part of the scope of this engagement, Pace and Vantage will work with each GDC and the Board to perform and evaluate such simulations.

D. ELIZABETHTOWN CURRENT HEDGING PROGRAM – OVERVIEW

INTRODUCTION

The Board retained Pace and Vantage to evaluate Elizabethtown Gas' (ETown) natural gas hedging activity covering the period 2001 to present, and to provide recommendations as to how ETown might improve the structure of its program. This report encapsulates our findings and recommendations on these questions, and is organized into two sections.

The first section comprises our review of ETown hedging activities over the period, including a recap of the plan's stated objectives and design elements, as well as an analysis of the plan's performance. As part of that analysis, the report focuses in on the design elements of ETown's program that we identified as most critical to the outcomes it produced.

The second section contains our recommendations to enhance ETown's hedging program. In doing so, the recommendations section first provides, as a basis of reference, a simulation of a enhanced hedging program over the same time period of our review of ETown's program. The results of the simulation provide empirical support to our recommendations for modifying ETG's hedging program.

ETG'S HEDGING PROGRAM OBJECTIVES AND DESIGN

As a first step of our analysis, we reviewed a number of documents and data sources relevant to ETown's hedging activities since 2001, including ETown's hedge transaction registers, BGSS filings, quarterly hedge reports, financial and physical natural gas transactions, and the ETown Risk Management Policy. In addition, clarifying information was gleaned through interviews with several ETown front- and middle-office personnel, as well as company management.

According to the its Risk Management Policy, the objective of ETown's risk management program is to manage volatility risk on behalf of the customer while maintaining optimal financial flexibility, quality, and solvency.

With the aim of achieving the above goals, ETown's hedge plan features two types of hedging decision rules (hereinafter termed "protocols"). The first category of protocols is termed "Non-Discretionary", which is intended to ensure a minimum hedge ratio through the layering in of programmatic hedging transactions over time. ETown deploys Non-Discretionary protocols for storage volumes commencing 18 months prior to delivery (injection); additionally, ETown deploys Non-Discretionary hedging protocols for Flowing Gas, also commencing 18 months in advance of delivery up to a maximum 33% hedge ratio.

The second type of protocols, referred to as "Discretionary", which enables ETown to increase its hedge ratio up to 34% above its Non-Discretionary level, or to a maximum aggregate of 67%. ETown's Discretionary hedging protocol is guided by a decision matrix of market sentiment and fundamental indicators.

PROGRAM PERFORMANCE

In analyzing the performance of ETown's hedging program, we initially determined the weighted-average cost of ETown's natural gas portfolio for each month in the review period under its hedge program relative to what ETown would have incurred had it simply floated with the market. This measure provides a broad indicator of the program's overall cost efficiency, and is instructive in identifying how the program responds under different market conditions. Note that data for ETown was only available from August 2004 forward.

Overall, ETown's hedged portfolio produced an aggregate weighted-average cost of gas for the period of $7.78 per MMBtu, or approximately equal to the aggregate market settlements of $7.83 per MMBtu.[43] However, during the August 2004 to January 2006 period, during which market settlements featured substantial year-over-year increases and a pronounced spike, ETG's hedging program yielded a $32.5 million positive mark-to-market (savings).

In addition to providing BGSS customers some insulation during that period of steeply rising prices, ETown's hedged portfolio was also more stable than the market settlements (i.e., achieved a narrower range of prices). As shown in Exhibit 94 below, the month-to-month volatility of ETown's hedged portfolio since August 2004 was 35%, compared to 44% for the market.

Exhibit 94: ETG Hedged Portfolio Reduction in Volatility vs. Market Settlements

	REALIZED PRICES/MMBTU		
	LOW	HIGH	VOLATILITY
ETG	**$4.83**	**$12.50**	**35%**
Market (NYMEX)	**$4.20**	**$13.91**	**44%**

Source: Pace and Vantage

Accordingly, ETown's hedging program met its stated objective to reduce volatility on behalf of customers.

While these results are evidence of some success with ETown's hedging program, the program can be improved to produce substantially greater volatility reduction and mitigation of price spikes. This will be supported empirically later in the "Simulation of Enhanced Program" section. In this respect, two important observations are gleaned from the hedged portfolio's performance relative to market settlements during the 2004-2007 time frame.

[43] The cost-per-MMBtu values are weighted by ETown's actual monthly volumetric requirements.

The first is that the program produced a comparatively low hedge ratio (i.e., low insulation against market volatility) during periods in which prices rose sharply, including the period in which prices reached historic highs. Ideally, the hedge ratio should increase *in response to* increasing volatility, *but before* the onset of intolerably high prices. Specifically, from September 2005 to January 2006, when market settlements were sustained above $10.00 per MMBtu, ETown's hedge ratio was as low as 19% and was less than 53% in three of those five months. This outcome runs counter to the true (but unarticulated) goal of the program: to insulate ETown and its customers from intolerable price spikes.

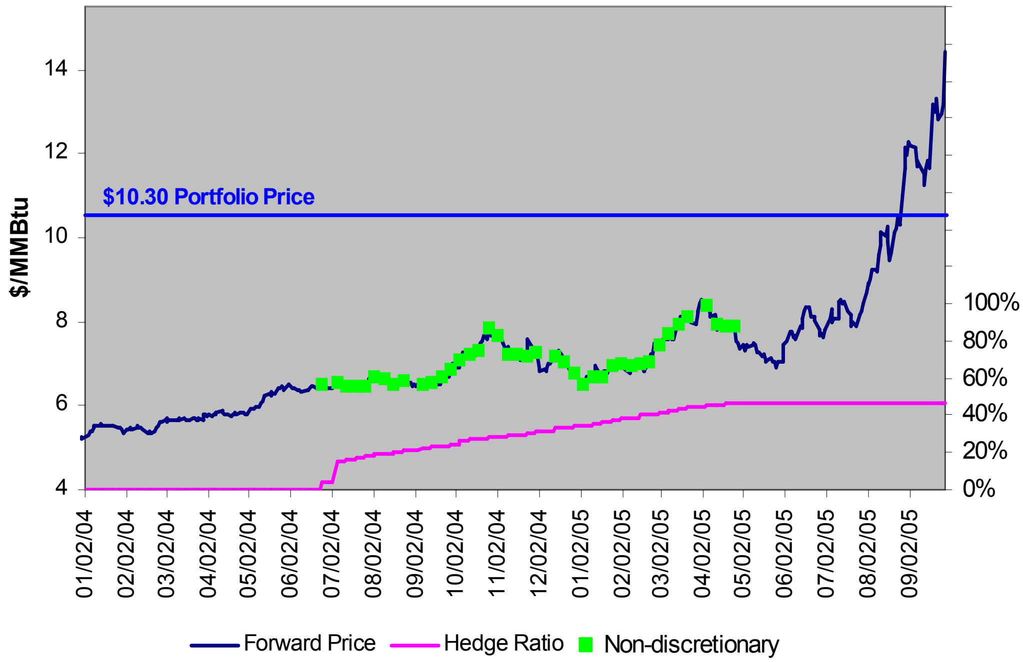
Secondly, ETown's Discretionary protocol was deployed erratically during the period. In particular, very little in terms of discretionary hedges were accumulated in advance of the acute five-month price period described above (which would have greatly augmented savings).

In highlighting these periods, our purpose is not to accentuate the less desirable outcomes produced by the program but rather to provide a context for analyzing and improving the program's design elements as relating to these results. The sections that follow present our analysis of how ETown's hedging protocols produced these results.

PROGRAM PERFORMANCE – OCTOBER 2005

October 2005 was the highest monthly market settlement of the review period, and is therefore instructive about understanding the effectiveness of ETown's program in mitigating the impact of severe price spikes. For October 2005, ETown's program yielded a 46% hedge ratio and an $11.07/MMBtu weighted-average cost of gas. As compared to the market settlement of $13.91/MMBtu, the portfolio's fixed positions produced a $6.2 million favorable mark-to-market (savings). At the same time, however, October 2005 was also one of the highest monthly portfolio prices ETown experienced during the program's history because of the 54% unhedged position.

Exhibit 95: October 2005: ETG Accumulation of Hedge Positions



Source: Pace and Vantage

Tracking the program's protocols mechanically, ETown's Non-Discretionary protocols enable hedge positions up to 18 months in advance of delivery. For October 2005, Non-Discretionary hedges were placed prior to June 2004, most likely beginning in February of that year.[44] The accumulation of those hedge positions amounted by a hedge ratio of approximately 46% by May 2005.

ETown did not execute any discretionary hedges whatsoever with respect to the October 2005 contract; therefore, all of the hedge positions were achieved via the Non-Discretionary protocol. While all of the hedges made for October 2005 matured in-the-money as a result of the month's high settlement, ETown's program rendered over half of its October 2005 requirements unhedged as of the end of July 2005, a mere three months before settlement. The program's protocols therefore place most of the risk-mitigation weight on short-term hedging actions, which were unable to respond adequately to preempt the consequences of the Katrina-induced prices. For November 2005, which experienced equally high prices, ETown's program produced an even lower hedge level. Furthermore, since no hedges were taken earlier than 18 months prior to delivery, those fixed positions were not as effective as would have been the case for hedges taken much earlier. Hedging earlier would have provided greater savings and prevent hedging in large, undiversified volumes. In addition, the presence of a defensive protocol to preempt the precipitous rise in the October 2005

[44] Trade dates for ETG's transactions prior to June 2004 are unknown.

contract would have mandated that ETown hedge even more of its volumes before the contract settled.

SIMULATION OF ENHANCED PROGRAM

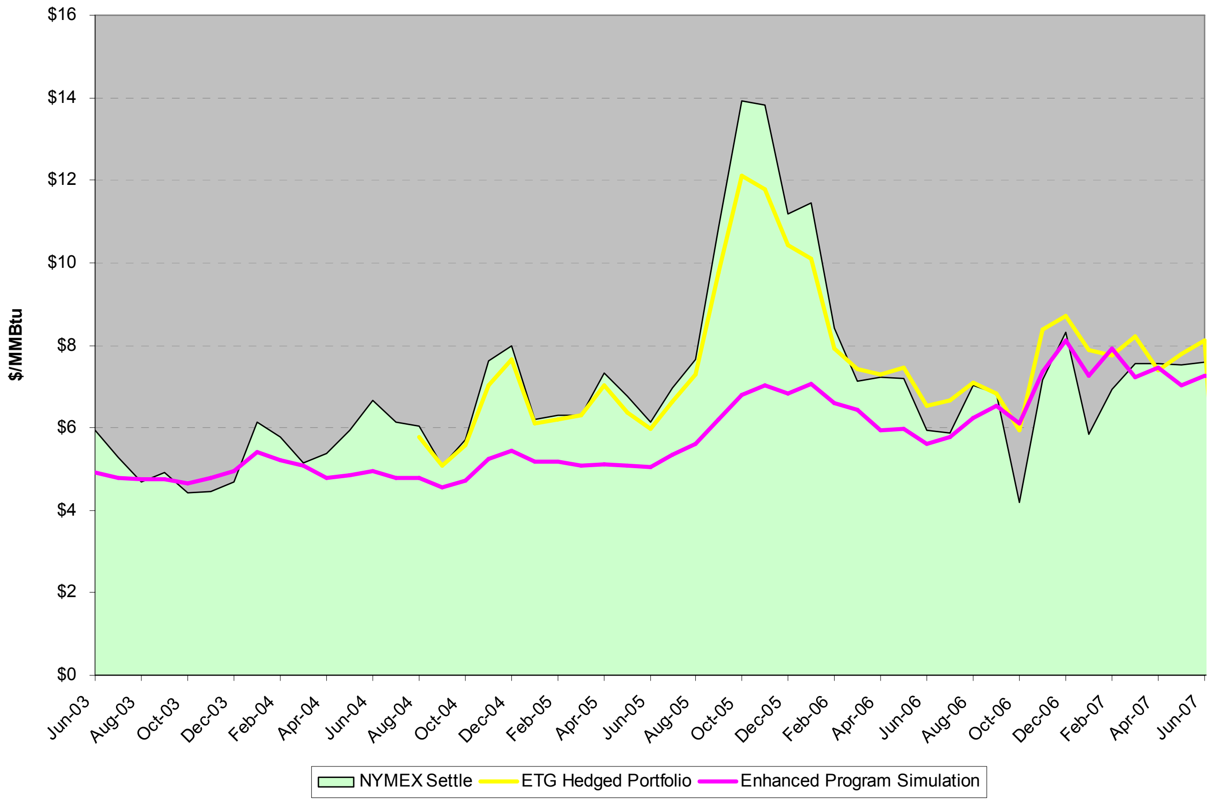
To demonstrate the mechanics and effectiveness of the enhanced hedging framework – and to provide a basis of comparison with ETown's current hedging practices – a simulation of a enhanced framework of hedging decision protocols was performed for the same time frame as our analysis of ETown's hedging program. The simulation modeled a set of programmatic, defensive, and discretionary, and contingent hedging decision protocols over the 2004 – 2007 period as applied to ETown's monthly load requirements. Of note, the simulation reflects but one of any number of possible combinations of programmatic, defensive, and discretionary, and contingent hedging decision protocols.

The simulation was performed by the use of a computer (MatLab) program that deploys the specified hedging decision protocols (identified above) against the actual history (daily) of forward prices that occurred during the period of the simulation. That is, the simulation's algorithms execute the decision rules to determine if hedging actions are needed in response to each day's forward price data, the attendant VaR-OP and VaR-FP, and a quantified discretionary buying indicator.

SIMULATION RESULTS

As depicted in Exhibit 96 below, the simulated hedging program produced significantly different results over the 2004-2007 time frame than did ETG's program. The simulated program yielded a weighted-average cost of gas of $6.36/MMBtu as compared to ETown's actual weighted-average cost of $7.78/MMBtu.

Exhibit 96: Enhanced Program Simulation vs. ETG Hedged Portfolio



Source: Pace and Vantage

Of note, the simulation's use of contingent protocols (the deployment of options to mitigate out-of-market risk) is observed in the participation of market downturns in October 2006 and January 2007.

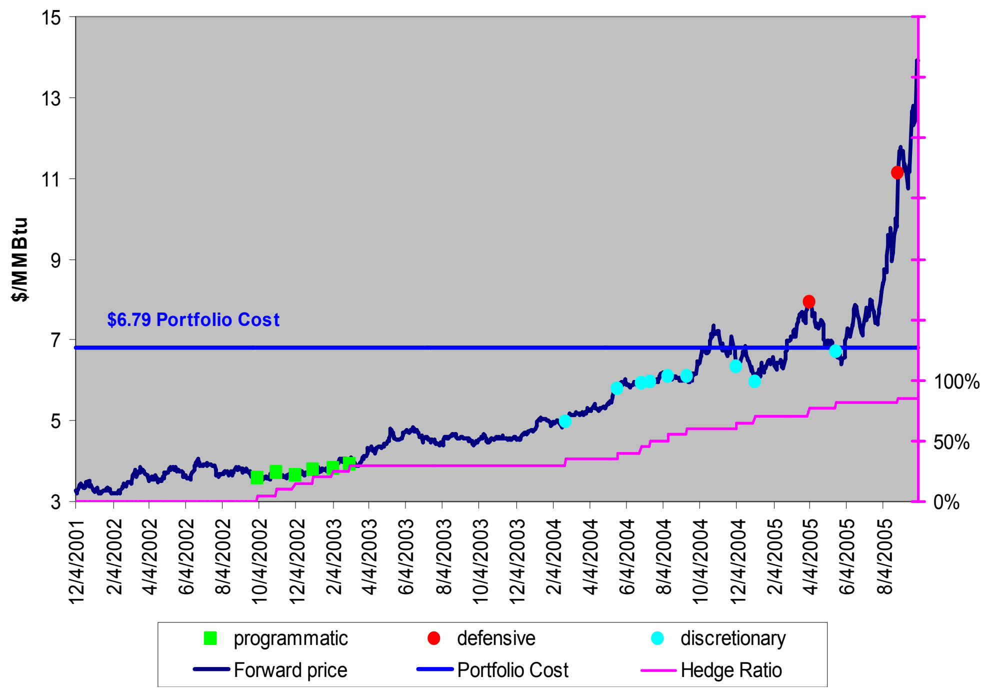
As was done in evaluating ETown's program, the simulated hedging program's mechanics will be demonstrated by deconstructing the October 2005. The purpose of these analyses is to identify how design elements of the simulated program work to produce different results than ETown's program for a critical price-spike period.

ANALYSIS OF SIMULATION RESULTS – OCTOBER 2005

Overall, the simulated hedging program produced an 85% hedge ratio and a weighted-average cost of gas of $6.79 per MMBtu for October 2005, compared with a market settlement of $13.91/MMBtu. As weighted by ETown's volume requirements, this translates to a $15.6 million mark-to-market. For reference, ETown's actual results for October 2005 were a 47% hedge ratio, an aggregate cost of $11.07/MMBtu, and a mark-to-market of $6.2 million.

Exhibit 97 below tells much of the story of why the simulated portfolio produced a lower average cost. First, the simulation's programmatic protocol established an early 30% hedge ratio by taking positions from October 2002 through March 2003 in 5% increments (i.e., hedges were taken as much as 36 months in advance of delivery). The programmatic hedges were then supplemented by six (6) discretionary hedges that were triggered before October 2004 (the 12-month-forward horizon). Accordingly, the simulated program accumulated a 60% hedged position a full year in advance of delivery. This is a prime driver of the difference between the simulation and ETown's actual results. Two additional discretionary hedges were triggered in the 2004-2005 winter. In response to the short-lived price rise in the spring of 2005, the program executed its first defensive hedge; subsequently, the program executed 1 more discretionary hedge and 1 more defensive hedge to bring the overall hedge ratio to 85%.

Exhibit 97: Simulation – October 2005



Source: Pace and Vantage

But for the early hedge ratio established by the programmatic and discretionary protocols, the program would have hedged much more aggressively on a defensive basis both in the fall of 2004 as well as during the steep run-up in the summer/fall of 2005. Also, as Exhibit 97 displays clearly, the program filled the hedge ratio with a balance of discretionary and defensive hedges once October 2005 was within the 1-year horizon.

ELIZABETHTOWN SPECIFIC RECOMMENDATIONS

In general, we find that ETown's hedging program includes several elements fundamental to a sound risk management program. Our recommendations center on aligning those elements in a way that will produce more robust mitigation of price spikes and more stable cost outcomes going forward. The comparison of the simulation with ETown's existing program brings to light several design enhancements that ETown can make to its program. Described below are our recommendations for enhancing ETown's hedging program:

IV-R16 <u>ETown should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.</u>

ETown's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules.

