



**How to Be Market Responsive Despite
Rising Crude Oil Prices and
Transportation Costs**

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Introduction

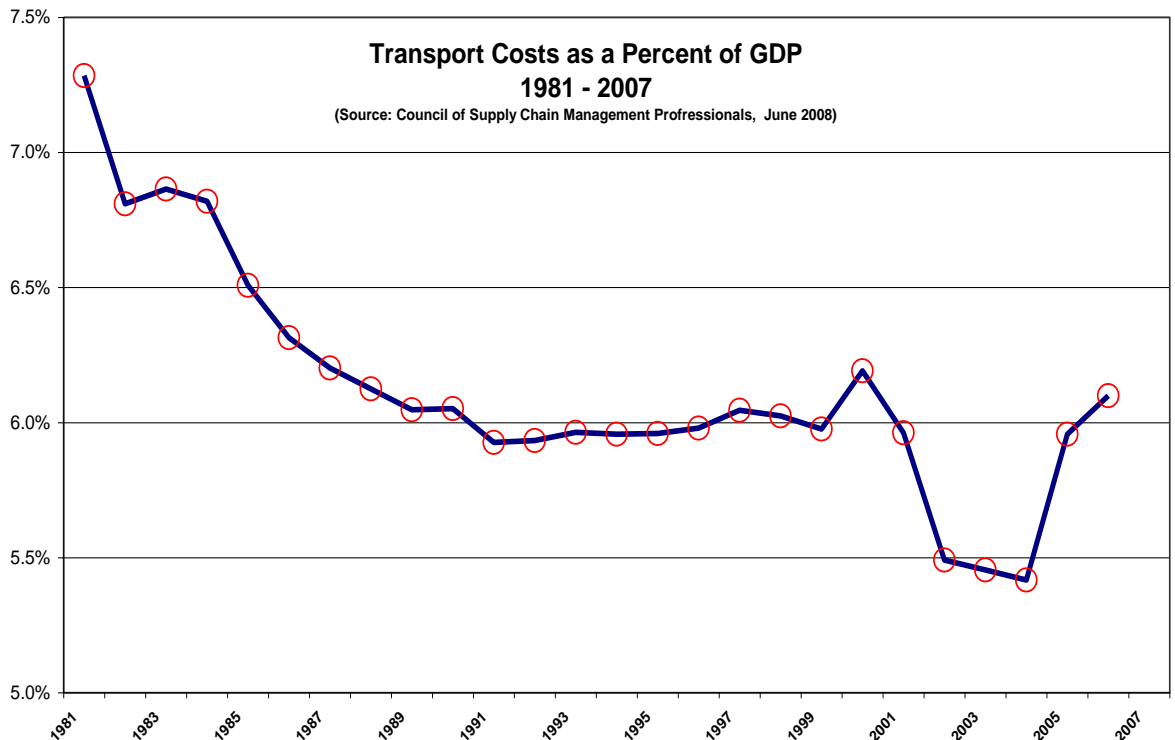
“A lot of our supply chain design work was really developed in the 1980’s and 1990’s, when oil was 10 bucks a barrel. I could say that the supply chain design is now upside down. Transportation cost is going to create an even more distributed sourcing network than we would have had otherwise.”

—Keith Harrison, Head of global supply, Procter & Gamble¹

Consumer goods producers and industrial manufacturers are currently under intense pressure to lower costs and improve service performance in many areas. From the pressure to improve revenues and market share, to mandates to cut expenses, all the while maintaining eco-friendly policies, such as responsible sourcing of raw materials. These weighty challenges require exceptional juggling skills from even the most seasoned senior executives.

The fact that crude oil has risen to over \$140 per barrel probably seems like one more annoyance for many executives; another one of those “uncontrollable costs or events” that are part of running a business. Hitachi Consulting’s perspective is that the consequences of \$140 per barrel (per bbl) crude oil—even \$150 or \$200 per bbl—are very much controllable and that making the effort to control those consequences likely has benefits—aside from reduced expenses—in higher revenues, and even reducing the company’s carbon footprint.

The first step to controlling the consequences of \$140 per bbl crude oil is to realize that transportation now takes a bigger chunk of the sales dollar than it has in the last five years. The chart below shows that overall transportation costs as a percent of gross domestic product (GDP) have grown by 47 percent in the last five years. Intense competition and excess capacity have prevented a large portion of these costs from being passed from carriers to shippers so far. But, capacity in all modes of transportation is either static or shrinking, and carriers are increasingly passing on their cost increases in the form of higher rates or more onerous fuel surcharges.



