

Having a Profit Center of Fuel and Mineral Trading is Already Essential for the Mining Companies and the Skillsets they Need

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Abstract

Price uncertainties are increasing as diverse buyers and sellers are coming into the fuel and minerals market. There are supply-side uncertainties due to resource depletion, supply chain problems, and prolonged wars and conflicts. Uncertainties enhance risk. Moreover, standard trading practices in the minerals and oil and gas industries like long-term supply agreements with rigid price-fixing mechanisms are being challenged by short-term trading agreements and contracts where the price rigidities are non-existent; the market determines the price on the basis of the supply of buyers and sellers in an open market. Moreover, the market for derivatives of minerals and oil and gas is becoming more pronounced as the various uncertainties to secure materials supply are growing. In order to tread in the unknown waters of flexible trading, the mining companies can think of opening a profit center with qualified people to tide over the challenges and to gather knowledge of the trading system, which will also influence how the financing of the project investments would take place in the future.

Keywords: Capital Markets, Contango Play, Hedging, LNG Assets, Mineral Trading, Profit Centre, Skillsets, Supply Chain Risk, Spot Trading

1.0 Supply Chain Risk is Growing

The global demand of minerals is not coming down- only it is shifting from one side to the other. The metals and rare earth minerals are likely to take the pole positions while fuel minerals are supposed to take a back seat. But, the requirements of metals and rare earth minerals will be so much that it will more than offset the value of fuel minerals.

While still attractive for investment, risk and uncertainty is growing in the resources sector. The best way for a company to distribute risk is to have a portfolio of productive assets. Suppose you have a portfolio of coal

or LNG assets you may prefer to have a base metal asset as well. Or, you are a production cum sales company of minerals, you may think of having a trading arm that also times the sale to more benefit. Single resource asset plays and tiding over long term price uncertainties are becoming increasingly difficult to sustain. I place one example.

2.0 The Case Study

Glencore, the miner and commodity trader, has emerged as a big winner from the oil market turmoil sparked by a

price war and the coronavirus pandemic, with its trading business expected to report blockbuster results in the first half of 2020. The Switzerland-based company confirmed that its “marketing” division had seized the opportunity to buy cheap barrels of crude when prices crashed in March and April and sell them in the futures market for a higher price. As the result of a “very strong” first-half performance, the company said it now expected the unit to deliver earnings before interest at the top of a \$2.2bn to \$3.2bn guidance range in 2020. In March and April, as oil prices plunged, traders were able to buy and store huge amounts of cheap crude before selling it on later for higher prices, a trade known in industry jargon as a “contango” play. The strategy is simple but timing is important: buy in the low, and sell on the high. The cost part is buying cheap oil on deep discount and store on land or in the ships in rent. The container market has been suffering from low business for some time and so there was an opportunity for low price rent. The revenue is to sell in the Futures market on good terms. Moreover, over the sea sales bring some tax benefits. So the trading team should know when and where the capital and credit is cheap, raw material is cheap, the rent on land and on the sea is negotiable, and nobody is looking at the prospect. Glencore’s marketing or trading arm generated about 40 per cent of group EBIT last year. The division sets Glencore apart from its “production and sale” peers, helping to smooth out the more volatile earnings from its mining assets. This year, it would also compensate for the fact that Glencore did not produce iron ore and has missed out on the soaring prices that benefited some rivals such as Rio Tinto.

In 2021, Glencore was set for another year of bumper profits from its trading arm on the back of strong demand for raw materials as economies rev up after the pandemic crash. In a third-quarter production report, the Switzerland-based group said earnings from its “marketing” business were set to exceed the top end of its \$2.2bn to \$3.2bn guidance range. In 2020, the division reported record earnings before interest of \$3.1bn as it took advantage of an unprecedented drop in oil prices to scoop up cheap barrels of crude and sell them in the futures market for a profit.

Commodity prices have surged this year as economies reawaken and energy shortages in China and Europe help drive up the price of natural gas and thermal coal, which is burnt in power stations to generate electricity. Glencore is the world’s biggest exporter of seaborne thermal coal, which soared to a record above \$250 a tonne in September before easing to around \$200. Tyler Broda, analyst at

RBC Capital Markets, said the strong performance of Glencore’s trading arm had been expected given tight commodity markets.

However, he said the update would reassure investors as wild price swings, particularly in gas markets, triggered large payments on derivatives positions used by trading houses to hedge physical business.

“Considering that extreme commodity price volatility can cause hedges to disconnect, this positive affirmation should...reassure the market,” Broda said. As well as its large trading business, Glencore is a big producer of coal, copper, cobalt, zinc and nickel.

3.0 Mining Companies Generally Shied Away from Trading

The content private sector and public sector mining companies are generally indifferent to trading as a prospect, either by lethargy and control or by lack of training. In the coming days, they should seriously think of trading as a choice. There is one good part of risk: you can win or you can get knowledge (why you lose is the knowledge that helps later). Unlike their peers in the oil industry, mining companies have traditionally shied away from trading physical commodities, put off by large working capital commitments and volatile markets. But some are now joining the market, using the sophisticated strategies employed elsewhere in commodities trading.