IV-R17 <u>ETown's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.</u>

In ETown's existing program, hedging protocols are only defined for the forward 18-month horizon. While the existing program provides for placement of both Non-Discretionary and Discretionary hedges throughout the duration of this horizon, in practice a limited amount of hedging occurs beyond the one-year horizon, meaning there is no assurance that adequate protection will be installed prior to the onset of acute volatility. As demonstrated by the simulation, an early programmatic hedge protocol effectively truncates exposure (VaR) in advance of the onset of acute volatility. As a result, defensive hedging actions are able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

IV-R18 <u>ETown should establish clearly-defined Discretionary protocols/triggers, with respect to when, how much, and how far forward to hedge are not well defined.</u>

We note ETown has a relatively sophisticated matrix of indicators to support discretionary hedges, but does not fully employ it. We recommend that ETown implement Discretionary protocols for a minimum 18-month horizon in order to capture value opportunities over a longer market cycle and help stabilize rates over multiple BGSS cycles.

IV-R19 <u>ETown should institute VaR-based defensive protocols such that hedge positions are taken when volatility threatens tolerance thresholds.</u>

ETown's current program does not trigger defensive hedges on the basis of market movements and their impacts on ETown's portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

IV-R20 <u>ETown should determine its hedging program modifications on the basis of multiple simulations of varying decision rules.</u>

Such an exercise would enable ETown to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design. As part of the scope of this engagement, Pace and Vantage will work with each GDC and the Board to perform and evaluate such simulations.

E. NJNG CURRENT HEDGING PROGRAM – OVERVIEW

INTRODUCTION

The Board retained Pace and Vantage to evaluate New Jersey Natural Gas' (NJNG) natural gas hedging activity covering the period 2001 to present, and to provide recommendations as to how NJNG might improve the structure of its program. This report encapsulates our findings and recommendations on these questions, and is organized into two sections.

The first section comprises our review of NJNG's hedging activities over the period, including a recap of the plan's stated objectives and design elements, as well as an analysis of the plan's performance. As part of that analysis, the report focuses on the design elements of NJNG's program that we identified as most critical to the outcomes it produced.

The second section contains our recommendations to enhance NJNG's hedging program. In doing so, the recommendations section first provides, as a basis of reference, a simulation of a enhanced hedging program over the same time period of our review of NJNG's program. The results of the simulation provide empirical support to our recommendations for modifying NJNG's hedging program.

NJNG HEDGING PROGRAM OBJECTIVES AND DESIGN

As a first step of our analysis, we reviewed a number of documents and data sources relevant to NJNG's hedging activities since 2001, including NJNG's BGSS filings, hedging program documents, Sarbanes-Oxley Policy and Procedure, Annual Reports, transaction history, storage practice, risk management fillings, risk management program protocols, risk management policy and procedure, risk committee meeting minutes; in addition, information was gleaned through interviews with several NJNG front- and middle-office personnel, as well as management.

NJNG's hedging decisions are governed by the Guidelines and Procedures established by its Risk Management Committee (RMC). Currently, NJNG is authorized to utilize futures contracts, options contracts, commodity swaps, and basis swaps.

NJNG's hedging activities can be divided into two distinct components, basic hedging operations and storage optimization. According to the hedging plan documents, the primary objectives of NJNG's hedging program are as follows:

(1) Achieve a certain hedge level prior to the onset of each winter season,

(2) Realize storage costs below its benchmark.

The first objective function requires that NJNG achieves a minimum hedge ratio of 75% for the November-March winter period by November 1, and that it also hedges at least 25% for the ensuing 12-month April-March period. In effect, its purpose is to ensure that no more than 25% of its normalized winter BGSS gas load is exposed to market prices. Importantly, volumes injected into storage for withdrawal in the ensuing winter apply toward the 75%

hedge ratio target (storage volumes account for nearly 50% of NJNG's expected winter send out). This practice is intended to promote price stability for the BGSS customers and helps mitigate potentially volatile prices during peak demand season.[45]

For its second objective function––to realize storage costs below the established benchmark–– NJNG uses financial instruments essentially to capture value (arbitrage). The incentive program promotes the sharing of benefits between NJNG and its customers and encourages NJNG to capture the lowest possible portfolio cost following the establishment of its storage incentive benchmark. NJNG executes its storage incentive strategy largely through the use of options.

NJNG has established a target range of 20-23 Bcf of gas available through storage as of October 31 each year. Eighteen Bcf of the total target gas is accumulated through the Storage Incentive Program. The guideline of the program set the purchase level for each month equal to 2.57 Bcf during the period April through October.

The hedging activities NJNG engages in under the storage incentive program frequently produce intermediate mark-to-market effects (i.e., costs or savings prior to the contract settlement). This is because NJNG trades in and out of positions regularly in an effort to extract arbitrage value from price movements. As such the "net" or resultant hedge level in any month (hedged volumes relative to physical volumes) is not necessarily indicative of the measures taken to mitigate risk. Further, these intermediate activities, which are significant to the overall value of NJNG's storage hedging program, can yield net hedge ratios that are not aligned with cost outcomes, even though the program is run in a well-controlled manner.[46]

PROGRAM PERFORMANCE

In analyzing the performance of NJNG's hedging program, we initially determined the weighted-average cost of NJNG's natural gas portfolio for each month in the review period under its hedge program, relative to what NJNG would have incurred had it simply floated with the market. This measure provides a broad indicator of the program's overall cost efficiency, and is instructive in identifying how the program responds under different market conditions. Note that data for NJNG was only available through September 2006.

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[45] / NJNG Makes two comments on this paragraph. 1) That statement misconstrues the language of the NJNG Hedging Guidelines since the reverse was the intent – NJNG knows that warmer-than-normal winters can be 75% of normal and wanted to hedge to at least that level. The level of market exposure to normal weather sales was a net result of that, not the purpose. 2) Since NJNG only hedges for the Periodic BGSS customers, not total sendout, the simulations may be based on incorrect assumptions.

[46] / NJNG argues that the Storage Incentive is always in a 100% hedge ratio. Accordingly, NJNG is not clear about the "net hedge' ratio discussion.

Overall, NJNG's hedged portfolio produced an aggregate WACOG for the period of $5.69 per MMBtu, or approximately 30 cents below the aggregate market settlements of $6.01 per MMBtu.[47] During the January 2002 to January 2006 period, in which market settlements featured substantial year-over-year increases and two pronounced spikes, NJNG's hedging program yielded a $114 million positive mark-to-market (savings).

In addition to providing BGSS customers some insulation during that period of steeply rising prices, NJNG's hedged portfolio was also more stable than the market settlements (i.e., achieved a narrower range of prices). Exhibit 98 below demonstrates the month-to-month volatility of NJNG's hedged portfolio since 2001 was 58%, compared to 45% for the market. Accordingly, NJNG's hedging program met its stated objective to reduce volatility on behalf of customers.

Exhibit 98: NJNG Hedged Portfolio Range of Realized Prices vs. Market Settlements

	REALIZED PRICES/MMBTU	
	LOW	HIGH
NJNG	$2.06	$11.49
Market (NYMEX)	$1.83	$13.91

Source: Pace and Vantage

While these results are evidence of some success with NJNG's hedging program, the program can be improved to produce substantially greater volatility reduction and mitigation of price spikes. This will be supported empirically later in the "Simulation of Enhanced Program" section. In this respect, two important observations are gleaned from the hedged portfolio's performance relative to market settlements during the 2001-2007 time frame.

The first is that the program produced a comparatively low hedge ratio (i.e., low insulation against market volatility) during periods in which prices rose sharply, including the period in which prices reached historic highs. Ideally, the hedge ratio should increase *in response to* increasing volatility, *but before* the onset of intolerably high prices. Specifically, from September 2005 to January 2006, when market settlements were consistently above $10/MMBtu, NJNG's net hedge ratio was below 20% for the entire five-month period. Nominally, the hedge ratio was higher than this as explained previously; however, the program left significantly more volume exposed to the market than was optimal. This outcome runs counter to the true (but unarticulated) goal of the program. That is to insulate NJNG and its customers from intolerable price spikes.

[47] The cost-per-MMBtu values are weighted by NJNG's actual monthly volumetric requirements.

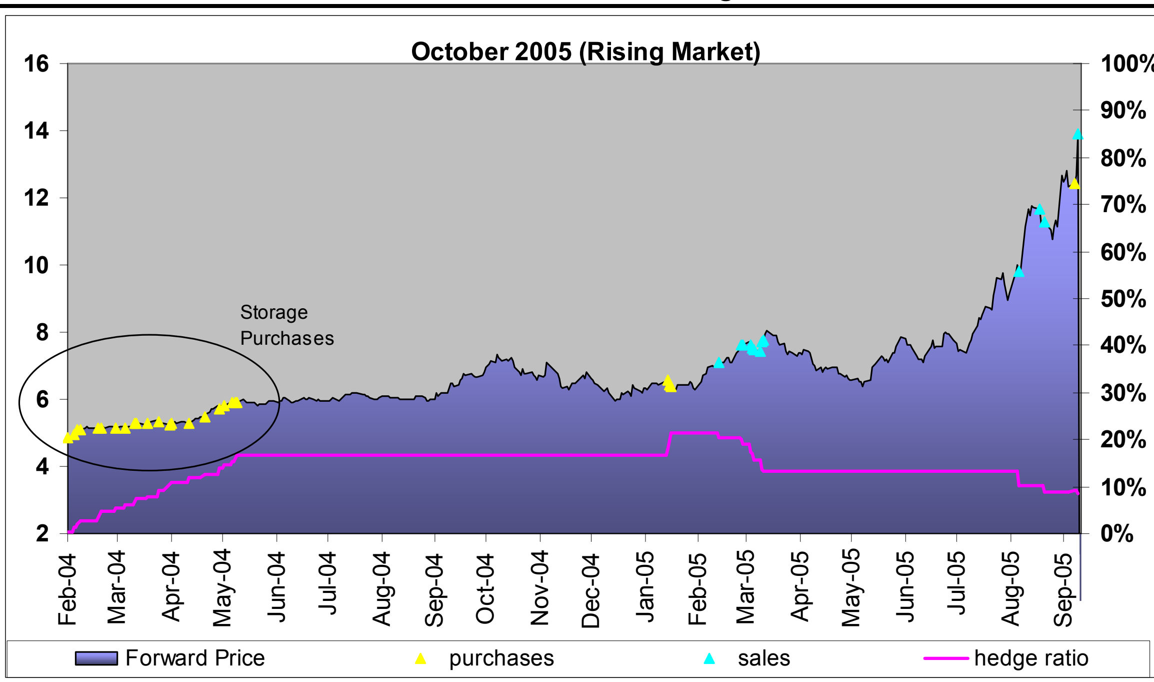
In discussing these periods, our purpose is not to highlight the less desirable outcomes produced by the program, but rather to provide a context for analyzing and improving the program's design elements as related to these results. The sections that follow present our analysis of how NJNG's hedging protocols produced these results.

PROGRAM PERFORMANCE – OCTOBER 2005

October 2005 illustrates a month from the period during which the current program left NJNG's portfolio highly exposed to market volatility. We refer to this case as the "High Open-Position Risk Case". As indicated in Exhibit 98 above, NJNG's program yielded a 17% hedge ratio and a $12.03/MMBtu weighted-average cost of gas for that month. As compared to the market settlement of $13.91/MMBtu, the portfolio's fixed positions were $1.84/MMBtu, or $18 million "in-the-money"; however, October 2005 was also the highest monthly portfolio price NJNG experienced during the program's history because of the 83% open position.

Tracking the program's protocols mechanically, we look first at the discretionary protocols. For October 2005, the storage incentive program triggered a series of hedges from February 2004 to May 2004, as depicted in Exhibit 99 below. The trigger prices embodied in the protocol were well below market (forward) prices available to NJNG during the entire period. As a result, NJNG reached almost 20% in its hedge ratio.

Exhibit 99: October 2005: NJNG Accumulation of Hedge Positions



Source: Pace and Vantage

Subsequently, as the October 2005 futures contract rose through the winter and spring of 2005 – before the acute spike precipitated by Katrina – the stop-loss rules within NJNG's

Time Buying protocols triggered a couple occasions in January and February 2005, accumulating an aggregate hedge ratio of 25%. Taken at face value, each of these "defensive" stop-loss hedges effectively mitigated the price NJNG would have otherwise realized for October 2005; however, the program insulated less than half of NJNG's volumes from that exposure and it did so too late to curtail much exposure. Of note, NJNG's program did not capture fixed positions on any of the intermediate downturns that occurred during the period in which the stop-loss positions were taken. Also, part of the positions were liquidated during the March of 2005 bringing the hedging ratio to only 15% in the second half of September.

Thus, the lack of early hedging transaction for the October 2005 contract placed all of the risk mitigation weight on the non-discretionary protocol, which was unable to respond adequately to preempt the consequences of the Katrina-influenced pricing. Further, in light of the program's second stated objective of capturing value opportunities, none of the hedges taken were done pursuant to a value or budget decision rule.

STORAGE INCENTIVE PROGRAM

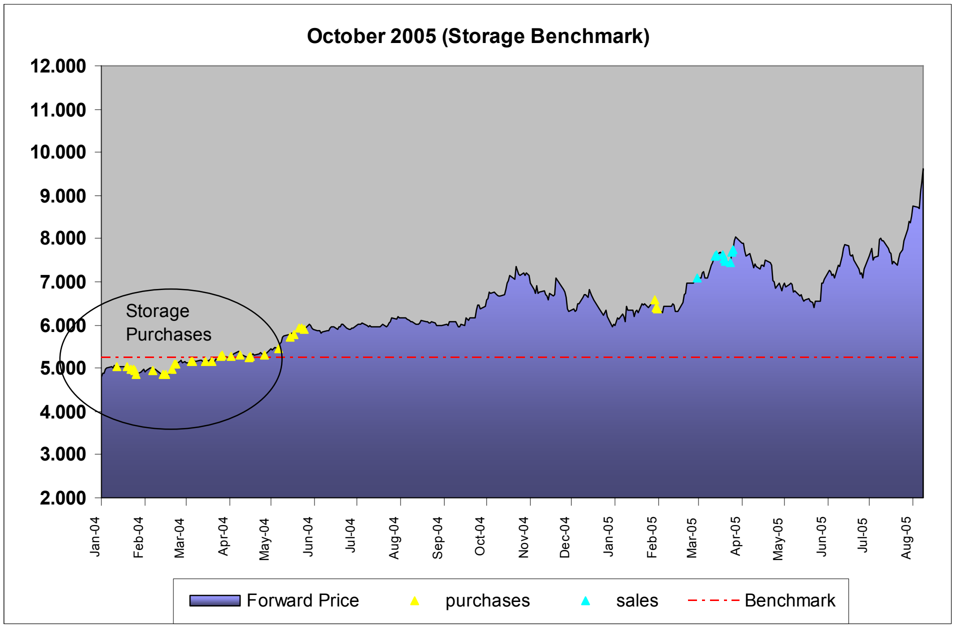
NJNG uses storage inventories to mitigate the gas cost volatility. There are two major characteristics that provide cost mitigation. The first characteristic is that the inventoried gas has a fixed price. The second characteristic, is the ability to control the costs by adjusting injection and withdrawal schedules. The fixed price for the storage gas inventory serves as factor for the winter pricing stability. Once storage is filed with the amount of gas required for the winter the price is not longer subjected to the volatility on the market.

With the aim of achieving the above goals, NJNG put in place the Storage Incentive Program that proved beneficial to customers through added price stability and cost reductions. The program establishes a benchmark cost for storage injections against which actual injection costs are measured. The promotion of innovative purchasing strategies serves the purpose of achieving cost savings that transparently pass-through to the customers bills. The profit or loss calculated as a difference between benchmark and actual costs are currently shared between company and customer in the proportion of 80% for customers and 20% NJNG.

NJNG Company has established a target range of 20-23 Bcf of gas available through storage as of October 31st each year. Eighteen Bcf of the total target gas is accumulated through the Storage Incentive Program. The guideline of the program sets the purchase level for each month equal to 2.57 Bcf during the period April through October.

Currently, NJNG executes this program by actively participating in hedges that accumulate 2.57 Bcf for each month during the first half of each period. As shown in Exhibit 100, the October 2005 Storage Incentive Program triggered a series of hedges between January 2004 and May 2004. The benchmark position was set at a level of $5.23. All other hedges during the entire period were executed as part of non-storage incentive and as operational and price discretionary injections.

Exhibit 100: October 2005: Storage Benchmark



Source: Pace and Vantage

Overall, we conclude that NJNG's storage incentive mechanism has led to the extraction of value by NJNG that otherwise would not have occurred absent the incentive. NJNG's reported optimization values of $11.3 million in 2006 and $14.4 million in 2007 are material and are consistent with estimates of the extrinsic option value of NJNG's storage capacity given market volatility. NJNG's application of sophisticated techniques provides strong evidence of their capability to deploy such expertise. We believe that comparable expertise is readily accessible by all of the GDCs, and that the incentive featured in the storage optimization program is relevant to the fact that NJNG employs more robust techniques in its storage optimization program than in its forward hedging program.

A significant driver of the overall cost of storage embedded in NJNG's rate structure is the benchmark price that is established when NJNG hedges the storage injection volumes that are designated for storage injection. For example, the estimated mark-to-market of the hedges that formed the benchmark for NJNG's 2006 storage program was $29 million. Notwithstanding the value extraction relative to the benchmark, there is currently no feature of the program that assures that the benchmark price will be minimized.

SIMULATION OF ENHANCED PROGRAM

To demonstrate the mechanics and effectiveness of the enhanced hedging framework, and to provide a basis of comparison with NJNG's current hedging practices, a simulation of a enhanced framework of hedging decision protocols was performed for the same time frame as our analysis of NJNG's hedging program. The simulation modeled a set of programmatic, defensive, discretionary, and contingent hedging decision protocols over the 2001 – 2007 period as applied to NJNG's monthly load requirements. Of note, the simulation reflects only of any number of possible combinations of programmatic, defensive, and discretionary, and contingent hedging decision protocols that could be selected.

