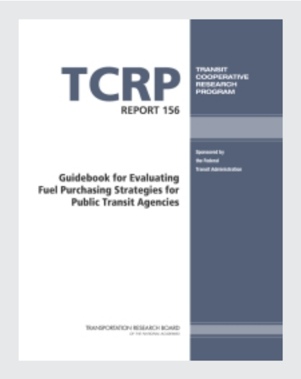

Guidebook for Evaluating Fuel Purchasing Strategies for Public Transit Agencies

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TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP REPORT 156

Guidebook for Evaluating Fuel Purchasing Strategies for Public Transit Agencies

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SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
McLean, VA

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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions,* published in 1987 and based on a study sponsored by the Urban Mass Transportation Administration—now the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), Transportation 2000, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, the National Academies, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

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The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

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FOREWORD

By Lawrence D. Goldstein
Staff Officer
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TCRP Report 156 is a guidebook for public transit agency professionals on how to identify and evaluate risks and uncertainties with respect to fuel prices, and describes tools and techniques for minimizing the impact of these uncertainties over time. This guidebook introduces the concept of fuel price risk management to public transit agencies, identifying alternative purchasing strategies and outlining steps necessary to implement an effective risk management program. It defines and evaluates alternative cost-effective fuel purchasing strategies designed to benefit public transportation agencies of varying sizes, and it provides a management framework to assist transit agencies through the fuel purchasing process. While using this guidebook, it is important to recognize that "risk management" is distinct from "removal of risk." It does not assure the lowest fuel prices; rather, it seeks to control the impact of price swings on overall transit system operating budgets.

The cost of fuel for transit system operations has been increasing in real terms as well as in terms of percentage of total operating expenses. In addition, fuel costs have exhibited a continuing high level of volatility, undermining a transit agency's ability to forecast future costs with any degree of certainty. What makes forecasting so difficult is that prices are influenced by many disparate factors, including world-wide supply and demand as well as international political uncertainties in oil producing regions throughout the world.

Past significant fuel price increases have had a negative impact on transit system budgets, limiting resources available for expansion while making it difficult to maintain current operations. In addition, higher gasoline prices contribute to increased demand for and dependency on public transit services. Increased demand for transit service creates a greater need for transit agencies to at least maintain current service levels. Given that transit agencies often have a limited ability to raise revenues, volatile fuel prices can have a significant impact on both near- and long-term planning. An effective response requires innovative fuel acquisition strategies as part of an overall service delivery plan. These strategies can incorporate the use of future contracts, derivatives, swap strategies, spot market, joint purchasing, and other options. Long-term fuel acquisition strategies must also recognize that transit agencies differ in size and ability to access federal, state, and local funding sources. The guidebook focuses on developing an understanding of key concepts of fuel price risk management at public transit agencies, and it also summarizes the procedural steps for implementing a strategic plan. Two types of energy price risk are addressed: commodity price risk and delivery price risk with the greater emphasis placed on the discussion of commodity price risk, which is considered the greater of the two. As a major component of the research, the guidebook presents various options for helping consumers manage or "hedge" exposure to risk.

Several important steps need to be implemented to benefit from hedging. Transit agencies need to solicit transit agency management interest and support, obtain stakeholder backing, and develop and implement hedging strategies that are most appropriate for a particular agency. None of these steps are necessarily simple or uniformly applicable, as conditions vary with agency, management structure, size and service characteristics, as well as other factors. As a result, effective tools and techniques will vary by transit agency, local government regulations and practices, and by state. Each individual agency must consider the framework and context for risk management decisions and implement strategic plans accordingly, using and building on the evaluations presented in this guidebook.

This guidebook has been designed for the public transit agency professional; however, it may also be of interest to other groups responsible for large transportation system fuel purchases, including state, municipal, and private fleet operators. Considering the nature of the topic, financial institutions as well as private sector suppliers, particularly those interested in hedging in concert with the transit industry, are also potential audiences.

To help formulate this guidebook, case studies of fuel purchasing strategies were carried out for 15 transit agencies across the U.S. and Canada. These case studies were based on direct interviews with transit agency representatives. Detailed summaries of these case studies are included as an appendix, providing examples of real-world experience. In addition, a wide range of transit agency representatives were invited to review and comment on the guidebook. Their comments have further enhanced the final product.

CONTENTS

Note: Many of the photographs, figures, and tables in this report have been converted from color to grayscale for printing. The electronic version of the report (posted on the Web at www.trb.org) retains the color versions.

SECTION 1

Introduction

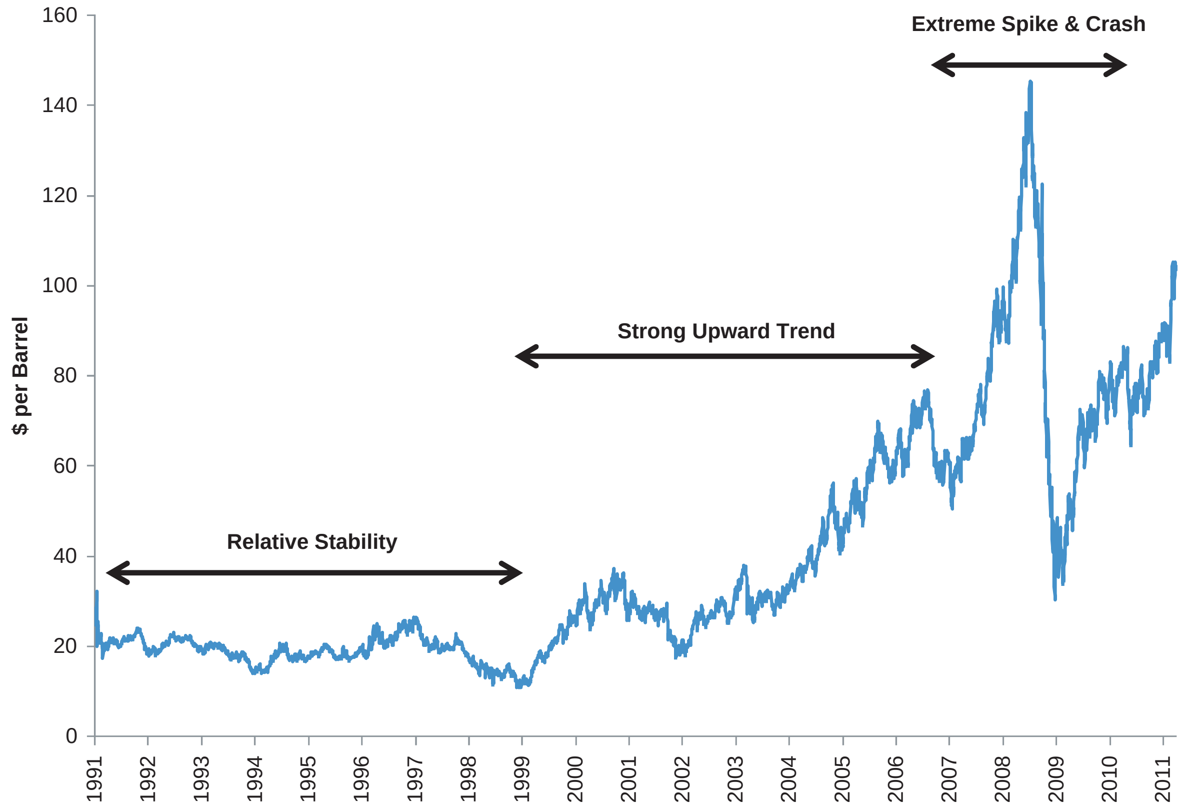
Energy is one of the largest and most variable costs for organizations that operate in the transportation sector. The importance of managing fuel price risk has grown in recent years as higher fuel prices have increased energy's share of overall costs and greater price volatility has made fuel costs increasingly difficult to predict. Following the energy crisis and price deregulation of the 1970s, private companies in the transportation sector—including airlines and other large fuel consumers—began using financial products to manage energy price risk when new risk management tools were introduced. Although the popularity of these instruments has grown tremendously since their inception, public transit agencies have been slow to adopt these innovations in risk management. Throughout much of the 1990s, low and largely stable fuel prices made managing fuel price risk mostly unnecessary. Since the early 2000s, however, extreme volatility in energy markets has led to a renewed interest in fuel price risk management, particularly after the severe oil price spikes of 2007 and 2008 (see Figure 1.1).

This guidebook is designed to introduce the topic of fuel price risk management to public transit agencies. It should be noted that risk management is distinct from removal of risk and does not assure the lowest fuel prices; rather, risk management seeks to control the impact of price swings. This guidebook describes and evaluates different fuel purchasing strategies available to transit agencies and outlines the steps that an agency needs to follow to implement an effective risk management program. This guidebook is not a "do-it-yourself" manual, but is designed to provide an understanding of key concepts on which the reader can build.

1.1 Why Manage Fuel Price Risk?

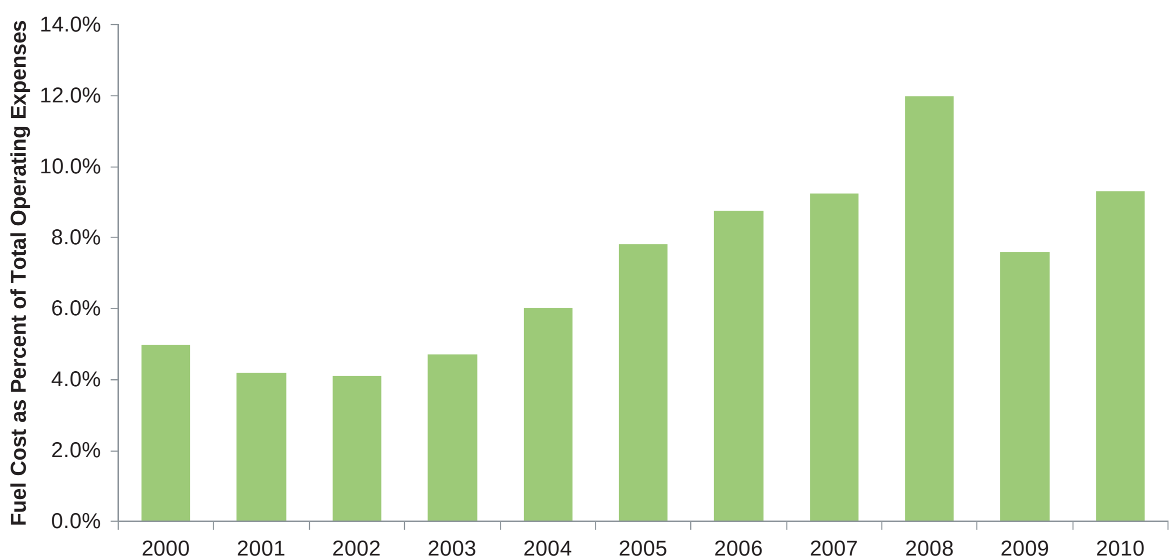
The primary reason that public transit agencies manage fuel price risk is to achieve budget certainty. In recent years energy prices have risen tremendously and have grown increasingly volatile. This scenario has had two major effects on public transit agencies. First, higher energy prices have increased the share of energy costs in transit agencies' overall budgets. As a result, the overall budgets are more sensitive to the changes (either up or down) in the price of energy. Figure 1.2 shows how a typical transit agency's fuel prices would have increased as a share of total operating expenses over the past decade, assuming that fuel accounted for 5% of the agency's budget in 2000. Figure 1.2 shows that fuel costs as a share of total operating expenses would have more than doubled from 5% to 12% from 2000 to 2008 if fuel costs increased at the same rate as oil, and non-fuel expenses grew at the general inflation rate. A 2008 study by the American Public Transportation Association (APTA) showed fuel and power costs increased from 6.13% of the operating budget in 2004 to 10.88% of the operating budget in 2008.[1] The second effect

[1] "Impact of Rising Fuel Costs on Transit Services." American Public Transportation Association. May 2008. http://www.apta.com/resources/reportsandpublications/Documents/fuel_survey.pdf



Source: SAIC, Energy Information Administration: http://www.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D

Figure 1.1. West Texas Intermediate (WTI) crude oil spot price, 1991–2011.



Source: SAIC

Figure 1.2. Hypothetical growth of fuel costs as a share of total operating expenses (2000–2010).

of higher prices and greater volatility on public transit agencies is that it has made it increasingly difficult to predict energy costs over the course of a year. The overall result of these two effects is that the budgets of public transit agencies have grown increasingly uncertain.

Budget uncertainty is a concern for public transit agencies because they have little leeway to manage higher energy costs. Most transit agencies operate under fixed budgets with funding coming from a combination of farebox receipts and contributions from state and local tax revenue. When costs rise, some transit agencies pass through costs in the form of higher fares, but this may be politically difficult if a large share of the agency's ridership is lower income. Managing the budget in other ways—such as cancelling or delaying capital improvements, delaying or cancelling service increases and operating improvements, and cutting existing services—might also be painful and could impact the long-run health of the agency's transit system. Borrowing funds for operations or increasing local or state contributions to fill the budget gap are other possibilities, but these options may be politically difficult and might violate the balanced budget requirements of many state and local governments. Given the limited operational and budget flexibility of many public transit agencies, budget certainty is a very desirable goal and is a strong reason to manage fuel price risk.

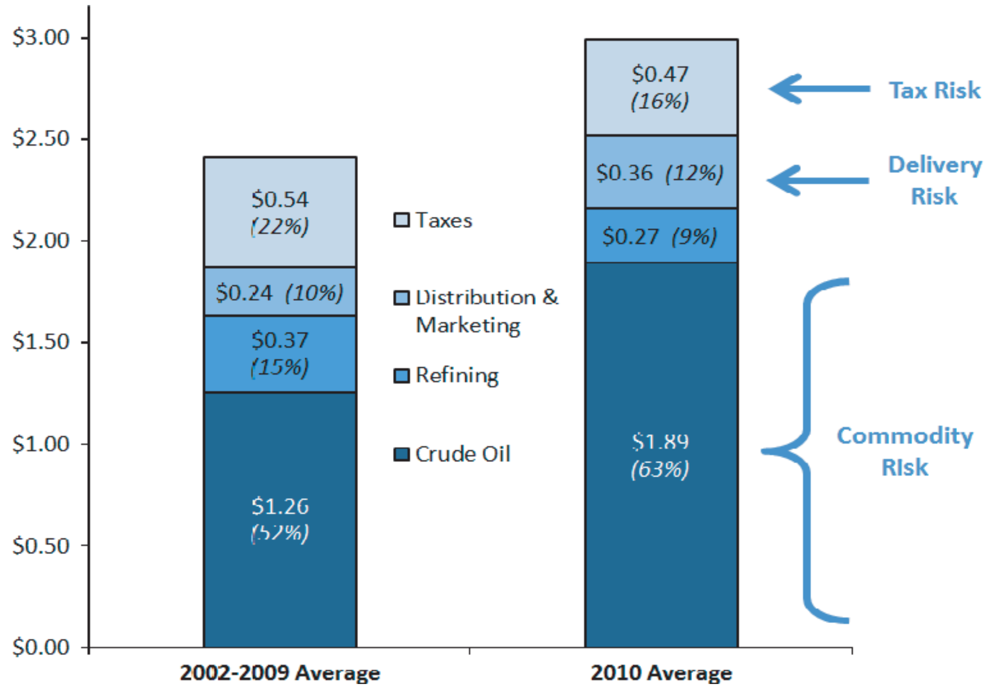
Opponents to using financial products to lock-in fuel prices (a practice called hedging) feel that the practice is too risky and akin to gambling. However, hedging consultants and transit agencies that hedge make the opposite argument: agencies that buy fuel at the market price without hedging are taking a greater risk than agencies that use hedging instruments to lock-in or cap future fuel prices. They suggest that buying fuel at the volatile market price is more of a gamble because the transit agency doesn't know if it will pay more or less than originally budgeted. If executed properly, hedging significantly reduces the probability that a transit agency will exceed its planned fuel budget over a given fiscal year. Other hedging proponents compare hedging to buying insurance: it may not be necessary every year, but not having it one day could financially ruin a transit agency.[2]

Overall, hedging does not remove risk; rather, it changes the risk from day-to-day variations in prices—and associated difficulties in establishing firm budget allocations—to variations in average prices over a longer term. While a longer-term future price projection will sometimes prove to be too high, locking into a longer-term price allows confident budget allocations. A key objective of hedging is that over the course of many long-term contracts, the higher-than-actual contract prices and lower-than-actual contract prices balance out and the agency gains certainty for adequate budgeting.

1.2 Types of Energy Price Risk

The main types of energy price risk are commodity price risk, delivery price risk, and tax price risk. Before these risk types are described in detail, it important to first explain the cost components that make up the price of fuel. The price of fuel paid by a public transit agency is the final product of costs and profit-taking across a long and capital-intensive supply chain that includes producers, shippers, refiners, and distributors. An increase in costs across any one of these segments will pass through to the final consumer. Figure 1.3 shows the breakdown by component of a gallon of diesel in 2010, as well as the average breakdown from 2002 to 2009. In 2010, taxes (including federal and average state taxes) accounted for 16% of the price of a gallon

[2] Vitale, Robert. "Hedging eases pain of rising fuel prices for COTA." *The Columbus Dispatch*. April 10, 2011. http://www.dispatchpolitics.com/live/content/local_news/stories/2011/04/10/copy/hedging-eases-pain-of-rising-fuel-prices-for-cota.html?sid=101 (April 14, 2010).



Source: SAIC, Energy Information Administration: http://www.eia.gov/oog/info/gdu/dieselpump.html

Figure 1.3. Diesel fuel pump price by cost component.

of diesel, distribution and marketing accounted for 12%, refining accounted for 9%, and crude oil accounted for 63%.

The price component breakdown in Figure 1.3 outlines the three types of energy price risk (i.e., delivery, commodity, and tax risk). Delivery price risk corresponds with the distribution and marketing segment; commodity price risk corresponds with the crude oil and refining segments; and tax risk, of course, corresponds with the tax segment. Commodity price risk is the biggest of the three risks that transit agencies face, because it makes up the lion's share of the cost of fuel. Together, crude oil and refining accounted for roughly two-thirds of the cost of fuel between 2000 and 2009 and nearly three-fourths of the cost of in 2010.

Commodity price risk is the risk that crude oil and/or refining costs will increase significantly and put pressure on the transit agency's budget. The price of crude oil—the major input for petroleum products—is driven at the macrolevel by global supply and demand characteristics. Among other factors, crude oil prices have been driven sharply higher in recent years as a result of a surge in demand from developing countries, slow growth in global production, an erosion of global spare production capacity, geopolitical instability in oil producing regions, the devaluation of the dollar, and a growing interest in oil derivatives as an alternative investment product. Risks in the refining sector are associated with local or regional petroleum product markets, including unplanned refinery shutdowns that curtail supply or weather-related increases in demand for petroleum products such as heating oil. Commodity price risk is extremely difficult for a transit agency to manage because it is based on events that are largely out of the agency's control (instability in the Middle East, hurricanes in the US Gulf Coast, etc.). A lower or more stable commodity price cannot simply be negotiated with a supplier. As a result, more sophisticated risk management tools are needed. Since the 1980s, financial derivative products such as futures, swaps, and options have emerged to help energy consumers to hedge their risk exposures. Adopting these risk management tools will give public transit agencies the best opportunity to reduce energy price volatility and achieve their goal of budget certainty. These strategies are discussed in depth in Sections 2 through 5 of this guidebook.

A lesser but not insignificant concern is delivery price risk. Delivery price risk is the risk that a local fuel distributor will charge a high and unreasonable margin price for fuel. This situation may arise in an uncompetitive market in which the fuel distributor has monopoly power. While it is unlikely that any one distributor will be able to dominate large fuel markets, smaller markets may have just one supplier. Nevertheless, delivery price risk is often not a major driver of price volatility for most transit agencies. This is because the distribution and marketing component makes up a relatively small share of the total price of fuel. Transit agencies and other end users typically purchase fuel from local distributors at a rack plus margin price. Distributors purchase fuel at a floating rack price at a refinery or a product pipeline terminal and then resell that fuel to consumers at a higher price that takes into account the cost of transporting the fuel and profit for the company. The difference between the rack price and the price charged to the consumer is the supplier's margin, which is often a fixed amount quoted in cents per gallon. In 2010, this margin accounted for only 12% of the final cost of diesel for the average consumer (see Figure 1.3). While its margin remains fixed, the distributor simply passes through increases or decreases in the rack price of fuel to the consumer. Fuel purchasing strategies designed to manage delivery price risk might lower the supplier's margin, but are unlikely to reduce volatility in the rack price of fuel. Strategies to counter delivery price risk are discussed in Section 7 of this guidebook.

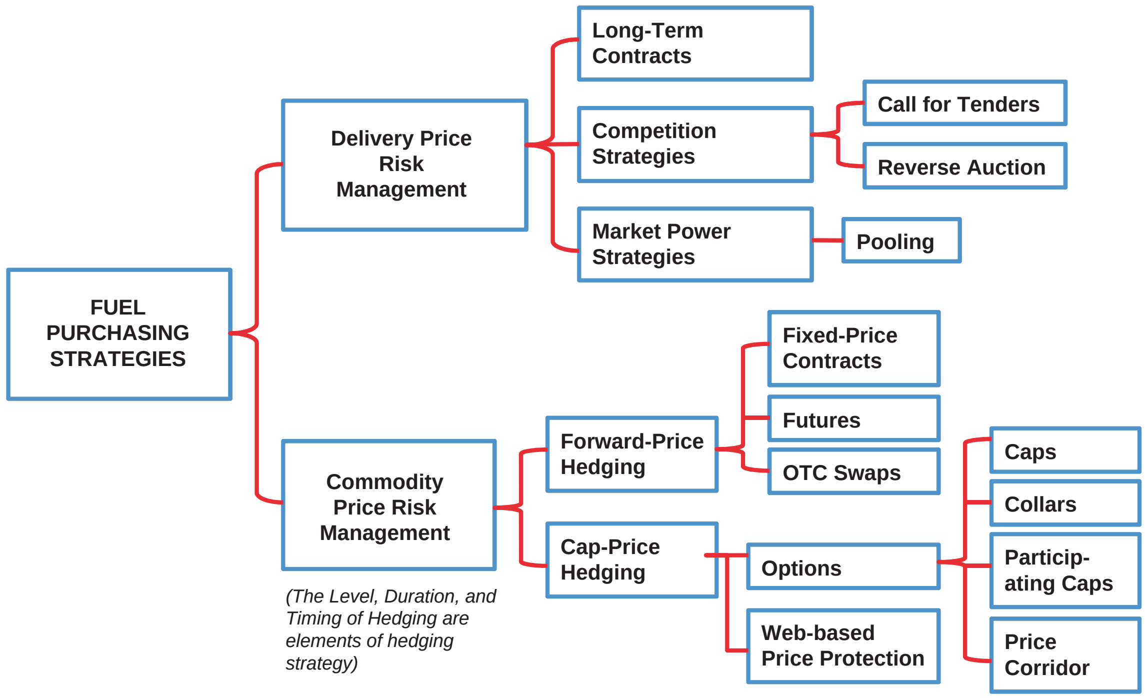
The third type of energy price risk is tax risk. This is the risk that the federal, state, or local government will increase taxes on energy products or introduce a carbon tax that increases the transit agency's cost of doing business. In 2010, the federal tax was 18.4 cents per gallon on motor gasoline and 22.4 cents per gallon on diesel fuel. State taxes for both gasoline and diesel ranged from 7.0 cents to 37.5 cents per gallon.[3] For the most part, tax risk is unavoidable, although it may be possible for public transit agencies to receive an exemption from state fuel taxes because they are government-owned entities. This guidebook does not address strategies for reducing tax risk.

1.3 Classification of Fuel Purchasing Strategies

In this guidebook, fuel purchasing strategies are divided into two major categories: 1) those aimed at reducing commodity price risk, (i.e., risk caused by volatility in global oil and regional refining markets); and 2) those aimed at reducing delivery price risk, (i.e., risk associated with the local fuel delivery and markets). Figure 1.4 broadly classifies each strategy that is discussed in this guidebook along these two risk management categories and several subcategories.

Commodity price risk management strategies are divided into two subcategories: 1) forward-price hedging strategies, which are strategies that fix the price of fuel for future consumption; and 2) cap-price hedging strategies, which are strategies that put a ceiling on the price of fuel in exchange for an upfront premium payment. Forward-price hedging strategies include the use of firm, fixed-price (FFP) supply contracts, exchange-traded futures contracts, and over-the-counter (OTC) swap contracts. Cap-price hedging strategies include the use of financial options (traded on an exchange or over-the-counter) and web-based price protection programs. Options can be further arranged in ways that provide customized risk management profiles, such as caps, collars, participating caps, and price corridors. These commodity risk management strategies and others are discussed in detail in Sections 2 through 5 of this guidebook. Other elements of hedging strategies are discussed in Section 6, including the level of hedging in relation to total fuel consumption, the duration of hedging programs, and the timing of the purchase of hedging instruments.

[3] Table EN1. Federal and State Motor Fuels Taxes. Energy Information Administration/Petroleum Marketing Monthly. April 2011. http://www.eia.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_monthly/current/pdf/enote.pdf (April 14, 2011).



Source: SAIC

Figure 1.4. Classification of fuel purchasing strategies.

Delivery price risk management strategies are discussed in Section 7 of this guidebook. These strategies are divided into three categories: long-term contracting, competition strategies, and market power strategies. Long-term contracting strategies are designed to fix the fuel supplier's margin to protect the transit agency from temporary price spikes caused by local supply and demand imbalances that cause price volatility in retail markets. Competition strategies, such as holding a call for tenders or a reverse auction, are designed to reduce the fuel supplier's margin by increasing competition among fuel suppliers. Finally, market power strategies, such as demand pooling, can reduce suppliers' margins by increasing the transit agency's bargaining power and enabling small consumers to acquire volume-discount pricing.

The final section, Section 8, introduces a step-by-step guide to implementing a commodity price risk management program (a hedging program). Launching a hedging program is a complicated task and will often require the assistance of an outside adviser or consultant. Section 8 is not designed to be a replacement for those services, but it provides a brief overview of the steps and challenges involved in starting a hedging program.

This guidebook has been designed for the public transit agency professional. The vast majority of public transit agencies use diesel or gasoline to power transit fleet operations, and this guidebook presents fuel purchasing strategies in the context of these fuels. Where appropriate, the limitations of extending particular strategies and instruments to alternative fuels, such as biodiesel, natural gas, or electricity, are noted.

SECTION 2

The Basics of Commodity Price Risk Management

Commodity price risk management strategies are designed to mitigate fuel price volatility caused by fluctuations in global oil markets and regional refining markets. This price volatility is caused by global and regional supply and demand factors, as well as other factors that are beyond the control of the consumer. The practice of commodity price risk management is commonly called hedging and the financial products used are often called hedges because they involve taking an offsetting financial position (i.e., entering a contract that pays off when prices rise) in order to counter the effect of rising fuel prices on the consumer's budget. The terms commodity price risk management and hedging are used interchangeably in this guidebook.

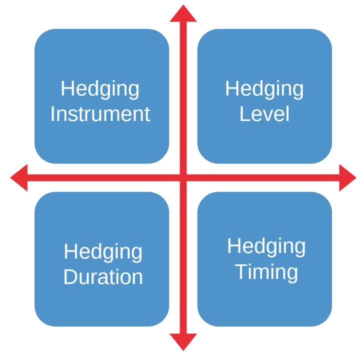
2.1 Goals of Hedging

The primary goal of hedging is to obtain budget certainty. As mentioned in the previous section, budget volatility is particularly difficult for public transit agencies because often they have limited operational and budget flexibility. Public transit agencies cannot easily pass increased fuel costs to customers, cut service, or borrow money to cover shortfalls in the budget. The goal of budget certainty as achieved through hedging does not assure lower overall fuel expenses. In other words, for a hedge to be effective, the average price paid by a hedged transit agency does not have to be lower than the average market price, it must only be more predictable. In theory, a transit agency that is primarily concerned with budget certainty would not care whether it pays an above-the-market price for fuel as long as that price is predictable at the beginning of year so that money can be allocated with certainty. In practice, however, using hedging strategies to lower the price of fuel, or at least to avoid overpaying for fuel, is also an important consideration for transit agencies. Other considerations include minimizing the resources and effort needed to develop and implement a hedging program, minimizing or avoiding collateral requirements required by the hedging program, and managing other risks associated with hedging. In order to achieve the goal of budget certainty subject to these considerations, a transit agency must carefully evaluate every component of its hedging strategy.

2.2 Components of Hedging Strategy

The primary goal of commodity price risk management is to achieve fuel budget certainty by fixing or capping fuel prices. The plan of action designed to achieve this goal is set out in the transit agency's hedging strategy and is executed through the agency's hedging program. A hedging strategy is defined by four key components that are presented graphically in Figure 2.1.

Decisions made along these four coordinates govern the nature of the hedging strategy. The choice of the hedging instrument governs the type of price protection: forward-price protection,



Source: SAIC

Figure 2.1. Components of a hedging strategy.

which fixes the price of fuel today for the delivery in the future, or cap-price protection, which sets a cap or ceiling on upward price movements in exchange for a premium payment. The choice of hedging level determines the percentage of the agency's fuel consumption that will be protected from price increases. The choice of hedging duration determines how far into the future the price is protected. The choice of hedging timing governs how the transit agency executes purchases and sales of hedging instruments and is a key determinant of whether the agency will pay a hedged price that is higher or lower than eventual market price. These four components form the core of a fuel price risk management strategy.

2.3 Hedging Instruments

Hedging instruments are generally applied to only a portion of projected fuel purchases; hence, the potential benefits and risks of these strategies apply to only the portion of purchases made with these instruments. The two main hedging instruments are forward-price instruments and cap-price instruments. Forward-price instruments fix the price of fuel that will be purchased in the future and fix the amount of fuel to be purchased under the instrument. If fuel prices in the future are above the fixed price, the hedge is advantageous; if they are below the fixed price, the hedge is unfavorable, except for gains in budget certainty.

Cap-price instruments, on the other hand, place a ceiling on future fuel prices while allowing the buyer to benefit from future price declines. As a result, the hedge is advantageous if fuel prices rise above the cap but has no disadvantage if prices are below the cap. However, this win-win risk profile is not free; the purchaser of the cap-price instrument must pay an upfront premium to compensate the seller. One innovative variant of cap-price protection is collar-price protection, which creates a band (a price ceiling and a price floor) within which prices can fluctuate. If structured properly, this strategy does not require a premium payment.

Forward-price and cap/collar-price protection can be obtained through several instruments. One type of forward-price instrument can be purchased and traded on an exchange, such as the New York Mercantile Exchange (NYMEX), where it is called a futures contract. A second type of forward-price instrument, over-the-counter (OTC) swap contracts, can be negotiated directly with a counterparty, such as a bank or financial institution. Cap-price protection can be purchased as options on both futures contracts and OTC swap contracts.

Firm, fixed-price (FFP) supply contracts, another type of forward-price instrument, are generally arranged with an agency's physical fuel supplier. Cap-price protection can be purchased

Table 2.1. Hedging instruments by protection type and method of obtaining.

	Protection Type:	
Obtained Through:	**Forward-Price**	**Cap-Price**
Exchange (NYMEX)	Futures	Purchased NYMEX Call Option
Over-the-Counter (OTC) Transaction	OTC Swap	Purchased OTC Call Option
Fuel Supplier	Firm, Fixed-Price (FFP) Contract	Firm, Cap-Price Contract
Web-based Fuel Price Protection Program		Pricelock, Fuel Bank, MoreGallons, etc.*

* The listed web-based programs are provided as examples—there is no intent to promote these programs over other, unlisted programs.
Source: SAIC

from fuel suppliers via cap-price supply contracts. For those with smaller fuel purchase volumes, a number of web-based programs have been developed to provide cap-price protection. Table 2.1 classifies the various hedging instruments according to the type of price protection and method of obtaining.

The most popular instruments for fuel price hedging—NYMEX futures, OTC swaps, and FFP supply contracts—provide forward-price protection. The advantages, disadvantages, costs, and risks of each of these instruments are discussed in Section 3. The process of constructing cap-price instruments (and variants such as collars) with NYMEX and OTC options are discussed together in Section 4 as these instruments share many of the same advantages and disadvantages. Section 4 also discusses web-based fuel price protection programs, a fairly new hedging method that seeks to provide cap-price protection to smaller volume fuel consumers. Section 5 provides an overall evaluation of each of the instruments discussed, and Section 6 discusses hedging level, duration, and timing.

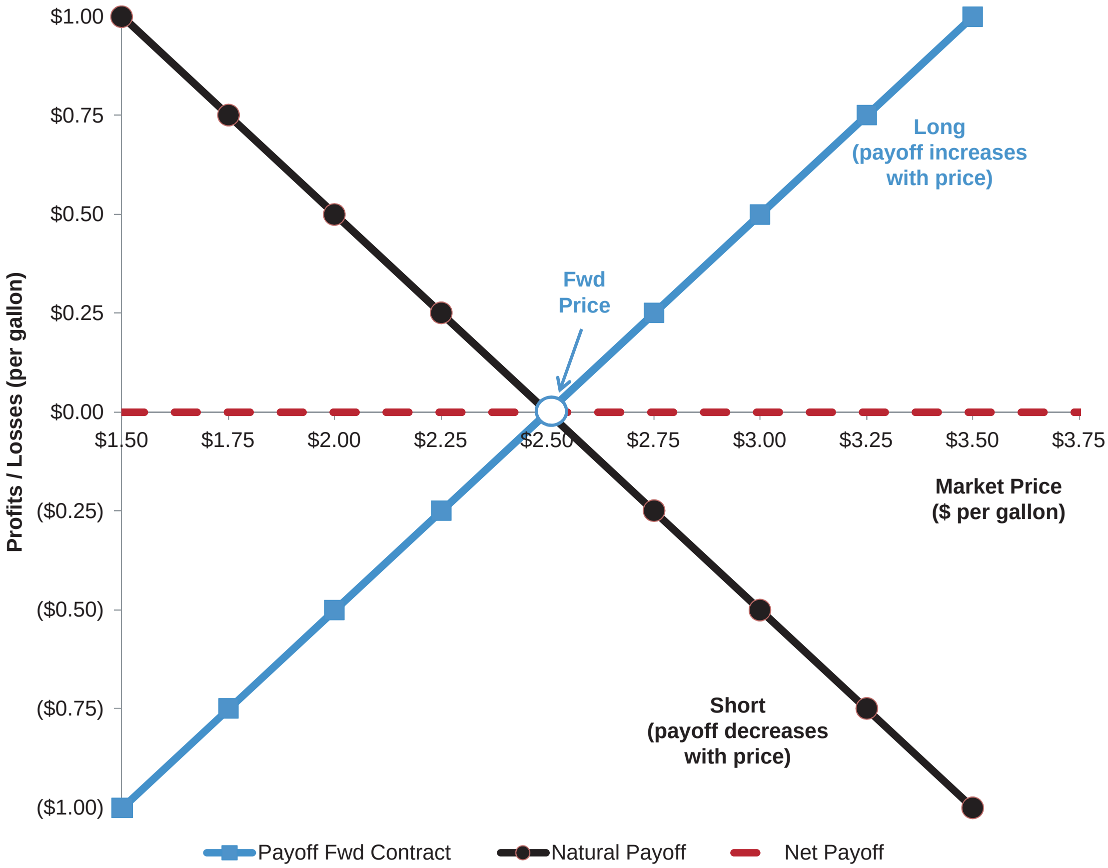
SECTION 3

Hedging with Forward-Price Instruments

The most common instrument for fuel price hedging is the forward-price instrument, commonly called a forward contract. Forward contracts allow consumers to lock-in the price of a specific volume of fuel that will be consumed in the future. All forward contracts have both a buyer and a seller, although forward contracts are typically costless at initiation (i.e., the buyer does not actually pay the seller for the forward contract). Instead, all profits and losses are determined by the results of the "bet" that the buyer and seller have agreed to. The buyer of a forward contract is long fuel, which means that the buyer profits if the market price exceeds the contract's forward price at maturity, and loses money when market prices are lower than the forward price at maturity. Conversely, the seller of a forward contract is short fuel, which means the seller loses money when the market price exceeds the forward price at maturity and profits when the opposite is true.

As a fuel consumer, public transit agencies are naturally short fuel; they must periodically purchase fuel in order to keep their operations running, which means they lose money (go over budget) when fuel prices increase. In order to effectively hedge this exposure, the agency must take the opposite position—it must take a long position on fuel prices by buying forward contracts. When properly executed, the gains and losses on the long forward contracts will offset the gains and losses on the transit agency's naturally short position as a fuel consumer, thus creating a synthetic fixed price. This payoff structure is illustrated in Figure 3.1. In this diagram the horizontal axis represents the price of fuel in dollars per gallon, increasing from left to right. The vertical axis represents the impact to the transit agency's fuel budget on a per gallon basis. The dark line, which slopes downward from left to right, represents the agency's natural profit function; as fuel prices increase, the agency loses money per gallon of fuel consumed. The lighter line, which slopes upward from left to right, represents the profit function of the purchased (long) forward contract; as fuel prices increase, the transit agency gains money. The horizontal dotted line shows the combination of these two payoff functions: the profits or losses of the transit agency are zero regardless of the direction of market price movements.

For example, suppose that a transit agency wanted to hedge its October fuel consumption of 84,000 gallons of diesel fuel. For the sake of the example, assume forward contracts could be obtained with a forward price of $2.50 per gallon, the exact spot price in the current month. The agency would buy (take the long position) enough forward contracts to cover 84,000 gallons of fuel at a price of $2.50 per gallon. Say in October that the price increased by $0.25 to $2.75 per gallon. Because the transit agency buys fuel to run its fleet, this would increase fuel expenditures (cash outflows) by $0.25 × 84,000 gallons = $21,000. However, because the price increased, the agency's forward contracts would pay out and the agency would receive a cash inflow of $0.25 × 84,000 gallons = $21,000, which is enough to exactly offset the loss on the physical fuel contract and create a zero net payoff. Thus, the forward contract effectively protected the agency from the increase in fuel prices. On the other hand, locking-in a fuel price with a forward contract also prevents the agency from benefiting from a fall in prices. If prices fall by $0.25, the agency would pay $21,000 less for physical fuel (a cash inflow), but would lose $21,000 on its forward contracts



Source: SAIC

Figure 3.1. Forward (long) versus natural (short) payoff profiles.

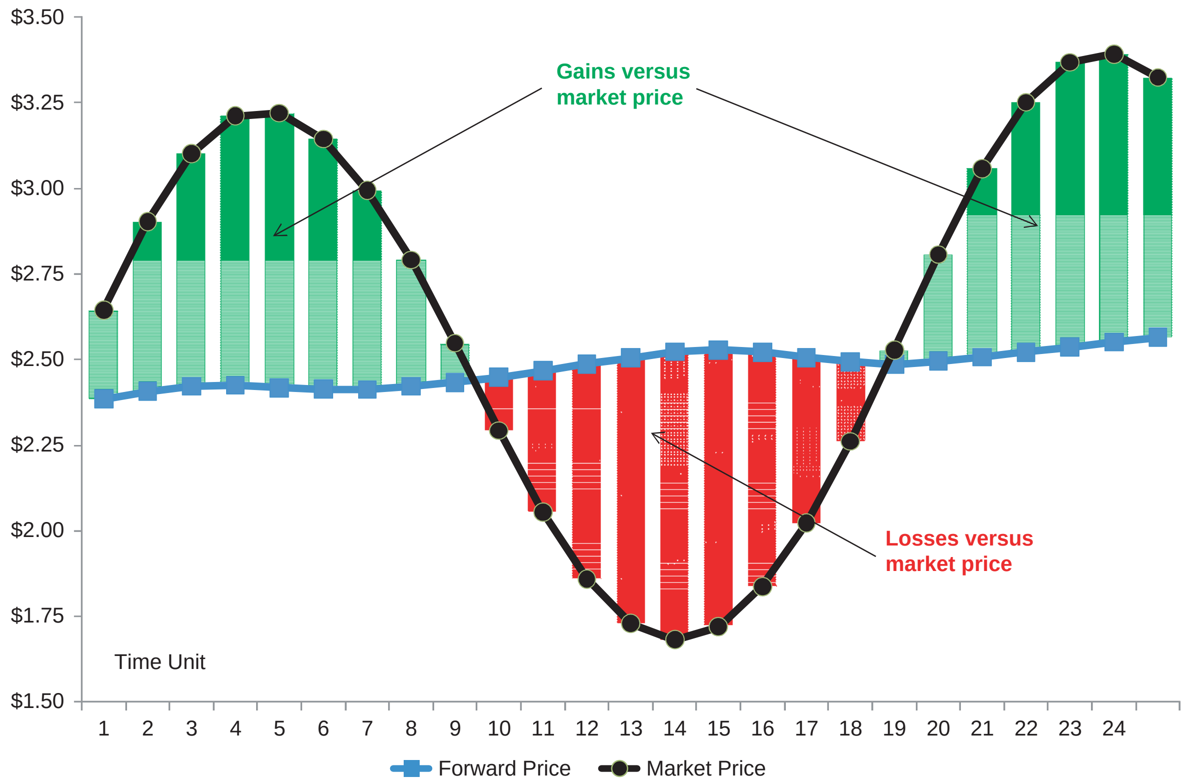
(a cash outflow). The result of this hedge is that the transit agency would pay the same price for fuel ($2.50 per gallon) regardless of whether fuel prices increased or decreased.

Figure 3.2 shows a forward-price curve for diesel fuel (the line that runs nearly horizontally through the graph) obtained in November 2010 versus a hypothetical range of future fuel prices (black sine curve). If forward contracts were purchased in November 2010 covering all fuel consumption in these future months, the agency's fuel prices would follow the nearly horizontal line regardless of what happens to actual spot prices. In Figure 3.2, the bars above the horizontal line and below the black line show gains from hedging versus the market and the bars below the horizontal line but above the black line show losses from hedging versus the market.

The three primary forms of forward-price contracting are: 1) futures contracts that are traded on a central exchange such as NYMEX; 2) custom OTC swap contracts that are negotiated off-exchange with counterparties such as banks, financial institutions, and the trading desks of large energy companies; and 3) FFP supply contracts arranged by the transit agency's fuel supplier.

3.1 Futures Contracts

Futures contracts are forward-price instruments that are traded on an exchange for standardized products with standardized volumes, delivery dates, and delivery locations. The futures contract most commonly used to hedge diesel fuel and jet fuel prices is No. 2 fuel oil (also known as heating oil), which is traded on the NYMEX. For futures contracts beyond April 2013, heating oil

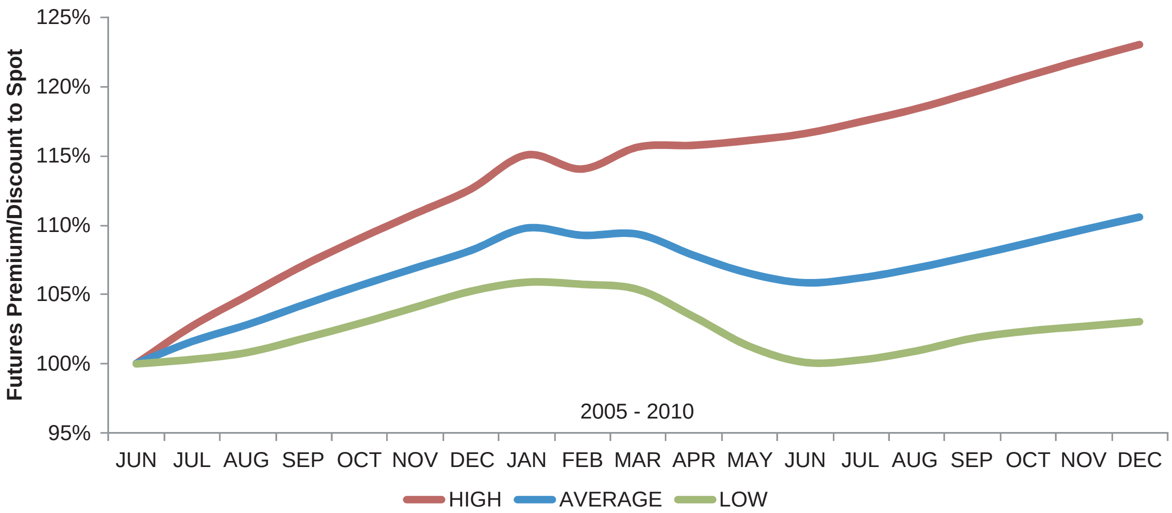


Source: SAIC, CME Group

Figure 3.2. Forward contract: gains and losses versus hypothetical market (spot) prices.

will be replaced with ultra low sulfur diesel (ULSD) as NYMEX responds to environmental regulations in New York State requiring lower sulfur standards for heating oil.[4] Gasoline is typically hedged with futures contracts tied to reformulated blendstock for oxygenate blending (RBOB) gasoline, an unfinished gasoline that has not been blended with oxygenates such as ethanol. Both No. 2 fuel oil and RBOB contracts specify the future delivery of 42,000 gallons (1,000 barrels) of product in New York Harbor. This means that in order to effectively hedge, a transit agency's annual fuel consumption must be at least 42,000 gallons × 12 months = 504,000 gallons on an annual basis. Under some futures contracts, the buyer actually takes delivery of the physical fuel in New York Harbor at the month of maturity. However, the vast majority of futures are paper contracts that are cash settled at the end of the month before the delivery month. If the spot price at maturity is higher than the price at which the futures contract was entered, the Exchange pays the buyer of the contract the difference between the two prices. If the price is lower, then buyer of the contract pays the Exchange the difference. NYMEX is technically the counterparty for every futures contract traded on its trading platform, but every contract has both a buyer and a seller. Because of the size and popularity of NYMEX futures contracts covering gasoline and heating oil, there is sufficient liquidity for futures contracts to always be bought or sold at a price. Prices are discovered by bid and ask prices made by buyers and sellers with the NYMEX acting as the market maker. No. 2 fuel oil futures contracts (the diesel correlate) are listed for 22 consecutive months commencing in the next calendar month.[5] RBOB (the gasoline correlate) futures con-

[4]Burkhardt, Paul, July 27, 2011. "Nymex Heating Oil Contracts to Be Replaced by ULSD in 2013," *Bloomberg Press*. As viewed at: http://www.bloomberg.com/news/2011-07-27/nymex-heating-oil-contracts-to-be-replaced-by-ulsd-in-2013-1-.html
[5]"Heating Oil Futures." CME Group Website. http://www.cmegroup.com/trading/energy/refined-products/heating-oil_contract_specifications.html. (April 14, 2011).



Source: SAIC, CME Group

Figure 3.3. Average, low, and high term structure of June futures contracts as percentage of spot price (2005–2010).

tracts are traded for 36 consecutive forward months.[6] For both products, contracts that cover near months (one to six months forward) are more heavily traded—and thus more liquid—than contracts covering further out months. Hedging further into the future than 22 months for diesel or 36 months for gasoline requires the use of light sweet crude oil (also known as West Texas Intermediate [WTI]) futures, which extend in consecutive months for the five forward years and can be obtained for select months as far as nine years forward.[7] Although hedging forward with crude oil futures could manage much of the commodity price risk associated with diesel and gasoline, doing so would increase exposure to basis risk (see Info Box: Basis Risk).

Futures contracts for other fuels and other delivery locations are also available on NYMEX. Other popular futures contracts by trading volume include natural gas futures for delivery at the Henry Hub in Louisiana, bunker fuel (No. 6 fuel oil) for delivery in the Gulf Coast, and ethanol for delivery in Chicago. Electricity futures are also available for peak and off-peak electricity at popular trading hubs within regional transmission organizations across the country, such as the PJM Interconnection that covers parts of the East Coast and Midwest. Natural gas and electricity markets in the United States are highly regional because they are based on fixed supply networks and are highly sensitive to regional weather patterns. As a result, hedging instruments for electricity and natural gas can hold significant basis risk (see Info Box: Basis Risk).

