

Risk Management 101



Physical Natural Gas



Gas Measurement

- **Mcf**
 - Thousand cubic feet
 - Volumetric measurement
- **MMBtu**
 - Million British Thermal Units
 - Heating value measurement of gas based on a standard heat value or stored energy
 - One Btu is the amount of heat necessary to raise one pound of water one degree Fahrenheit.
- **Dekatherm**
 - Approximately equal to MMBtu

Market Participants

- **Producer**
 - Own physical gas production
 - Supplier/Seller of natural gas
- **Marketer**
 - Intermediary between suppliers and purchasers
 - Buyer and Seller of natural gas
 - Independent or producer/utility affiliate

Market Participants

- **Local Distribution Company**
 - Distributor of natural gas to residential, commercial and industrial customer
 - Buyer of natural gas
- **End User**
 - Ultimate user of natural gas
 - Buyer of natural gas
 - Industrial, commercial, residential

Physical Gas Purchasing

- **Purchase periods**
 - Day
 - Month
 - Season
 - 1 year or longer (long term)
- **Pricing**
 - Index
 - Daily - Gas Daily
 - Monthly - Inside FERC Gas Market Report

Physical Gas Purchasing

- **Pricing continued**
 - **NYMEX (exchange based)**
 - Monthly, seasonal and long term
 - Basis – additional pricing component
 - **Fixed**
 - Daily
 - Market price during daily trading period
 - Monthly, seasonal and long term
 - Based on NYMEX

Physical Gas Purchasing

- **Trading Periods**
 - **Daily**
 - Approximately 8:00 a.m. to 11:00 a.m. ET
 - **Monthly**
 - Between 2 and 5 days prior to the beginning of each month (“bid week”)
 - **Seasonal and long term**
 - 3-6 months prior to the beginning of the summer or winter season

Hedging

Gas Price Volatility

As conditions change over time, gas prices fluctuate depending on those changing conditions. For example, if it is cold and demand is high, prices will increase to reflect the shift in the supply/demand balance. The duration of the price increase will depend on many factors including how long and how severe the cold is.

Gas Price Risk

If this price increase coincides with the monthly trading cycle, prices for the next months gas, or possibly longer, will also be high. Due to the uncertainty of the timing of events and to the changes in conditions, it is often unknown what price will be paid for gas in any given month prior to entering that month. This creates risk for both buyers and sellers.

Hedge - Definition

- **A means of protection or defense (against financial loss)**
- **to protect oneself from losing by a counterbalancing transaction**
- **a method of reducing the risk of loss caused by price fluctuation**
- **the initiation of a position in a futures or options market that is intended as a temporary substitute for the sale or purchase of the actual commodity**

Hedging Tools

- **Futures**
- **Options**
- **Swaps**
 - **Fixed price**
 - **Basis**

Futures

- **Definition**
 - **A firm commitment to make or accept delivery of a specified quantity and quality of a commodity during a specific month in the future at a price agreed upon at the time the commitment is made**

Futures

- **Requirements for any futures contract to be successful/sustainable**
 - **Prices of the underlying commodity must be volatile**
 - **Diverse and large number of buyers and sellers**
 - **Underlying physical products must be fungible (interchangeable)**

Futures

- **New York Mercantile Exchange (NYMEX)**
 - **World's largest physical commodity futures exchange**
 - **NYMEX Division – energy related commodities**
 - **COMEX Division – metal related commodities**

Futures

- **What does the exchange offer?**
 - **Matches up both buyers and sellers of individual commodities**
 - **Hedgers**
 - **Underlying industries seeking to avoid risk**
 - **Private and institutional investors**
 - **Assume risk underlying industries seek to avoid in exchange for possible profits**
 - **Hedge funds**
 - **Speculators**

Futures

- **What does the exchange offer?**
 - **Cost-efficient trading and risk management opportunities**
 - **Competitively traded in an anonymous auction**
 - **Pricing widely and instantaneously disseminated**
 - **Performance is supported by a strong financial system backed by members**
 - **Safe, fair and orderly markets protected by rigorous financial standards and surveillance procedures**