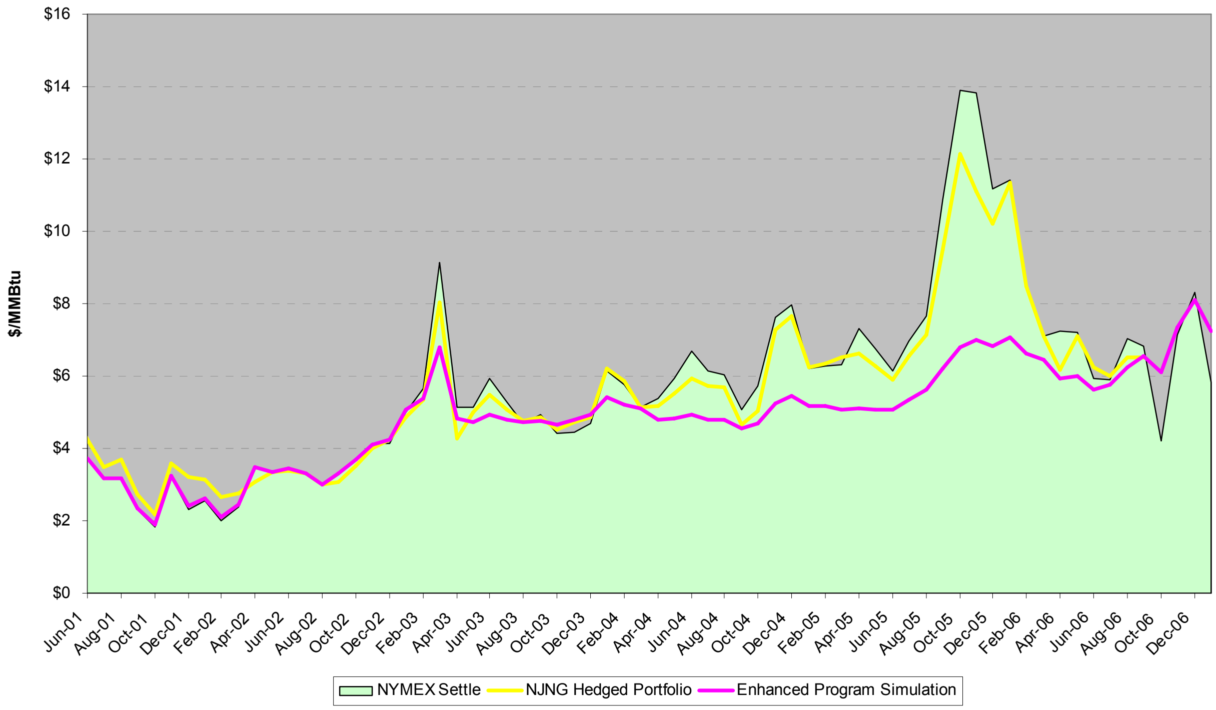
The simulation was performed by the use of a computer (MatLab) program that deploys the specified hedging decision protocols (identified above) against the actual history (daily) of forward prices that occurred during the period of the simulation. That is, the simulation's algorithms execute the decision rules to determine if hedging actions are needed in response to each day's forward price data, the attendant VaR-OP and VaR-FP, and a quantified discretionary buying indicator.

SIMULATION RESULTS

As depicted in Exhibit 101 below, the simulated hedging program produced significantly different results over the 2001-2007 time frame than did NJNG's program. The simulated program yielded a weighted-average cost of gas of $5.37/MMBtu as compared to NJNG's actual weighted-average cost of $6.27/MMBtu.

As depicted in Exhibit 101 and Exhibit 102 below, the simulated hedging program produced significantly different results over the 2004-2007 time frame than did NJNG's program. In aggregate, the simulated program yielded a weighted-average cost of gas of $7.13 per/MMBtu, and an overall positive mark-to-market of $50.7 million. While the simulation and NJNG's program performed comparably on an overall cost basis in the initial months, the results diverged during the period of the pronounced price run-up (September 2005 to January 2006) and the subsequent 14-month period. The simulation's deployment of options per the contingent protocol is observed in the participation in the market downturns in October 2006 and January 2007. Overall, the simulation resulted in a cumulative $87.5 million more favorable mark-to-market than did NJNG's program.

Exhibit 101: Enhanced Program Simulation vs. NJNG Hedged Portfolio



Source: Pace and Vantage

Of note, the simulation's use of contingent protocols (the deployment of options to mitigate out-of-market risk) is observed in the participation of market downturns in October 2006 and January 2007.

As was done in evaluating NJNG's program, the simulated hedging program's mechanics will be demonstrated by deconstructing the October 2005. The purpose of this analysis is to identify how design elements of the simulated program work to produce different results than NJNG's program for a critical price-spike period. [48]

ANALYSIS OF SIMULATION RESULTS – OCTOBER 2005

Overall, the simulated hedging program produced an 85% hedge ratio and a weighted-average cost of gas of $6.79 per MMBtu for October 2005, compared with a market settlement of $13.91/MMBtu. As weighted by NJNG's volume requirements, this translates to a $12.7 million mark-to-market. For reference, NJNG's actual results for October 2005

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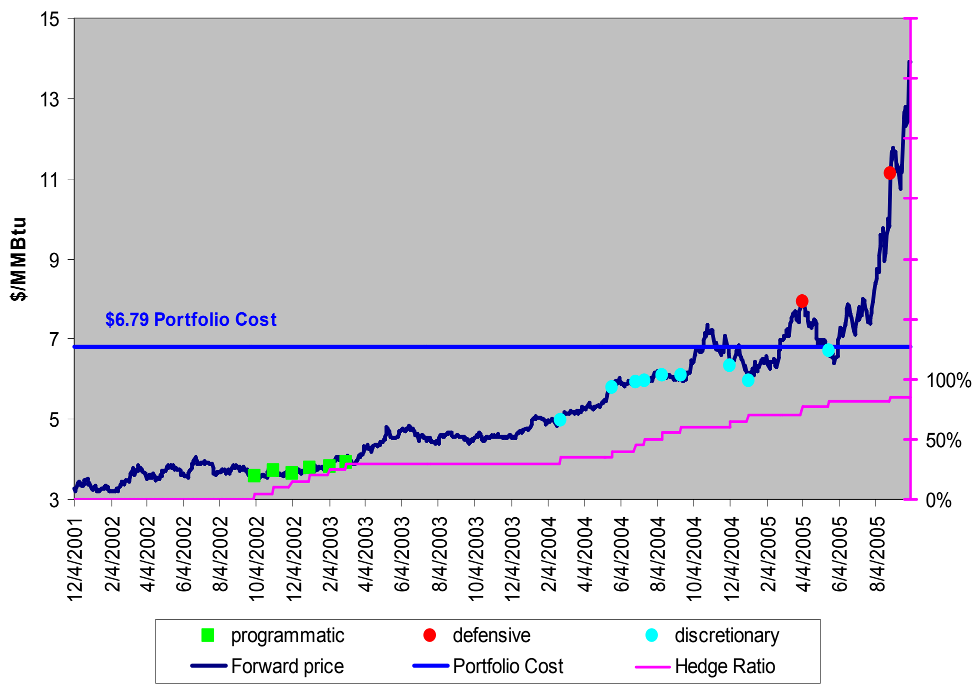
[48] / NJNG states that the simulation analysis of Oct05 assumes that the actual sendout levels could be known beforehand and that 100% of the load is subject to hedging. Since NJNG only hedges for the Periodic BGSS customers, not total sendout, the simulations may be based on incorrect assumptions.

were a 53% hedge ratio, an aggregate cost of $10.84/MMBtu, and a mark-to-market of $5.5 million.

Exhibit 102 below tells much of the story of why the simulated portfolio produced a lower average cost. First, the simulation's programmatic protocol established an early 30% hedge ratio by taking positions from October 2002 through March 2003 in 5% increments (i.e., hedges were taken as much as 36 months in advance of delivery). The programmatic hedges were then supplemented by six (6) discretionary hedges that were triggered before October 2004 (the 12-month-forward horizon). Accordingly, the simulated program accumulated a 60% hedged position a full year in advance of delivery. This is a primary driver of the difference between the simulation and NJNG's actual results. Two additional discretionary hedges were triggered in the 2004-2005 winter. In response to the short-lived price rise in the spring of 2005, the program executed its first defensive hedge; subsequently, the program executed 1 more discretionary hedge and 1 more defensive hedge to bring the overall hedge ratio to 85%.

Exhibit 102: Simulation – October 2005



Source: Pace and Vantage

But for the early hedge ratio established by the programmatic and discretionary protocols, the program would have hedged much more aggressively on a defensive basis both in the fall of 2004 as well as during the steep run-up in the summer/fall of 2005. Also, as Exhibit 102 displays clearly, the program filled the hedge ratio with a balance of discretionary and defensive hedges once October 2005 was within the 1-year horizon.

NJNG SPECIFIC RECOMMENDATIONS

In general, we find that NJNG's hedging program includes several elements fundamental to a sound risk management program. Our recommendations center on aligning those elements in a way that will produce more robust and more predicable results going forward. The comparison of the simulation with NJNG's existing program brings to light several design enhancements that NJNG can make to its program. Described below is Pace's recommendations to NJNG for enhancing its natural gas hedging program:

IV-R21 NJNG should define program objectives that are explicit in terms of potential cost and out-of-market outcomes that are tolerable.

NJNG's current objectives, while laudable in intent, are too ambiguous to translate into a clear set of decision rules. Not only are they fundamental to the utilities' deployment of hedges, explicit risk tolerance objectives should be a key basis upon which the programs' effectiveness is evaluated.

IV-R22 NJNG's program should be structured so as to ensure a hedge ratio is established well in advance of delivery to pre-empt the situation of hedging precipitously during the highly-volatile portion of the curve.

NJNG's current program mandates a 25% hedge ratio for the 7 – 18 month forward period by November 1 of each year, which must be augmented to 75% by the ensuing November 1 (largely through storage). As such, nearly all of NJNG's hedging activity occurs within a 12-month forward time horizon, leaving its costs exposed to acute volatility that takes hold in near-term horizons. We would recommend that NJNG's program be enhanced to establish an earlier hedge ratio – 24 or 36 months forward, to truncate its exposure to near-month volatility Doing so would enable defensive hedging actions be able to respond more effectively in a rising market such as that observed in the September 2005 to January 2006 period.

IV-R23 NJNG should more clearly define its Discretionary protocols/triggers.

The current program's lacks clear decision rules regarding when, how much, and how far forward to hedge to capture value opportunities. Moreover, we recommend that NJNG implement Discretionary protocols for a minimum 18-month horizon in order to capture attractive prices over a longer market cycle and help stabilize rates over multiple BGSS cycles.

IV-R24 NJNG's should establish defensive or "stop-loss" protocols by deploying VaR metrics such that hedge positions are taken when volatility threatens tolerance thresholds.

NJNG's current program does not trigger defensive hedges on the basis of market movements and their impacts on NJNG's BGSS portfolio costs. The pre-emptive feature of VaR-based defensive protocols can be expected to produce more efficient cost results by mandating hedges before prices move up.

IV-R25 <u>NJNG should modify its hedging program modifications on the basis of multiple simulations of varying decision rules.</u>

Such an exercise would enable NJNG to "preview" the results of different combinations of programmatic, defensive, and discretionary protocols, and provide an objective, quantified basis for determining both risk tolerances and program design.

VI. New Jersey GDCs' Use of Hedging Instruments

A. CONTEXT FOR HEDGING

OBJECTIVE-SETTING

The objective-setting function of a utility's commodity hedging program serves as the key driver of which hedging tools are deployed and how they are deployed. Building off of the objective-setting process laid out in the enhanced programs framework, a well-structured hedging program should mitigate unfavorable outcomes first; then promote improved cost-effectiveness where achievable. To this effect, program objectives need to establish a reasonable pairing of explicit ***upside*** and ***out-of-market tolerance boundaries***. An example of such objective pairings might be:

- Manage volatility, with 97.5% confidence, to constrain the potential for unfavorable gas costs to no worse than $9.00/MMBtu; and
- Limit hedges to assure, with 97.5% CONFIDENCE, that gas costs will not diverge unfavorably from market by more than $1.25/MMBtu

Once a reasonable pair of upside and out-of-market tolerance boundaries are established, the utility will evaluate what the market allows for in terms of choices of hedging instruments.

RISK TOLERANCE PAIRINGS

Market conditions dictate the relative emphasis of fixed-price instruments and options a utility needs to deploy. The more volatile the market, the more a utility's pairing of upside and out-of-market tolerance boundaries will be simultaneously encroached and the greater will be the need to use options. Thus, the choice of fixed-price instruments and options is neither arbitrary nor based on their stand-alone payout structures; rather, the deployment of these instruments is directly a function of the need to defend both dimensions of risk given market volatility.

For example, a utility with a high open price tolerance but a relatively low tolerance for out-of-market positions may adopt a strategy that does not hedge in rising markets for fear of being "out-of-the-money" in a falling market (see Exhibit 103 Row 1). In this situation, the utility would require no option budget because it rarely hedges and would not need to employ contingent strategies since it would rarely, if ever, find its portfolio "out-of-the-money." Similarly, a firm with limited tolerance to the upside but which shows less regard for potential out-of-market positions would also require limited to no options coverage; because the utility has little tolerance for rising prices, it would hedge aggressively with fixed-price instruments and still feel comfortable with the program in a declining market (see Exhibit 103, Row 3). Conversely, companies with a combination of medium to low open price tolerance and low out-of-market tolerance are more likely to rely on options strategies in order to best comply with their upside and out-of-market tolerance boundaries. The options strategies are required because hedging only with fixed-price instruments will place the open and out-of-market tolerance objectives in conflict (see Exhibit 103).

Exhibit 103: Reasonable Pairs Chart

Reasonable Pairs

Open Price Tolerance	Out-of-Market Tolerance	Option Budget
HIGH	LOW	ZERO
MEDIUM	MEDIUM	ZERO
LOW	HIGH	ZERO
MEDIUM	LOW	MEDIUM
LOW	LOW	HIGH

Source: Pace and Vantage

FRAMEWORK OF DECISION RULES

Hedging Decision Protocols are decision rules designed to *constrain exposure to volatility* for both risk types. To briefly review, HDPs comprise the following:

- Some early ***Programmatic Protocols*** (dollar-cost-average)
- ***Defensive Protocols*** that hedge incrementally, but not precipitously, when volatility threatens tolerable levels
- ***Discretionary Protocols*** that capture attractive price points in diversified proportions
- A ***Contingent Strategy*** to forewarn potentially unfavorable hedge outcomes and shift to options when necessary

The decisions surrounding which financial instruments to choose and when and how to deploy them are most relevant to the ***Contingent Strategy*** of HDPs, for which options serve as a critical component in achieving the utility-specified program objectives. In a robust risk management program, structured options transactions are deployed as a Contingent Strategy to manage out-of-market risk.

B. DEFINITIONS OF COMMON HEDGING INSTRUMENTS

For the purposes of a commodity-cost hedging program, the array of existing hedging instruments can be broken down at the most basic level into fixed contracts and options contracts. Fixed contracts include physical forward contracts and financial swaps and futures contracts. Often, fixed contracts are the primary instrument used to hedge programmatically, defensively, and discretionarily. Options consist of call and puts, and distinct options strategies exist based on the various combinations of call options and put options. These instruments are critical tools of the contingent strategy and can be used to manage out-of-market risk.

Below are definitions of the most relevant hedging instruments to an enhanced program.

Physical Hedge

A hedge that is tied to physical volumes and entered into with a physical supplier.

Financial Hedge

A financially settled instrument that is entered into with a counterparty and is independent of physical exchange/delivery of the commodity.

Commodity Swap

A contract in which counterparties agree to exchange payments related to indices, at least one of which (and possibly both of which) is a commodity index.

Option

The right but not the obligation to buy (sell) some underlying instrument at a pre-determined rate on a pre-determined expiration date in a pre-set notional amount. Options consist of "Calls" (Call Option) and "Puts" (Put Option).

Call Option

A call option is a financial contract giving the owner the right but not the obligation to buy a pre-set amount of the underlying financial instrument at a pre-set price with a pre-set maturity date.

Put Option

A put option is a financial contract giving the owner the right but not the obligation to sell a pre-set amount of the underlying financial instrument at a pre-set price with a pre-set maturity date.

Collar

Combination of options in which the holder of the contract has bought one out-of-the money option call (or put) and sold one (or more) out-of-the-money puts (or calls). Doing this locks in the minimum and maximum rates or price that the owner will pay for the underlying at expiry. The premium received from the sale of the out-of-the-money put (call) is used to offset some of the premium paid on the long call (put).

Bear Put Spread

A type of options strategy that is achieved by purchasing a put option at a specific strike price while selling another put at a lower strike price. This strategy is used to provide existing swap positions additional participation in a falling market.

REVIEW OF NEW JERSEY NATURAL GAS HEDGING INSTRUMENTS

New Jersey Natural Gas Company (NJNG) has engaged in physical and financial hedging of its natural gas commodity costs for a number of years, in fact it developed its hedging program prior to the natural gas price spike of 2001. Additionally, since the summer of 2004, NJNG has hedged via the Storage Incentive program it developed with the New Jersey Board of Public Utilities (NJBPU) Staff and Rate counsel. Today, a variety of physical forward agreements, financial positions, and storage assets constitute its natural gas portfolio pertaining to its BGSS customer base.

NJNG's hedging decisions are governed by the Guidelines and Procedures established by its Risk Management Committee (RMC). Currently, NJNG is authorized to utilize all of the hedging instruments previously outlined in the section entitled "Definition of Common Hedging Instruments," including futures contracts, options contracts, commodity swaps, and basis swaps. Exhibit 104 contains a summary list of the company's approved hedging instruments.

Exhibit 104: NJNG Hedging Instruments

Type	Instrument	Authorized for Use	Time Horizon	Currently Used	Frequency
Fixed	Swaps	YES	1-18 Months	YES	FREQUENT
	Forwards	YES	1-18 Months	YES	FREQUENT
	Futures	YES	1-18 Months	YES	FREQUENT
Options	Caps/Calls	YES	1-18 Months	YES	FREQUENT
	Floors/Puts	YES	1-18 Months	YES	OCCASIONALLY
	Collars	YES	1-18 Months	YES	OCCASIONALLY

Source: Pace and Vantage

NJNG's hedging activities can be divided into two distinct components, compulsory basic hedging operations and storage optimization. As such, the company's decisions surrounding when and how much to hedge are guided by two primary objective functions: (1) achieve a certain hedge level prior to the onset of winter, and (2) realize storage costs below its benchmark.

The first objective function requires that NJNG achieves a minimum hedge ratio of 75% for the November-March winter period by November 1, and that it also hedges at least 25% for the ensuing 12-month April-March period. In effect, its purpose is to ensure that no more than 25% of its normalized winter BGSS gas load is exposed to market prices. This practice tends to promote price stability for the BGSS customers and helps mitigate potentially volatile prices during peak demand season.

For its second objective function, to realize storage costs below the established benchmark, NJNG uses financial instruments essentially to capture value (arbitrage). It promotes the sharing of benefits between NJNG and its ratepayers and encourages NJNG to capture the lowest possible portfolio cost following the establishment of its storage incentive benchmark. NJNG executes its storage incentive hedging largely through the use of options.