The futures contract price represents the expected spot price of the product at a future date. At expiration, the futures price converges with the spot price of the fuel. Futures contracts may exhibit premiums or discounts to the current spot price due to seasonal supply and demand variations. For instance, heating oil prices typically peak in the winter heating season whereas gasoline prices typically peak during the summer driving season. Figure 3.3 shows the term structures of June No. 2 fuel oil futures contracts with the average, low, and high term structures identified for contracts between 2005 and 2010.

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[6] "RBOB Gasoline Futures." CME Group Website. http://www.cmegroup.com/trading/energy/refined-products/rbob-gasoline_contract_specifications.html (April 14, 2011).
[7] "Light Sweet Crude Oil Futures." CME Group Website. http://www.cmegroup.com/trading/energy/crude-oil/light-sweet-crude_contract_specifications.html. (April 14, 2011).

Transit agencies can hedge using futures contracts by making an arrangement with a futures broker who has a seat on the NYMEX. When buying or selling futures contracts on NYMEX, the transit agency must post collateral in the form of a margin account (also known as a performance bond). The size of this account is set by formula and is a function of the price volatility in the market, but it is typically around 15% to 20% of the contract value. This account is marked-to-market every day and sometimes multiple times per day during periods of high volatility. Marking-to-market means that if prices for outstanding futures contracts rise, the Exchange will credit the difference to the buyer's account even though the contracts have not yet reached maturity. This surplus money (the amount over the minimum balance) can be withdrawn from the margin account at any time or can be left in the account and collected at maturity. Conversely, if prices fall, NYMEX will debit money from the buyer's margin account. If the buyer's margin account falls below the minimum balance, then the Exchange makes a margin call meaning the buyer must add money to the margin account to restore the minimum balance. If the buyer fails to make the margin call, the Exchange sells off the contract and absorbs all losses with the money remaining in the margin account.

3.1.1 Advantages

One of the most attractive aspects of hedging with futures is its cost advantage relative to other hedging instruments. Contracts with NYMEX brokers are fairly standard and easy to negotiate. Typically contracts stipulate a brokerage fee of 0.1 to 0.15 cents per gallon for each futures purchase, or roughly $42 to $63 for each 42,000-gallon contract, with no fee for settling contracts at maturity. Furthermore, because NYMEX futures prices are readily observable and brokerage fees clearly stated, futures prices and premiums are relatively transparent compared to other hedging instruments.

Another advantage of futures contracts is that they involve no counterparty risk. The NYMEX has never defaulted on a contract and all positions are backed by marked-to-market margin accounts with gains and losses realized on a daily basis. Because NYMEX contracts are so liquid, it is almost always possible to exit a position by either prematurely selling a purchased futures contract or entering an offsetting position by taking a short position (i.e., selling) a new futures contract. This flexibility may be particularly advantageous for an agency executing a managed strategy (see Section 6.3 on Hedge Timing) or for an agency that has an unexpected reduction in future fuel consumption. Finally, like all financial hedging instruments, futures can be bought and sold independent of the physical fuel contract, thus allowing the agency to continue its best practices for fuel procurement.

3.1.2 Disadvantages

Futures contracts have two main disadvantages that make them potentially risky for some transit agencies: adverse basis risk and margin call risk. Basis risk is explained in detail in the Info Box: Basis Risk.

Info Box: Basis Risk

In a hedging strategy, basis risk is the risk that fuel price changes in the hedging instrument (futures or swap contract) will not move in an entirely opposite direction than the transit agency's physical fuel price. This imperfect inverse correlation between the two prices creates the potential for excess gains or losses in the hedging strategy, thus adding to risk.[8] Excess gains are not necessarily bad, so fuel consumers that hedge

[8] "Basis Risk." Investopedia.com. http://www.investopedia.com/terms/b/basisrisk.asp. (April 14, 2011).

Basis Risk, cont'd

are primarily concerned with adverse basis risk, which refers to the risk of excess losses from imperfect price correlations. Mercatus Energy Advisors, a consulting firm, identifies three forms of basis risk: locational, product/quality, and calendar (spread).[9]

Locational basis risk occurs due to differences in the delivery point of the transit agency's physical fuel supply and the delivery point specified in the hedging instrument. In the case of NYMEX futures contracts, the delivery point is New York Harbor. Unless a transit agency purchases its physical fuel supply in New York Harbor or is able to purchase fuel at a price linked to the New York Harbor price, there is a risk that the NYMEX New York Harbor price will not correlate perfectly with the transit agency's physical fuel price, which usually tracks a local or regional index price as reported by an accepted pricing reference agency such as Oil Price Information Service (OPIS) or Platts. If the local index price increases while the NYMEX price declines, the agency pays a higher price for its physical fuel and has to pay money to the Exchange to satisfy its obligations under its futures contracts, thus realizing losses on both positions. Prior to selecting futures as a hedging instrument, most agencies run historical correlations between the NYMEX price and the selected local rack price to ensure that there is a sufficient correlation to make the strategy an effective hedge.

Locational basis risk is a particular concern for agencies outside the Northeast and especially for agencies in West Coast and Rocky Mountain states where fuel markets are largely isolated from the interconnected refinery and pipeline systems serving the Gulf Coast, Midwest, and Northeast. Even if historical correlations are adequate to justify the use of futures contracts, there is always a chance that price correlations will break down in the future, or that a particular occurrence (such as a refinery outage that increases local prices while NYMEX prices decrease) could drive a wedge between futures and physical fuel prices.

1. Figure 3.4 shows the correlation coefficient of the percent change in the monthly average NYMEX No. 2 fuel oil price[10] and the percent change in the monthly average local retail price of ULSD fuel by region and year. The correlation coefficient is a statistical measure that shows how much the change in one variable is dependent on a second variable. A correlation coefficient of zero indicates no relationship between the two variables. A correlation coefficient of one indicates a perfect relationship between the variables. If a transit agency's local fuel price has a high correlation with the NYMEX fuel price, it will take on low basis risk when hedging with NYMEX futures.

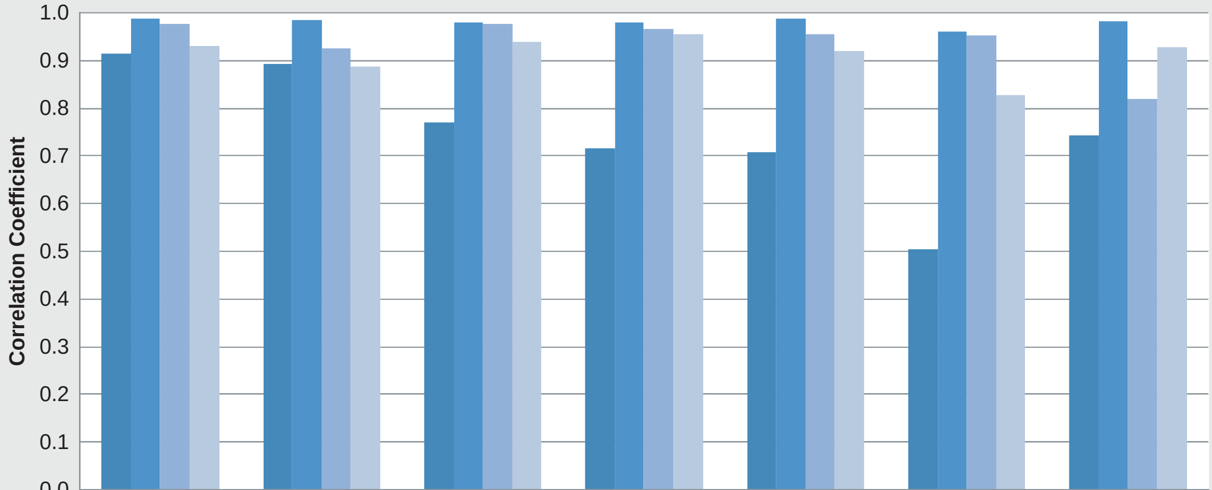
   Figure 3.4 indicates that ULSD prices in the Northeast (New England and Central Atlantic) are fairly well correlated with the NYMEX No. 2 fuel oil price. Lower Atlantic, Midwest, and Gulf Coast ULSD prices also tracked NYMEX fairly closely for most years, but all showed lower correlations in 2007. The Rocky Mountain and West Coast prices were the least correlated with the NYMEX price in most years. In recent years (2008 through 2010) product prices around the country have been highly correlated with the NYMEX price primarily due to volatility in the global crude oil prices (the primary input in the production of ULSD).

2. **Product/quality basis risk** occurs due to differences between the type of physical fuel purchased by the transit agency and the type of fuel specified in the futures contract traded on NYMEX. Most transit agencies hedge diesel consumption with NYMEX No. 2 fuel oil futures due to the historically high price correlation between the two fuels. Hedging with heating oil has historically been effective for diesel consumers, but if this correlation breaks down, product/quality basis risk could become a concern. Figure 3.5 shows the

(continued on next page)

[9] "The Basics of Basis Risk." Mercatus Energy Pipeline. Mercatus Energy Advisors. Posted April 14, 2010. http://www.mercatusenergy.com/blog/bid/38368/The-Basics-of-Basis-and-Basis-Risk. (April 14, 2011).
[10] Note: for futures contracts beyond April 2013, NYMEX will replace No. 2 Fuel Oil with Ultra Low Sulfur Diesel (ULSD), as reported at: http://www.bloomberg.com/news/2011-07-27/nymex-heating-oil-contracts-to-be-replaced-by-ulsd-in-2013-1-.html

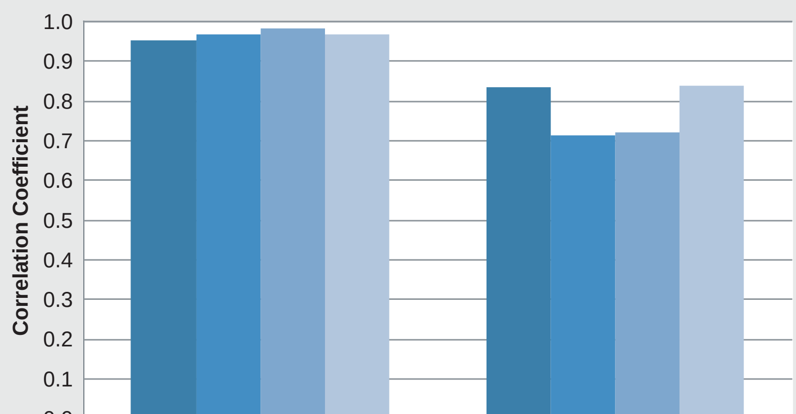
Basis Risk, cont'd



	New England	Central Atlantic	Lower Atlantic	Midwest	Gulf Coast	Rocky Mountains	West Coast
2007	0.92	0.89	0.77	0.72	0.71	0.50	0.74
2008	0.99	0.98	0.98	0.98	0.99	0.96	0.98
2009	0.98	0.93	0.98	0.97	0.95	0.95	0.82
2010	0.93	0.89	0.94	0.95	0.92	0.83	0.93

Region Definitions: http://www.eia.doe.gov/oog/info/twip/padddef.html
Source: SAIC, Energy Information Administration: http://www.eia.doe.gov/dnav/pet/pet_pri_dist_dcu_nus_m.htm and http://www.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EER_EPD2DXL0_PF4_Y35NY_DPG&f=D

Figure 3.4. Correlation between spot NYMEX No. 2 fuel oil price and regional ULSD price by region and year.



	NYH No. 2 Fuel Oil	WTI
2007	0.95	0.83
2008	0.97	0.71
2009	0.98	0.72
2010	0.97	0.84

Figure 3.5. Daily correlation of NYH ULSD spot price to NYMEX price indices by fuel and year.

Basis Risk, cont'd

daily correlation of the New York Harbor (NYH) ULSD spot price to the New York Harbor No. 2 fuel oil price and the WTI price.

Figure 3.5 shows that NYH No. 2 fuel oil is highly correlated with the NYH ULSD prices, and thus futures or swap contracts referencing the No. 2 fuel oil price index are appropriate hedging instruments for fuel buyers that purchase NYH ULSD. The correlation of NYH ULSD prices with the WTI spot price is not as strong, and thus hedging NYH ULSD fuel purchases with hedging products that reference NYMEX WTI crude oil futures would be a less effective hedge.

3. **Calendar (spread) basis risk** occurs when the settlement dates for the transit agency's physical fuel purchases do not match the settlement dates for the NYMEX futures contracts that it uses to hedge. NYMEX futures contracts settle on the last trading day of the month before the contract month (i.e., the May contract settles on the last trading day in April). Often, transit agencies will purchase physical fuel in small (less than 42,000-gallon increments) multiple times per month. These purchases will often not take place at the end or beginning of the month. As a result, there is some risk that the market price for physical fuel purchased in the middle of the month will be different than the price on the settlement date for the current month contract or the near-month contract.

To some degree, locational, product/quality, and calendar basis risk can be mitigated through the use of exchange-traded or OTC basis swaps. A fuel price basis swap operates similar to an interest rate basis swap. For example, a transit agency that consumes gasoline in the Gulf Coast can buy a "Gulf Coast ULSD (Platts) Up-Down Spread Swap Futures" contract on NYMEX under which the agency pays a fixed differential between the Platts Gulf Coast ULSD price and the NYMEX No. 2 fuel oil price and receives a floating differential between the two indices.[11] This floating differential can be used to hedge the basis risk on the standardized NYMEX product.

The second major disadvantage of hedging with futures contracts is the risk that rapidly falling fuel prices will lead to excessive margin calls on outstanding future contracts, which will drain the agency's cash balance and force the agency to borrow funds. NYMEX's margin account requirements are set by formula and the more volatile fuel prices are, the larger the margins will be as a share of the contract value. If prices drop rapidly (as they did in the second half of 2008) not only may NYMEX issue a margin call, but it might also require a larger minimum margin account balance. This could potentially put a cash-strapped transit agency in a difficult situation. Some large agencies attempt to avoid this risk by hedging only part of their fuel consumption with futures while hedging the remainder with swaps or other hedging instruments.

Futures contracts also share many disadvantages with other financial hedging instruments. Receiving authorization to hedge with futures may be difficult since some state and local governments have restrictions on investment activity by public entities. Board members may be suspicious of financial products and reluctant to approve a fuel price hedging program. Additionally, an agency's accounting department may need to learn how to properly account for the gains and losses from futures contracts.

[11] "Gulf Coast ULSD (Platts) Up-Down Spread Swap Futures." CME Group Website. http://www.cmegroup.com/trading/energy/refined-products/up-down-gulf-coast-ultra-low-sulfur-diesel-ulsd-vs-nymex-heating-oil-ho-spread-swap-futures_contract_specifications.html. (April 14, 2011).

Table 3.1. Hedging with futures: advantages and disadvantages.

Advantages	Disadvantages
➢ Low costs compared to other hedging instruments	➢ Adverse basis risk
	➢ Risk of excessive margin calls
➢ No premiums	➢ No benefit if fuel prices fall
➢ No counterparty risk	➢ Requires approval from board
➢ Flexibility to exit contracts at any point	➢ Requires adjustments for hedge accounting
➢ Fuel procurement best practices can continue	➢ Minimum hedge volumes of roughly 0.5 million gallons per year

3.1.3 Summary

Futures contracts can be an effective, low-cost way to hedge fuel prices for gasoline and diesel fuel use. These products are easy to understand, relatively inexpensive to arrange, and hold very little counterparty risk because they are arranged through NYMEX. However, because futures contracts are standardized, they expose hedgers to adverse basis risk and the margin account system that eliminates counterparty risk creates margin call risk. Adverse locational basis risk may be a concern for transit agencies located on the West Coast or Rocky Mountain states. Table 3.1 summarizes the advantages and disadvantages of hedging with futures.

3.2 Over-the-Counter Swap Contracts

Over-the-counter (OTC) swap contracts are several consecutive months of forward contracts that are negotiated between two counterparties. Over-the-counter is a financial term that denotes that the trading takes place outside of an exchange (such as NYMEX). Counterparties that trade OTC swap protection are typically banks, financial institutions, or the commodity trading desks of large energy companies. Because they are negotiated off-exchange, swaps can be customized to suit the needs of the parties involved. This means a local fuel price index can be used as a reference price and contracts can be set with any range of fuel types, volumes, maturities, settlement frequencies, and collateral requirements. As with futures contracts, swap contracts pay out if the index price is above the forward price of the swap contract.

Although OTC swaps are customizable, general limits typically hold. Because negotiating and arranging swap agreements can be time-intensive, swap dealers rarely have an appetite for volumes less than one to two million gallons per year. Furthermore, although swaps can typically be obtained in large cities with liquid price indices, it may be more difficult to obtain swaps based on local indices in some small and mid-sized cities. As a result, many swaps often use NYMEX or another large-market price index rather than the local index.

The counterparty in the swap agreement (the swap seller) takes the short side of the swap, which means the seller profits when prices decline below the swap price. The counterparty may wish to have this exposure because it believes that oil prices will decline and hopes to earn money on the swap. More likely, however, the swap seller is using the swap to hedge oil price exposure elsewhere in its portfolio. Thus, some swap sellers may only sell swaps until they have sufficiently hedged their portfolios. These swap volumes may or may not be enough to meet the transit agency's desired coverage. Alternatively, a swap seller may agree to a swap and then go to the futures market to hedge the swap in order to make money off the spread between the futures price and the swap price. In this case, the swap price may be based on NYMEX or on the local index price. Which price is used will determine which party (the buyer or seller) holds the basis risk.

3.2.1 Advantages

OTC swaps hold two advantages over futures contracts. The first is that OTC swaps can use a local pricing index instead of NYMEX, thus eliminating or reducing adverse basis risk for the fuel buyer. However, it may not always be possible to enter a swap contract based on a local index, or if it can be achieved, the swap dealer may require a significant premium to compensate for holding the basis risk. Nevertheless, large cities or small cities that base their purchasing contracts on a local or nearby index can take advantage of OTC contracts to eliminate, or at least reduce, basis risk relative to hedging with futures. This is particularly important for transit agencies in Rocky Mountain or West Coast markets where correlations with the NYMEX price are not as strong (see Info Box: Basis Risk).

A second advantage of OTC swaps is that these instruments can be negotiated without any collateral or with custom collateral. Many transit agencies have solid finances (predictable farebox and tax revenues) and thus have good credit ratings. As a result, it is often possible to enter swap agreements without posting collateral or by pledging general obligation dollars or physical assets, such as buses and trains, as collateral. Some counterparties may only require collateral for hedging volumes above a certain threshold. Negotiable collateral may be particularly valuable for an agency that has low cash availability at any given time. OTC swaps preclude the need to move money into and out of margin accounts on a daily basis. Because all settlements are exchanged at maturity, there is no risk that excessive margin calls will put the transit agency in a difficult position.

Other advantages of OTC swaps are largely contingent on how the swaps are structured. OTC swaps if based on NYMEX prices are relatively transparent, but less so if based on an index without a readily observable forward price curve. Most agencies that hedge with swaps work with two or more swap counterparties and report that swap prices are reasonably competitive. Finally, like all financial hedging instruments, swaps can be bought and sold independent of the physical fuel contract, thus allowing the agency to continue its best practices for competitive fuel procurement.

3.2.2 Disadvantages

Although OTC swaps remove or reduce some of the risks associated with futures contracts—primarily basis risk and the risk of excessive margin calls—these risks are often transferred to the swap counterparty and often come at a cost. Premiums for swaps based on price indices without forward curves are difficult to estimate. However, swaps based on NYMEX prices (that have no basis risk for the swap dealer) are typically priced one to five cents per gallon above the NYMEX price. This is significantly higher than the cost of buying futures directly (0.1 to 0.15 cents per gallon), but much less than the premium on firm, fixed-price supply contracts (an estimated 15 to 25 cents per gallon).

Entering a hedging relationship with a counterparty can often be lengthy and expensive. Doing so often requires that the transit agency hold a request for proposals (RFP), run due diligence (credit checks, etc.) on potential counterparties, and negotiate master swap agreements with the approved counterparties. A master swap agreement sets the legal structure for conducting swaps between the two parties, including identifying the risks and who will bear them. Because master swap agreements are custom agreements, each detail must be agreed upon by both sides. Transit agencies that hedge with swaps indicate that the negotiation of the master swap agreement is a lengthy process that takes from three to six months and involves several expensive reviews by outside legal advisors on both sides. Furthermore, the transit agency must negotiate a separate master swap agreement with each counterparty, so while increasing the number of counterparties may increase competition, it also requires a larger upfront investment in time and legal fees.

Table 3.2. Hedging with OTC swaps: advantages and disadvantages.

Advantages	Disadvantages
➢ No basis risk if swaps based on local index ➢ Collateral or margin requirements are negotiable ➢ Fuel procurement best practices can continue	➢ No benefit if fuel prices fall ➢ Higher costs than futures contracts ➢ May not protect from basis risk if swaps based on NYMEX prices ➢ Counterparty risk exists ➢ Minimum hedge volumes of one to two million gallons

OTC swaps are also subject to the risk that the swap counterparty will go bankrupt and default on its end of the obligation (or choose to strategically default on its obligation). The lower the swap price compared to the spot price, the higher the probability that the counterparty will default. Most transit agencies that hedge with OTC swaps choose creditworthy counterparties based on ratings provided by major ratings agencies. However the methods of ratings agencies have been questioned since the 2008 financial crisis. Although no transit agency interviewed for this guidebook had experience with a defaulting counterparty, one agency was in the process of negotiating a swap agreement with Lehman Brothers prior to its bankruptcy in 2008. The risk of bankruptcy or incomplete delivery of a contract can be mitigated by requiring appropriate bonding of each party in the contract.

OTC swap contracts also share disadvantages with other financial hedging instruments. It may be difficult to get authorization to hedge with swaps given that some state and local governments have restrictions on investment activity by public entities and it may be difficult to convince board members who may be suspicious of financial products in general. However, swaps are often easier than futures for management boards to understand because many agencies already have experience hedging their variable-rate debt with interest rate swaps. Additionally, the agency's accounting department may need to learn how to properly account for gains and losses from swap contracts.

3.2.3 Summary

OTC swaps essentially provide the same forward-price protection as exchange-traded futures contracts. However, because the transactions take place off-exchange, they are customizable and can reduce or eliminate adverse basis risk, and often do not require collateral. On the other hand, OTC swaps are typically priced at a premium compared to similar futures contracts, require more time and money to arrange, and expose the purchaser to counterparty risk. Table 3.2 summarizes the advantages and disadvantages of hedging with OTC swaps.

3.3 Firm, Fixed-Price Supply Contracts

Employing a firm, fixed-price (FFP) fuel supply contract is the simplest form of achieving forward-price protection. Under an FFP supply contract, a fuel buyer agrees to buy fixed fuel volumes for future delivery at a fixed price for the duration of the contract. The particular fixed-price services offered will vary from supplier to supplier, but typically they require minimum volumes of one to two million gallons per year with durations ranging from three months to one year. Some large fuel suppliers may provide FFP contracts to smaller volume consumers if they already have at least one large volume customer with an FFP contract. In addition, some fuel suppliers offer cap-price or collar-price contracts.

Although obtaining an FFP supply contract is a convenient way to hedge, fuel suppliers are not always well equipped to provide these contracts. Fuel suppliers typically operate a relatively simple retail business model: suppliers buy fuel from refiners or importers and then resell the fuel to buyers (such as transit agencies) with a markup to account for delivery costs and profits. Thus, fuel suppliers are naturally hedged because they both buy and sell fuel. If the supplier's fuel prices increase, it simply passes those increases on to the buyers. The fuel buyer holds all the price risk. Under fixed-price (or cap-price) supplier contracts, the fuel buyer's price risk is transferred from the fuel buyer to the fuel supplier and disturbs the fuel supplier's natural hedge. If oil prices increase, the fuel supplier cannot pass those increases on to the fuel buyer. Often the fuel supplier, which operates under a simple retail model, cannot afford to hold this price risk and must turn to financial markets to hedge its position through swaps or futures in order to provide FFP contracts to its customers.

3.3.1 Advantages

FFP supply contracts allow the transit agency to hedge without devoting significant internal resources to a hedging program. The transit agency does not need to educate its staff about financial instruments, does not need to negotiate agreements with swap counterparties or NYMEX brokers, does not need to manage margin accounts or pay upfront premiums, does not need to adjust its accounting system, and, perhaps most importantly, does not need to change state laws or local statutes in order to obtain authorization to use FFP supply contracts. FFP contracts are also easier for the agency's board of directors to understand and do not appear to be investment activity or speculation. Furthermore, because FFP contracting is similar in nature to standard variable-price contracting, it is easier for an agency's procurement department to understand and negotiate. FFP contracts shift virtually all the costs and risks associated with hedging (particularly basis risk) to the fuel supplier and allow the transit agency to benefit from relatively hassle-free hedging. However, this transfer of costs and risks to the fuel supplier comes at a high cost.

3.3.2 Disadvantages

Hedging with FFP supply contracts costs significantly more than hedging with other forward-price instruments. Transit agencies that have used FFP contracts complain that pricing for FFP contracts is not transparent and that premiums vary significantly from supplier to supplier. Energy consultants in the Midwest and Texas interviewed for this guidebook estimated that a transit agency would pay a premium of 15 cents per gallon for an FFP contract in 2010, roughly three times as much premiums on over-the-counter swaps. One West Coast transit agency estimated that it paid a premium of 20 cents to 25 cents per gallon for its FFP contract. It is difficult to assess the fairness of these premiums. Fuel suppliers claim that high premiums on FFP contracts are needed because providing such contracts requires the fuel supplier to hedge with financial products and take on considerable risks (including basis and counterparty risk). Fuel suppliers are not well suited to take on the risks and costs of hedging. Many fuel suppliers have credit ratings that are lower than those of transit agencies and therefore, may be required to pay higher premiums when hedging.

FFP contracts are single-point decisions that may result in contracts that are extremely favorable or extremely unfavorable depending on how market prices actually develop. The timing of these contracts dictates whether they are advantageous compared to market prices, which presents a significant energy price risk. (Hedge timing is discussed in Section 6.3.)

Hedging with FFP supply contracts might force a change in a transit agency's fuel procurement best practices. Transit agencies typically procure fuel under contracts based on the local rack (OPIS) price of fuel plus a fixed margin to account for delivery costs and the supplier's profit margin. Often a transit agency will compete its fuel procurement contract to achieve the lowest margin over the OPIS price. Requiring potential fuel suppliers to have the ability to provide FFP contracts may reduce the number of fuel suppliers that qualify to compete for the lowest margin. In larger metropolitan areas with many fuel suppliers, this may not be a concern, but for small

Table 3.3. Hedging with firm, fixed-price supply contracts: advantages and disadvantages.

Advantages	Disadvantages
➢ Few internal staff need to be devoted to hedging ➢ No collateral ➢ No basis risk ➢ Easy to get authorization under existing state and local laws ➢ Easy for board of directors to understand	➢ Extremely high premiums relative to hedging with financial products ➢ Availability of fixed-price fuel suppliers may reduce competition for the agency's fuel procurement contracts ➢ Duration of the physical fuel contract limits the maximum hedge duration. ➢ Counterparty risk with fuel supplier ➢ Minimum hedge volumes of one to two million gallons ➢ Cannot exit hedge if prices collapse

and mid-sized cities, competition in the fuel procurement process could be reduced. Furthermore, fuel suppliers in smaller markets may not offer FFP services, or may require an exorbitant premium in order to start a fuel hedging program and offer a fixed price.

Hedging with FFP contracts limits the hedge duration and hedge coverage of an agency's hedging strategy because it does not separate price hedging decisions from physical fuel procurement. For instance, some transit agencies prohibit physical fuel procurement contracts from spanning budget periods. Thus, the maximum duration that an agency can hedge is the duration of the budget period (usually 12 months) if the contract was locked at the very beginning of the budget period. This limits the ability of the transit agency to take advantage of relatively low price environments by hedging further into the future. FFP contracts also limit the maximum hedge coverage. Because pricing and physical delivery remain linked, an agency will be reluctant to hedge a high percentage of its anticipated fuel consumption. If a snowstorm or other event causes the transit agency to cut service (and therefore fuel consumption) during a particular month, high levels of coverage could lead to overdelivery of fuel. Thus, transit agencies that hedge with FFP contracts typically hedge a lower percentage of fuel than they optimally would choose. With financial hedging instruments, an agency can simply exit the contract at the mark-to-market price without worrying about storing surplus fuel.

A final disadvantage of FFP contracts is counterparty risk—the risk that the fuel supplier will go bankrupt and default on its end of the obligation or strategically default on its agreement. The lower the FFP contract guaranteed by the fuel supplier is compared to the market price, the higher the probability that the fuel supplier will default. A transit agency interviewed for this guidebook had a FFP natural gas contract with Enron prior to its bankruptcy in late 2001, exemplifying this risk.

3.3.3 Summary

Firm, fixed-price supply contracts are a relatively easy forward-price instrument to implement because the majority of the resources and risks needed to develop a financial hedging program are simply outsourced to the fuel supplier. However, this benefit comes at a significant cost in terms of high premiums for providing hedging services and changes to the transit agency's procurement best practices. Table 3.3 summarizes the advantages and disadvantages of hedging with FFP supply contracts.

SECTION 4

Hedging with Cap-Price Instruments

Cap-price instruments create a price ceiling that prevents fuel prices from exceeding a certain level. They are often compared to insurance: the buyer pays a premium in exchange for protection against a bad outcome. As with forward-price instruments, the buyer of the cap instrument is credited the difference when fuel prices exceed the price specified in the contract (called the strike price). Unlike forward contracts, however, the buyer does not pay out money when prices fall. When purchasing physical fuel, gains from fuel price declines are not offset by losses on the cap-price instrument. This type of win-win protection is not free. Unlike forward contracts, which are essentially costless (other than brokerage fees) at initiation, cap-price instruments require the buyer to pay a premium to the seller. This payment is not collateral; it is an actual outflow of money from the buyer to the seller to compensate the seller for undertaking the risk of selling cap-price protection.

Premiums on cap-price instruments are determined by a number of factors including the spot price of fuel at initiation, the price specified in the price cap (the strike price), the maturity of the instrument, interest rates, and the volatility of the fuel market at the time the contract is initiated. Typically, the strike price of the cap-price instruments is set out-of-the-money, which means that fuel prices would need to rise significantly before the cap would pay out for the buyer. The higher that the strike price is relative to the spot price at initiation, the lower the cost of the premium will be. Typically the premium is paid upfront at the time the instrument is purchased, but some instruments allow for deferred premium payments (although such deferred payment plans require higher overall premium payments). Historically, cap-price instruments have rarely been used by transit agencies due to the high cost of premiums. Structuring options to create participating caps, collars, and price corridors reduces or eliminates the premium on cap-price instruments.

There are essentially three ways to achieve cap-price protection:

1. Purchasing OTC or exchange-traded options contracts;
2. Participating in a web-based fuel price protection program; or
3. Having a fuel supplier provide protection via a cap-price physical fuel supply contract.

The pros and cons of the third method were discussed in the Section 3.3. OTC options contracts and web-based fuel price protection programs will be discussed in the following sections.

4.1 Options Contracts

Options contracts give the buyer the right, but not obligation, to purchase or sell fuel at a specific price (the strike price) over a specified period of time. American-style options allow the buyer to exercise the option at any point before expiration while European-style options can only be exercised at maturity. There are two basic types of options: call options that give the right to buy fuel at a specific price, and put options that give the right to sell options at a specific price. Options contracts are further classified based on whether the option is being bought or sold. A full explanation of the different types of options available to transit agencies is beyond the scope of this overview.

The strike price on an option is typically set out-of-the-money at initiation, meaning that there is no value to exercising the option because the spot price of the fuel is more advantageous than the strike price of the option. As prices change over time, however, an option can become in-the-money, meaning that the strike price is advantageous compared to the spot price and the options contract will pay out if exercised. As with forward contracts, payouts on options are typically settled on a cash basis. In other words, the seller does not actually sell physical fuel to the buyer, but pays the buyer the difference between the market price at the time the option is exercised and the strike price that was agreed at initiation. The buyer of an option has the right, but not obligation, to exercise the option. This means that if the market price is lower than the strike price, a purchased call option would be out-of-the-money and the buyer would not benefit from exercising the option. In this case, the buyer would simply let the contract expire.

Fuel price options can be purchased over the counter (i.e., directly through a counterparty) or via an exchange (i.e., NYMEX) for some fuels and delivery locations. Over-the-counter options are customizable with respect to the price index used for settlement, meaning that a local price index can be used to reduce or eliminate basis risk (see Info Box: Basis Risk). European- and American-style options that are indexed to the New York Harbor No. 2 heating oil futures contract (the diesel fuel correlate) and RBOB gasoline (the gasoline correlate) can be obtained on NYMEX where they have significant open interest and trading volume in near months, but are more difficult to obtain for further out months. These contracts are available to cover up to 36 consecutive forward months with 60 predetermined strike prices ranging from 1 to 60 cents above and below the at-the-money strike price (the current price of the desired month's futures contract).[12]

4.1.1 Caps

The most straightforward way for a transit agency to hedge with options is to purchase call options to create a synthetic cap on upward price movements. When the spot price exceeds the strike price of the call option at maturity, the transit agency can exercise the option and receive the difference between the market price and the strike price. The transit agency would continue to pay the higher market price for its physical fuel supply. However, if the hedging plan is structured properly, increased expenditures on physical fuel purchases would be offset by payments to the agency from the seller of the call option, which creates a synthetic cap on the agency's fuel price. Regardless of the spot price, the buyer of the call option pays the seller a premium. This means that the maximum effective fuel price that the agency will pay is equal to the call option strike price (the cap) plus the premium. At all prices below the strike price, the buyer does not exercise the call option and simply pays the market price on its physical fuel plus the premium to the option seller.

Figure 4.1 shows the performance of a 24-month string of call options with a strike price of $2.75 per gallon and a 20-cent premium versus a hypothetical range of future prices. The horizontal dashed line in Figure 4.1 indicates the call option's strike price, the black line represents a hypothetical range of spot prices, and the solid lighter line represents the price paid by the transit agency (the minimum of strike price and the spot price, plus the fixed 20-cent premium). For example, if the market price rises to $3.25 per gallon, the call option pays out $3.25 – $2.75 = $0.50 per gallon to the buyer. However, the net gain to the agency is 50 cents less the 20-cent premium, or only 30 cents per gallon. When prices are lower than the strike price, the buyer simply pays the market price for fuel plus the 20-cent premium.

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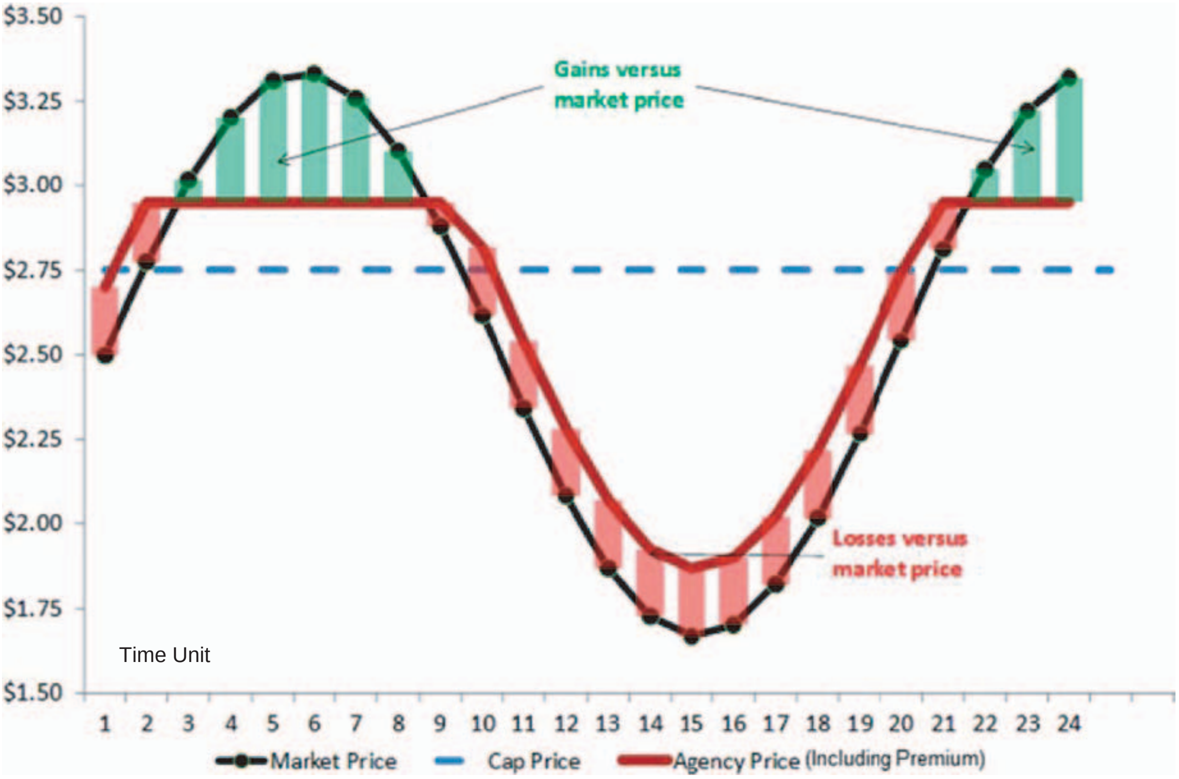
[12] "Heating Oil Options: Contract Specifications." CME Group Website. http://www.cmegroup.com/trading/energy/refined-products/heating-oil_contractSpecs_options.html#prodType=AVP (April 14, 2011).



Source: SAIC

Figure 4.1. Cap: gains and losses versus hypothetical market (spot) prices.

Info Box: Options Pricing

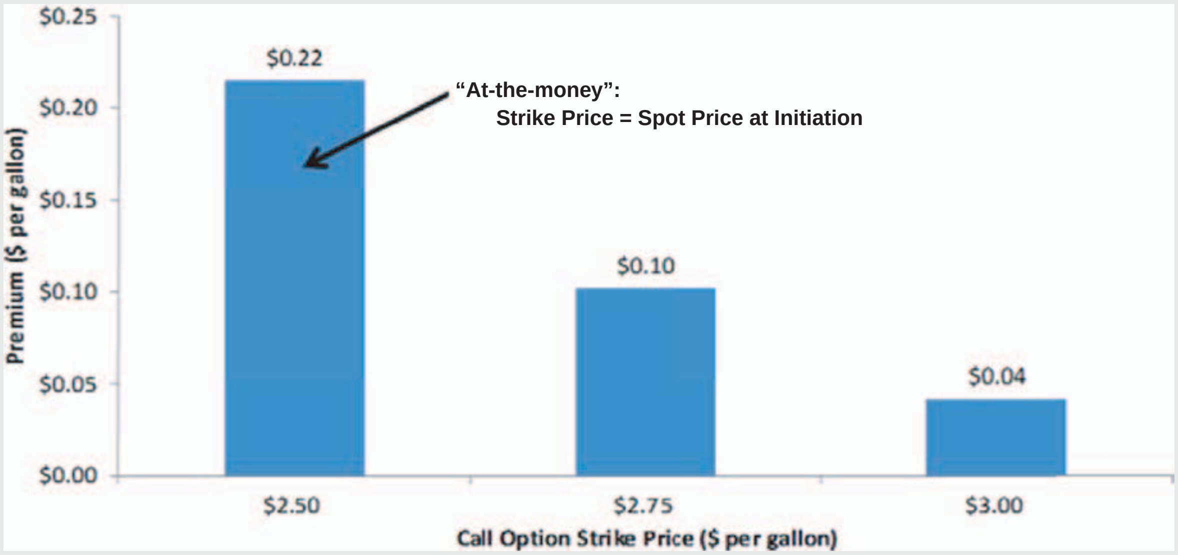
The premium on an option contract is determined by a mathematical formula that estimates the probability that the option's strike price will be above the spot price at maturity. A widely used formula for the pricing of European-style options (options that can only be exercised at maturity) is the Black-Sholes formula. This formula is mathematically complex, but essentially prices options (either puts or calls) based on five factors: 1) the current price of the underlying asset, 2) the strike price of the option, 3) the volatility of the underlying asset, 4) the time to maturity of the option, and 5) interest rates.

Applying the Black-Sholes formula, Figure 4.2 shows how the premium for a 12-month European-style call option decreases as the strike price increases. The prices are calculated assuming that the spot price for diesel is $2.50 per gallon, volatility is 15%, and the interest rate is 5%. Figure 4.2 shows that the premium on an at-the-money call option (a call option where the strike price is equal to the current spot price) would be approximately 22 cents per gallon. In other words, if a transit agency wished to hedge itself against any upward movement in prices it would cost the agency 22 cents for each gallon hedged. Thus, the effective maximum price would be the strike price of $2.50 plus the 22-cent premium, or $2.72 per gallon. If the spot price at maturity falls to $2.40 per gallon, then the effective price paid would be $2.40 + $0.22 = $2.62 per gallon.

The option premium is also sensitive to two other important variables: oil price volatility and the time until maturity. Figure 4.3 shows the calculated premium of a diesel call option under different volatility environments (5%, 10%, and 15%) and at varying maturities (1 to 24 months forward) given a current spot price of $2.50 per gallon, a strike price of $2.75 per gallon, and an interest rate of 5%.

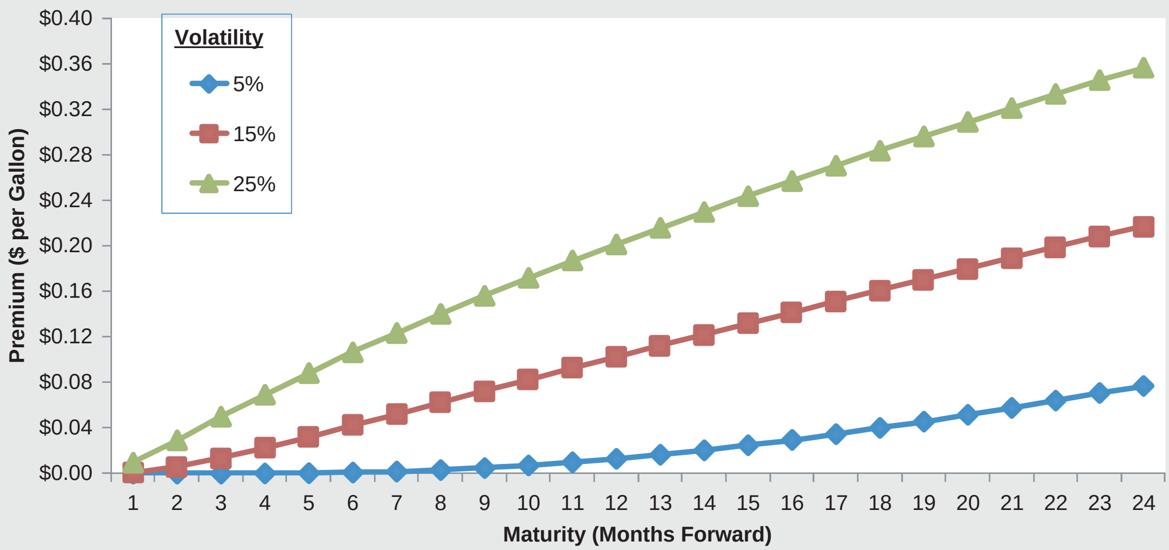
(continued on next page)

Options Pricing, cont'd



Source: SAIC, OptionTradinngTips.com: http://www.optiontradingtips.com/pricing/free-spreadsheet.html

Figure 4.2. Twelve-month European-style call option premiums by strike price when spot price is $2.50, interest rate is 5%, and volatility is 15%.



Source: SAIC, OptionTradingTips.com: http://www.optiontradingtips.com/pricing/free-spreadsheet.html

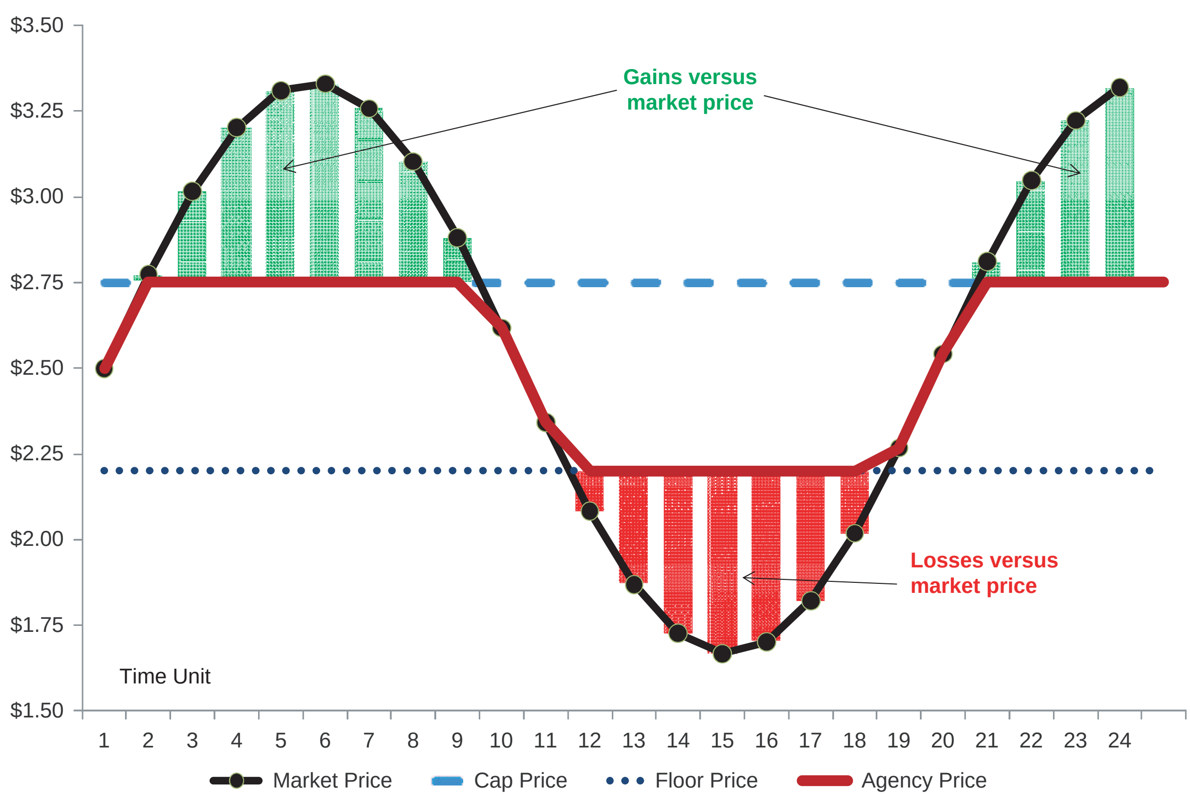
Figure 4.3. Call option premiums by maturity and volatility environment when spot price is $2.50, strike price is $2.75, and interest rate is 5%.

Options Pricing, cont'd

Figure 4.3 shows that the call option premium increases when volatility is higher because greater volatility increases the probability that the strike price will be higher than the spot price at maturity. The premium for a call option with a strike price of $2.75 and a maturity 12 months in the future has a price of .01 cents per gallon when volatility is low (5%), 10 cents per gallon when volatility is moderate (15%), and 20 cents per gallon when volatility is high (25%). At all volatility levels, options prices increase with time to maturity because longer timeframes give volatility more of a chance to work, thus increasing the probability that the strike price will be above the spot price at maturity. In a high volatility (25%) environment, the call option premium increases from roughly 1 cent for the one-month forward option to 36 cents for an option with a maturity 24 months in the future.

