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**A Primer on Hedging:  
The Case of Natural Gas**

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# A Primer on Hedging: The Case of Natural Gas

## I. Topics

- A. Basic things to know about hedging
- B. Different hedging options
- C. Policy and economic issues
- D. Regulatory options

## II. The Definition of Hedging

- A. An economic activity in which an individual or group uses the market to protect an existing or anticipated physical market exposure from unexpected or adverse price fluctuations
- B. A *bona fide* hedger is concerned only with price volatility; she is not concerned with price expectations (akin to auto drivers who purchase auto insurance irrespective of the likelihood of an accident).
- C. One example is a utility's purchasing gas futures contracts to cover future months' requirements and fix their purchase price.
  - 1. When the month for which the utility requires physical gas approaches, it will sell its futures contract and purchase physical gas.
  - 2. As the two transactions occur almost simultaneously, their prices cancel each other out (with an adjustment for basis to account for the difference in the spot price at the Henry Hub and the local delivery point).
  - 3. The result is that customers pay the original price of the futures contract for the physical gas they purchase from the utility.

## III. Contrast with the Definition of Speculation

- A. Economic activity in which an individual or entity attempts to profit from price movements
- B. Specifically, the individual or entity tries to buy an economic good or asset at a price lower than the price at which the good or asset expects to sell in some future period.

- C. Speculation represents a basic economic function in markets with high price volatility and opportunities for profit making from price movements.

#### **IV. Examples of Speculation**

- A. Physical speculation with assets such as land, houses, and stored commodities
- B. Financial speculation with assets such as futures contracts, swaps, and options
- C. A speculator may neither own nor plan to own the commodity.

#### **V. Basic Things to Know about Hedging**

- A. High price volatility supports consideration of hedging by utilities and other large consumers, including hedging with financial instruments:
  - 1. Utility hedging can be important for retail customers: Customers can suffer substantial economic welfare losses, for example, when natural gas prices rise to very high levels
  - 2. This comment implies that a utility should hedge to prevent customers from paying extremely high prices, especially during high-demand periods
- B. Relative to physical hedges, financial instruments can have:
  - 1. Lower costs
  - 2. Higher liquidity
- C. Some financial instruments have lower transaction costs and higher liquidity than other instruments (e.g., NYMEX contracts versus over-the-counter contracts such as swaps).
- D. Since the beginning of this century, state commissions have conveyed to gas utilities that buying gas at the market or spot price may no longer be acceptable (i.e., may be “imprudent”).
- E. Hedging with financial instruments, or hedging in general, may not always be desirable (e.g., hedging normally involves a cost that may be high relative to the risk exposure).
- F. State commissions vary in how much upfront guidance they give utilities regarding hedging activities (e.g., some commissions tell utilities they can hedge with financial instruments but give no added guidance).

- G.** Almost always, more stable and predictable prices by way of hedging involve a long-run cost to consumers or other gas purchasers (there is no “free lunch”); the pertinent question then becomes: How much should a utility pay (e.g., in the form of an options premium) to have more stable and predictable prices?
- H.** The fundamental answer to the previous question depends upon how much customers are willing to pay for more stable and predictable prices or to avoid price spikes.
- I.** In the finance literature, firms primarily hedge to stabilize cash flow; but with PGAs and FACs, customers are the biggest beneficiaries of hedging.
- J.** Hedging resulting in higher prices (*ex post*) to consumers can still be regarded as successful and prudent.
- K.** Hedging can result in stabilizing prices against both upward and downward moves; hedging, therefore, risks a utility and its customers paying above-market prices.
- L.** A common position of state commissions is to tell a utility “Go ahead and hedge, we won’t stop you, but we’ll evaluate your hedging strategy and the associated activities and costs after the fact with a prudence review.”
- M.** Although PGAs/FACs may weaken incentives for hedging by utilities, the threat of cost disallowance if the spot price of gas suddenly rises can induce utilities to hedge; other reasons exist for why a utility may want to hedge.
- N.** Financial hedging instruments can cost less than physical hedging alternatives such as physical contracts and storage.
- O.** Hedging is an integral part of any commodity market in which prices are volatile.
- P.** How much to hedge and how to hedge are more complicated and subjective than traditional gas-procurement decisionmaking. Hedging is, therefore, highly susceptible to second guessing.
- Q.** Some analysts and policymakers view hedging as a value-added service distinct from traditional gas procurement practices (namely, the value of customers not having to pay high prices).

