RiskCentrix, LLC

Clarity in a World of Uncertainty

Encouraging "Robust" Risk Mitigation

robust - strong enough to withstand or overcome adversity or intellectual challenges

Olympia WA Workshop

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Presented by Mike Gettings, RiskCentrix

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Introductions

Mike Gettings Brief CV

- Early career in "economic studies" for a NY-NJ-PA combination gas & electric utility
  - Forecasting, cost allocations, marginal cost studies, regulatory testimony, etc.
- Ran a natural gas marketing firm from 1985 (initial deregulation) to 1996
  - O&R Energy, later called NorStar after Shell bought an interest ~1994
  - Began trading futures with the advent of NYMEX gas contract in 1991
- Ran the risk consulting division (+ other practices) of Pace Global from 1996 to early 2010
- Principal of RiskCentrix, LLC since Feb-2010
- Developed RM policies, processes & systems for numerous utilities & industrials, including
  - Long Island Power Authority, NY Power Authority, Santee Cooper, CA-DWR, Duquesne Power, Covanta, etc. - plus paper, chemical, steel companies et al
- Performed ad hoc reviews & program recommendations for numerous others, including
  - All 4 NJ LDCs, FortisBC (Terasen), Vectren, LCRA, Austin Energy, Seattle CL, Mittal Steel, etc.

Discussion Points

My Goal today is to provide a view on how risk mitigation programs can be improved . . .

First . . .

- The Most Basic Risk Management Tenet
- Regulatory Impediments

Then . . .

- A Quantitative Finance Approach
- A Prescription for Regulatory Change
- Q&A

Hedge programs should manage risk!

Opportunity management is a different issue.

So hedges should be executed based on a "risk view" not a "market view."

And a corollary . . .

Risk cannot be managed effectively unless it is measured and monitored.

There are well documented standards for measuring risk . . .

Measuring Risk

Industry standards for measuring risk . . .

"Quantitative Finance"

- 25 years ago, in 1989, JP Morgan developed risk metrics and quantitative methods to manage its own financial risk, and in 1992 it published the methodology to the marketplace
- Key concepts from that work have become risk-industry standards
- It is taught in most top university financial programs
- In the mid 1990's, after the advent of the NYMEX natural gas futures contract, these methods were adopted by the energy industry to deal with the deregulated markets and newfound price volatility

These methods are widely accepted and have been deployed by many energy companies . . .

- Large public-entity utility companies
- Large oil & gas producers,
- Marketing and trading companies,
- Independent power generators.
- Some regulated utilities, especially when operating in competitive environments

But a broad segment of utilities use less rigorous methods.

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Regulatory Impediments & Remedies

The typical regulated utility's risk objectives are two-fold:

1. Reduce the customers' exposure to cost-related pain, and also
2. Minimize the utility's exposure to prudence risk.

Regulatory Impediments . . .

a) Utilities that gear up to make specialized big-impact risk decisions increase their own prudence exposure in the absence of a regulatory compact on methods and potential results

b) The probability distribution of potential results depends on volatility which is wildly transient, so any safe harbor agreement (prudent $ thresholds) would discourage hedging when it is most important

c) Regulators usually lack the specialized skills to assess quantitative finance risk mitigation decisions

The way to facilitate more effective risk mitigation is to . . .

- Deepen (quantitative methods) risk expertise on both sides
- Establish a regulatory compact regarding what constitutes prudent procedures as to risk measurement, monitoring, and mitigation strategies ("Triple-M")
- Require that LDCs file company-specific Triple-M plans annually
- Commit to review hedge program (robust) design & execution, not arbitrary retrospective results
- Look at results in the context of volatility over the period & the LDC's proper measurement and response to risk conditions

Realistically, this probably requires a two-year evolution

A Quantitative Finance Approach

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First . . . A Useful Framework
Setting Objectives