Futures – Contract Specs

- **NYMEX Natural Gas Futures**
 - Volume – 10,000 MMBtu/contract
 - Contract term – one month
 - 72 future months traded
 - Physical delivery capability
 - Henry Hub - Louisiana
 - Less than 1% of all contracts traded go to delivery
 - Financial requirements
 - Minimal transaction fees
 - Margin – performance insurance
 - Contract expiration 3 business days prior to the beginning of month

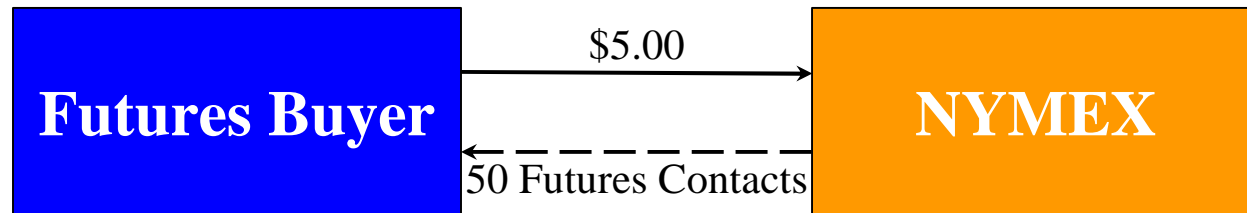
Futures Example

A natural gas burner buys its physical gas at the Henry Hub. Its October physical purchase requirement is 500,000 MMBtu for the month. The burner believes natural gas prices will increase from current price levels before October and therefore will use NYMEX natural gas futures to manage its risk of price movements between now and October.

Futures Example

Because the burner has a need for physical gas, yet does not currently own the physical gas, it is considered short the 500,000 MMBtu required for October. Its hedge strategy will be to purchase, or go long, the equivalent number of October futures. Since each natural gas futures contract is equivalent to 10,000 MMBtu, the burner will buy 50 October futures contracts.

Futures Example



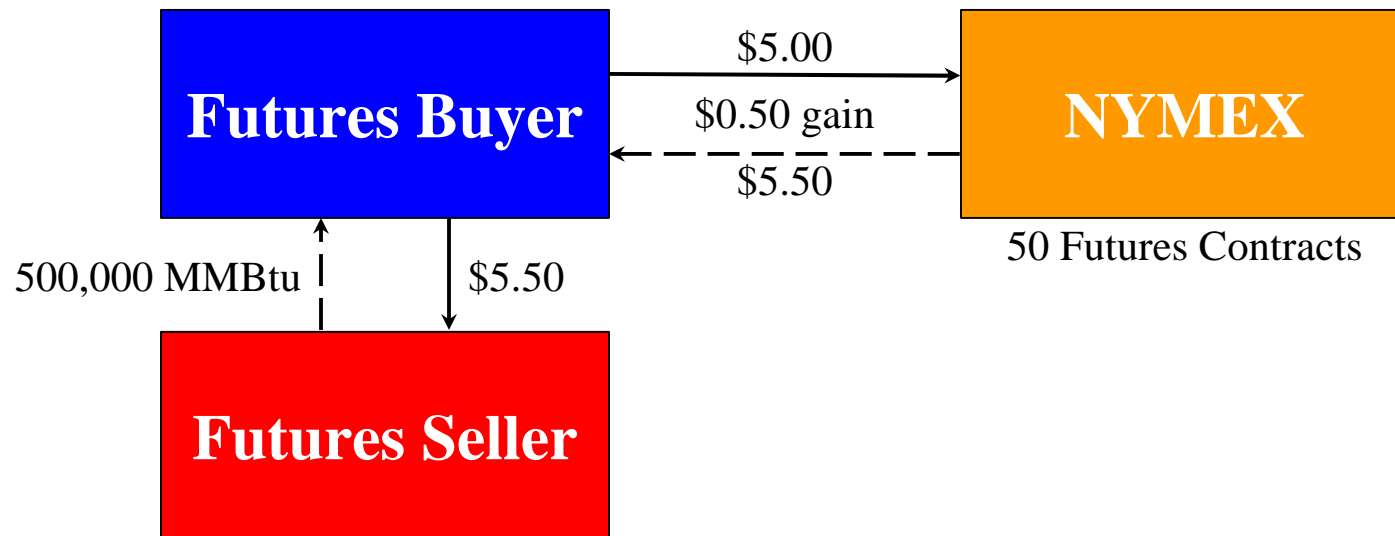
The current price for October natural gas futures is \$5.00

The burner now owns natural gas futures contracts that can be converted to physical gas on expiration of the October futures contract through Standard Delivery.