4.0 The Above Trading Practice is Nothing New

In the commodity sector this is pretty common. Take the example of Cargill. At Cargill, they trade and transport the world’s commodities from areas of surplus to those of deficit. Our global, multi-sector operations enable us to maintain a unique view of international trade.

By collaborating with Cargill’s businesses in the agriculture, mining and food industries, they produce valuable insights into global trade patterns. Their analytics teams build sophisticated models for short- and long-term demand forecast across various commodities, and they use these to position themselves and their customers in the maritime sector. Cargill charters vessels to transport almost 200 million tons of dry and wet bulk cargo across the world. Operating a chartered fleet of around 650 vessels requires a certain level of size, scale and expertise. Elsewhere, Cargill is also one of the world’s

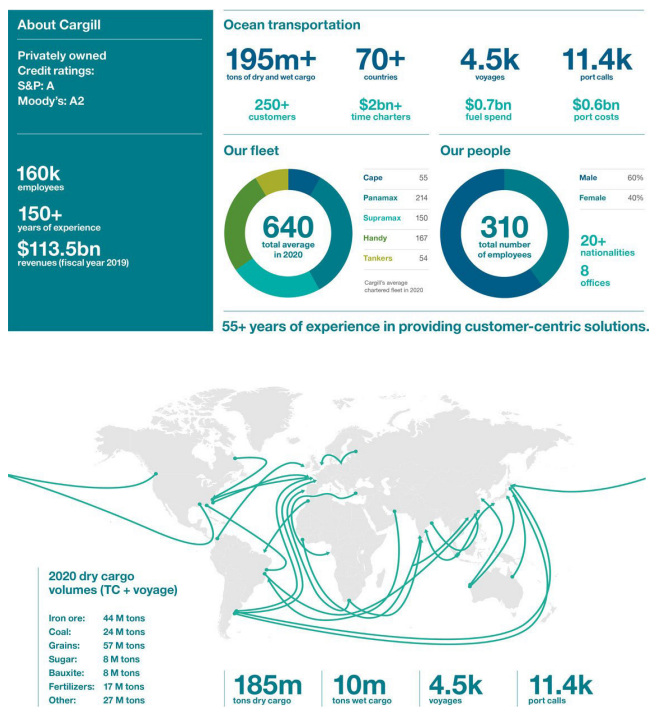


Figure 1. How Cargill works.

largest container shippers. This completes a rounded approach to global supply chain management and risk management and a deep understanding of the maritime sector.

5.0 How the Other Mining Companies are Faring

5.1 Rio Tinto

Anglo-Australian mining company Rio Tinto has moved into physical commodities trading to get better prices for the metals and minerals it produces and sharpen its commercial focus. The company was buying and selling bauxite, alumina and aluminium from a marketing and procurement hub in Singapore that employs more than 500 people. “We are already trading in the aluminium space. Not big volumes... and there is a long, long way to go before we become a big trader,” said Rio chief executive Jean-Sébastien Jacques in 2017. “But at some point in time, over the medium and long term, we could increase our trading activities.”

5.2 BHP Group

A December 2019 report says Global miner BHP Group is feeling its way back into commodities trading, making

a dedicated hire to help it manage a base metals book in Singapore as it seeks to boost returns and manage transaction risk. BHP’s previous commodities trading stretches back to when it merged with British peer Billiton in 2001, setting up a centralized marketing model across its operations in Singapore and The Hague. The concept was to achieve consistent price realization, said a person involved at the time, as it leveraged its physical production to launch proprietary trading within predetermined risk limits, around pricing, as well as concentrates and refined metal. In 2006 BHP abruptly dismantled the trading arm some five years later, as the CEO focused on cutting operational risk, after a credit-related loss in freight and losses in thermal coal.

6.0 Profit Center

A profit center is a branch or division of a company that directly adds or is expected to add to the entire organization’s bottom line. It is treated as a separate, standalone business, responsible for generating its revenues and earnings. Its profits and losses are calculated separately from other areas of the business. Peter Drucker coined the term “profit center” in 1945. Profit centers are crucial to determining which units are the most and the least profitable within an organization. They function by differentiating between certain revenue-generating activities. This facilitates a more accurate analysis and cross-comparison among divisions. A profit center analysis determines the future allocation of available resources and whether certain activities should be cut entirely. The managers or executives in charge of profit centers have decision-making authority related to product pricing and operating expenses. They also face considerable pressure as they must ensure that their division’s sales from products or services outweigh the costs—that their profit center produces profits year after year, either by increasing revenue, decreasing expenses, or both.

In a new profit center, the company invests a certain fund for a period with the objective that the unit becomes profitable within a certain time. It will have a CEO of its own and his /her team. They will separately and independently leverage and take opportunities to create profit or value for a long market play.

There can be multiple arrangements like special purpose vehicle (SPV), public –private partnership (PPP), Startup incubation and joint ventures (JVs) to name a few.