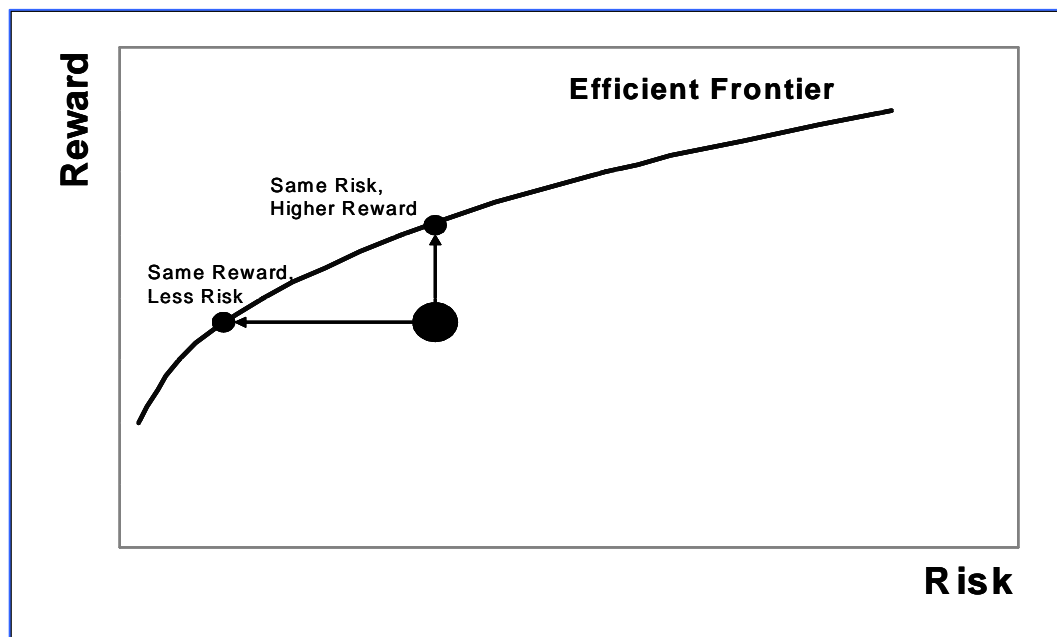
## VI. Gas Procurement Options

- A. Multi-month contracts
- B. Month-ahead contracts
- C. Daily spot purchases
- D. Stored gas

## VII. Different Hedging Options: Physical and Financial Hedges

- A. Physical fixed-price contracts
- B. Staggered contracts
- C. Financial instruments (e.g., futures contracts, options, swaps, collars)
- D. Storage
- E. Gas supply diversity (e.g., connected to at least three supply basins)
- F. Portfolio of hedging alternatives (e.g., storage, options plus staggered contracts)

## VIII. Portfolio Analysis: Tradeoff between Risk and Reward (i.e., the Inverse of Expected Cost)



$$\text{Reward} = (1/\text{Expected Cost})$$

## IX. Examples of Financial Instruments

### A. Futures contracts

1. Definition: An agreement to purchase or sell gas for delivery in the future: (1) at a price that is determined at the beginning of the contract, (2) which obligates each party to the contract to fulfill the contract at the specified price, and (3) which may be satisfied by delivery or an offset.
2. Illustration: On August 1, 2010, a January 2011 gas futures contract sold for \$6 per MMBtu; the January 2011 contract calls for 10,000 MMBtus of gas to be delivered over the month; by purchasing the futures contract at \$6, the utility effectively locks in that price for its customers, notwithstanding the fact that the utility will actually buy the physical gas during January 2011 under a separate contract at the market price.

### B. Swaps

1. Definition: Transaction in which parties exchange payments based on changes in the price of gas or a market index, while fixing the price they effectively pay for the physical commodity.
2. Illustration: Midnight Sun Gas Company purchases a swap from ENROCK trading company to lock in a fixed price of \$5 per MMBtu; the utility continues to pay its supplier at index; at prices over \$5, ENROCK pays the utility the difference; at prices below \$5, the utility pays ENROCK the difference; the net price remains at \$5 for the duration of the agreement.