¹ *Financial Times*, June 27, 2008

Given this recent trend, forward-looking companies are taking action for the longer-term and near term, to increase their control over transportation activity and costs, and potentially reaping the brand-awareness benefits of a lower carbon footprint.

Long-Term Approaches

Supply Network Modeling

The long-term approach to controlling transportation costs starts with taking a fresh look at the overall supply network, and the most appropriate tool to use for this is a quantitative supply network model. For a company without access to such a model, the first step is to acquire access through a third party or to develop the expertise in-house. To build a model of the supply network, or update an existing model, make sure the costs associated with the baseline version of the model reflect the current P&L. This means recalibrating for every facility, the costs for every raw material, production process, and the value of inventory levels at each of those facilities. Consider the following questions:

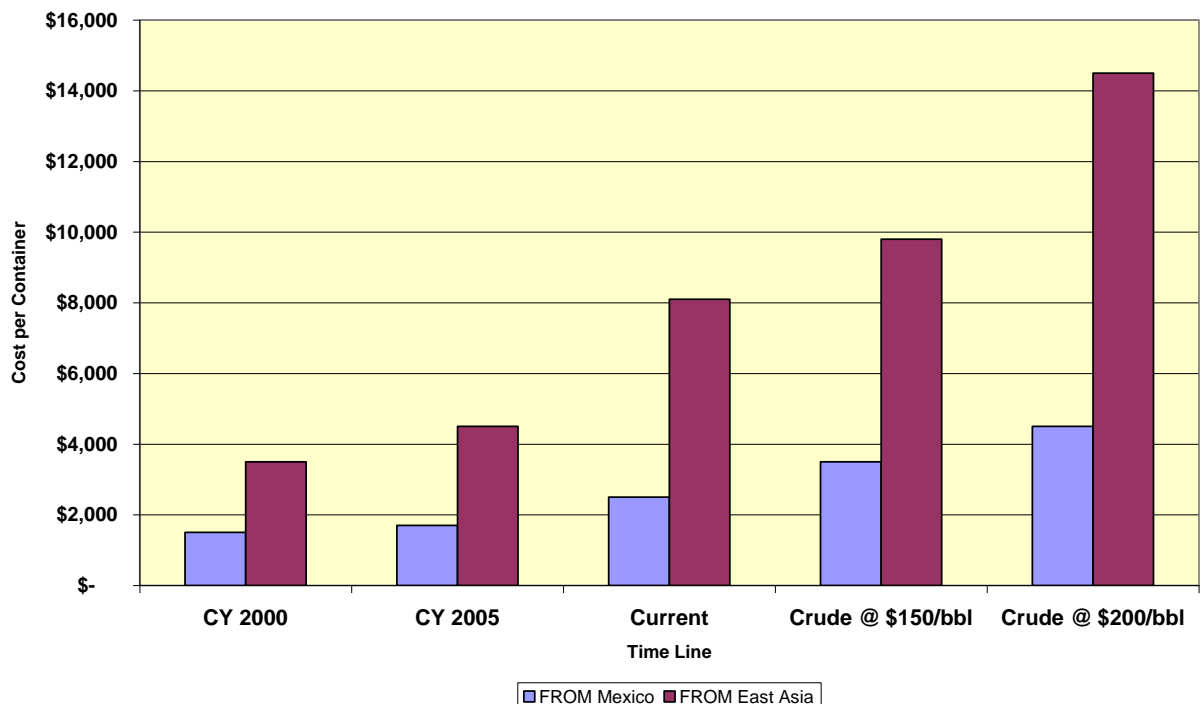
- Are electric power costs and consumption rates current?
- Are labor and burden rates current?
- Are plant capacities current for both owned and supplier's plants?
- Are the prices and source locations of raw materials current?
- Are the levels and dollar value of inventory at each location current?

Once facility and inventory costs are up to date, you'll need to recalibrate the transportation costs, the links from suppliers to production and from production and distribution to customers to match the P&L.

When the transportation costs have been recalibrated to match the P&L, you will then need a basis for projecting the impact of changing transportation costs. For purposes of estimating the impact of changes in fuel prices on overall supply network efficiency, use the table below for guidance.