Futures Example – Scenario #1

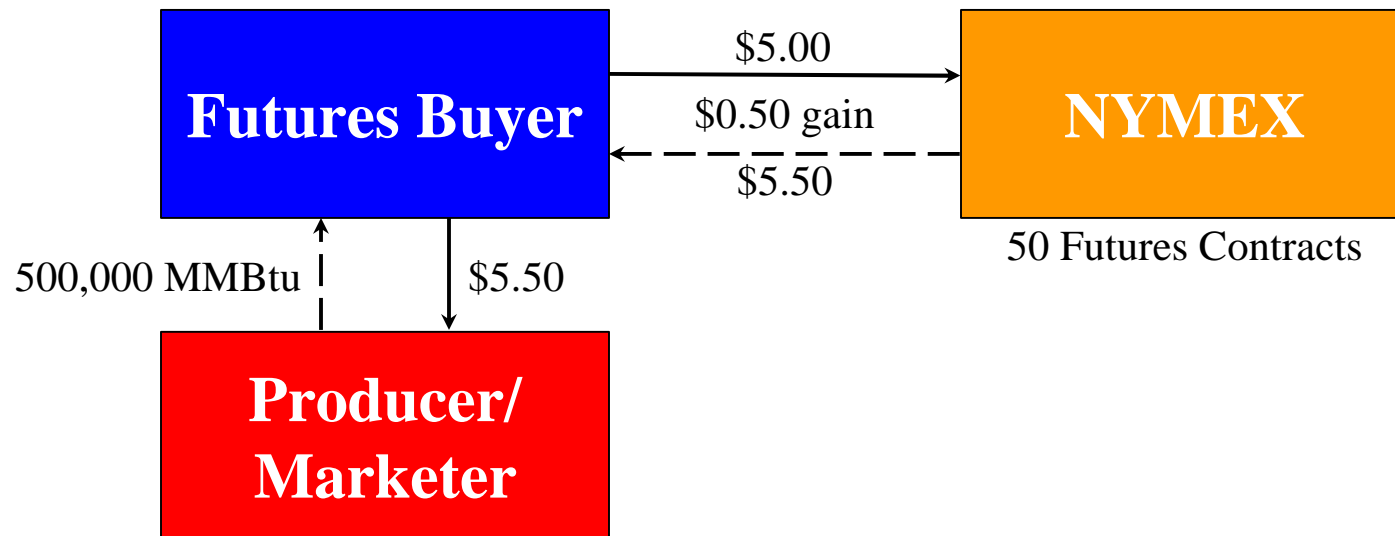
On September 27th (3rd business day before October 1), the October futures contract settles at \$5.50. The burner can either sell back his October futures contracts or hold on to them for delivery of physical gas at the Henry Hub.

Futures Example – Scenario #1



If the burner chooses to hold onto the futures contracts for delivery, the NYMEX will match the burner with a counterparty holding a short futures contracts position. The physical transaction between the buyer and the seller will be priced at the settlement price of \$5.50. The NYMEX will credit the gains from the long futures position to the burners account. The burner will apply the gains towards the physical gas purchase, netting \$5.00/MMBtu.