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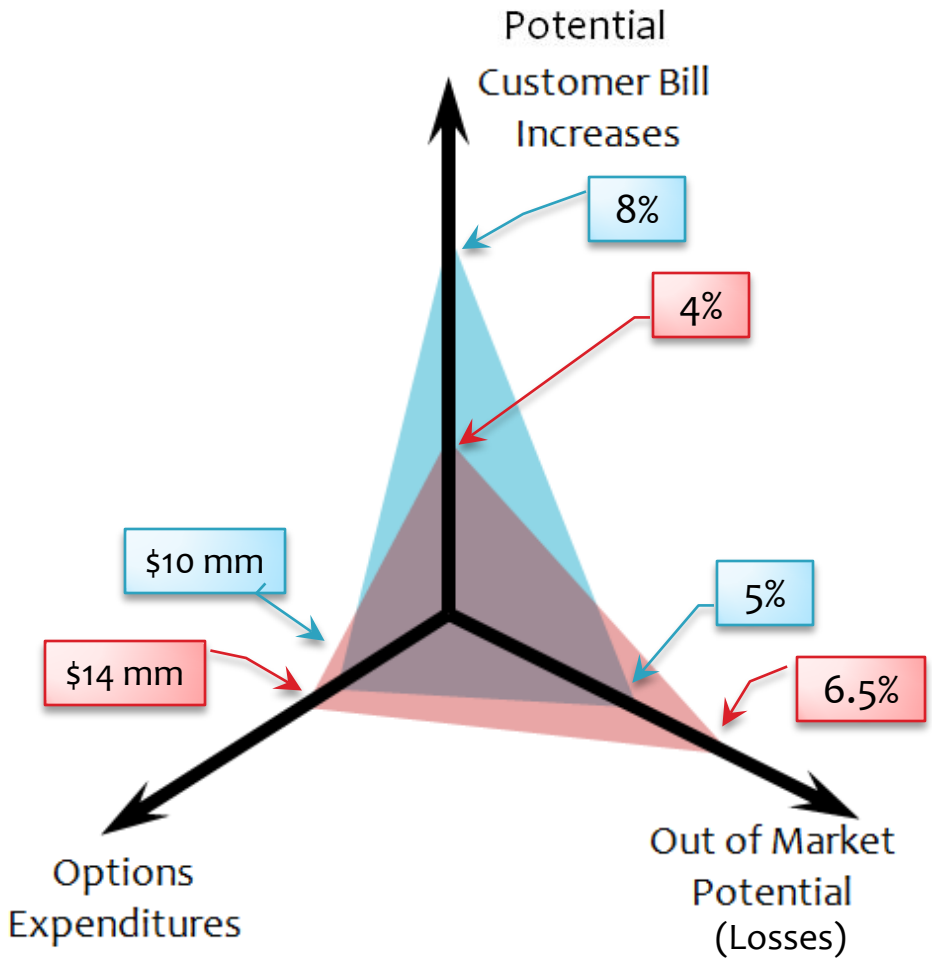
Objectives must balance 3 competing Issues:

- Customer Bill Increase Tolerance
- Out of Market Tolerance (Losses/Collateral)
- Option Expenditures

- The Blue and Red Triangles (right) are alternative sets of tolerances for an assumed volatility level.

Note that the higher the design volatility, the larger the triangle must be!



. . . A Useful Framework
Hedge Decision Types

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A Menu of Hedge Decision Types . . .

The best programs use 3, maybe 4 types

Defensive Hedges

- Hedge when necessary to defend upside cost tolerance given 'forward price + risk' metrics

Defensive Hedges utilize quantitative finance methodologies

Programmatic Hedges

- Early gradual accumulation to pre-mitigate net exposures to a level manageable via Defensive Hedge Rules

Many regulated utilities' hedge programs do only this.

Discretionary Hedges

- Hedge in modest increments when prices offer target values consistent with goals

These are more about opportunity management than risk management

Contingency Plans

- When extreme circumstances arise, how will decisions be modified to constrain hedge losses?

Seldom need to be deployed; standby to constrain losses in collapsing markets

Properties of Futures Prices

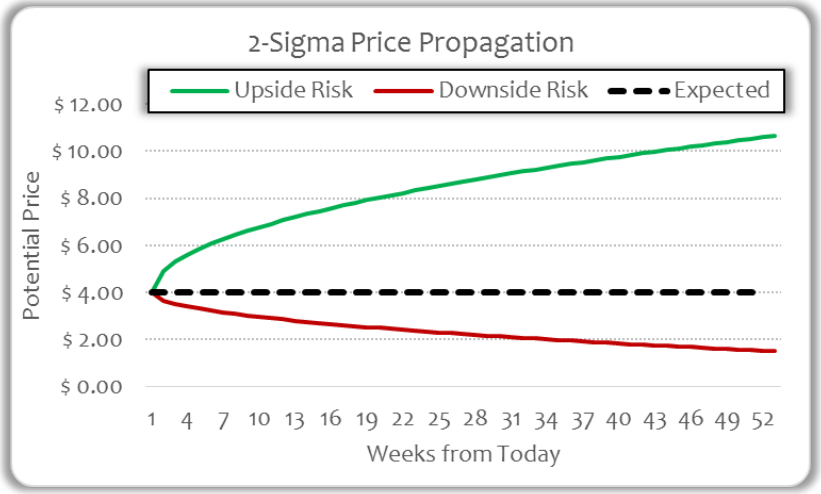
The NYMEX futures price for a given forward contract month reflects' the money-backed consensus of all market participants as to the "mean expectation" of the future cost of gas, but it is transient. It can change with each trade.