C. REVIEW OF PUBLIC SERVICE ELECTRIC & GAS HEDGING INSTRUMENTS

The hedge program of Public Service Electric and Gas (PSE&G) relies solely on supply contracts for future delivery of natural gas to manage its commodity price risk. At the BGSS level, PSE&G's natural gas price hedging is the product of an objective function that demands a minimum hedge level each year. More specifically, it requires the firm to comply with pre-determined volumetric hedge targets prior to commencement of the winter and summer seasons. The ER&T Risk Management Policy for Basic Gas Supply Service, upon renewal, delineates hedge targets for the winter and summer seasons. For example, the most recent Risk Management Policy established a hedge target of 325,000 MMBtu/day, or 49.1 Bcf for the 2008 winter season, and a target of 230,000 MMBtu/day, or 49.2 Bcf for the 2008 summer season. Therefore, PSE&G will be expected to have hedged approximately 98.3 Bcf of its natural gas portfolio for fiscal year 2008. This hedging objective insures that only a portion of its BGSS portfolio is exposed to market prices, thereby mitigating the risk of price spikes and potential volatility in customer rates.

In reaching the hedge target, PSE&G accumulates hedge positions through two mechanisms. The Non-Discretionary component covers one-half of the targeted volume, which it accomplishes by hedging beginning 18 months prior to commencement of the respective winter or summer season and continuing on a "relatively ratable basis." The remaining 50% of the targeted volume is hedged Discretionarily based on market conditions and time triggers. The Discretionary time triggers are as follows:

Winter:

- Minimum 1/3 of 50% target hedged by 12 months prior start of season
- Minimum 2/3 of 50% hedged by 6 months prior start of season
- Entire 50% hedged immediately before start of winter season

Summer:

- Minimum 1/3 of 50% target hedged by 12 months prior start of season
- Minimum 2/3 of 50% hedged by 6 months prior start of season
- Entire 50% hedged before end of summer season

While PSE&G has granted its risk management function the authority to employ all hedging instruments quintessential to an enhanced program, the utility has chosen to hedge entirely through the use of physical fixed forwards; it has refrained from utilizing financial derivatives of any type, including futures, swaps and options since 2003. However, the company does have a history of hedging via financial instruments prior to 2003, when it employed both fixed price derivatives and various options strategies, including collars.

Exhibit 105: PSE&G Hedging Instruments

Type	Instrument	Authorized for Use	Time Horizon	Currently Used	Frequency
Fixed	Swaps	YES	1-18 Months	NO	N/A
	Forwards	YES	1-18 Months	YES	FREQUENT
	Futures	YES	1-18 Months	NO	N/A
Options	Caps/Calls	YES	1-18 Months	NO	N/A
	Floors/Puts	YES	1-18 Months	NO	N/A
	Collars	YES	1-18 Months	NO	N/A

Source: Pace and Vantage

D. REVIEW OF ELIZABETHTOWN GAS HEDGING INSTRUMENTS

In December 2000, Elizabethtown Gas Company (ETG) established its Gas Procurement Strategy and Plan (GPS&P), the focus of which is "to manage or mitigate natural gas commodity price volatility for the benefit of firm sales customers of ETG."

ETG's GPS&P requires that a certain mixture of physically hedged prices, financially hedged prices, and market purchases (spot prices) constitute its natural gas portfolio. Its Risk Management Policy allows for utilization of physical forward contracts, in addition to financial swaps, futures and options. However, the sale or underwriting of options is strictly prohibited; option use is restricted to the establishment of caps and/or floors through purchases of options on futures contracts. Exhibit 106 contains a list of the company's approved hedging instruments.[49]

Exhibit 106: ETG Hedging Instruments

Type	Instrument	Authorized for Use	Time Horizon	Currently Used	Frequency
Fixed	Swaps	YES	3-36 Months	YES	FREQUENT
	Physical Forwards	YES	1-18 Months	NO	N/A
	Futures	YES	3-36 Months	NO	N/A
Options	Caps/Calls	YES	3-36 Months	NO	N/A
	Floors/Puts	YES	3-36 Months	NO	N/A
	Collars	YES	3-36 Months	NO	N/A

Source: Pace and Vantage

The primary stated objective of ETG's hedging program is to produce a diversified natural gas portfolio by purchasing a basket of physical hedges, financial hedges, and market prices. The Risk Management Policy insures a particular balance between fixed prices (hedges) and floating prices (market purchases) by requiring that the firm hedge at least 33% (Non-Discretionary) but no more than 67% (Non-Discretionary + Discretionary) of its projected monthly flowing gas. The 33% to 67% of expected volume for which ETG hedges its price exposure is hedged via physical storage injections (natural hedge), financial hedging of storage injections, and financial hedging of flowing gas purchases. Non-Discretionary hedging is conducted in a programmatic fashion commencing 18 months prior to each delivery month, while Discretionary hedges may be placed as many as 36 months but no

[49] / ETG states that the following table is misleading because ETG used fixed futures exclusively until recently, ETG has also used collars and puts.

less than 2 months in advance of the delivery period, although the overall focus remains on the 18-month rolling forward period.

Additionally, the Discretionary Level, which ranges from 0% to 34% of storage injection and flowing gas purchase volumes, is determined by a decision matrix; the criteria for the decision matrix are: (1) the relationship between the current NYMEX Price compared to the Long Term Price Forecast and (2) a company-established assessment of market sentiment known as the "Market Barometer." Finally, the Risk Management Policy governs that Collars must not constitute more than 50% of Discretionary hedge quantities.

In practice, ETG has hedged financially primarily via Henry Hub Futures, but it has not employed options as part of its natural gas risk management strategy. While the use of options is permitted, it is not part of the company's formal risk management strategy. It states, "In the event that adequate amounts of cash become unavailable to support the hedge program, then the RMC will consider alternative hedging strategies to minimize its margin exposure. For example, the RMC may consider purchasing put options to offset margin calls resulting from gas price declines."[50]

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[50] / ETG states that it has used collars and puts as a components of its hedging program.

E. REVIEW OF SOUTH JERSEY GAS HEDGING INSTRUMENTS

South Jersey Gas Company (SJG) formally established its hedging program with the institution of its Risk Management Policy (RMP) in 2001. The company subsequently began using financial instruments to hedge its price risk the same year through the initiation of the Non-Discretionary component of its program. SJG's financial hedging activities are composed of three parts: Non-discretionary, Discretionary, and Storage Incentive mechanism.

As delineated in the company's RMP, SJG's commodity cost hedge program holds the authority to utilize all of the hedging instruments outlined in Exhibit 5, including physical and financial fixed price contracts and financial options. It may employ any of these instruments to hedge its estimated future positions as far as 18 months forward. Additionally, options are authorized for use up to $3 million in annual premium expenditures.[51]

Exhibit 107: SJG Hedging Instruments

Type	Instrument	Authorized for Use	Time Horizon	Currently Used	Frequency
Fixed	Swaps	YES	1-18 Months	YES	FREQUENT
	Forwards	YES	1-18 Months	YES	OCCASIONALLY*
	Futures	YES	1-18 Months	YES	FREQUENT
Options	Caps/Calls	YES	1-18 Months	NO	N/A
	Floors/Puts	YES	1-18 Months	NO	N/A
	Collars	YES	1-18 Months	NO	N/A

Source: Pace and Vantage

The SJG RMP requires that the company hedge no less than 20% and no greater than 50% of its estimated annual requirements, excluding summer season purchases which may be considered "natural" hedges. In its recent hedging practices, the utility has striven to hedge approximately 66% of its natural gas portfolio; achieving a hedge target of about two-thirds of its annual portfolio has served as one of the primary objective functions of its hedging

[51] / SJG claims this is a misrepresentation of "Secondary Transactions" contained in the company's Risk Management Policy. The policy is to limit losses incurred by making secondary transactions to$3 million, which could include the cost of options.

program. This practice is intended to provide stability in customer rates by mitigating open market exposure to dramatically rising prices.

The second stated objective of SJG's hedging program is to improve on the established benchmark for the Storage Incentive Mechanism and to capture the lowest possible portfolio cost following the establishment of this benchmark. This function provides for increased profitability for the firm, while at the same time promoting the sharing of cost benefits with its ratepayers. The benchmark is set by accumulating hedge positions for the summer months beginning 1 year prior to injection season and is established on March 31.

SJG has traditionally relied on a combination of physical and financial contracts to pursue its hedging objectives. Currently, it relies increasingly on financial instruments, and the company intends to hedge strictly financially in the future. Its basket of working financial instruments includes swaps and futures, but excludes options. The company has contemplated executing options-based strategies in the past, but it has not progressed beyond the exploratory stage.[52]

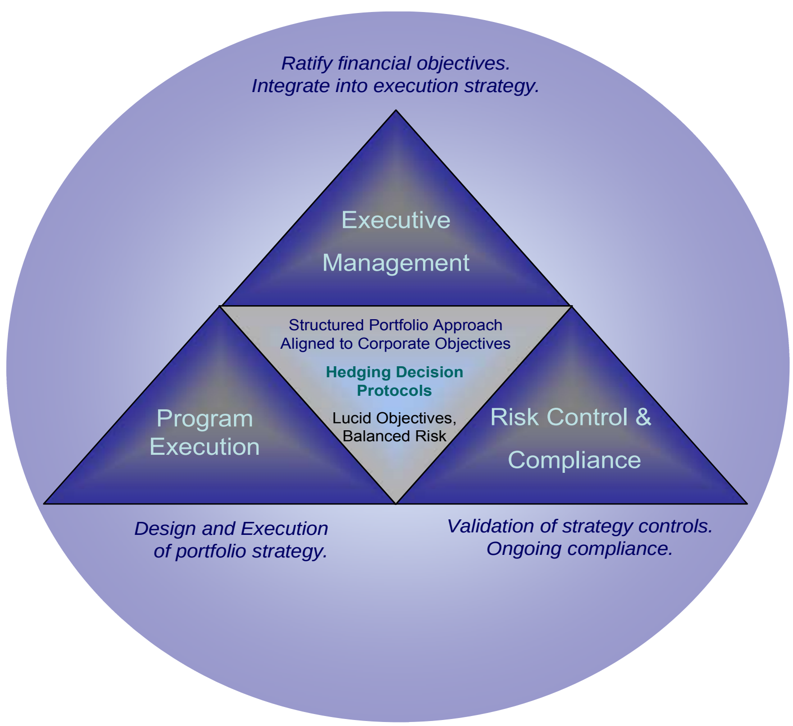
[52] / SJG states it has used financial options (puts and calls) in the discretionary hedging strategy on a limited, but regular basis since 2002.

VII. NEW JERSEY GDCS' RISK MANAGEMENT GOVERNANCE, POLICIES, AND ORGANIZATIONAL STRUCTURE

A. CHAPTER SUMMARY

As outlined in the report on Enhanced Program design, program governance and oversight are fundamental to effective risk management. The design of, and compliance with, appropriate controls is vital in at least two respects. The first, rather obvious reason is to guard against speculation and the potential for risk augmentation by an unchecked front (or back) office. The second is to ensure compliance with the program's parameters (i.e., the hedging decision protocols) such that the program is conducted in a manner that promotes the defined risk mitigation objectives. As indicated below, the organizational structure that corresponds to a enhanced program will provide for separate yet interdependent functions for Executive Management, Program Execution, and Risk Control and Compliance.

Exhibit 108: Organizational Structure



Source: Pace and Vantage

Here, we address the question of the GDCs' effectiveness in governing their existing risk management practices and, from that review, make inference about the firms' capacity for effective governance of the more sophisticated commodity hedging program structures we are recommending.

Overall, we find that the GDCs have effective governance procedures in place given their existing risk management programs. As described in the body of this report section, our findings are based on the existence of written policies, awareness and involvement of the firms' boards, delegation of authorities, existence and conduct of risk management committees, separation of duties, auditing procedures (including observable compliance with Sarbanes-Oxley requirements), and evidence of compliance gleaned from our own spot check of transactions. The exhibits below provide a summary of the key facets of program governance for each of the four GDCs:

Exhibit 109: Key Facets of Program Governance Part 1

	Involved In RM Program?				Codified in Procedures Document?			
	PSE&G	NJNG	ETG	SJG	PSE&G	NJNG	ETG	SJG
Board of Directors	Y	Y	Y	Y	Y	Y	Y	Y
Risk Management Committee	Y	Y	Y	Y	Y	Y	Y	Y
Chief Risk Officer	Y	N	Y	N	Y	N	Y	N
Interal Audit								
Front Office	Y	Y	Y	Y	Y	Y	Y	Y
Middle Office	Y	Y	Y	Y	Y	Y	Y	Y
Back Office	Y	Y	Y	Y	Y	Y	Y	Y
						1		2

Notes:

1. NJNG: The functions to be performed are described in the RMC Guidelines and Procedures, the terms "Front, Back, Middle Office" are not.

2. SJG: The functions to be performed are described in The Risk Management Policy and Procedures. Detailed Process and Procedures are described in a variety of other policies/procedures including Contract Review and Approval Procedure, Derivatives cycle, Risk Control Relationship process description.

Exhibit 110: Key Facets of Program Governance Part 2

	Role being Performed?				Codified in Procedures Documents?			
	PSE&G	NJNG	ETG	SJG	PSE&G	NJNG	ETG	SJG
Front Office								
Executing Trades	Y	Y	Y	Y	Y	Y	Y	Y
Trade Entry	Y	Y	Y	Y	Y	Y	Y	Y
Middle Office								
Reporting	Y	Y	Y	Y	Y	Y	Y	Y
Program Oversight	Y	Y	Y	Y	Y	Y	Y	Y
Credit Management	By ERMD	Y	Y	Y	Y	Y	Y	Y
Back Office								
Trade Confirmation	Y	Y	Y	Y	Y	Y	Y	Y
Reconciliation of trades	Y	Y	Y	Y	Y	Y	Y	Y
Accounting	Y	Y	Y	Y	Y	Y	Y	Y

While the firms' forward hedging practices for BGSS customers are less complex than we are recommending, the firms have sophisticated risk management reporting and monitoring processes consistent with the complexity of their hedging and trading activities in other aspects of their operations. These practices provide clear evidence of the existence of the GDCs' capacity to deploy effective governance procedures for much more sophisticated risk management processes. For example, PSE&G's enterprise-wide risk management policies and practices – which derive from the corporations' generation assets and significant credit risk management requirements – are well-structured and deployed. Likewise, NJNG employs a sound separation of duties, risk monitoring, and auditing procedures pertaining to its storage incentive program.

The areas of potential weakness in the firms' governance procedures are not material, at least with respect to executing the existing risk management functions which are the subject of this engagement. We believe that implementation of a more robust BGSS hedging program (as we are recommending) will provide the impetus for the firms to improve in these areas. Our conclusion, therefore, is that governance and auditing capabilities are not a stumbling block to the GDCs adopting more robust BGSS forward hedging programs. However, clarity of the regulatory framework under which hedging activities will be treated (in all permutations of outcomes) is essential.

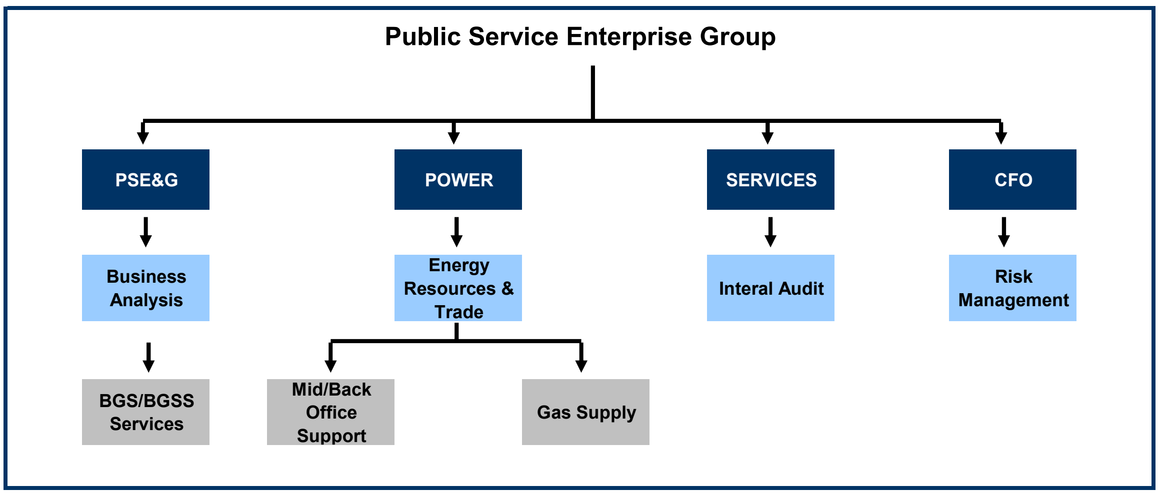
B. PUBLIC SERVICE ELECTRIC & GAS

INTRODUCTION

Public Service Electric and Gas (PSE&G) is the electric and gas distribution subsidiary of Public Service Enterprise Group (PSE&G). The parent's other main subsidiaries include PSE&G Power LLC, and PSE&G Energy Holdings LLC. PSE&G serves about 70% of New Jersey's population.

For purposes of our analysis, there are four key organizations within the overall PSE&G structure:

Exhibit 111: Public Service Enterprise Group



- BGSS Services is the GDC organization charged with management and oversight of the gas supply.
- Energy Resources & Trade (ERT) is responsible for energy procurement and trading within Power. It procures the gas supply for PSE&G under a full requirements services agreement. Gas Supply is the front office, responsible for executing all of the transactions. They are supported by the mid and back office support group within ERT.
- Internal Auditing resides in the Services organization.
- The Chief Risk Officer and the Risk Management organization report to the CFO.

Top level governance and oversight of these key organizations originates with the PSE&G Board of Directors including the Board's Audit Committee and its Corporate Governance Committee.

An additional critical policy-setting and oversight function is provided by the Risk Management Committee, which is chaired by the CFO and comprised of the highest level executives. ERT also has a Risk Advisory Committee (RAC) which has a limited role.

In the sections that follow, we will discuss each of these organizations, their role in the management of the gas supply, polices and processes that frame their work and their overall effectiveness in meeting those responsibilities.

PUBLIC SERVICE ELECTRIC & GAS FINDINGS

VI-F1 Comprehensive governing policies are in place and have been internalized in the organization.

VI-F2 BGSS Services is the single organization in the gas supply process that has direct accountability for the regulated utility services customer base.

VI-F3 The organizations in ERT that manage the gas supply and hedging efforts are fulfilling their responsibilities to the existing program in an effective and professional manner.

VI-F4 The various organizational relationships of Internal Auditing provide for independence yet allow effective working relationships with other compliance and governance functions.