Futures Example – Scenario #1

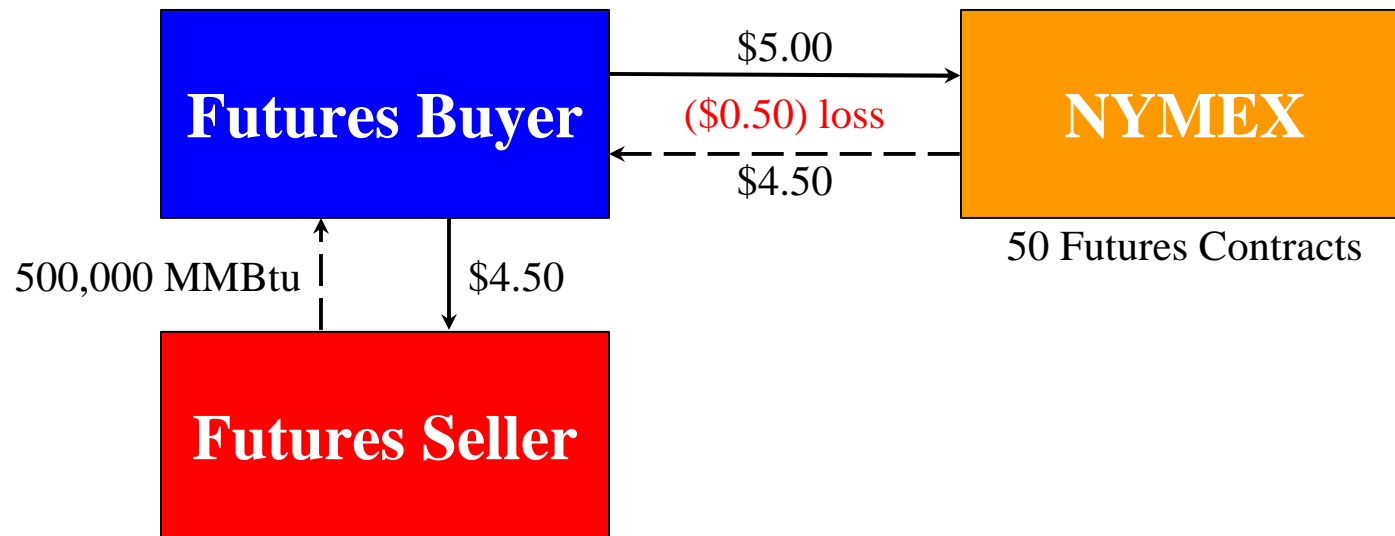


If the burner chooses to liquidate its futures contracts at settlement, it will sell back the futures contracts on the NYMEX and collect the \$0.50/MMBtu gain. It will then purchase its physical gas from a producer or marketer of its choosing. The physical transaction between the buyer and the seller will be priced at the settlement price of \$5.50. The burner will apply the gains from the sale of the NYMEX contracts towards the physical gas purchase, netting \$5.00/MMBtu.

Futures Example – Scenario #2

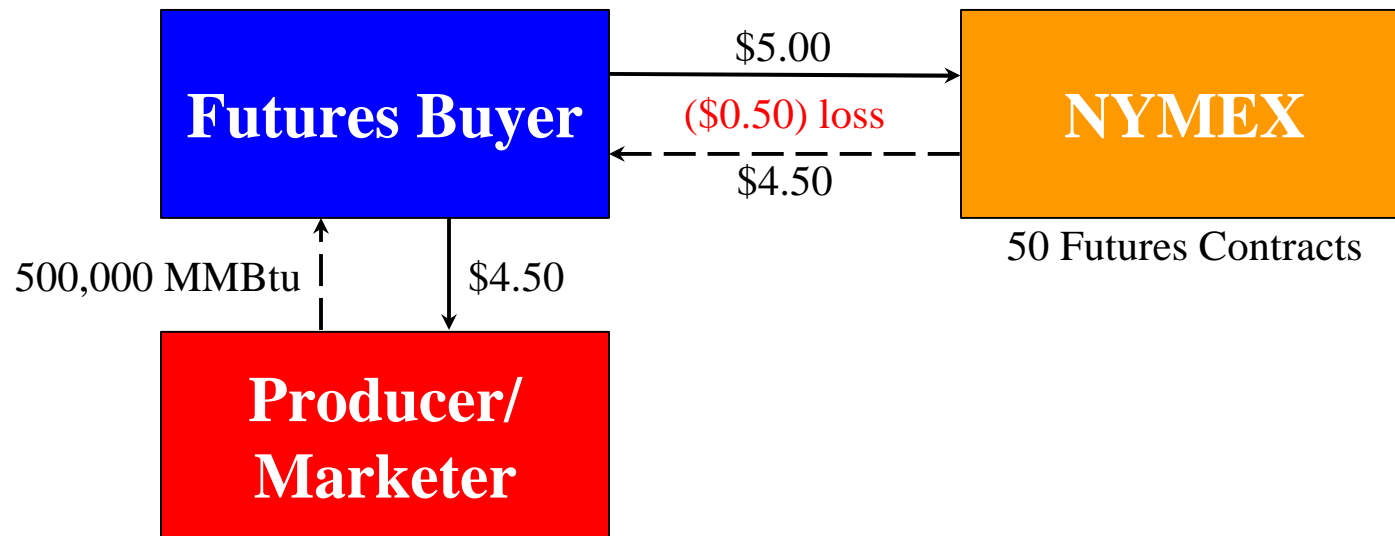
On September 27th (3rd business day before October 1), the October futures contract settles at \$4.50. The burner can either sell back his October futures contracts or hold on to them for delivery of physical gas at the Henry Hub.