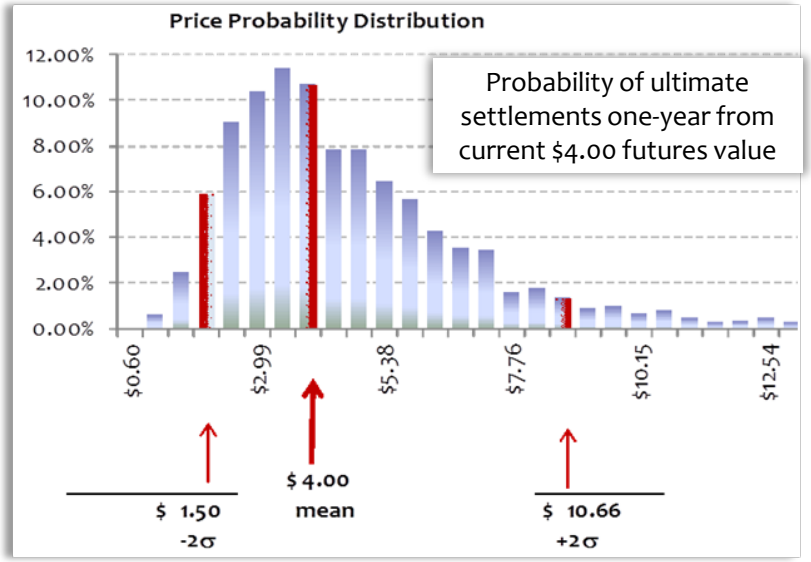
Volatility can be measured empirically based on daily price changes over a statistically valid period like 30 days.

A risk envelope of potential ultimate settlement values *or interim future hedge opportunities* can be determined based on daily volatility propagated over the time to settlement (Top graph).

The second graph shows the potential probability distribution one year from now at 2 sigma.

(2 sigma means all but 2.3% of potential outcomes on the top and 2.3% on the bottom)