VI-F5 The internal audit function contributes to a viable BGSS program via annual audits of ERT's implementation of the contract.

VI-F6 PSE&G has a comprehensive, enterprise risk management in place and a sound process by which it manages that program.

VI-F7 A spot check of transactions suggests full compliance with complete and accurate transaction documentation readily available.

VI-F8 PSE&G has made an aggressive effort, at both the Board and management levels, to achieve full compliance with Sarbanes-Oxley.

VI-F9 PSE&G has a strong internal audit program in place and supporting controls that assure a high level of compliance.

GOVERNANCE & ORGANIZATIONAL STRUCTURE

Board of Directors

The policies governing the operations of the Board are well defined and communicated. Governance principles are clearly stated and comprehensive in their scope. More importantly, the key personnel we met were conversant in these matters, suggesting that the Company's governing principles are more than words – they are truly practiced and are indeed internalized within the organization.

Our review showed that the Board's focus evolved over the last 5-6 years as the demands of Sarbanes-Oxley and other governance pressures grew. SOX issues, questions and compliance status tended to dominate the Board minutes, and it is clear that the Board confronted these demands aggressively and effectively. During this period, risk management also became increasingly important and appeared more frequently in Board meeting documentation.

Risk Management Committee

PSE&G's Risk Management Committee (RMC) consists of the highest level executives in the Company. However some circumstances suggest that the Company has had some difficulty in keeping the RMC a high priority including:

- The RMC was unable to garner a quorum throughout 2005.
- Rather than elevating the priority of RMC, or assigning individuals better able to attend the meetings, the Company changed them to make them more reasonable while still including management at more senior levels – thus maintaining the priority of the committee rather than delegating down.
- The quality of the meeting minutes, which were generally informative through 2005, deteriorated considerably in 2006, such that there is little record of meaningful discussion and accomplishment of the RMC since that time.
- The lack of quality minutes hampers the oversight capabilities of the Board. Further, minutes are not routinely sent to the Board although the Company's policies require that "minutes will be taken for all RMC meetings and be available to the Audit Committee".

While we hope the above discussion is helpful to the Company, the role of the RMC in the GDC hedging program is more of a concern for our work. As with our earlier discussion of Board activities, the subject of the GDC and its pricing challenges on behalf of customers is simply not a question for RMC. This diluted attention flows from the reality that gas pricing for residential customers is a pass-through proposition. Regulatory risk, in the form of imprudence, is the Company's only exposure. Ironically, this guarantees that anything but strict conformance to BPU approved procedures is off the table. Under the current paradigm, it would be anything but prudent for the Company to take on internal risks to better manage external (customer) risks.

Chief Risk Officer

The Chief Risk Officer (CRO) manages the Enterprise Risk Management Department (ERMD). This key position oversees the risk profile of the Company and assures compliance with appropriate risk management policies and procedures.

The ERMD is the seat of subject matter expertise for risk management. As such, they have responsibility for assuring appropriate methodologies are available to the organization and that those methodologies are consistently applied.

The CRO was able to present a very clear picture of her duties and responsibilities and we have no reservations with the capabilities she has developed and how those skills are effectively utilized within the Company. We would characterize the organization and its programs as very strong and impressive, with perhaps just a couple areas of concern. First, we discussed above that the RMC is not functioning with the priority intended by executive management.

Second, the CRO was able to efficiently lay out a very structured and powerful hierarchy of policies and procedures, but people from other PSE&G organizations are far less conversant in those documents. This raises the question of how effectively the policies have been internalized by others.

HEDGE PROGRAM EXECUTION

Risk Advisory Committee ("RAC")

BGSS hedge executions are performed by ER&T and monitored by PSE&G. ER&T's risk management practice for basic gas supply service (BGSS) was reviewed and approved by the RMC and governs the hedging activities conducted by ER&T on behalf of the BGSS customers. Monitoring of these hedging activities is jointly performed by ER&T's VP Gas Supply and PSE&G's Business Analysis unit.

BGSS Services

The BGSS services organization is an arm of the Business Analysis unit in the regulated subsidiary. Their role is critical in that they are the only entity within the gas supply process that directly represents the utility. There is little question that the greatest source of expertise in gas procurement lies within ERT. It is therefore quite natural for them to gravitate to a lead role in defining supply options, including hedging strategies. There is no suggestion here that BGSS Services take a more dominant role; rather, it must simply be established that BGSS Services is applying the appropriate level of direction and oversight.

The key policy document is the "ER&T Risk Management Policy for BGSS" which originates within ERT. But it appears that this "policy" is more akin to a "plan" in that it articulates the quantities associated with the residential hedge program but offers little in the way of applicable policies. The document does address accountabilities and, again, ERT emerges as the dominant organization.

Another question relates to the role of PSE&G in risk management. Interestingly, the Corporate RMC previously directed that an RMC be formed in PSE&G. This directive was subsequently reconsidered and rescinded. To the extent that PSE&G assumes a more aggressive posture in managing customer price risks, it would be logical to again consider the appropriateness of an RMC within the regulated utility.

ERT

The two organizations within ERT that provide the gas supply services are Gas Supply and the Mid/Back Office Support group. We found both organizations to be well structured, well staffed, professional and effective.

Gas supply transactions are originated in the Fuels Supply and Trading Section of Gas Supply (the front office). Two traders make all of the BGSS purchases, which take the form of forward physical contracts. The Company's trading floor is nicely laid out to permit close interfaces with support personnel and separation from traders of non-BGSS portfolios.

SUMMARY

In our enhance program report, we defined the essential elements of an effective risk management program. Within the context of this framework, PSE&G has all of the bases covered. The executive-level RMC is in place and functioning. PSE&G also has in place a Governing Policy, which is contained within a well-structured hierarchy of policies that define the risk management program. A simplified view of that hierarchy follows:

- Delegation of authorities – contained in two documents: the D of A's for Power and ER&T.
- Standards of conduct – ERT has established a number of operating policies that are listed in the Procedures and Control Manual. In addition, all employees are required to subscribe to the Company's Standards of Integrity, and must certify compliance via signature and understanding via testing.
- Risk management philosophy – the overall structure is defined in the PSE&G Enterprise Risk Policy. Policy is also clearly articulated in other documents in the hierarchy.
- Permissible activities and instruments – approved trading products and instruments are defined in the RMC Guidelines.
- Quantification of positions and exposures – methodologies are discussed in the Risk Practices and in the ER&T Manual.
- Management and control – details of control requirements are delineated in the PSE&G Risk Management Practice document and in the ER&T Procedures and Control Manual.

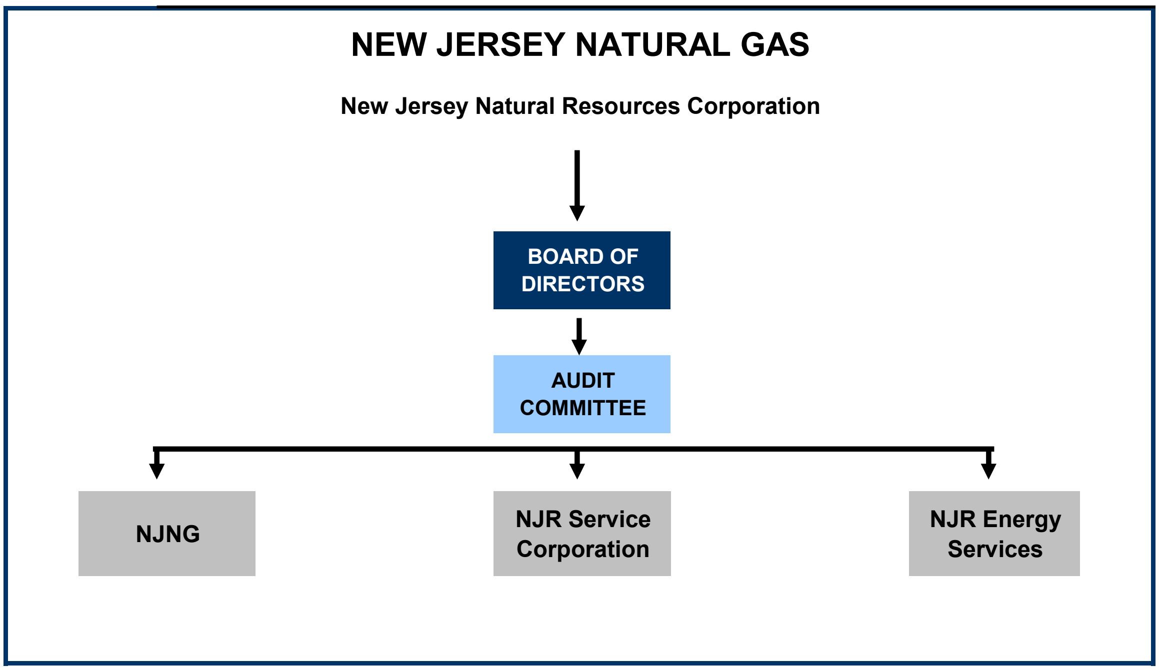
Compliance is assured by a variety of organizations, including the business units themselves, ERMD and Internal Auditing. Our review revealed no examples of major non-compliances and interviews with the CRO, VP of Internal Auditing and business unit managers likewise suggested a high level of compliance.

If a new paradigm evolves for hedging the residential gas supply, PSE&G stands well positioned to manage it effectively. With a high level of skills and capabilities, sophisticated tools and methodologies, and an effective, well-designed program, significant benefits are sure to accrue to PSE&G and its residential customers.

D. NEW JERSEY NATURAL GAS

INTRODUCTION

Exhibit 112: New Jersey Natural Gas



New Jersey Natural Gas is the gas distribution utility of New Jersey Resources Inc. It serves approximately 480,000 customers in New Jersey.

For purposes of assessing Risk Management in the context of gas supply hedging programs, the organization structure of the risk management activities consists of four primary entities:

New Jersey Natural Gas Company's (NJNG) Risk Management Committee and New Jersey Energy Services (NJRES) Risk Management Committee (RMC) provide governance for the hedging activities of the gas distribution company (NJNG) and the non-regulated operations of New Jersey Resources (NJRES). The RMCs report to the Audit Committee of the New Jersey Resources Corporation Board of Directors.

NJR Service Corporation provides support services characteristic in a corporate shared services environment (functions include financial services including the controller, general counsel, internal audit, and corporate services). Functions expressly involved in the risk management role include the controller's office, internal audit, and general counsel.

The Risk Management Committees function nearly identically (they meet at the same time and minutes of meeting are reported in the same documents). Remarks here are intended to relate primarily to the NJNG RMC.

NJNG's RMC currently consists of five Company officers: Senior Vice President and CFO, Senior Vice President Energy Services, Vice President Regulatory Affairs, Vice President and General Counsel and Controller.

Top level governance of the hedging function is conducted by the RMCs with the express and active involvement of the Board's audit committee. The primary function of the RMC and board's audit committee is to ensure that the policies and procedures which govern the risk management/hedging function are complied with. To that end, with respect to hedging, the company culture appears focused on monitoring, reporting and controlling risk inherent in the hedging process.

NEW JERSEY NATURAL GAS FINDINGS

VI-F10 The NJR Board Audit Committee is actively engaged in governance of the RMC.

VI-F11 The RMC is highly attuned to ensuring compliance with the RMC Guidelines and Policy and managing the executional risks of its hedging activities.

VI-F12 The organization provides appropriate separation of duties between Front, Middle and Back office functions.

VI-F13 Internal audit provides independent oversight of internal controls.

VI-F14 Energy Services is highly conscious of the obligation associated with BGSS service.

VI-F15 The Front Office functions exist, are monitored and focus on compliance with process and procedures.

VI-F16 Front Office personnel are fluent in the company's risk management guidelines and procedures and aware of the firm's focus on managing the executional risks of their activities.

VI-F17 The Manager of Credit and Contracts is responsible for conducting due diligence on trading counterparties and provides a key contract administration role.

VI-F18 The Manager of Mid Office provides essential functions such as trade confirmation and reconciliation.

VI-F19 The Manager of Credits and Contracts provides essential contract administration and accounting responsibility.

VI-F20 A spot check of transactions suggests compliance with transaction documentation readily available.

VI-F21 New Jersey Resources has made a diligent effort to achieve compliance with Sarbanes-Oxley.

The following sections address the organizations, their role in the management of gas supply and hedging, policies and processes and their overall effectiveness in meeting the current objectives of hedging activities.

GOVERNANCE AND ORGANIZATIONAL STRUCTURE

Board of Directors

The chair of the Audit Committee shared the point of view from 'the top' that the firm is first and foremost a gas distribution company focused on serving customers with an essential service. He indicated that while NJNG does have a Board of Directors charged with responsibility for the utility, approximately 40% of the NJR Board's meeting deals with NJNG topics. The RMCs report to the NJR Board Audit Committee.

The Audit Committee Chair reported that it formally meets six times a year (the Audit Committee Charter requires at least four regular meetings/year), receives all of the minutes of the RMCs, and has frequent communication with the RMC chair and Vice President of Internal Audit beyond the formal meetings. The Chair indicated that roughly one-sixth to one-fourth of Audit Committee time is devoted to risk management activity. He indicated that risk management activities are also discussed by the Board at large. The chair was fluent in the RMC role, organization and key participants and issues. He functions as the disseminator of information on risk management activities to the remainder of the audit committee and to the Board at large.

We were provided with access to minutes of six meetings of the NJR Board of Directors and five presentations made to the Board. This provides an indication that gas supply and risk management are topics for Board discussion approximately once a year. This coincides with the interview of the CFO during which he mentioned that the company provides information to the board on these topics annually.

Risk Management Committee

The RMC routinely meets twice a month as required by the policy and receives a detailed information packet for each meeting. The committee minutes provide details of the storage incentive program, encroaching credit limits, positions that are out of guidelines, volume limits exceeded, and changes to internal control procedures. This reporting and documentation is consistent with the policies. These practices provide clear evidence of NJNG's ability to deploy effective governance procedures for a much more robust BGSS forward risk management program.

The RMC Guidelines and Policy outlines the various procedures and policies to be followed by those involved in hedging. RMC activities are more directed to explicit compliance and less oriented toward strategic objectives. Specific limits and constraints are defined and noted on the chart accompanying this report. There are also required notifications to the Audit Committee by the RMC. The Guidelines and Procedures require independent monitoring, segregation of duties and periodic non-scheduled audits. The Manager of Middle Office provides detailed independent reports. The company recently hired a new treasurer and described his role as one of additional oversight of credit and risk management activities.

It was reported and confirmed that the Board Audit Committee receives the minutes of the RMC meetings as well as a verbal briefing. The RMC and Board Audit Committee are made aware of Internal Audit reports and recommendations regarding hedging and risk management.

The members of the RMC are active, engaged and fluent in requirements of the RMC Guidelines and Policies. They represent high engagement in the risk management program and keen interest in complying with all process, procedures and BPU requirements. They are experienced executives in their respective functions in the Company and in the industry.

The Company's current hedging activity has spawned a variety of policies and procedures to ensure compliance with the Risk Management Policies as on file with the BPU and to ensure the requisite separation of functions, independent oversight and internal controls are adhered to.

The company's senior leadership is clearly engaged in the risk management process. There is much attention placed on controlling the risk the company is exposed to through its trading activity, inadequate counterparty or customer creditworthiness. The company's 2006 annual report to shareholders reported that customers experienced savings and rate reductions due to moderate weather and hedging of approximately $70 per customer, which we understand owes largely to the optimization of storage injections pursuant to the Storage Incentive Mechanism

HEDGE PROGRAM EXECUTION

Energy Services

The Senior Vice President, Energy Services displays a comprehensive grasp of how the various elements of gas supply (including the hedging function) integrate to achieve the BGSS rate. He described his objective as not to beat the market, but to protect the price filed in the BGSS. In structuring the portfolio, he described his focus as striving to avoid extreme gas price volatility. His department has a gas price model that is regularly run to assess BGSS rates against cost expectations.

Front office functions such as market monitoring, executing trades are performed in the Energy Services Organization. Interviews with those responsible for initiating NJNG hedges indicated that they are responsible for market monitoring, knowing where the company was with respect to its hedging targets and collaborating with the Senior Vice President to meet the target objective. The Director of Financial Book and Trading Analyst were familiar with the RMC guidelines and regular reporting package provided to the RMC. They understood the hedging policy includes target percentages to achieve, timeline for achievement, and the SIM and FRM.

The employees acknowledged familiarity with the requirement that phone trades be recorded, that confidentiality agreements be signed, and the policies regarding ethics. They further indicated compliance will the established protocols and procedures outlined in the Policy documents.

The company has assigned a lead auditor to office whose work location is in close proximity to the trading operation. This person is keenly aware of the need to be vigilant and independent. His role is one of compliance and he attends all RMC meetings.

NJR Service Corporation

"Middle Office/Back Office" functions reside primarily in NJR Service Corporation noted above, providing essential separation of duties. The Manager Mid Office is proficient in the company systems, provides an internal control function and compiles information reviewed at each RMC meeting. Internal Audit has a prominent role ensuring internal controls are functioning properly and procedures are complied with.

As noted above, the RMC meets twice a month and attendance at meetings is very high. The Manager, Mid Office has detailed understanding of the guidelines and reports provided to the RMC. The Manager Mid-Office reports to the CFO through the Controller providing essential independence and segregation of duties. He creates reports for the committee directed at key aspects (volume and credit limits, top counterparties, contract durations, etc). He appears well-qualified to provide essential management information and is actively engaged and competent in his role.

The Manager of Credits and Contracts provides essential vetting of counterparty credit and contract administration. Much of his scope of authority addresses 'back office' functions of invoice processing and contract administration and accounting. He reports to the Vice President of Energy Services. He has the authority to deny traders the ability to conduct business with a party if there is insufficient evidence of creditworthiness. He is keenly aware of his role in managing risk for the firm.

Internal Audit has also issued a set of proposed controls for Wholesale Trading which the company is largely in compliance with. There is a lead auditor assigned exclusively to the trading function to provide independent oversight. He is credentialed and understands the deal and information flow essential to fulfill his role.

Back Office

Functions typically characterized as 'back office' include trade confirmation, reconciliations invoice processing and ongoing accounting. In NJNG's organization, these roles are executed primarily by staff in the Energy Services Organization and described under "Mid Office". Two managers have key responsibilities and report up through different Vice Presidents than do the trading/front office personnel.

SUMMARY

In our enhance program report, we defined the essential elements of an effective risk management program. We began with an executive-level Risk Management Committee and a Governing Policy. We then moved to policies and procedures that address the following:

- Delegation of authorities
- Standards of conduct
- Risk management philosophy
- Permissible activities and instruments

- Quantification of positions and exposures
- Management and control

And finally, we stressed that the policies and procedures would address the individuals and responsibilities in the front, middle and back offices.