4.1.2 Collars

Collar strategies are designed to reduce or eliminate the expensive premiums associated with traditional caps by foregoing some benefits when prices fall. A collar is composed of a combination of call and put options that create a price ceiling and a price floor. These contracts allow the buyer's fuel prices to fluctuate within a band, providing protection on the high end and allowing full participation in price declines up to a certain point. If the price ceilings and price floors are structured properly, a collar may not require the buyer to pay premiums. This type of instrument is called a no-cost collar. Figure 4.4 shows the performance of employing a 24-month, no-cost collar with a cap of $2.75 per gallon and a floor of $2.20 versus a hypothetical range of future fuel prices.



Source: SAIC

Figure 4.4. No-cost collar: gains and losses versus hypothetical market (spot) prices.

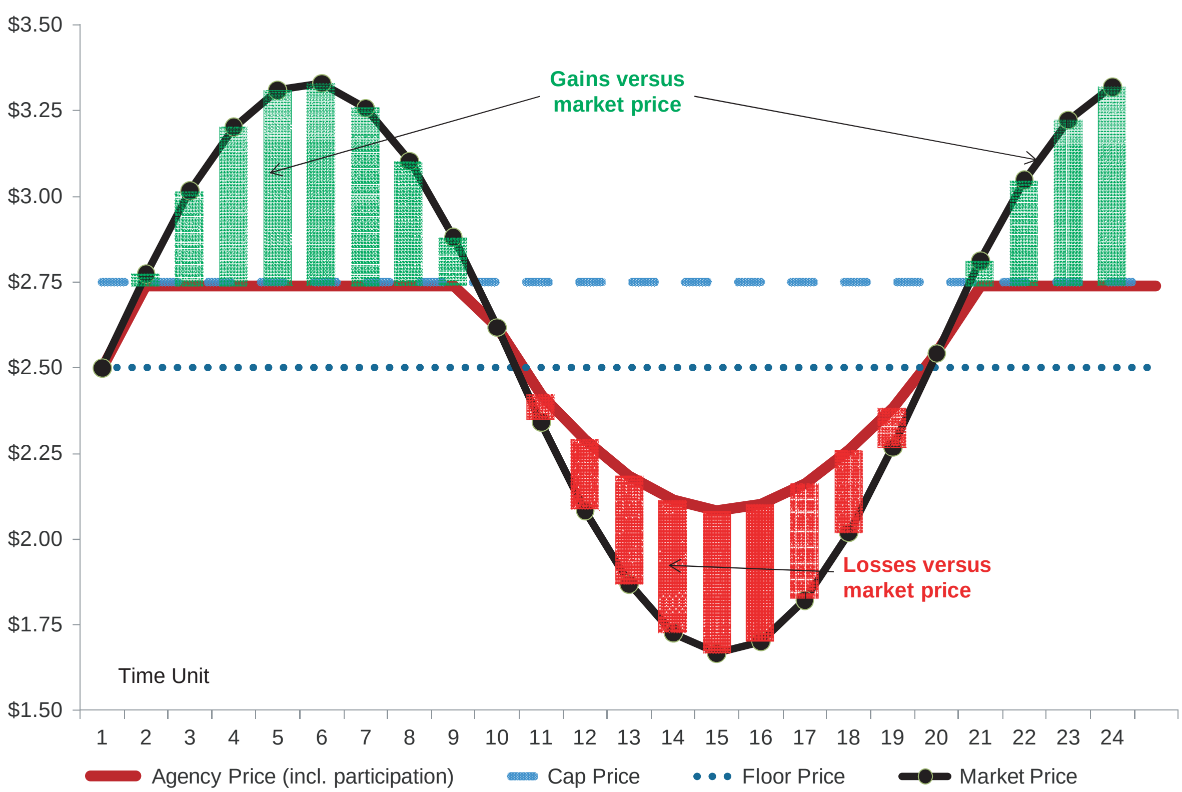
4.1.3 Participating Cap

A participating cap is similar to a collar in that both strategies offer ceilings on upward price movements and trade away some benefits from falling prices in order to reduce or eliminate premium costs. Rather than employing a firm price floor like a collar strategy, a participating cap trades away a percentage of every downward price decline. The result is an instrument that creates a firm cap on upward price movements and allows unlimited, but partial, participation in downward price movements. If structured properly, a participating cap may not require a premium payment. This type of strategy is called a no-cost participating cap.

The participation rate—the percentage of fuel price declines that the transit agency enjoys—will depend on a number of factors, including the level of the price ceiling relative to the spot price (i.e., how far out-of-the-money the strike price is). Raising the price ceiling will increase the participation rate if price declines. Figure 4.5 shows the performance of a 24-month, no-cost participating cap with a strike price of $2.75 per gallon and a 50% participation rate versus a hypothetical range of market prices.

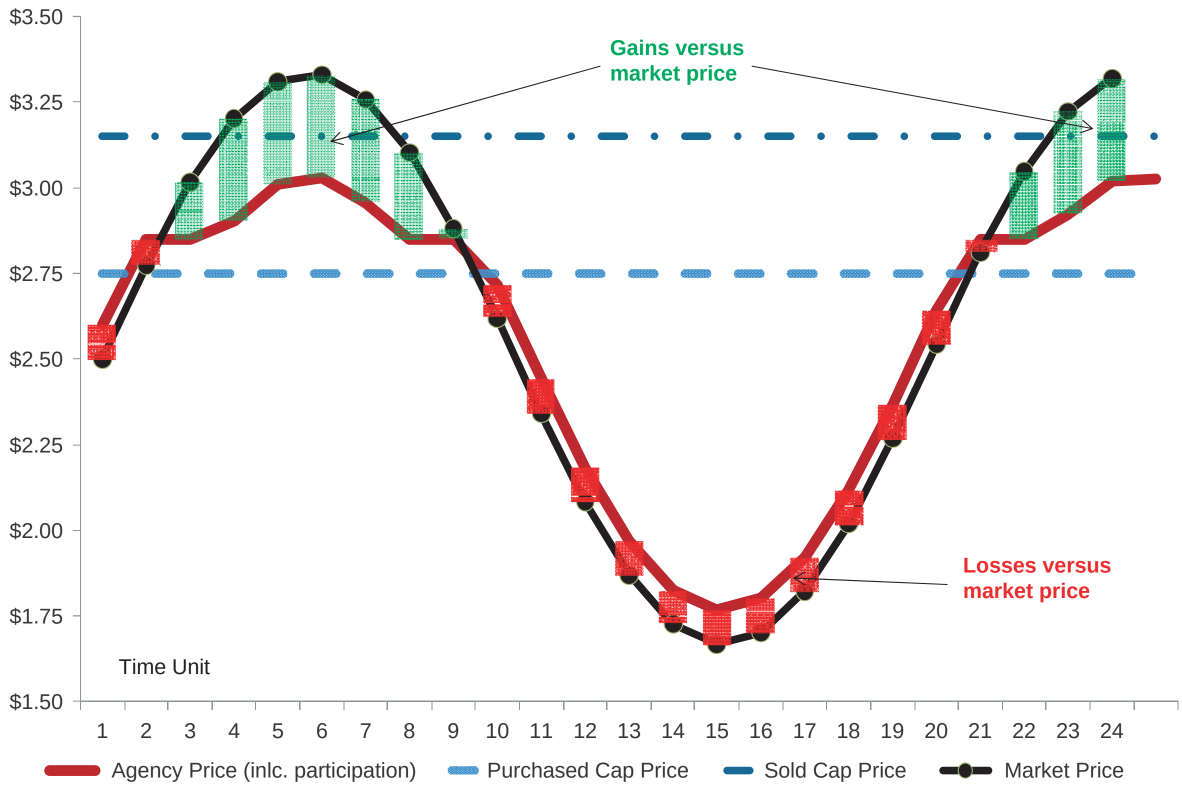
4.1.4 Price Corridors

A price corridor is an options strategy that reduces but does not eliminate premiums by only capping prices up to a certain point. As with a traditional cap, a price corridor places a ceiling on price movements above a specific price. Under the price corridor strategy, however, prices are only capped up to a certain point, beyond which they are permitted to keep rising. If structured properly, this strategy reduces the premium payment required under a traditional cap-price options strategy and provides the buyer with adequate price protection under most price scenarios. However, the



Source: SAIC

Figure 4.5. No-cost participating cap: gains and losses versus hypothetical market (spot) prices.



Source: SAIC

Figure 4.6. Price corridor: gains and losses versus hypothetical market (spot) prices.

strategy does not give full protection under extreme price scenarios. Figure 4.6 shows how the price corridor would perform versus the market over a 24-month period given a hypothetical range of market prices.

4.1.5 Advantages

The biggest advantage of cap-price instruments over forward-price instruments is that they permit greater flexibility to customize a transit agency's fuel price risk profile. Forward contracts simply lock-in a price over a set period of time and provide profit when prices go up and losses when prices go down. By contrast, cap-price instruments, such as those that can be created with options, allow transit agencies to limit exposure to upward price risk while at the same time benefit from favorable, downward price movements. Although this win-win risk profile requires a premium, it allows transit agencies to more carefully customize their hedging strategies to their operations. Additionally, innovative use of options strategies can reduce or eliminate premium requirements.

The ability to take advantage of falling prices is an important consideration for transit agencies. Often, a transit agency must report to and be held accountable to its board of directors, state and local governments, and the greater public. Many of these stakeholders do not fully understand why an agency chooses to hedge its fuel prices and are suspicious of the financial instruments used to hedge. If these stakeholders learn that the agency is significantly overpaying for its fuel compared to the market price, support for the agency's hedging program may waver. Hedging with options that allow an agency to take advantage of falling prices can help a transit agency avoid public backlash and encourage continued support for the hedging program.

Hedging with options avoids adverse basis risk (see Info Box: Basis Risk), even if the options used are based on a price index that does not always closely track local prices. Adverse basis risk is less of an issue with call options because options contracts never lose and can only pay out money when exercised.

Like all financial hedging instruments, options can be bought and sold independently of the physical fuel contract, thus allowing the agency to continue its best practices for fuel procurement.

4.1.6 Disadvantages

Hedging with options is an extremely costly alternative. Several agencies interviewed for this guidebook had considered cap strategies at some point, but decided against them due to their extremely high cost relative to other hedging strategies. Options prices are driven by several factors (see Info Box: Options Pricing). A 12-month-forward, European-style call option in a moderate volatility price environment could cost roughly 10 cents per gallon, compared with fees of 0.1 to 0.15 cents per gallon for futures contracts and 1 to 5 cents per gallon for OTC swap contracts with similar maturities. Furthermore, call options typically require premiums to be paid upfront on all the contracts purchased. Funding this large, upfront cash premium may be a difficult task for a transit agency if cash is not readily available. However, premium costs for cap-price instruments can be reduced or eliminated through the use of innovative cap-price products, such as collars, participating caps, and price corridors.

A related disadvantage is that premiums for long-dated call options are much more expensive than those for short-term options, which limits the time horizon over which an agency can affordably hedge its fuel consumption. Even in low volatility price environments, longer-dated options are expensive because they give volatility more time to work. The buyer of an option can only benefit from increased volatility because it increases the probability that the option will be in-the-money at maturity. This heavy premium on longer-dated call options makes it impractical to use options strategies for longer-term hedging strategies.

Although no-cost options strategies, such as collars and participating caps, could theoretically eliminate some of the cost-related disadvantages of hedging with options, no transit agency interviewed for this guidebook has had experience employing them. This may be due to the inherent complexity of hedging with options. Some hedging advisers that work with transit agencies believe that options are generally good products for hedging in terms of the risk profiles that they allow the buyer to create, but believe that employing such strategies is difficult in practice. Many transit agencies are suspicious of complexity and prefer hedging with more straightforward instruments such as futures or swaps. Some transit agencies interviewed for this guidebook expressed interest in using option strategies, but wanted to see how their experience with futures or swaps fared before moving on to more complex instruments.

4.1.7 Summary

Table 4.1 summarizes the main advantages and disadvantages of hedging with over-the-counter options.

4.2 Web-Based Fuel Price Protection Programs

An alternative to options for cap-price protection is to hedge with web-based fuel price protection programs such as Pricelock, Fuel Bank, or MoreGallons. In discussing these web-based programs, there is no intent to promote one program over the other, or to promote the named

Table 4.1. Options: advantages and disadvantages.

Advantages	Disadvantages
➢ Ability to take advantage of downside price movements and customize the agency's price risk profile ➢ Adverse basis risk is not an issue ➢ Premiums can be avoided under certain options strategies (collars, participating caps, price corridors)	➢ High cost for caps compared with futures and swaps ➢ Extremely high prices for further-out options make long-term hedge protection prohibitively expensive ➢ More complex than swaps or futures and can be difficult for management to embrace

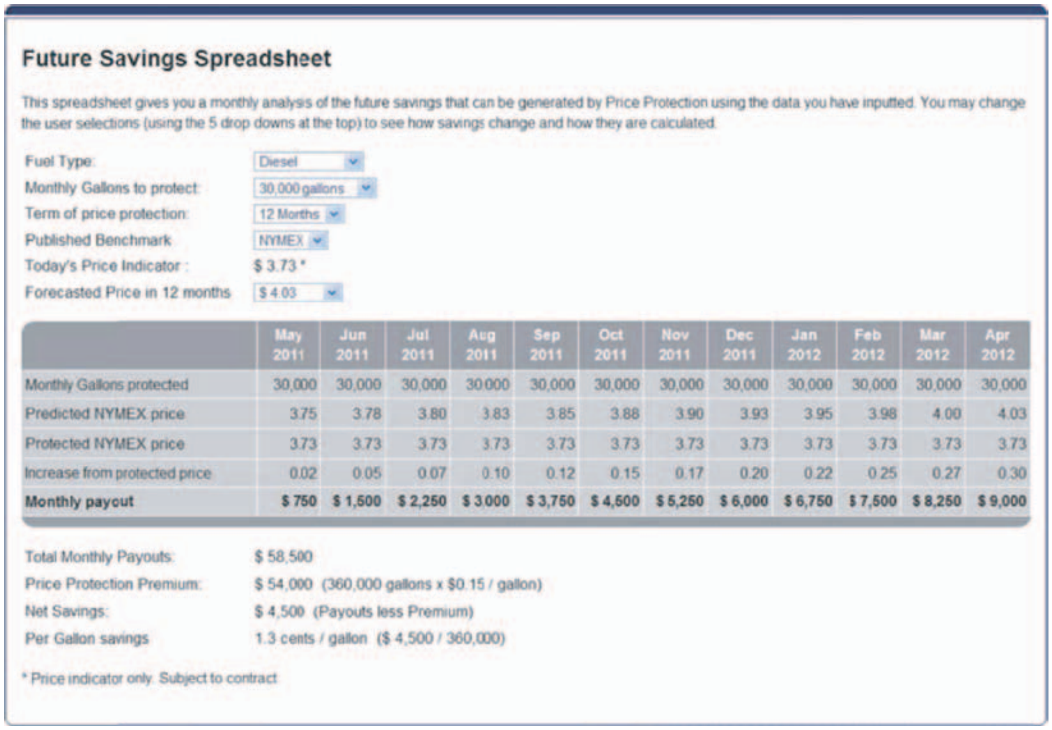
programs over other, unnamed programs. Rather, the purpose of this discussion is to provide a better understanding of how these types of programs work and provide examples of the ways in which they differ. The differences attributed to these programs in the discussion below are based upon the program descriptions at the time of this writing, and should be verified by anyone considering use of the programs.

The price protection services offered by web-based fuel price protection programs differ, but in general, their niche is among operators of small and medium-sized fleets that do not have the minimum monthly fuel consumption to utilize other hedging instruments. These companies enter small-volume hedging agreements with many customers and then pool these hedging requirements to achieve volume that can be hedged in financial markets. The companies reviewed in this guidebook provide this hedging service for refined petroleum products, particularly diesel and gasoline. The value of these companies is to bring hedging products to small-volume consumers and to simplify the often complex process of entering financial hedging agreements. Each company maintains a user-friendly website with videos and articles explaining how the programs work, and provides online platforms that allow the user to obtain instant quotes and purchase protection. Figure 4.7 shows the price protection plan fee (i.e., premium) calculator on Pricelock's website and Figure 4.8 shows the fuel savings spreadsheet on Fuelbank.com.

All of the web-based price protection programs reviewed for this guidebook require customers either to prepay for fuel or to pay an upfront premium for price protection. After the customer has purchased coverage, the customer will never be obligated to pay money to the web-based program. The customer receives money from the program if the price exceeds the price cap, but does not pay money to the program when prices fall. By requiring upfront payments for service, these web-based programs avoid having to assess the credit risk of each user, thus making it

Source: Pricelock.com

Figure 4.7. Protection plan fee calculator on Pricelock's website.



Future Savings Spreadsheet

This spreadsheet gives you a monthly analysis of the future savings that can be generated by Price Protection using the data you have inputted. You may change the user selections (using the 5 drop downs at the top) to see how savings change and how they are calculated.

Fuel Type: Diesel
Monthly Gallons to protect: 30,000 gallons
Term of price protection: 12 Months
Published Benchmark: NYMEX
Today's Price Indicator: $ 3.73 *
Forecasted Price in 12 months: $ 4.03

	May 2011	Jun 2011	Jul 2011	Aug 2011	Sep 2011	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012
Monthly Gallons protected	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Predicted NYMEX price	3.75	3.78	3.80	3.83	3.85	3.88	3.90	3.93	3.95	3.98	4.00	4.03
Protected NYMEX price	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73
Increase from protected price	0.02	0.05	0.07	0.10	0.12	0.15	0.17	0.20	0.22	0.25	0.27	0.30
Monthly payout	**$ 750**	**$ 1,500**	**$ 2,250**	**$ 3,000**	**$ 3,750**	**$ 4,500**	**$ 5,250**	**$ 6,000**	**$ 6,750**	**$ 7,500**	**$ 8,250**	**$ 9,000**

Total Monthly Payouts: $ 58,500
Price Protection Premium: $ 54,000 (360,000 gallons x $0.15 / gallon)
Net Savings: $ 4,500 (Payouts less Premium)
Per Gallon savings: 1.3 cents / gallon ($ 4,500 / 360,000)

* Price indicator only. Subject to contract

Source: Fuelbank.com

Figure 4.8. Fuel savings spreadsheet from Fuelbank.com.

possible to extend coverage to any number of consumers regardless of volume. Although this type of protection is similar in nature to insurance, the web-based programs are not insurance products. Customers hedging with these programs do not need to submit receipts or fill out paperwork in order to be reimbursed when fuel prices increase.

The web-based fuel price protection programs reviewed for this guidebook essentially provide products with risk profiles similar to purchased call options (caps). Although the types of protection that these web-based programs provide are similar, there are several key differences. One important difference is the method in which the cap price and premiums are set:

- **Pricelock** allows the customer to set its own cap price and choose a protection term ranging from 3 to 12 months. Pricelock charges a premium depending on how far out-of-the-money the cap price is and the length of the protection term.
- **Fuel Bank** offers its customers fixed premiums for 3-month, 6-month, or 12-month protection terms, but varies the cap price to fit those premiums to the market environment. During highly volatile price environments, the cap price will be higher than in a low-volatility market.
- **MoreGallons** simply sets the cap price as the national average price on the day the protection is purchased (i.e., an at-the-money strike price). All fuel is fully prepurchased.

While both Pricelock and Fuel Bank provide coverage for periods ranging from 3 to 12 months, MoreGallons offers an unlimited term of protection. However, unlike its two competitors, MoreGallons requires customers to fully prepurchase every gallon of fuel they wish to cover and charges fees for every transaction as well as an annual membership fee for joining the program. Fuel Bank and Pricelock, on the other hand, simply charge an upfront premium to cover their risks. Table 4.2 compares the characteristics of the three web-based price protection companies reviewed for this guidebook.

Table 4.2. Comparison of web-based fuel price protection programs.

	Pricelock	Fuel Bank	MoreGallons
Instrument Type	Cap-price	Cap-price	Cap-price
Fuel Types Covered	Gasoline, diesel	Gasoline, diesel, jet fuel, aviation gasoline, marine fuel, heating oil	Gasoline, diesel
Minimum Monthly Volumes (gallons)	50	1	100
Protection Term	3-12 months	3, 6, or 12 months (longer terms available on request)	No limits (pre purchased gallons never expire)
Price Index	US Dept. of Energy	NYMEX or USDept. of Energy	MoreGallons Price Index
Cap Price	Set by customer	Set by Fuel Bank	Price on day customer prepurchases
Premium (cents per gallon [c/g])	Varies depending on strike price	3 months: 15 c/g 6 months: 20 c/g 12 months: 25 c/g	None
Other Fees	None	None	Purchase fee: 6 c/g Cash-in fee: 6 c/g Annual Member fee: $79
Fuel Pre-Payment	No	No	Yes
Method of Payment	Monthly settlements	Monthly settlements	Cash-in prepurchased gallons on website within 30 days of physical fuel purchase

Sources:
Pricelock: https://www.pricelock.com/
Fuel Bank: http://www.fuelbank.com/
MoreGallons: http://www.moregallons.com/

4.2.1 Advantages

Web-based fuel price protection programs that offer cap-price protection share some of the same advantages as purchased call options (caps). As with call options, web-based fuel price protection programs offer protection from upside price movements while allowing the buyer to enjoy the benefits of downside movements. Unlike options, however, web-based programs do not offer customized no-cost risk management strategies, such as collars or participating caps.

The major advantage of web-based fuel price protection programs is that they allow small and medium-sized transit agencies to engage in hedging. These consumers typically do not have the minimum volumes to buy a single futures contract (42,000 gallons per month) or the required volumes to enter an over-the-counter swap agreement. In addition, these programs typically simplify the fuel hedging process, thus requiring less internal knowledge-building and management for transit agency employees. Furthermore, because these web-based programs are less complex than options, it may make it easier to convince the transit agency's upper management and board to approve use of the program.

Finally, as with other financial hedging strategies, web-based programs allow a transit agency to continue its fuel procurement best practices for its physical fuel supply contract.

4.2.2 Disadvantages

Web-based fuel price protection programs that offer cap-price protection share many of the same disadvantages as purchased call options. As with purchased call options, the premiums for

Table 4.3. Web-based fuel price protection programs: advantages and disadvantages.

Advantages	Disadvantages
➢ Small and medium-sized fuel consumers can use these programs ➢ Ability to take advantage of downside price movements ➢ Adverse basis risk is not an issue ➢ User-friendly websites take the complexity out of hedging and may make it easier to obtain management approval	➢ Extremely high cost on a per-gallon basis compared with hedging directly with financial products ➢ Counterparty risk exists with price protection provider ➢ Basis risk may lead to ineffective hedging

hedging with web-based programs are extremely high relative to hedging with other tools, such as OTC swap or futures contracts. The premiums, which are paid up front to Pricelock and Fuel Bank, can be prohibitively high for a small, cash-strapped transit agency. MoreGallons does not charge a premium under its program, but does require the buyer to fully prepurchase all of its gallons and charges an effective fee of 12 cents per gallon hedged (6 cents for purchases and 6 cents for cashing in). Unlike Fuel Bank and Pricelock, MoreGallons is not quite a cap-price instrument in the traditional sense. Because the volumes under the MoreGallons program are fully prepurchased, there is an incentive to use them at some point in the future even if the spot price is above the strike price. If a customer does not cash in its prepurchased gallons, the customer loses the full amount of the purchased gallon. However, the customer is not forced to turn its gallons at any specific maturity so it has the ability to decide when it wishes to cash in its gallons.

Web-based fuel price protection programs expose the customer to counterparty risk. The customer trusts the web-based program to cover the risks it undertakes on the financial market. If the company running the web-based price protection program goes bankrupt, it is unlikely that the company will make good on its obligations to its customers.

Web-based hedging products are generally standardized in terms of the index used for reference pricing, thus introducing basis risk, particularly for transit agencies in markets where the fuel price does not correlate well with the index price used by the program. However, adverse basis risk (the risk that the customer will lose money on physical purchases and its hedging instrument) is not a serious concern because the instruments do not lose money when prices fall. Nonetheless, opposite movements in the local physical fuel price and the price index used by the web-based program could lead to a situation where the hedging program is ineffective (i.e., the customer loses money on physical purchases, but the hedging instrument does not offset the loss).

4.2.3 Summary

Web-based fuel price protection programs are an attractive option for small and medium-sized transit agencies that do not require adequate amounts of fuel to hedge directly using financial markets. In exchange for an upfront payment, these programs allow the transit agency to protect itself against price increases while still benefiting from downward price movements. However, web-based price protection programs are more expensive on a per-gallon basis than hedging with financial products, expose the customer to counterparty risk in the event that the protection provider goes bankrupt, and expose the customer to some degree of basis risk that could lead to ineffective hedging (see Table 4.3).

SECTION 5

Summary and Evaluation of Hedging Instruments

Evaluating the effectiveness and appropriateness of different hedging instruments is not a straightforward exercise. A one-size-fits-all solution for managing energy price risk does not exist. Instead, the most appropriate hedging instrument will depend on a number of factors unique to the agency, such as fuel type, fuel consumption, location, cash availability, and budget profile. This section reviews the major hedging instrument types, lists and defines the objective criteria used to evaluate hedging instruments, presents a matrix to compare each hedging instrument against the objective criteria, and presents a general assessment of the appropriateness of different hedging instruments based on key characteristics of different types of public transit agencies. If properly used, each hedging instrument presented in this analysis has the ability to effectively hedge fuel price and budget volatility. This analysis does not seek to evaluate the profitability of hedging with each instrument (i.e., the value of hedging versus doing nothing) because such outcomes are heavily dependent on market timing issues. The risks and rewards of different timing strategies are discussed later in this guidebook.

5.1 List of Hedging Instruments

The five major categories of hedging instruments evaluated in this section are briefly summarized below:

- **Firm, Fixed-Price Supply Contracts**—The agency agrees to a physical fuel supply contract with a fixed volume and fixed price.
- **Exchange-Traded Futures Contracts**—The agency enters long paper futures contracts on the NYMEX for the future delivery of fuel at today's market prices. These contracts pay out when the price of fuel rises. The agency continues to purchase physical fuel at variable market prices from local fuel suppliers. Price changes in the physical supply contract are offset by gains and losses in the futures portfolio, thus creating a synthetic fixed price.
- **Over-the-Counter Swap Contracts**—These contracts work the same way as futures contracts except that instead of NYMEX, the counterparty is a bank, a financial institution, or the trading desk of a large energy company. These contracts can be customized in terms of reference price, quantity, and other factors.
- **Options Contracts**—Often compared to insurance, these contracts give the agency the right, but not obligation, to purchase or sell fuel at a future date at a predetermined price in exchange for a premium payment. Options contracts can be entered on NYMEX or over-the-counter with a bank or financial institution. The most common type of protection is a purchased call option, which places a cap on upward price movements in exchange for a premium. Call options can be combined with other options contracts to create customized risk profiles, such as collars, participating caps, and price corridors. Some of these structures reduce or eliminate the required premium payment.

- **Web-Based Price Protection Programs**—Online programs such as Pricelock, Fuel Bank, and MoreGallons offer fuel price protection that is similar to a cap (purchased call option). These programs offer standardized hedging instruments and are typically more expensive than hedging directly with financial products, but are particularly well-suited for small and medium-sized transit agencies that do not consume enough fuel to hedge directly.

5.2 Objective Criteria

Each tool described in the previous section can, if used properly, either fix the agency's price of fuel or place a ceiling on the agency's price of fuel. In other words, each of these hedging instruments is an effective tool to achieve a transit agency's primary energy price risk management goal: budget certainty. Although budget certainty is the primary goal of a hedging program for transit agencies, many agencies may also evaluate hedging instruments on one or more of the following goals (criteria):

- **Type of Protection**—There are two major types of hedge protection: forward-price instruments that essentially fix the price of fuel for future delivery and cap-price instruments that place a ceiling on upward price movements, but allow the user to benefit from falling prices.
- **Fuel Types Covered**—While most hedging instruments cover diesel and gasoline, hedging products for other fuel types may be limited.
- **Reference Price Used**—Different hedging instruments use different fuel price indices to calculate payouts. If the index referenced by the hedging instrument does not correlate well with the transit agency's actual fuel price, the hedge may be ineffective or even cause the agency to lose money on both physical fuel purchases and on the hedge instrument (a danger known as adverse basis risk).
- **Minimum Fuel Volumes**—Due to the standard size of exchange-traded contracts and the time and effort needed to negotiate counterparty agreements, most financial hedging products require a minimum contract size.
- **Cost (Premiums and Fees)**—Cost consists of both premium payments to compensate the protection providers for undertaking risk and fees for services provided by banks, financial institutions, and other intermediaries.
- **Collateral Requirements**—Some hedging instruments require collateral to be posted to ensure that money or assets are available in the event that one party owes the other money.
- **Time to Reconcile**—Different hedging products reconcile accounts at different intervals. Some products allow the buyer to reconcile on any day while others reconcile within specific intervals. If the time to reconcile for the transit agency's hedging instrument does not match the timing of its fuel purchases, the agency is exposed to calendar basis risk—the risk that the price at which it buys fuel will be different on the day it buys fuel than on the day it reconciles its hedging account.
- **Counterparty Risk**—The risk that a counterparty in a hedging agreement will default on its obligations under the agreement is known as counterparty risk.
- **Impact on Fuel Procurement Best Practices**—Some hedging instruments may require the user to change how it purchases its physical fuel supply, thus altering the user's best practices for competing and achieving the lowest price.
- **Negotiation Time**—Some hedging instruments require longer and more complex negotiations with counterparties.
- **Ability to Exit Hedge Contracts**—In some cases it may be advantageous to exit hedged positions that are losing money relative to the market price. Not all hedging instruments allow for easy exit.
- **Complexity**—In many cases simple hedging programs (programs that are simple to understand and implement) are easier to develop and implement and require less internal resources to get off the ground.

Other goals that a transit agency might have—including minimizing overall fuel budget costs by timing the market, minimizing day-to-day management of the program, and reducing the likelihood of a bad outcome (i.e., overpaying for fuel)—are a function of the agency's timing strategy of entering and exiting hedge positions and are discussed in a separate section covering hedge timing.

5.3 Matrix of Hedging Instruments by Criteria

Table 5.1 evaluates the five main categories of hedging instruments discussed in this section along with a set of objective criteria defined in the previous section. Each agency must weigh the advantages and disadvantages of each instrument against its own requirements and risk tolerance.

Table 5.1. Comparison of major hedging instruments.

Criteria	Fixed-Price Contracts	NYMEX Futures	OTC Swaps	Options (OTC or NYMEX)	Web-based Price Protection
Protection Type	Forward	Forward	Forward	Cap	Cap
Fuel Types Covered	All (Availability depends on supplier)	Refined Petroleum Products, Natural Gas, and Electricity are available for some markets	All (Availability depends on counterparty)	All (Availability depends on counterparty)	Refined Petroleum Products
Reference Price Used	Local Index	NYMEX (New York Harbor for most fuels)	Custom	OTC: Custom NYMEX: NYMEX (New York Harbor for most fuels)	Pricelock: US DOE Fuel Bank: US DOE or NYMEX MoreGallons: MoreGallons Index
Minimum Volumes (gal. per month)	Varies	42,000	~84,000-168,000	OTC: ~84,000-168,000 NYMEX: 42,000	Pricelock: 100 Fuel Bank: 1 MoreGallons: 1
Cost (Premiums & Fees)	High (~$0.15-$0.20 per gallon)	Low (~$0.001-$0.0015 per gallon)	Moderate (~$0.01-$0.05 per gallon)	Cap: High (varies) No-Cost Collar or Participating Cap: No premiums	Pricelock: High Fuel Bank: High MoreGallons: Prepayment + $0.12 per gallon + $80 annual fee
Collateral Requirement	Credit	Margin Account (performance bond) ~15% of contract value	Credit (cash margin, collateral negotiable)	None (upfront premium covers all risk)	Pricelock: None Fuel Bank: None MoreGallons: All gallons fully pre-purchased
Time to Reconcile	N/A	Any trading day (but contract expires at end of preceding month)	Custom (usually once per month)	OTC: Custom (usually once per month) NYMEX: Any trading day	Pricelock: monthly Fuel Bank: monthly MoreGallons: any trading day
Counterparty Risk	Yes	None	Yes	OTC: Yes NYMEX: None	Yes
Impact on Procurement Best Practices	Yes (competition limited to fixed-price fuel suppliers)	None	None	None	None
Negotiation Time	Low	Low (standard broker agreements, positions backed by collateral)	High (must negotiate collateral, credit triggers, force majeure clauses, etc.)	OTC: High NYMEX: Low	Low
Ability to Exit Hedge Contracts	None (must take-or-pay for all fuel)	Yes (can exit contracts but must settle outstanding contracts at mark-to-market cost)	Yes but difficult (terms must be renegotiated before prematurely terminating or offsetting a contract)	Yes (buyer chooses whether or not to execute the contract)	Yes (buyer chooses whether or not to execute the contract)
Complexity	Low	Medium	Medium	High	Low

Table 5.2. Transit agency examples and best-fit hedging.

Type of Agency	Best-Fit Hedging Instrument
AGENCY 1 • Mid to large-sized diesel consumer • Located on East Coast • Purchase price is highly correlated with New York Harbor price for No. 2 fuel oil • Cash available for collateral	A strategy utilizing **NYMEX futures** would achieve hedging goals with no counterparty risk, little adverse basis risk, and low transaction fees.
AGENCY 2 • Mid to large-sized diesel consumer • Located on West Coast • Purchase price not well correlated with New York Harbor price for No. 2 fuel oil • Cash available for collateral	A strategy utilizing **OTC swaps** would achieve the agency's hedging goals without exposing the agency to adverse basis risk. Transaction fees are moderate and the agency will take on some counterparty risk.
AGENCY 3 • Mid to large-sized diesel consumer • Legally banned from investment activity, which is defined to include hedging	A strategy utilizing **firm, fixed-price supply contracts** would achieve hedging goals without violating the ban on investment activity. The agency would pay a high premium over the spot price. The agency might have to change its fuel procurement best practices, potentially limiting competition for its fuel contracts.
AGENCY 4 • A small agency with consumption of less than 42,000 gallons of diesel per month.	A strategy utilizing **web-based price protection program** would achieve the agency's hedging goals, but would have high transaction costs/premiums and would expose the agency to counterparty risk.
AGENCY 5 • Mid to large-sized diesel consumer • Will go bankrupt if prices increase by 25% • For competition reasons, the agency must be able to pass through lower costs if fuel prices fall • Willing to pay a premium to have upside protection.	A strategy utilizing **options** contracts could achieve the agency's hedging goals, particularly the use of a purchased call option (cap). If the premium is too high, the agency can trade some downside price benefits to create a no-cost collar or participating cap.
AGENCY 6 • Mid to large-sized natural gas consumer • Located in the Midwest • Purchase price not correlated well with the NYMEX price for gas delivered at the Henry Hub in Louisiana.	A strategy utilizing **OTC swaps** would achieve the agency's hedging goals without exposing the agency to significant adverse basis risk. Transaction fees are moderate and the agency will take on some counterparty risk.

5.4 Appropriateness of Hedging Instruments

There is no one-size-fits-all hedging instrument for every transit agency. Each agency must evaluate its own fuel procurement process, price risks, and price management goals before selecting the hedging instrument that best fits the agency's needs. However, a few broad generalizations can be drawn. Table 5.2 presents several examples of public transit agencies that vary by size, location, fuel type, cash availability, and budget profile. For each agency, the best-fit hedging instrument is identified and brief comments are given regarding the risks and rewards of the utilizing the selected instruments. It should be noted that the best-fit instrument varies with financial stability of the agency—a condition that is not fully detailed in Table 5.2. Under some circumstances, multiple strategies may be appropriate, but this level of detail is beyond the scope of this guidebook.

SECTION 6

Hedging Level, Duration, and Timing

6.1 Hedge Level

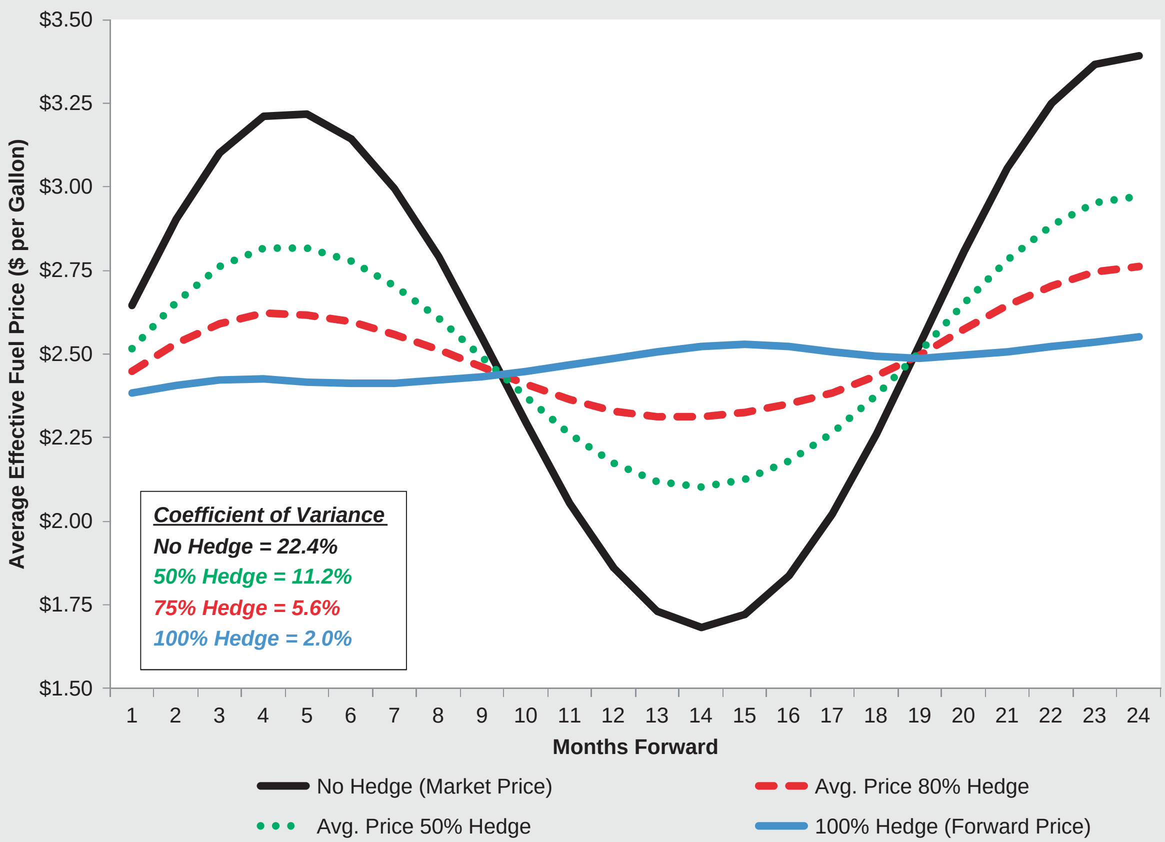
Determining the level of coverage is an important component of a hedging strategy. The level of hedging coverage is typically expressed as a percentage of total fuel consumption and ranges from 0% (no coverage) to 100% (full coverage). As noted earlier in this guidebook, hedging involves mitigating exposure to fuel price risk by taking an offsetting position by using financial instruments. If a transit agency chooses to take offsetting positions in excess of 100% of its fuel consumption, this activity would not be considered hedging and would instead be considered a speculative investment. The primary goal of hedging is to achieve budget certainty; therefore, the closer an agency's protection ratio is to 100%, the greater the budget certainty. Thus, in theory, a 100% protection ratio maximizes budget certainty (see Info Box: Levels of Coverage and Fuel Price Variability).

Although hedging 100% of fuel consumption minimizes budget variance and maximizes budget certainty, many organizations hedge less than 100% in order to avoid overhedging. Overhedging occurs when an organization consumes less fuel than it had originally anticipated, leaving it with more protection than it needs and exposing it to the risk that losses on some of its hedge positions will not be offset by gains in physical fuel purchases. The result of overhedging is a net monetary loss and an increase in budgetary fuel spending. Overhedging not only adds variability to the organization's fuel budget, but may also have accounting and legal implications if the surplus hedging positions can be considered speculative investments. Thus, fuel consumption variability and the potential for overhedging need to be considered when deciding the level of hedging coverage.

As a conservative rule to avoid overhedging, an organization should not hedge more per month than its expected fuel consumption for the month less two standard deviations (a 95% confidence interval). Fuel consumption variability will differ from industry to industry and for some industries, may vary from month to month. An airline company that runs more flights when the economy is good and runs fewer flights when the economy struggles may experience significant fuel consumption variability from year to year or even month to month and may not be comfortable hedging a high percentage of its fuel consumption. A public transit agency, on the other hand, typically runs vehicles on fixed routes and schedules and has highly predictable fuel consumption on a monthly and annual basis. As a result, public transit agencies typically hedge a higher percentage of their fuel consumption. Many transit agencies interviewed for this guidebook reported levels of hedging coverage in the range of 80% to 90% of fuel consumption. Some transit agencies in northern climates reported hedging a lower percentage of fuel consumption (50% to 60%) during winter months due to the chance that snow or ice storms could shut down public transportation for an extended period of time and reduce fuel volumes.

Info Box: Levels of Coverage and Fuel Price Variability

Figure 6.1 compares the volatility of a futures contract strategy with differing levels of hedging coverage (50%, 75%, and 100%) over a hypothetical range of prices covering two years forward. If the organization does not hedge and buys fuel at the market price, the organization's average fuel prices would have a coefficient of variance of 22.4%. The coefficient of variance is measured as the standard deviation of the fuel price divided by the mean fuel price. Hedging 50% of fuel consumption reduces this variance by half to 11.2% and hedging 75% of fuel consumption reduces the variance to 5.6%. Hedging 100% of fuel consumption reduces the variance to just 2%, a level of variance that takes into account the seasonal variance in the futures curve.



Source: SAIC

Figure 6.1. Impact of percentage hedged on fuel price variability.

6.2 Hedge Duration

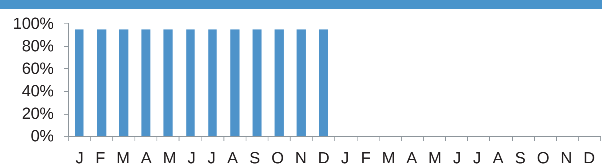
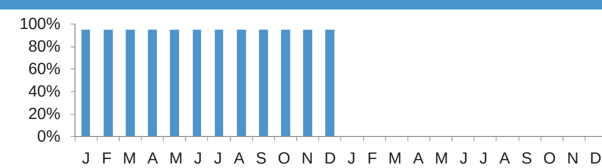
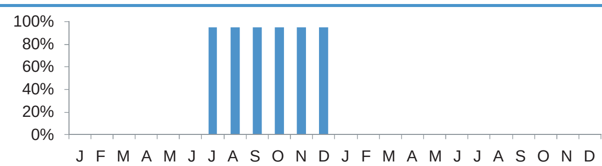
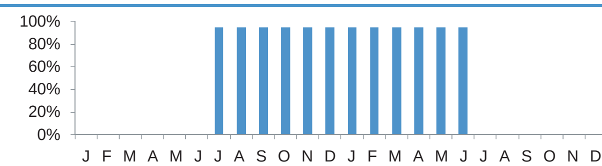
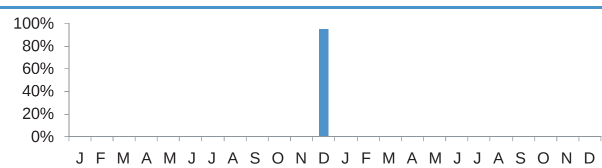
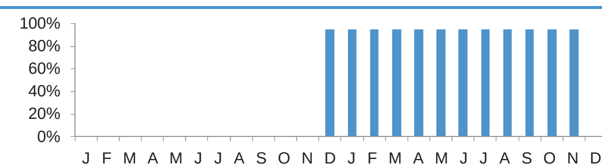
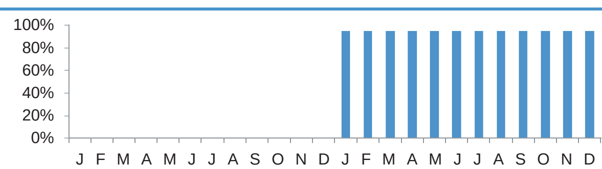
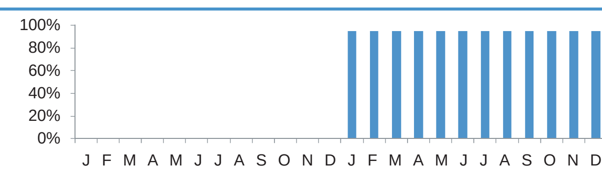
The hedging duration is the length of time that the transit agency is protected from fuel price increases and is expressed in months of forward fuel consumption. Often, a transit agency will choose to align its hedge duration with the agency's budget term (the period of time over which the agency's budget is set and fixed). For instance, if an agency's budget term is annual, the agency will seek to hedge 12 months of consumption. If the agency's budget term is biannual, the agency may hedge 24 months forward. Setting the hedge duration in this way ensures budget certainty over the period when budget certainty is desired. Hedging over the budget term also protects against overhedging in the event that the transit agency makes downward adjustments in its fuel consumption between budget periods (due to the cancellation of bus routes, for instance).

Hedging durations may be set on either a fixed or rolling basis. Hedging over a fixed duration means hedging specifically within the budget period. For instance, if a budget ends in December 2010, December 2010 is the furthest out month that can be hedged until the new budget period begins in January 2011. Hedging on a fixed basis means that the hedge duration shortens as hedge contracts mature within the budget period. Hedging on a rolling basis, on the other hand, means that the hedging duration continually moves forward as current month hedging contracts mature. For instance, an agency that hedges 12 months forward on a rolling basis can hedge out to December 2011 once the December 2010 contract matures and to January 2011 when the January 2010 contract matures. Table 6.1 compares the forward hedge profiles of two hedging policies that allow 12-month forward hedging of 95% of fuel consumption. One policy does allow hedging within a fixed term while the other allows hedging forward on a rolling basis.

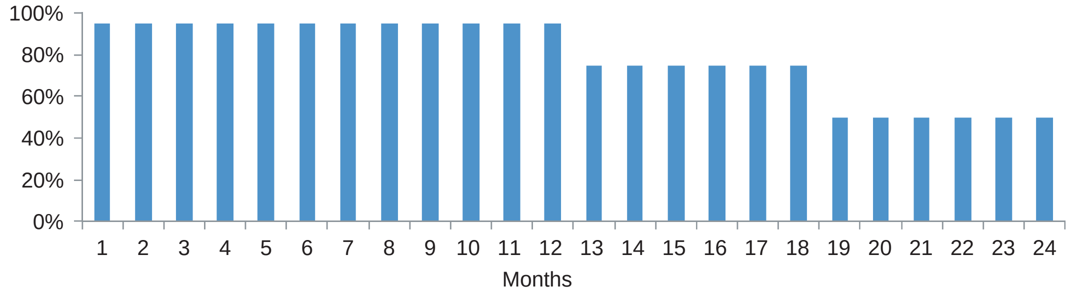
Table 6.1 shows that while both policies cover 12 forward months at the beginning of the year, the fixed-term hedging policy has shorter forward hedge duration for every month during the year except for January. The decision between hedging within a budget term and hedging forward on a rolling basis will have an impact on the types of hedge timing strategies that are employed.

Another duration strategy that is sometimes used is a tapered approach that allows a higher level of hedge coverage in the near months and a lower level of hedge coverage for further out months. For instance, a transit agency may allow maximum hedge protection of 95% during the forward 12 months, maximum protection of 75% from 12 to 18 months, and maximum

Table 6.1. 12-month forward hedge durations: budget constrained versus rolling.