Volatility & Risk Is Anything But Static
It Must Be Monitored

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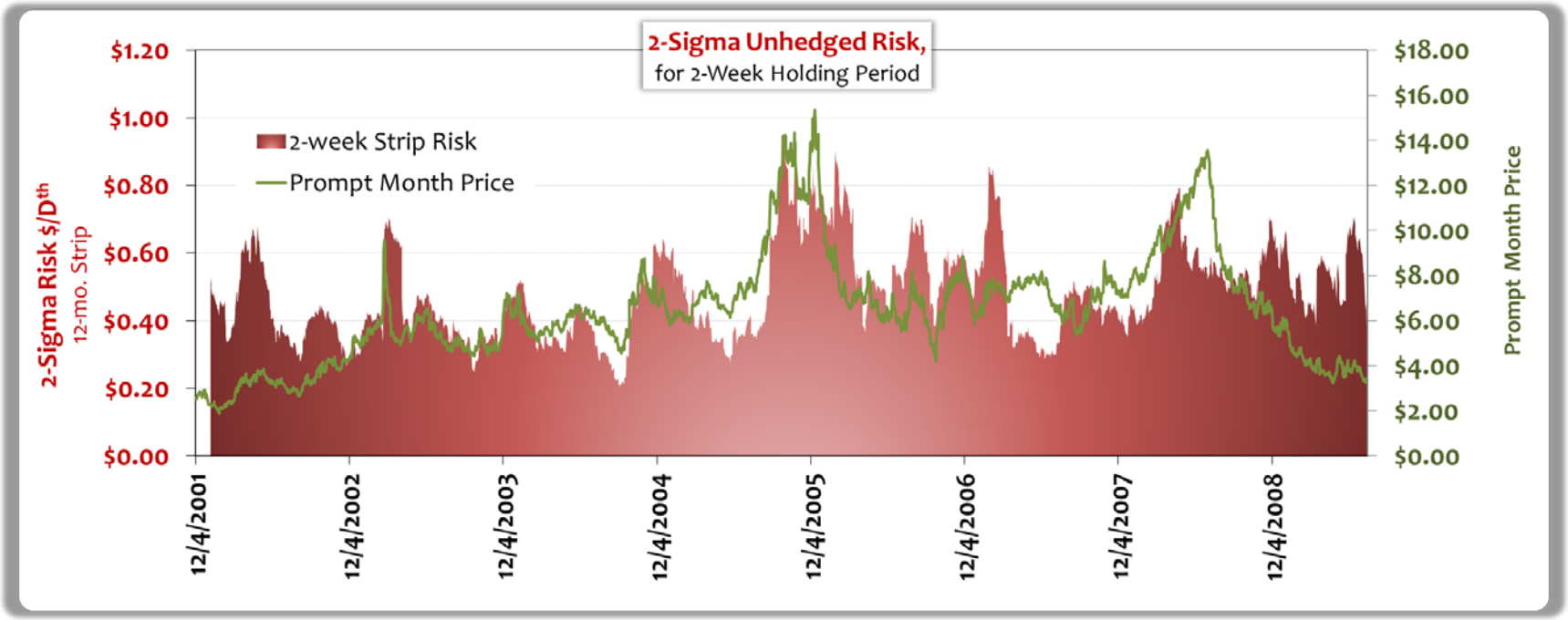
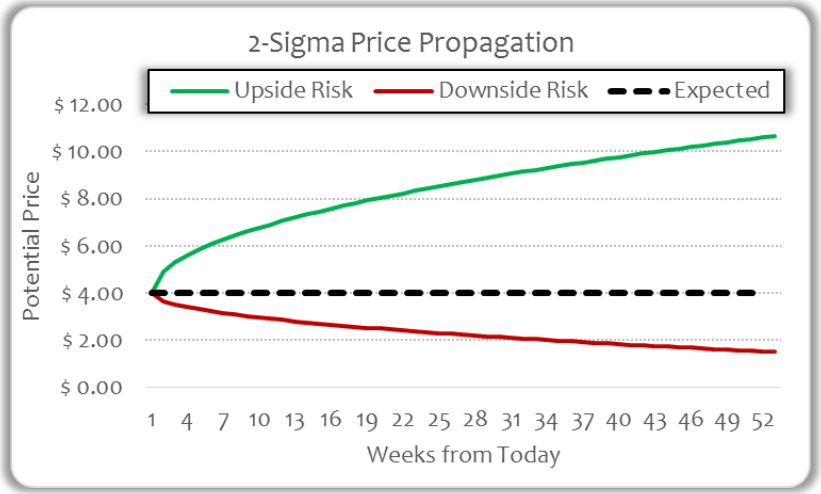
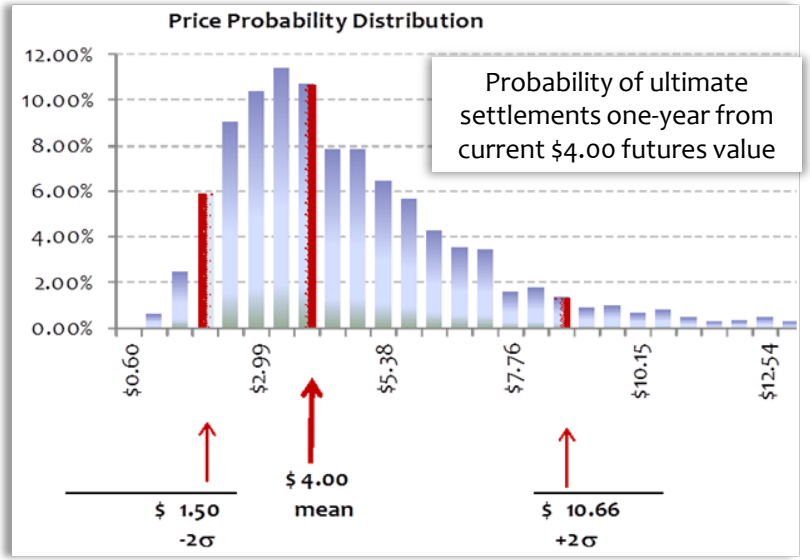
The 2-sigma Risk, as presented here in red, indicates the potential upside price risk in $/Dth that would only be exceeded 2.3% of the time.



In conjunction with early emergence of price increases, 2-sigma risk will warn of forward price spikes, but it must be monitored.