Futures Example – Scenario #2



If the burner chooses to hold onto the futures contracts for delivery, the NYMEX will match the burner with a counterparty holding a short futures contracts position. The physical transaction between the buyer and the seller will be priced at the settlement price of \$4.50. The NYMEX will debit the loss from the long futures position from the burners account. The burner will apply the losses towards the physical gas purchase, netting \$5.00/MMBtu.

Futures Example – Scenario #2



If the burner chooses to liquidate its futures contracts at settlement, it will sell back the futures contracts on the NYMEX and pay the \$0.50/MMBtu loss. It will then purchase its physical gas from a producer or marketer of its choosing. The physical transaction between the buyer and the seller will be priced at the settlement price of \$4.50. The burner will apply the loss from the sale of the NYMEX contracts towards the physical gas purchase, netting \$5.00/MMBtu.

Options

- **The right, but not the obligation, to purchase or sell natural gas at a particular price in the future**
- **Option premium/expense**
- **Calls – right to purchase at set price**
- **Puts – right to sell at set price**
- **Option expiration 4 business days prior to the beginning of month (one day before futures expiration)**

Option Example

A natural gas burner buys its physical gas at the Henry Hub. Its October physical purchase requirement is 500,000 MMBtu for the month. The burner believes natural gas prices will decrease prior to the beginning of the month, but is still worried about prices increasing for some unforeseen reason. Therefore, the burner will use NYMEX natural gas options to manage its risk of price movements between now and October.

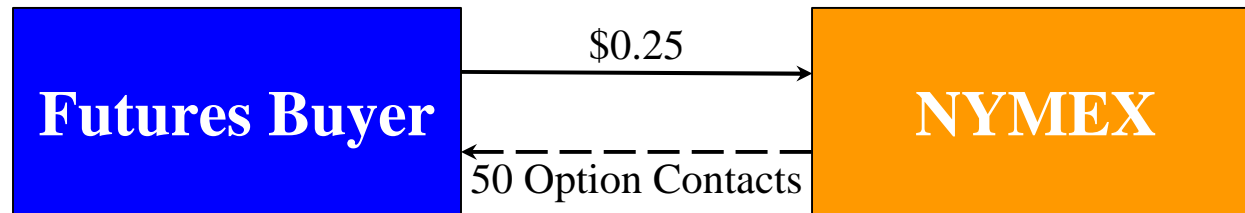
Option Example

Because the burner has a need for physical gas, yet does not currently own the physical gas, it is considered short the 500,000 MMBtu required for October. The burner believes that prices should decline before the month begins and would probably be better off waiting to purchase its gas at that time.

Option Example

However, since the burner is still concerned over higher prices, a call option will protect it from higher prices while still allowing it to purchase its gas at lower prices if prices do in fact decline. Its hedge strategy will be to purchase, or go long, the equivalent number of October natural gas options. Since each natural gas option contract is equivalent to 10,000 MMBtu, the burner will buy 50 October call option contracts.

