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## What Do Volatile Oil Prices Do To Your Distribution Network?

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Supply chains are under pressure from many directions. Managers are expected to deliver ever-improved speed and flexibility while cutting operating costs—and simultaneously reduce the impact of the company’s activities on the environment. The volatility of oil prices have added to the challenge. As 2008 has shown, companies cannot count on predictable oil prices as part of long-term planning. In fact, today’s economic forces are testing traditional supply chain strategies and causing companies to evaluate their distribution networks as profit erodes. As producers and distributors of supplies and consumer goods feel the effects of rising production and delivery costs, many will look to minimize operations costs, tracing opportunities back to their real estate portfolios.

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The best method in understanding the impact of oil price on business location is by understanding how it fits into a product’s total delivered cost. When calculating the total delivered cost, the analysis must go beyond the production process and include distribution and facility costs such as rent, utilities, property taxes, equipment leases and shipping. Higher oil prices inflate not only transportation cost but also the cost of raw inputs, utilities and packaging materials. Unfortunately corporate leaders have little ability to reduce these costs. Recent drops, perhaps driven by the current economic crisis, have granted a temporary reprieve. However, some expect prices to return to mid- 2008 levels upon resolution of the crisis, driven by renewed demand from growing overseas economies. In this challenging economic situation, a closer examination of what can be controlled, specifically real estate-related costs, is necessary.

### Evaluating Transportation Cost

One area with the opportunity of scrutiny is transportation cost and the location and number of distribution points. In the past decade, efficient shipping meant movement toward mega-distribution centers with consolidated inventory in a select few locations.<sup>1</sup> This movement was shaped by years of supply chain optimization in a low oil price environment. The influence of labor and real estate costs drove companies to place distribution centers in a small number of locations with strong transportation connections. The cost of somewhat longer distribution routes was more than offset by reduction in inventory, efficient layout, and reduced labor cost.

However, the balance between warehouse efficiency and fuel cost is shifting. While the megacenters model will remain optimal for some, recent reports discuss a new trend in building an efficient logistics network. As an alternative, some are moving toward a greater number of small distribution centers nearer to customer locations. The purpose of the shift

is to minimize overall shipping distance from the warehouse to the market, which offsets some of the sharply higher transportation cost generated by 2008's peak oil prices. This emphasis requires closer examination of the real estate site selection process both for companies expanding into new territories and those that are attempting to develop a more efficient distribution network.

Redesigning a logistics network with emphasis on reducing transportation cost will yield both positive and negative results. Each company must evaluate the trade-offs between the number of distribution points and the relative inefficiency of smaller distribution centers.

### Fewer Distribution Points

#### Advantages

- Lower required inventory
- Lower space requirement
- Ability to consolidate deliveries

#### Disadvantages

- Longer delivery routes
- Slower delivery
- Higher fuel usage

### More Distribution Points

#### Advantages

- Faster delivery
- Lower fuel and trucking costs

#### Disadvantages

- Requires greater inventory cushion
- More difficult to consolidate routes
- Higher headcount

This emerging logistics reality has been addressed analytically through GIS software capable of optimizing networks. One recently developed scenario depicts the effect rising oil prices have on a company with customer locations across the U.S.<sup>2</sup> The hypothetical logistics dilemma is analyzed by considering the increase in transportation cost for the current product distribution system serving all U.S. customers. The distribution structure remains constant and therefore cost effective at most oil price levels. This demonstrates the continuing influence of labor and real estate costs on business location. However, upon reaching a fuel price of \$150 per barrel of oil, the logistics network is forced to change in response to prohibitively high transportation costs. At this point the increased cost of additional distribution centers closer to customer locations is offset by the savings in transportation cost. While distribution points near population centers remain fixed, a reorganization occurs where customer locations are spread across large distances. Despite added costs of two new facilities, the hypothetical company is better situated to reduce total delivered cost by cutting high-cost shipping routes.

While fuel prices have not yet hit \$150 per barrel, this scenario raises an important point in the creation of an optimized logistics network. All companies have a point where transportation cost constitutes an unreasonable percentage of the total delivered cost. At this point company management will need to decide whether to continue absorbing the cost or find alternative means, which includes a closer look at the location of real estate.