Within the context of this framework, New Jersey Natural has all of the bases covered. The executive-level RMC is in place and functioning. A Governing Policy is also in place, and is contained within a well structured hierarchy of policies that define the risk management program. We can align our enhance program specification with the NJNG program by examining each of our recommended elements:

- Delegation of authorities – contained in the Risk Management Committee Guidelines & Procedures
- Standards of conduct – NJNG has established a number of operating policies that relate to trading and risk management activities. There is a code of conduct with which employees must comply.
- Risk management philosophy – the overall structure is defined in the RMC Guidelines. Policy is also clearly articulated in other documents in the hierarchy.
- Permissible activities and instruments – approved trading products and instruments are defined in the RMC Guidelines.
- Quantification of positions and exposures – methodologies are discussed in the RMC Guidelines and Procedures.
- Management and control – details of control requirements are delineated in the RMC Guidelines.

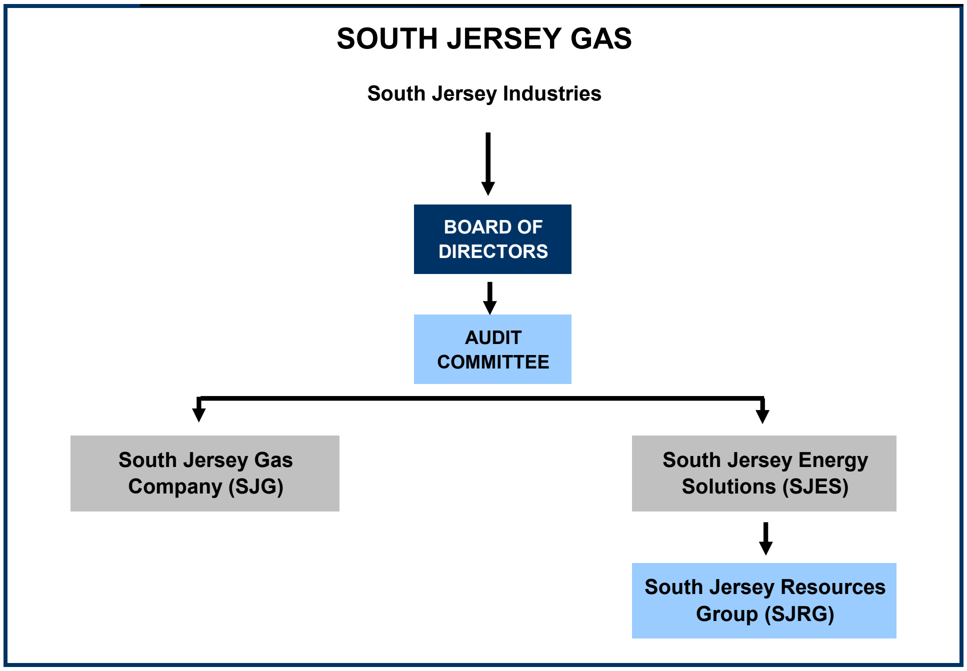
Compliance with the above program is assured by a variety of processes, including Internal Audit's program. Our review revealed no examples of major non-compliances and interviews with the Chair of the Board Audit Committee, VP of Internal Auditing, Chief Financial Officer and Senior Vice President of Energy Services likewise suggested a high level of compliance.

If a new paradigm evolves for hedging the residential gas supply, NJNG stands well positioned to manage it effectively. With a high level of skills and capabilities, sophisticated tools and methodologies, and an effective, well-designed program, significant benefits are sure to accrue to NJNG and its residential customers.

E SOUTH JERSEY NATURAL GAS

INTRODUCTION

Exhibit 113: South Jersey Gas



South Jersey Gas Company is the gas distribution utility of South Jersey Industries and serves over 330,000 customers.

For purposes of our assessment, the organization structure of the risk management activities consists of four primary entities:

The SJI Board Audit Committee provides governance and oversight of the Risk Management Committees (RMC) and hedging functions. SJI provides corporate services to SJG and other subsidiary corporate entities.

The SJG RMC was formed in the Fall of 2004 with the approval of the BPU and the company board. Prior to that time there was one RMC for both entities. The Chief Financial Officer chairs both SJG and SJI RMC.

SJRG is the only 'counterparty' deployed by SJG in its hedging program. SJRG is responsible for executing trades as directed by SJG as well as for its own book of business. SJG hedging program is entirely programmatic/non-discretionary, requiring SJRG to purchase 2 contracts each month for each of the upcoming 18 months. The Company deploys the Planalytics™ system to capture trading information. There is a discretionary feature of the hedging program in which SJG utilizes the Planalytics™ system to provide indicators buying opportunities based on its proprietary models.

It should be noted that South Jersey Gas was subject to a comprehensive management audit by The Liberty Consulting Group undertaken by the Board of Public Utilities which concluded in 2005. The Company has competed the process of addressing recommendations resulting from that work. We did review the public copy of the audit report.

The Company has a keen awareness of its role as a gas distribution utility. A key focus in recent years has been ensuring adequate supply and pipeline capacity to meet the needs of its customers. In conversations with officers throughout this engagement, they recognize the importance of sufficient supply and pipeline capacity.

SOUTH JERSEY GAS FINDINGS

VI-F22 <u>Risk Management, in the context of hedging gas supply price risk is not routinely a matter discussed by the Board of Directors.</u>

VI-F23 <u>Internal Audit provides a strong independent role in ensuring adequate internal controls and compliance with policies related to hedging.</u>

VI-F24 <u>The Risk Management Committee does not have regular, structured meetings focused on hedging activities, strategy or compliance.</u>

VI-F25 <u>SJG Gas supply is focused on meeting needs of BGSS market. SJG trading personnel perform market monitoring, execute and document the trading activities.</u>

VI-F26 <u>The Manager of Risk Management fulfills both mid-office and back office functions for both SJG and SJRG.</u>

VI-F27 <u>SJG's Back Office role is limited, and resides primarily with one person.</u>

VI-F28 <u>A spot check of transactions suggests compliance with transaction documentation readily available.</u>

VI-F29 <u>South Jersey Industries has made a diligent effort to achieve compliance with Sarbanes-Oxley.</u>

The following sections addresses the organizations, their role in the management of gas supply and hedging, policies and processes and their overall effectiveness in meeting the current objectives of hedging activities.

GOVERNANCE AND ORGANIZATIONAL STRUCTURE

Board of Directors

We reviewed the minutes of the SJG board of directors covering the period May 28, 2004 through May 17, 2007. The minutes convey the impression that the definition of risk management and its role in the company depends highly on the context.

Risk discussions occur in terms of major contracts or commitments, corporate guarantees, compliance and procedures. The minutes did not describe risk management in the context of mitigating volatility of prices to regulated customers. In July 2006 the company created a new officer position (Assistant Vice President Financial Reporting and Risk Management) which is charged with enterprise risk management. In our interview with him, he described his role as monitoring and managing interest rate risk, more than commodity pricing risk. He did attend both the SJI and SJG Risk Management Committee meetings in 2007.

From the evidence we reviewed, it does not appear that hedging activities or BGSS supply costs are regular discussion items for the Board of Directors. The minutes of SJG's Board did not note matters related to BGSS, gas supply pricing or regulatory strategy discussed frequently during this period (May 2004-May 2007). In the March 2005 strategy session, the discussion appeared centered around operations and expansion plans. In October 2005 (the Katrina timeframe) gas supply was discussed and noted that SJG had been 'very active in its hedging activities' without mentioning the current market environment, expectations or consequences.

The minutes indicated the Audit committee is dedicated to strong governance. They maintain vigilance over Internal Audit by insisting that open points were not being resolved fast enough. Deloitte representatives provided reports at every meeting. Sarbanes Oxley matters were a topic of continuing interest and attention.

The Internal Audit department was often mentioned in interviews highly engaged ensuring identification of key processes and controls to ensure not only the integrity of the financial reporting process, but as a respected participant in the firm's governance. The Director of Internal Audit expressed a high degree of independence and access to the Board Audit Committee.

Risk Management Committee

The SJI Board Audit Committee provides governance and oversight of the Risk Management Committees (RMC) and hedging functions. SJI provides corporate services to SJG and other subsidiary corporate entities.

The SJG RMC was formed in the Fall of 2004 with the approval of the BPU and the company board. Prior to that time there was one RMC for both entities. The Chief Financial Officer chairs both SJG and SJI RMC.

SJG's RMC consists of South Jersey Gas Company's Risk Management Policy and Procedures proscribes the framework for the Company's hedging activities and Risk Management Committee(s).

The Company describes the purpose of its hedging activity as "intended to stabilize prices." This objective, while laudable in intent, lacks specificity to enable SJG to execute in a manner that promotes tolerable outcomes as is essential in enhance program programs.

The chair schedules quarterly RMC meetings at the beginning of the year. Committee members indicated however, that the meetings are held on an 'exception' basis. The minutes of the committee meetings indicate that since inception the SJG RMC meets officially, on average twice a year generally in September and October In 2007 the Committee did meet in March and July thus far. The members of the committee indicate that they have sufficiently frequent communication on a routine basis and that, given the nature of the Company's hedging program, they think this has provided adequate management of the Risk Management activities.

The RMC Guidelines and Policy is procedures oriented and appears designed to manage and control the potential risk inherent in trading. We did interview those people involved in the transactions and found they appeared to be familiar with the policies and procedures. They described their responsibilities in the trading function and we observed them following the procedures. There is an independent control point which balances the transactions between SJG trading and SJRG on a daily basis which appears to be functioning.

PROGRAM EXECUTION

Gas Supply and Off-System Sales

The Director of Gas Supply & Off-System Sales has first line management responsibility for SJG's supply portfolio, including the hedging function. He is squarely focused on meeting the needs of the BGSS market and indicated that he had no roles within SJI or SJRG.

Conversations with the traders indicated that they were familiar with the RMC guidelines and hedging plans. They appeared proficient in the software and diligent about documenting the transactions.

Gas supply's personnel appear to be proficient with the Planalytics™ software. Given the structured nature of the hedging program, there is not a high need for sophisticated market monitoring or analytic functions. The expectation is that these functions reside in SJRG executing on behalf of SJG's BGSS market. Planalytics™ also provides indicators of buying opportunities for the discretionary portion of the Company's hedging program. When the system indicates a buying opportunity, this information is provided to SJRG to execute. .

Financial Reporting and Risk Management

The Manager of Risk Management fulfills the 'back office' role of the SJRG trading operation and reconciles SJG and SJRG transactions. Given that he wears both hats, there is not a clear separation of duties. However, it is not uncommon in organizations of this size for the middle and back office functions to be performed within the same organization or by the same individuals. Of greater importance is a separation of duties from those charged with front office responsibilities and those with middle office responsibilities. This is clearly the case at SJG and thus doesn't raise any concerns regarding the fulfillment of middle and back office duties.

In this role he is responsible for ensuring the accuracy of SJG trades. He performs monthly reconciliations between Resources Group and Gas Company. He also is responsible for monitoring and reporting credit for both firms. He uses RADAR system for report generation. He also described his responsibility to manually reconcile volumes and values for both entities. He also sends out all confirmations for SJRG and generates summary reports on positions. He reports to the AVP of Risk Management.

The Liberty audit recommended that the company draw on SJRG's expertise in its discretionary program, which it has done. However, in doing that, it becomes incumbent on SJI's RMC to ensure process and procedures are properly in place to assure compliance with policies and procedures.

Back Office

Given the focused and limited nature of trading for SJG, with deploying the expertise of SJRG, the more significant back office role must reside with SJRG. Based on information provided, we conclude that Internal Audit is actively engaged to ensure proper back office procedures and controls.

SUMMARY

In our enhance program report, we defined the essential elements of an effective risk management program. We began with an executive-level Risk Management Committee and a Governing Policy. We then moved to policies and procedures that address the following:

- Delegation of authorities
- Standards of conduct
- Risk management philosophy
- Permissible activities and instruments
- Quantification of positions and exposures
- Management and control

Within the context of this framework, and the present state of SJG's hedging activity, the essential bases are covered. The executive-level RMC is in place and functioning. Its charter should be reviewed, as noted above to provide context and focus vis-à-vis hedging. Governing Policy is also in place, and is contained within a well structured hierarchy of policies that define the risk management program. We can align our enhance program specification with the SJG program by examining each of our recommended elements:

- Delegation of authorities – clearly defined and contained in the Risk Management Committee Guidelines & Procedures.
- Standards of conduct – SJG has established a number of operating policies that relate to trading and risk management activities. There is a code of conduct with which employees must comply.

- Risk management philosophy – the overall structure is defined in the RMC Guidelines. The risk management objectives are stated in general terms.
- Permissible activities and instruments – approved trading products and instruments are defined in the RMC Guidelines.
- Quantification of positions and exposures – methodologies are discussed in the RMC Guidelines and Procedures.
- Management and control – details of control requirements are delineated in the RMC Guidelines.

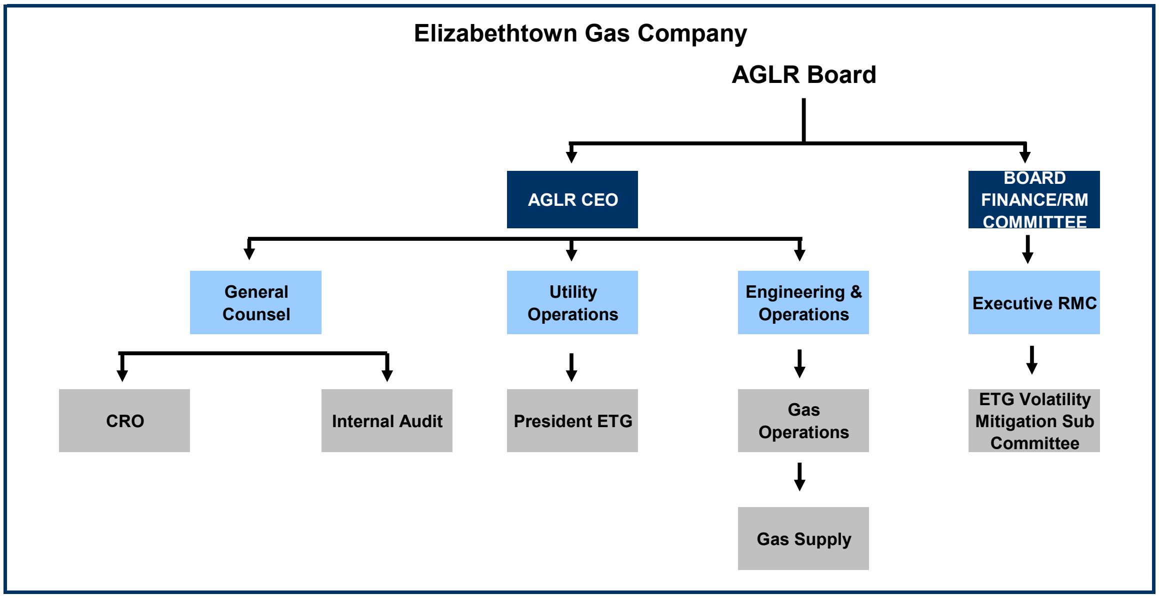
Compliance with the above program is assured by a variety of processes, including Internal Audit's program. Our review revealed no examples of non-compliances and interviews with the Director of Internal Auditing, Chief Financial Officer and Manager of Gas Supply likewise suggested the highest level of compliance.

If a new paradigm evolves for hedging the residential gas supply, SJG stands well positioned to manage it effectively. With a high level of skills and capabilities, sophisticated tools and methodologies, and an effective, well-designed program, significant benefits are sure to accrue to SJG and its residential customers.

F. ELIZABETHTOWN NATURAL GAS

INTRODUCTION

Exhibit 114: Elizabethtown Gas Company



Elizabethtown Gas (ETG) serves more than 260,000 customers. It became a subsidiary of AGL Resources (AGLR) in 2004. The parent owns six gas distribution companies stretching from New Jersey to Florida, two gas storage facilities and an asset management company (Sequent Energy Management).

For purposes of our analysis, there are six key organizations within the overall AGLR structure:

- The Chief Risk Officer (CRO) reports to the General Counsel, who serves as the Chief Compliance and Ethics Officer.
- The VP of Internal Audit reports to the General Counsel.
- A Senior Vice President of Mid-Atlantic Operations serves as the President of ETG and two other gas distribution companies.
- The Gas Supply organization is responsible for capacity planning and the management of the hedging program.
- An Executive Risk Management Committee provides oversight at the corporate level.
- A Volume Mitigation Sub-committee provides oversight of the hedging program.

AGLR has assigned responsibility for overall oversight of the risk program to the Board's Finance and Risk Management Committee.

ELIZABETHTOWN NATURAL GAS FINDINGS

VI-F30 Comprehensive governing policies are in place and have been internalized in the organization.

VI-F31 Management has ascribed a high level of importance to the RMC, with direct participation by the highest level executives.

VI-F32 The RMC provides substantive attention to the management of ETG's hedging activities.

VI-F33 The Volatility Mitigation Subcommittee has played an effective role in the management and oversight of the hedging program.

VI-F34 The internal audit function is independent, with adequate and diverse reporting paths as appropriate.

VI-F35 AGLR and ETG both have current, written risk management policies in place.

VI-F36 The risk management organization fills a staff role and supports both executive management and the business units, who retain overall responsibility for management of their risk programs.

VI-F37 A spot check of transactions suggests compliance with process requirements and the availability of complete transaction documentation.

VI-F38 AGLR has made an aggressive effort, at both the Board and management levels, to achieve full compliance with Sarbanes-Oxley.

VI-F39 ALGR has a program in place with supporting controls that assures compliance.

VI-F40 There are numerous organizations charged with assuring compliance and, with few exceptions, the program appears to be effective.

In the sections that follow, we will discuss each of these organizations, their role in the management of the gas supply, polices and processes that frame their work and their overall effectiveness in meeting those responsibilities.

GOVERNANCE AND ORGANIZATIONAL STRUCTURE

Board of Directors

The nature of ETG's governance structure changed considerably over the last six years. Until 2003, the Elizabethtown Board was an advisory board to the NUI Corporation Board until September 2003. At that time it was merged into the NUI Utilities, Inc. Board. The NUI Utilities, Inc. board and NUI Corporation board were separate and distinct entities.. In 2004, NUI was acquired by AGLR and the AGLR Board became the governing authority.

We reviewed all of the NUI and ETG Board meeting minutes made available to us, and those minutes were of good quality, providing us with a level of understanding of those Boards' priorities and focus. We have not, however, received or reviewed any Board documentation for the AGLR years. The Company has certified that there were no discussions at the Board relevant to our document request. Specifically, the Company was asked to provide "Minutes of Board meetings, committee, and task-team meetings, presentations that relate to gas supply and risk management". In response to this request, the Company provided considerable information on pre-AGLR Board meetings, but reported that no discussions fitting the boundaries of the data request were held.