Option Example



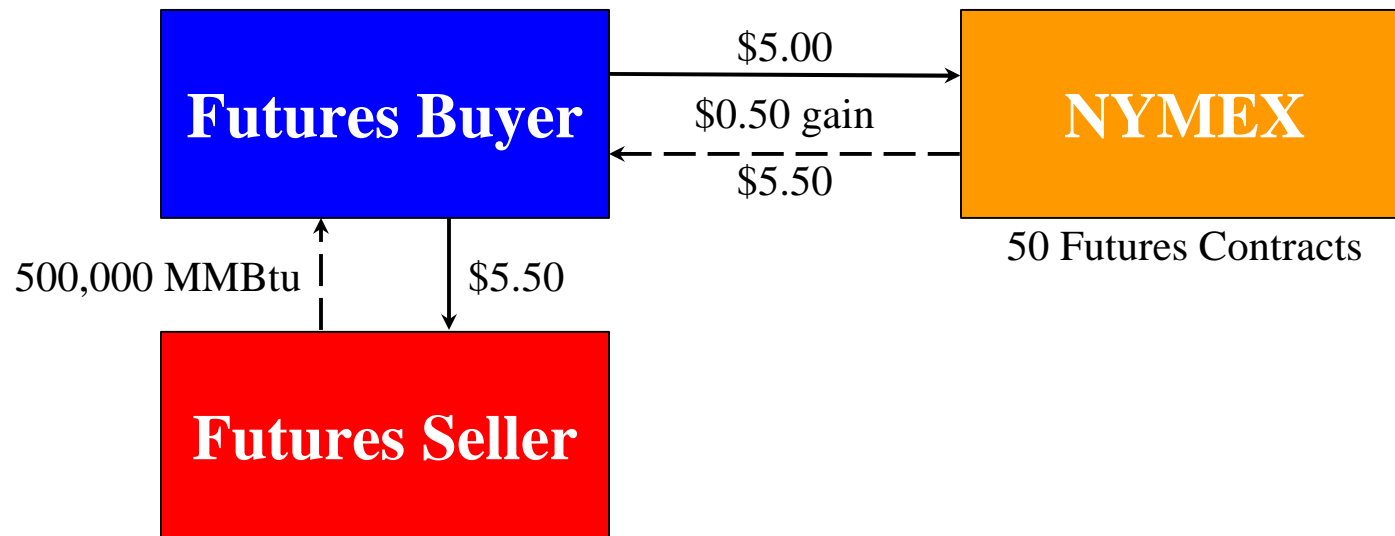
The current price for October natural gas futures is \$5.00.
The current price for the \$5.00 natural gas option is \$0.25.

The burner now owns natural gas option contracts that can be converted to natural gas futures contracts prior to futures expiration and then ultimately to physical gas on expiration of the October futures contract through Standard Delivery.