### Emphasis on Optimal Location

This phenomenon has increased in significance when determining an optimal production location in a business location analysis. Each client's distribution requirements and optimal network is unique. A recent Grubb & Ellis Strategic Consulting Group client requested a business location analysis that placed greater emphasis on logistics network optimization. Exchange rate shifts, rising transportation costs and a poor building layout led this Canadian-based manufacturer to consider the ability of its existing facility to handle long-term growth. The facility was far from the majority of customer locations and at odds with industry trends pointing to rapid growth in the eastern and southern U.S. We focused on minimization of transportation costs in identifying the optimal location of a North American headquarters and manufacturing facility. The network analysis identified locations with minimized shipping costs to existing distribution centers and direct customers while accommodating for future market growth. From this base, we evaluated labor market data, transportation costs, tax burdens, and real estate expenses for identified buildings and markets to create a total delivered cost of production in each location. A considerable drop in transportation costs was the main driver in the recommendation to relocate to a Midwestern city, based on production savings on a per unit basis despite increases in utility and rental costs.

### Improving Delivery Flexibility

The prospect of higher oil prices is not the only driver for a greater number of small distribution centers closer to customers. Less-than-truckload shipping and just-in-time customer demands are at odds with high oil prices. Customers have come to expect rapid delivery based on experience in other industries. Full load trucking, which is more efficient in fuel economy and labor cost, is difficult to implement without relaxing customer demands or relocating warehouses. However, some companies understand the disadvantages of less-than-load trucking and are committed to reducing this form of transportation. As part of its supply chain reorganization, Whirlpool adopted a policy of full truckloads whenever feasible. Despite challenges, the company is currently moving more than 63% of its consumer products via full truckloads.<sup>3</sup>

The adoption of full load deliveries at more frequent intervals has driven the creation of delivery networks with smaller, more numerous nodes. This push toward greater flexibility affects not only finished good producers, but also the rest of the supply chain. The Journal of Commerce Online reports that some suppliers have shifted to a greater number of distribution centers within short-haul ranges of 150 miles or less.<sup>4</sup>

The requirement for greater flexibility has also accelerated a shift toward leased facilities as companies mitigate the risk of continued oil price volatility. Ownership prohibits a quick exit from a market when the optimal supply chain dictates a relocation. In leased facilities, companies have the ability to re-optimize these networks on a more frequent basis. The feasibility of rapid decision-making and execution can create significant savings as transportation costs rise. Kimberly-Clark's well publicized "supply chain network of the future" not only locates mega distribution centers closer to customer locations, it also leases them. The decision to lease and operate via 3PL allows Kimberly-Clark to change its logistics network as market conditions evolve.<sup>5</sup>

### Environmental Benefit

This approach to redesigning logistics networks can improve the environment as well. Optimized distribution center locations reduce shipping miles, fuel consumption and carbon emissions. Along with cost reduction comes the benefit of positive external press. Quantifiable emission reductions can provide a concrete example of a green results in an era when companies are under pressure to demonstrate reduced carbon footprints.

### Moving Toward Optimization

While oil prices continue to fluctuate, economists seem to agree that high prices are a long-term reality. Unyielding demand from growing nations and a finite supply provides a convincing argument. The challenge for corporate decision-makers is to offset the effect of higher transportation costs on the total delivered cost of a product. This will necessitate reevaluation of the location of distribution facilities, with greater emphasis on transportation cost. Although this scrutiny of distribution locations would appear to erode the competitive logistics advantage of certain cities, individual companies will create an optimized network unique to their customer locations. In certain cases, well-connected but often overlooked markets can emerge as the top location for serving a territory. Conversely, established logistics markets with existing intermodal facilities, strong highway connectivity and proximity to population centers will likely continue to attract companies striving for cost minimization. Until the distances and quantity of product to each customer and intermediary is assessed, no location can be overlooked in the formation an optimal logistics network.

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<sup>1</sup> Council of Supply Chain Management Professionals "2007 State of Logistics Report"

<sup>2</sup> Supply Chain Digest – March 20, 2008, Dr. David Simchi-Levi

<sup>3</sup> Cooke, James A. "The Greening of Whirlpool's Supply Chain" *Supply Chain Quarterly*, 2nd Quarter 2008

<sup>4</sup> Decesare, Jon. "Changing Dynamics of Industrial Real Estate" *The Journal of Commerce Online*, Jan. 8, 2008

<sup>5</sup> Ryan, Vincent. "Sucking It Up" *CFO Magazine*, Apr. 1, 2008

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