Month	12-Month Forward Hedge (Fixed Duration)	12-Month Forward Hedge (Rolling Duration)
Jan 2011		
Jun 2011		
Nov 2011		
Jan 2012		

Source: SAIC



Source: SAIC

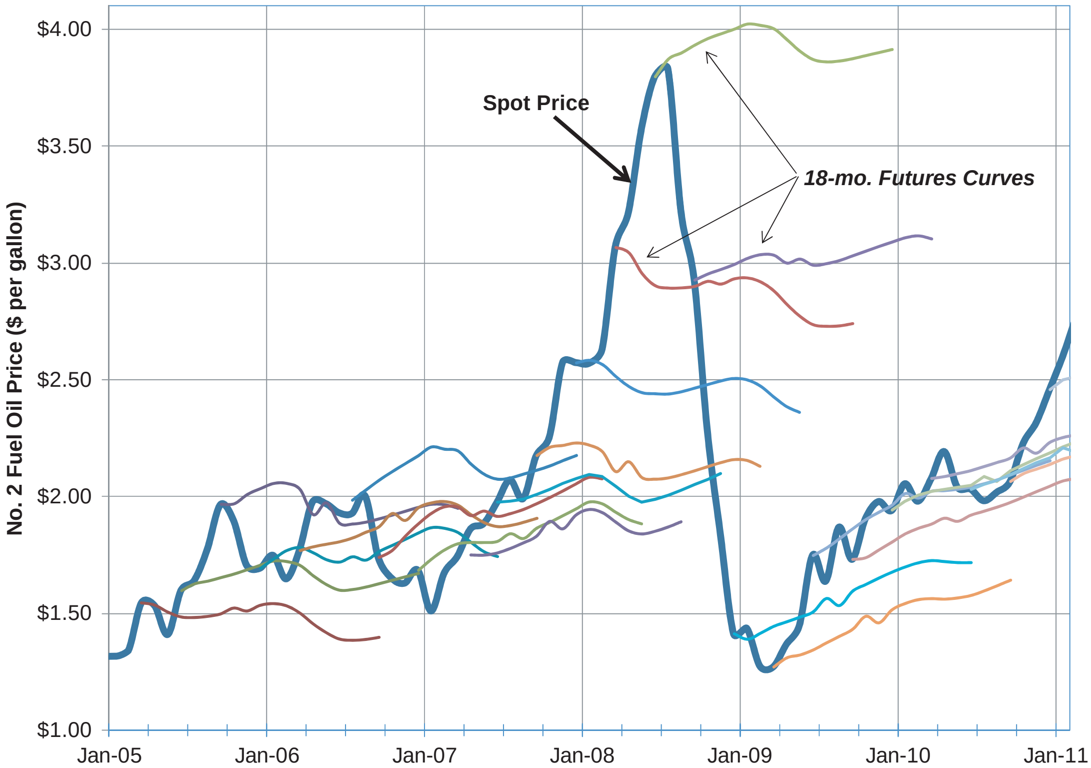
Figure 6.2. Hedge duration with a tapered approach.

protection of 50% from 18 to 24 months. A tapered approach allows for low prices to be locked-in further into the future when desirable, but avoids the risk of overhedging in the event that fuel consumption is reduced. Figure 6.2 shows a hedge profile that follows a tapered approach, with the amount that can be hedged declining based on hypothetical agency rules that limit the maximum percentage that can hedged beyond 12 months and 18 months into the future. Tapered approaches can be employed on either a fixed or rolling basis.

Although 12-month to 24-month hedging durations are effective at achieving budget certainty over the budget term, they may not be optimal for minimizing fuel prices over the long run. Short hedging terms prevent a transit agency from taking advantage of low price environments when it may be advantageous to lock-in fuel prices for several years forward. This was a problem faced by Houston METRO in early 2009 when oil prices fell below $40 per barrel. Houston METRO saw an opportunity to purchase fuel price swaps for 2010 and 2011 at bargain prices. The agency's hedging staff quickly began arranging swaps as far out as 24 months—the maximum horizon allowed under the agency's hedging policy. As the current months matured, Houston METRO would purchase the next 24-month forward swap. In this depressed price environment, it would have been advantageous for Houston METRO to hedge further out—perhaps 36 or 48 months—to lock-in low fuel prices for years to come.

6.3 Hedge Timing

Timing is one of the most significant determinants of the outcome of a hedging strategy. Hedging, if done properly, will often achieve its primary goal: budget certainty. However, budget certainty is not the only goal sought by transit agencies. Typically, transit agencies also seek to hedge at a price that will be lower than the market price or at least to avoid hedging at price that will be significantly above the market price. When and how agencies enter hedging positions will have an effect on whether the hedged price will be favorable or unfavorable to the market price. Timing issues are particularly important for forward-price contracts because they lock-in a price, thus preventing the agency from benefiting from price declines. For instance, amid runaway fuel prices in the first half of 2008, several transit agencies rushed to hedge their fuel price exposure, fearing that prices would continue to rise or stay high for the foreseeable future. However, prices peaked in summer 2008 and then precipitously declined as the economy entered a deep recession. Many of the agencies that had locked-in prices with forward-price instruments in early 2008 ended up paying record fuel prices in 2009 despite a crash in spot market fuel prices. Of course, avoiding such an outcome would have required that the transit agencies (or their fuel consultants) have the ability to predict when and how future fuel prices would peak and crash. Figure 6.3 plots No. 2 fuel oil spot prices (the thickest line) against the 18-month forward futures price curve at three-month



Source: SAIC, CME Group

Figure 6.3. No. 2 fuel oil spot prices and NYMEX futures curves (2005–2010).

intervals from 2005 through 2010. The futures curves are indicated by the thin lines extending from the spot price series.

Figure 6.3 illustrates the importance of timing. Hedging with an 18-month strip in June 2007 at roughly $2.00 to $2.10 per gallon would have avoided the extreme run-up in spot prices over the second half of 2007 and into 2008. Hedging with an 18-month strip a year later in June 2008 would have had the opposite effect of locking-in prices at roughly $3.80 to $4.00 per gallon and tremendously overpaying for fuel versus the market price over the second half of 2008 and through 2009. Clearly, both timing and the amount of fuel hedged at any particular point are important considerations.

Three strategies for hedge timing and amount are discussed below. Single-point decisions haves the highest risk of hedging at too high of a price. The other two strategies, managed timing and rule-based, seek to mitigate the risk of hedging at too high a price.

6.3.1 Single-Point Decisions

A single-point decision is when an agency hedges its entire fuel consumption (or its target hedge level) for a long duration at a single point in time. While single-point decisions are used for firm, fixed price (FFP) contracts, they generally are not used with other forms of hedging. The risk with hedging using single-point decisions is that the resulting hedge (or FFP contract) may be extremely favorable or extremely unfavorable compared with how market prices actually develop. This risk has become increasingly acute in recent years as volatility in energy markets has increased. Reducing energy price risk below that of FFP contracts is often a goal, and single-point decisions are not likely to achieve this. Managed timing and rule-based hedging strategies generally have greater potential to reduce energy price risk.

6.3.2 Managed Timing Strategy

A managed strategy—sometimes known as a dynamic, situational strategy—is a timing strategy that seeks to reduce the average fuel price by adjusting elements of the hedging strategy (instrument, level, duration, etc.) in response to changes in the market environment and price outlook. Managed strategies require the transit agency to hire a full-time, in-house energy market expert or to hire a consultant with the relevant expertise to operate the hedging program. Managed strategies involve constantly watching developments in energy markets and taking a view on where prices are headed. Depending on the market outlook, the hedging program manager might choose to adjust components of the agency's hedging strategy. For instance, if the manager sees a bubble developing in energy prices and expects an imminent collapse, the manager might suggest locking-in prices for only a short period (i.e., three months) rather than hedging further out. Alternatively, the manager might suggest hedging with a cap-price instrument (such as a cap or a collar) instead of a hedging with forward-price instrument if cap premiums are favorable. In a period of record low fuel prices, the expert might suggest hedging out as far as possible. During some periods, such as rapidly falling prices, the expert may suggest remaining unhedged and waiting for prices to stabilize before hedging again.

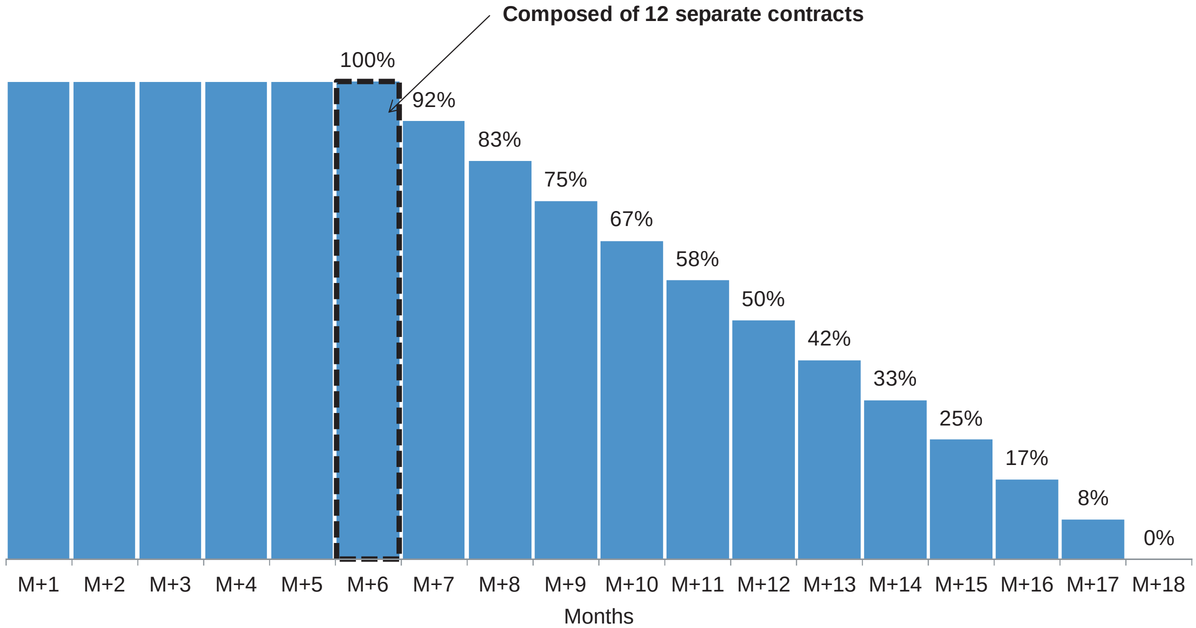
The underlying assumption with managed timing strategies is that it is possible to beat the market through market intelligence and savvy use of hedging instruments. This strategy does not require managers to predict the direction of the market at every juncture. Instead, the manager must be able to understand market environment and assess the risks and opportunities of hedging at different points in time. This strategy is underpinned by the belief that making adjustments in response to changing market outlooks will result in better performance than single-point decision strategies that are not based on expert market analysis. The value of managed strategies versus single-point decisions cannot be easily evaluated as the philosophy and quality of managed strategies will differ from program to program. Regardless of the value of these programs, managed hedging strategies typically require higher fees (if managed by an outside hedging consultant) or greater time and investment devoted to maintaining an in-house hedging program. The potential value of a managed hedging program must be weighed against the extra costs and the track record of the program manager.

6.3.3 Rule-Based Timing Strategy

Rule-based timing strategies—sometimes known as schedule-based or continuous hedging strategies—seek to mitigate the risk of hedging at too high of a price by entering hedge positions at preset intervals, levels, and durations. Rather than adjusting the strategy in response to changing market outlooks, a rule-based timing strategy uses a single strategy that is designed to mitigate the risk of hedging too high regardless of the market environment. Rule-based strategies involve splitting hedging purchases into multiple transactions that are spaced over time so that no single transaction is driving the hedged price. This is sometimes called a dollar-cost averaging strategy and can be achieved by entering hedge positions at regular intervals to cover a small share of the next year's fuel purchase.

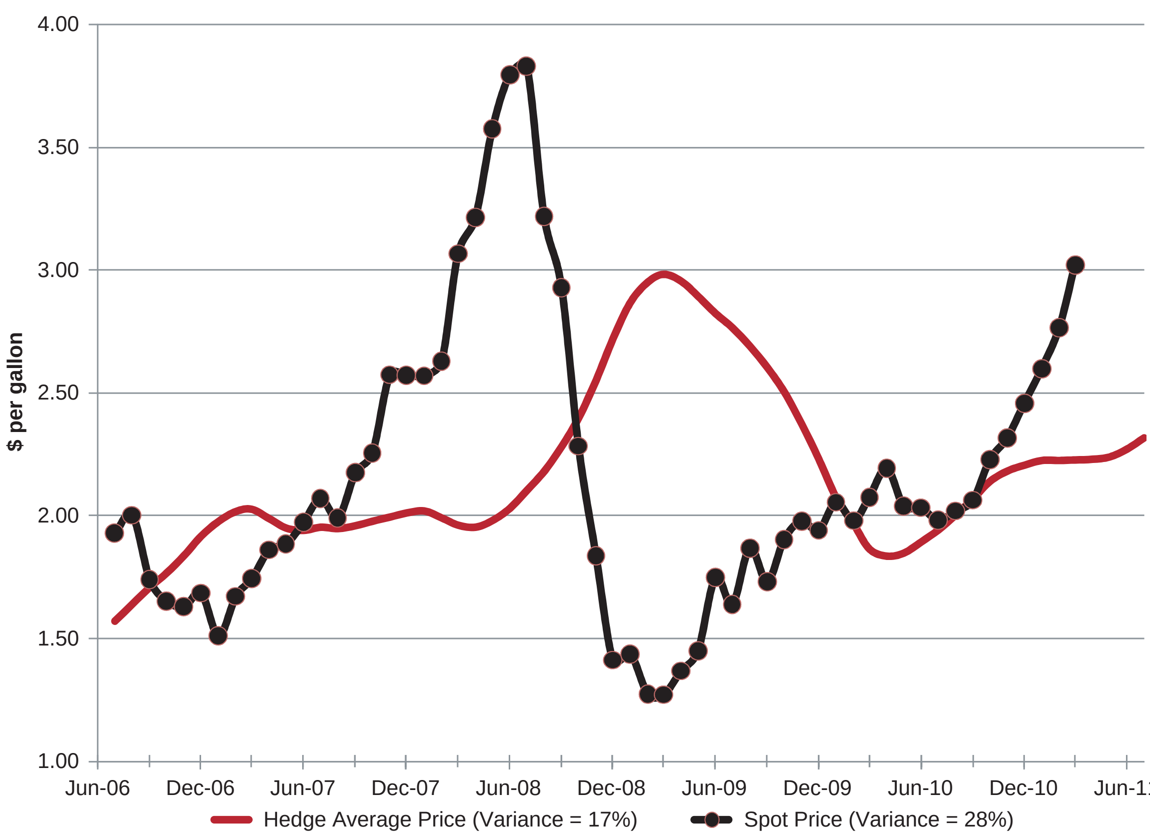
For example, a rule-based strategy might call for hedging 100% of the next forward six months of fuel consumption using 12 separate No. 2 fuel oil futures contracts with progressively fewer contracts covering 7 to 17 months forward (11 contracts covering the seventh forward month, 10 contracts covering the eighth forward month, etc.). Figure 6.4 shows the coverage profile of this hypothetical strategy. As the current month's contract matures, a new contract is purchased for each forward month in order to maintain the coverage profile.

Figure 6.5 backcasts the performance of this type of rule-based strategy against actual spot fuel prices from June 2006 through June 2011. The resulting fuel price is a 12-month moving average of the current month's future price with a 6-month time lag.



Source: SAIC

Figure 6.4. Coverage profile of rule-based timing strategy.



Source: SAIC, NYMEX

Figure 6.5. Average prices from rule-based hedging strategy backcast against actual spot No. 2 fuel oil prices.

Figure 6.5 shows that this strategy does not lock-in a fixed price level for the long term as with single-point hedging decisions. Overall, between June 2006 and December 2010, the hedged and spot price series have roughly the same mean at $2.15 per gallon. In other words, the rule-based hedging strategy does not fare any better or worse on average than purchasing fuel at the spot price. However, the rule-based hedge strategy price series has a variance of 17%, which is significantly less than the spot price variance of 28%. Furthermore, under the rule-based hedging strategy the price for any given month is fully established six months in advance and is between 50% and 92% established from 12 to 7 months in advance. Overall this equates to roughly 85% of the agency's price being established over the next 12 months at any given point in time. Of course, this is only one example of rule-based strategies. Other strategies might use different parameters and would fare differently under the same circumstances.

One noticeable disadvantage to the rule-based (continuous) hedging strategy is that it is more effective for organizations with larger fuel consumption. This is because each futures contract covers 42,000 gallons. This means that an organization that consumes 504,000 gallons per month (around six million gallons per year) can average each month's prices with 12 contracts. However, smaller organizations would use fewer contracts to cover each month, thus reducing the averaging effect and increasing the risk of overpaying for fuel versus the spot price by hedging at the wrong time. For instance, an organization consuming 168,000 gallons per month (around two million gallons per year) would need to hedge each month with four contracts, perhaps spacing these purchases three months apart. Because the intervals are greater, the averaging effect would be less effective.

6.3.4 Hybrid Strategies

Managed and rule-based strategies are not necessarily mutually exclusive and a transit agency might incorporate components of both into its overall strategy. For instance, even if an agency follows a rule-based approach, it may have some leeway to make decisions on when hedging positions are entered within each interval, even if each hedging interval is predetermined by a schedule. For example, if an agency's strategy calls for a new contract for December 2011 to be purchased in June 2011, the agency has a one-month period (about 20 trading days) in which to lock-in a price. Given the volatility of energy markets in recent years, prices can fluctuate significantly from day to day or even hour to hour within a trading day. Thus, keeping a watch on energy markets and managing the timing aspect of purchases will be involved to some degree in any rule-based strategy even if the strategy restricts hedging decisions to a particular time window. Conversely, a managed hedging strategy may at times call for the agency to adopt a rule-based approach under certain market environments. For instance, a hedging manager might choose to employ a rule-based strategy for several months in a low-volatility market that exhibits no clear upward or downward price trend.

SECTION 7

Delivery Price Risk Management

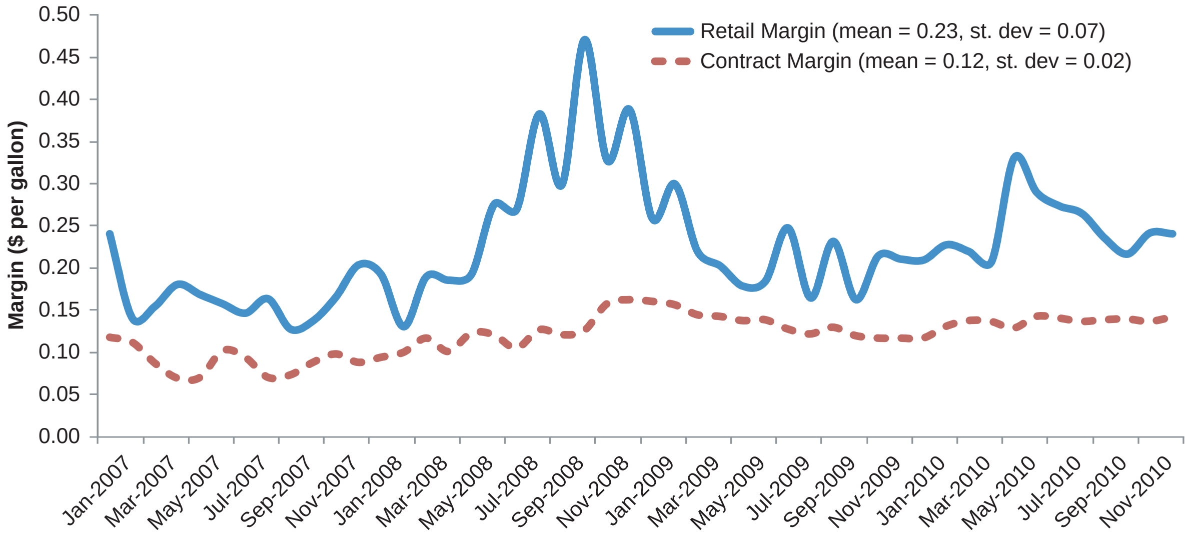
Delivery price risk management is the practice of employing competition and contracting strategies to lower the level and volatility of fuel prices. The delivery price, which is often known as the supplier's margin, is the cost of distributing and marketing fuel from the rack facility at the refinery or pipeline terminal to the transit agency's fueling station plus the supplier's profit. In retail markets, the supplier's margin is the difference between the retail fuel price and the supplier's fuel acquisition cost (the wholesale price). The national average retail supplier margin for ULSD was approximately 23 cents per gallon from January 2007 through December 2010. The coefficient of variance around the mean value was roughly 32% with a low of 13 cents per gallon and a high of 47 cents per gallon. The high value, which was nearly double the average for the period, was reported in October 2008 when supply shortages occurred in several states after Hurricane Ike disrupted refinery production and pipeline infrastructure in the Gulf Coast, causing a ripple effect throughout the eastern United States.

There are three strategies that transit agencies can use to manage delivery price risk: long-term, fixed-margin contracting; competition strategies; and market power strategies. These strategies can be used in combination with one another to reduce the supplier's margin and manage delivery price risk from extreme market events such as the one that followed Hurricane Ike. These strategies and their impacts are discussed in the subsections below.

7.1 Long-Term, Fixed-Margin Contracting

The simplest way to manage the fluctuations in the retail fuel supplier margin over the course of a year is to avoid buying fuel at the retail price and instead buy fuel under a long-term contract (one year or longer) with a fixed margin. Long-term contracting is advantageous for two reasons. First, it allows the transit agency to negotiate a fixed margin, which reduces one source of variability in the agency's fuel costs over the contract term and helps to prevent temporary spikes in the supplier's margin such as the one that occurred following Hurricane Ike. Second, long-term contracting increases the volume and thus the monetary value of the transit agency's supply contract, making it more attractive for individual fuel suppliers. This improves the transit agency's bargaining position and makes competition strategies easier to implement (see Section 7.2).

Long-term contracting has the potential to lower some of the transit agency's fuel price volatility. Figure 7.1 compares the national average retail diesel margin with the national average margin for commercial buyers with long-term contracts by month from 2007 through 2010. Figure 7.1 also presents the standard deviation—the absolute value of the average deviation from the mean—for each margin. This figure shows that not only was the margin for long-term contracts significantly lower—an average of 12 cents versus 23 cents per gallon—but contract margins were also much more stable. Of course it is important to note that long-term bulk



Source: SAIC, Energy Information Administration: http://www.eia.doe.gov/dnav/pet/pet_pri_dist_dcu_nus_m.htm

Figure 7.1. US average ULSD supplier margins by type, 2007 to 2010.

contracts typically involve the delivery of fuel to a fueling station that is owned and operated by the transit agency. The cost per gallon of operating this station has not been added to the long-term contract margin and will vary from agency to agency based on a number of factors. Nevertheless, having a long-term contract with a fixed margin would have protected the transit agency from the blow out in the retail margin that occurred in the second half of 2008.

Long-term, fixed-margin contracting is particularly effective at managing fuel price risk when combined with the hedging of commodity price risk. This combination leads to a situation where the delivery price (supplier's margin) is fixed via contract and the floating rack price is synthetically fixed using hedging instruments. This combination produces a fully fixed price. Long-term, fixed-margin contracting protects the transit agency from price spikes caused by local supply and demand characteristics while hedging protects the agency from spikes in the commodity price of the fuel caused by global forces.

7.2 Competition Strategies

Competition strategies are designed to increase competition among fuel suppliers in order to lower the supplier's margin and achieve lower overall fuel prices. There are two major types of competition strategies: calls for tenders and reverse auctions. Competition strategies typically work well with long-term, fixed-margin contracts because they allow suppliers to compete to provide services at the lowest margin. Before we discuss competition strategies, however, it is important to explain the two main components of the supplier's margin: the supplier's cost structure and the supplier's profit. Differences in these components will cause margins to vary from supplier to supplier. Typically, the supplier's profit is the only component of the supplier's margin that is negotiable.

Differing cost structures are the primary reason for differences in fuel suppliers' margins. Given equal profit margins, a more efficient cost structure will lead to a lower supplier's margin. For instance, a supplier that delivers fuel to a transit agency over a shorter distance will have a more efficient cost structure than a supplier shipping fuel from farther away and will thus be able to supply fuel to the transit agency at lower cost. Larger fuel suppliers are also more likely to have more efficient cost structures because they are able to leverage economies of scale to provide lower per-unit distribution costs. Suppliers' margins may also be lower in areas that do not require diesel fuel to be blended with biodiesel. Fuel distribution is more expensive when biodiesel blending is required because fuel distributors must make two stops—one at the petroleum product rack and one at the biodiesel rack. Biodiesel cannot be blended in pipelines or in bulk storage tanks due to its corrosive effect on those infrastructures, so before delivery of the finished, blended product to the transit agency, the biodiesel is typically splash blended in the fuel supplier's delivery trucks while en route to its destination. Identifying fuel suppliers with the lowest cost structures will often lead to lower suppliers' margins.

The profit margin is a smaller component of the supplier's overall (cost plus profit) margin, but has a higher potential for negotiation. Competition strategies—those strategies that seek to increase competition to lower prices—are likely to be more successful for large transit agencies that operate in markets with multiple fuel suppliers. These strategies are likely to be less effective for smaller transit agencies with little market power, particularly if the agency is located in a market dominated by one or two fuel distributors. In these areas, market power strategies—strategies that seek to lower prices by increasing the transit agency's bargaining power—are more likely to be effective (see Section 7.3).

7.2.1 Call for Tenders

A call for tenders (or call for bids) is a contracting practice in which a transit agency invites qualified fuel suppliers to bid for the transit agency's fuel supply contract. The call for tenders may be an open tender, which is open to all fuel suppliers that can guarantee performance under the contract, or a restricted tender, whereby the tender is preceded by a pre-qualification questionnaire in which the transit agency assesses the ability of the fuel supplier to supply the requested quality and volume of fuel and assess the financial stability and overall counterparty risk of the supplier. Public transit agencies are familiar with employing calls for tenders (open or restricted) as it is a common requirement for government entities and entities that receive direct state or local government funding.

7.2.2 Reverse Auctions

Another innovative competition strategy is to hold a reverse auction. Reverse auctions are known by many different names, including: service auction, procurement auction, sourcing event, and e-sourcing. At the federal level, this purchase method has been promoted in several memoranda issued by the Office of Management and Budget (OMB).[13,14]

The roles of buyers and sellers are reversed in a reverse auction. In a normal auction, buyers bid to purchase a good or service. Competition among buyers drives the price up and the buyer with the highest bid at the end of the auction purchases the item at the highest bid price. In a reverse auction, multiple sellers compete to sell a good or service to a single buyer by bidding successively lower prices. The seller that bids the lowest price must provide the service at that price. In the context of fuel procurement, a transit agency would hold a reverse auction for its fuel supply contract. Among other terms, the contract would specify the type of fuel, the volume

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[13]Office of Federal Procurement Policy, Office of Management and Budget, May 12, 2004. "Utilization of Commercially Available Online Procurement Services." As viewed at: http://www.whitehouse.gov/sites/default/files/omb/assets/omb/procurement/publications/online_procurement_051204.pdf

[14]Office of Federal Procurement Policy, Office of Management and Budget, July 18, 2008. "Effective Practices for Enhancing Competition." As viewed at: http://www.whitehouse.gov/sites/default/files/omb/procurement/memo/enhancing_competition_071808.pdf

of fuel, and the timing and location of fuel deliveries required by the agency. The fuel supplier that can guarantee performance of the contract at the lowest bid wins. In terms of a fuel supply contract that follows index plus margin pricing, fuel suppliers compete to bid the lowest margin. Because fuel suppliers can bid multiple times and because the bids of other suppliers are known, a reverse auction has the ability to achieve a lower supplier's margin than a call for tenders. Typically the winner of the auction will be the fuel supplier that has the lowest combination of cost structure and profit margin.

According to a recent study, firms that employ reverse auctions as a strategic management technique increased bids by 20 to 30 times the normal number of bids and consistently received price reductions of 12% to 24%.[15] For fuel procurement, this would equate to a 12% to 24% reduction in the supplier's margin, not a reduction in the overall fuel price (index plus margin). Thus, a public transit agency that pays a fixed supplier's margin of 12 cents per gallon might expect to reduce the supplier's margin by 1.5 cents to 3 cents by holding a reverse auction. Recent reverse auction success stories include:

- In 2004, the Baltimore Regional Council Purchasing Committee (BRCPC) achieved a 42% savings in the transportation of 4.9 million gallons of heating oil to nine school districts, reducing transportation costs from 10 cents per gallon to 5.9 cents per gallon.[16]
- In 2007, the state of Connecticut achieved a savings of more than $20 million for 570 million kWh of electricity for the 2009 fiscal year, a savings of roughly 3.5 cents per kWh hour.[17]
- FedBid, the company that manages reverse auctions for federal procurement, says its systems can produce savings of up to 15% on commodities.[18]

There are several types of reverse auction models that a transit agency can employ: outsourced, consultative, software, and active server pages (ASP). An outsourced model is a fully managed model in which an outside company runs the reverse auction. The company provides this service free to the buyer, but requires suppliers to pay fees of 1% to 2% of the contract price. Presumably, suppliers will pass some this cost to the transit agency in the form of slightly higher bids. A consultative model involves hiring a consultant to set up an in-house system for performing reverse auctions. Consultants charge a fee for this service and will often take a percentage of the buyer's savings. Other approaches include installing special reverse auction software or using a web-hosted ASP application. The outsourced and consultative models are typically only appropriate for high-value contracts ($50,000 to more than $1 million) whereas software and ASP models typically have no limit on contract size. Because the value of annual fuel contracts for public transit agencies is typically large, all models are able to provide effective solutions. Figure 7.2 from sorcity.com compares and contrasts the characteristics, fees, purchases, and total time to establish each of available reverse-auction models.

One potential disadvantage of reverse auctions (or any competition strategy where the sole consideration is price) is that the winning bidder may have been able to bid the lowest price because it reduces its cost structure in ways that may be dangerous or detrimental to the supply operation. For instance, a low-cost bidder may reduce its cost structure by failing to adequately maintain its fuel delivery vehicles or storage tanks, potentially leading

[15] Farris, Ted, et al. "Reverse Auction Case Studies Effectively & Ethically Lowering Supply Chain Costs." Institute on Supply Management. http://www.ism.ws/files/Pubs/Proceedings/JFGuillemaudFarrisRoth.pdf (April 14, 2011).
[16] "eSchoolMall Helps Maryland Schools Save Money: Reverse Auction Provides Significant Reduction in Energy Costs." Eschoolmall.com. July 26, 2004. http://www.eschoolmall.com/customer_feature.asp?pdate=7/26/2004 (April 14, 2011).
[17] "Reverse Auction Yields Savings of $20M." The State of Energy. CT Office of Policy and Management. Jan/Feb. 2008. http://www.ct.gov/opm/lib/opm/pdpd_energy/the_state_of_energy_jan-feb08.pdf (April 14, 2011).
[18] "FedBid Inc. has been awarded a five-year contract to provide online reverse auction services for federal agencies." AllBusiness.com. January 13, 2006. http://www.allbusiness.com/technology/technology-services/857536-1.html (April 14, 2011).

	Outsourced Model	Consultative	Software	ASP
Characteristics:	Fully Managed Professional Support No software Ready in Hours	Consulting Engagement Lengthy process Software install Ready in Months	Software purchase Implementation Internal support Team Ready in Months	Web hosted app. Internal support Team Ready in Months
Fees:	None for buyer Supplier pays 1-2%	Consulting fees Percent of savings	Software & Maint. License fees Internal support Cost	License fees Training Time/Cost Internal Support Cost
Purchases:	All products and services, $50k - $millions	Strategic $tens of millions+	Various products Various prices	Various products Various prices
Total Time Est:	Several hours up to weeks	Several weeks up to months	Several days up to months	Several days up to weeks

Third Party Independence

Source: sorcity.com

Figure 7.2. Reverse-auction models available online (from sorcity.com).

to off-spec fuel. For this reason, a transit agency may need to subject fuel distributors to a very thorough prequalification process before allowing them to participate in the reverse auction. Alternatively, the transit agency might evaluate the winning bidder after the reverse auction. If the bidder fails to meet the transit agency's requirements, the contract can be awarded to the second-lowest bidder (contingent on this bidder also meeting the agency's qualifications).

Reverse auctions have the potential to significantly reduce the supplier's margin, but this strategy may only be effective in large markets with multiple, qualified fuel suppliers. For instance, a reverse auction with only one bidder would be ineffective. At a minimum, two qualified bidders are needed in order to realize savings from reverse auctions. As a result, competition strategies are often more difficult to employ for electricity and natural gas procurements because these services are frequently provided by local monopolies.

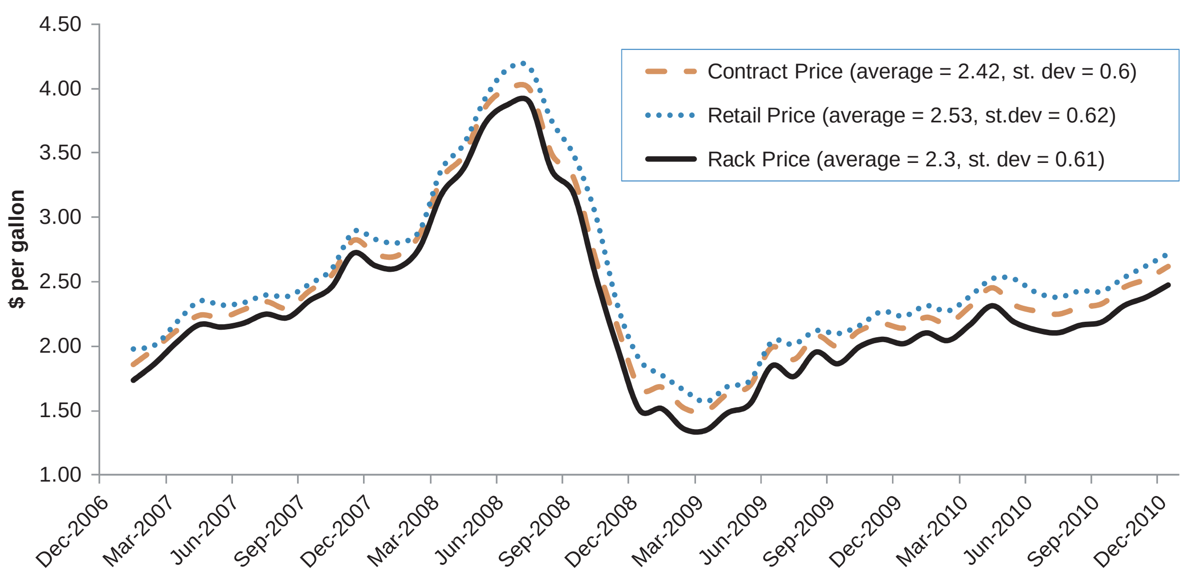
7.3 Market Power Strategies

Market power strategies are designed to increase a transit agency's bargaining power, typically by combining its fuel consumption with other consumers. By itself, a small transit agency with relatively low fuel consumption may not have significant market power and would be a price taker in supplier negotiations. Furthermore, a small transit agency might not have its own onsite fueling station and would have to rely on retail fueling stations. Because the agency lacks bargaining power, it may have to pay the retail price for fuel or receive only a small discount from the retail supplier. By practicing pooling, cooperative buying, or demand aggregation with other consumers, the transit agency and its partners can increase their bargaining power and obtain volume discount pricing. Prime candidates for pooling are other government agencies in the transit agency's jurisdiction (police, fire, schools, etc.) or other transit agencies in nearby cities or counties that have similar requirements with respect to the types of fuels consumed.

Despite their attractiveness as a tool for increasing market power, fuel purchasing cooperatives can be difficult to form. They require not only identifying partners with similar consumption needs but also convincing each partner to give up some degree of independence in order to realize price savings as an combined entity. Creating a cooperative may be very difficult if each partner is already locked into a firm-volume (guaranteed purchase) contract. Even once a cooperative has been legally formed, bargaining can be difficult if one or more of the cooperative's partners has a low credit rating. Although the fuel supplier may sign only one contract, it must assess the risks of default for each of the cooperative's partners. The credit risk of each partner may be a particular issue if the cooperative is seeking a fixed-price contract (one in which the fuel supplier hedges fuel volumes for the cooperative) because it may be tempting for one of the cooperative's partners to default on the contract if the retail price falls below the fixed price. Some of the complications of forming a fuel purchasing cooperative can be alleviated by using a demand pooling company. Demand Pooling Global Services (DEPO), a Dallas-based firm, runs an online platform that allows users to enter their specifications to form a cooperative. DEPO clients are primarily state and local governments.

7.4 Effectiveness of Delivery Price Risk Management Strategies

Long-term contracting, competition strategies, and market power strategies can each be used independently or in combination to minimize the supplier's margin and achieve a lower overall fuel price. The effectiveness of any one strategy is difficult to assess because of differences between transit agencies and the markets in which they operate. On average, a transit agency would have saved roughly 11 cents per gallon if it used long-term contracting instead of retail purchasing of ULSD from 2007 through 2010, although this figure does not take into account the cost of operating a transit agency-owned fueling station. Nevertheless, long-term contracting is likely to reduce prices overall and also protect the transit agency from extreme spikes in the supplier's retail margin.



Source: SAIC, Energy Information Administration: http://www.eia.doe.gov/dnav/pet/pet_pri_dist_dcu_nus_m.htm

Figure 7.3. Historical comparison of US average ULSD contract, retail, and rack prices, 2007 to 2010.

Competition strategies such as calls for tenders and reverse auctions can also achieve greater savings on the supplier's margin. From 2007 to 2010, the ULSD price savings from reverse auctions were in the range of 1.5 cents to 3 cents per gallon. It is difficult to measure the savings from forming a fuel purchasing cooperative, but it is likely to be considerable for smaller-volume transit agencies.

Delivery price risk management strategies are effective at lowering a transit agencies overall fuel costs. However, these strategies do little to impact fuel price volatility. In other words, these strategies will lower the overall cost compared to doing nothing, but they do little to increase budget certainty, which is the primary goal of energy price risk management. Figure 7.3 shows the performance of long-term ULSD contract prices for commercial buyers, ULSD retail prices, and ULSD wholesale rack prices from January 2007 through December 2010. Contract prices were significantly lower by roughly 11 cents for contract prices versus retail prices, but contract prices had only a slightly smaller standard deviation (60 cents versus 62 cents). Commodity price risk management is a more effective strategy for mitigating fuel price volatility and ensuring budget certainty.

SECTION 8

Program Implementation

Fuel price hedging programs are the most effective way for a public transit agency to manage fuel price volatility. Starting a hedging program can be a long and involved process depending on the type of strategy and instrument and the types of financial activity that the agency is authorized to participate in. This section of the guidebook is designed to provide an overview of the major steps required to implement a fuel price hedging program. These steps are presented in the general order in which they should be undertaken, although work on many of these steps can run concurrently. General timeframes are provided for each step based on interviews with several transit agencies and consultants, but these timeframes can vary significantly from agency to agency. A hedging program can be implemented in a couple of months or several years depending on a number of factors including the complexity of the program and the legal prerequisites.

8.1 Evaluate Impact of Fuel Price Volatility on Budget Variance

Timeframe: 1 month

The first question that a transit agency should ask before it begins the process of developing and implementing a hedging program is "should we hedge?" This task, best performed by the agency's finance department, involves an evaluation of the agency's budget variability and the degree to which fuel price fluctuations contribute to this variability. This evaluation may involve an historical analysis of budget data as well as a forward-looking analysis of the budget's sensitivity to fuel price changes under a range of hypothetical price changes. This forward-looking analysis should include a study of value-at-risk as well as worst-case scenarios in which the price increases by at least two standard deviations from the mean. Once the agency has determined how much of its budget is at risk due to fuel price volatility, it must assess what the consequences of this risk are for the organization. If the worst-case fuel price volatility has only a small impact on the overall budget, or the agency has cash or other funds available to absorb losses in the event of a worst-case scenario, then a hedging program may not be a necessity. Transit agencies should also consider their ability to manage fuel price costs in other ways, such as passing along fuel costs through fuel surcharges or reducing service on less popular routes. Often, raising prices and cutting service is not possible for public transit agencies, but an evaluation of alternative methods of managing budget variability should be performed before deciding to hedge.

8.2 Educate Staff About Hedging

Timeframe: 1 to 3 months

Once a transit agency has determined that hedging would be advantageous to the organization, it must educate its staff about the different hedging instruments and strategies available. This process involves reviewing informational resources (such as this guidebook), contacting neighboring transit agencies or companies that have experience with fuel price hedging, and contacting hedging consultants. A hedging consultant may be an employee from the transit agency's bank or may be an independent adviser. At this stage in the program, hedging consultants and advisers will often work with the transit agency free of charge and will make presentations to the agency explaining the need for hedging, describing the options available, and marketing the consultant's experience and capabilities. If possible, it may be advantageous to bring in two or more hedging consultants to explain their risk management philosophies and approaches. The agency then has an opportunity to evaluate the consultants' qualifications and decide which one would be a good fit for the organization. Hedging can be a complex activity that requires careful management, and it is important that the transit agency understand and trust the consultant's approach to hedging. At this stage, the transit agency should also identify the financial products and strategies that might be effective at hedging its fuel consumption and should consider an optimal duration of the hedge.

8.3 Obtain Authorization to Hedge

Timeframe: 0 months to several years

This step will vary considerably from agency to agency. Some transit agencies may already have legal authorization to hedge. Often, however, public transit agencies are explicitly prohibited from investment activity, including the use of financial hedging instruments. In other cases, hedging is neither authorized nor prohibited. Regardless of the agency's legal situation, management should consult the agency's lawyers to confirm the agency's legal position and outline how to implement a hedging program within the existing authorization or identify the steps needed to obtain legal authorization. These steps will vary depending on specific state and local laws, budgetary practices, agency bylaws, management structures, and oversight. Obtaining authorization for hedging might be as simple as a receiving approval from the board of directors or as complex as enacting a change in state or municipal law. As a result, obtaining approval for hedging could take from a few days to a few years.

Convincing lawmakers or board members to authorize the development and implementation of a hedging program requires transit agency management to convince those in power of the value of hedging. Transit agencies that have successfully obtained hedging authorization recommend using an organized, data-driven approach. Management must present charts and statistics to explain the transit agency's financial position and explain the potential risk of increases in fuel prices. Often, hedging consultants are asked to explain the finer points of hedging to help engender confidence in the program. Transit agencies that have successfully obtained authorization to hedge note that it is important to emphasize that hedging is a conservative practice and not a speculative investment activity. One transit agency official interviewed for this guidebook reported using the term forward-pricing instead of hedging when presenting his agency's risk management strategy to the board of directors because hedging had a negative connotation for some board members, particularly in the wake of news about scandals involving Wall Street hedge funds. (It is important to note that fuel price hedging has nothing to do with hedge funds.)

In cases where obtaining authorization to hedge involved a change to state law, some transit agencies reported that banks that wished to act as counterparties to the transit agency in the hedging program helped to lobby lawmakers. In some cases, the hedging program may be authorized as a pilot program, and the decision to continue the program on a permanent basis may be made only after an evaluation of the effectiveness of the pilot program.

8.4 Develop Hedging Policy

Timeframe: 1 month

Once authorization for the hedging program has been obtained, the transit agency must begin developing its hedging policy. This policy can be developed before authorization has been obtained or while the agency is in the process of obtaining authorization. The transit agency will often work closely with a hedging consultant to develop its strategy and the agency may not be allowed to compensate this consultant for development of the strategy until it has received authorization to spend money on a hedging program. Alternatively, an in-house financial expert can be hired to develop the strategy and manage the program or an existing employee can be trained to do this task. The need for specific expertise (either in-house or outsourced) will depend on the complexity of the hedging instruments selected. Managing fuel price risk with firm, fixed-price contracts can often be handled by the transit agency's existing fuel procurement officials, and employing user-friendly, web-based price protection programs can be effectively handled by the agency's existing finance or procurement departments. However, when using financial derivative products, such as futures, swaps, and options, it is highly recommended to develop the agency's hedging policy with the help of an experienced professional.

A hedging policy is a document that outlines the transit agency's strategy for managing fuel price risk. The document identifies the hedging instruments that the strategy will employ, the maximum hedge level (as a percentage of total projected fuel consumption), the maximum hedge duration (i.e., the farthest-out month that can be hedged), and the strategy for timing purchases. The four components of a hedging strategy were described and compared in Section 2 of this guidebook. Often, the hedging policy will also outline the process for authorization and approval of all hedging transactions. In some cases, the hedging consultant may have full authorization to manage the program (including entering and exiting hedge positions) on the transit agency's behalf. More often, however, transactions must be executed by a designated transit agency official who receives advice and recommendations from the hedging consultant. Under some strategies, particularly those that involve single-point decisions, each hedging transaction may need to be approved by senior management. The policy will also outline the hedging program's reporting practices, which might include periodic program reports to management and annual program evaluations.

A hedging policy usually will need to be approved by upper management and by the board of directors before it is adopted. Subsequent amendments to the hedging policy, such as extending the hedge duration or using a different hedge instrument, will often also require management and board approval. As a result, it is advantageous to include sufficient flexibility in the hedging policy. For instance, a transit agency may want to include the use of options in its hedging policy even if it initially intends to use swaps as the primary hedging instrument. This will give the transit agency authority to adjust its strategy in the future without obtaining new approval from the board. While broadly worded hedging policies are advantageous from a flexibility standpoint, it is important that the hedging policy provide enough detail and direction to present a clear conception of the agency's hedging strategy.

8.5 Identify Qualified Derivative Brokers or Counterparties

Timeframe: 1 to 3 months

When hedging with financial derivatives (futures, swaps, or options), public transit agencies must establish a relationship with qualified brokers or counterparties in order to execute hedging transactions. This step is usually only started once the hedging program has been fully authorized and the hedging policy has been approved. Hedging with exchange-traded futures or options requires a relationship with a broker with a seat on the NYMEX and is an easier process than evaluating counterparties for over-the-counter transactions. NYMEX brokers execute hedge transactions, such as entering futures contracts or buying options, on the transit agency's behalf while charging the agency fees based on the number and size of transactions. NYMEX brokers do not take on any basis risk and require clients to meet collateral requirements and pay premiums associated with their NYMEX transactions. The brokerage business is generally competitive in terms of fee structures and brokerage contracts are typically standard agreements. As a result, shopping for the broker with the lowest fees may not yield significant savings. Often, the brokerage firm used for NYMEX transactions is recommended by the agency's hedging consultant.

Establishing counterparty relationships with OTC swaps and options requires a more involved evaluation process. The fees and premiums associated with OTC hedging are less transparent than with exchange-traded products. As a result, fees and premiums may vary from counterparty to counterparty, and it is advantageous to have at least two counterparties compete with each other to provide hedging services with the lowest markup. This means that the transit agency may need to identify and qualify several counterparties before the hedging program can be launched. This process will typically require that the transit agency issue an RFP for interested counterparties, such as banks, financial institutions, and the trading desks of major energy companies. If the transit agency's hedging adviser is an employee of the transit agency's bank, then this bank should be prohibited from participating in the RFP in order to prevent a conflict of interest.

When evaluating potential counterparties for OTC hedging services, transit agencies should consider a number of factors. One of the most important factors is counterparty risk—the risk that the counterparty will owe money to the transit agency through its OTC contracts, but be unable or unwilling to pay it. In order to minimize counterparty risk, transit agencies will typically select counterparties with investment grade credit ratings. Conversely, providers of OTC hedging services may require the public transit agency to have an investment grade credit rating. (Public transit agencies often do not have credit ratings and may have to have one issued before attempting to enter hedging agreements.) Other factors that transit agencies should consider when evaluating counterparties are the products they offer, limits in terms of volumes and durations, and collateral requirements.