Option Example – Scenario #1

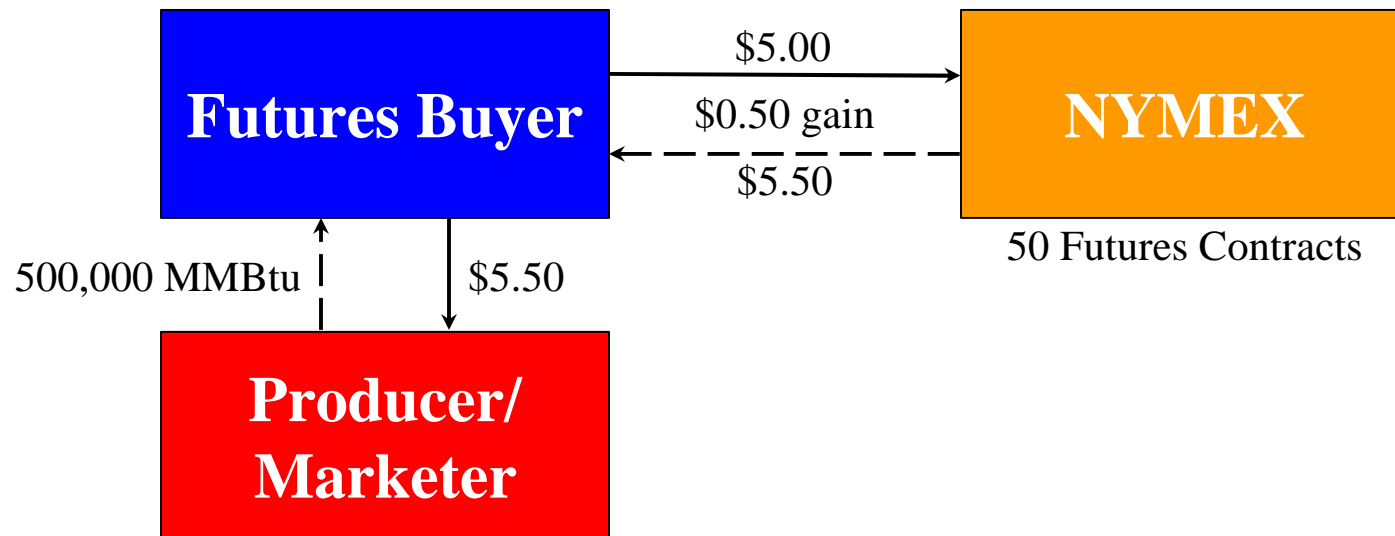
On September 26th (4th business day before October 1), the October futures contract settles at \$5.50. The burner will elect to exercise the option and convert the contracts to 50 futures contracts at \$5.50. The burner can then either sell back his October futures contracts or hold on to them for delivery of physical gas at the Henry Hub.

Option Example – Scenario #1



This transaction now becomes exactly like the futures transaction previously discussed with one exception. The burner must now account for the \$0.25/MMBtu option premium in his overall cost of gas. This added cost makes the burner's new net cost of gas at \$5.25/MMBtu. Still better than the \$5.50/MMBtu it would have paid by not hedging, but not quite as good as if the burner had purchased futures to begin with.

Option Example – Scenario #1

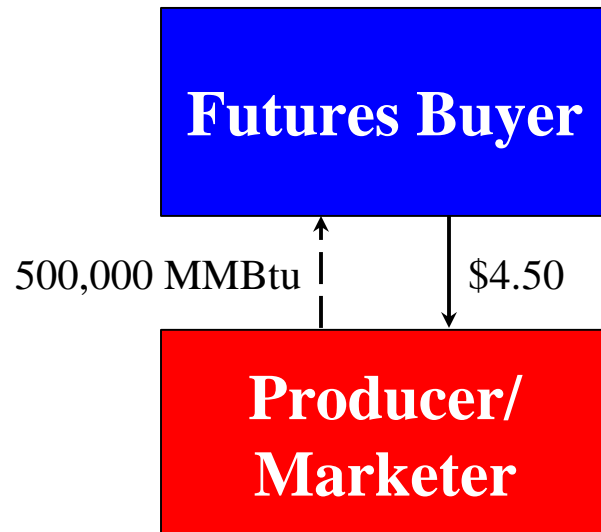


Again, the transaction the same as previously discussed with the new net cost of gas at \$5.25/MMBtu due to the added option expense.

Option Example – Scenario #2

On September 26th (4th business day before October 1), the October futures contract settles at \$4.50. The burner will not elect to exercise its option on \$5.00 futures contracts and purchase its gas in the market at current prices of \$4.50.

Option Example – Scenario #2



Since the burner did not elect to exercise its option, it will not have any losses associated with the \$5.00 futures contract. It will, however, have to include the option premium expense in its overall cost of gas. Its net cost of gas will now be \$4.75/MMBtu due to the added option premium. Better than if the burner had just purchased futures contracts but not quite as good as if the burner had done nothing.