More on Properties of Futures Prices





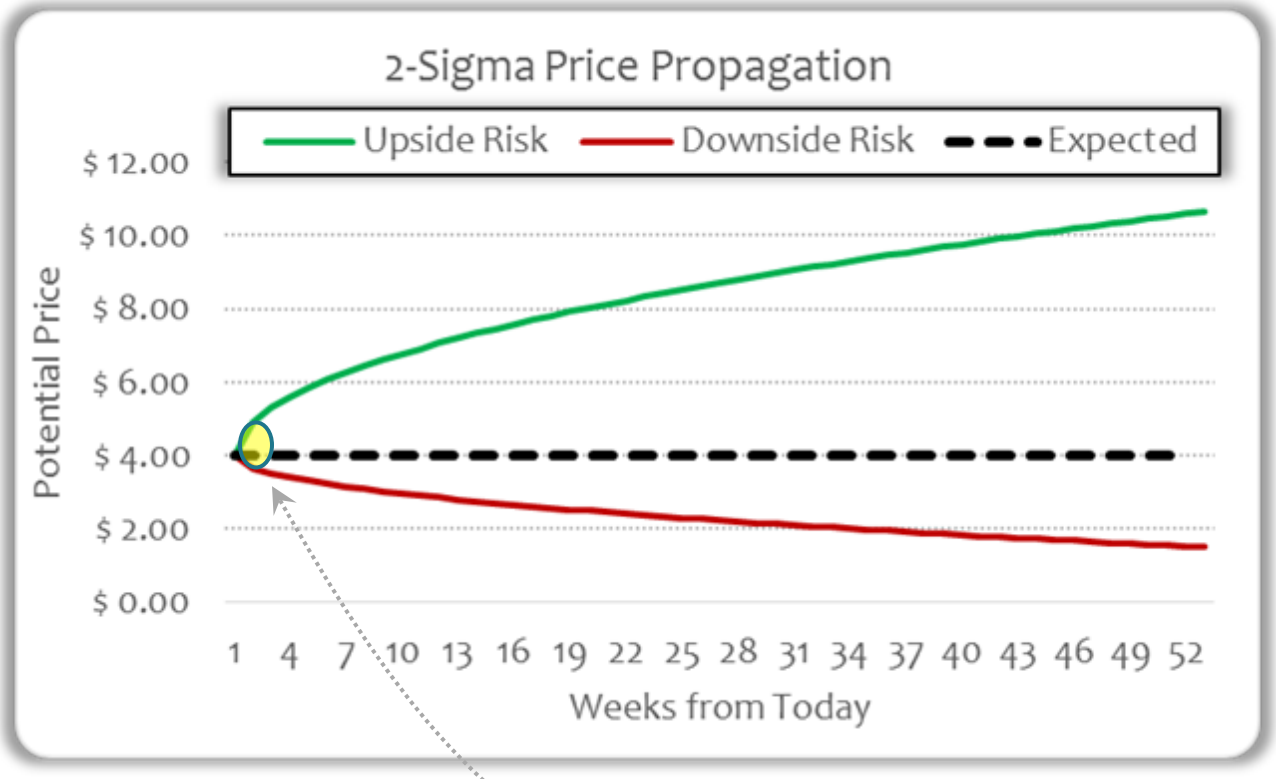
Note:

- Upside extreme outcomes are far greater in magnitude than downside extremes because prices are constrained to no less than zero on the downside. (Log normally distributed)
- The risk is proportionate to the square root of the time it accumulates. This will facilitate management by "holding period."

And . . .

- Since the probability-weighted expected value is the mean of the distribution, the most likely outcomes fall on the downside which counterbalances the greater magnitude to the upside.

So What?



Why would anyone try to make one annual decision to manage this?

A full year's risk span

When a two-week horizon & hedge review (holding period) allows them to manage much smaller risk increments

