The Impact of Fuel Costs on Transportation and Supply Chain Planning

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Abstract

The cost of fuel is a potent force behind transportation and supply chain planning since energy is the central point of the flow of goods. Increase in the price of fuel leads to high transportation cost on the road, air, sea and even in some warehouse related processes. Such escalated costs do not remain within the transport budget. They were distributed through procurement, inventory planning, sourcing strategy, customer pricing and general supply chain design. That is why fuel cost does not represent a mere financial fact.

It is a strategic variable capable of changing the manner in which companies plan movement, source of movement, quantity of inventory they have and their service to customers.

On the simplest level, transportation requires fuel to be able to move products between suppliers, factories, warehouses, distribution centers, stores and customers. When the price of fuel is high, the price of transporting the goods will be increased as well. Perhaps that growth is manageable enough in the short run, in the case of some businesses. To other people, particularly those who handle large volumes of goods or those with low margins, the impact may be enormous. In the long term, any small rise in fuel will transform the economics of the delivery routes, the mode of shipping and sourcing choices. This is the reason why the planners of the supply chain should be keen on the fuel costs. They have much more to do with the trucking line on a budget.

Transportation expense is one of the most obvious impacts of fuel costs on supply chains planning. All modes of freight, road freight, air freight, ocean shipping, and parcel delivery, are sensitive to the fuel prices, be it a direct effect on the operating cost or indirect effect on the fuel surcharge. Carriers tend to transfer some of these increases to customers and this means that the pressure is experienced by the businesses sooner. A company that previously had a route or a method of shipping that seemed to be cost-

effective, may now believe that this decision is far more difficult to defend. This compels the supply chain groups to scrutinize the transport plans better and create decisions on whether they require alternate routes, alternate carriers, alternate shipping frequencies or even alternative customer service guarantees.

The balance of the transportation mode is also shifted by the fuel cost pressure. Long route trucking might not be as appealing to some freight moves when the cost of fuel increases drastically. Air transport can be made even more costly, particularly of goods which are already under pressure on margin. Businesses in turn can convert more of their volume to rail, consolidated ocean or intermodal transportation where feasible. The changes are not always easy since every mode has trade-offs in the speed, reliability and flexibilities. Nevertheless, the rise in fuel costs can frequently make the supply chain focus more on the consideration of what transport mode provides the most benefit to the system as opposed to the quickest or the most commonly used mode.

Here route planning comes in particularly. Poor routing decisions are costly within a high-fuel environment and become extremely costly within a short time. Each mile that is unnecessary, each unnecessary stop, each vehicle with low utilization and each hour of idle time add to cost. The planners of supply chain thus require better optimization of the routes. They take a more penetrating look at the distance, traffic, density of deliveries, waiting time, and backhaul opportunities. A pathway that might have been considered satisfactory now might require redrawing due to the fact that fuel waste cannot be overlooked any more. The improved route planning will reduce cost by minimizing traveling distance, idle time, and vehicle use, which is even more appreciated in the case of unstable fuel prices.

The other significant reaction to increasing fuel prices is shipment consolidation. Fragile loads and incomplete delivery patterns are more difficult to substantiate when each trip is more expensive. The naturally given response by businesses is to pool shipments into larger truckloads or larger containers to make the transport capacity utilized more efficiently. This enhances the cost per unit shipped and will aid the minimization of the individual trips required. The overall concept is straightforward. It is usually more economical to move one shipment than many smaller shipments in case the fuel cost is high. Such planning demands enhanced coordination in terms of inventory, warehousing, order timing and customer expectations and the savings can be significant.

The sourcing strategy is also influenced by fuel costs. The distance becomes important when the cost of transport is increased. A supplier who sells at a low purchase price but is long distance with the target market might lose its appeal when the transport price is added to it. This is just one of the reasons why increased fuel prices tend to favour interest in nearshoring, regional sourcing or the diversification of suppliers nearer to the point of demand. Companies start to think about the fact that a low-cost offshore source would still be the best choice in case the delivery of goods out of that source would take too much time, fuel, and freight costs. By doing so, fuel expenses will be able to transform not only the transport

planning but also the overall supply chain architecture.

Inventory strategy also alters. Close relationship exists between transportation cost and lead time. In case the cost of fuel increases urgent shipping becomes too costly, companies can choose to stock more products in strategic places such that they will not have to resort to expensive emergency transportation. This way, an increase in the cost of fuel may drive certain firms out of the very lean inventory systems and into more defensive stock holdings of key products. This is not merely about stocking up the overproduction of all places. It implies that one should think more critically about the location of stock to ensure that the business has minimized exposure to high costs of transport, but still achieve service levels.

Conversely, a pressure in the cost of fuel might also stimulate business to minimize the movement of unnecessary inventory. Provided that the products are being moved too frequently between the facilities, or the replenishment patterns are not designed properly, the increased fuel prices will reveal such inefficiencies rather quickly. The businesses can counter it by reconsidering the flow of the network, they are going to decrease internal transfers, enhance the decisions of the initial allocation, and put inventory nearer to the probable demand. This demonstrates that outbound shipping is not the only area that is impacted by the cost of fuel. They have an effect on the entire internal supply chain movement pattern.