In other areas, the policies governing the operations of the Board are well defined and communicated. Governance principles are clearly stated and comprehensive in their scope, with the Board's policies included in 24 individual guidelines. Management personnel interviewed are generally conversant and supportive of these policies.

Risk Management Committee

The (Executive) Risk Management Committee (RMC) reports to the Finance and Risk Management Committee of the Board and consists of the highest level executives in the Company. The membership list sends a strong message as to the importance executive management assigns to this function. Policies are in place that disqualify certain executives from voting on any issues relating to risk mitigation responsibilities in their areas. The roles and responsibilities of the RMC are clearly laid out in detail in the AGLR Risk Management Policy.

The Company provided excerpts from RMC meetings that involve the business of BGSS and hedging. While the entries are not extensive, they nonetheless indicate that ETG's hedging activities are indeed on the RMC's agenda with a level of priority that is adequate and appropriate. The nature of discussions suggest an effective role of oversight, policy direction and helpful suggestions.

Chief Risk Officer

The Chief Risk Officer (CRO) manages the corporate risk management staff and chairs the RMC. AGLR operates with a philosophy that each business unit is fully accountable for risk management, so each organization has its own personnel and organization for that purpose. The CRO's role is therefore one of supporting executive management by bringing risk matters together in a clear and consistent way. He also supports the line organizations with technical and programmatic guidance. While the CRO's organization does compliance "spot checks", they primarily serve as facilitators of good governance and control.

The risk management function was not involved with the design of the hedging program, having inherited that program with the acquisition of NUI. Rather, they sought to effectively integrate the hedging activities into the AGLR framework. They are not involved with the Gas Procurement Strategy & Plan (GPS&P) other than through support for the ETG Risk Management Policy and the CRO's membership on the VMSC.

HEDGE PROGRAM EXECUTION

Volatility Mitigation Subcommittee

The Volume Mitigation Subcommittee (VMSC) reports to the RMC and serves as the oversight function for the ETG hedging program. The Subcommittee's role and responsibilities are defined in the ETG Risk Management Policy.

Based on the ETG Risk Management Policy, the VMSC has a minimum membership of:

- VP, Gas Operations
- AGLR's CRO
- Managing Director, Gas Supply (Chair)
- Hedge Program Manager

Note that the latter two members are the individuals specifically responsible for executing the hedge program and all of its transactions, while the VP is their superior. This leaves the CRO as the only "independent" party, and raises the question of the suitability of such a membership roster for oversight purposes. Such a membership appears to reflect a philosophy in which the Company considers line management in the business units as fully responsible and accountable for risk management. This is a good practice, but there also needs to be a reasonable degree of independent oversight and the current structure of the Subcommittee does not meet that standard.

The VMSC does not meet frequently but is focused on appropriate topics when it does. Meeting minutes reflect a healthy approach and strong contributions from this group.

While we question the structure of the Subcommittee, and an infrequent meeting regimen, there is no basis for questioning the scope or quality of its work over the last few years.

Gas Supply

Gas Supply and Capacity Planning is the organization that manages the hedge program and executes all of the associated transactions. The organization is located in Atlanta but has assigned an individual to the ETG headquarters as the Hedge Program Manager. The Hedge Program Manager, with another representative of Gas Supply on the line, executes the hedging transactions, which currently take the form of OTC futures. There are presently 18 people in the group including the one position in New Jersey.

An asset management agreement is in place with a sister company, Sequent Energy Management. Sequent supplies all of ETG's physical gas on an index basis and pays ETG a fee for access to its assets.

It is clear that AGLR has gas supply expertise throughout the Corporation, including in Gas Supply and Sequent. It is therefore appropriate that Gas Supply plays the dominant role in the strategy, design and execution of the hedging program. The Managing Director of Gas Supply indicates he has a "dotted line" (not necessarily formally or officially) to local ETG management, including specifically the President and ETG's VP of Operations, but it is not clear how those positions provide direction or oversight on the part of the utility.

SUMMARY

In our enhance program report, we defined the essential elements of an effective risk management program. We began with an executive-level Risk Management Committee and a Governing Policy. We then moved to policies and procedures that address the following:

- Delegation of authorities
- Standards of conduct
- Risk management philosophy
- Permissible activities and instruments
- Quantification of positions and exposures
- Management and control

And finally, we stressed that the policies and procedures would address the individuals and responsibilities in the front, middle and back offices.

Within the context of this framework, AGLR has all of the bases covered. The executive-level RMC is in place and functioning. Governing Policy is also in place, and is contained within a well structured hierarchy of policies that define the risk management program. The hierarchy begins with the AGLR Risk Management Policy and flows directly to the ETG Risk Management Policy. Other policies subordinate to the AGLR policy include Sequent, SouthStar, AGLR Interest Rates and Sequent credit.

The AGLR program requires "schedules" to be prepared by the business unit for the risks associated with each business line. These schedules directly include the policies and procedures we have discussed above as required for an enhance program. Specifically, the Risk Management Policy dictates that the following information be contained in the schedules:

1. Identified risks
2. Purpose (why the risk should be managed)
3. Approved instruments and activities
4. Risk measurement methodologies
5. Risk monitoring (how will risks be observed)
6. Limits
7. Compliance (how to assure effective implementation)

8. Organizational structure and responsibilities

9. Reporting

Compliance with the above program is assured by a variety of organizations, including the business units themselves, the CRO organization, Internal Auditing, RMC and VMSC. Our review revealed no examples of major non-compliances and interviews with the CRO, VP of Internal Auditing and business unit managers likewise suggested a high level of compliance.

We have noted a few exceptions throughout this review, including a possible lack of independence on the VMSC and the minimal level of audit participation in hedging and risk management. It does not appear that either of these possible shortcomings is currently having a negative impact on the program or the level of compliance.

II. RECOMMENDATIONS FOR A REGULATORY FRAMEWORK IN NEW JERSEY REGARDING GAS PRICE-RISK MITIGATION

A. INTRODUCTION

Utility rate regulation has historically centered on protecting consumers from the potential for excessive rents to be extracted by utilities' natural monopoly position. The fundamental elements of cost-of-service, return-on-capital, cost allocation, and rate design were honed into constructs that promote just and reasonable distribution service rates. For utilities, cost-allowance expectations of this regulatory paradigm are clear: costs incurred that cannot reasonably be linked to the provision of safe, reliable, and efficient service are at-risk for recovery.

This set of regulatory constructs matured during an era in which the energy industries were more vertically integrated and wholesale energy prices were considerably more stable than is the case today. For decades, this historical regulatory paradigm groomed consumers to understand that changes in retail utility rates were primarily a reflection of the relative efficiency of a utility's operations.

In more recent years, deregulation has had a pronounced impact on the energy markets. In the natural gas industry, wellhead deregulation and the elimination of pipelines as commodity merchants spawned liquid spot and forward commodity markets, as well as some level of retail competition. With this more liquid market structure, commodity price volatility has grown dramatically (volatility is even more acute in the electric power markets, to which our recommendations here would also apply). Many core utility customers find themselves exposed to ever-increasing volatility, the budget impacts of which oscillate from mildly disruptive to extremely painful.

In this era of persistent price volatility, utilities and regulators have made modest gains in enabling robust energy-price risk mitigation. While our regulatory culture recognizes that consumer price risk is one of its most central issues, it seems to adhere to the historical paradigm in which retail rate impacts must somehow be linked to utility efficiency. At the same time, utilities are bound by the well-established norm that costs which are decoupled from basic service provision are at-risk. As a result, the mitigation of energy-price risk remains less robust than we observe in other sectors, including public (i.e., non-investor-owned) utilities.

What is needed, in our view, is a regulatory framework that is appropriate to the prevailing wholesale market. Investor owned utilities ("IOUs") must balance obligations to their shareholders with obligations to their customers. The potential for a comparatively small retrospective finding of imprudence under the historical regulatory paradigm can paralyze a company's risk mitigation activities. It is often deemed more "prudent" for a utility to justify a constant hedge ratio than to engage in decisions to increase hedges in response to volatile market conditions. The former elicits little scrutiny; the latter requires judgment and judgment can invite criticism if the hedges settle unfavorably. As we will show, the problem is that the public welfare benefits lost from the lack of more dynamic risk mitigation utilities dwarfs the perceived imprudence risk. The capabilities of the New Jersey gas utilities are more than sufficient to adopt more sophisticated hedging programs; they are simply not deployed for core-customer risk mitigation because of the issues discussed herein.

This report section deals with these issues and does so by addressing the following topics regarding New Jersey's BPU and GDC's:

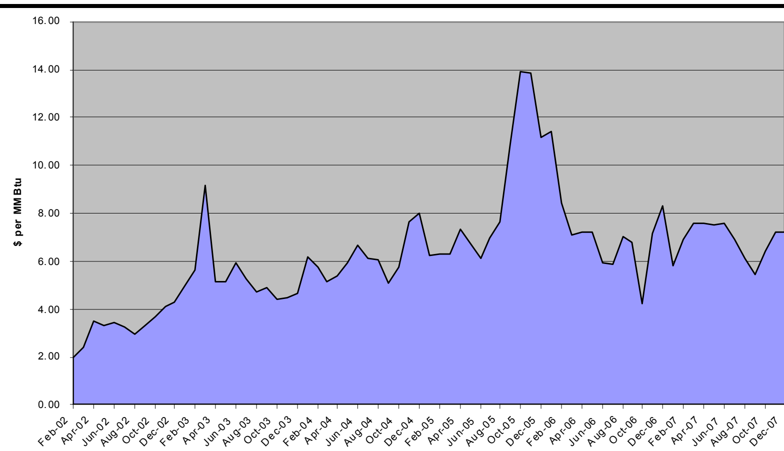
1. "Why hedge at all?" is an important foundational question that is often misunderstood.
2. An overview of the characteristics of a robust risk program (discussed in detail in the Enhanced Program section of this report).
3. A discussion of how a new regulatory approach can enable more robust risk mitigation, including a template for how to structure such a framework between the BPU and GDC's.

BACKGROUND

Why Hedge at All?

When the question "Why Hedge at All?" arises, one will often hear discussions of whether or not one can "beat the market." Those discussions miss the point, so they will not be debated here. Price volatility, by itself, is not a reason to invest in risk mitigation, but it is a key contributor. While the chart of historical natural gas prices in Exhibit 115 is provided for reference, the real issue relates to the interplay of asymmetrical volatility with asymmetrical customer welfare.

Exhibit 115: Historical Natural Gas Prices



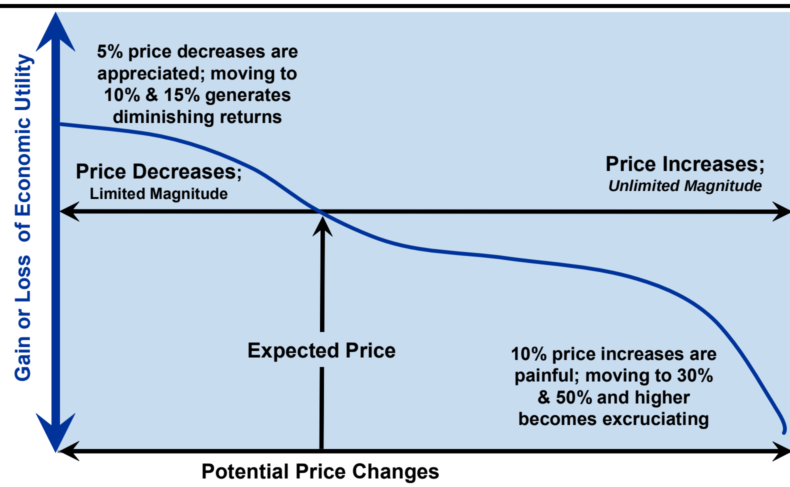
Source: NYMEX

Energy commodity price movements are typically skewed; that is, potential upside movements generally dwarf downside movements. This effect can be seen in Exhibit 1116 for natural gas; it is also true for power and virtually any commodity.

The second consideration amplifies the first, and it relates to the marginal utility of the consumer. If a residential customer expects utility bills to be $2,000 per year, but they turn out to be $1,600, he has some unexpected disposable income. But what happens when prices spike and those bills turn out to be $3,500? The $400 positive variance to expectations is a good thing, but the pain of coming up with the extra $1,500 is a very bad thing. For certain customers, unanticipated cash drains of this magnitude can threaten monies budgeted for other necessities. On balance, the economic welfare impacts of this pair of outcomes are decidedly negative, even if the acute bad news occurs less frequently. This issue may be equally serious for small commercial and industrial customers, where the difference could impact the viability of the business.

The following chart illustrates the point. Potential price increases can dwarf potential decreases and the consumers' loss of marginal utility can be dramatic.

Exhibit 116: Effect of Potential Price Increases



Source: Pace

So why hedge? The answer is to mitigate the asymmetrical pain associated with dramatic price increases, not because there is an expectation that hedging will improve cost outcomes relative to market in a sustained way. To mitigate the asymmetrical pain, a utility's risk mitigation program must be responsive to different market environments. A 25% hedge ratio might be appropriate in relatively stable markets, but as volatility and price levels rise, the program must respond by increasing the hedge ratio.

Regulatory Implications

If one accepts the above reasoning, then a simple extension of that reasoning would indicate that measured investments in risk mitigation should yield a net improvement in the welfare of consumers. Yet, across the nation the regulatory landscape seems to promote limited deployment of risk-mitigation expertise and exercise of judgment as informed by that expertise. Why not?

The outcome of any individual hedge transaction is not predictable, and amorphous standards for cost recovery chill hedging judgments. The appropriate regulatory policy would be to recognize that high uncertainty of outcomes combined with uncertainty in standards will suppress investment in risk mitigation, and utilities will eschew business judgment that might be criticized retrospectively, even if it has not occurred to date.

Regulators cannot be expected to change the underlying market volatility, but they can address the amorphous standards for cost recovery. To be clear, the envisioned standards are not preemptive of prudence findings, but a benchmark for evaluation and assessment of effectiveness.

WHAT CONSTITUTES ROBUST RISK MITIGATION

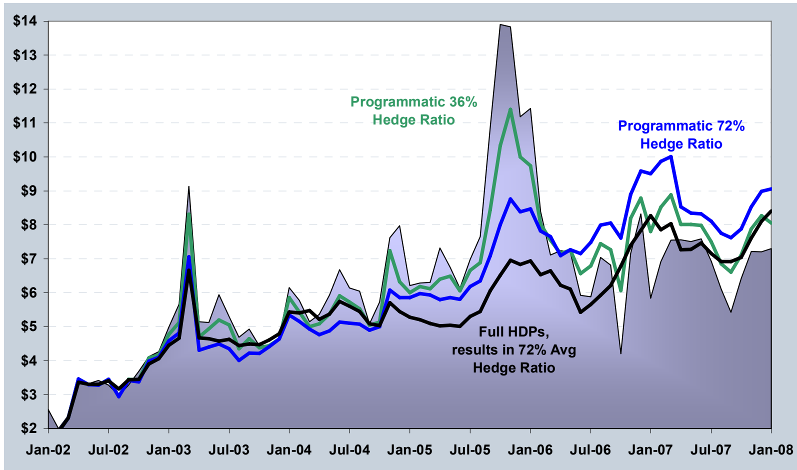
Risk is bipolar. There is the risk of market prices running up when requirements are unhedged, and there is the risk of market prices running down against already executed hedges. Mitigating either of these dimensions of risk increases the other. That is, each hedge added to guard against rising prices increases the chance of an out-of-market situation; likewise, foregoing hedging to avoid out-of-market outcomes increases exposure to rising prices. A robust risk-mitigation program manages both to a reasonable balance, and to do so requires more expertise, more governance, and some investment. Yet it can be done very well if hedging decisions are planned in a rigorous manner.

The next graphic shows cost results from three approaches to hedging as they would have played out in the gas markets[liii] of the last half-dozen years:

1. (Green) Dollar-cost-average accumulation of hedges up to a 36% hedge ratio
2. (Blue) A doubling of the same simple accumulation up to a 72% hedge ratio, and
3. (Black) A sophisticated set of hedging decision protocols ("HDPs") that also happen to achieve a 72% average hedge ratio. These HDPs will be described in the next section.

[liii] Thee principles apply to any energy commodity.

Exhibit 117: Different Hedge Strategies vs. Market Settlements



Source: Pace

Note that the 36% dollar-cost-average settlements provide modest protection against the 2005-2006 spike in gas prices, but reasonably tracked with the subsequent downturn in prices. The 72%-by-rote settlements provided more protection against rising prices, but substantially diverged from market prices in the subsequent downturn. Finally, the set of responsive hedging protocols provided a comparatively desirable balance along both dimensions – superior upside price mitigation *and* good participation in the market downturn that followed.

There are two key elements in the third approach that are absent from the by-rote approaches.

- The HDPs include a process of monitoring prices and volatility and comparing the potential for price increases to an explicit upside tolerance. Hedges are then accumulated in proportion to the need to further mitigate exposures. Think of this as an early warning mechanism that triggers additional hedging as upside risk increases.
- Also the HDPs include an early warning mechanism for mark-to-market risk;liv that mechanism triggers the use of financial options when that risk exceeds tolerances. Options allow downside participation in market movements while constraining upside exposure; they do require the outlay of a premium.

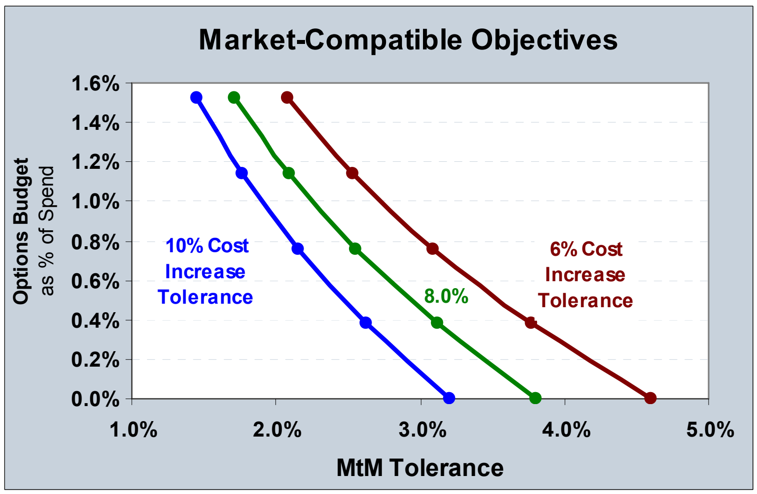
What is different about these two elements from the prevailing hedging programs the NJ GDCs is that they are *responsive*. The first element responds to prevent prices from

[liv] Mark-to-market risk is the potential for existing hedges to diverge from (i.e., be above) prevailing market prices.

exceeding high outcomes; the second responds to prevent hedges from decoupling too far from falling market prices. Deployment of these two elements demands clarity of decision rules, ongoing quantitative assessments, and clear governance and controls. Those same characteristics provide the basis for a regulatory framework, as well as unambiguous standards for the assessment of the program.