Volatility Translates to 2-Sided Risk

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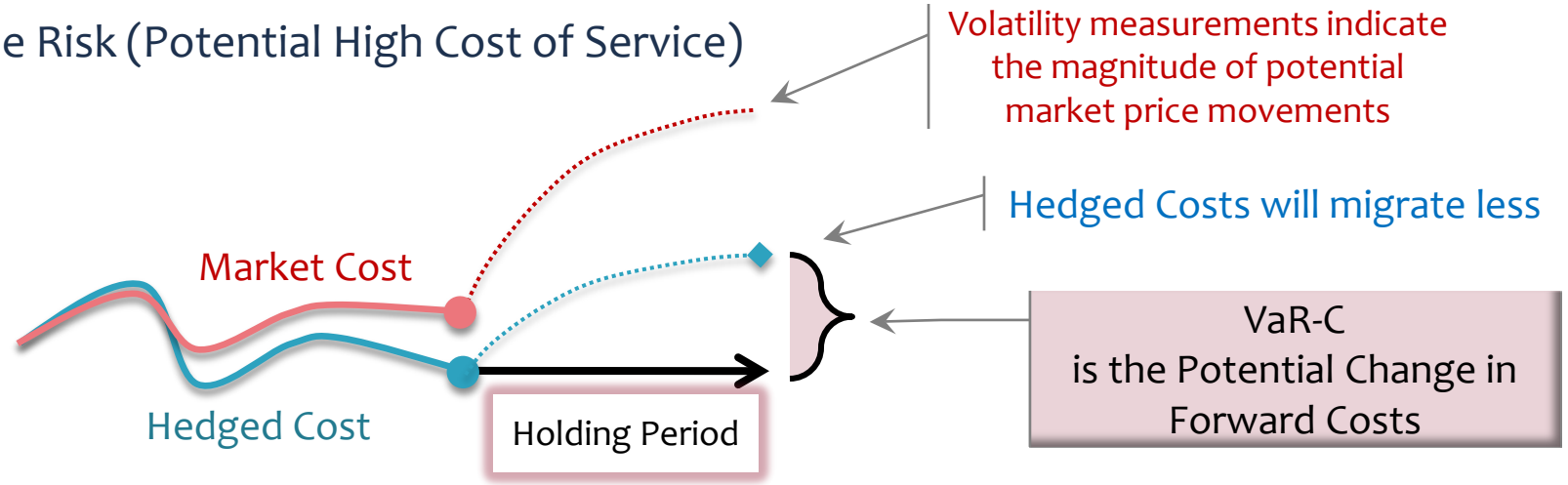
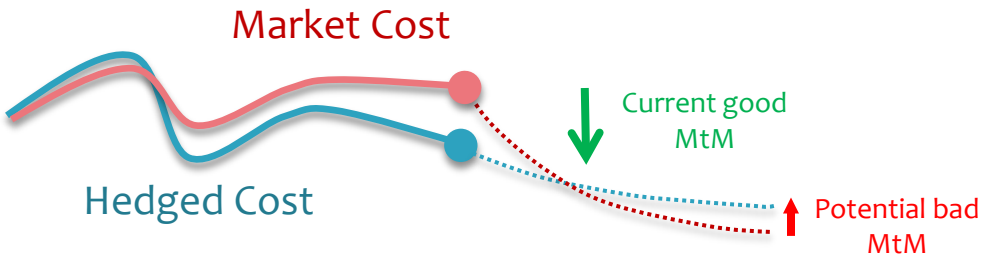
Upside Risk (Potential High Cost of Service)



Downside Risk (Potential Foregone Participation in Cost Declines, i.e., Hedge Losses)



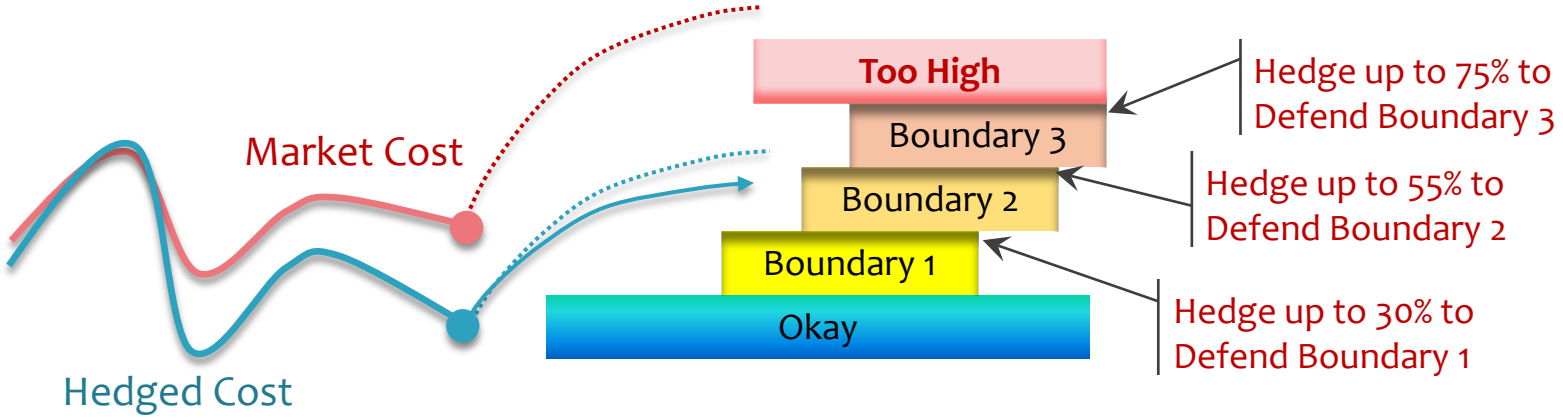
VaR-L
is the Potential Change in MtM;
(In this case from a favorable to an unfavorable MtM)

MtM = Mark to Market

How Can We Say That?