6.1 New Market Players Adopt Profit Center

At the retailer Walmart, different departments selling different products could be divided into profit centers for analysis. For example, clothing could be considered one profit center while home goods could be a second profit center. In addition, departments that rotate on a seasonal basis, such as the garden center or sections relating to holiday decor, can be examined as profit centers to separate these departments' seasonal contribution from those with a year-round contribution.

The computer giant Microsoft has a wide variety of profit centers ranging from hardware to software to digital services. In analyzing these large revenue sources, the company may choose to separate the funds produced from the sale of its Windows operating system from that of other software suites, such as Microsoft Office, or other hardware sectors, such as the Xbox gaming console. This allows the profitability of different products to be examined and correlated based on associated cost and revenue comparisons. (examples courtesy: Investopedia)

The concept of a profit center is a framework to facilitate optimal resource allocation and profitability. To optimize profits, management may decide to allocate more resources to highly profitable areas while reducing allocations to less profitable or loss-inducing units.

7.0 Commodity Trading

7.1 Spot Trading

A spot trade, also known as a spot transaction, is when a trader buys or sells a financial instrument, commodity, or foreign currency on a specific date (the spot date). A spot contract often involves the physical delivery of currency or commodity. Spot trading accounts for the time value of the share price paid which depends on the maturity and interest rates. In spot foreign exchange transactions, the rate at which changes occur is called the spot exchange rate. You can compare futures or forward trading to spot trading.

The current price through which you can buy or sell a financial instrument is called its spot price. It is created after the seller and the buyer place a buy or sell order. Orders are filled immediately when new ones come into the marketplace. Therefore, spot prices change every second in liquid markets. Bonds, options, and most other interest rate instruments are also traded on the next day for spot settlement.

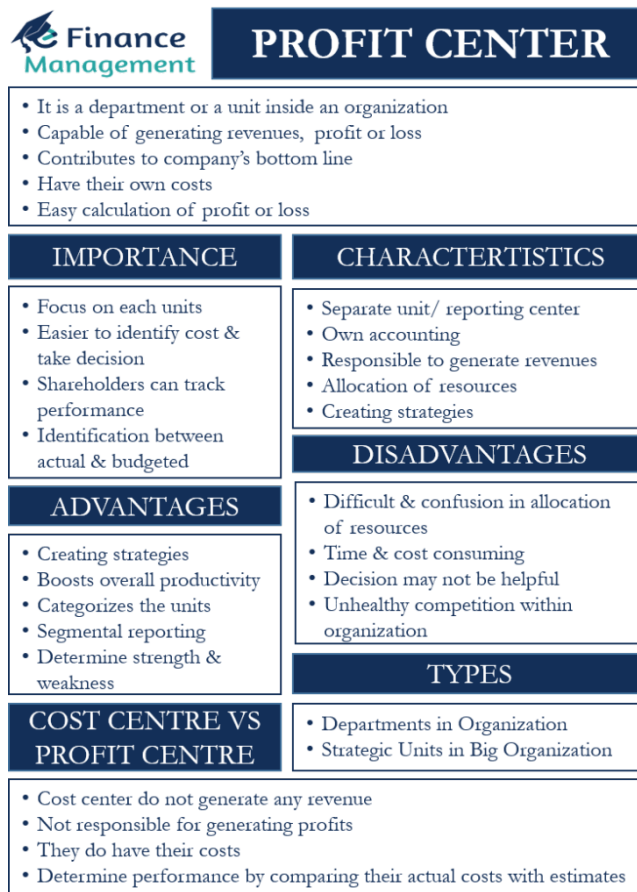


Figure 2. The concept of Profit Center.

A spot trading contract is conducted between a company and a financial institution or between two financial institutions. In interest rate swaps, the near-term leg is usually for the spot date, which is often settled over two trading days.

7.2 Forward Contracts and Futures Contracts

Forward and futures contracts are derivatives arrangements that involve two parties who agree to buy or sell a specific asset at a set price by a certain date in the future. Buyers and sellers can mitigate the risks associated with price movements down the road by locking in the purchase/sale price in advance.

7.3 Forward Contract

A forward contract is an arrangement that is made over-the-counter (OTC) and settles just once at the end of the contract. Both parties involved in the agreement

negotiate the exact terms of the contract. It is privately negotiated and comes with a degree of default risk since the counterparty is responsible for remitting payment.

7.4 Futures Contract

Futures contracts are standardized contracts that trade on stock exchanges. As such, they are settled on a daily basis. These arrangements come with fixed maturity dates and uniform terms. There is very little risk with futures, as they guarantee payment on the agreed-upon date.

7.4.1 Examples of Futures Contract

A futures contract gives the buyer of the contract, the right and obligation, to buy the underlying commodity at the price at which he buys the futures contract. Conversely, a futures contract gives the seller of the contract, the right and obligation, to sell the underlying commodity at the price at which he sells the futures contract. However, in practice, very few commodity futures contracts actually result in delivery, most are utilized for hedging and are sold or bought back prior to expiration.

So how can an oil and gas producer utilize futures contracts to hedge their exposure to volatile oil and gas prices? As an example, let's assume that you are a crude oil producer who wants to hedge the price of your future crude oil production. For sake of simplicity, let's assume that you are looking to hedge (by "fixing" or "locking" in the price) your July crude oil production. To hedge this production with futures, you could sell (short) a September ICE Brent crude oil futures contract. We are using ICE Brent futures in this example as ICE Brent is

the global benchmark for crude oil but, most producers in the Americas would be likely be inclined to utilize NYMEX WTI futures rather than ICE Brent futures.

8.0 Hedging: The Case of Oil

Hedging is somewhat analogous to taking out an insurance policy. If you own a home in a flood-prone area, you will want to protect that asset from the risk of flooding—to hedge it, in other words—by taking out flood insurance. In this example, you cannot prevent a flood, but you can plan ahead of time to mitigate the dangers in the event that a flood did occur.

There is a risk-reward tradeoff inherent in hedging; while it reduces potential risk, it also chips away at potential gains. Put simply, hedging isn't free. In the case of the flood insurance policy example, the monthly payments add up, and if the flood never comes, the policyholder receives no payout. Still, most people would choose to take that predictable, circumscribed loss rather than suddenly lose the roof over their head.

In the investment world, hedging works in the same way. Investors and money managers use hedging practices to reduce and control their exposure to risks. In order to appropriately hedge in the investment world, one must use various instruments in a strategic fashion to offset the risk of adverse price movements in the market. The best way to do this is to make another investment in a targeted and controlled way. Of course, the parallels with the insurance example above are limited: In the case of flood insurance, the policy holder would be completely compensated for her loss, perhaps less a deductible. In the investment space, hedging is both more complex and an imperfect science.

The most common way of hedging in the investment world is through derivatives. Derivatives are securities that move in correspondence to one or more underlying assets. They include options, swaps, futures, and forward contracts. The underlying assets can be stocks, bonds, commodities, currencies, indexes, or interest rates.

8.1 Example

For sake of this example, let's assume that to hedge July, 2022 production that one (producer, trader or any intermediary) simply sold one September, 2021 ICE Brent crude oil futures contract. So he or she sold in September to complete the contract in July. If he or she had done so

Difference between Futures and Forward Contract

Forwards contract	Futures contract
1) Private contract between the two parties bilateral contracts	Traded on organized exchanges
2) Not standardized (customized)	Standardized contract
3) Normally one specified delivery date	Range of delivery dates
4) Settle at the end of maturity. No cash exchange prior to delivery date.	Daily settled. Profit/loss are paid in cash.
5) More than 90 per cent of forward contract are settled by actual delivery of assets.	Not more than 5 per cent of future contract are settled by delivery.
6) Delivery or final cash settlement usually takes place	Contract normally closed out prior to the delivery.

Figure 3. Forwards and Futures (picture courtesy acknowledged).

in July, based on the closing price of September ICE Brent crude oil futures, he or she would have hedged your July production at approximately \$61.90/BBL, for example.

Let's now assume that it is July 19, the expiration date of the September ICE Brent crude oil futures contract. Because he or she do not want to make delivery of the futures contract, he or she buy back the September futures contract at the prevailing market price to close out position.

To compare how the strategy will work if the September crude oil futures contract settles at prices both above and below your price of \$61.90, let's examine the following two scenarios.

In the first scenario, let's assume that the prevailing market price, at which he or she buys back the September Brent crude oil futures contract, is \$65/BBL, which is \$3.10/BBL higher than the price at which you sold the futures contract. In this scenario, you would receive approximately \$65/BBL for July crude oil production. However, his or her net revenue would be \$61.90, the price at which he/she originally sold the futures contract, excluding the basis differential, gathering and transportation fees, etc. This is because one would incur a loss of \$3.10/BBL ($\$65.00 - \$61.90 = \3.10) on the futures contract.

In the second scenario, let's assume that the prevailing market price, at which he or she buys back the September Brent crude oil futures contract, is \$50/BBL, which is \$11.90/BBL lower than the price at which you sold the futures contract. In this scenario, one would receive approximately \$50/BBL for July crude oil production. However, the net revenue would be approximately \$61.90/BBL, again excluding the basis differential, gathering and transportation fees. This is because you would incur a gain of \$11.90/BBL ($\$61.90 - \$50.00 = \11.90) on the futures contract.

8.2 Swaps

A swap is an agreement whereby a floating (or market) price is exchanged for a fixed price or a fixed price is exchanged for a floating price, over a specified period(s) of time. The instrument is referred to as a swap because the transaction involves buyers and sellers "swapping" cash flows with one another.

Swaps are arguably the most popular - because swaps can be customized while futures contracts cannot - hedging instrument used by oil and gas producers

to hedge their exposure to volatile oil and gas prices as hedging with swaps allows them to lock in or fix the price they receive for their oil and gas production. In addition to companies seeking to hedge their exposure to energy commodity prices, swaps are also utilized by companies seeking to hedge their exposure to agriculture commodities, metals, foreign exchange rates and interest rates, among others.