Estimated Cost of Shipping One 40 ft Container to US East Coast

(Source: CIBC World Markets - May 2008)



With the baseline network model and costs in place, you are set to run several “what if scenarios” based on varying fuel prices. With each scenario, an analyst looks to see what has changed:

- Have supply sources shifted?
- Have processes (e.g. production loadings) shifted from one facility to another?
- Has the value of inventory changed, etc.?

In short, an analyst takes the baseline model and, through a series of iterations on ever-higher prices of fuel, estimates the likely changes in transportation costs as well as to the supply network, and the consequences of those changes. The analyst’s report should be an urgent topic for the senior executive team. In addition to examining the impact of fuel costs on transportation activity and costs, the analyst also needs to be running various scenarios on the impact of fuel cost increases on electric costs. The options there might also include an analysis of switching to non-fossil fuel-based electricity sources.

Evidence is emerging that companies are already acting to control overall supply network costs. Hopefully these companies are taking action as a result of quantitative modeling. Those that aren’t, could learn trade-offs and consequences of actions the hard way. For example, adding a distribution center (DC) to lower transportation costs could cause higher inventory levels that offset the transportation costs saved. Unfortunately, at the macro level it appears these trade-offs are not well understood. The following chart shows Inventory costs and transportation, as a percent of GDP, are rising quickly.

Inventory and Transportation as a Percent of GDP 2000-2007

(Source: Council of Supply Chain Management Professionals - June 2008)



Let’s look at another example, say the decision to locate a distribution center or production facility closer to customers. This would seem to contribute to lower transportation costs since goods entering the facility would be shipped in larger volumes with presumably lower transportation costs per unit, and goods leaving the facility would have shorter distances with higher per unit rates. However, the DC location process needs to address more than transportation costs. It must (this is where quantitative modeling and activity simulation become critical tools for executive decision-making) explicitly address:

- The current per-unit costs of inbound and outbound goods including an examination of the impact of mode changes for each segment
- The seasonality of inventory requirements
- The impact of customer-driven service levels by SKU on inventory requirements (i.e. do we have the right stuff in the right place at the right time?)
- The impact of overall inventory levels

Leaders in conducting this sort of quantitative modeling employ more than one toolset. The Supply Network modeling tool establishes a baseline for examining scenarios and the model quantifies the trade-offs among many possibilities for the location of facilities and process activities at those facilities, given the demand for various products. However, Supply Network models typically treat inventory levels as an output so each scenario should have overall inventory charted. The next step then is to take the optimized supply network, and further solve for inventory optimization: given the service level requirement for each customer in the demand area, what is the best level of inventory for each product group. The combination of Supply Network modeling and Inventory Optimization modeling should provide the guidance executives need to lower transportation and inventory costs.

A good starting point for the analysis needed for quantitative modeling is to chart inventory and transportation costs as a percent of sales for each major business unit, then focus on those units where those costs are rising faster than comparable units.

Acquiring a Transportation Management System

One of the limitations of the Supply Network model is that it does not directly account for possible shifts in transportation mode that could be triggered by incremental changes in costs. Taking advantage of mode shifts can help lower costs without affecting service levels. Mode shift opportunities are more likely to be discovered and applied if there is a way, such as a transportation management system (TMS), which systematically searches for the lowest cost carrier that meets the service requirement. Recently, a shipper used a newly installed TMS and saw remarkable mode shifts and eight percent lower transportation costs when the system detected that carriers within modes applied fuel surcharges and other accessorial charges differently. With constantly changing order volumes, the system selected a less-than-truckload (LTL) carrier while the long-term legacy choice had been a truckload (TL) carrier. The shipper expects to extend the use of its TMS to systematically analyze orders that have been automatically assigned to a parcel carrier. The shipper expects many of these orders can be consolidated into LTL or even TL drop-off shipments resulting in still lower costs.