"If properly designed, loss potential seldom exceeds tolerance"

Because if we observe multiple tiered boundaries we won't hedge to defend Boundary 2 until a favorable MtM [2] exists from Boundary-1 hedges, and we won't hedge to defend Boundary 3 until a even more favorable MtM exists from Boundary-1 & Boundary-2 hedges.



For each boundary, hedges are sized to eliminate only as much VaR as needed – no quantum jumps

Also, a reasonable options budget allows cost caps with minimal loss potential (i.e., the premium)

Simulations can be used to design & assess hedging decision rules that meet the three-legged constraints, even in substantially stressed market environments like 2005 and 2008 & following.

[2] MtM = Mark to Market

Just Suppose . . .
We Started in 2007 for Gas Year `07 – `08

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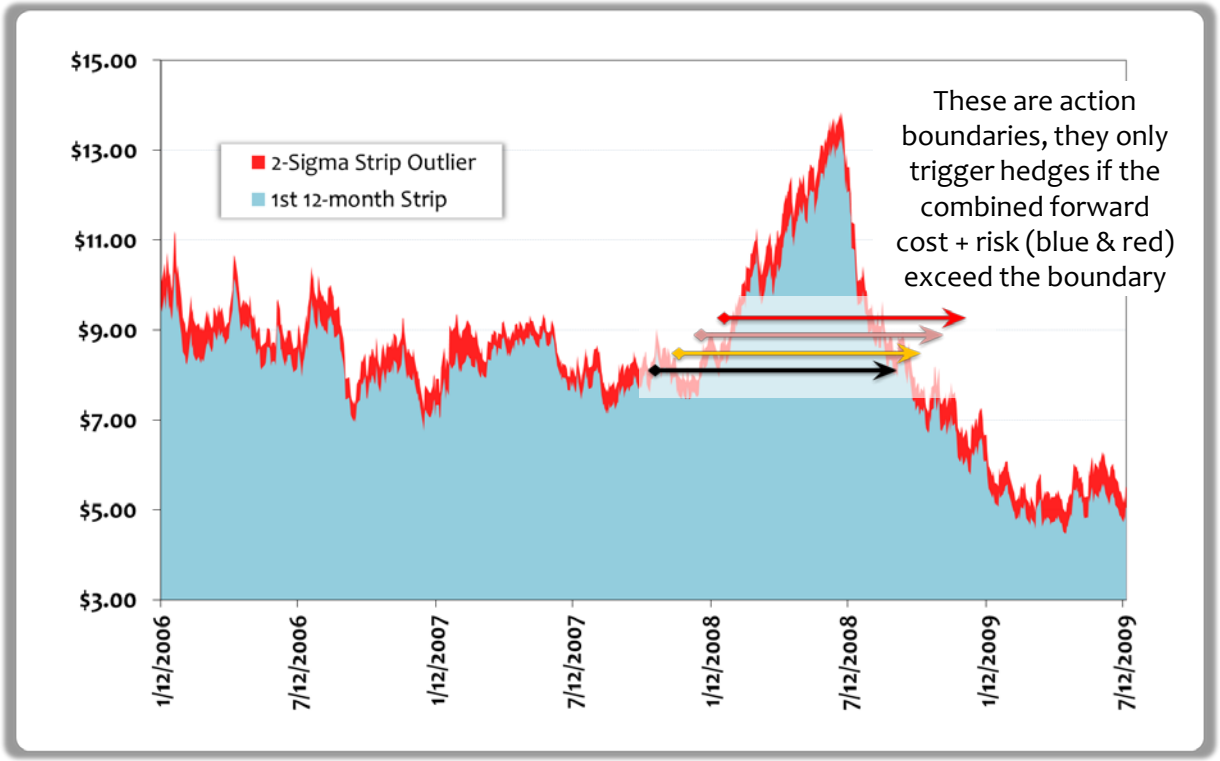
By Setting Tolerances for the coming gas year in the 3rd Quarter of 2007
when the 12-month forward strip was $8.00
and our top boundary "tolerance" might have been $9.25



As our metrics
(*Current forward portfolio value + 2-sigma risk*)
encroached on boundaries
. . .