The upside and downside tolerances and options budget can be linked in sets, each of which represents an equally valid set of objectives. To facilitate this discussion, we will refer to these tolerance sets as Market Compatible Objectives. Different firms may choose the most appropriate objective function based on their own circumstances. An illustration of some Market Compatible Objectives is shown below.

Exhibit 118: Market-Compatible Objectives



Source: Pace and Vantage

From a regulatory perspective, any Market Compatible Objectives could define reasonable outcomes. So a regulatory framework could be built around the definition of reasonable expectations.

B. TEMPLATE FOR A REGULATORY FRAMEWORK REGARDING RISK-MITIGATION

Detail will of course be specific to New Jersey's regulatory culture, but an outline for a regulatory framework is envisioned as outlined below. We have included in Appendices B, C, and D of this report sample filings, transaction reporting, and a framework for incorporating an incentive structure consistent with the points identified above.

1. Each New Jersey gas utility would file a Risk Mitigation Plan ("RMP") annually, including:
    a. Specified tolerances for upside commodity cost and the related customer bill impact

b. Specified mark-to-market tolerance limits and associated options budget

c. The Hedging Decision Protocols to be deployed, including transaction criteria for programmatic, discretionary, defensive, and contingent hedges.

d. Oversight procedures and where flexibility is envisioned for adjusting or waiving the HDPs, the associated approvals and notices that will be required.

2. The BPU would compare the filed plan to the range of Market Compatible Objectives and accept the plan, or return it with comments. (Note that the BPU would be accepting the reasonableness of the tolerance limits, and the compatibility of the plan structure with those limits; the Board would *not* be imposing management judgment as to the program design.)

3. Reports would be filed quarterly documenting hedge transactions, their purpose under the HDPs, critical risk metrics, and any actions related to 1(d) above.

4. With respect to cost recovery, compliance with the filed RMP would constitute strong evidence of prudent behavior:

    a. The Market Compatible Objectives constitute reasoned expectations as to the range of normal results, including expectations for some level of unfavorable mark-to-market outcomes.

    b. Compliance with the filed contingent strategy would provide evidence that the GDC was actively managing the potential for unfavorable settlements.

    c. If the RMP was complied with, any results outside of the Market Compatible Objectives would coincide with anomalous market conditions, and the GDC would be required to demonstrate that such conditions were evident.

- Incentives – which we recommend but acknowledge may not be required – could be crafted to promote investment and management focus, and to reward compliance commensurate with risk mitigation.

As part of this engagement, we are also providing the Staff training necessary to administer such a program with minimal budget impact. We believe that adoption of such a framework by the Board can enable enhancements to the NJ utilities' gas cost risk mitigation plans that would be of substantial benefit to the state's BGSS customers.

PSE&G Comment Regarding Template

The "Template for a Regulatory Framework" section of the Draft Report is vague and not specific enough for PSE&G to fully evaluate. In addition, PSE&G was not provided with copies of the referenced Appendices B, C, and D, which apparently provide additional details or examples of what the consultants are proposing. However, the cited language at pp. 106-107 of the Draft Report implies that the BPU would have the ability to second-guess a GDC's filed Plan after the results are in, which would not be appropriate.

"If the RMP was complied with, any results outside of the Market Compatible Objectives would coincide with anomalous market conditions, and the GDC would be required to demonstrate that such conditions were evident."

NJNG Comment Regarding Template

The final section of the Draft Report briefly discusses possible approaches for establishing a regulatory framework for what is termed "risk mitigation in New Jersey." There are general suggestions provided for information and documents that could be provided to the BPU for their review and acceptance. The Draft Report stresses that there has been a successful and useful implementation of hedging in New Jersey, based on an overall goal of price stability. At this point in time, NJNG does not believe that such a structured approach is necessary and that there is little benefit to beginning such a process. The work that has been started should be continued on a company-by-company basis. Given the differences within each of the four natural gas utilities – service territory, customer demographics, usage patterns and even weather – it is not possible to create a "one size fits all" model or standard for operations.

NJNG's financial risk model includes an ongoing review and assessment of not only the impact of the existing hedging programs but also the potential benefits to be found in the use of new financial instruments. With the information learned from the Pace/Vantage work and from the experience NJNG has garnered over the years its financial risk programs have been developing, NJNG intends to continue such monitoring to ensure that the Company's goal of price stability is still met. The fundamentals inherent in any successful hedging program have been pointed out in this Report and a reliance on those basic tenets will continue as NJNG maintains its prudent approach to hedging with a primary focus on maintaining price stability without forward risk or surprise. Risk management opportunities vary greatly and, in our minds, a balanced combination of financial tools provides the necessary protections to customer prices while prudently optimizing utility assets. Accordingly, the best financial risk models are flexible, oriented toward the needs of each utility and include a stated objective.

C. CONCLUSION

New Jersey has the opportunity to stimulate robust risk mitigation across all of its regulated GDCs. The benefits would be substantial at times of spiking prices while simultaneously constraining unfavorable outcomes (See Exhibit 3). Given the skew in gas price volatility (upward movements being greater than downward) and the skew in consumers' marginal utility related to price changes, the consumer welfare benefits could be significant. A new regulatory framework has been recommended to stimulate more robust risk mitigation; such a framework has been outlined above.

One important element of that framework would relate to the structuring of incentives. If incentives are designed as a symmetrical zero-sum game, we do not believe they will produce the desired results. There will be investment required by the GDCs and a zero-sum game will cause that investment to be perceived as simply increasing shareholder risk. An alternative structure has been recommended. The cost to ratepayers could be embodied in the incentive program that would be small in proportion to the related commodity purchases. That incentive program would offset the necessary investments and commitments on the part of GDCs.

Monitoring the programs will require some effort by Staff and the training and tools provided by this assignment will enable that oversight.

PSE&G Comment Regarding Conclusion Section

As discussed above with respect to the similar discussion at pages 14-15 of the Draft Report, this language suggests that the burden of proof would be on the GDC (even if it complies with the filed plan but results are not good) to prove that the results were due to "anomalous market conditions." The Company believes that such a regulatory framework is inappropriate and would be fraught with subjective determinations as to whether the market conditions were "anomalous" during any given period.

ETG Comment Regarding Conclusion Section

The final section of the draft report outlines suggestions for a regulatory framework to address gas price-risk mitigation. The outline for such a regulatory framework suggests each gas utility will file an annual plan with the NJBPU for its consideration and acceptance. Reporting requirements will also be established. Elizabethtown respectfully submits that such a program is unnecessary. The draft report found that the programs of all four-gas distribution utilities, while different, produced measurable benefits to date.

As a result of the Vantage and Pace analysis, Elizabethtown has been engaged in a review of its hedging program and has made certain modifications to the increase the ratio of non-discretionary hedging and our time horizon. We are still engaged in this review and will propose, justify and discuss any prospective changes with the Board Staff and Rate Counsel in the context of the Company's ongoing Basic Gas Supply Service ("BGSS") review proceedings.

Agenda Date: 02/24/09
Agenda Item: 1A

STATE OF NEW JERSEY

Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
www.nj.gov/bpu

AUDITS

IN THE MATTER OF THE ANALYSIS OF THE GAS PURCHASING AND HEDGING STRATEGIES OF THE NEW JERSEY GAS UTILITIES	))	ORDER DOCKET NO. GA05121062

(SERVICE LIST ATTACHED)

BY THE BOARD:

At its meeting of December 14, 2005, the New Jersey Board of Public Utilities ("BPU" or "Board") directed its Divisions of Audits and Energy to expeditiously initiate a process to obtain a consultant to analyze the gas purchasing practices of all four Gas Distribution Companies ("GDCs") and provide a report and recommendations on these practices. The Divisions of Audits and Energy developed a request for proposal ("RFP"), number 07-X-39146, to solicit bid proposals from qualified bidders. The RFP was issued by the Purchase Bureau, Division of Purchase and Property, Department of the Treasury ("Treasury") on behalf of the State of New Jersey. Treasury, along with Board Staff, proposed that the contract resulting from RFP 07-X-39146 be awarded to Vantage Consulting, Inc. ("Vantage"). The Board considered this matter at its May 11, 2007 agenda meeting, and concurred with Board Staff's and Treasury's selection of Vantage as the consultant for this analysis at a total cost not to exceed $1,392,033.

Vantage, and its subcontractor Pace Global Energy Services, LLC ("Pace"), performed a comprehensive review of the hedging activities of each of the GDCs covering the period 2001 to 2007. That review included a transaction-by-transaction analysis of each utility's hedging program; an evaluation of risk management policies, control procedures, and organizational structure; and the recommendation of and simulation of an alternative hedging program design. Additionally, Vantage and Pace held two comprehensive seminars on the strategic use of hedging instruments for BPU staff.

On January 15, 2009, Vantage submitted a final report entitled "Analysis of the Gas Purchasing Practices and Hedging Strategies of the New Jersey Major Gas Distribution Companies" ("Final Report"). The Final Report provides a detailed analysis of all four GDCs' hedging programs, specific recommendations for each GDC, and general recommendations for all of the GDCs and the Board. Among other things, Vantage and Pace's analysis found that during the pronounced gas price spike subsequent to the hurricanes of 2005, the collective risk mitigation efforts of the GDCs avoided an estimated $305 million in gas costs compared to prevailing market prices.

It is Staff's opinion that Vantage has successfully completed the hedging analysis report according to the terms of the contract. Staff recommends that the "Analysis of the Gas Purchasing Practices and Hedging Strategies of the New Jersey Major Gas Distribution Companies" (Docket No. GA05121062) be accepted for filing by the Board and be released to the public.

Staff also recommends that the 25% contractual hold back of fees be paid and that the Board authorize release by Treasury of the final payment to Vantage. Vantage has been paid $1,044,025, leaving $348,008 that is owed to Vantage under the terms of the contract. It is Staff's further recommendation that the specific and general recommendations not be implemented at this time but that the Final Report be used as a starting point for discussions in the upcoming 2009 Basic Gas Supply Service (BGSS) proceedings concerning potential modifications or program expansions of each GDC's hedging program, as appropriate and on a case-by case basis. While Staff believes that the Final Report contains many insightful recommendations, adjustments to the GDCs' respective hedging programs should only be undertaken as part of the GDCs' overall gas purchasing strategies which are reviewed in their annual BGSS proceedings.

DISCUSSION AND FINDINGS

After review of the Final Report and consideration of Staff's recommendations, the Board agrees with Board Staff's assessment and HEREBY FINDS that Vantage and Pace have successfully completed the hedging analysis report as required under the terms of the contract. Therefore, the Board HEREBY ACCEPTS the Final Report for filing purposes and releases it to the public. The Board HEREBY DIRECTS Staff to post the Final Report on the Board's website and to provide a copy of the Final Report to each of the GDCs and to the Department of the Public Advocate, Division of Rate Counsel. Further, the Board HEREBY AUTHORIZES final payment to Vantage.

The Board also agrees with Staff's assessment that any adjustments to the GDCs' respective hedging programs should be undertaken in connection with the review of the GDCs' overall gas purchasing strategies within their annual BGSS proceedings. Therefore, the Board HEREBY

DIRECTS the parties in each of the upcoming 2009 BGSS proceedings to use the Final Report as a starting point for discussions concerning potential modifications or program expansions of each GDC's hedging program, as appropriate and on a case-by case basis.

DATED: 2/25/09

BOARD OF PUBLIC UTILITIES
BY:

Jeanne M Fox
JEANNE M. FOX
PRESIDENT

Frederick F. Butler
FREDERICK F. BUTLER
COMMISSIONER

JOSEPH L. FIORDALISO
COMMISSIONER

Nicholas Asselta
NICHOLAS ASSELTA
COMMISSIONER

ELIZABETH RANDALL
COMMISSIONER

ATTEST:

Kristi Izzo
KRISTI IZZO
SECRETARY

I HEREBY CERTIFY that the within document is a true copy of the original in the files of the Board of Public Utilities

Kristi Izzo

I/M/O The Analysis of the Gas Purchasing and Hedging Strategies of the New Jersey Gas Utilities
Docket No. GA05121062

M. Patricia Keefe, Esq.
Elizabethtown Gas Company
300 Connell Drive
Suite 3000
Berkeley Heights, NJ 07922
M. Patricia Keefe Esq. (mkeefe@aglresources.com)

Len Willey
Elizabethtown Gas Company
300 Connell Drive
Suite 3000
Berkeley Heights, NJ 07922
Len Willey (lwilley@aglresources.com)

Tim Sherwood
AGL Resources
Ten Peachtree Place
Atlanta, GA 30309
Tim Sherwood (tsherwoo@aglresources.com)

Susan Potanovich
Elizabethtown Gas Company
300 Connell Drive
Suite 3000
Berkeley Heights, NJ 07922
Susan Potanovich (spotanov@aglresources.com)

Joseph Shields
New Jersey Natural Gas Company
1415 Wyckoff Avenue
PO Box 1464
Wall, NJ 07719
Joseph Shields (jpshields@njresources.com)

Tracey Thayer Esq.
New Jersey Natural Gas Company
1415 Wyckoff Avenue
PO Box 1464
Wall, NJ 07719
Thayer Tracey Esq. (TThayer@njng.com)

Joy Rinehart
New Jersey Natural Gas Company
1415 Wyckoff Avenue
PO Box 1464
Wall, NJ 07719
Joy Rinehart (JLRinehart@njresources.com)

Paul H. Bralczyk
Public Service Electric and Gas Co.
80 Park Plaza, T8C
PO Box 570
Newark, NJ 07101
Paul.Bralczyk@pseg.com

Gregory Eisenstark Esq.
Public Service Electric and Gas Co.
80 Park Plaza, T8C
PO Box 570
Newark, NJ 07101
Gregory Eisenstark Esq. (Gregory.Eisenstark@pseg.com)

Jodi Moskowitz, Esq
Public Service Electric and Gas Co.
80 Park Plaza
Newark, NJ 07102
Jodi Moskowitz Esq (Jodi.Moskowitz@pseg.com)

Felicia Thomas-Friel, Esq.
Division of Ratepayer Advocate
31 Clinton Street, 11th Floor
PO Box 46005
Newark, NJ 07101
Felicia Thomas-Friel Esq. (fthomas@rpa.state.nj.us)

Judith Appel, Esq.
Division of Ratepayer Advocate
31 Clinton Street, 11th Floor
PO Box 46005
Newark, NJ 07101
Judith Appel Esq. (jappel@rpa.state.nj.us)

Timothy W. Rundall
South Jersey Gas Company
215 Cates Road
Egg Harbor Twp., NJ 08234
Timothy W. Rundall (trundall@sjindustries.com)

Samuel A. Pignatelli
South Jersey Gas Company
1 South Jersey Plaza
Folsom, NJ 08037
Samuel A. Pignatelli (spignatelli@sjindustries.com)

Chris Moschella
South Jersey Gas Company
1 South Jersey Plaza
Folsom, NJ 08037
Chris Moschella (CMoschella@sjindustries.com)

Chuck Dippo
South Jersey Gas Company
1 South Jersey Plaza
Folsom, NJ 08037
Chuck Dippo (cdippo@sjindustries.com)

Althea Curry
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Althea Curry (Althea.Curry@bpu.state.nj.us)

Jerry May
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Jerry May (Jerome.May@bpu.state.nj.us)

Robert Schultheis
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Robert Schultheis (Robert.Schultheis@bpu.state.nj.us)

Scott Sumliner
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Scott Sumliner (Scott.Sumliner@bpu.state.nj.us)

Beverly Tyndell-Broomfield
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Beverly Tyndell (Beverly.Tyndell@bpu.state.nj.us)

Sheila Iannaccone
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Sheila Iannaccone (Sheila.Iannaccone@bpu.state.nj.us)

Henry Rich
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Henry Rich (Henry.Rich@bpu.state.nj.us)

Arthur Gallin
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Gary Schmidt (Arthur.Gallin@bpu.state.nj.us)

I/M/O The Analysis of the Gas Purchasing and Hedging Strategies of the New Jersey Gas Utilities
Docket No. GA05121062

Jacqueline Galka
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Jacqueline Galka (Jacqueline.Galka@bpu.state.nj.us)

Donna Luhn, Esq.
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Donna Luhn (Donna.Luhn@bpu.state.nj.us)

Gary Schmidt
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Gary Schmidt (Gary.Schmidt@bpu.state.nj.us)

Dennis Moran
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102
Dennis Moran (Dennis.Moran@bpu.state.nj.us)

Tim Metts
Pace Global Energy Services
4401 Fair Lakes Court
Fairfax,VA 22033
Tim Metts (Timothy.Metts@PaceGlobal.com)

Scott B. Scholten
Pace Global Energy Services
4401 Fair Lakes Court
Fairfax,VA 22033
Scott B. Scholten (Scott.Scholten@paceglobal.com)

Mike Gettings
Pace Global Energy Services
4401 Fair Lakes Court
Fairfax,VA 22033
Mike Gettings (GettingsM@paceglobal.com)

Jackie Squillets
Vantage Consulting , Inc.
21460 Overseas Hwy.
Cudjoe Key, FL 33042
Jackie Squillets (Jsquillets@vantageconsulting.com)

Walter P. Drabinski
Vantage Consulting , Inc.
21460 Overseas Hwy.
Cudjoe Key, FL 33042
Walter P. Drabinski (wdrabinski@vantageconsulting.com)

Howard J Axelrod Ph. D.
Vantage Consulting , Inc.
5 Danbury Court, Suite 1
Albany, NY 12204
Howard J Axelrod Ph. D. (esi@nycap.rr.com)

Rich Mazzini
Vantage Consulting , Inc.
3282 Golden Key Road
New Tripoli, PA 18066
Rich Mazzini (r.mazzini@att.net)

Mary Lovell
Vantage Consulting , Inc.
2800 Carriage Lane
Carrollton, TX 75006
Mary Lovell (mslovell@yahoo.com)

Babette Tenzer, DAG
Division of Law
Department of Law and Public Safety
124 Halsey Street
Newark, New Jersey 07101
Babette Tenzer(Babette.Tenzer@law.dol.lps.state.nj.us)

Jessica Campbell, DAG
Division of Law
Department of Law and Public Safety
124 Halsey Street
Newark, New Jersey 07101
Jessica Campbell(jessica.campbell@dol.lps.state.nj.us)