Select and Sign Contracts with Fuel Efficient Carriers

Truck: The selection of trucking companies can increasingly be based on fuel-management practices. Shippers can rightfully ask the carrier (and this can apply to private truck fleets as well) if they:

- Specify equipment designs that promote fuel efficiency
 - Cab and trailer fairing improves efficiency by two to three percent
 - Using small diesel generators instead of idling increases the effective miles per gallon (and reduces air and noise pollution as well)
 - Matching the drive train to duty cycle (even if it means higher horsepower, but more efficiency) reduces engine lugging and improves fuel economy
 - Replace old equipment with newer trucks: Electronically controlled drive trains, including automatic transmissions for Class 8 trucks, improve fuel economy and take some burden off driver behavior for reduced consumption
- Have a fuel-hedging strategy to lower the overall average fuel spend
 - This implies a level of financial management maturity and an access to cash reserves that may limit the number of carriers who can use this technique
- Have daily operating procedures in place to reduce fuel consumption

Keep in mind that these concepts have been already applied by air carriers. Southwest Airlines started retrofitting its planes with winglets to improve aerodynamics when oil hit \$50 per barrel. Winglets increase fuel efficiency by five to seven percent. Southwest has been a leader in fuel hedging, using a number of hedging strategies tied to multiple fuel price indices. For 2008, Southwest says that 70 percent of its fuel is effectively priced at the equivalent of \$51 per barrel of oil.

Trucking companies might not see as dramatic improvements, but shippers who refuse to push carriers for this sort of innovation will pay more and more going forward.

Rail: Looking ahead, as the railroads increasingly understand and exploit their inherent advantage in fuel economy, the practical threshold for using intermodal may drop from 650-700 miles to lower levels, and thus see a modal shift from truckload to intermodal. Of course the railroads will have to improve their own performance too. The average speed of an intermodal train will have to increase from the current level of about 28 mph to something closer to the truckload average speed of 42 mph door-to-door. This may require considerable investment in additional capacity: more double track, closer train control, and above all, better overall execution in running trains on-time.

One shortcut to identifying fuel-efficient carriers is to check out carriers who are participants in the EPA's *SmartWay Transportation Partner* program. These carriers commit to certain goals and are recognized for achievement in improved fleet efficiency and lower emissions.

Reducing Fuel Surcharge Costs Using a Transportation Contract

Most shippers now track fuel cost changes from the Department of Energy's (DOE) weekly posting. However, fewer shippers—especially those using LTL carriers—relate the fuel surcharge directly to distance traveled. From the shipper's perspective, using the transportation contract to force the carrier to shift from a "percent of freight charges"-based surcharge to one based on miles, forces the carrier and the shipper to come to grips with a shipper-induced improvement in miles per gallon (mpg).

Typically this involves setting up a matrix that shows that for every five-cent change—above a baseline such as \$1.50 per gallon—in the weekly DOE fuel price, the fuel surcharge changes by one cent per mile. If the carrier can manage his fuel consumption so that his fuel costs go up by less than a penny, then he gains a little extra margin. Shippers need to understand the mpg targets of their carriers and apply that knowledge to the matrix. Consider these two cases:

<u>Element</u>	<u>Carrier A</u>		<u>Carrier B</u>	
Typical Truckload Journey (miles)	500		500	
Base Price of Diesel	\$	1.50	\$	1.50
Current Price	\$	5.00	\$	5.00
Surcharge per five cent increase in DOE Fuel Price	\$	0.01	\$	0.01
MPG Basis for surcharge		6.0		6.0
Actual MPG	\$	6.50		5.25
Calculated Fuel Surcharge per Mile	\$	0.70	\$	0.70
Charge for Fuel included in Rate plus surcharge	\$	475.00	\$	475.00
Actual Cost of Fuel for Journey	\$	384.62	\$	476.19

Both carriers had fuel surcharges based on six mpg, and both had similar incremental increases based on the weekly DOE fuel price. Yet Carrier A, with more attention to fuel economy, actually gained profits from the fuel surcharge, and Carrier B actually lost money in fuel. Shippers who blindly accept carrier-offered fuel surcharge programs without investigating the underlying elements such as actual mpg, inflict higher prices on themselves.

The better course is to gain insight into the carrier's fleet mpg, or better yet, gain insight into the likely mpg of the shipper's freight movement. A shipment of 540 miles from Topeka to Denver across the prairie typically consumes a lot less fuel than the same shipment of 540 miles from Denver over the Rocky Mountains to Salt Lake City. A TMS can be configured to account for these changes in mpg and apply the correct charge automatically.