8.6 Negotiate Counterparty Agreements

Timeframe: 1 to 3 months

Contract negotiation is an important part of any form of fuel price hedging, except when using web-based price protection programs that have standard usage agreements. Hedging with firm, fixed-price contracts involves negotiation on volume, price, delivery dates, and other components. Hedging with futures contracts involves a contract with the futures broker and although this is typically a standard contract, the transit agency may have some leeway on negotiated fees. OTC hedging with swaps and options involves the most time and resource intensive contract negotiations because OTC agreements are often arranged with multiple counterparties and each counterparty may have a different expectation about the agreement. OTC products are fully customizable in terms of the reference price index, methods of calculation, basis risk exposure, settlement dates, and collateral requirements, which results in a large number of negotiable items. As a result, it is not uncommon for a counterparty agreement to be passed back and forth several times between the transit agency, the counterparty, and the lawyers of both parties. Several transit agencies interviewed for this guidebook noted that the negotiation of OTC agreements was one of the most time-consuming steps in implementing their fuel hedging programs. OTC agreements are reviewed by upper management, and sometimes the board of directors, before being signed by the transit agency.

A full overview of the myriad of negotiable clauses in an OTC hedging agreement is beyond the scope of this guidebook. However, it is important to highlight some of the issues with negotiating collateral. For smaller clients with weaker credit, OTC swap and options providers often require cash collateral to be posted to mark-to-market accounts. This is similar to the margin accounts (performance bonds) required by the NYMEX. Public transit agencies, however, typically have strong balance sheets and can obtain high credit ratings because they have fairly reliable income sources (taxes and farebox receipts) and are often implicitly backed by state and local governments with considerable funding power. As a result, public transit agencies have significant bargaining power when it comes to negotiating collateral requirements. One large Midwestern transit agency reported that it was able to receive one-way cash collateral from its swap counterparties. One-way cash collateral is when one party posts collateral, but the other doesn't. The Midwestern transit agency was able to achieve this deal because its hedge positions were secured by stable farebox and tax revenues. Other transit agencies reported being able to use buses and physical assets in addition to or instead of cash collateral.

8.7 Begin Hedging

Timeframe: not applicable

Once the requisite legal authorization, hedging policy, and brokerage or OTC counterparty agreements are in place, the transit agency can begin hedging following the strategy and process outlined in the hedging policy. Several other items that are needed prior to hedging are: a system of tracking profits and losses on hedge positions on a daily basis; a system for ensuring that the targets outlined in the hedging strategy are being met; a system for tracking the performance of the hedging strategy against the program's goals and benchmarks (i.e., staying within the fuel budget for the year); a system for reporting hedging results to management and the board of directors on a periodic basis; and a system for reporting hedging activity and profits and losses in annual reports and financial statements. Samples of some of these reports and systems are included in the Appendix A: Case Studies.

Glossary

A

Adverse Basis Risk — In the context of a hedging strategy, this risk occurs when losses from an organization's physical fuel/energy contract are not offset by profits from the organization's hedging instruments. This problem can arise when the fuel contract is based on a price index that does not correlate perfectly with the price index referenced by the hedging product. Types of basis risk include locational basis risk, product/quality basis risk, and calendar (spread) basis risk.

At the Money — A term used to describe an option that would be neither profitable nor unprofitable to exercise. Both call and put options are at the money when the strike price is exactly equal to the current spot price.

C

Calendar (Spread) Basis Risk — A type of adverse basis risk caused by imperfect correlations that occur due to differences in the settlement dates of the organization's physical fuel contract and settlement dates of the organization's hedging instrument.

Call for Tenders — Also known as a call for bids, a call for tenders is a competition strategy in which an organization invites qualified fuel/energy suppliers to bid for the organization's fuel/energy supply contract.

Call Option — An options contract that gives the buyer the right but not obligation to buy a commodity at a predetermined strike price. Typically the buyer must pay the seller of the call option an upfront premium. The seller of the call option must sell the commodity to the buyer at the predetermined strike price if the buyer chooses to exercise the option. Call options are typically settled financially.

Cap — An options strategy that places a cap or ceiling on upward price movements. A cap is created by purchasing an out-of-the-money call option.

Cap-Price Instrument — A physical contract, financial contract, or other instrument that places a cap or ceiling on upward movements in the price of energy or fuel while allowing the buyer to fully or partially participate in downward price movements. Cap-price instruments often require the instrument's buyer to pay an upfront premium to the instrument's seller.

Collar An options strategy that places a cap on upward price movements and a floor on downward price movements. Collars are created by purchasing out-of-the-money call options and selling out-of-the-money put options. A premium is paid to purchase the call option and a premium is received from selling the put option.

Commodity Price Risk A subset of energy price risk, commodity price risk refers to unexpected and unfavorable changes to energy prices caused by global or regional factors that are beyond the control of most market participants, such as crude oil prices and refinery outages.

Commodity Price Risk Management Also called hedging, commodity price risk management refers to the use of physical contracts, financial contracts, or other instruments to reduce or eliminate commodity price risk.

Competition Strategies Fuel or energy contracting strategies designed to increase competition for an organization's fuel or energy supply contract.

Cooperative Buying Also known as pooling or demand aggregation, cooperative buying is market power strategy in which an organization increases its bargaining position to obtain volume-discount pricing.

Counterparty Risk The risk that a counterparty in a hedging agreement will default on its obligations under the agreement

D

Delivery Price Risk A subset of energy price risk, delivery price risk refers to the unexpected and unfavorable changes to energy prices caused by local factors, such as the pricing practices of a local fuel distributor. These factors can often be influenced by individual market participants.

Delivery Price Risk Management The use of procurement or contracting practices to reduce delivery price risk.

Derivative Any financial product that derives its value from value of an underlying asset or commodity. Futures, swaps, and options are derivatives.

E

Energy Price Risk Unexpected and unfavorable changes in energy prices. Energy price risk can be divided into commodity price and delivery price, and tax risk segments.

Energy Price Risk Management (EPRM) Sometimes called fuel price risk management, EPRM is the use of physical contracts, financial contracts, or other instruments to reduce or eliminate energy price risk. The goal of EPRM is to provide an organization with budget certainty. EPRM strategies can be categorized into two groups: 1) strategies designed to manage commodity price risk, and 2) strategies designed to manage delivery price risk.

Exchange An institution, organization, or association that hosts where stocks, bonds, options, futures, and commodities are traded during specific hours on business days. Exchanges impose rules and regulations on the exchange participants and mitigates all counterparty/credit risk between buyers and sellers.

F

Firm, Fixed-Price Supply Contracts A physical fuel or energy supply contract in which prices for future delivery are set in advance, usually for a fixed volume of fuel.

Fixed-Duration The process of hedging forward fuel or energy consumption within a fixed budget period (i.e., budget year).

Forward Contract A forward-price instrument that fixes the price of fuel or energy in the future. A forward contract can involve physical delivery of fuel or energy, but more often it is a paper contract that involves a financial, rather than physical, exchange at maturity.

Forward-Price Instrument A physical contract, financial contract, or other instrument that contractually or synthetically fixes the price of energy or fuel that will be consumed in the future.

Futures Contract A forward contract on an exchange. Several standardized futures contracts for energy products are traded on NYMEX.

H

Hedge Timing Hedge timing refers to how an organization times or schedules the entering and exiting of hedge positions (typically through the purchase and sale of hedging instruments).

Hedging See Commodity Price Risk Management.

Hedging Duration The length of time into the future over which an organization is hedged.

Hedging Instrument The physical contract, financial contract, or other instrument that is used to hedge energy prices.

Hedging Level The percentage of the organization's fuel or energy that is hedged.

Hedging Policy A document that outlines an organization's strategy for managing fuel price risk in broad terms. The document identifies the hedging instruments that the strategy will employ, the maximum hedge level, the maximum hedge duration, and the strategy for timing purchases. Often, the hedging policy will also outline the process for authorization and approval of all hedging transactions and for monitoring the performance of the hedging program.

Hybrid Timing Strategy A timing strategy that utilizes components of both managed and rule-based timing strategies.

I

In-the-Money A term used to describe an option that would be profitable to exercise. A call option is in-the-money when the strike price is lower than the spot price of the underlying commodity. A put option is in-the-money when the strike price is higher than the underlying commodity's spot price.

L

Locational Basis Risk A type of adverse basis risk caused by imperfect correlations that occur due to differences in the delivery point of an organization's physical fuel contract and the delivery point of the price index referenced by the organization's hedging instrument.

Long Position If an organization is long an asset, it gains money when asset prices increase and loses money when asset prices decrease.

Long-Term, Fixed-Margin Contracting Entering into a physical fuel supply contract over a long-term period (>1 year) with a fixed delivery margin. Pricing typically follows a rack plus margin method.

M

Managed Timing Strategy Sometimes known as a dynamic, situational hedging, managed timing is a timing strategy that seeks to reduce the average fuel price under a hedging program by adjusting elements of the hedging strategy (i.e., instrument, level, duration) in response to changes in the market environment or outlook.

Margin Account Also known as a performance bond, this account acts as collateral for outstanding futures contracts on NYMEX. Buyers and sellers of futures must fund and maintain margin accounts until their positions have matured. The value of these positions are marked-to-market every day and sometimes more than once in the same day. This means that as the price of a futures contract changes, money is either credited or debited to the margin accounts of buyers and sellers.

Margin Call On NYMEX, if the margin posted in the margin account falls below the minimum margin requirement, NYMEX issues a margin call which requires the owner of the account to either replenish the margin account with additional funds or close out his position.

Market Power Strategies Fuel purchasing strategies designed to lower fuel prices by increasing an organization's market power during negotiations.

Mark-to-Market In the context of forward contracts, mark-to-market accounting refers to accounting for the fair value of the forward contract based on the current price of forward contract.

N

New York Mercantile Exchange (NYMEX) The world's largest physical commodity futures exchange. Several standardized futures and options contracts for energy products are traded on NYMEX.

No Cost Collar A collar that has no upfront cost because the premium paid for the purchased call option is offset by the premium received from the sold put option.

O

Options Contracts Often compared to insurance, options contracts give the buyer the right but not obligation to purchase or sell fuel at a specific price (the strike price) over a specified period of time. Options contracts often involve an upfront premium payment from the buyer to the seller at initiation. As with other financial instruments, contracts are typically settled financially at maturity based on the difference between the strike price and the current spot price. Physical exchange of fuel rarely takes place. There are two types of options contracts: calls and puts.

Options Premium A payment, typically made upfront, that compensates the seller of an options contract for providing cap-price or floor price protection.

OTC Swaps Several consecutive forward contracts that are traded over the counter.

Out-of-the-Money A term used to describe an option that would be unprofitable to exercise. A call option is out-of-the-money when the strike price is higher than the spot price of the underlying commodity. A put option is out-of-the-money when the strike price is lower than the underlying commodity's spot price.

Over-the-Counter (OTC) Trading of financial instruments directly between two parties rather than through an exchange. OTC transactions allow customized instruments to be traded, thus reducing or eliminating basis risk. Unlike exchange-traded transactions, OTC transactions have counterparty or credit risk.

P

Participating Cap An options strategy that places a cap on upward price movements and allows unlimited but partial participation in downward price movements. Participating caps are created by purchasing an out-of-the-money call option and selling an at-the-money put option. The quantity of the underlying commodity covered by the sold put option is less than the quantity covered by the purchased call option. If the premiums received on the sold put options fully offset the premiums paid on the purchased call options, the strategy is called a No Cost Participating Cap.

Performance Bond See Margin Account.

Price Corridor An options strategy that caps upward price movements but only up to a certain point. A price corridor is created by purchasing an out-of-the-money call option and selling an even further out-of-the-money call option. The premium received from the sold call option offsets some but not all the premium paid on the purchased call option. Thus this strategy reduces but does not eliminate upfront costs.

Product/Quality Basis Risk A type of adverse basis risk caused by imperfect correlations that occur due to differences between the type of fuel purchased under the organization's physical fuel contract and the type of fuel of the price index referenced by the organization's hedging instrument.

Put Option An options contract that gives the buyer the right but not obligation to sell a commodity at a predetermined strike price. Typically the buyer must pay the seller of the put option an upfront premium. The seller of the put option must buy the commodity from the buyer at the predetermined strike price if the buyer chooses to exercise the option. Put options are typically settled financially.

R

Rack Plus Margin (or Rack Minus Margin) A pricing methodology where the price that the buyer pays for fuel or energy is equal to the price of fuel at a fixed delivery point or market hub plus or minus a fixed differential. The rack price is obtained by an independent third-party price reporting service, such as OPIS or Platts, and floats (i.e., is not fixed).

Reference Price The specific price index referenced by a hedging instrument for calculating payouts. Price indices typically track a particular fuel or energy product in a particular geographic location (i.e., heating oil in New York Harbor).

Reverse Auction A competition strategy in which an organization holds an auction where the roles of buyers and sellers are reversed. Multiple sellers (fuel/energy suppliers) compete to supply a good or service to a single buyer by bidding successively lower prices. The seller that bids the lowest price during the auction period is awarded the supply contract.

Rolling-Duration The process of hedging forward fuel or energy consumption on a rolling basis (i.e., always 12 months forward).

Rule-Based Timing Strategy Sometimes known as a schedule-based hedging, rule-based timing is a timing strategy that seeks to mitigate the risk of hedging at too high a price by entering hedge positions at preset intervals, levels, and durations.

S

Short Position If an organization is short an asset, it loses money when asset prices increase and gains money when asset prices decrease.

Spot Price The current price of a particular fuel or energy product in a particular market.

Strike Price Determined at initiation, the strike price is the fixed price at which the owner of an options contract can purchase or sell the underlying commodity regardless of the spot price at the time of purchase or sale.

T

Tax Risk In an energy price context, tax risk refers to the unexpected and unfavorable changes to energy prices caused by increases in federal, state, or local taxes on energy products.

Time to Reconcile The time intervals between when hedging contracts are settled (i.e., daily, weekly, monthly).

W

Web-Based Price Protection Program An online fuel hedging service, such as Pricelock, Fuel Bank, and MoreGallons, that provides cap-price protection.

Acronyms and Abbreviations

$/g	dollars per gallon
ASP	active server pages
c/g	cents per gallon
DEPO	Demand Pooling Global Services
EIA	Energy Information Administration
EPRM	energy price risk management
FFP	firmed, fixed-price
GASB	General Accounting Standards Board
NYMEX	New York Mercantile Exchange
NYH	New York Harbor
OPIS	Oil Price Information Service
OMB	Office of Management and Budget
OTC	over-the-counter
RBOB	reformulated blendstock for oxygenate blending
RFP	request for proposal
SAIC	Science Applications International Corporation
st. dev.	standard deviation
ULSD	ultra low sulfur diesel
WTI	West Texas Intermediate (crude oil)

APPENDIX A

Case Studies

Case studies of fuel purchasing strategies were developed for fifteen transit agencies across the United States and Canada based on interviews with transit agency representatives. In general, commonalities are greatest among case studies with similar geographic region and fuel purchase volume. As such, case study pages are shown below organized by these categories.

Case Study Region, Fuel Purchase Volume, and Page

Small = <1 million gallons per year
Medium = 1 to 10 million gallons/year
Large = >10 million gallons per year

Region	Fuel Purchase Volume	Transit Agency	Page
East / South	Small	Anonymous Gulf Coast Transit System	66
	Small	Birmingham-Jefferson County Transit Authority	71
	Medium	Hampton Roads Transit	74
	Medium	Nashville Metropolitan Transit Authority	77
	Large	Southeastern Pennsylvania Transportation Authority	81
	Large	Houston METRO	84
Midwest	Small	Sioux Area Metro	88
	Medium	Minneapolis-St. Paul Metro Transit	91
	Medium	Greater Cleveland Regional Transit Authority	95
	Medium	Greater Dayton Regional Transit Authority	99
	Large	Chicago Transit Authority	103
	Large	Greater Toronto and Hamilton Area Metrolinx/GO Transit	109
West	Medium	BC Transit	113
	Large	King County Metro Transit	117
	Large	Denver Regional Transportation District	119

Anonymous Gulf Coast Transit System

Summary

Location: Gulf Coast Region
Fleet: 67 diesel buses (35-foot to 40-foot full-size buses) and 17 paratransit vehicles (14 gasoline and 3 diesel)

Fuel Volumes:

- transit system: Diesel – 624,445 gallons (FY 2009), Gasoline – 9,407 gallons (FY 2009)
- city: Diesel – approximately 600,000 gallons, Gasoline – 600,000 gallons

The transit system is one of more than 30 departments of the city and serves an area covering approximately 100 square miles. The city provides its residents all of the public utilities. The electricity generation plants are the city's major user of diesel and natural gas fuels. The transit system used 624,445 gallons of diesel fuel in FY 2009 at a total cost of $1,314,041, or an average price of $2.10 per gallon. The transit system's FY 2009 gasoline usage was 9,407 gallons at a total cost of $23,611, or an average price of $2.51 per gallon and the current fuel budget is approximately $2 million. For comparison, the city's total energy budget is $175 million, so the transit system's fuel does not represent a major portion of the budget. The city's FY 2009 fuel use, excluding the transit system, totaled approximately 600,000 gallons of diesel and 600,000 gallons of gasoline. The non-transit system fuel use is for over 2,000 city vehicles, including solid waste collection, utility, police, construction, street and drainage, emergency response, and administrative.

Delivery Price Risk Management

Fuel Contracting

Diesel. Prior to 2009, the transit system purchased fuel using fixed price contracts with a local supplier. The city secures a new fuel purchasing contract through a competitive bid process every two or three years. Due to geographic location and the fact that all fuels are piped or trucked into the area, the city has only had one fuel supplier respond to the bid since the 1990s. Pricing for delivered diesel fuel is based on the Oil Price Information Service (OPIS) price plus a margin, currently $0.05 per gallon. The transit system is one department on the city's fuel contract, so the city ultimately makes the fuel supply purchasing decisions. The transit system has an open purchase order on the city's contract for purchasing diesel and gasoline fuel. The transit system's energy costs on this contract are a direct pass through without an additional user fee.

Natural Gas. In 1991, the city purchased natural gas for the electric and gas utilities from the pipeline company. Following industry deregulation, the city's natural gas purchasing has been done with individual contracts with suppliers for various terms (short-, mid-, and long-term). In early 2002 the city saw a need to diversify fuel suppliers and enhance counterparty creditworthiness. A risk management program was initiated and using hedging as a financial risk management tool began to be investigated (see Commodity Price Risk Management section).

Pooling

The city does not participate in a fuel purchasing cooperative as there are no candidate organizations to work with. However, a number of large local entities, including universities and large industrial customers, purchase fuel on the city's contracts, so the total volume is increased. The combined fuel use is sufficient for the city to negotiate acceptable prices with suppliers and allows for maintaining control over all areas of fuel purchase decisions and acquisitions; as such, participation in a cooperative would not likely help to significantly reduce costs. The local entities benefit from the city's fuel purchasing activities which bring about budget certainty to their operations.

Commodity Price Risk Management

History

Early in 2002, the energy services department hired a financial consultant to evaluate the city's energy risk management policy and procedures. The consultant suggested utilizing financial tools such as hedging on the New York Mercantile Exchange (NYMEX) to lock in fuel prices. This approach required the city to fund a NYMEX margin account for a percentage of the total hedged purchase costs. The preparatory work of the energy services department hedging program was overseen by the city's Energy Risk Policy Committee (ERPC). The group is composed of city-appointed officials and executive staff from the city's utility, financial, and administrative units and answers to the city commission. The coordination resulted in the city commission's February 2002 approval for "[A]n Energy Risk Management Policy and Procedures providing for use for hedging purposes of energy commodity futures and options contracts ("hedge transactions") on the New York Mercantile Exchange ("NYMEX")." The hedging policy outlines the allowable hedging practices and includes trade limits for volume, future, and time limits. The financial consultant stressed that the policy language state that the purpose of the hedging program is a budget certainty tool, not an investment tool. The next step in the process was to locate a brokerage firm to actually execute the trades. The city issued a bid and selected a full service brokerage firm in April 2002 with competitive commissions. Another company was hired at this time to supply consulting services related to financial risk evaluation of the city's overall energy supply portfolio as well as to provide assistance in developing program strategies and tracking hedge transactions.

The city began hedging natural gas, used for power generation, in February 2003 on the NYMEX to lock in prices and allow the city to avoid supplier and third-party counterparty risks. The city started with $20 million in the margin accounts and later increased the quantity to approximately $30 million (10% of the hedged fuel cost). Hedging on the NYMEX requires cash in a margin account as there is no credit on the NYMEX. Since the city was using more than $150 million of natural gas annually, the $30 million margin account was inadequate to hedge beyond two years. The city needed to hedge for longer terms, so the energy services department pursued other hedging methods. The city decided to use over-the-counter (OTC) swap contracts, rather than exclusively trading on the NYMEX. The city received approval in 2006 to allow hedging with a counterparty using OTC forward pricing contracts. In 2006, the city utilized International Swap Dealers Association (ISDA) contracts to execute OTC transactions. OTC swap contracts are available for a range of commodities, including natural gas. All transactions are financial, not physical, and do not involve delivery. The counterparties negotiate various credit limit levels based on ratings by Standard & Poor's and Moody's.

The city did not hedge diesel or gasoline purchases until its fuel budget, including the transit system's, was significantly impacted by the 2008 fuel prices spike. The budget was negatively impacted during a bad economic time, but the city was able to absorb the transit system's 2008 fuel cost increases in the short-term. The city evaluated the available cost control options for its liquid fuel (diesel and gasoline) purchases and in 2009, the city began purchasing and hedging its liquid fuel purchases for all of its departments, including the transit system. Unfortunately, long-term fuel supply contracts were difficult to secure during this period due to volatility and rising fuel prices. The city waited until fuel prices decreased to begin hedging diesel and gasoline purchases. After fuel prices decreased in 2009, the city initiated hedging of diesel and gasoline, including for the transit system. (Note: since fuel purchasing and hedging is done by the city for all of its departments, including the transit system, the remaining discussion of the city's hedging program includes the transit system's fuel use, so the transit system is not discussed separately.) The approvals for hedging and the program structure (i.e., financial advisor, hedge broker, and funded margin accounts) were already in place because of the natural gas hedging program, so the city added an additional account in 2009 to begin hedging its diesel fuel purchases.

Strategy

The city has 300,000 barrels of storage capacity for No. 6 residual fuel oil (heavy diesel) and diesel that is used by power generation plants. The transit system's storage capacity is much smaller with 20,000 gallons of diesel (approximately 1.3 weeks' usage) and 10,000 gallons of gasoline (approximately 3 months' usage) storage. Onsite storage is a hedge in itself, but the volumes are not sufficient for long-term hedging; instead the city's financial hedging instruments are the primary hedge program tools.

The city's hedging program relies on mean reversion analysis, a mathematical concept that is typically used for analyzing stock investments, but can also be used for other assets such as fuel. The city researches a commodity's historical prices and identifies the high and low prices. These are compared to the commodity's average price. Mean reversion analysis assumes that the high and low prices are temporary, and that prices will eventually gravitate towards the average (mean) price over time. In practice, for each point a commodity price decreases the city purchases larger volumes of this commodity for a longer time horizon. As a commodity price increases, the city purchases lower volumes for a shorter time horizon.

The city uses forward pricing contracts rather than options. Options provide a range of stability, but not cost certainty. Forward pricing contracts provide both stability and cost certainty. Hedging contracts typically include a premium for the price certainty they provide; the farther out the hedge, the higher the implied premium.

The city has eight to ten accounts for hedging on the NYMEX. One account hedges the transit system's diesel purchases with No. 2 heating oil futures. The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated and generally track each other. The city hedges gasoline purchases with gasoline futures and hedges natural gas purchases for power generation with natural gas futures. The city currently hedges approximately 90% of its gasoline, diesel, and natural gas purchases. It does not hedge 100% of fuel demand to provide flexibility in case demand decreases. The remaining 10% of fuel purchases are purchased on the spot market. As of September 2010, the city has hedged its diesel and gasoline fuel purchases for 18 months out (until March 2012) utilizing a series of one month contracts. Each contract is at a different price, but the overall average fuel price is $1.50 per gallon for diesel and gasoline. The city's natural gas purchases are hedged for 24 months until September 2012. Using this methodology, the city has achieved a high level of budget certainty, and as fuel prices increase so do cost savings. Such budget certainty is important for the city because operating expenses for fleet and bus services are fixed in the short-term because of the annual budget; deficiencies must therefore come out of the general fund.

Approval and Execution Process

Daily execution of the hedging program is done by the Energy Services Department. The group operates within the scope of the hedging policy defined in the Energy Risk Management Policy and Procedures and communicates closely with the Superintendent of Transit Maintenance for planning purposes. The city's acquisition timing for executing hedging contracts is not fixed, but rather takes into account market, weather, and other factors. For example, spring fuel prices are historically lower right before summer, and February and March prices are lower if followed by a mild winter. As previously mentioned, in September 2010, the Energy Services Department observed what it determined was advantageous pricing on fuel and hedged until March 2012 (18 months out) at an average cost of $1.50 per gallon of both diesel fuel and gasoline, so there will not be much hedging activity for 6 months. If in 6 months the price falls below $1.50, the city will discuss whether it wishes to lock in prices further out.

The city has an annual contract with the financial consultant who provides market and credit evaluations. The Energy Risk Policy Committee provides oversight and accountability of the Energy Services Department. The consultant provides an independent perspective, and provides third-party information for the city's hedging activities and assurance to the city Commission that the program is on track. The group develops a plan for the hedge program for the next quarter or longer and uses scenario analysis to determine how to manage uncertainty.

At the beginning of each fiscal year, the transit system opens a purchase order on the city's fuel contract for, purchasing fuel on the same schedule each month. At the end of the month, the city Financial Department notifies the transit system Superintendent of Transit Maintenance of the hedge fund status, and whether to add or subtract an amount to that month's fuel invoice to balance the fuel account.

Results

Since the transit system's hedging program began, fuel hedging has saved the fleet approximately $20,000 to $30,000 per month. In 2009, over the time the hedge was active, the transit system saved roughly $116,000. The hedging activity has saved the city over $60,000 per month. Just as importantly, however, the city has seen that hedging provides budget certainty, reduces volatility, and protects against extreme fuel price shocks.

The city has found that purchasing from the spot market could provide a lower cost, but this increases price volatility. Overall, the hedging program has successfully mitigated price volatility as intended. There has been a positive impact on average fuel prices, and it is believed that hedging will continue to have a positive impact. The city's hedging of the transit system's diesel fuel was very successful. It was fortunate, through good timing and planning, to purchase futures contracts during early 2009 when fuel prices had reached a low. The hedging program has also simplified the fuel purchasing process for the superintendent of transit since the fuel contract and hedging program are operated by the city.

Tips for Success

Diversification Is Necessary

Through its experience with volatile energy markets in 2001, the city discovered the need to diversify its resources and to fix prices when necessary for budget certainty. The city determined that working with multiple larger-sized, creditworthy counterparties is a must. The city found that utilizing NYMEX and ISDA forward pricing contracts provided the city with many options for attaining the high degree of budget certainty it desired.

Hedging Program Guiding Policies and Oversight Are Needed

The agency must have an oversight committee, policies, procedures, and a clear strategy on which to base and evaluate decisions, as well as a strategy for managing unexpected circumstances such as significant market fluctuations or the disappearance of one's counterparty.

Fuel Price Certainty through Energy Price Risk Management Is Good

Since the hedging program started in 2009, the transit system has saved money by avoiding the price increases taking place in the fuel market. As shared by the superintendent of transit maintenance, "the most important aspect has been the ability to budget for fuel and be fairly confident that it will not be a show stopper budget item."

Effective Policies and Procedures Are a Must, Including Energy Risk Management Policy and Procedures

Having these items in place enables oversight by all entities including the Energy Rick Policy Committee, formalizes the process, and is useful for succession planning.

Interdepartmental Discussions Regarding Hedging Program Purpose and Structure Is Key

Interdepartmental communication about the purpose and operation of the hedging program was vital when the transit system was included in the city's program to explain the program to all involved staff.

Birmingham-Jefferson County Transit Authority (BJCTA)

Summary

Location: Birmingham, Alabama
Fleet: 83 buses: approximately 22 35-foot and 20 30-foot diesel buses (FY 2010), 36 35-foot compressed natural gas (CNG) buses, and 5 paratransit vehicles
Fuel Volumes: Diesel – 377,000 gallons (FY 2009), natural gas – 120,000 gasoline gallon equivalents (GGE)[1] (FY 2009)

Birmingham-Jefferson County Transit Authority (BJCTA) is the public transportation authority that provides fixed-route and demand response service (paratransit) to various municipalities including Birmingham, Bessemer, Fairfield, Homewood, Mountain Brook, Hoover, and Vestavia Hills. The service area includes more than 200 square miles and serves a population of nearly 400,000. Approximately 56% of BJCTA's transit bus fleet is diesel powered; the remaining 44% is CNG powered. BJCTA began purchasing CNG buses in 2000 to replace diesel buses and plans to transition the entire fleet to CNG buses to reduce its environmental footprint and to improve local air quality. As part of its commitment to this goal, BJCTA owns and operates its own CNG fueling station on the fleet's property. The station is accessible 24/7 to municipalities, commercial vehicles, and to the public. BJCTA is on target to have the fleet converted to CNG by the end of 2014. The diesel bus fleet used approximately 377,000 gallons of diesel fuel in FY 2009, at a total cost of $1.53 million, and an average cost of $4.04 per gallon.

Delivery Price Risk Management

Fuel Contracting

Diesel. Until 2006, BJCTA used Oil Price Information Service (OPIS) rack pricing plus differential (includes delivery and profit) for purchasing diesel fuel. Suppliers were selected through an RFP process. Prices were based on the weekly rack price plus a fixed-fee incremental cost for delivery.

Starting in 2006 BJCTA realized that the correlation between market prices and the rules of supply and demand were beginning to change. The agency found it more difficult and expensive to lock in low prices with local suppliers because diesel fuel prices at the time were volatile and were becoming increasingly more so because supplies were affected by Hurricanes Katrina and Rita. BJCTA exceeded its fuel budget by $1 million in 2006. This overrun was partially offset by previous savings reserves and additional contributions from the municipalities BJCTA serves through hourly rate increases. As petroleum fuel prices and volatility continued to increase dramatically in 2006, BJCTA's procurement officer recommended that BJCTA begin utilizing fixed-price contracts for hedging to protect the agency from even higher fuel costs and to enhance

[1]GGE is a method to normalize the usage of multiple fuels by their energy content (i.e., British thermal units per gallon, or Btu/gal] using gasoline as the baseline. For example, diesel fuel has an average energy content of 128,400 Btu/gallon while gasoline has an average energy content of 115,000 Btu/gallon. Thus one gallon of diesel fuel has equivalent energy content of 1.12 gallons of gasoline [i.e., 128,400 Btu/gal divided by 115,000 Btu/gal = 1.12])

budget certainty. The BJCTA procurement officer gave a presentation to the board of directors to educate the members on how forward pricing mechanisms (i.e., hedging) can be used as a budget risk reduction tool to manage price variability and the cost/budget uncertainty associated with the diesel fuel purchases. The board of directors agreed that budget certainty was key and agreed that including hedged fixed-price contracts in the agency's fuel purchase strategy had merit. BJCTA recognized that fixed-price contracts were the best approach for balancing simplicity, flexibility, and allowable activities regarding investments as established by the Federal Transit Administration.

BJCTA approached its supplier to discuss its willingness and ability to offer fixed-price fuel contracts. BJCTA's supplier is based in Wisconsin, but fuel is delivered from Atlanta, Georgia. The supplier had recently begun servicing BJCTA on a three-year contract that had just started a new contract period. The supplier educated BJCTA on how its fixed-price program worked. The supplier operates an in-house hedging program and purchases futures contracts for No. 2 heating oil indexed to the NYMEX to hedge its diesel fuel purchases. The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated and typically track each other. This in-house hedging program allows the supplier to offer fixed-price contracts to customers. Each fixed-price contract with customers is for the same amount of fuel that is covered by one futures contract (42,000 gallons). Therefore, the fleet is obligated to purchase this amount of fuel. The fixed-price fuel contracts are arranged by the fleet in the same manner as conventional fuel contracts. The fleet calls the supplier to request a price for a certain number of contracts during a certain period and has the option to accept or refuse the offer. The hedged fixed-price contracts are treated just like other contracts or procurements, so even though the supplier is hedging its own position, it is a regular contract for BJCTA.

The result of this fuel purchasing option is that BJCTA realizes the fuel price stabilization of fuel hedging without having to operate an in-house hedging program. This method means that the agency does not have the administrative and margin account burden from operating its own program. The supplier has the administrative overhead for the program operation and also assumes the risk for maintaining the margin account. These costs are passed on to BJCTA as a premium, or fee, which is included in the agreed upon fuel price and fuel volume requirement.

BJCTA initiated a trial program using the hedged fixed-price contracts in late 2006 by purchasing three contracts (42,000 gallons each) to cover 100% of its anticipated three month fuel use. The performance was evaluated and the fleet was pleased with the performance, so it initiated a longer six-month, fixed-price contract in 2007 for further evaluation. The six-month trial was also successful, so BJCTA included fixed-price contracts in its available fuel purchasing options. The agency was not required to use fixed-price contracts, so it could purchase as much fuel as it wished using fixed-price contracts. The remaining fuel purchases would be made using OPIS rack pricing plus a differential.

Natural Gas. BJCTA has purchased natural gas from the same natural gas supplier since 2000. The supplier provides natural gas to customers at different price levels based on the type of account. BJCTA does not have a contract in place for the natural gas fuel supply, but the agency receives a rate which has lower supply costs than a commercial account would. The resulting cost is approximately half the cost of diesel for an equivalent amount of energy. BJCTA has also received a $0.50 credit from the Internal Revenue Service (IRS) for each gasoline gallon equivalent (GGE) of natural gas used for the last three years (even though BJCTA does not pay federal taxes) which further decreases fuel costs. BJCTA did not see much change in natural gas costs during the petroleum fuel spike that occurred in 2007 and 2008, and is pleased with the lack of volatility as well as the lower costs.

Approval and Execution Process

BJCTA did not require board approval before it began using the fixed-price contracts. The fleet also noted that board approval would not be necessary if it decided to initiate an in-house hedging program. The BJCTA executive director and the procurement officer work together to develop the annual fuel purchases budget based on historical and future fuel requirements and fuel cost expectations. The executive director then presents the recommendations for future actions and methodology to the board of directors for approval, including the pursuit of long-term contracts and the decision to renew an option year for the fuel supplier contract.

The procurement officer is responsible for generating reports on the programs' status and results, and for monitoring the energy markets. The supplier provides recommendations, but BJCTA also subscribes to the OPIS price reports and reviews the daily closing rack prices to track diesel costs on its own. The fleet is comfortable with this level of information so does not use a third-party financial advisor. BJCTA's supplier does not disclose what its fee is, so BJCTA compares the rack price to what its supplier's delivered fuel price is to determine if the price being offered is reasonable. This information keeps the agency up to date on the market activity and gives them the knowledge about when to accept the supplier's recommendations to lock in prices again with one or more contracts. Once a purchase decision is made, the procurement officer contacts the supplier to place an order for the required number of contracts at the agreed upon price. Once the contracts are in place the BJCTA purchasing department can order fuel as it is needed.

Results

Diesel. Following the budget overrun in 2006, BJCTA's biggest concern was experiencing another round of fuel price increases that would affect the budget in a similar manner. Entering into fixed-price fuel contracts for 100% of its diesel fuel requirements enabled the agency to achieve a significant level of budget certainty. Budget certainty is the metric for evaluating fuel purchasing program effectiveness. The agency does not compare the money saved/lost relative to what would have been spent if purchasing at the rack price.

In late 2007, when oil was over $100 per barrel, BJCTA locked in from October 2007 to March 2008 at $2.30 per gallon. The next fixed price contact was locked in from April 2008 to December 2008 at $2.92 per gallon. Rack prices during this timeframe went over $5.00 per gallon.

In both cases, BJCTA achieved the goal of obtaining fuel price certainty. Additionally, in 2008 the fixed-price contract saved the agency a large amount of money. During the April 2008 to December 2008 time period oil prices increased above $112 a barrel and the fleet was not certain prices would not continue to rise. The agency had to attain fuel price certainty even if it meant that it was not purchasing fuel at the lowest cost. The result was that BJCTA locked in prices from January 2009 to December 2009 at $4.04 per gallon. Influenced by the economic downturn, rack prices fell below $2.00 per gallon during this timeframe.[2] Witnessing lower rack prices, BJCTA discontinued covering future purchases with fixed-price contracts and resumed purchasing all of its fuel needs in 2010 at OPIS rack pricing plus a differential ($0.0273 per gallon). BJCTA's tracking of the OPIS price reports will inform the fleet on when to consider locking in prices again with fixed-price contracts. BJCTA made up some of the expense of its locked-in diesel prices during the economic downturn because natural gas prices decreased and natural gas use increased as the CNG bus fleet grew. This resulted in decreased diesel utilization and costs. There is concern that the fleet's lower diesel fuel usage will not be high enough for the agency's supplier to continue offering BJCTA a fixed-price contract purchasing option.

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[2]Prices include delivery charges and the agency's supplier's premium for fixed-price contracts

Natural Gas. BJCTA is also managing its future fuel costs by diversifying the fuels used by its buses, in this case by replacing diesel buses with CNG buses. BJCTA has found that natural gas prices are approximately half the cost of diesel and are less volatile than diesel as well. By increasing its CNG bus fleet, and thus its natural gas fuel use, BJCTA expects to decrease future fuel prices, volatility, and budget deficits. In addition, the IRS natural gas usage tax credit saved BJCTA approximately $500,000 last year. As BJCTA replaces more and more of its diesel buses with CNG buses, diesel fuel use will continue to decrease. As a result, the agency may continue to rely on purchasing diesel fuel at rack prices and accept the possible volatility and budget uncertainty for this portion of its fuel budget, rather than using fixed-price contracts which include a cost premium.

Pooling

BJCTA does not participate in any cooperative arrangements with other agencies in the Birmingham area because it believes that the agency will not receive better price offers than it already does.

Commodity Price Risk Management

BJCTA does not operate a fuel hedging program. Instead, as discussed above, its fuel vendor hedges its bulk fuel purchases and passes the cost of its hedged position on to BJCTA. The vendor tracks markets and makes recommendations to the transit agency, which has the discretion to act on or reject the recommendations. This allows BJCTA to benefit from fuel hedging without operating its own program.

Tips for Success

Consider the Best Way to Assess Diesel Fuel Market Risk

BJCTA found that assessing diesel fuel market risk has been difficult. BJCTA indicated that starting in 2006 fuel prices have had a closer relationship to the stock market and fluctuations than to the traditional rules of supply and demand. This made it more difficult to attain fuel-price stability than in prior years when traditional forward pricing contracts met the agency's needs for budget certainty and acceptable costs. BJCTA believes that there are several methods that can be used to achieve fuel-price stability and certainty, so it feels that transitioning its diesel buses fleet to CNG buses will allow it to reduce fuel prices and fuel price volatility.

Use Forward Pricing Mechanisms as Insurance

BJCTA approached its board of directors for approval of fixed-price contracts as insurance against unexpected and significant fuel price increases. There is a cost for this "insurance" and the agency is primarily evaluating the program based on operating within budget rather than on how much money is saved.

Hampton Roads Transit (HRT)

Summary

Location: Hampton, Virginia
Fleet: 185 diesel full-size transit buses, 26 diesel hybrid-electric full-size transit buses, 3 paddle-wheel ferry boats.
Fuel Volumes: Diesel – 3.0 million gallons (FY 2009), Gasoline – 0.5 million gallons (FY 2009)

Hampton Roads Transit (HRT) is a Virginia state agency and regional public transportation provider that serves seven cities spanning approximately 375 square miles and serving a population of 1.3 million.[3] HRT's fleet consists of 185 diesel transit buses, 26 diesel hybrid-electric buses, and three 150 passenger paddle-wheel ferry boats.[4] HRT will continue to add to its diesel hybrid-electric bus fleet and, starting in 2011, will have a light-rail component as well.[5] During FY 2009, HRT used just over three million gallons of diesel fuel at an average cost of $3.00 per gallon, and approximately 528,000 gallons of gasoline at an average cost of $2.58 per gallon. Together, these represent approximately 11% of HRT's annual budget.[6] One third of HRT's funding is from the federal government. HRT utilizes vendor-arranged fixed-price contracts to lock in prices and achieve budget certainty, and it also takes advantage of the spot market when it is to the agency's advantage.

HRT's budget was adversely affected by buying fuel at the Oil Price Information Service (OPIS) price during FY 2006. HRT does not have a dedicated funding source, so in situations where the agency exceeds its budget, it must request funding from its jurisdictions. HRT is not allowed to make a profit. At the end of the year, HRT works with the local jurisdictions it serves to determine what payments between the groups are necessary to balance the previous year's fuel purchases. An active proposal to restructure this agreement to allow the agency to make a profit, and thereby build some operating reserves, is under discussion.

Delivery Price Risk Management

Fuel Contracting

HRT utilizes fuel vendor-arranged fixed-priced contracts to control fuel costs. Prior to 2007, HRT fuel contracts were set for purchasing on the spot market at Oil Price Information Service (OPIS) prices. This method worked well until FY 2006 when HRT exceeded its fuel budget by $1.5 million when fuel prices increased significantly faster than expected. This experience was the catalyst for HRT to evaluate new fuel purchasing options to more effectively control fuel costs.

In response, HRT issued a request for proposal to fuel suppliers in 2007 for a dual-price quote that included two purchasing options: 1) a fixed-price contract option, and 2) an option to purchase on the spot market using OPIS prices. The goal is to strategically use both options, with fixed-price contracts being used to lock in fuel prices when management believes they are likely to increase. The use of fixed-price contracts is meant to create price and budget certainty, protect against extreme fuel price fluctuations, reduce volatility, and save money when possible. Locking in fuel prices provides HRT with budget certainty, which is a necessity for an agency without a dedicated funding source.

The current fixed-price fuel purchasing contract was signed in 2007 with a fuel supplier. The supplier operates an in-house fuel hedging program to hedge its diesel fuel purchases.[7] This in-house hedging program allows the supplier to offer several fuel purchasing risk management options to its customers including fixed-price contracts, fixed-price contracts with downside protection, cap contracts, collars, and swaps. This method means that the agency does not have the administrative and margin account burden from operating its own program. The supplier has the administrative overhead for the program operation and also assumes the risk for maintaining the margin account. These costs are passed on to HRT as a premium, or fee, which is included in the agreed upon fuel price and fuel volume requirement. The result of this fuel purchasing option is that HRT realizes the fuel price stabilization of fuel hedging without having to operate an in-house hedging program.

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[3] http://www.gohrt.com/about/
[4] http://www.gohrt.com/services/paddlewheel-ferry
[5] http://www.gohrt.com/about/go-green/
[6] Hampton Roads Transit, Consolidated Financial Statements Years Ended June 30, 2009 and 2008, January 13, 2010
[7] PAPCO, Inc., Distillate Supply and Risk Management Programs, http://www.papco.com/price-programs.html

Strategy & Risk Management

HRT noted that the fuel market in recent years has not followed the fundamentals of supply and demand, but rather has been closely following the stock market. This is problematic because stock market performance has been based on perceptions and not reality, so rationality has been eliminated. HRT's chief budget officer and director of procurement monitor fuel market information by tracking OPIS prices and the fuel market, and use this information to determine when to lock in fuel prices with fixed-price contracts. HRT's supplier also tracks the fuel markets and makes fuel purchase timing recommendations to HRT, which the fleet can either approve or reject. The supplier's advice has been good most of the time and has worked for HRT. HRT continues to work with the supplier to improve fuel price certainty. Should HRT misjudge the market and fuel prices increase beyond the budget, it may have to approach the jurisdictions it serves for financial assistance. This can be difficult due to tight budgets.

HRT fuel purchases are designed as a rolling series of fixed-price contracts covering up to 100% of expected diesel and gasoline fuel consumption demand. HRT locks in 100% of its fuel prices if it believes it will be advantageous. When HRT management is uncertain on the direction of future prices, it will only lock in 50% to 75% of the expected fuel requirements and assume the risk of fuel prices increasing for the remainder of its fuel. Individual contracts are typically for 3, 6, or 12 months out. HRT generally has contracts covering a total of 12 months out, but prefers to stay covered for 12 to 15 months ahead for protection against sudden fuel price increases. There are instances, such as when fuel prices are especially volatile, when the vendor's fee is beyond what is practical for HRT to pay for the level of protection. In these cases HRT purchases fuel on the spot market, relying on OPIS pricing.

Results

The strategy of using fixed-price contract has resulted in lower fuel costs than if HRT had relied exclusively on purchasing fuel on the spot market at OPIS prices. The cost savings since FY 2006 have been considerable and HRT has been able to establish price and budget expectedness. The fleet plans to continue with this fuel purchasing approach.

Pooling

HRT does not participate in a fuel purchasing cooperative. HRT maintains full control of its fuel purchasing decisions and quantities by working directly with the fuel vendor.

Commodity Price Risk Management

HRT does not operate a fuel hedging program. Instead, as discussed in other sections, its fuel vendor hedges its bulk fuel purchases and passes the cost of its hedged position on to HRT. The vendor tracks markets and makes recommendations to the transit agency, which has the discretion to act on or reject the recommendations. This allows HRT to benefit from fuel hedging without operating its own program.

Tips for Success

Consider Overall Level of Risk in Addition to the Approach Used to Manage Risk

HRT has found that one risk management approach is not inherently better than another. The relevant issue is how much risk an agency is willing to assume, either short- or long-term. HRT has determined that locking in prices in advance (in the short-term; 12 to 15 months out) with fixed-price contracts is the best approach for the agency.

Nashville Metropolitan Transit Authority (Nashville MTA)

Summary

Location: Nashville, Tennessee
Fleet: 200 buses: 12 sixty-foot, 115 forty-foot, 10 35-foot, and 63 cutaway buses sized for 12 to 14 people
Fuel Volumes: Diesel – approximately 1.7 million gallons (FY 2009 and 2010)

The Nashville Metropolitan Transit Agency (Nashville MTA), as part of its environmental and long-term fuel strategy, is transitioning much of its 60-foot and 40-foot transit bus and paratransit vehicle fleet to hybrid-electric vehicles to reduce fuel usage. Vehicle additions and replacements that took place in fall and winter of 2010 included fourteen 60-foot diesel-electric hybrid buses, four 40-foot diesel-electric hybrid buses, and 35 gasoline-electric hybrid cutaway paratransit buses. Nashville MTA chose gasoline hybrid-electric technology for the paratransit buses because diesel hybrids were not available. In the future, depending on technology and pricing, Nashville MTA hopes to transition to fuel cell vehicles. Fuel usage over the past several years has been similar, but prices have varied due to the fuel market. In FY 2007, 1.4 million gallons of diesel were used at an average cost of $2.07 per gallon. In FY 2008, 1.68 million gallons of diesel were used at an average cost of $2.87 per gallon. In FY 2009, 1.7 million gallons of diesel were used at an average cost of $2.10 per gallon. From July 1, 2009 to June 30, 2010 (FY 2010) 1.7 million gallons of diesel were used at an average price of $1.88 per gallon.

Delivery Price Risk Management

Fuel Contracting

Through spring 2009, Nashville MTA purchased diesel fuel off of the spot market using daily quotes from three to five local fuel suppliers. The initiation of the hedging program (see Commodity Price Risk Management section) in July 2009 did not change its fuel purchasing method. Though Nashville MTA now hedges its fuel purchases, it is still important to obtain good spot market fuel prices to help ensure consistent correlation with the index prices used in hedging activities. The addition of gasoline hybrid-electric paratransit buses required Nashville MTA to locate a gasoline provider, so the fleet now purchases gasoline directly from one of the Metropolitan Government of Nashville & Davidson Country's (Metropolitan Nashville) local fuel depot stations. As described elsewhere in this case study, funds from the hedging program offset daily pricing changes.