The decision of customer service is also affected. Rapid provision has turned out to be a significant anticipation in numerous markets yet quicker service needs more transport intensity. Same-day transportation, emergency supply, and high-performance air transportation will all be costly during increased fuel prices. The businesses are then left to choose on whether to absorb the cost, or transfer it to the customers, limit the service provision or re- design their network to accommodate speed in a more cost effective manner. These are not mere decisions since they have an influence on both margin and customer satisfaction. Nevertheless, the price of fuel compels organizations to be more explicit in those trade-offs than believing that the high-quality service can be always provided at reasonable cost.

The other effect is significant on forecasting and budgeting. One of the inputs in logistics that are also more volatile is fuel and when the prices fluctuate rapidly, the fixed annual transport budgets become obsolete within a short period. The supply chain teams must thus have more dynamic planning models. They should be able to know the impact of the fuel variations on the freight cost, delivery economics, supplier decisions, and the product margins. This usually needs more integration between logistics and finance, procurement and commercial divisions. In case the fuel costs increase sharply, the reaction can be the inclusion of budget change, review of prices, renegotiation of transport or strategic sourcing. The absence of cross-functional planning can make the supply chain keep working based on the obsolete assumptions as the cost pressure mounts in the background.

Procurement is also influenced by fuel prices since the suppliers are under pressure. A supplier that has

increased the cost of internal transporting, inbound material costs or freight costs outbound may increase the price or alter the terms of service. This implies that procurement teams must be aware of the direct impact of transport on their individual network, but the indirect one through supplier prices and availability. In other instances, a supplier that used to appear stable can lose its competitiveness due to the fact that the logistics structure is too fuel-intensive. The procurement should therefore pay more attention to transport resilience and total landed cost in making sourcing decisions.

Another area that is closely related to the fuel cost is sustainability. Increased fuel costs tend to make operations that are fuel-efficient, electric fleets, lower-emission transport modes and reduced-unnecessary-mile network designs attractive. Although the sustainability objectives can start as environmental objectives, fuel cost can make them direct financial targets. Cost control as well as lower emissions is supported by route optimization, less empty miles, improved load utilization, modal shifts, and sourcing regionally. In that regard, it is possible to speed up smarter and sustainable supply chain design both with fuel pressure accelerating it.

Technology is significant in assisting business to respond. The management of transportation, route optimization systems, telematics, predictive analytics, and live shipment data are all useful in enabling companies to make decisions more efficiently when fuel prices are volatile. Such tools are able to determine the costs of the inefficient routes, compare carriers, detect the unnecessary idling, assist with dynamic scheduling, and indicate the underutilization. In the absence of such visibility, businesses will find themselves taking longer to react to them or make general assumptions rather than taking specific action. Technology does not eliminate the fuel risk, it only intelligently assists the supply chains to deal with it.

The cost of fuel also influences the long-term network design. Supply chain established on extremely long transportation paths and continuous movement can be efficient in case of constant fuel prices but more vulnerable when the energy prices begin to increase. This is the reason why most companies reconsider the centralization and regionalization balance. A very centralized network can lower the facility cost but will cause increased transport dependency. A more distributed network will be more expensive to physically run and less distance will need to be covered to deliver the goods but also the business will not be as susceptible to a rise in fuel prices. The answer does not exist, yet the cost of fuel is something that renders the question highly significant.

The other feasible reaction to the escalating fuel prices is the contract strategy. Companies can seek more long-term carrier contracts, fuel hedging, or price arrangements that minimize abrupt costs spikes. More flexible options can be preferred by others in case they want to undergo rapid mode or network design changes. Carrier strategy is more strategic in any case because of fuel cost depending upon the business model. Transport is no longer a matter that can be handled as a booking problem. It gets included in larger cost and risk planning.

Ultimately, fuel expenses are such an issue as they influence the motion of commodities on a daily basis and the more profound planning of the supply chain as a whole. They affect the route decisions, the mode of transport, the frequency of shipment, network network, inventory location, sourcing decisions, customer service policies, and the profitability. Supply chain planners cannot consider the problem as a mere surcharge problem when fuel prices increase or fluctuate. They must reconsider the movement of the system and efficiency that can be achieved.

This is why the effect of the cost of fuel on transportation and the supply chain planning is so big. It keeps a business in mind that logistics is closely connected to energy and that cost management in one part of the business may require a more intelligent design in a large number of others. Those companies who react well do not just negotiate more with carriers. They redesign routes, enhance effectiveness of loads, reduce unnecessary miles, position inventory more effectively, and wonder whether long-distance motion is still viable on all products and suppliers. The most powerful supply chains, in a high cost transport environment, are not necessarily the quickest. It is they that travel the most disciplined, the least wasteful and they are the ones that have the best idea of what each mile really costs.