Short-Term Actions

Since the long-term approaches may take time to initiate and accomplish, there are steps shippers and carriers can take more immediately to reduce transportation charges, particularly those related to fuel prices. These steps (and again they can be applied to private fleet operations as well) ought to include:

- Fuel Economy
 - Incent drivers to drive more economically. Most engines can record fuel consumption by day and many fleets use Onboard Data Collection devices to record speeding, over-revving, hard braking, etc. Configuring the output, then setting the driver incentive program for higher mpg can improve mpg by two to three percent. Put another way: smart companies should “pay the drivers rather than ‘Big Oil’”
 - As much as drivers may disapprove, governing speed may be an effective fuel economy device. Smart operators may consider the trade-off between higher driver pay and lowering fuel costs to see if there is another opportunity to “pay the drivers rather than pay ‘Big Oil’”
 - Paying careful attention to preventive maintenance such as oil changes, tire pressures, and use of the right lubricants and additives offers gains in fuel economy of about one percent. Air carriers have discovered that engine cleaning alone increases fuel economy by 1.9 percent
 - Reduce engine idling by increasing throughput for loading and unloading (e.g. scheduling drivers for loading/unloading), and providing facilities for drivers to wait for loading and unloading
- Other operating procedures: pay attention to asset utilization
 - Run tractors 18 to 20 hours per day versus 12 hours by “slip-seating” drivers in round-the-clock operations; shift-differential pay will be offset by fewer vehicles
 - Pay drivers by the activity (by mile and stop) and not by the hour, incenting them to hustle (safely); driver “Miles per Hour Worked” goes up by 25 percent, and equipment costs go down
- Concentrate on the “Perfect Order”—on-time, on quality, on quantity, and accurately invoiced; this avoids extra trips and wasted resources
- Control and improve load factors: half-full trucks and containers waste both fuel and capacity

Summary

This paper has identified several long-term approaches that can result in lower transportation and supply chain costs, and several short-term actions that can have a more immediate beneficial impact. Shippers who have applied these techniques have experienced transportation cost reductions as the table below shows. Also note that service, as measured as on-time performance, is substantially better.

Metric	Leading Companies	Laggards
Trend in Transportation Spend over Last Two Years (Including Fuel Surcharges)	0 -10% Reduction	Increased by more than 10%
Spend on Expedited Freight	Decreased or remained the same	Increased by more than 10%
Percent of International Shipments That Arrive On-Time	95% +	Less than 80%
Percent of Outbound Shipments That Ship On-Time	95% +	87%
Percent of Companies Using Real Time Information to Change Transport Mode, Itinerary, etc. to Meet On-Time Requirements	40%	20%

Source: Aberdeen 2007 - 2008

But the real message, as P&G has realized, is that activities that seemed too costly at \$10 per barrel, may be very effective in reducing transportation costs as crude oil soars to \$200 per barrel. The savvy executive team is beginning to understand that transportation, once seemingly uncontrollable, now represents a much bigger portion of operating expense, and future profits depend on immediate action to gain control. Stakeholders and shareholders alike will be pleased with the likely side benefits of better customer service and a lower carbon footprint.

About Hitachi Consulting

As Hitachi, Ltd.'s (NYSE: HIT) global consulting company, Hitachi Consulting is a recognized leader in delivering proven business and IT solutions to Global 2000 companies across many industries. We leverage decades of business process, vertical industry, and leading-edge technology experience to understand each company's unique business needs. From business strategy development through application deployment, our consultants are committed to helping clients quickly realize measurable business value and achieve sustainable ROI.

With offices in the U.S., Japan and Europe, Hitachi Consulting's client base includes nearly 35 percent of the Fortune 100, 25 percent of the Global 100, as well as many leading mid-market companies. We offer a client-focused, collaborative approach, which integrates strategy, people, process and technology, and we transfer knowledge throughout each engagement. For more information, call 877.664.0010 or visit www.hitachiconsulting.com.

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About Hitachi

Hitachi, Ltd. (NYSE: HIT/TSE: 6501), headquartered in Tokyo, Japan, is a leading global electronics company, with approximately 356,000 employees worldwide. Fiscal 2005 (ended March 31, 2006) consolidated sales totaled 9,464 billion yen (\$80.9 billion). The company offers a wide range of systems, products and services in market sectors including information systems, electronic devices, power and industrial systems, consumer products, materials and financial services. For more information on Hitachi, please visit the company's Web site at <http://www.hitachi.com>.

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