Prior to 2008, Nashville MTA considered working with fuel suppliers to lock in prices using fixed-price contracts. This approach was not selected by the board due to the risk of being locked into high expense, long-term fixed fuel costs should fuel prices decrease. This situation could have resulted in a potentially negative effect on Metropolitan Nashville which provides approximately 48% of Nashville MTA's funding.

Pooling

Nashville MTA participated in a cooperative fuel purchasing group, but determined that the group and process became too large and complicated. The decision making control was out of the agency's hands and did not give it the level of control and results it sought. Nashville MTA then ended its relationship with the group to focus on developing an internal hedging program.

Commodity Price Risk Management

History

Amid dramatic increases in market volatility and fuel prices across the nation, Nashville MTA's average fuel cost increased from $2.07 per gallon in FY 2007 to $2.87 per gallon in 2008. This, along with a fuel usage increase from 1.4 million gallons to 1.68 million gallons, significantly increased the agency's annual fuel cost from approximately $3 million to $5.16 million, surpassing the agency's 2008 fuel budget by $1 million. Responding to this situation, Nashville MTA was forced to eliminate between five and seven service routes in October 2008 and sought a way to create budget certainty for fuel prices through the use of a commodity hedging program.

The Nashville MTA board was in favor of participating in a hedging program, but needed to have others involved for the program to be approved. Nashville MTA was also concerned about the public and political perception of hedging in the event that fuel prices dramatically decreased while the agency was locked in at a higher price. The agency's goal for the hedging program was to act as an insurance policy against volatile fuel prices, not as a potential revenue stream. As such, the agency was able to garner necessary support from the public and the board to pursue the idea further.

Nashville MTA approached Metropolitan Nashville, which agreed to create a partnership to facilitate the development of a fuel hedging program; as part of this process, legislation would be written granting the agencies permission to pursue the use of hedging instruments to protect against fuel price volatility. The hedging program includes several local participant groups including Metropolitan Nashville, Nashville MTA, the Regional Transportation Authority (RTA), and the City of Franklin. An interagency agreement was used to facilitate the collaboration. A hedging program committee consists of the Metropolitan Nashville finance director, the Metropolitan Nashville fleet manager, the Nashville MTA CFO, the Nashville MTA fleet manager, and the city of Franklin finance director. The City of Franklin finance director assumed the lead for developing the legislation that would allow for a hedging program to be used by the participants. Metropolitan Nashville is the program guarantor.

The process of developing the legislation and securing support for the bill took about one year. The bill was passed in the spring of 2009 with language that allowed Metropolitan Nashville and its partners to hedge fuel purchases for no more than 24 months forward. The legislation also included a firm end date for the pilot hedging program.

At the start of the process of getting the original legislative approval to hedge its fuel purchases, Metropolitan Nashville solicited bids from financial institutions to serve as counterparty and to manage the hedging activity. Rather than setting up a hedging account with a financial institution to hedge directly on the New York Mercantile Exchange (NYMEX), Metropolitan Nashville opted to pursue financial institutions which use over-the-counter (OTC) swaps as a counterparty. In this way, Metropolitan Nashville could rely on its credit rating and avoid having to fund and administer a margin account. Metropolitan Nashville carries the credit risk for all members of the hedging group, while a large regional bank was selected as the counterparty financial institution. The counterparty worked with Metropolitan Nashville to determine which policies were needed for Metropolitan Nashville, what legislation would need to be in place, and the annual fuel usage for Metropolitan Nashville and Franklin to determine the number of contracts needed to cover fuel purchases of diesel and gasoline. The hedging committee decided that involving a third-party financial advisor was not needed, solely relying on the counterparty financial institution for its outside financial information. The committee worked with the counterparty to discuss its hedging recommendations and to structure the program to meet the group's needs.

The initial hedging legislation became effective in May of 2009. The initial hedge agreement for OTC swaps started July 1, 2009 and was slated to run until June 30, 2011 to lock in the hedge price of $1.88 per gallon for seven contracts of diesel and $1.82 per gallon for three contracts of gasoline. The program was favorably evaluated after completing the first year, so new legislation to create the permanent authority for a hedging program was introduced and passed in May 2010. The legislation did not extend the maximum allowable hedge timeframe, but did allow for the end date to transition to a rolling 24 months from the present. Following the legislative approval, the hedging committee approved another OTC swap with the same fuel volumes as the initial hedge at $2.30 per gallon for diesel and $2.10 per gallon for gasoline for July 1, 2011 to June 30, 2012.

Strategy

Metropolitan Nashville, Nashville MTA, and the city of Franklin debated how much of the annual fuel purchases should be hedged because there were concerns over hedging too much fuel. The Nashville MTA board and other participating agencies were not comfortable with hedging 100% of needed fuel. The hedging group has a total of seven diesel contracts at 42,000 gallons (1,000 barrels) per contract per month, or a little more than 3.5 million gallons annually.

Nashville MTA uses almost three of the contracts with their annual usage of 1.7 million gallons. Nashville MTA has found that hedging approximately 85% of fuel purchases has been successful. Metropolitan Nashville and the city of Franklin hedge approximately 70% of their fuel purchases. The group also has three contracts for gasoline for approximately 1.3 million gallons annually. The remaining fuel purchases for each agency are purchased on the spot market.

As mentioned earlier, the hedging instrument employed is OTC swaps with a regional financial institution as the counterparty. The counterparty provides market updates and makes recommendations to the hedging committee every two to four weeks.

Fuel prices are indexed to the NYMEX (No. 2 heating oil is used for diesel and gasoline is used for gasoline). The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated so typically track each other. The counterparty determined that the NYMEX was still the best index for Nashville, even though they are not geographically close to New York.

The initial hedging contract was for two years because of the pilot program structure. Moving forward, the group decided to standardize with one-year contracts. The group's goal for the hedging program is to act as an insurance policy and to achieve budget certainty for the least amount of program management, so one year contracts provide the level of results, flexibility, and program management the group is comfortable with.

Approval and Execution Process

The market evaluation, approval for hedge positions, and execution process is straightforward. The hedging program committee prefers to work in one-year increments, so the group meets once a year to review and discuss the necessary information including market prices, indexes, forecasts, and anticipated fuel consumption. The counterparty participates in these meetings to present a summary of the previous year's performance and to discuss options for the next year. If fuel prices are favorable, the committee votes to move forward and Metropolitan Nashville locks in prices for an additional year, keeping the hedging contracts within the required rolling 24 months. If the market is not favorable, the hedging program committee meets as often as necessary until pricing becomes favorable to lock in prices for twelve months. The committee has found that this approach keeps the program simple and still ensures budget certainty.

The bank compares fuel prices monthly to the relevant indexes and sends Metropolitan Nashville either a check or a bill, depending on how the index compares to the price agreed to in the fuel contract. The CFO of Nashville compares the fuel purchasing costs with the NYMEX to make sure that the program is on target. The program results are also compared to the state fuel contract prices to gauge as a reference point for local prices.

Accounting for the hedging program began in July 2009. Nashville MTA does not have to report to the board on the operation and performance of the hedging program in a formal process.

Rather, a footnote about derivatives and disclosures will be included in the agency's 2010 audited financial report and funds received from the hedge are reported in the financial accounting records.

Results

Nashville MTA is very pleased with its hedging program. Fuel prices dropped below the hedge price for the first three months, so Nashville MTA (through the hedging group) was making payments to its counterparty financial institution (also referred to as being "on the bad side of the hedge"). Since then the trend has reversed and the agency is receiving funds from its counterparty. Overall the hedge activities are in the positive (also referred to as being "on the good side of the hedge"). The hedging program has saved Nashville MTA more than $143,000, or 4% of its FY 2010 fuel budget of $3,500,000. Nashville MTA also has found that it gets better fuel prices on the spot market (i.e., without the hedge activity) than if it had participated in the state fuel purchase contract.

Nashville MTA notes that it is nice to save money, but as experience in 2008 showed, the primary focus of the hedging program is to serve as a stabilizing factor and insurance policy against price increases and to provide budget certainty.

Tips for Success

Teaming with Other Parties Can Be Valuable

Teaming with other local transportation agencies, government, and cities, allowed Nashville MTA to develop and participate in a hedging program that would benefit many parties and draw on the strengths of each group. For example, the city of Franklin's finance director brought his expertise for getting legislation passed to bring about the hedging program. The team's agreed upon input allowed the group to lock in fuel prices for two years at $1.88 per gallon.

Keep the Hedging Program Small for Manageability, Local for Control, but Large Enough to Be of Interest to Other Parties

Working together allowed Nashville MTA, Metropolitan Nashville, and the city of Franklin to create a hedging program that was large enough to be of interest to a financial institution. Metropolitan Nashville also provided a strong credit background to serve as the guarantor, which was of great value because it removed the cash requirements for funding a margin account. Furthermore, the five person hedging committee is composed of local entities, and is small enough to come to quick and balanced decisions without the challenges that a larger committee or bureaucracy might experience.

Consider the Necessity for Energy Price Risk Management

Nashville MTA believes that it is becoming increasingly important for transit agencies to have an effective energy price risk management program in place since it appears that speculative market forces are moving fuel prices more than traditional rules of supply and demand.

Budget Certainty Is of Great Value

Nashville MTA sees its hedging program as insurance for the unexpected, as was experienced in 2008. The program mitigates the necessity for reducing services and difficult budget cutting in the middle of the year.

Southeastern Pennsylvania Transportation Authority (SEPTA)

Summary

Location: Philadelphia, Pennsylvania metropolitan area
Fleet: 2,788 vehicles: 1,073 diesel transit buses (primarily 40-foot and 155 sixty-foot articulating), 372 forty-foot diesel-electric hybrid transit buses, 38 forty-foot electric trackless trolleybuses, 185 light-rail cars, 343 elevated subway cars, 352 railcars, and 425 ADA/Shared Ride vehicles (15 to 25 feet long)
Fuel Volumes: Diesel – 13,268,000 gallons (July 2009-April 2010), B2 Biodiesel blend – 2,700,000 gallons (May 2010-June 2010), Gasoline – 205,000 gallons, Electricity – 500,400 MWh

The Southeastern Pennsylvania Transportation Authority (SEPTA) is the sixth largest transit system in the country and provides fixed route and demand response service (paratransit) to Bucks, Chester, Delaware, Montgomery, and Philadelphia counties. The service area includes 2,184 square miles, serves 400,000 weekday customer trips, and provides more than 300 million rides each year. From July 1, 2009 to June 30, 2010 (FY 2010), SEPTA used 205,000 gallons of gasoline in utility and support vehicles at an average price of $1.88 per gallon. During the same period SEPTA used over 13.2 million gallons of diesel at an average price of $2.35 per gallon. In May 2010 SEPTA transitioned all diesel buses to a 2% biodiesel blend (B2) to comply with a state legislative mandate and used 2.7 million gallons of B2 (a blend of 2% biodiesel and 98% petroleum diesel by volume) at an average price of $2.43 per gallon. In addition, SEPTA used more than 2.6 million gasoline gallon equivalents (GGE) of natural gas at an average cost of $1.11 per GGE, and over 500,000 megawatt hours (MWh) of electricity were used at an average price of $85.70 per MWh.[8] Approximately 80% of the electricity use was for propulsion power for the regional rail system, subway-elevated lines, light-rail lines, and trolleybus routes. The remaining 20% is used to power SEPTA's General Service (GS) and High Tension (HT) accounts which include Headquarters' Building, stations, depots, and other locations.

Delivery Price Risk Management

Fuel Contracting

Diesel. SEPTA contracts directly with fuel suppliers and chooses suppliers by issuing an RFP. The supplier with the lowest price that can assure the fuel's delivery receives the contract. Fuel vendors do not have to be local to compete for the contract. For twenty years prior to September 2010, SEPTA used fixed-price contracts to lock in fuel costs with vendors for gasoline, diesel, and now biodiesel blended fuels. In 2006 and 2007 SEPTA's longer term fixed-price contracts expired and the agency decided to float on the market (i.e., no fuel contract or other financial mechanism was in place) in anticipation of decreasing fuel prices. Instead, SEPTA surpassed its 2007 fuel budget by $15 million because of a rise in fuel prices and the corresponding increase in costs for fixed price contracts. The agency was able to absorb most of the overages because transit system ridership during the same time increased as a result of high fuel prices, which in turn increased revenue.

Diesel fuel prices dropped precipitously in the second half of 2008 from a high of $3.95 per gallon in July 2008. Beginning in March 2009 SEPTA negotiated several short-term fuel contracts from a low price of $2.34 per gallon of diesel to a high price of $2.44 per gallon over the

[8]GGE is a method to normalize the usage of multiple fuels by their energy content (i.e., British thermal units per gallon, or Btu/gal) using gasoline as the baseline. For example, diesel fuel has an average energy content of 128,400 Btu/gallon while gasoline has an average energy content of 115,000 Btu/gallon. Thus, one gallon of diesel fuel has equivalent energy content of 1.12 gallons of gasoline [i.e., 128,400 Btu/gallon divided by 115,000 Btu/gallon = 1.12]).

18-month period that ended August 31, 2010. The weighted average market price was $2.36 per gallon over the 18-month contract period and $2.41 per gallon over the last six months of the contract period—slightly lower than the contract price. This was the agency's last fixed-price diesel fuel purchase contract. Under these agreements, SEPTA was obligated to purchase at least 16 million gallons of diesel fuel per year.

Since September 2010, SEPTA continues to utilize an RFP process to purchase both diesel and gasoline fuels. Fixed price contracts continue to be used for gasoline purchases. Diesel fuel purchases, however, are based on the weekly Oil Price Information Service (OPIS) index price (as of Sunday evening) plus a margin (fee). The current diesel fuel supply contract is with one company for a total of 24 million gallons of B2 (16 million gallons for 12 months) over an 18 month timeframe. This fuel purchasing approach was chosen to work in tandem with the agency's newly implemented (September 2010) fuel hedging program, which is described in the Commodity Price Risk Management section.

Electricity. SEPTA has an electricity supply rate tariff agreement with a local utility with rates that were approved by the Pennsylvania Public Utility Commission. The electricity rate cap was slated to end December 31, 2010, so SEPTA and Amtrak developed a strategic partnership to secure market generation electricity supply for their propulsion power accounts. A solicitation was released by Amtrak, but SEPTA assumed full responsibility for the negotiation and award of the SEPTA account contracts. The contracts with two energy companies went into effect on January 1, 2011. The contracts fall under Amtrak's Master Agreements with the suppliers and are signed by each of the three parties. Each entity has a separate agreement under the bid. The master agreement, proposed by SEPTA's energy consultant, includes an Emergency Purchase Agreement, which gives SEPTA preapproval to solicit fuel supply contracts with a list of suppliers as a precaution if circumstances dictate such an action. This was critical because the decision time was cut from a likely five months to between two and four months.

Pooling

SEPTA does not participate in a cooperative fuel purchasing arrangement. The agency is large enough to have sufficient negotiating power and prefers to remain in control of fuel purchasing decisions. Because of this, SEPTA works directly with suppliers to meet fuel purchasing needs and maintains full control of all aspects of fuel acquisition. As mentioned above, however, SEPTA and Amtrak did team up to solicit better electricity rates for the propulsion power accounts than they could have received on their own.

Commodity Price Risk Management

History

SEPTA was recently approached by several banks and financial institutions to encourage the agency to initiate a fuel price hedging program. One of these banks, a global financial services company based in Germany, initially approached SEPTA in December 2009 and briefed the agency's financial department, the CFO, and the purchasing department about the benefits of hedging.

SEPTA agreed that implementing a hedging program was the best option for its fuel purchasing strategy. To start the program development, SEPTA participated in four educational meetings with the bank over the course of about nine months to learn about hedging options. These meetings included SEPTA's CFO, purchasing department, finance department, fleet department, and a public financial management (PFM) consultant who served as SEPTA's financial and investment advisory consultant. This larger group agreed that a hedging program would be an effective solution to establish fuel price and budget certainty; the level of customer service the bank could provide was also ranked highly. The ability to achieve budget certainty was critical because of concerns over decreasing transit funding due to the recession. The program was able to be quickly initiated by the CFO, in consultation with the general manager, by using the emergency purchase agreement for critical commodities; board approval was therefore not needed. (The board had originally implemented this provision to ensure that SEPTA would not miss opportunities such as this.) The Authority's fuel hedging agreement with the bank was finalized by the SEPTA CFO in April 2010. The hedging program went into effect in September 2010.

The goal of the hedging program is to protect against price shocks, reduce price volatility, and to create price and budget predictability/certainty. The program is not intended to operate as a revenue stream. The agency is finalizing internal accounting arrangements in accordance with the Governmental Accounting Standards Board and has set up an account with the bank for its hedging activities.

Strategy

SEPTA's diesel buses were transitioned to operating on B2 biodiesel blends in May 2010 to comply with a state legislative mandate. Thus, SEPTA's hedging activities correspond with the purchase of B2 biodiesel blended fuel. SEPTA's fuel purchasing strategy is to maintain two separate arrangements: 1) a supply agreement with a fuel supplier (as described earlier), and 2) an over-the-counter swap hedging agreement with a financial service company as the counterparty. SEPTA has a very good bond credit rating so the requirement to maintain funds in a margin account was waived. SEPTA employs a dynamic, situational hedging strategy and hedges 100% of its fuel purchases. Biodiesel fuel prices are hedged against New York Mercantile Exchange prices of No. 2 heating oil. The same approach would have been used if 100% petroleum diesel fuel were used. The hedging program costs (fees and payments) are accounted for as part of the overall fuel expense on the balance sheet and in the budget.

Approval and Execution Process

SEPTA's fuel hedging decision-making process is a collaborative effort among the operating budget, treasury, and purchasing departments. The counterparty bank also provides a summary of SEPTA's daily and monthly fuel prices and fuel volumes at the end of each month to show the current performance of the program. SEPTA's asset treasurer tracks the fuel market on a daily basis. Longer-term trends and projections developed internally, by third-party advisors or by the bank, are analyzed. Joint recommendations are developed and presented to the CFO and general manager for final decision making purposes.

Results

Since the program was initiated in September 2010, SEPTA has entered into three separate consecutive swap agreements at different prices, though each was for the same monthly fuel usage quantities. The first agreement was for four months (September 1, 2010 to December 31, 2010) at a price of $2.38 per gallon for 5.4 million gallons. The second agreement (Jan 1, 2011, to June 30, 2011) was for 8.1 million gallons at a price of $2.32 per gallon. The third agreement was for 8.1 million gallons (July 1, 2011 to December 31, 2011) at $2.20 per gallon. As of this writing, SEPTA was not hedged for the final two months of its fuel supply contract; SEPTA planned to reassess this situation as the year progressed. SEPTA expects to have another hedge in place by spring or summer of 2011. As of September 2010, during the first four months of the agreement, the heating oil futures rate was fixed at $2.38 per gallon.

SEPTA's hedging program is too new to evaluate its effectiveness. SEPTA tracks fuel expenses closely. Although the agency wrote a check to its counterparty bank for September and October to balance the account (as prices have been lower than their agreement), expectations are that fuel prices will rise and SEPTA will save money over what would have been paid on the spot market. There is no formal process for evaluating the program effectiveness. The assistant treasurer reports on hedging program status and performance to the CFO in monthly meetings. The agency's guidelines for evaluating the effectiveness of the hedging program include: 1) the quality of the working relationship with the counterparty, 2) the amount of administrative work the hedging program creates for SEPTA, 3) how well SEPTA works with its fuel suppliers, and 4) the effectiveness at achieving budget certainty, which is key.

Tips for Success

Finding the Right Partner Is Key

SEPTA's hedging program was initiated in September 2010 (one month prior to this writing), so it is too early to evaluate the program's effectiveness. After being approached by different banks and financial institutions, SEPTA's CFO and financial department staff saw the need to find a partner willing to educate them, handle large scale transactions, and minimize counterparty risks. The agency noted that the process takes planning and education and that it is still learning, but that it sees great value in being able to mitigate pricing fluctuations to achieve budget certainty.

Houston METRO

Summary

Location: Houston, Texas
Fleet: 1,374 buses, 18 rail cars (FY 2009)
Fuel Volumes: Diesel – 13.2 million gallons (FY 2009), Gasoline – 0.8 million gallons (FY 2008 projected), electricity for propulsion – 7.555 million kWh (FY 2008 projected)

Metropolitan Transit Agency of Harris County (Houston METRO) is the public transit agency serving the Houston metropolitan area, a service area of 1,285 square miles. The agency's fleet is primarily composed of diesel-powered buses, but it also contains 18 electric rail cars. In 2009, Houston METRO consumed 13.2 million gallons of diesel fuel at a hedged price of $3.59 per gallon. Beginning in 2005, Houston METRO attempted several fuel price hedging strategies, including bulk purchases and fixed price contracts, before implementing a financial hedging strategy in 2008.

Delivery Price Risk Management

Fuel Contracting

Houston METRO's procurement department conducts bids by posting bid requests to an online platform and alerting potential bidders. In 2009, the agency had a 12-month contract with a floating price calculated as the Platt's index price for ultra low sulfur diesel (ULSD) in the Gulf Coast plus a fixed per gallon differential.

Houston METRO includes a special clause in its diesel contracts to ensure that the agency can purchase fuel on a priority basis in the event that hurricanes disrupt the region's fuel supply. The contract stipulates that 30,000 barrels (1.26 million gallons) of diesel be available to the agency on a priority basis during hurricane months. Houston METRO only allows bids from producers that control the racks from which the fuel is dispensed to ensure availability of fuel. In previous years, Houston METRO had ensured fuel availability by leasing a 105,000-barrel storage facility. However, this lease was cancelled in 2010 because Houston METRO considered that availability of fuel could be assured through a fuel contract with a priority clause and by utilizing the storage capacity at Houston METRO's facilities.

Commodity Price Risk Management

History

In 2005 Houston METRO began exploring ways to control fuel costs after the agency's fuel budget nearly doubled over three years from $10.37 million ($0.65 per gallon) in FY 2002 to $19.00 million ($1.13 per gallon) in FY 2004.[9] Under the assumption that prices would continue to rise, Houston METRO CEO Frank Wilson directed the agency to make a 12-month bulk purchase of diesel fuel from a local refiner in January 2005. The bulk purchase essentially locked in the January 2005 price of diesel, although Houston METRO had to pay a storage fee to hold the fuel over the course of the year as it was consumed. As a result, the agency saved more than $5 million on its fuel expenditures.[10]

In November 2005, as January's bulk fuel supply began to dwindle, the agency entered into a six-month fixed-price future delivery contract with a supplier. Under the contract, the supplier sold set volumes of diesel fuel to Houston METRO at a fixed price. The agency had contacted several refiners and dealers seeking a fixed price contract and one refiner offered a much lower fixed price than other suppliers. Overall, the fixed price contract saved the agency roughly $0.75 million over six months. The contract was in Houston METRO's favor but was set to expire in May 2006 and neither the supplier nor other local fuel dealers were willing to extend the contract at a similar price level. When the contract expired in May 2006, Houston METRO made a one-month purchase from a local fuel storage facility, saving another $0.29 million versus the rack price.[11]

Overall, Houston METRO's aggressive fuel purchasing strategies saved roughly $6.2 million versus purchasing at market prices in FY 2005 and FY 2006. Despite these savings, however, rising oil prices continued to impact Houston METRO's fuel budget; the agency's diesel budget rose to $22.83 million ($1.52 per gallon) in FY 2005 before surging to nearly $27.55 million ($1.90 per gallon) in FY 2006.[12]

Faced with out-of-control fuel costs and a lack of fixed-price options, Houston METRO turned to the financial markets for ways to manage its fuel prices. A banking consultant put Houston METRO in contact with a fuel price consultant based in Dallas, who helped craft a fuel price risk management policy to fit the agency's needs.

The policy was presented to Houston METRO's board of directors in February 2006. The board was made up of local businessmen who understood the need for fuel price hedging to control costs. The board approved the policy and later authorized implementation of the fuel hedging program. Once the program was authorized by the board, Houston METRO's attorneys drafted a master swap agreement that favored the agency. The agency also established a credit rating, a prerequisite for funding swap margin accounts.

With the help of its consultant, Houston METRO identified eight potential counterparties made up of highly-rated financial institutions and trading subsidiaries of major energy corporations. Houston METRO solicited these potential counterparties to prequalify a short list of those who would like to enter a swap agreement. Houston METRO's attorneys then worked to negotiate master swap agreements with interested parties that had been prequalified, a task which took months. Once the master agreements were in place, Houston METRO could procure a swap agreement for a particular month (or strip of months) through a competitive telephone bid process.

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[9] http://www.ridemetro.org/AboutUs/Publications/Pdfs/FY2007BudgetBook.pdf (p. 56)
[10] FY 2007 Budget Book (p. 56)
[11] FY 2007 Budget Book (p. 56)
[12] FY 2007 Budget Book (p. 15) http://www.ridemetro.org/AboutUs/Publications/Pdfs/FY2008_Bus_Plan_Budgets.pdf

Strategy and Process

The goal of Houston METRO's fuel price risk management strategy is to minimize operating budget variance attributable to fuel price variability. The philosophy behind Houston METRO's fuel price risk management strategy is to engage in discrete, situational hedging. This policy requires the agency's management to develop an executable hedge plan by setting specific diesel price targets with a corresponding authorized quantity of fuel to hedge. This plan is to be executed by fuel transaction clerks in the agency's procurement department. The policy allows Houston METRO to hedge up to 100% of the agency's fuel consumption for a period of up to 24 months by entering into fixed price contracts, financial swaps, collars, or caps.[13] Houston METRO's hedging policy prohibits the agency from taking on basis risk (the risk that hedge price movements will not perfectly offset movements in the agency's physical fuel prices). As a result, Houston METRO can only use hedge instruments that follow Platt's Gulf Coast ULSD pride index (the index used to calculate Houston METRO's physical fuel bills).

Procurement Manager Michael Southwell was designated as one of Houston METRO's fuel transaction clerks charged with implementing the telephone bid process. Southwell, with the help of Houston METRO's financial department and a consultant in Dallas, monitors the oil market waiting for price dips. When an attractive price environment is identified, Southwell consults the financial department and then approaches Houston METRO's CEO with figures for consideration. If the CEO and METRO's financial department are comfortable with the price environment, the CEO authorizes Southwell to contract a swap at or below a target price. Southwell then initiates a telephone bid by contacting two or three pre-qualified institutions to bid swap prices. From this list Southwell selects the best offer that is at or below the target price and then sends the swap agreement to the agency's financial department for processing. Altogether, the telephone bid process takes three to four minutes.

Results

Despite being authorized for FY 2007, Houston METRO's hedging program did not take off until FY 2008. The original hedging program called for FY 2007's diesel fuel to be hedged by July 2006. In June 2006, however, diesel fuel swaps were being bid in the $2.30 to $2.42 per gallon range. Including a transportation and TxLED fee of eight cents per gallon, this would have brought the agency's pre-tax fuel budget to $2.38 to $2.50 per gallon compared with a diesel fuel budget of $2.08 per gallon plus tax in FY 2006.[14] Locking in at the higher prices would have added $4.5 to $6.3 million to Houston METRO's fuel budget and management did not believe it to be prudent to hedge all of its FY 2007 consumption at those prices.[15] The management decided to remain unhedged and wait for lower prices before entering a swap agreement. Instead of hedging with swaps in FY 2007, Houston METRO entered into NYMEX-based fixed price future delivery contracts covering the first six months of the fiscal year and storage fuel was used over the last six months.[16] Despite these measures, Houston METRO's diesel fuel budget surged nearly $10 million in FY 2007 to $37.02 million.

Houston METRO finally began implementing its financial hedging program in January 2007, when it executed two financial swaps for diesel fuel for FY 2008. A total of 13.5 million gallons (98%) of the required diesel for FY 2008 was hedged at an average market price of $1.83 per gallon

[13]Fuel Price Risk Management Policy, February 16, 2006
[14]http://www.ridemetro.org/AboutUs/Publications/Pdfs/FY2007BudgetBook.pdf (p. 57)
[15]FY 2007 Budget Book (p. 57)
[16]http://www.ridemetro.org/AboutUs/Publications/Pdfs/FY2008_Bus_Plan_Budgets.pdf (p. 16)

(excluding $0.0893 additional for additives and transportation). The details of the swaps are listed in the following chart:

Vendor	Gallons	Date of Purchase	Avg. Price per gallon	Cost
Vendor 1	7,014,000	1/10/07	$1.88	$13,179,466
Vendor 2	6,510,000	1/17/07	$1.77	$11,516,148
Total	13,524,000		$1.83	$24,695,614

Source: http://www.ridemetro.org/AboutUs/Publications/Pdfs/FY2008_Bus_Plan_Budgets.pdf (p. 16)

These swaps settled monthly from October 2007 to September 2008 (Houston METRO's fiscal year) and resulted in a gain of $17.25 million in FY 2008. In particular, Houston METRO's hedging strategy allowed it to avoid the sharp run up in fuel prices between January and July 2008 as crude oil prices surged from $100 to nearly $150 per barrel. The swaps also gave Houston METRO budget certainty after several years of volatile, upward trending fuel prices.[17]

Houston METRO's experience in FY 2009 was less positive. During FY 2008, the agency had entered into seven commodity swaps with two counterparties covering 13.6 million gallons of diesel fuel. These contracts settled monthly from October 2008 to September 2009 and represented 98% of the agency's diesel consumption. This time Houston METRO bought high and sold low; the swaps effectively locked in an average price of $3.55 per gallon over FY 2009.[18] As oil and diesel prices precipitously declined over the course of the fiscal year, Houston METRO realized a net loss of $26.7 million on its swap contracts.[19]

In FY 2010 Houston METRO hedged 14.5 million gallons (100%) of its anticipated diesel fuel purchases at an average price of $2.62 per gallon. These contracts, together with contracts covering 8.9 million gallons for FY 2011, had a negative value of $8.85 million at the beginning of FY 2010.[20] Some of the swaps for FY 2010 were entered in 2008 while others were initiated in 2009.

Tips for Success

Consider the Pros and Cons of Different Strategies for Determining When to Hedge

The greatest difficulty with Houston METRO's strategy is the selection of a price target. The agency's hedging policy stipulates that management develop a price target as part of an executable hedge plan. However, the development of a price target requires a reasonable forecast of where prices are headed over the hedge horizon (24 months). Price targets are also tricky because they raise the possibility that swap prices may never exactly meet the target price, causing the agency to remain unhedged and exposed to price further price increases.

In practice, Houston METRO enters into swap agreements when prices "sound good" to the management. This adds pressure on those executing the strategy. Timing decisions by Houston METRO's management could lock in prices that save or cost the agency millions of dollars. Selecting the right time to hedge is one of the key challenges of discrete, situational hedging

[17]http://www.ridemetro.org/AboutUs/Publications/Pdfs/2008-AnnualReport.pdf (p. f44)
[18]http://www.ridemetro.org/AboutUs/Publications/Pdfs/FY2010-Budget-Summary-21-September-2009.pdf (p. 4)
[19]http://www.ridemetro.org/AboutUs/Publications/Pdfs/2009-Annual-Report.pdf (p. c61)
[20]http://www.ridemetro.org/AboutUs/Publications/Pdfs/2009-Annual-Report.pdf (p. f61)

strategies. Continuous, rule-based strategies, on the other hand, rely less on timing decisions because futures contracts are purchased on a continual basis. Well-executed situational strategies can potentially outperform rule-based strategies over time but can also require more active, higher pressure management decisions.

Using a Range of Hedging Tactics Might Improve Results

Although Houston METRO's hedging policy authorizes it to use several hedging tactics including swaps, caps, and collars, Houston METRO has only used swaps to date. Michael Southwell attributes this to the difficulty in getting management to understand and approve use of all of the tactics at the agency's disposal. Reliance on one tactic means that Houston METRO has only two options: 1) lock in a particular price, or 2) remain unhedged and exposed to further price increases. This limits the agency's flexibility to adapt its hedging strategy to different price environments.

For instance, in 2008, as diesel fuel prices skyrocketed to above $4 per gallon, Houston METRO's hedging consultant recommended purchasing caps for FY 2009 rather than locking prices in with swap agreements. Employing caps would have placed a ceiling on further upward price movements while at the same time allowing the agency to benefit if prices crashed. At the time, the consultant had recommended buying the protection at $5 per gallon. Houston METRO management thought this cap was too high and the premium on the cap was never priced. In hindsight, this strategy would not have paid out as diesel prices never surpassed $5 per gallon. Nevertheless, employing caps rather than swaps would have allowed the agency to take part in falling prices in FY 2009. Given the extreme volatility of oil prices in 2008, a cap would have been a better fit for the price environment than locking in at a high rate or remaining unhedged.

Situational Hedging Programs May Benefit from More Flexible Hedge Horizons

In early 2009, after oil prices crashed to below $40 per barrel, Houston METRO saw an opportunity to purchase swaps for FY 2010 and FY 2011 at bargain prices. Michael Southwell quickly began arranging swaps as far out as 24 months—the maximum horizon allowed under the agency's hedging policy. As the current months expired, Southwell would purchase the next month out if the price looked good to management. In this depressed price environment, it would have been advantageous for Houston METRO to hedge further out—perhaps 36 or 48 months—to secure low (and certain) fuel prices for years to come. However, Southwell was limited by the hedging policy, which restricted the program to a maximum of 24 months. Under discrete, situational hedging strategies, practitioners may benefit from having flexible hedge horizons.

Sioux Area Metro (SAM)

Summary

Location: Sioux Falls, South Dakota
Fleet: 54 buses: 29 twenty-nine-foot diesel buses, 22 twenty-seven-foot cutaway diesel buses, 2 thirty-foot diesel trolleys buses (seasonal), 1 gasoline passenger van (FY 2010)
Fuel Volumes: Diesel – 216,500 gallons (FY 2009)

Sioux Area Metro (SAM)[21] is the public transit agency that serves the city of Sioux Falls, South Dakota. SAM's service area covers approximately 100 square miles. The agency provided over

[21]Sioux Area Metro was formerly known as Sioux Falls Transit until the name was changed in December 2009.

one million passenger trips in FY 2009, and "operates 12 regular fixed routes, three school tripper routes, paratransit services for the elderly and disabled, and a seasonal trolley service in downtown Sioux Falls."[22,23] The city contracts with another company to operate and maintain the city's transit fleet. The majority of the operating funds come through fare box revenue, city funds, and federal government grants.[24] The fleet consists of 54 diesel powered buses, including two seasonal diesel trolleys, and one gasoline passenger van. The diesel bus fleet used almost 217,000 gallons in FY 2009, with an average cost of $2.01 per gallon, and a total cost of $436,000 (price includes all fees). Fuel costs in FY 2009 accounted for approximately 6.0% of transit operations budget and 5.1% of the total transit budget.[25] The city's transit division total annual budget was $8,547,963 in 2009[26] and $7,419,258 in 2010.[27] For more historical reference, in FY 2006 SAM used 232,000 gallons of diesel at an average cost of $2.40 per gallon. In FY 2007 238,000 gallons of diesel were used at an average cost of $2.44 per gallon. In FY 2009 216,500 gallons of diesel were used at an average cost of $2.01 per gallon. A fuel reporting issue caused erroneous data to be collected in 2008 so is not reported.

Delivery Price Risk Management

Fuel Contracting

Prior to 2007, SAM purchased fuel on the spot market, as did all other city departments, through a pool of four local fuel vendors. The supplier which offered the lowest costs (including delivery and other fees) was selected. Since 2007, this fuel purchasing method continues to be used for nine months out of the year (July to March). For the remaining three months (April to June), the city secures a three-month fixed-price contract from the fuel supplier that can guarantee delivery of the required fuel volume at the lowest price. SAM is required to purchase fuel on the contract during this three-month period. This approach provides the city, and SAM, with budget certainty for these three months, and avoids long-term obligations and premiums that might arise from locking in fuel costs at higher than market prices for the rest of the year. SAM is restricted from entering into its own fixed-price contract for the nine month period from June to March.

SAM works with the city fuel purchasing department's team to develop a fuel usage and costs estimate for the next year's budget request. The analysis includes SAM's average miles per gallon, total expected miles to be traveled, and the team's forecasted fuel price. SAM's anticipated fuel use, along with the anticipated usage from the other city departments, provides the city purchasing department with the necessary information to request price quotes from the four vendors two months before the April to June contract period begins.

Strategy

The city's fuel purchasing strategy is to use price competition among four local vendors for fuel delivery for June to March, and to lock in prices with a fixed-price contract for April to June.

[22]Mayor's Recommended Budget 201: City of Sioux Falls, South Dakota, http://www.siouxfalls.org/~/media/documents/finance/2010/2011_mayors_recommend_budget.ashx (p. 110)
[23]Transit Management Agreement Audit: Internal Audit Report 8-02, http://www.siouxfalls.org/~/media/documents/auditors/2008/transit_audit_report_08_02.ashx (p. 1)
[24]Id.
[25]City of Sioux Falls, South Dakota 2009 Budget for the Fiscal Year Ended December 31, 2009, http://www.siouxfalls.org/~/media/documents/finance/2008/2009_budget_summary.ashx (p. 5)
[26]Id.
[27]City of Sioux Falls, South Dakota 2010 Budget for the Fiscal Year Ended December 31, 2010, http://www.siouxfalls.org/~/media/documents/finance/2009/2010_Budget_Summary.ashx (p. 1)

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The city believes that this approach allows it to receive the most competitive pricing as fuel costs fluctuate, and to take advantage of locked-in pricing at a time of year when prices are generally lower. The city also believes that this approach avoids any cost premiums or long-term obligations from June to March.

Approval and Execution Process

SAM is authorized to purchase fuel directly from local vendors at spot market prices for the open nine months of the year (July to March). During this timeframe, SAM sends a fax request approximately every two weeks for bids to the four local vendors for a 7,500 gallon load of diesel fuel. The vendor with the lowest price (including delivery and other fees) receives the order. During the April to June timeframe, SAM informs the city's purchasing department when it needs a load of fuel. The city places the order for delivery to SAM's storage tank and sends an invoice to SAM for the fuel cost.

Results

In FY 2006, before the three-month fixed-price contracts were used, SAM purchased fuel on the spot market through local vendors throughout the year and used 232,000 gallons of diesel at an average of $2.39 per gallon. In FY 2007, the first year the three-month fixed-price contracts were used, the city locked in prices for the second quarter. SAM's total annual fuel use was 238,000 gallons, at an average of $2.31 per gallon. In 2008, SAM purchased diesel fuel on the city's April to June supply contract for approximately $2.80 per gallon instead of the then-market price of $4.20 per gallon during the high price volatility period; this saved SAM roughly $75,000. The city attempted to get a contract extension, but the fuel supplier did not agree to extend the contract. For all of 2008, SAM used 187,000 gallons of diesel fuel, averaging just over $3.26 per gallon, at a total of $611,000. In this instance, the three month fixed price contract saved SAM 10.9% over the whole year. Even with the $75,000 savings, SAM exceeded its fuel budget. SAM eliminated unnecessary spending, but did not reduce service to eliminate/reduce the overage. Additional funding was still needed to close the budget gap. Funding was approved by the city council to cover the remaining $100,000 overage. That year (FY 2008) was the only instance where SAM had a budget issue due to fuel costs, indicating that its budgeting and purchasing system generally proves to be effective, even though it is very straightforward.

Pooling

SAM does not participate in, nor is pursuing, any cooperative arrangements. Pooling has never been investigated as a fuel purchasing option.

Commodity Price Risk Management

SAM does not utilize commodity risk management strategies for its fuel purchases.

Tips for Success

Select a Fuel Purchasing Strategy Appropriate for the Agency's Size

SAM believes that it is difficult for an agency of small size to have the resources to dedicate staff or hire a consultant to stay ahead of the fuel pricing market. The agency acknowledges that doing so could save a significant amount of money and possibly provide more budget certainty. In many ways, the current approach is to self-insure. The method has proven effective since SAM's fuel costs are not a major part of the city's budget.

Minneapolis–St. Paul Metro Transit

Summary

Location: Minneapolis-St. Paul, Minnesota
Fleet: 910 buses: 658 conventional diesel 40-foot buses, 67 diesel-electric hybrid 40-foot buses, 166 articulated diesel 60-foot buses, 19 over-the-road diesel coach buses; and 27 rail cars. (Bus figures are for FY 2010, rail is for FY 2008.)[28,29]
Fuel Volumes: Diesel – approximately 6.9 million gallons (FY 2009)

Metro Transit is part of the Metropolitan Council (the Council), which is the regional planning agency for the Minneapolis-St. Paul seven-county metropolitan area.[30] Additionally, the Council provides programs which service metro-wide transportation services, waste water processing, housing, parks, and land use planning. Metro Transit is one of the largest transit agencies in the United States with an annual ridership of approximately 78 million passenger trips. It serves a major portion of the cities of Minneapolis and St. Paul, as well as surrounding suburbs. In addition to its transit bus fleet, Metro Transit operates both a light-rail line and a commuter rail line.

Delivery Price Risk Management

Fuel Contracting

Metro Transit works directly with suppliers to meet fuel purchasing needs and maintains full control of all aspects of such fuel acquisition. Metro Transit represents about 90% of the Council's diesel fuel consumption; the remaining 10% is consumed by the Council's Metro Mobility group.

Prior to 2005, Metro Transit purchased fuel from a local refiner/distributer through fixed price contracts. This contract/arrangement also allowed Metro Transit to lock in prices for a future period. Under this arrangement, Metro Transit was subject to paying a premium for a fixed-price contract over a floating price contract. The option to lock in prices some of the time was recognized as a valuable but expensive service. After the final fixed-price contract ended, Metro Transit's fuel price management process was divided into two pieces: 1) a floating-price fuel supply contract solely, and 2) a hedging program that used futures contracts to lock in future prices, thus giving a high degree of "budget certainty." The hedging program is described below in the Commodity Price Risk Management section.

Pooling

Metro Transit does not currently participate in a cooperative diesel fuel purchasing arrangement. The state of Minnesota provides such a service. Generally, the cooperative locks in a price on a given date for the next 12 months, thus giving exposure to one price which may be the high or low in fuel prices for the year, but more likely is somewhere in between.

Commodity Price Risk Management

History

Cost certainty is critical for government agencies since they operate on a fixed annual budget; thus, hedging was seen as a potential solution. Prior to implementing its own hedging program,

[28]Metro Transit, About Metro Transit, http://www.metrotransit.org/about-metro-transit.aspx
[29]Metropolitan Council, 2008 Comprehensive Annual Financial Report, http://www.metrocouncil.org/about/CAFR2008.pdf
[30]Metropolitan Council, About the Metropolitan Council, http://www.metrocouncil.org/about/about.htm

the agency tracked its fixed-price contracts and compared them to what price would have been paid if it had floated by paying market prices. Metro Transit was confident after the analysis was completed that instituting an in-house hedging program had the potential to meet its fuel price risk management goals at a lower average cost than by using fixed-price contracts with its fuel suppliers.

To establish its hedging program, Metro Transit's director of purchasing and contract services approached the Council's treasury department, Transportation Committee, and the division's general manager to educate the Council's policy body on the importance of managing fuel price volatility risk and the opportunity for enhanced budget certainty at a lower cost. Following the presentation, the Council supported the program's concept and allowed Metro Transit to move forward with establishing the hedging program. With the assistance of a consultant/advisor, the Council decided to handle the planning, execution, and operation of the hedging program in-house because the Council had the required depth of financial expertise to effectively manage the program. The Council's state-governed investment policies at the time did not allow for using forward pricing mechanisms (i.e., hedging) for energy purchases. Staff from Metro Transit and the Council worked with the state legislature to educate the legislature about using hedging as a financial tool to mitigate future fuel price volatility, with the goal of the legislature authorizing Metro Transit to use hedging for its fuel purchases. Initially, due to a certain stigma associated with the term hedging, the Council was careful to characterize its risk management strategy as forward pricing.

The hedging activity can be viewed as an insurance policy against future fuel price volatility for a defined time period. The Council also emphasized that the proposed hedging strategy was not speculative, but rather was a budget stabilization tool intended to create fuel price certainty in an unstable commodity, the opposite of a risky venture. The state legislative body saw the merits of a fuel hedging program for Metro Transit and the agency located a legislation sponsor. The legislative process took two years over multiple legislative discussions to complete. The legislation was passed in June 2005 and enabled the creation of the hedging program and allowed the Council to hedge up to 100% of Metro Transit's projected fuel consumption.[31]

While the legislation was working its way through the legislative process, anticipating a positive result, the Council worked closely with their third-party financial consultant (a commodity trading advisor, or CTA), brokerage firms, and other entities to build their knowledge base on fuel price hedging. The CTA, which has a focus on hedging for the transportation industry, was selected through a bidding process. The CTA brought its experience to the table and assisted the Council in developing the fuel hedging program, as well as reviewing the necessary policy and procedures. These detailed documents outline the hedging program's policy, purpose, implementation, and accountability. To be conservative, management stipulated that the total hedged position would be limited to 90% of projected diesel fuel purchases. The lower percentage allows for some unpredictable reduction in fuel demand to avoid over-hedging. The policy document also emphasized that the hedging program was structured for achieving fuel price stability, not for speculation.

Strategy

Once the fuel hedging program was approved by the state legislature, the Council's treasury department, which operates the hedging program within the Council, chose to purchase its initial futures contracts incrementally over approximately five months so as to spread out the fuel acquisition cost (the net of hedging). (One futures contract is equal to 42,000 gallons of fuel.) The initial contracts were at the best available rate and covered a significant portion of the

[31] http://www.house.leg.state.mn.us/hrd/bs/84/HF1481.html#_Toc104630735

near-term fuel use. Subsequently, the Council's approach evolved into a rolling hedges purchases strategy where it bought futures contracts without regard to whether the current market price was high or low.

The rolling contract purchase strategy approach is intended to mimic dollar cost averaging rather than trying to time the market. The agency is continually in the market with this approach, so it experiences the average price for the coming year. This approach was more easily explainable to larger audiences. The strategy allowed The Council to purchase contracts from the program's start, rather than having to time the market to wait for the best price to purchase all of the contracts at the same time.[32]

Metro Transit purchases futures contracts on the New York Mercantile Exchange (NYMEX) via a brokerage firm which actually secures the contracts. Diesel fuel purchases are hedged with No. 2 heating oil. The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated, i.e., they typically track each other's price changes. The NYMEX requires that a margin account be maintained that covers purchases or adjustments due to price changes of commodities being traded. The NYMEX also requires a separate margin account be maintained for each commodity type. The margin account value is adjusted daily, and includes cash, money markets, and US Agency bonds that cover a percentage of the amount of fuel that the Council is hedged for at all times. When Metro Transit began hedging, 7% of the amount hedged was required to be maintained in the margin account. This amount has decreased slightly over time because of the Council's good credit and the seasoning of the contracts relative to price changes. The money market accounts and US Agency bonds accrue interest, so surplus cash is moved out of the account as necessary. Generally, the program's accounting and cash management are treated separately, e.g., when there are realized gains the cash is not usually physically moved out of the account and back to the Council's pool; rather, the cash is moved only periodically. Excess cash in the margin account is always invested and is ready to support price reversals on futures contracts still on the books.

Metro Transit's high fuel use requires frequent fuel purchases. The Council's treasury department reviews Metro Transit's projected diesel fuel consumption and coordinates with its brokerage firm to purchase and liquidate up to four futures contracts per week. (Liquidation occurs at the time of the corresponding consumption of the fuel.) Over the course of a year, the Council purchases approximately 150 contracts and liquidates a like amount. The Council now uses the financial consultant occasionally to receive feedback for hedging implementation and fuel purchase planning. The futures contracts typically have an expiration date of between 20 to 23 months forward. In total, the contracts cover approximately 90% of the fleet's projected fuel consumption, even though the Council is able to hedge 100% of the projected fuel consumption. Hedging approximately two years out allows Metro Transit to set the next year's budget knowing that 90% of the fuel costs will be locked in. The strategy of locking in only 90% of the projected fuel use allows for a margin of error to give flexibility for unanticipated fuel consumption changes that occur during the year.[33] Looking retrospectively, Metro Transit can see that hedging two years out provides significant price certainty, but in some cases a time premium is paid for this insurance.