Hedges would have been accumulated at $8.00 - $9.00

Then in Q3 2008
We'd Set Revised Boundaries

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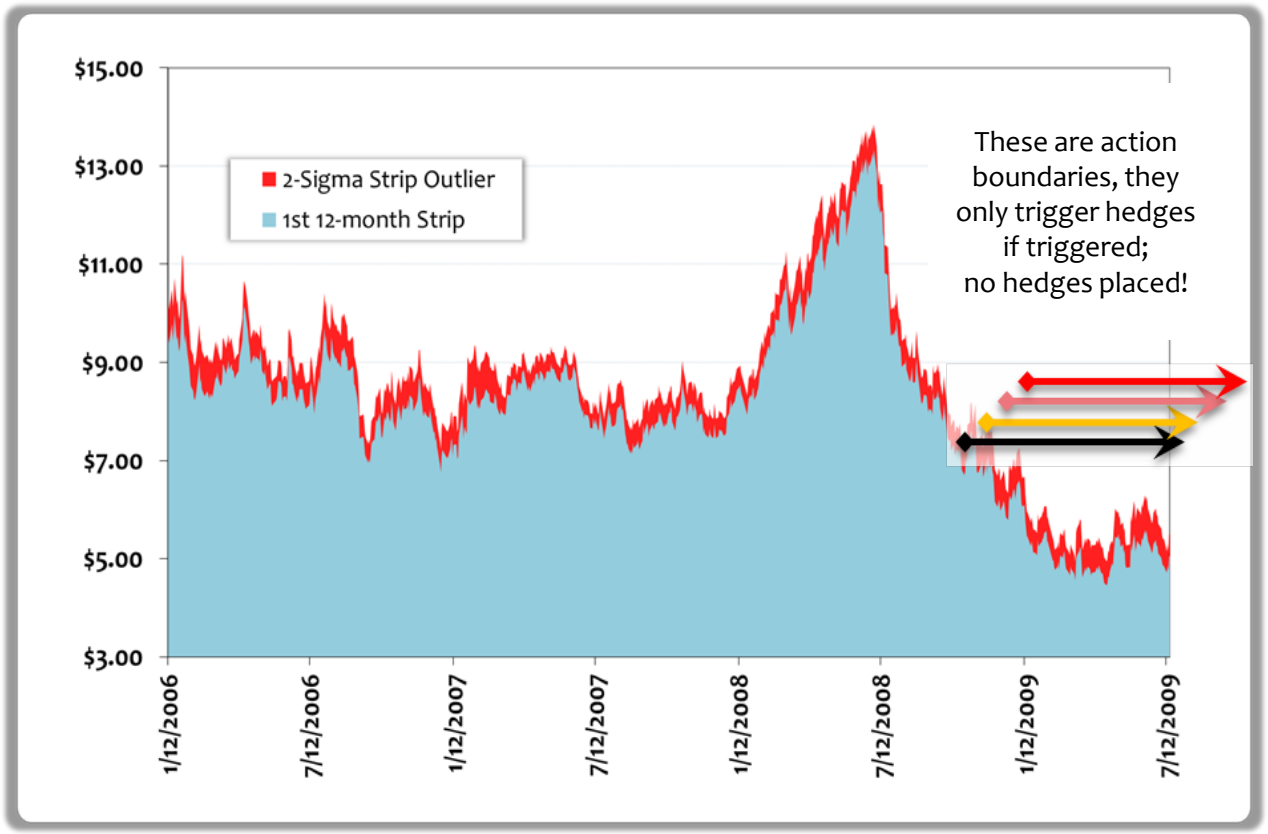
In Q3-2008 Boundaries would key off portfolio positions (hedged + unhedged) around $8.00/Dth . . .



We would have started that gas year substantially hedged, and

We would have already stopped new defensive hedges earlier, around Q2-2008, because we had hedged the peak before it materialized.

For the next few years we would probably hold small-volume programmatic hedges only.

Closing Comments

- More Robust Programs Are Attainable
  - But realistically, only if a regulatory compact can be reached

- That Would Take a Two-Year Effort Requiring . . .
  - New Expertise in Quantitative Finance for all or most parties
  - LDC filings delineating Change Plans, including:
    - Development of methods (Procedures & IT systems) to measure & monitor risk metrics
    - Strategy Development: Programmatic, Defensive, and Contingent Strategies
    - A Phase-In of New Methods while gaining comfort
  - Regulatory Review & Approval
  - A regulatory compact for each LDC regarding Procedural Prudence Standards

Questions?

End

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