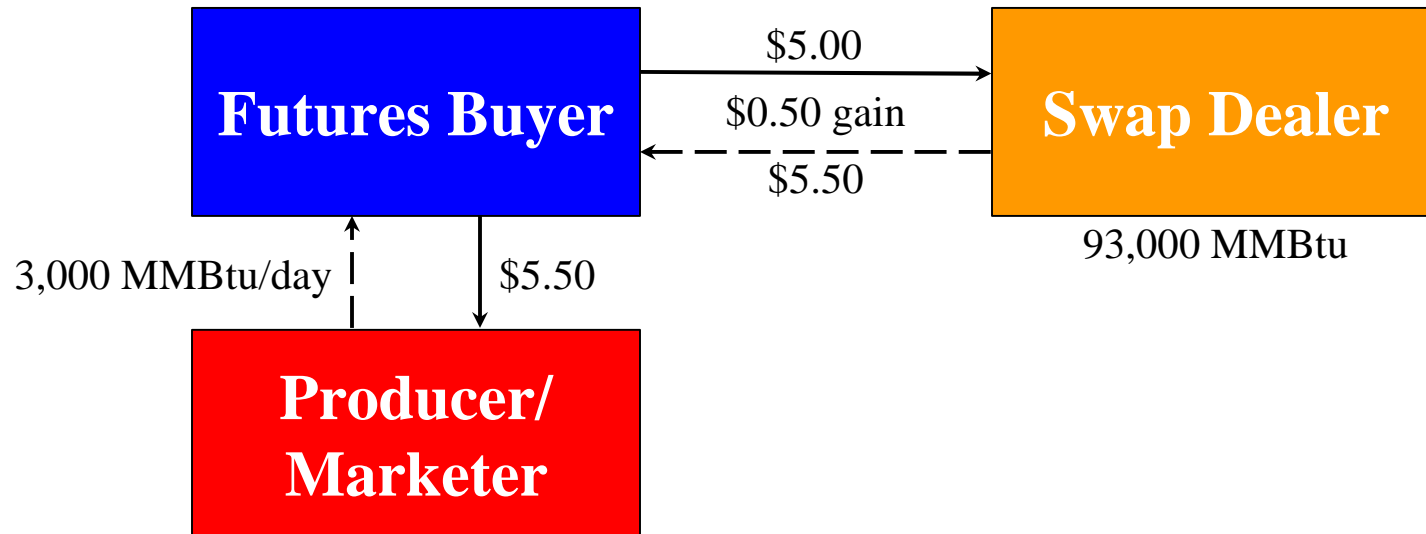
Swaps

- **Non-exchange**
- **Independent counterparties**
- **Negotiated contract parameters**
 - Volume
 - Term
- **Strictly financial**
- **Settled after expiration**
 - Settled against published prices
- **No margin requirements**
- **Credit exposure**

Swaps

- **Futures look alike**
 - Acts like a futures
 - Negotiated terms
 - Volume
 - Term
 - Settle against NYMEX
- **Basis**
 - Location pricing differential from the Henry Hub (transportation)
 - Settled against published index for specified location

Swap Example



The swap futures look alike acts the same as a futures with the exception that it is done through a third party and not the NYMEX and can be customized to the exact needs of the burner.

Hedging at SCANA



Fixed Price Customer Offerings

- **Industrial and commercial customers**
 - Provide industrial and commercial customers the ability to manage their price risk
 - Ability to fix, or lock in, a specific price for the volume they expect to burn at any given time in the future
 - At the time SCANA agrees to guarantee the customer a fixed price, SCANA is now short natural gas at the fixed price for the period of time in the future
 - SCANA will purchase futures contracts to offset the risk created by the fixed price guarantee to the customer

Physical Purchases

- **Prior to each monthly purchase cycle, risk management and gas purchasing coordinate to insure to all physical volumes are purchased according to the hedges executed for each entity.**

Other SCANA Hedging Activities

- **Storage/time spreads**
 - Locking in value of injected gas
 - Summer/winter
- **Inventory value**
 - Insuring value of injected gas from declining market
- **Interest rates**
 - Protection against fluctuating interest rates on borrowed money.
- **Weather**
 - Protection against under collection of fixed cost due to lower throughput from warm weather