At first, the Council hedged only diesel fuel purchases, but after the hedging program proved to be effective, a natural gas hedging component was added to the program to manage natural gas usage costs in buildings. Natural gas purchases were hedged with natural gas futures contracts. The Council used the same rolling hedges strategy for natural gas purchases. Only 80%

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[32]Metropolitan Council, Procedure—Energy Forward Pricing Mechanism (p. 4)
[33]Metropolitan Council, Procedure—Energy Forward Pricing Mechanism (p. 2)

of projected natural gas consumption was hedged due to more volatile price movements associated with natural gas. Hedging of natural gas was performed for four years, but the Council ceased purchasing natural gas futures contracts at the end of November 2010 for the following reasons: 1) natural gas was then inexpensive and expected to remain that way due to excess supply, 2) the price risk of purchasing on the open market was low, 3) cash reserves were sufficient to ride out high variability, and 4) natural gas purchases were not a very large portion of the budget.

Metro Transit's fuel supply acquisition and costs are separate from the hedging process. Hedging activity revenue (gains) and expenses (losses) are added to, or subtracted from, the fuel expense budget line item for accounting purposes.

Approval and Execution Process

The Council's treasury department performs the in-house management of the hedging programs' price risk strategy. Staff obtain a periodic fuel "consumption report based on the relevant frequency of commodity consumption" from the Metro Transit director of purchasing. The data are used to determine the future hedging needs.

Ultimately, the department makes the decision about when to purchase new futures contracts and/or make adjustments to previous hedge positions. Authorized treasury staff contact the agency's brokerage firm and place the required orders. The annual brokerage fee for this level of diesel price protection is approximately $15,000, which is a relatively small amount of money compared to the fuel purchase costs. Council staff record the trade confirmations and financial transactions in a subsidiary accounting system.

The Treasury Department is responsible for ensuring the margin account is funded at the proper level.[34] The treasury department also provides a quarterly investment report to the Council's Investment Review Committee and Management Committee which includes the status of the EMPM hedging accounts referencing realized and unrealized gains or losses.

Results

The Council evaluates the hedging program effectiveness based on its performance for creating fuel price budget certainty. The program's goal was to stabilize fuel prices and create budget certainty; it was not necessarily intended to minimize costs. Since the hedging program began in 2006, it has financially broken even (realized gains approximate realized losses). Most importantly, Metro Transit emphasized that the hedging program has neutralized energy price spikes and dips, and has established budget certainty for 90% of its fuel costs as intended. For 2010, Metro Transit paid $2.67 per gallon of diesel fuel (net of hedging activity). On average there have been no negative outcomes resulting from the diesel hedging strategy.

Tips for Success

Planning and Communication Are Key Factors

Finding support for initial legislation that enabled the creation and operation of the hedging program and communicating clearly that the program's purpose was for achieving budget certainty, and not speculation, was essential. The hedging program has been a positive experience for Metro Transit and the Council. Hedging has provided budget certainty and reasonable fuel prices, even if they are not always the lowest. This result is acceptable to the agency because of the added cost certainty.

[34]Metropolitan Council, Procedure—Energy Forward Pricing Mechanism (p. 3)

Find the Best Advisor for Your Agency, Be Careful About Doing It Yourself

Metro Transit stressed that agencies that are interested in operating an in-house hedging program need to have sufficient funds for the margin account and also need to have substantial in-house expertise covering investing and accounting (and/or access to a good consultant). Agencies must first determine their risk tolerance and understand the potential upsides and downsides to hedging. Even with Metro Transit's expertise it was recommended that the agency work with a financial consultant/advisor experienced in hedging petroleum markets. The Council's financial consultant plays a critical role by providing the hedging expertise as well as the knowledge of applicable pieces of the market. The consultant is used to recognize and respond to risk, and makes the program manageable for the Council. The consultant is also used to keep the program on track and avoid problems. The agency stressed that it is important to take the time to research potential financial consultants to find the right firm for the agency, noting that there are many generalist advisors without significant experience in commodity hedging. The agency must also have the right contacts and make sure that its financial situation can support the activity. Similar to purchasing other types of insurance, it is important to make sure that the board or council understands the nature of this type of program and what is required for it.

Different Firms Offer Different Abilities, Expertise, and Focus

The financial consultant's focus for the Council is on the advisory piece to the commodity programs, not the brokerage activities. Other firms may offer both the advisory and the brokerage hedging functions. Researching, understanding, and finding the right entities is crucial. Initially, futures contracts seem relatively straightforward; however, mismanagement can cause problems and misunderstandings can cause a reversal of support for the program. More complicated and sophisticated hybrid forward pricing mechanisms (e.g., options contracts) require more complicated accounting practices; there are firms that can handle the tracking of these activities if agencies need the assistance. Focusing on the budget certainty aspects will help maintain focus.

Greater Cleveland Regional Transit Authority (RTA)

Summary

Location: Cleveland, Ohio metropolitan area
Fleet: 492 diesel-power buses
Fuel Volumes: Diesel – 5.0 million gallons (2010)

The Greater Cleveland Regional Transit Authority (RTA) is a public transit agency serving the Cleveland metropolitan area. RTA covers 458 square miles and serves 1.3 million people. The agency operates 492 diesel-powered buses on fixed routes and provided an estimated 17.1 million service miles in 2009.[35] RTA is a political subdivision of the state of Ohio and all power and authority granted to RTA is vested in, and exercised by, its board of trustees. About one-fifth of RTA's budget comes from operating revenues, including passenger fares and advertising/concessions. The remainder of the agency's budget is funded through sales/use taxes, grants, and other forms of funding. RTA's 2009 diesel fuel expenditures were $17.4 million, accounting for about 7.3% of agency's operating expenditures.[36] This expense was expected to fall in 2010 and 2011. RTA launched an energy price risk management program in 2009 which has experienced favorable results.

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[35]http://www.riderta.com/annual/2009/
[36]http://www.riderta.com/annual/2009/

Delivery Price Risk Management

Fuel Contracting

Prior to 2006, RTA purchased diesel fuel on the open market. Worried about rising fuel prices, RTA used physical fixed-price contracts to cover fuel purchases in 2007 and 2009. For 2010, RTA fixed its fuel prices by hedging with financial instruments including exchange-traded futures and fuel price swaps with financial counterparties. Since then, RTA has purchased diesel via long-term contracts tied to the spot Oil Price Information Service (OPIS) price less a discount of 1.1 cents.

Pooling

RTA does not belong to a fuel purchasing cooperative.

Commodity Price Risk Management

History

RTA's fuel hedging program is a relatively new initiative that grew out of the record high fuel costs and extreme volatility of the mid-to-late 2000s. In 2006 and 2008, RTA entered physical fixed-price contracts to lock in prices for fuel consumption in 2007 and 2009, respectively. In 2008, with extreme volatility as the new reality for fuel prices, RTA sought to employ new tools to ensure better performance in the management of its fuel costs, and the agency started looking into the creation of an energy price risk management (EPRM) program, also known as a fuel hedging program.[37] Neighboring Ohio transit agencies in Dayton and Cincinnati had maintained fuel hedging programs for several years and Cleveland hoped to launch a program under the same authorization. Ohio's attorney general had issued an opinion that fuel hedging programs were permissible under existing state law, but Cleveland RTA's lawyers would not allow the agency to move forward with the program because they did not believe the opinion provided adequate authority. RTA managed to insert authorization for the program into the state's budget legislation.

State-level authorization was not enough for RTA to launch its EPRM program. Before it could begin hedging, RTA needed to convince its board of trustees to allow it to move forward with a program. This proved to be a difficult task. The board was skeptical of hedging with financial products and some board members considered the practice to be a "speculative investment" even though the budget legislation that authorized the program said that hedging was not speculative so long as the quantity of fuel hedged was less than total fuel consumption. Convincing the board to approve the hedging program required a lot of education. The manager of RTA's Office of Management and Budget, RTA's procurement manager, and an outside commodity trading advisor were the principal advocates of the program. After several meetings with the board, the program's advocates eventually convinced the board to approve the program. By January 2009, the hedging program was finally ready to be launched.

Strategy

The overall objective of RTA's fuel hedging program is to decrease energy price volatility, increase the certainty of future fuel costs, stabilize and control the budget, and lower overall long term energy costs. The fuel hedging program's strategy uses a process that:

1. Addresses market opportunities and market risk;
2. Holds the risk of exceeding budget at or below an acceptable level;
3. Uses historical pricing ranges as pricing parameters;

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[37] http://www.riderta.com/pdf/budget/2010/2-3PerformanceManagement.pdf (p. 12)

4. Is continuous;
5. Will use a dollar-cost averaging approach; and
6. Mitigates transaction-timing risk by making numerous smaller volume transactions (i.e., 42,000 gallons per transaction).

RTA's hedging strategy is unique in that it utilizes two instruments simultaneously. RTA hedges with both exchange-traded futures contracts (home heating oil futures traded on the New York Mercantile Exchange [NYMEX], the diesel correlate) and with over-the-counter fuel price swaps with financial institutions certified by the International Swaps and Derivatives Association (ISDA). Although hedging with futures contracts is less expensive than hedging with swaps, RTA chose not to hedge fully with futures because it feared that margin calls on its NYMEX margin accounts would potentially tie up too much of the agency's limited funds. Hedging with NYMEX futures requires the agency to set aside a margin account of about 15% of the contract's value. Thus, if RTA decided to hedge a large percentage of its fuel consumption or hedge far out into the future, the NYMEX would require the agency to fund a large margin account, which would be credited or debited as prices fluctuate. RTA's over-the-counter fuel price swaps, on the other hand, do not require the agency to maintain a margin account or post collateral to back its investments. Swap dealers, however, lock in prices at premium—usually about 3.5 cents per gallon—over the futures price.

RTA's hedging policy dictates that the maximum hedge ratio will not be more than 90% of the forecasted consumption and that hedges can only go out 36 months into the future (this was extended from 24 months in mid-2009).[38] RTA does not hedge all of its fuel in a single futures purchase or swap agreement. Instead, it hedges its forward fuel consumption over a period of several months, thereby minimizing transaction-timing risk. RTA also practices "dollar-cost averaging": entering more futures contracts and swap agreements when prices decrease and buying less as they increase. By spreading out its hedging decisions across several months, RTA removes the risk of making a single-point decision that could be costly to the agency.

Execution Process

RTA's fuel price hedging strategy was developed and implemented in concert with an outside commodity trading advisory firm. The trading advisory firm is responsible for the daily execution of the program, including the execution of transactions, generating reports on the program's status and results, and monitoring the program and energy markets.[39]

RTA's EPRM committee—four officers from RTA's budget and procurement offices led by the directors of these offices—works closely with the trading advisor. When the program was first launched this committee met often. However, as the agency gained experience with hedging, communication was reduced to quick email exchanges. The director of the budget office communicates regularly with the trading advisor and keeps the EPRM committee apprised of program activities.

In practice, the trading advisory firm regularly monitors the market and identifies opportunities to lock in low prices. They contact the manager of RTA's Office of Management and Budget when buying opportunities present themselves and the RTA manager decides whether or not to hedge after receiving input from the EPRM committee. Both RTA's Office of Management and Budget manager and the head of procurement are fully authorized to place hedging orders, although RTA's general manager signs off on all transactions. The activities of the hedging program are also closely monitored by RTA's internal auditor to ensure that the program is

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[38]http://www.riderta.com/pdf/budget/2010/2-3PerformanceManagement.pdf (p. 12)
[39]http://www.riderta.com/pdf/budget/2010/2-3PerformanceManagement.pdf (p. 12)

legitimately doing what it was approved to do and that participants are not engaging in "speculative" investment activity.

Results

RTA's experience with fixed-price contracts and financial hedging has yielded mixed results in terms of performance against spot market purchases. However, both hedging strategies achieved their stated goal of stabilizing the fuel budget and allowing the agency to adequately budget for the future.

RTA first began hedging in 2006. Faced with runaway fuel prices, it joined a consortium to obtain a firm, fixed-price fuel supply contract with a local fuel supplier for 2007. RTA obtained what it believed was a fair price, but almost immediately after entering the agreement spot fuel prices dropped by 30 cents and RTA was caught paying a higher rate than the market. As 2007 wore on, however, fuel prices increased significantly, and by the end of the year RTA was breaking even on the fixed-price contract.

Towards the end of 2007, RTA attempted to enter a fixed-price contract covering its 2008 purchases with a request for bids that was released in November 2007. RTA looked at the initial bids and believed that the agency could probably get a price that was 7 cents cheaper, so it kept the bid open and waited for a lower price. This proved to be an ill-advised decision. Prices continued to increase between November 2007 and January 2008 when RTA officially closed the bid. RTA refused to hedge at higher prices, continuing to believe that prices would drop, and fuel purchases remained unhedged through the volatile oil price spike of 2008. In 2008, RTA's cost per gallon for diesel fuel ranged from $2.54 to $4.18 and the decision to not hedge led to an increase in the fuel budget of $7.4 million compared to 2007, or about $3.6 million higher than RTA's planned 2008 fuel budget.[40]

While RTA struggled to get a financial fuel hedging program authorized in 2008, fuel prices continued to increase. In July 2008, however, prices peaked and then began precipitously declining. RTA watched as prices declined from a peak of $4.18 per gallon in July to $3.12 in September. In September prices appeared to have bottomed out and were beginning to increase again. RTA had not yet received authorization to hedge with financial instruments. Fearing it would lose an opportunity to lock in at the market bottom, RTA entered a physical fixed-price contract covering its 2009 fuel purchases at $3.17 per gallon. RTA's decision to lock in prices in September 2008 proved to be premature. Shortly after RTA locked in its contract for 2009, panic in the financial markets quickly reversed the brief spike in fuel prices. Prices continued to decline precipitously through 2008 and into 2009, and although RTA's overall fuel costs fell from $19.3 million to $17.4 million between 2008 and 2009, costs could have fallen much more had RTA not hedged and instead purchased at the market rate.[41]

By the first quarter of 2009, RTA's financial hedging program had been approved and was ready to commence. Having already locked in its 2009 fuel prices with a fixed-price contract, RTA began positioning its 2010 hedge portfolio. Seizing on record-low fuel prices in the first half of 2009, RTA hedged 100% of its projected 2010 fuel usage (five million gallons) with futures and swap contracts.[42] The agency's performance objective was to establish a 2010 fuel cost at or below $2.20 per gallon.[43] RTA's 2009 hedges locked in a projected 2010 fuel cost of $9.4 million (an average of $1.88 per gallon), roughly $1.6 million under the performance target.[44] Taking

[40]http://www.riderta.com/pdf/budget/2010/2-3PerformanceManagement.pdf (p. 12)
[41]http://www.riderta.com/pdf/budget/2010/2010Budget_Full.pdf (p. 110)
[42]http://www.riderta.com/pdf/budget/2010/2010Budget_Full.pdf (p. 280)
[43]http://www.riderta.com/pdf/budget/2010/2-3PerformanceManagement.pdf (p. 12)
[44]http://www.riderta.com/pdf/budget/2010/2010Budget_Full.pdf (p. 280)

advantage of the attractive buying opportunities in early 2009, RTA also hedged its fuel consumption for as many months in 2011 as the agency's hedging policy's 24-month forward limit would allow. Realizing the potential of locking in low prices for the long term, the EPRM committee quickly returned to the RTA board and, after two sessions, convinced the board to extend the forward hedging limit to 36 months. After the extension was granted, RTA locked in prices for the remainder of 2011.

Tips for Success

Spread out Hedging Decisions to Reduce Transaction-Timing Risk

RTA has learned that it is important to spread the risk of timing decisions when entering hedge agreements. Prior to launching its financial fuel price hedging program, RTA locked in prices in single-point decisions to enter (or not enter) physical fixed-price contracts. Poor timing with a fixed-price contract in September 2008 led to an overpayment of millions of dollars versus the spot market price in 2009. By hedging with financial swaps and futures, RTA was able to make hundreds of smaller hedging decisions—each covering 42,000 gallons—that could be spread out across several months. With hundreds of contracts entered at different times, above-market (out-of-the-money) hedge contracts will typically be offset by an equal number of below-market (in-the-money) contracts.

It Is Important to Be Nimble When Prices Are Volatile

When RTA first launched its financial fuel price hedging program in January 2009, prices were the lowest that they had been since 2005. Prices were also relatively stable. This meant that timing decisions were not very important to the overall hedging strategy. By May 2009, however, fuel prices again began to exhibit significant volatility and RTA realized it needed to adjust its methodology to adapt to the new environment. RTA found that it had to be more nimble with its hedging decisions. The volatile market exhibited peaks and valleys and it was now important to monitor the market for the best hedging opportunities. When the program was first launched, RTA would announce to its counterparties that it intended to hold a bid one day before it was held. With prices exhibiting significant changes daily and even hourly, RTA shortened this window to just 20 minutes.

A Clear Methodology Helps to Win Board Approval for Your Hedging Program

One of the biggest challenges that RTA faced with implementing its hedging program was getting board approval for the program. RTA found that educating the skeptical board required a clear hedging methodology and enough data to show how the market is trending and explain the risks of not hedging. Even when a methodology was clearly presented, RTA found that it was still difficult for some board members to understand. Convincing the board requires assurance that the intent of the program is to stabilize the fuel budget rather than make money.

Greater Dayton Regional Transit Authority (GDRTA)

Summary

Location: Dayton, Ohio
Fleet: 276 buses: 113 forty-foot diesel buses (FY 2010), 10 forty-foot electric-diesel hybrid buses, 4 thirty-foot diesel buses, 54 forty-foot electric trolley buses, and 95 project buses <30-feet (FY 2010)
Fuel Volumes: Diesel – 1.9 million gallons (FY 2008)

The Greater Dayton Regional Transit Authority (GDRTA) is the public transportation authority that serves the Greater Dayton metropolitan region, an area of more than 500 square miles that includes 19 communities within two counties, and more than 11 million passenger trips per year. GDRTA's fleet is composed primarily of conventional diesel-powered buses. Dayton is the smallest city in the United States to operate electric trolley buses. Ten diesel-electric hybrid buses were added to the fleet in the spring of 2010 and the fleet expects to add ten more buses by the end of 2010 to further improve fleet average fuel efficiency and reduce greenhouse gas emissions. The bus fleet used approximately 1.9 million gallons of diesel fuel in FY 2008.

Delivery Price Risk Management

Fuel Contracting

Between 1989 and 2007, GDRTA contracted its fuel purchases using an invitation for bids process issued to local fuel suppliers to secure annual fixed-price fuel supply contracts. This allowed for fair competition between local suppliers for GDRTA's business and resulted in the best price and delivery of diesel fuel for GDRTA's transit buses. GDRTA generally locked in prices 6 to 12 months out, but sometimes went out as far as 18 months. GDRTA found that prior to 2005 the diesel fuel market fairly consistently followed the rules of supply and demand, so fixed-price fuel supply contracts were an effective approach for purchasing fuel with price certainty. This correlation began to shift after 2005, and by late 2007 fewer fuel providers were willing to agree to offer fixed-price contracts as fuel costs increased, even for terms as short as three or six months out. If providers were willing to offer fixed-price contracts, they charged high premiums for the price inflation risk. GDRTA had to increase the annual fuel budget from 2005 to 2009 and eliminate some services to help avoid extensive fare increases. GDRTA initiated a financial fuel price hedging program in 2008 (see Commodity Price Risk Management section), so switched its fuel purchasing method to use fuel supply contracts (one year base period plus option years) with prices based on the Oil Price Information Service (OPIS) market plus a fixed margin of $0.08 per gallon.

Pooling

GDRTA investigated, but does not participate in, any cooperative purchasing arrangements. GDRTA's size and fuel utilization volume is sufficiently large to have sufficient buying power to garner the best fuel prices. Purchasing fuel on its own terms also allows GDRTA to maintain control of its fuel purchases.

Commodity Price Risk Management

History

In the years leading up to 2005, GDRTA primarily used fixed-price fuel supply contracts with local suppliers to lock in prices for up to 18 months out. As the correlation between market prices and supply and demand began to change during the next three years (2006 to 2008), GDRTA found it harder and more expensive to lock in prices with local suppliers over the long-term. In 2007, the GDRTA Investment Advisory Committee began considering using hedging strategies to address fuel price volatility. GDRTA's board of trustees (board) had already authorized the use of forward pricing mechanisms in 1989 ". . . as a Budget risk reduction tool to manage price variability and cost/budget uncertainty associated with the purchase of diesel fuel," so the legal groundwork was already in place establish a financial fuel hedging program.

GDRTA issued an RFP in late 2007 to acquire a third-party fuel advisor. A Minneapolis-based company was selected, and assisted GDRTA to locate a futures brokerage firm and to create its Energy Price Risk Management Statement of Policy & Strategy. This strategy document addressed the purpose of the risk management program, the program infrastructure, the physical supply of fuel, the strategy process, the program execution, and the monitoring and reporting requirements of the program. The program document was adopted by the board in March 2008 and was subsequently revised in July 2010.[45] The fuel advisor was paid a set monthly fee for services. The brokerage firm would also be paid a set fee for each hedging transaction. GDRTA was required by the New York Mercantile Exchange (NYMEX) to create and fund a margin account to cover a percentage of its hedged fuel purchases for potential projected losses. In addition, GDRTA also issued an RFP for fuel suppliers to deliver fuel based on the OPIS market prices plus a fixed margin of $0.08 per gallon (see Delivery Price Risk Management section).

Strategy

GDRTA's primary fuel purchasing strategy objective is to attain the lowest fuel cost for both the short- and long-term and to maintain costs at, or below, the budgeted amount without speculating or considering its EPRM as an investment. The strategy encompasses several elements. On the physical fuel purchasing side, GDRTA makes smaller, more frequent fuel purchases to take advantage of dollar cost averaging and to mitigate transaction timing risk. Physical purchases are made in 42,000-gallon increments, corresponding with the size of No. 2 heating oil futures contracts traded on the NYMEX. The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated so typically track each other. The physical fuel purchase price is based on the daily OPIS market prices plus a fixed margin of $0.08 per gallon as outlined in the contract with the local fuel supplier. GDRTA is exposed to basis risk because physical fuel purchases are based on OPIS prices and the futures contracts are based on NYMEX prices.

The financial side of the EPRM program employs a continuous, rule-based hedging strategy that utilizes historic price ranges as parameters and includes a process that addresses the market opportunities and risks. When a physical fuel purchase is made, GDRTA simultaneously sells a futures contract which ties the price of fuel to the price of No. 2 heating oil on the contract creation date. Initially, GDRTA's hedging policy allowed for covering up to 80% of its anticipated fuel purchases. The policy was revised in 2008 to allow GDRTA to cover up to 95%. This provided additional flexibility and enables GDRTA to have a high level of budget certainty and protection from large fuel price increases. In July 2010, GDRTA enacted a maximum hedged fuel price limit of $100 per barrel to avoid issues that come with a volatile fuel market. If the price exceeds this limit, the GDRTA Investment Advisory Committee will hold a special meeting to vote on necessary action and make decisions as to purchasing futures contracts when crude oil prices are above $100 per barrel. This policy was put in place to have the board and Investment Advisory Committee become more involved at that threshold to make decisions to protect the budget and future costs in the event that prices shifts downward where GDRTA could be locked in at unreasonably high prices.

Approval and Execution Process

The Investment Advisory Committee, which includes the CFO, works with the fuel advisor to develop recommendations on future fuel purchase decisions. The Investment Advisory Committee makes the final decisions according to plan within the scope of the risk management policy and strategy. The CFO and fuel advisor are responsible for executing the transactions. The CFO and the fuel advisor are also responsible for the continual monitoring of the energy markets and for generating reports on the program's status and results. The brokerage firm also submits daily and weekly reports to GDRTA that show the past few weeks' activity and what the futures markets look like. The CFO and the fuel advisor also develop weekly status and results

[45] Energy Price Risk Management Statement of Policy & Strategy, Greater Dayton Regional Transit Authority, Initial Adoption/Effective Date: March 20, 2008, Revised: July 15, 2010

updates to keep the involved parties informed. Monthly status and results reports are generated, which also include a risk analysis and a summary on the futures account activities. Oversight for the program is primarily the responsibility of the Investment Advisory Committee, and the board of trustees is updated on the performance of the program periodically as the board deems necessary.

Results

GDRTA began purchasing futures contracts of No. 2 heating oil on the NYMEX exchange in April 2008 through the brokerage firm. In accordance with the then-upper limits of GDRTA's risk management program, GDRTA purchased futures contracts to cover 80% of anticipated fuel use for the next 24 months. Diesel fuel prices rose dramatically after this time to $4.07 per gallon, and market analysis indicated that prices would continue to rise. The board of trustees took these circumstances into account and approved a change to the agency's hedging policy to allow for hedging of up to 95% of the forecasted fuel consumption. With new upper limits in place, and in anticipation of expected fuel price increases and shorter supplies, GDRTA purchased futures contracts each month to maintain coverage for 95% of the anticipated fuel purchases 24 months out. The contracts were purchased near the peak of the oil prices (July 2008). The bus fleet used approximately 1.9 million gallons of diesel fuel in FY 2008 at an average cost of $3.41 per gallon, including the hedging activities. Because of the unexpected decline in fuel prices, by the end of 2008 GDRTA experienced realized losses of $368,737 and unrealized losses on the remaining open contracts of $3.1 million corresponding to the expectation of lower fuel costs in upcoming fiscal periods.[46]

As fuel prices precipitously declined in 2009, GDRTA discontinued purchasing futures contracts so the agency was not locked in to paying significantly more than current market prices. The average diesel fuel cost in FY 2009 was $3.27 per gallon. The fuel purchases were within the budget, partially because the fuel budget was increased due to higher fuel costs. At the end of 2009, the investment committee resumed the hedging program by purchasing new hedging contracts, but with a slower approach than during the period of much more volatile price fluctuations that took place in 2007 and 2008. The next Investment Advisory Committee meeting was scheduled for January 2011 to determine the next steps, which most likely would include locking in prices starting in April/May 2011. GDRTA's fuel price FY 2010 forecast was $2.30 per gallon, but through the first three quarters the average diesel fuel cost was $2.42 per gallon. In light of current diesel fuel prices and prior experience, GDRTA reassessed its hedging strategy and planned to have a new approach in place for when its futures contracts expired in April of 2011.

Overall, GDRTA's risk management program has provided the agency with a level of budget certainty and protection from extreme price increases at a time when expectations and market indicators pointed to even higher inflation of oil costs. GDRTA evaluates the hedging program effectiveness by a comparison of the unrealized gains/losses and by whether they operate within the fuel budget.

Tips for Success

Develop Risk Assessment Experience

Assessing risk has been difficult, especially in light of the volatile fuel prices of 2008 and the ensuing economic downturn. Additionally, GDRTA has found that fuel prices now have a closer relationship to stock market values and fluctuations than to supply and demand, which has made

[46]Audit Report for the Years Ended December 31, 2008 and 2007, Greater Dayton Regional Transit Authority, http://www.i-riderta.org/assets/1/workflow_staging/AssetManager/332.pdf, March 29, 2009 (p. 27)

it far more difficult to implement an effective hedging strategy compared to prior years when forward pricing contracts were used. GDRTA notes that it takes experience to have an educated understanding of fuel pricing, supply and demand, and the ability to factor in how Wall Street speculation and current events affect fuel and hedging prices.

Be Cautious When Locking in Prices

GDRTA noted that there is a cost to locking in prices, but does not view its hedging program as an insurance policy; rather, it is a means to locking in a budgeted number. However, a point can be reached when the upside protection becomes too expensive and can result in a long-term negative effect in the event prices drop when the agency is locked in at high prices. This situation has deep effects, not just in terms of realized and unrealized gains/losses, but also in terms of actual money being spent that could either be saved or go to other programs or needed services. It is necessary that the board understand these factors and their effect on the public's perception of GDRTA.

Chicago Transit Authority (CTA)

Summary

Location: Chicago, Illinois
Fleet: 1,782 diesel buses, 1,190 electric rail cars
Fuel Volumes: Diesel – 22.1 million gallons (2009), Electricity – 408,000 MWh (traction power)

The Chicago Transit Authority (CTA) operates the nation's second largest public transportation system, serving the Chicago metropolitan area with a fleet of 1,782 diesel-powered buses and 1,190 electric rail cars along eight rail lines. CTA is an independent government agency created by state legislation and governed by the Chicago Transit Board, which is appointed by the mayor of Chicago and by the governor of Illinois. CTA generates revenue from both farebox collections and non-farebox revenues, and receives supplemental funding for operating expenses from the Regional Transportation Authority.[47] In 2010, CTA's diesel fuel costs were $52.1 million, representing an average fuel price of $2.71 per gallon. CTA participates in a fuel purchasing cooperative for non-revenue vehicles only. The agency has maintained an energy price risk management program since 2003. CTA's hedging program has evolved over time from a discrete, situational hedging strategy to a strategy with a continuous, rule-based approach.

Delivery Price Risk Management

Fuel Contracting

CTA purchases fuel through a supply contract which is obtained through a competitive bidding process. CTA's most recent diesel fuel contract is an 18-month contract running from April 2010 to October 2011. The contract follows a "rack plus margin" pricing method whereby CTA pays the rack price for No. 1 ultra low sulfur diesel (USLD) plus a fixed differential of $0.095 per gallon to account for the distributor's profit margin, trucking fees, insurance, office overhead, etc. CTA is a large purchaser of diesel fuel and bids are highly competitive with respect to the differential. However, the rack or wholesale portion of the fuel price fluctuates with the market. CTA believes that it could obtain a fixed price contract (with both a fixed differential and a fixed rack price) but that doing so would be prohibitively expensive.

[47]http://www.transitchicago.com/about/facts.aspx

Pooling

CTA participates in a fuel purchasing cooperative for its non-revenue vehicles only. A number of other municipal departments and sister agencies belong to this cooperative.

Commodity Price Risk Management

History

CTA's energy price risk management program was first initiated in 2003. In that year, the agency was looking for innovative ways to mitigate budget variance. Jim Burns, CTA's general manager of treasury management at the time, had significant experience with hedging programs and recommended to the CFO, Dennis Anosike, that CTA explore the opportunity. Anosike submitted a request to the Chicago Transit Board to allow CTA to test a pilot hedging program to bring the agency's fuel budget under control. The board authorized Anosike to move forward with a pilot hedging program that would cover up to 50% of CTA's fuel requirements.

Once authorized to begin hedging, CTA issued an RFP for fuel hedge counterparties and received responses from five to six financial institutions and energy companies. Based on a set of evaluation criteria, the agency narrowed these proposals to two qualified financial institutions. CTA's lawyers then performed the time-consuming task of negotiating master swap agreements with the two chosen counterparties. Meanwhile, CTA's accounting department began to determine how to handle hedge accounting and accurately record the program's monthly cash settlements under the proposed swap agreements.

In November 2003, with the legal and accounting measures finally in place, CTA entered a one-year swap agreement with monthly payments based on a notional amount of 950,000 gallons of NYMEX No. 2 heating oil, equal to about 50% of the agency's annual fuel consumption.[48] The pilot program was very successful. Despite higher consumption, CTA's fuel costs increased by only 23% between 2003 and 2004 while spot diesel prices increased by more than 30%.[49] In 2004, the board authorized a permanent program that allowed CTA to hedge up to 100% of its fuel requirement.

Strategy

CTA's current energy price risk management policy was put in place with the help of an energy consultant in 2008. Prior to 2008, CTA's hedging program was managed by Jim Burns in CTA's treasury department. This policy allows CTA to use derivative instruments to hedge the price of diesel fuel. The policy does not allow financial instruments to be used to hedge electricity and natural gas. However, these commodities may be hedged through the use of physical fixed price contracts.

CTA's energy price risk management policy allows the agency to hedge up to 100% of the agency's diesel fuel requirement for a period of up to 18 months, and 50% of volume from 18 to 24 months. No hedging is allowed beyond 24 months.

CTA's hedging policy allows the agency to use several derivative instruments, including over-the-counter (OTC) swaps, and other contracts, such as caps, floors, and collars. CTA uses financial instruments to hedge when they:

1. Reduce expected fuel costs;
2. Hedge fluctuations in fuel prices and/or;
3. Gain efficiency in structuring fuel-related transactions.

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[48] http://www.transitchicago.com/assets/1/finance_budget/cta2003fin.pdf (p. 39)
[49] http://www.transitchicago.com/assets/1/finance_budget/cta2004fin.pdf (p. 8) and http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RHONYH&f=A

The policy stipulates that CTA use OTC swaps that reference the price of the NYMEX No. 2 heating oil futures contract, which effectively tracks the price of ULSD with little basis risk. Swaps are allowed in increments of 42,000 gallons, equivalent to one futures contract on NYMEX No. 2. Because CTA purchases its fuel based on a regional diesel rack price and its swap contracts are based on NYMEX prices for fuel delivery in New York Harbor, the agency is exposed to adverse basis risk (the possibility that the local price will go up and the NYMEX price will go down), causing CTA to simultaneously pay more for physical fuel and lose money on its derivative contracts. However, historical price analysis shows a strong correlation between the NYMEX and the regional rack price, and the adverse basis risk has been determined to be low. Historical instances where the two indexes have diverged have been rare and would not result in significant losses for CTA.

CTA's strategy involves entering swap contracts in a layered approach. Instead of entering a single swap agreement covering an entire year's fuel requirement, CTA enters quarterly strips (three consecutive months of OTC swap contracts) with higher coverage for near months but lower coverage for months farther out. As current months expire and future months approach, CTA enters additional swap agreements to increase its near-month coverage. As a result, each month is hedged by two to four layers of separate swap agreements initiated at different times with reference prices that reflect the market at the time of initiation. This strategy ensures that no single reference price is overly weighted in the hedge portfolio, thus lessening the risk of locking in a price for the year at the height of the market. This continuous, rule-based approach to hedging provides direction to CTA's hedging program and requires less monitoring of market conditions.

CTA's hedging policy also allows the use of stop orders that initiate swap contracts with counterparties (upon CTA management approval) when certain trigger prices are reached. When prices are rising above market, stop orders initiate swaps that allow CTA to lock in a price to keep the agency within its fuel price budget for the year and set a cap on further fuel price increases. When prices are falling, below-market stop orders allow CTA to lock in a low fuel price before prices rise again, thus taking advantage of temporary market dips.

Although CTA's strategy of continuous, rule-based hedging does not require constant market monitoring, CTA's hedging policy directs it to actively manage its derivative contracts. This entails frequent monitoring of market conditions by CTA's energy advisor (a separate company) to identify emergent hedging opportunities and risks. Based on analysis of the market, CTA may modify its existing swap positions including:

- Early termination;
- Shortening or lengthening of contract terms;
- Adjustments to stop order:
- Sale or purchase of options;
- Use of basis swaps; and
- Entering into offsetting derivative contracts.[50]

These modifications are allowed if management determines that they will maximize the benefits and minimize the risks that the agency carries on its derivative contracts. The policy does not allow modifications of existing positions for speculative purposes.

CTA implements its hedge strategy through written agreements with approved counterparties. The agreements are based on the generally accepted ISDA Master Agreement of the industry and any special clauses agreed upon by CTA and the counterparty. In addition to typical

[50]Energy Price Risk Management Policy, Chicago Transit Authority, November 2009 (p. 3)

qualification criteria related to creditworthiness and experience with derivative instruments, CTA also requires that its counterparties be willing to accept one-way cash collateral. This means that CTA can require its counterparty to post cash collateral to back up its swap position, but the counterparty cannot require CTA to do so. CTA's hedging policy prohibits it from entering into swap agreements that require it to post cash collateral unless "it is clearly in the best interest of the Authority."[51] Instead, CTA's swap agreements include a credit support agreement under which CTA pledges general obligation dollars to meet its requirements under the swap contract.

Approval and Execution Process

CTA's Energy Price Risk Management Committee (a group made up of members of the agency's budget, treasury, and purchasing departments) reviews CTA's hedging program on a monthly basis to develop a plan to define acceptable energy costs, review and evaluate recommended price risk management transactions, and determine whether proposed transactions are consistent with CTA's hedging policy. If the EPRM committee determines that additional hedging is needed, the treasurer/CFO will recommend the transactions to the board chairman for approval. This process may involve setting milestones requiring a certain percentage of fuel be hedged by a certain date. When setting the hedging schedule, the EPRM committee receives hedging advice from CTA's energy adviser.

Once board approval for the hedging transactions is obtained, execution is handled by the CFO's designee, CTA's general manager of treasury management. The general manager works with CTA's energy advisor to determine the best time to execute the approved hedging strategy. In practice, CTA's advisors contact the general manager when they believe they have identified a hedging opportunity within the framework of the EPRM committee's hedging directives. The company sends the general manager pricing charts and the general manager cross checks these charts against Bloomberg data. If comfortable with moving forward, the general manager contacts CTA's two qualified counterparties to obtain price quotes (typically for quarterly strips) and then selects the counterparty based on the price offered and counterparty risk concentration. CTA evaluates its hedging results along two criteria: 1) how the actual fuel expenditures fare against the fuel budget, and 2) whether CTA is receiving or paying money on the swap contract. The general manager of treasury management sends swap payment information to CTA's accounting department, which evaluates fuel payments against the budget. Monthly commodity reports showing fuel expenditures are prepared by CTA staff and provided to select committee members.

Results

CTA's pilot hedging program, which limited hedging to 50% of annual fuel consumption, was a successful venture, saving the agency at least 7% on its 2004 diesel fuel costs versus the spot market. Following the successful pilot program, which ended at the end of October 2004, CTA received approval for a permanent program that allowed the agency to hedge up to 100% of its fuel requirements up to 18 months and 50% of its requirements from 18 to 24 months.

With a permanent program in place, CTA decided to take a layered approach rather than hedging all of its fuel consumption under one swap agreement. At the end of November 2004, CTA entered a 12-month swap agreement with monthly payments based on 285,000 gallons of NYMEX heating oil futures.[52] Over the course of the 12 months, the swap covered 3.42 million gallons of fuel, or roughly 16% to 17% of the agency's annual fuel consumption. Then, CTA methodically entered into five separate 12-month swap agreements on the first day of the first

[51] Energy Price Risk Management Policy, Chicago Transit Authority, November 2009 (p. 3)

[52] http://www.transitchicago.com/assets/1/finance_budget/cta2004fin.pdf (p. 40)

five months of 2005. Each of these contracts covered 16% to 17% of its annual fuel consumption.[53] Thus, by the end of May 2005, CTA had fully hedged its 2005 fuel requirements and had partially covered itself for 2006. CTA's 2004–2005 hedging program again paid dividends. By the end of 2004, CTA's 2004 commodity swap held a fair value of $3.6 million and by the end of 2005 the agency's January-May 2005 swaps had a fair value of $1.3 million.

In October 2005, CTA continued its layered approach by executing two 12-month swaps covering 16.8 million gallons through October 2006.[54] Soon after entering these contracts, prices declined and their fair values initially dropped to negative $0.6 million at the end of 2005.[55] However, prices rose again over the course of 2006 and the two contracts had a fair value of $0.3 million by the end of the year.

In June 2006, CTA began executing 12-month swaps for 2007, and by September 2006 had hedged 22.8 million gallons or 95% of CTA's annual usage. Falling oil prices led to a negative fair value of $8.6 million at the end of 2006, but by the end of 2007 the fair value was $0.85 million.

In July 2007, Jim Burns, the general manager of treasury management who led the day-to-day activities of the energy price risk management program at CTA, left the agency. This left the program with a considerable knowledge gap. CTA responded by appointing a new general manager to Burns's position and eventually bringing in an outside company as an energy consultant. The hedging process was also reformed so that hedging transaction decisions would be made by the EPRM committee and the consultant rather than by one individual. This restructuring allowed the program to continue through the changeover in management and made it so that no single person had complete authority.

Following its energy consultant's guidance, CTA changed its strategy from a discrete, situational approach to a continuous, rule-based approach. Rather than entering 10–20 swap agreements in a single month to cover the year's fuel consumption, the consultant suggested pursuing a layered approach in which swap agreements are entered into on a quarterly basis (see Strategy section). According to the new general manager, Paul Murray, the new approach was more logical and disciplined because it did not involve speculation or trying to predict the direction of the market. By breaking hedging transactions into numerous, smaller agreements spread out in time, the new rule-based strategy took the uncertainty out of making market timing decisions. The consultant also suggested the use of stop orders at prices above or below the current market price to either set a cap on the price and limit exposure to higher prices or take advantage of a drop in price.

CTA's hedges from its 2007 hedging program expired at the end of the year and the agency remained unhedged over the first few months of 2008 as the new hedging program with its consultant was being put into place. Amid soaring fuel prices in the spring of 2008, CTA's board of directors asked the agency to expedite hedging transactions. CTA executed twelve new swap agreements with effective dates between May 2008 and January 2010 and terms of 7 to 13 months. When oil prices collapsed in the second half of 2008, CTA's swaps began to lose money. By the end of 2009, the twelve contracts had a fair value of negative $62.1 million.[56] This experience led to the development of a stronger, more disciplined hedging program.

In 2009, CTA entered 28 new swap agreements covering 2009 and 2010. Of these contracts, six covered volumes in 2009. These contracts had a fair value of negative $3.8 million by the end of the year. CTA's hedges from 2008 had locked in record-high prices and over the course of 2009

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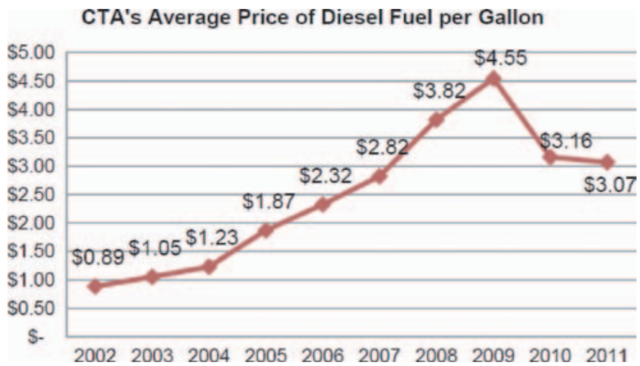
[53]http://www.transitchicago.com/assets/1/finance_budget/cta2005fin.pdf (p. 48)
[54]http://www.transitchicago.com/assets/1/finance_budget/cta2005fin.pdf (p. 48)
[55]http://www.transitchicago.com/assets/1/finance_budget/cta2006fin.pdf (p. 50)
[56]http://www.transitchicago.com/assets/1/finance_budget/cta_financialstatements_2009-2008.pdf (p. 67)

CTA's average fuel price was $4.55 per gallon. Illinois retail diesel prices averaged about $2.00 per gallon in the same year.[57]

At the end of 2009, the 22 swap agreements hedging 2010 consumption covered 14.1 million gallons of fuel (about 77% of projected usage of 18.4 million gallons) and had a fair value of negative $1.8 million, with some contracts holding positive values and others holding negative values.[58] As diesel prices increased in 2010, many of the futures contracts with negative values turned positive. At the end of 2010, CTA's average fuel price was $2.71 per gallon and CTA reduced its settlement payments by $47.9 million from 2009. By the end of 2010, all contracts had a fair value of $2.3 million.

Despite the negative results from hedging in 2008 and 2009, CTA remains committed to its hedging program. The original goal of the program was to mitigate budget variance, and in this respect it has been successful. Although hedging at the height of the market led to adverse results, the experience has helped CTA to develop a stronger, more disciplined hedging program.



Source: 2011 CTA Budget Book

Tips for Success

Continuous, Rule-Based Hedging Is Easier to Implement Than a Discrete, Situational Strategy

The continuous, rule-based approach to fuel price hedging recommended by CTA's energy consultant and implemented by CTA since 2008 was easier to implement than the discrete, situational hedging strategy that CTA had practiced in prior years. Under the situational strategy, the CTA's general manager of treasury management, Jim Burns, had full control over the hedging decisions. Timing decisions on swap agreements were made based on Burns' personal analysis and predictions on the direction of oil markets. Burns had experience with hedging and CTA trusted his judgment. When Burns left in 2007, CTA was left with a significant knowledge gap and the agency was not comfortable entrusting hedging decisions to a single staff member. Instead, CTA switched to a rule-based strategy, whereby decisions were made by a committee (with the help of an outside adviser) and implemented according to a rule-based schedule with swap agreements executed over the course of a year rather than at a single point in time. The CTA staff responsible for implementing this strategy has found it more logical, disciplined, and easier to implement since it removes much of the stress of timing decisions. This strategy also prevents any single individual from having too much control over the hedging process and ensures continuity of the program in the event of staff turnover.

[57]http://www.eia.gov/dnav/pet/pet_pri_dist_a_EPD2D_PTC_cpgal_a.htm
[58]http://www.transitchicago.com/assets/1/finance_budget/cta_financialstatements_2009-2008.pdf (p. 66)

Market Orders Offer Additional Price Controls

CTA has included market orders in its hedging strategy since 2008. Market orders initiate swap contracts when certain target prices are reached. For example, if CTA has a price target of $3.00 per gallon and prices are rising, CTA may let them float and only lock in the price if it hits a particular target (say $3.50) that, when locked, will cause the average price for the year to stay within the budget of $3.00 per gallon. The target price will constantly move based on the realized (paid) prices earlier in the year.

It Is Difficult to Exit Hedge Positions without Cash Flow Availability

During the tumultuous price collapse of 2008–2009, Murray and other CTA staff considered unwinding their hedged positions in order to take advantage of further price decreases, but they were prevented from doing so by the exiting costs and the agency's cash flow availability. Unwinding its swap agreement would have required CTA to cash-out its future, unrealized losses at a single point in time at the current mark-to-market price. This would have required CTA to pay out millions of dollars in a single transaction (rather than several smaller transactions over several years as the contracts reached maturity). Because CTA is funded by general obligation dollars and does not maintain a margin account, adequate cash was not available to unwind the agency's positions. Alternatively, CTA could have exited its position by entering into additional swap agreements and taking the short (rather than long) position. However, doing so would have required a new swap agreement, which may have involved a lengthy negotiation process.

A Good Hedging Adviser Is Worth the Cost

The CTA staff responsible for implementing the hedging program believes that the return from hiring an energy adviser is worth the outside cost.

Greater Toronto and Hamilton Area Metrolinx/GO Transit

Summary

Location: Toronto, Ontario, Canada
Fleet: 360 forty-five-foot coach buses, 62 locomotives, and 491 rail cars
Fuel Volumes: Diesel – 11.6 million gallons (FY 2009)

Metrolinx/GO Transit (GO Transit) is Canada's first, and the Province of Ontario's only, inter-regional public transportation service for the Greater Toronto and Hamilton Area of Southern Ontario (approximately 4,000 square miles). GO Transit's fleet includes 360 diesel coach buses, 62 diesel locomotives, and 491 rail cars. GO Transit runs 185 train trips and 2,045 bus trips daily, carrying about 217,000 passengers on a typical weekday—180,000 on trains and 37,000 by bus. The combined rail and bus system handles nearly 55 million riders annually.

GO Transit is in the process of transitioning to new locomotives that are capable of pulling 12 cars (up from ten cars with the current locomotives). Fuel consumption of the locomotive will increase as a result of the new locomotive's larger size, but fuel consumption per car will be lower.

Delivery Price Risk Management

Fuel Contracting

GO Transit operates on a fixed income; roughly 80% to 90% of operating costs are covered by fares. A fixed government subsidy covers the remaining operating costs. The agency is required to operate on a balanced budget, so achieving price certainty is critical. The agency cannot afford wild fuel price swings, so locking in prices is critical. If it exceeds (or does not reach) its budget, the agency must request (or return) additional funds from (to) the government. To meet these requirements, GO Transit's fuel purchasing strategy emphasis is to establish and maintain cost certainty in its budget. GO Transit has utilized fixed-price contracts through suppliers with the ability to hedge for the last nine years.