As an example of how an oil and gas producer can utilize a swap to hedge its crude oil production, let's assume that X is an oil producer who needs to hedge his December crude oil production to ensure that his December revenue meets or exceeds his budget estimate of \$50.00/BBL. If X had sold a December WTI crude oil swap at the close of business on a day, the price would have been approximately \$56.59/BBL. Now let's take a look at how hedging with the December WTI crude oil swap would impact his revenue, and in turn his cash flow, if the December WTI crude oil swap settles \$10 higher and \$10 lower than the \$56.59 price at which you sold the swap.

In the first scenario, let's assume that settlement price for the December NYMEX WTI crude oil swap is \$66.59/BBL. In this case, the price X receives at the wellhead for his December crude oil production would be approximately \$66.59/BBL. However, because you hedged with the \$56.59 swap, you would incur a hedging loss of \$10.00/BBL which equates to net revenue of \$56.59/BBL. In this scenario, while X did experience a hedging loss of \$10.00/BBL, the hedge did perform as anticipated and allowed him to lock in a price which was \$6.59/BBL which is more than X's budgeted price of \$50.00/BBL.

In the second scenario, let's assume that settlement price for the December NYMEX WTI crude oil swap is \$46.59/BBL, \$10 lower than your swap price. In this case, the price X receives at the wellhead for his December crude oil production would be approximately \$46.59/BBL. However, thanks to his \$56.59 swap, he would incur a hedging gain of \$10.00/BBL which, like the first scenario, will also provide you with net revenue of approximately \$56.59/BBL. In this scenario, the hedge again performed as anticipated and allowed him to lock in a price which also provides him with a net price that allowed him to exceed his budget target of \$50.00/BBL.

As this example indicates, oil and gas producers can mitigate their exposure to volatile crude oil prices by hedging with swaps. If the price of crude oil during the

respective month averages less than the price at which the producer hedges with the swap, the gain on the swap offsets the decrease in revenue. On the contrary, if the price of crude oil during the respective month averages more than the price at which the producer hedges with the swap, the loss on the swap is offset by the increase in revenue.

While this example addresses how oil and gas producers can utilize swaps to hedge their crude oil price risk, a similar methodology can be used to hedge natural gas and NGLs as well. In addition, consumers, marketers and refiners can also utilize swaps to manage their exposure to energy prices as well.

9.0 Commodity Options

'Options', as the word suggests, refer to choices or alternatives. An option is a derivative contract which gives the buyer (the owner or holder of the option) the right, but not the obligation, to buy or sell an underlying. For owning this right, the option holder pays a price (called 'option premium') to the seller of this right. The seller (writer) of option, on the other hand, bears the obligation to honour the contract should the buyer choose to exercise the option. The option buyer will exercise their option only when the price of the underlying is favorable to them, otherwise they will let the option expire worthless.

Based on the right of the holder, options are of two types:

- a. Call options: It gives buyer the right to buy the underlying
- b. Put options: It gives buyer the right to sell the underlying

Based on exercise, options can primarily be of two types:

American: The buyer can choose to exercise the option at any time before the expiry of the option contract.

European: The buyer can choose to exercise the option only on the date of expiration of the contract.

As per current regulatory norms, only European style commodity options are available in India at present.

MCX in India offers options on commodity futures contracts traded on the exchange. These commodity options, on exercise, devolve into the underlying futures contracts. All such devolved futures positions open at the strike price of exercised options. Commodity options are useful risk management tools, particularly for the small

stakeholders, as the option buyer does not generally have to maintain margins. They are akin to price insurance for the hedgers which can be bought by paying only a one-time option premium.

An option is contract which provides the buyer of the contract the right, but not the obligation, to purchase or sell a particular amount of a specific commodity on or before a specific date or period of time. There are two primary types of options, call options (also known as a caps) and put options (also known as floors). A call option provides the buyer of a call option with protection against rising prices. Conversely, a put option provides the buyer of the put option with protection against declining prices.

Mineral/energy consumers can utilize call options to mitigate their exposure to rising energy prices, including but not limited to electricity, diesel fuel, gasoline, heating oil, propane, etc.

Mineral/energy producers often utilize put options to mitigate their exposure to declining energy prices, such as crude oil, natural gas and natural gas liquids.

As an example of how an end-user (consumer) utilize a call option, let's assume that your company has a large fleet and in order to ensure that your gasoline expenses do not exceed your budget, you need to cap the price of your anticipated cost of your gasoline consumption for a specific month. For sake of simplicity, let's assume that you are looking to hedge 100% of your anticipated, May 2011 gasoline consumption, which equates to 125,000 gallons.

In order to do accomplish this you could purchase a May 2011, NYMEX RBOB gasoline, average price call option from an energy trading company. Furthermore, let's assume that you wanted to mitigate your exposure above \$3.00 per gallon (excluding basis and taxes). If you had purchased this option last Friday, it would have cost you approximately 13 cents per gallon or \$16,250 ($\$0.1300 \times 125,000$ gallons).

Now let's examine how this option would perform if gasoline prices both increase and decrease between now and the end of May.

In the first scenario, let's assume that fuel prices increase and that the average price for NYMEX RBOB gasoline futures for each business day in May, was \$3.50/gallon. In this scenario, your hedge would result in a "gain" of 50 cents per gallon ($\$3.50 - \$3.0000 = \$0.50$) or \$62,500. As a result, you would receive a payment of \$62,500 from the energy trading company, which would

offset the increase in your actual fuel expenses by \$0.50/gallon. However, given that you paid 13 cents per gallon, your net gain would be 37 cents per gallon or \$46,250.

In the second scenario, let's assume that fuel prices decrease and that the average price for NYMEX RBOB gasoline futures for each business day in May, was \$2.75/gallon. In this scenario, your hedge would be "out-of-the-money" and you would not receive a return on the option. However, given that gasoline futures prices have decreased, so should your actual gasoline costs at the pump. Last but not least, given that you paid 13 cents for the option, your actual net cost per gallon would need to account for the 13 cent premium cost.

As this example shows, purchasing a gasoline call option allows companies which consumes large quantities of gasoline to hedge their exposure against rising gasoline prices. The following chart shows the "payoff" of the \$3.00 gasoline call option described above. As you can see, when gasoline futures are below \$3.00 per gallon, the company's net price is equal to the gasoline futures plus 13 cents (the price of the option). Conversely, when the futures are above 13 cents per gallon, the company's net price remains \$3.13 (\$3.00 + \$0.13).

9.1 Call Options for Peabody Energy in the Aftermath of Ukraine Invasion

Options of Coal miners have surged as the Ukraine crisis boosts energy prices, and options traders are active in a key name. Anticipating coal prices would rise, the buyers hedged on call options in December, 2021. Let us check out this large transaction in Peabody Energy (BTU), the world's largest private-sector coal miner:

- Some 7,500 December 25 calls (short for call options) were sold for an average premium of \$7.80.
- A matching number of December 30 calls were purchased at the same time for \$6.30.
- Volume was below open in the 25s but not the 30s. That suggests the trader rolled an existing long position to the higher strike.

Calls fix the level where investors can buy securities. They tend to gain value when prices rise, potentially generating leverage relative to the underlying stock. Calls can also lose value if they expire out of the money.

Peabody shares fell 19 percent to \$21.25 in November 2021, but had more than doubled in the next

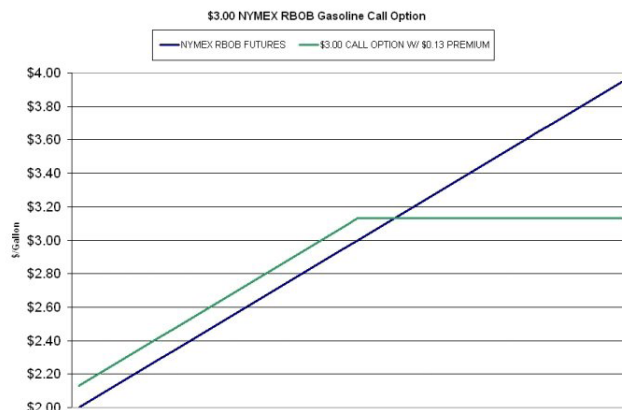


Figure 4. The buyer will start making profit/savings after the market price becomes more than call strike price and price of option. Figure 5 gives the general strategy of options trading.

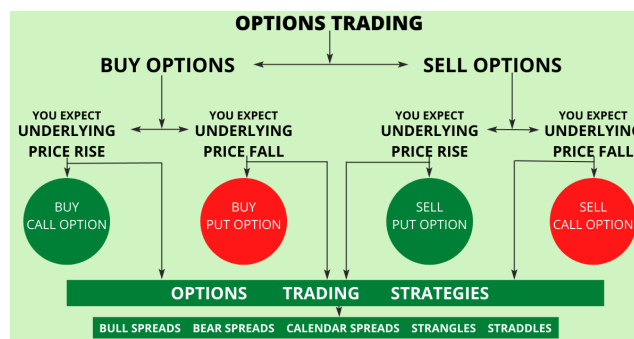


Figure 5. Options trading strategy.

three months. It's been riding a surge in coal prices as Russia's invasion of Ukraine triggers one of the biggest energy crunches shortages of modern history. Not only has the conflict driven up the price of oil and natural gas. It's also caused Western nations to shun coal supplies from Russia, the world's No. 6 producer. Peabody's traded share is known as BTU in New York Stock Exchange. Peabody mines are in U.S. states like Wyoming, Illinois and Alabama, along with Australia. The company was an actively traded member of the S&P 500 during the commodities boom of 2005-2011, but fell into bankruptcy in 2016 as demand fell. It reemerged as a public company in 2017. As of April, 2022, call options roll (various call options) was likely the work for an investor who had purchased calls when the stock was lower. He or she apparently profited from the rally. Adjusting the position let them recover about \$1.50 of capital while remaining exposed to potentially further gains as coal prices are likely to go high in the winter of 2022. Overall options

volume in BTU was almost triple the daily average in the March, 2022. Calls outnumbered puts by a bullish 3-to-1 ratio.

9.2 Put Option

Many oil and gas producers hedge with put options as doing so allows them to mitigate their exposure to declining crude oil, natural gas and/or NGL prices while retaining the ability to benefit from potentially higher prices. Similarly, many consumers hedge with call options as call options allow them to minimize the impact of potentially rising prices while retaining the ability to benefit from potentially lower prices.

As an example of how an oil and gas producer can hedge their commodity price exposure with put options, let's assume that you are a crude oil producer and that you need to hedge your exposure to potentially lower crude oil prices to ensure that you can service your debt, as required by your lender. More specifically, let's assume that you need to ensure that you are hedged at no less than \$40/BBL. For the sake of simplicity, let's also assume for this example that you are focused on hedging your September production. Clearly in practice you would hedge many months of production, not only a single month.

In to do accomplish this you could purchase a \$45 September Brent crude oil put option. As this is being written, a \$45 September Brent crude oil average price (also known as an APO or Asian) put option is trading for a premium of \$1.91/BBL, which would mean that your of pocket cost for hedging 1,000 BBLs with this strategy would be \$1,910 (1,000 BBLs X \$1,910/BBL).

Now let's analyze how the September \$45.00 Brent crude oil put option will impact your business, and ensure that you are able to service your debt, if the average of the prompt month Brent crude oil futures during the production month of September settles both above and below your strike price of \$45.00/BBL. As we noted our last post, crude oil futures expire before the production (delivery) month. In the case of the September production month, the prompt month Brent futures contract is the November futures contract.

In the first outcome, let's assume that average settlement price for the prompt Brent crude oil futures, for each business day in September, is \$60.00/BBL. In this case, the actual price that you realize at the wellhead should be approximately \$60.00/BBL, excluding basis, gathering and transportation fees. However, because you

hedged with a \$45.00 put option, your hedge would be "out-of-the-money" and you would incur neither a gain nor loss on the \$45.00 put option. Recall that you had to pay \$1.91/BBL for the option, so your actual net, including the option premium, would be \$/BBL (this excludes basis, gathering and transportation fees as well). Clearly, this would be a pleasant surprise as \$58.09/BBL would not only allow you to service your debt but to generate a nice profit as well.

In the second outcome, let's assume that average settlement price for the prompt Brent crude oil futures, for each business day in September, is \$35.00/BBL. In this scenario, the actual price that you realize at the wellhead should be approximately \$35.00/BBL. However, because you hedged with a \$45.00 put option, your hedge would be "in-the-money" and you would incur a hedging gain of \$10/BBL. In addition, you had to pay \$1.91/BBL for the option, so your actual net, including the option premium, would be \$43.09/BBL (again, this excludes basis, gathering and transportation fees). While not nearly as ideal as the first scenario, a net of \$43.09/BBL would indeed allow you to ensure that you can service your debt, and hopefully pay your investors a small dividend as well.

The above chart shows the potential outcomes of a crude oil producer hedging with a \$45.00 Brent crude oil put option, as described in the example. As the chart indicates when Brent crude oil prices average \$45/BBL or less, your net price including the option premium of \$1.91/BBL, is 43.09/BBL. Conversely, when Brent crude oil prices average more than \$45/BBL, your net price is the Brent monthly average minus the option premium of \$1.91/BBL.

As this example indicates, hedging with put options provides oil and gas producers with the best of both worlds as put options provide a hedge against potentially declining crude oil (as well as natural gas and natural gas liquids) prices while allowing the producer to potentially benefit from higher prices as well.

9.3 Costless Collars: Using both Call and Put Options

An option is contract which provides the buyer of the contract the right, but not the obligation, to purchase or sell a specific volume of a specific commodity, or the financial equivalent of said commodity, on or before a specific date or period of time. In addition, we addressed the two primary types of options - call options and put

options. A call option provides the buyer of the option with a hedge against higher while a put option provides the buyer of the option with a hedge against lower prices.

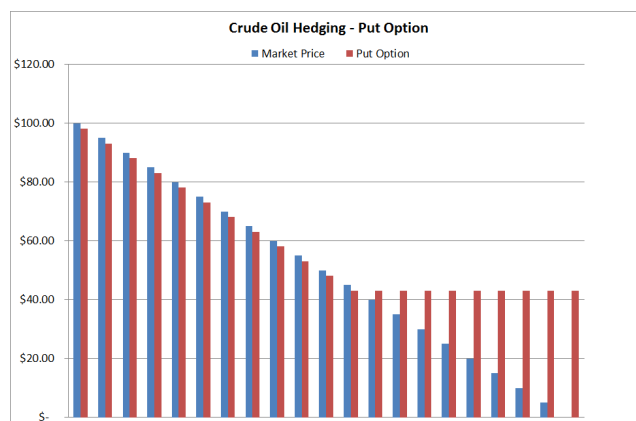
While futures, swaps and put options are the preferred hedging strategies of many oil and gas producers, many also utilized a strategy known as a costless collar. While the terminology might sound confusing at first, it's actually quite simple. A costless collar is the combination of two options. In the case of a producer it is generally the combination of buying a put option (floor) and selling a call option, the combination of which results in both a floor and a ceiling.

As an example, let's examine how an oil and gas producer can hedge with "producer costless collar" on Brent crude oil, a strategy which will include buying a Brent crude oil put option and selling a Brent crude oil call option. In addition, to make the option costless, the options will be structured so that the premium paid for the put option will be offset by the premium received from selling the call option.

For the sake of this example, let's assume that Y is an oil and gas producer looking to hedge her December crude oil production with a Brent crude oil costless collar. Let's further assume that Y needs to be hedged against December Brent prices trading below \$40/BBL. As such, Y decided to buy a \$40 December Brent crude oil APO (average price) put option for a premium of \$1.50/BBL. In addition, in order to offset the cost of the \$1.50 premium associated with the \$40 put option, Y also sell a \$59 December Brent crude oil APO (average price) call option for a premium of \$1.50/BBL

The combination of these two options provides Y with a December Brent **\$40/\$59 producer** costless collar, which equates to a \$40 floor and a \$59 ceiling. As such, if Brent crude oil prices during December average less than \$40/BBL then you will incur a hedging gain. Conversely, if Brent crude oil prices during December average more than \$59/BBL then you will incur a hedging loss. If the price is between \$40 and \$59 then you will incur neither a hedging gain nor loss.

How will the \$40/\$59 costless collar will perform if Brent crude oil prices during the month of December average less than \$40/BBL and more than \$59/BBL? Let's first look at a scenario where the average settlement price for the prompt Brent crude oil futures, during the month of December, is \$35.00/BBL. In this case, the price you receive at the wellhead for your December crude oil production will be approximately \$35.00/BBL. However,



because you are hedged with the \$40 put option, you would receive a hedging gain of \$5/BBL. As such, the net price you receive for your December production, excluding the basis differential, gathering and transportation fees) will be \$40/BBL.

Now let's examine a scenario where the average settlement price for the prompt Brent crude oil futures, during the month of December, is \$70.00/BBL. In this case, the price you receive at the wellhead for your December crude oil production will be approximately \$70.00/BBL. However, because you sold the \$59 call option as part of your costless collar, you would have a hedging loss of \$11 on the call option. As such, the net price you receive for your December production, excluding the basis differential, gathering and transportation fees) will be \$59/BBL.

As previously mentioned, if the average settlement price for the prompt Brent crude oil futures, during the month of December, is between \$40 and \$59 you will not incur a hedging gain or loss. For example, if the average settlement price for the month is \$50.00, the net price you receive for your December production will be approximately \$50/BBL.

As this example indicates, costless collars is an effective hedging strategy for oil and gas producers. However, because one "leg" of the strategy involves selling (shorting) a call option, you need to fully understand the potential risks of selling a call option before you hedging with a costless collar, something many market participants have learned the hard way. For example, when prices spiked in 2008 many oil and gas producers who had hedged with costless collars were subjected to margin calls which were difficult to meet, as their borrowing bases did not yet reflect the higher price environment.

10.0 Preparing for the Future

The mining companies, big or small, need to note the following, while participating in trading:

- a. Prepare for a long play with an early investment in the profit center.
- b. Profit Center should have an independent CEO and an overseeing board.
- c. The companies can bring out their own OTC Call and Put Options depending on the structure, loyalty, trust and legality. Two or more companies can enter into varieties of Call and Put Options.
- d. The participating companies need to have a strong relationship with one another when working on OTC terms.
- e. The trading can also be conducted in trading exchanges in all varieties of actual and derivatives based trading.
- f. A large mining company trader can partner with other buyers and sellers like that of stones and sand, aggregates and industrial minerals, etc.
- g. Today's trading needs new age skills and knowledge.

11.0 References

1. Available from: <https://www.cargill.com/transportation/our-business>
2. Available from: <https://www.investopedia.com/terms/p/profitcentre.asp#:~:text=A%20profit%20center%20is%20a,generating%20its%20revenues%20and%20earnings>.
3. Available from: <https://www.indiafoline.com/knowledge-center/share-market/what-is-spot-trading#:~:text=A%20spot%20trade%2C%20also%20known,delivery%20of%20currency%20or%20commodity>.
4. Available from: <https://www.investopedia.com/ask/answers/06/forwardsandfutures.asp>
5. Available from: <https://www.tradestation.com/insights/2022/03/08/options-alert-btu-peabody-energy-call-roll/>
6. Available from: <https://www.reuters.com/article/us-bhp-group-au-trading-idUSKBN1YM0D0>
7. Available from: <https://www.ft.com/content/0a889756-e565-11e7-97e2-916d4fbac0da>
8. Available from: <https://www.mercatusenergy.com/blog/bid/86599/the-fundamentals-of-oil-gas-hedging-put-options-0>
9. Available from: <https://www.mercatusenergy.com/blog/bid/86597/The-Fundamentals-of-Oil-Gas-Hedging-Futures>
10. Available from: <https://www.mercatusenergy.com/blog/bid/106577/The-Fundamentals-of-Oil-Gas-Hedging-Costless-Collars>