### C. Caps

1. Definition: A contract between two parties, whereby the buyer is assured that she will not pay more than a given maximum price.
2. Illustration: Midnight Sun Gas Company purchases a cap from ENROCK with a \$6 strike price; the utility pays an upfront premium to ENROCK to protect the desired volume; should the market price rise above \$6, ENROCK pays the difference between the strike price and the market price; if market prices fall below \$6, the utility can discard the cap and buy gas in the spot market.

### D. Collars

1. Definition: A contract between two parties, whereby the buyer is assured that he will not have to pay more than some maximum price, and whereby the seller is assured of receiving some minimum price.

2. *Illustration:* Midnight Sun Gas Company wishes to ensure that it pays prices between \$5-6; the utility subsequently purchases a \$6 cap and sells a \$5 floor, effectively “collaring” the amount to be paid; if the premiums paid/received are equal, the transaction is deemed a costless collar.

## **X. Policy and Economic Issues**

- A. Why should a utility hedge? Who are the major beneficiaries?
- B. How much should it hedge? How much should it spend on hedging?
- C. Does a commission have the required expertise to evaluate a utility’s hedging strategy and to oversee its hedging activities?
- D. How should a utility hedge? How much should it hedge with storage and physical contracts, and with financial instruments?
- E. What role should the commission play in the development of a hedging strategy?
- F. Should a commission give a utility guidance on the development of a hedging strategy?
- G. How should a commission retroactively evaluate a utility’s strategy and activities?
- H. How should a utility recover hedging costs from its customers?
- I. What should be the essential components of a hedging strategy?
- J. What incentive does a utility have to:
  1. Hedge at the right level, and
  2. Hedge in an optimal way?
- K. Should a utility change its tactics in response to changed market conditions?
  1. If so, does it have the incentive, given that it would require active management, continuous monitoring, and the constant accumulation of market intelligence?
  2. Would the utility be more susceptible to a prudence review, since it would have to make more decisions?

## **XI. Regulatory Options**

### **A. Taking a proactive posture**

- 1.** Rationale for a pro-active commission
  - a.** How much to hedge and how to hedge mainly affect customer (rather than utility shareholder) welfare, thus justifying commission and non-utility involvement
  - b.** Hedging is highly susceptible to second-guessing or opportunism by regulators.
  - c.** It should help to narrow the scope and incidence of after-the-fact prudence reviews.
  - d.** It avoids placing a utility in a dilemma—no hedging versus hedging with no commission guidance.
- 2.** Involved commission activities
  - a.** Laying out guidelines or “rules of the road;” an example of guidelines
    - (1)** Establish the need
    - (2)** Keep a hedging strategy flexible to accommodate changed market and other conditions
    - (3)** Articulate the objectives of a hedging strategy
    - (4)** Identify all hedging costs
    - (5)** Establish reporting requirements
    - (6)** Know the utility’s hedging expertise
    - (7)** Articulate the prudence criteria (i.e., the conditions under which the commission would allow recovery of gas and hedging-related costs)
  - b.** Evaluating the reasonable of a utility’s hedging strategy before it is executed
  - c.** Evaluating the prudence of a plan’s execution for determining cost recovery

- d. Giving the utility the right incentives to design and execute a hedging strategy that best advances the welfare of risk-averse customers (e.g., hedging at an optimal amount and with active involvement by the utility or its outsourced contractor)
- B. **In establishing a prudence standard for hedging, a commission might want to:**
  - 1. Define an acceptable level of price volatility (or consumer risk tolerance toward price volatility)
  - 2. Define an acceptable average cost for gas, accounting for the costs associated with hedging
- C. **Second-guessing and micromanaging should be avoided.**
  - 1. Commissions should not (and really should not want to) tell utilities how to hedge.
  - 2. Second-guessing is contrary to the traditional prudence standard and, in addition, creates distorted incentives for utility hedging.
  - 3. But, according to this prudence standard, a commission should maintain authority to evaluate the reasonableness of (1) a hedging strategy *ex ante*, and (2) the execution of the strategy.
- D. **Another regulatory response is to do nothing until the utility requests recovery of hedging costs, which after all is the policy of several commissions. Is this a good policy? If not, what is wrong with it?**
- E. **What commitment should a regulator make to a hedging strategy?**
  - 1. *Full commitment* (e.g., pre-approval of a hedging plan and all of its costs)
  - 2. *Partial commitment* (e.g., pre-approval of a hedging plan but not its costs; upfront guidelines)
  - 3. *No commitment* (e.g., no guidance but after-the-fact prudence review)