GO Transit selects fuel suppliers through an RFP process and currently contracts with one supplier to meet the majority of its total fuel requirement. The contract with this supplier was a one year agreement with four option years; the contract is now in its fourth year (Option Year 3). The contract stipulates that the supplier must have the ability to hedge and pass along these benefits to GO Transit by giving the option to lock in fuel prices. This requirement provides GO Transit with the budget certainty it need without operating an in-house hedging program. Not all fuel is purchased under the fixed price contract, so the base contract can also be used to provide fuel at a discount from the Bloomberg index that is below rack price for that week, plus a delivery fee. GO Transit can also buy fuel from the spot market.

In the current arrangement, Ultramar operates an in-house hedging program and purchases futures contracts (in 42,000-gallon increments) for NYMEX No. 2 heating oil to hedge diesel fuel purchases used to supply its customers. The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated so typically track each other. The supplier then passes the benefits and costs of its hedging program on to GO Transit by means of fixed forward pricing contracts. Hedging on the NYMEX also adds an exchange rate risk for both the supplier and GO Transit. This risk is included in the hedging fees the supplier charges GO Transit.

GO Transit received board approval and then approval from the Ministry of Finance before initiating this approach for using hedged fixed price contracts to lock in long-term fuel prices. The approvals were not difficult to get since the fleet already had a commitment to purchase the volume of fuel to meet service requirements, so there was no need to change its investing policy or take any legislative action.

The result of this arrangement is that GO Transit realizes the benefits and price stabilization of fuel hedging without having to operate an in-house hedging program. This method also means that the GO Transit does not have the administrative and margin account burden for operating its own program. The supplier assumes the up-front administrative overhead, the program operation, and assumes the credit and financial risk for maintaining the margin account. These costs are passed onto GO Transit as a premium, or fee, which is included in the agreed upon fuel price and fuel volume purchase requirement. The downside to this approach is that because the RFP requires vendors to have the ability to hedge to offer fixed-price contract options, it limits the list of potential fuel suppliers. This is limiting, especially recently because fewer fuel suppliers are offering this service. One difficulty that was experienced with this arrangement was that the supplier's credit rating was negatively impacted by the economic downturn in the summer of 2009. To address this, the supplier considered reneging on its fixed-price contract obligation with GO Transit. Ultimately, this did not happen and the supplier honored its contractual commitment to GO Transit, so the agency was not affected. The agency did experience contract purchasing delays and a period of uncertainty about the ability to continue having the option of fixed-price contracts.

Strategy

GO Transit's fuel purchasing policy does not place an upper limit for the hedged fuel purchase percentage, so it can hedge up to 100% of its fuel purchases. GO Transit, however, is not required to hedge its fuel purchases, so it could buy all of its fuel on the spot market if that was the best option. Based on previous experience, GO Transit chooses to hedge conservatively, typically entering fixed-price contracts targeting 80% of its diesel fuel purchases. Hedging this percentage of fuel use allows the agency to have reasonable budget certainty while maintaining the flexibility to deal with unexpected circumstances, such as budget cuts or strikes. The remaining 20% of fuel purchases are purchased on the spot market.

One company currently supplies approximately 90% of GO Transit's fuel requirements (most under contract, some on the spot market). The remaining fuel purchases take place with vendors at local depots on the spot market. For example, in August 2010, approximately one million gallons of diesel came from the supplier (766,000 gallons for rail and 238,000 gallons for buses), while 132,000 gallons (13.1%) came from third-party suppliers.

GO Transit prepares its annual budget request with a target fuel price in mind. Hedging incrementally through the year allows GO Transit to lock in prices at its target price. By necessity, GO Transit will often initiate fixed-price contracts well before the agency has an approved budget for the following year from the Ministry of Finance. Because of this, it is imperative to have a financial buffer in place in case the Ministry of Finance reduces GO Transit's budget.

GO Transit purchases diesel fuel using one-year, fixed-price fuel contracts, reflecting the maximum contract timeframe its supplier will offer fixed-price contracts. Each contract is for 42,000 gallons (1,000 barrels) of diesel fuel. The diesel fuel is hedged on the New York Mercantile Exchange (NYMEX) against a corresponding volume of a No. 2 heating oil futures contract, which is purchased by the fuel supplier. The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated so typically track each other. The agency has several contracting timing options including initiating multiple contracts to cover a whole year of fuel, initiating a single agreement, and incrementally initiating multiple contracts throughout the year. For example, if GO Transit is purchasing on a longer-term basis, it may hedge 20% of the annual demand and wait to see how prices trend and respond accordingly. For example, as of this writing, GO Transit is not hedged from April 2011 to April 2012.

Approval and Execution Process

GO Transit collaborates with its major supplier and a third-party financial consultant to advise the agency on market fundamentals. The supplier provides GO Transit with a daily list covering fixed-price contract availability for the next 12 months. The manager of accounting works with the director of finance to monitor the market and GO Transit's supply needs, and communicates daily with the supplier for fuel purchases. The financial consultant understands GO Transit's methodology, need for budget stability, and has a good understanding of the fuels market. The consultant provides advice directly to GO Transit and is responsible for communicating on when to hedge based on market fundamentals throughout the year. Purchase decisions, however are ultimately GO Transit's decision. GO Transit's CFO, director, managing director, and manager of accounting meet periodically on an ad hoc basis to review diesel purchases strategically and to make long-term contract purchase decisions based on the available information to match the agency's long-term strategic plans. Adjustments are made as necessary during the year. The director of finance can at any time contact the supplier to order a specific amount of fuel, at a price not to exceed a fixed ceiling to initiate a fixed-price contract. Based on the request "at a price not to exceed a fixed ceiling," it may take days or even weeks for the supplier to fill the order depending on market prices. It is also possible that the market never reaches the requested price; in this case the order goes unfilled. Normally, GO Transit places orders that it believes are achievable in a couple of days.

Once a contract is approved, GO Transit notifies its supplier (located in Montreal, Canada), which in turn purchases the futures contract(s) to cover the fixed-price order through its trading desk in California. Since the futures contract(s) are purchased on the NYMEX, the price includes the prevailing US exchange rate. GO Transit receives a monthly invoice from its supplier based on the rack price and fees per the contract agreement. The supplier adds a credit or debit to GO Transit's account balance based on the performance of the previous months' hedge.

GO Transit's financial statements disclose its financial obligations through contracts with fuel suppliers. There is no need to maintain a margin account or for separate accounting because the supplier executes the hedging.

Results

Over the long-run, GO Transit's hedging strategy has broken even. GO Transit considers this a successful result because the agency considers budget certainty to be the primary program objective. The fuel purchasing program effectiveness is not evaluated in any other way. For example, GO Transit does not do a "win/lose" analysis that evaluates the financial gains/losses from the hedging activity. GO Transit does not second-guess hedging decisions that result in paying a higher price for fuel; the focus is, and will continue to be, cost certainty.

GO Transit is, however, considering other options for hedging fuel purchases by establishing an in-house hedging program to increase flexibility and potential savings in costs through competition among suppliers. GO Transit will need program approval from the Ministry of Finance and then will amend its operating policy to include hedging activities. It is likely that the program would have to limit itself, at least initially, to selecting simpler and less risky financial products to hedge with. GO Transit will also have to consider the exchange rate risk since most petroleum products in Canada are hedged using North American indexes such as the NYMEX.

GO Transit was negatively impacted by market timing decisions. In one instance, GO Transit delayed locking in a price because it did not want to lock in above its targeted budget price. Diesel prices rose dramatically, and GO Transit purchased diesel from its supplier at market prices.

Pooling

GO Transit does not participate in, nor is pursuing, any cooperative arrangements. Consideration has been given to this approach through discussions with the other ministries. Investigation found that each ministry had its own policies and contract dates, which would prove difficult for implementing any cooperative agreement. Though potentially proving beneficial to others, it would not necessarily reduce the fuel price paid by GO Transit. GO Transit has found that its fuel utilization volume is of sufficient size to have buying power to garner the best fuel prices while maintaining control of its fuel purchases.

Commodity Price Risk Management

GO Transit does not operate a fuel hedging program. Instead, the fuel vendor hedges its bulk fuel purchases and passes the cost of its hedged position on to GO Transit (see Delivery Price Risk Management section).

Tips for Success

Fewer Suppliers Willing to Hedge Equals Higher Costs

As fuel prices have grown more volatile in recent years, GO Transit has found that fewer suppliers are offering fixed-price contracts, and that those that do offer fixed-price contracts charge a high and increasing premium for the service. As a result, the agency is considering working with financial institutions to establish an in-house hedging program. A significant benefit of this approach is the expansion of the number of hedging options which GO Transit will have access to for pursuing fuel price certainty. This will also allow GO Transit to have access to better fuel purchasing pricing since more vendors will be involved in the competition for GO Transit's business.

To establish an in-house program, GO Transit will need to develop an amendment to the agency's investment policy that would allow for the utilization of hedging instruments and define which instruments are to be utilized. This amendment will have to be approved by GO Transit authorities and then by the Ministry of Finance.

Have Experienced Members on Your Team to Provide Appropriate Advice

In order to achieve budget certainty, GO Transit works with suppliers that can offer fixed-price contracts through the suppliers' own hedging efforts. This approach limits competition; once under contract, the supplier recognizes the agency's need for budget certainty and not necessarily the lowest price, so there is little incentive for the supplier to offer the best prices. Because of this, GO Transit relies on the expertise of its financial consultant to monitor the market and to understand how the supplier is calculating costs based on the NYMEX, the exchange rate, basis risk, and the premium being charged for that risk (in offering a fixed-price contract). The consultant then informs GO Transit if the fee being charged is appropriate, or advises GO Transit to consider renegotiating.

BC Transit

Summary

Location: British Columbia, Canada
Fleet: 1,030 buses, minibuses, and vans
Fuel Volumes: Diesel – 5.8 million gallons, biodiesel – 0.26 million gallons, hydrogen – some (2009/10)

BC Transit is a provincial Crown Corporation responsible for coordinating the delivery of public transportation within British Columbia, Canada, outside of Metro Vancouver. The agency has contracts with 20 private management companies and 15 non-profit agencies to operate BC Transit's fleet of 1,030 conventional and double-deck buses, minibuses, and vans. Although operations are outsourced, BC Transit reserves the right to contract for fuel. In 2009/10, BC Transit used 5.8 million gallons of diesel fuel blended with roughly 0.26 million gallons of biodiesel. The agency also operates a fleet of 20 hydrogen fuel cell buses. As a quasi-governmental agency, BC Transit is prohibited from hedging with financial products. Nevertheless, the agency has been effectively hedging its fuel purchases for more than 20 years by entering fixed price contracts with fuel suppliers.

Delivery Price Risk Management

Fuel Contracting

BC Transit is responsible for purchasing fuel for each of its transit fleets, which are spread out in many cities in British Columbia. BC Transit typically contracts fuel for terms of 12–24 months. The agency purchases fuel at three different rack locations: Vancouver, Vancouver Island, and Kamloops. The fuel market in British Columbia is fairly competitive, with multiple fuel suppliers operating in the area. These suppliers all offer floating price contracts, which are calculated as the local rack price less a discount for large volumes. In addition, some suppliers offer fixed price options, as well as contracts with maximum price clauses (caps) and maximum/minimum price clauses (collars).

In 2006, BC Transit's fuel procurement was complicated by the introduction of a 5% renewable fuel content mandate for biodiesel. In addition to the mandate, new tax incentives made it attractive to blend conventional diesel with as much as 20% biodiesel in the spring and summer months. Prior to 2006, BC Transit had taken possession of diesel fuel at its bulk storage tanks and the agency's fuel supply contracts included both fuel and freight. After the mandate, however, fuel suppliers would not allow biodiesel to be blended at their delivery trucks. As a result, BC Transit had to take possession of the diesel fuel at the rack, contract a trucking company to haul the fuel to a biodiesel storage facility, purchase biodiesel, and "splash blend" biodiesel in the truck's tank, before finally delivering the blended product to BC Transit's bulk storage tanks. This new supply method split up the diesel purchase, biodiesel purchase, and delivery into separate contracts. In 2010, however, several fuel suppliers began offering B5 (conventional diesel blended with 5% biodiesel) at its rack terminals, allowing BC Transit to contract for a single product with freight included.

Pooling

BC Transit has the exclusive right to operate public transit in British Columbia outside of the Greater Vancouver area. Although it contracts operations to private management companies, BC Transit retains procurement of parts and fuel. By retaining these procurement activities, the agency increases its buying power. However, this arrangement is distinctly different from a fuel purchasing cooperative because the private management companies do not have an option of buying independently.

Commodity Price Risk Management

History

As a Crown Corporation, BC Transit is prohibited under the BC Transit Act from entering directly into financial commodity contracts. However, the agency has been effectively hedging for more than 20 years through the use of fixed-price, fixed-volume contracts offered by local suppliers.

Following the unprecedented oil market volatility from 2005 to 2009, BC Transit's management began developing a long-term commodity price risk management program. The program, which was to be implemented in FY 2009/10 (March 2009 to March 2010), was designed to mitigate the volatility risk and thereby reduce BC Transit's budget risk to its provincial and local partners. BC Transit's management considered several fuel price risk reduction strategies including fixed-price contracting and financial commodity derivative contracts.[59] BC Transit's current fuel supplier explained to the agency how it set up financial hedges to provide fixed-price contracts to its customers.

BC Transit management determined that executing these financial hedges on their own and buying physical fuel at the rack price could be less expensive than signing up for fixed-price contracts. In 2009, the agency's management approached British Columbia's Ministry of Finance with a plan to begin a financial hedging program. However, the ministry's treasury board has a prohibition against any agency entering into commodity derivatives unless it has a full-service treasury group, including in-house expertise on commodity derivatives. Lacking both in-house experts and approval from the treasury board, the ministry did not approve BC Transit's financial hedging program. Although the new risk management program did not include financial hedging, BC Transit retained the ability to enter into fixed-price physical commodity contracts, a practice which has been governed under formal policies and is subject to limits established by the board of directors.

Strategy

BC Transit's strategy is to enter into fixed-price, fixed-volume contracts when the agency determines, over the length of the contract, that the premium paid will provide budget stability

[59]http://www.transitbc.com/corporate/general_info/pdf/BC_Transit_200910_Annual_Report_Final_WEB.pdf

in a time of expected volatile price increases. This strategy is aimed at protecting against extreme price shocks and creating budget predictability. The agency would like to explore the direct use of financial hedging contracts but is prohibited from doing so by the agency's governing bodies.

Results

Prior to 2000 and prior to the recent run-up in oil prices, entering a fixed-price contract was a fairly easy exercise for BC Transit. Fuel suppliers would provide "cost-up" pricing which was very transparent. Fuel companies would show all the associated cost items (transportation, exchange rate, profit margin) in their quotations. The oil futures market was also in "backwardation," meaning that futures prices were trading below the current spot price. This characteristic of the market allowed BC Transit to lock in fixed prices at rates below the current market price.

Hedging with fixed-price contracts in this environment was a very successful strategy for BC Transit. Over the 2002/03 fiscal year (ending in March 2003), the agency locked in a fixed-price contract at US$21.50 per barrel (US$0.51 per gallon) for diesel fuel while fuel prices hovered near US$30 per barrel (US$0.71 per gallon). This contract expired in March 2003. In April, BC Transit, expecting further price increases, entered a 23-month contract at a price of US$24.68 per barrel (US$0.59 per gallon).[60] By the time the nearly two-year contract expired in March 2005, spot oil prices had risen to US$58 per barrel (US$1.38 per gallon). Overall, this contract resulted in a savings of C$6.0 million (about US$5.0 million) versus the best available rack rates.[61]

By 2005, however, fuel vendors had started pricing differently and BC Transit was no longer able to obtain a fixed-price contract at a discount to the market. Rather than providing fixed-price contracts at a discount to the spot price, suppliers began charging a premium because the futures market had gone into "contango," meaning that the price of oil for future delivery was more expensive than the current spot price. Furthermore, exchange-traded futures prices, which typically track the crude oil price in Cushing, Oklahoma and the heating oil price in New York Harbor, began to exhibit a correlation disconnect (basis risk) from West Coast fuel pricing. As a result, suppliers began adding additional premiums to cover "market risk conditions" on fixed-price contracts. In this increasingly uncertain market, suppliers became reluctant to provide a build-up of indicative pricing for fixed price contracts, and contract pricing essentially became a black box to BC Transit.

Instead of locking in prices for the long-term, BC Transit shortened its hedging horizon, entering into a six-month, fixed-price, fixed-volume contract at C$0.79 per liter (about US$2.57 per gallon) in March 2005. When this contract expired in September, BC Transit renewed the contract for 3 months at a fixed price of C$0.91 per liter (US$2.94 per gallon).[62] With total fuel volume approaching 19 million liters in 2005/06, increased cost aggregated to C$5.9 million (US$4.9 million).[63] After the 3-month hedge expired in December, BC Transit monitored short-to-medium term futures prices but fixed-price contracts continued to command a significant premium over rack purchases. As a result, BC Transit decided to remain unhedged and purchase on the weekly rack rate during the last quarter of the 2005/06 fiscal year.

BC Transit continued to purchase diesel at the weekly rack rate as the oil market grew increasingly volatile over the 2006/07 and 2007/08 fiscal years. BC Transit preferred to remain flexible in the short-term rather than lock in future prices at a premium to the rack rate.[64] In 2007/08, crude

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[60]http://www.cawvidc.bc.ca/gvta/News%20Archive/transit_maps_out_cuts_in_routes.htm and http://www.transitbc.com/corporate/pdf/20050628_ar_2005.pdf (p. 40)
[61]http://www.transitbc.com/corporate/pdf/20050628_ar_2005.pdf (pp. 39–40)
[62]http://www.transitbc.com/corporate/pdf/20060725_service_plan.pdf (p. 12)
[63]http://www.transitbc.com/corporate/pdf/20060614_ar_2006.pdf
[64]http://www.transitbc.com/corporate/pdf/20070709_annual_rep_06_07.pdf (p. 35) and http://www.transitbc.com/corporate/pdf/20070709_annual_rep_06_07.pdf

oil prices surged from US$70 to US$108 per barrel and the futures market remained in contango. In its 2007/08 annual report, BC Transit explained that the its decision to remain unhedged despite unprecedented volatility was due to the significant hedging premium in western diesel markets and the inability to develop synthetic instruments to cover price fluctuations in the extremely volatile market.[65] BC Transit remained exposed to market fluctuations, and by July 2008, at the height of the market, the agency was paying a rack price of C$1.25 per liter (roughly US$4.72 per gallon).

Unwilling to hedge amid high premiums and facing a rapidly expanding fuel budget, BC Transit engaged fuel purchasing specialists to monitor and evaluate the agency's diesel purchasing strategy.[66] The specialists, anticipating that the market would soon peak, advised BC Transit to continue its strategy of remaining unhedged rather than locking in high prices. This strategy paid off as oil prices precipitously collapsed during the 2008/09 fiscal year. By May 2009, oil prices had fallen to approximately US$60 per barrel and the rack diesel price had fallen to C$0.77 per liter (about US$2.47 per gallon). Despite inherent volatility in fuel pricing and relatively low diesel prices in early 2009, BC Transit continued to remain unhedged, once again due to the contango in the futures market and the significant hedging premium in the western diesel market.

In 2009, BC Transit began developing a fuel price risk management program but failed to receive authority to engage in financial hedging (see History section). Instead, BC Transit management continued to monitor and compare weekly rack rates and fixed physical price premiums. In September 2009 the agency decided to lock in over 90% of its estimated annual bulk fuel consumption at a price of C$0.90 per liter (about US$3.35 per gallon) with a six-month, fixed-price fuel supply agreement.[67] The contract resulted in savings against BC Transit's fuel budget, but the supplier did not extend the fixed-price agreement after expiration in March 2010 and the agency returned to rack pricing.

Tips for Success

Keep Fixed Price/Volume Contracts Less Than Full or Near-Full Consumption

In 2009, BC Transit contracted over 90% of its annual bulk fuel volumes under a fixed-price, fixed-volume contract. As with most contracts of this type, the contract had a "take-or-pay" clause, which required the agency to take and pay for all contracted volumes or pay for volumes not taken. That year BC Transit's projections of fuel consumption were slightly off due to an assumption that seasonal fuel-use swings were similar among its systems throughout the province. The agency ended up being over-contracted by 1.6%, which was equivalent to roughly 1,000 barrels. The fuel could not be used immediately and BC Transit had its fuel transporter store the fuel at its storage tanks. The fuel transporter used the fuel to supply its other clients and then replaced the fuel when BC Transit was ready to use it in April 2010 (at which time the fuel cost was less than the rack discount price). In this case, BC Transit's fuel transporter did not charge a fee for storing the fuel, but in other cases, a storage charge could be added.

This experience has resulted in three changes at BC Transit: 1) fuel needs are projected based on tracking of actual fuel use at each system; 2) no more than 90% of its annual bulk fuel consumption can be hedged; and 3) for fixed-price, fixed-volume contracts, the fuel vendor now provides the option that for any under-lifted monthly volumes, BC Transit can pay any positive difference between the current rack rate and its fixed price, or if the fixed price is lower than rack, a small administration fee is applied.

[65]http://www.transitbc.com/corporate/pdf/20080717_AR_2008.pdf
[66]http://www.transitbc.com/corporate/pdf/20080717_AR_2008.pdf
[67]http://www.transitbc.com/corporate/general_info/pdf/BC_Transit_200910_Annual_Report_Final_WEB.pdf (p. 26)

King County Metro Transit

Summary

Location: Seattle, Washington metropolitan area
Fleet: 1,300 vehicles
Fuel Volumes: Diesel – 11.9 million gallons (2009), Gasoline, Electricity

King County Metro Transit operates a fleet of about 1,300 vehicles, including standard and articulated coaches, electric trolleys, dual-powered buses, hybrid diesel-electric buses, and streetcars. The agency serves an annual ridership of 100 million trips within a 2,134 mile area.[68] Metro Transit is a division of the King County Department of Transportation. Nearly 60% of Metro Transit's operating budget comes from the state sales tax, while the remainder comes from passenger fares and federal grants.[69] The Metro Transit operations fleet currently consumes diesel and gasoline, and until 2009 it also consumed biodiesel. Metro Transit purchases fuel through the state of Washington's bulk fuel contract and purchased fixed-price contracts for biodiesel in 2007 and for conventional diesel in 2008 and 2009. In 2009, Metro Transit paid an average price of $2.09 per gallon of diesel fuel. Metro Transit is currently seeking approval to begin hedging fuel prices with financial products.

Delivery Price Risk Management

Fuel Contracting

Metro Transit contracts diesel fuel under the state of Washington's bulk fuel contract and contracts directly with a city-owned utility for trolley power. The state's five-year bulk fuel contract is procured by rolling over existing contracts and holding periodic request for bids. The state's current fuel contract in King County is with a local fuel distributor. Under this contract, Metro Transit has the option of hedging through procuring fixed-price contracts or by purchasing at the OPIS daily average rack price plus a delivery and profit margin.

Pooling

Metro Transit pools its diesel fuel purchases with other state agencies under the state of Washington's bulk fuel contract.

Commodity Price Risk Management

History

Prior to 2009, Metro Transit only had authority from the state to hedge its fuel prices through physical, fixed-price contracts with fuel distributors. This authority was included in the state department of transportation's budget bill.

Metro Transit first began hedging through fixed-price contracts in 2007 due to the agency's unease with volatile biodiesel prices. At the time, Metro Transit was increasing its biodiesel blend from 5% to 20% and the agency sought security from its exposure to the volatile B100 market. Metro Transit decided to hedge this exposure through a fixed-price bulk contract for up to two million gallons of B100 but continued to purchase the base diesel fuel at the OPIS rack price. The fixed-price B100 contract was successful in stabilizing the agency's biodiesel budget. However, when the contract expired at the end of 2007, B100 prices had skyrocketed, and the agency

[68]http://metro.kingcounty.gov/am/metro.html
[69]http://metro.kingcounty.gov/am/budget.html

reduced its biodiesel consumption by more than half. By 2009, Metro Transit completely discontinued the use of biodiesel.

The year 2008 was turbulent for fuel prices with oil prices spiking to nearly $150 per barrel. Amid this volatility, Metro Transit contacted the state and made arrangements to start hedging its diesel fuel under the state's existing authority allowing physical fixed-price contracts. The results of this hedging are presented later in this case study.

After hedging with physical fixed-price contracts from September 2008 through the end of the 2009, Metro Transit began working to gain approval for a fuel price hedging program that would involve the use of financial derivatives, such as exchange-traded futures contracts and options. They gained state approval in 2009 by pushing for hedging language to be inserted in a state law authorizing a Smart Fuels buying program that covered several aspects of fuel procurement procedures for state agencies. However, Metro Transit still needs approval from the Metropolitan King County Council before it can begin financial hedging. It has not yet received this approval.

Strategy

Metro Transit's hedging program in 2008 and 2009 was not guided by a formal strategy. Fixed-price contracts were entered on a regular basis, roughly every one to two weeks, with a target not to heavily exceed 70% of expected fuel consumption (the agency was worried that snow storms might cut service during the winter months, leaving it over-contracted for fuel). The agency monitored the oil markets and sought occasional advice on when to avoid entering contracts (due to temporary spikes caused by refinery shutdowns, pipeline disruptions, etc.) from an advisory firm based in Minneapolis, Minnesota.

Execution

Metro Transit arranged its fixed-price contracts with a local fuel distributor, which in turn obtained fixed-price contracts from a major oil company that hedged its price exposure through the purchase of exchange-traded diesel futures. This fixed-price contract was essentially passed through from the oil major, through the local distributor, to Metro Transit. Decisions on when and how much to hedge were made by two managers, Gary Prince and Ralph McQuillan, from the agency's business and finance department, and they did not require further approval from upper management.

Results

Metro Transit's experience with fixed-price contracts has yielded mixed results. In August 2008, Metro Transit entered into two different six-month, fixed-price, fixed-volume contracts, each covering 42,000 gallons of diesel fuel starting in September. These volumes represented about 9% of the agency's monthly consumption. As diesel prices plummeted in the second half of 2008, Metro Transit entered additional fixed-price contracts, locking prices for more than 73% of fuel consumption over the first quarter of 2009. Metro Transit's 2008 fuel hedges suffered from bad timing. In 2008, the agency locked diesel prices at delivered rates of $2.02 to $3.66 per gallon, while spot fuel prices fell below $2.00 to record lows towards the end of 2008 and over much of the first half of 2009. As a result, Metro Transit significantly overpaid for fuel under its initial fixed-price diesel contracts, but did achieve pricing stability and budget certainty.

Metro Transit continued to obtain fixed-price contracts during the first four months of 2009, managing to lock in historically low diesel prices—ranging from delivered rates of $1.79 to $2.21 per gallon—for about 50% of its fuel requirements over the remainder of the year. These contracts had positive value for the agency as diesel prices began to increase over the second half of 2009. Despite the success of the fixed-price contracts it entered in 2009, the agency was not able to hedge beyond December 31, 2009 because the state prohibits entering fuel delivery contracts across its biannual fiscal period. In 2010, Metro Transit began the process of seeking approval to start hedging with financial derivatives rather than relying on fixed-price contracts.

Tips for Success

Hedging with Financial Derivatives Allows Greater Flexibility in the Agency's Hedging Strategy

To date, King County Metro Transit has only hedged through physical fixed-price contracts, although the agency is currently working to gain approval for full-fledged hedging program that would allow the use of financial derivatives, such as exchange-traded futures contracts and options. Hedging with financial products—as opposed to physical fixed-price contracts—would allow the agency to achieve fuel price stability without requiring it to actually take delivery of the fuel. This would allow the agency to safely increase the level of its coverage to as high as 100% of its fuel consumption without the risk of over-committing to the delivery of fixed volumes in the event of lower-than-expected fuel consumption. Financial derivatives would also be advantageous because they would allow Metro Transit to hedge further out (beyond the state's biannual fiscal period), thus allowing the agency to lock in lower prices for a longer period of time. Finally, financial contracts can be closed out at any time prior to maturity, thus allowing the holder to exit an overpriced contract before prices decline further.

Hedging with Financial Derivatives Is Less Expensive Than Hedging with Fixed-Price Contracts

When it hedged, Metro Transit received its fixed-price contracts through a local fuel distributor, which in turn procured fixed price contracts from a major oil company, which in turn hedged through a broker who buys exchange-traded financial products. Each organization in this process requires a profit margin to cover its risk. Metro Transit believes that by hedging directly with financial products it could save roughly 20 cents per gallon. Metro Transit estimates that maintaining a financial hedging program would cost approximately $100,000 per year and would save more than $2 million annually compared with fixed-price contracts.

Have a Clear Plan When Selling a Financial Hedging Program to Upper Management

Starting a financial hedging program at Metro Transit requires a change in state law (which was achieved in 2009) and approval by the Metropolitan King County Council (an effort that is still ongoing). Metro Transit has put together a clear Energy Price Risk Management (EPRM) policy and submitted the policy to the council for approval. The policy makes clear in its mission statement that the purpose of the program is price stability and not to make or lose money.

Denver Regional Transportation District (RTD)

Summary

Location: Denver, Colorado
Fleet: 1,032 buses (FY 2010): 118 sixty-foot articulated diesel buses, 148 forty-five-foot diesel buses, 577 forty-foot diesel buses, 160 thirty-foot diesel buses, 14 twenty-two-foot diesel cutaway buses, 15 assorted contingency fleet diesel buses, and 336 paratransit and "Call-n-Ride" cutaway buses; 125 electric light-rail trains
Fuel Volumes: Diesel – 10.4 million gallons, electricity – 45.2 million kWh (FY 2009)

The Regional Transportation District (RTD) is the primary public transportation agency in the Denver metropolitan area. RTD's fuel purchasing goal is to achieve budget certainty in a volatile market, while operating within the constraints of the state of Colorado's tax laws. RTD used approximately 10.4 million gallons of fuel in FY 2009 at an average cost of $3.10 per gallon, and expected to use about 10.5 million gallons of fuel in FY 2010. Diesel fuel accounts for less than 8% of RTD's operating budget.[70] Light-rail trains used 45.2 million kWh of electricity in FY 2009 at a cost of just over $3.7 million.[71]

Funding for RTD is partially provided by a Denver metropolitan area sales tax of 0.6%. Likewise a 0.4% sales tax goes to the FasTracks project, which funds a region-wide transit network expansion to include commuter rail service to the Denver airport and eventually outlying areas.

Delivery Price Risk Management

Fuel Contracting

Diesel RTD has utilized fixed-price fuel contracts for more than 20 years. RTD has purchased diesel fuel from the same supplier since 2005. Its current contract with its supplier started in January 2007 and was structured with a one year base period and four option years, ending in 2011. Approximately six months before a contract period ends, RTD will issue an RFP for a new fuel contract. RTD uses the RFP process, instead of an invitation for bids, because it provides RTD with flexibility to ensure price, quality, delivery, and vendor performance to select the best supplier. RTD protects its business by including fuel delivery guarantees as a key aspect of the contract requirement. The contract includes a performance bond that requires the supplier to deliver the fuel at the agreed upon prices and can supply the required fuel volume. In one instance, the supplier's failure to meet these requirements resulted in a $750,000 payment to RTD. There is a cost associated with ensuring fuel delivery, but RTD has found that this cost is worth the expense when compared to placing fuel contracts based solely on the lowest delivered cost. Experience has also shown that the lowest price may come with lower quality fuel, which increases maintenance costs, and fuel supply issues can result in fuel shortages; both of these issues can potentially be more financial damaging than higher priced fuel.

RTD's fuel purchasing contracts include two purchasing options: 1) locking in a price for a specific gallon amount for a specific period of time, and 2) purchasing on the spot market using indexed prices plus a margin that includes fees, taxes, and delivery charges. RTD is experienced in basing fuel prices on several indices, including the New York Mercantile Exchange (NYMEX) No. 2 heating oil index,[72] the West Texas Intermediate (WTI) crude oil index, and the Gulf Coast Index (GCI). Since RTD is located in the Rocky Mountain region, which is relatively isolated from the pipeline and fuel distribution networks serving the rest of the country, its experience has shown that the WTI index is typically the most accurate index for its operations. However, the WTI is not always the best option, so RTD monitors the market trends and shifts future purchases to another index if needed. When RTD purchases fuel on the spot market under the current contract, diesel fuel prices are based on Oil Price Information Service (OPIS) Petroleum Administration for Defense District IV prices, plus the contract-specified differential per gallon. RTD has determined that locking in a price for the long-term lowers the administrative burden because managing fuel prices by floating requires additional costs for administrative responsibilities.

RTD's supplier operates an in-house hedging program which allows it to offer fixed-price contracts to customers. The hedged fixed-price contracts are treated just like other contracts

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[70]RTD 2010 Adopted Budget, http://www.rtd-denver.com/PDF_Files/Financial_Reports/Adopted_2010.pdf, November 17, 2009, (p. 27)

[71]Science Applications International Corporation, Fuel Purchase and Price Risk Management Survey, August 2010 (p. 1)

[72]The heating oil index is used because the prices of diesel and No. 2 heating oil are highly correlated so typically track each other.

or procurements, so even though the supplier is hedging its own position, RTD can treat it as a regular contract. The supplier has also offered RTD the option of including downside protection in the contract agreement. Downside protection can be thought of as a form of additional insurance in the event fuel prices drop below the fixed-price contract amount. In this case, with a standard fixed-price contract RTD would pay more per gallon than the market price. With downside protection, the supplier will share the savings with RTD, protecting against both increases and decreases in prices away from the fixed-price amount. As with all insurances, this additional protection requires an added premium, which amounts to a few cents per gallon.

The result of this fuel purchasing option is that RTD realizes the fuel price stabilization of fuel hedging without having to operate an in-house hedging program. This method means that the agency does not have the administrative and margin account burden of operating its own program. The supplier has the administrative overhead for the program operation and also assumes the risk for maintaining the margin account. These costs are passed on to RTD as a premium, or fee, which is included in the agreed upon fuel price and fuel volume requirement.

Electricity. RTD's utility provides the agency with special low electricity rates for the light-rail service. These rates are lower than the rates RTD pays for facilities and other usages (e.g., park-n-Ride facilities). RTD is investigating working with the Western Area Power Administration for purchasing wind and hydropower electricity to improve the agency's greenhouse gas signature.

Strategy & Risk Management

RTD is primarily funded through sales and use taxes, passenger fares, capital grants, federal operating assistance, and investment income, so it is difficult for agency leaders to request additional funding midway through the budget year. Because of this, RTD's main fuel purchasing strategy is to manage fuel price risk and achieve budget certainty through the use of fixed-price contracts for fuel purchases. RTD's fuel purchases must comply with the Colorado Tax Payers Bill of Rights (TABOR) law, which requires it to operate on a year-to-year basis and precludes RTD from fuel price hedging in the commodities market. The fixed-price contracts with its supplier are traditional contracts, even though the supplier hedges its bulk fuel purchases. RTD's legal department evaluated this fixed-price contract option and found no conflict with the TABOR law requirements.

RTD has been approached by third-party consultants to provide market analysis and purchase recommendations, but has opted not to use this option because of the high level of financial and purchasing expertise RTD possesses. The RTD purchasing agent and senior manager of materials management monitor and report on the fuel markets to determine when RTD should float the market and when to lock in fuel prices. The purchasing agent and senior manager of materials management, work closely with all departments (e.g., finance, bus operations, maintenance) to determine the upcoming year's fuel requirements. This input and expertise is critical for making sound projections. These future fuel requirements and market data are evaluated for the following 12 to 24 months. This analysis includes continually reviewing a wide range of fuel-related information sources such as futures market data, various fuel indices (NYMEX, WTI, and GCI), weekly OPIS prices, and other information resources such as the British Petroleum Risk Manager and the US Department of Energy's Energy Information Agency (EIA) data. The analysis also includes non-fuel market information such as money market trends (including the U.S. dollar, euro, and British pound) and external influences that artificially drive demand or price (e.g., weather, hurricane season, stabilizers that may be reflected in futures, near-term military conflicts, value of currencies, how the economic bailout is proceeding). RTD's purchasing agent has done this trend analysis for the last ten years and has found it helpful to discuss it with RTD's fuel supplier's trading group.

The results of these evaluations and discussions determine the purchasing recommendations regarding when RTD should float or lock in fuel prices for the following budget year. The final purchasing recommendations are presented to the RTD general manager and senior leadership team officials for discussion and approval. This process allows the team to provide feedback to the general manager and senior leadership about how they arrived at the conclusions being presented. RTDs' purchasing agent noted that quick action is needed to take advantage of this knowledge since markets can change quickly. The purchasing agent begins following fuel prices in January and starts assessing trends in the March/April timeframe. Financial assumptions and discussions begin in June for the following year's budget, which begins in January. Prior to 2007, RTD was able to float and still meet the allotted fuel budget. The last three to four years have been challenging for RTD, as market volatility and world events have impacted fuel price planning. RTD noted that ten years ago average fuel prices might have increased one cent per year, but now the agency sees substantially greater price swings, such as a change in the OPIS for diesel of ten cents in just one week (see Results section).

Over the years, RTD has locked in fuel prices both all at one time and also incrementally throughout the year. There are risks involved with both approaches; for instance, locking in before a fuel price drop results in higher fuel costs. For RTD, each one-cent change in fuel cost equals a $100,000 difference in the budget. For the incremental approach, portions of the following year's fuel usage are locked in at a time. RTD has found that in some cases it is better for the agency to float the market during volatile periods than to make a decision to lock in prices with the possibility of fuel prices dropping. For FY 2011, RTD locked in prices for 90% of planned fuel purchases, or about 9.5 million gallons of diesel, in two increments. It was decided to lock in only 90% of the fuel purchases to maintain flexibility in the event of service cuts or other circumstances that would reduce fuel use. The first purchase covered 25% of the projected fuel demand at $2.25 per gallon, the second purchase covered the remaining 75% at $2.39 per gallon (prices include the differential). The remaining 10% of fuel purchases are purchased on the spot market.

RTD contracts half of its total services to other transportation service provider companies (contracted services), 40% is for fixed-route services, and the remaining 10% is for demanded routes. RTD developed a secondary strategy for managing fuel costs from their contracted service providers. With the volatility in fuel prices over the last five years, RTD realized that each contracted services provider was factoring additional costs into their bids to protect themselves from fuel price volatility concerns. RTD was able to remove this variable. Since RTD knows the routes, mileage, and fuel usage for each contracted services provider, it includes this fuel volume in the total volume used when arranging its fuel contract(s) (either fixed-price or float). The contractors are then allowed to purchase fuel using the same contract (using the same fixed-price or float price). The contracted services provider contracts state that RTD will reimburse them for fuel costs; however, RTD will pay no more than RTD's current fuel price.

This method ensures that RTD only pays the locked-in price for fuel which allows it to maintain control of its fuel costs and eliminates the additional contractor expenses. An additional benefit for RTD has been reducing the administrative burden by not having to scrutinize the contracted services providers' fuel price expenses. RTD does compare the fuel volumes being charged by contracted services providers to the expected fuel usage to ensure they are realistic.

Approval and Execution Process

The RTD General Manager was granted the direction and authority by the board of directors (board) to make fuel purchasing decisions without board approval. This authority is critical because it allows the agency to move quickly enough to take advantage of pricing opportunities and secure fixed-price fuel contracts. The fuel purchasing process requires that the board be notified of what steps RTD is considering regarding the target price range and how the related activities address RTD's requirement for meeting budget certainty and guaranteed delivery. The senior manager of materials management, upon approval of a fuel purchase recommendation, places the order with the supplier to lock in at a particular price when a fixed-price contract is selected. Because fuel prices may be locked in before the budget has been finalized, the contract includes a clause that states that the contract is based on funds being available (i.e., budget approval), thus working within TABOR requirements.

Results

The RTD Purchasing Agent evaluates the fuel purchasing program's performance at the end of each year by comparing the indexed weekly float price with the price RTD paid. Over the last 25 years, with the exception of 2009, RTD has had positive, but not perfect, performance.

During FY 2005, RTD's budget forecasted diesel fuel costs at $1.67 per gallon and approximately 90% of the year's planned fuel purchases were locked in late in FY 2004 at $1.99 per gallon. Overall RTD saved $64,000 in 2005 compared to floating the market. This may not seem to make sense, but this implies that the average annual float price was higher than the average fixed price RTD paid, even though the forecasted price was lower than the locked-in price. In FY 2006, the forecast was for $2.22 per gallon; RTD locked in at $1.99 per gallon, and saved $1.16 million compared to floating the market. In FY 2007 the results were even better. The forecasted price was $2.35 per gallon and the fleet locked in at $2.07 per gallon, which resulted in a savings of $1.83 million compared to floating. Results for 2008 were still positive, even with locking in late in 2007 during a period of increasing price volatility. The forecasted price was $2.62 per gallon, and RTD locked in at $3.21 per gallon, saving $123,000 compared to floating.

FY 2009 was RTD's most difficult year. In June 2008 RTD had to make challenging fuel purchasing decisions with forecasted diesel prices at $4.50 per gallon, which were coupled with increasing ridership which helped offset the higher costs. Rather than go through the lengthy process of public hearings to reduce services during a period of increased demand for their service, RTD elected to stabilize service to meet ridership needs. RTD's market evaluation showed fuel prices consistently over $4.00 per gallon (with a peak of $4.26 per gallon in mid-July) and futures for 2009 projected to be in the same price range. Budget certainty is RTD's key fuel purchasing goal, but achieving optimum pricing given the market is also an important secondary goal. RTD locked in prices in September 2008 when prices were at $3.10 per gallon. This was a significant improvement over the forecasted prices, but prices had "not yet made the final adjustment for trading influences."[73] The result was a $7.8 million loss compared to floating because prices decreased down to $1.49 per gallon at the end of December. RTD noted that even though they were able to avoid drastic service cuts during this period, it would have been worth the risk to have added downside protection for 2009. These prices and costs are summarized in the table below.

Year	Budget Forecast Price	Lock Price	Annual Cost Delta (Lock Price - Average Annual Float Price)
2005	$1.67/gal	$1.99/gal	$64,000
2006	$2.22/gal	$1.99/gal	$1.16 MM
2007	$2.35/gal	$2.07/gal	$1.83 MM
2008	$2.62/gal	$3.21/gal	$123,000
2009	$4.50/gal	$3.10/gal	-$7.8 MM
2010	$2.65/gal	$2.25/gal	$242,000
2011	n/a	$2.37/gal	>$3 MM (10/2011)

[73]RTD, Senior Manager, Materials Management, response to project survey, November 2010

RTD's FY 2010 fuel price forecast was for $2.65 per gallon and the fleet locked in prices at $2.25 per gallon. Market prices were below $2.25 per gallon for much of the beginning of the year, but prices rose towards the end of the year. At the end of the third quarter of 2010, RTD's fixed-price contracts had saved approximately $22,000, but by year's end the agency expected to have saved more than $150,000 on the 90% locked-in portion of fuel purchases.

RTD reiterated that floating the market results in a flat price differential, while a premium is paid to lock in prices. RTD's key fuel purchasing performance metric is not to receive the lowest prices (although good pricing is not overlooked), but rather is whether the price was managed within the budget, even in volatile markets. Achieving budget certainty and maintaining service for its customers constitute RTD's combined goal.

For FY 2011, RTD expected to use approximately 10.5 million gallons of fuel in 2011 and locked in prices incrementally. Again, RTD planned to lock in prices for 90% of its anticipated fuel use (9.5 million gallons). The budget forecast was for $2.64 per gallon. RTD locked in 25% of anticipated fuel use at $2.29 per gallon of diesel on July 8, 2010, and locked in the remaining 75% of the anticipated fuel use at $2.39 per gallon on August 12, 2010, giving an overall average price of $2.36 per gallon.

Pooling

RTD is a member of the Rocky Mountain Governmental Purchasing Association, a regional association that includes members from various agencies throughout the Rocky Mountain region. Through their participation as one of the largest diesel fuel purchasers in Denver, other participating agencies can buy diesel fuel off the RTD fuel contract. The additional purchases by other members have not significantly increased the pool fuel volume, so RTD has not received better prices from its supplier. The biggest impact of pooling for RTD has been the allowance of RTD's contracted services providers to purchase fuel from this contract with the same terms and conditions as discussed in the Strategy & Risk Management section.

Commodity Price Risk Management

The Colorado TABOR law precludes RTD from fuel price hedging in the commodities market. RTD stated that the ability to directly hedge its fuel purchases is not necessary considering its needs and the performance of the current approach, but it did believe that it would be a bonus.

Tips for Success

Determining the Right Index for Your Agency Is Important

NYMEX and other indexes had been a good source for the last eight years or so, but have not been as accurate and advantageous recently. RTD has found that the best index for its current fuel purchases has been the WTI.

Authority to Quickly Execute to Achieve Target Price Is Imperative

Until several years ago, RTD did not have the necessary authority to execute the quick, but educated, fuel purchasing decisions that are required in the current market to take advantage of favorable prices. (This should not be confused with the approach of "timing the market.") To remedy this, the RTD board of directors entrusted the general manager with the authority to make the purchasing decisions to lock in fuel prices. Fuel prices change by the minute, so making decisions at monthly or weekly board meetings is not ideal. When prices enter the target price range the purchasing team can quickly get approval from the general manager, make the purchase to lock in the price, and not miss the brief moment of opportunity waiting for board approval. To support the board of directors and its oversight, the purchasing team (see Strategy and Risk Management section) studies and reports on the market and other factors, and provides the board with update reports that factor in budget assumptions, including a target range for fuel prices. In this way, the board understands what decisions are being made and can assure its constituents that they are getting services at market driven prices. RTD notes that this approach takes trust on both sides, but is important for reaching targets.

Have a Good Working Relationship with Fuel Suppliers and a Method of Contracting That Works for Your Organization

RTD noted that it is important to have a good working relationship with the fuel supplier. The agency also noted that working with suppliers that are willing to negotiate is important. RTD believed that using an RFP to secure contract bids opens up negotiation opportunities that benefit both parties compared to the method of using an invitation for bids. One example of this came from the current supplier's proposal which stated that RTD's desired index (NYMEX) may not be the best option for RTD. The supplier explained that it had seen during the last five years that the WTI offered a lower average price than the NYMEX in RTD's region, so proposed using WTI instead. The supplier presented the differences and potential savings (for RTD and the supplier) for making the switch. RTD agreed and both parties benefited. RTD noted that its fuel supplier has worked very well with the agency in regards to billing, timing, and supplying fuel, with both parties making sure that there is mutual agreement and benefit to each party.

Have an Accurate Fuel Usage Forecast

The larger the agency, the more important and challenging it can be to accurately forecast the total fuel demand, including contracted services. This forecasting is imperative and covers a number of areas including fleet composition, total miles and mile per gallon of fuel for each vehicle, service on the street, deadhead time, etc. RTD works hard to make sure lines of communication are open across all departments in order to get accurate information in determining anticipated fuel usage. This has resulted in RTD accurately forecasting fuel demand. If RTD exceeds its expected fuel usage, then the agency must go to the spot market which can easily prove more expensive than anticipated. In general, this amount is only approximately 100,000 to 200,000 gallons. RTD's supplier has honored the locked-in price for these small volumes above the planned amount in the closing weeks of the year; however the supplier is not required to do so by its contract.

Consider Other Influences That Affect Pricing

RTD's contracts with its contracted services providers state that the agency will reimburse them for fuel only up to the RTD locked-in fuel price. This approach eliminates the extra expense RTD experienced from the contracted services providers, including higher fuels prices in their bids to RTD to cover their increased risk from volatile fuel prices.

Abbreviations and acronyms used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation