

# Driving Profitability with Swaps and Exchanges

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Swap and exchange programs can significantly reduce logistics costs, as well as an organization's carbon footprint. Despite its potential, the technique is often constrained by commercial, technical and operational concerns.

In today's tough economy, now more than ever, companies are seeking ways to control costs. Logistics budgets, which include the receipt of inbound raw materials and the shipment of outbound products, often exceed 15% of sales; excluding raw materials and energy, they can be larger than other production operations and maintenance expenses. Thus, improvements in supply chain management can have a significant impact on a firm's bottom line.

Swaps and exchanges are supply-chain-management practices whereby manufacturers contract with competitors to supply their customers with product during a specific interval until they are able to resume shipments. This has typically been done in response to unforeseen situations, such as an emergency plant shutdown. The arrangements rely on good faith, as competitors expect reciprocation should their own plants experience shutdown. Volume balance settlement is typically via products in-kind, with little or no cash changing hands. Swaps and exchanges differ in several ways (Table 1), including what product is traded

and how, the mode of delivery to the customer, and the frequency of trades.

Chemical producers are now looking at swaps and exchanges as a daily business routine that reduces costs and improves customer service. These swaps and exchanges offer very significant savings opportunities, often with an improvement impact of more than 1% of sales for the typical chemicals or polymers business unit. Swap and exchange programs can reduce logistics costs by 25% or more. The potential for formal long-term exchanges is even more dramatic when production optimization is included in the scope of North American or global exchange programs.

## Simple swaps

Simple swaps focus on an exchange of identical or like-kind products for delivery to two to six customer locations. In a swap, companies make no changes to the use of their assets, including railcars, trucks, warehousing, etc. Swap participants simply trade products and receive them from

**Table 1. Manufacturers may choose to swap or exchange product, depending on what products are traded and how.**

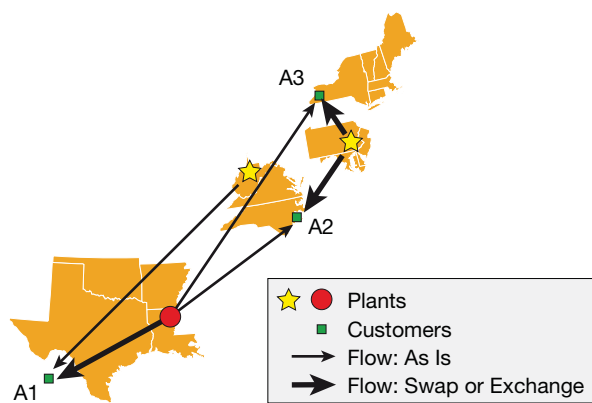
Type of Trade	Order Flow	Products	Freight/Region	Frequency	Reporting and \$\$\$ Reconciliation
Swap	Customer to Supplier, Supplier to Host Plant	Identical	Collect Freight by Supplier from Host Plant	Ad Hoc	Load for a Load (Reconcile number of pounds)
Product Exchange	a. Above b. Customer to host plant c. Regional third-party logistics company (3PL)	a. Above b. Interchangeable c. In-kind	a. Above b. Freight delivered c. Regional 3PL	a. Above b. Monthly c. Annual	a. Above b. Product value c. Logistics differential d. Production differential

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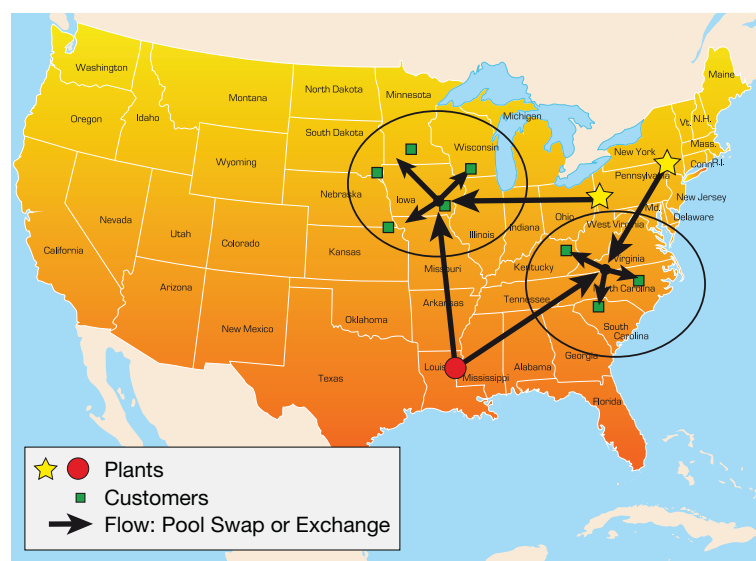
each other's terminals as a means to reduce freight costs. Customer confidentiality is maintained, since participating companies use their own assets or carriers to transport a product from the host plant to its final destination. The cost savings associated with freight, which is managed on a "collect" basis, is the target of simple swaps.

Swaps are typically developed around several key variables:

- *order flow.* Confidentiality requires the chemical supplier to receive the customer's order and place the order with the exchange partner's host plant.
- *products.* Products with identical purities or specifications are typically traded, since they may not require customer approval prior to exchange and shipment.
- *freight/region.* Freight is collected or picked up at the



▲ **Figure 1.** Swaps between manufacturers with plants near each other's customers can reduce freight costs.



▲ **Figure 2.** In a regional pooling swap or exchange, manufacturers with isolated plants (Yellow Star and Red Circle) can pool interchangeable product at shared terminals in strategic locations near customers.

host (competitor) plant because it is the simplest way to control delivery to customers.

- *frequency.* *Ad hoc* swaps have been the norm within the chemical industry, for which the savings are limited to the areas of freight-line haul, logistics or, perhaps, production.

- *performance reporting.* Swap performance reporting is focused on volume balances and compensation for out-of-balance weight differentials.

A typical swap is illustrated in Figure 1. In this scenario, two chemical companies with customers located adjacent to the other's plants can save freight costs by trading identical products through a series of swaps. By picking up similar product from a competitor's plant located somewhat adjacent to a customer's site, both companies can virtually eliminate the freight costs of transporting products to their customers' location.

Here, Red Circle Chemical Co., which has a plant located in Louisiana, can negotiate a swap with a plant in Pennsylvania owned by its competitor, Yellow Star, Inc., to reduce freight costs in delivering product to its (Red Circle's) customers in New York and North Carolina. At the same time, Red Circle will supply product for Yellow Star's customer in Texas.

Swaps are often conducted on an as-needed basis to cover plant upsets or turnarounds. However, they are gaining popularity as a routine means of reducing freight costs.

## Product exchanges

Although more complex than swaps, the potential for significant improvements relating to logistics expenses and production utilization is greater for product exchanges. The variables associated with exchanges are notably different than those of swaps:

- *order flow.* Although the order flow is from customer to supplier, the supplier may either contact the exchange partner directly or work through a regional logistics facility that manages the delivery process.

- *products.* Exchanges can involve the trade of a family of products that may or may not all be the same — for example, Company A gets product X while Company B gets product Y, and an agreed-upon adjustment is made based on the product cost differential.

- *freight/regions.* Product exchanges can be conducted between specific plants or within regions to reduce freight costs and expenses associated with distribution assets (such as truck fleets, rail fleets and terminals), as well as working capital for running logistics systems. Product

exchanges offer the opportunity to trade surplus stock to reduce inventory, increase production utilization, and reduce production switchover costs.

For example, in a regional pooled-product exchange (Figure 2), chemical companies with isolated plants can pool like or interchangeable product at shared terminals in strategic positions located near customers, rather than each maintaining individual terminals in the same space. Product may be shipped from these terminals using shared transportation fleets, such as trucks, reducing the costs of capital assets.

Costs are reconciled at the end of a specific period according to rates negotiated by both manufacturers. By exchanging product and sharing capital resources, companies can reduce both freight and capital costs associated with serving distant customers.

- *frequency*. Product exchange programs are conducted on a regular basis, and have goals such as an annual target and quarterly maximums or minimums.

- *performance reporting*. In addition to focusing on volume, exchanges may include agreed-upon payments for product, logistics, or production-cost differentials.

The complexity of product exchanges arises with the trade of in-kind rather than identical product and the use of the competitor's logistic assets or shared resources to ship products. Confidential information relating to product specifications and customer locations often must be disclosed between competitors to successfully execute product exchanges (Figure 3). Exchanges also involve reconciliation of costs at the end of specific negotiated terms.

To ensure confidentiality and simplify the process, a third-party logistics consultant is often contracted to manage the order, delivery, accounting, and billing and reconciliation process. Knowledgeable in legal terminology and the execution of swaps and exchanges, the consultant can maximize profitability while minimizing commercial risk. When working together, chemical companies must adhere to the American Chemistry Council's antitrust guidelines, as well as the other parties' non-disclosure agreements.

### Commodity chemicals are ideal for swaps and exchanges

Several characteristics make commodity chemicals and polymers excellent candidates for product swaps and exchanges:

- *cost escalation and service deterioration*. Transportation costs have dramatically increased while service levels, particularly for rail, have deteriorated.

- *source-point diversification*. The decline of transport service, as well as *force majeure* events (e.g., Hurricane Katrina), have led many companies to review their supply diversification strategies.

- *geography*. Chemical feedstock sources, plants, and end-markets are often geographically mismatched.

- *offshore sourcing*. The wide fluctuations in the prices of energy and related chemical feedstocks, currency values, and export capacities abroad create monthly and quarterly variations in the opportunity to source and sell products.

- *duplication*. Among commodity chemicals producers, there is duplication of logistics infrastructures, including rail fleets, terminal locations, storage tracks and warehousing facilities.

- *common specifications*. Typically, one-third to one-half of the product market is "commodity," in that customer specifications are not unique to a given production site or technology.

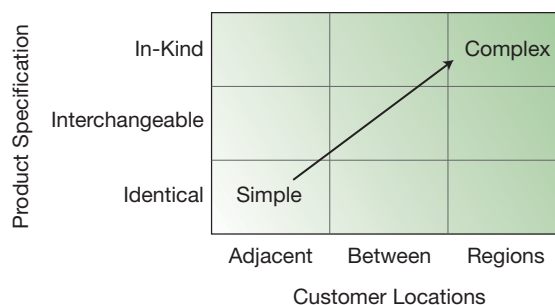
- *green chemicals*. Although not yet legally mandated, having optimized logistics reduces greenhouse gas emissions.

### Possible limitations to swaps and exchanges

Despite these potential benefits, commodity chemical and polymer producers have been slow to accept swaps and exchanges due to several constraints:

*Confidentiality: customers, product specifications and pricing, and transport contracts*. Customer confidentiality may affect the frequency and extent to which swaps can be made. The amount of customer information, such as a customer's consumption, may be highly confidential. Product specifications may also vary from customer to customer, making swaps slightly more difficult. In addition, product swaps and exchanges may be difficult because companies are involved in exclusive transportation and freight contacts.

*Compliance: environmental, transportation, stewardship, and anti-trust provisions*. Third-party logistics consultants can guarantee customer, product and pricing confidentiality, while completely managing logistics and operations to ensure optimized results. They also can ensure anti-trust



▲ **Figure 3.** Product exchange complexity increases when more diverse products, numerous customer locations and shared capital assets are involved in a program because confidential information must be exchanged to satisfy program requirements.

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compliance and eliminate the legal red tape associated with companies working directly together.

**Competition.** Many suppliers are reluctant to discuss volume, order management, pricing and delivery with competitors for fear of losing business. Some may feel they are giving up a competitive advantage by disclosing too much information. In formal exchange programs, no participant is required to give away an advantage. Exchanges allow regionally advantaged plants to maximize the value of their facilities at market values.

## Defining the opportunity: best practices

Before beginning a swap and exchange program, chemical shippers should consider these best practices to determine feasibility and whether such a program truly presents an opportunity to optimize the logistics function.

Table 2. The necessary historical baseline data include simple yet important information.		
Shipments	Service and Cycle	Costs
Origin – city, state, zip code	Order date	Logistics
Destination – city, state, zip code	Ship date	- Freight
Product stock keeping unit (SKU) and family	Delivery date	- Assessorsials
Freight modes and weight	Payment received	- Warehouse and fleet
		- Working capital
		Plants
		- Operations

Best practices include three sequential steps to define and capture the cost savings associated with swaps and exchanges:

1. **Feasibility assessment.** Before initiating a swap or exchange program, it is important to evaluate the potential benefits of the venture. A third-party logistics consultant can conduct a confidential assessment of the potential of a swap program among several companies without the formal and time-consuming process of direct discussions between suppliers about products, customer locations and demand levels. A quick look is a very important step to define the opportunity prior to working through the complexities.

2. **Simple swaps.** Simple swaps should be the first level of activity that is evaluated in a feasibility study. This gets the easier program up and running, generating some savings for both (or multiple) suppliers. As noted, simple swaps are focused on freight-line-haul savings. Scheduling is typically on an *ad hoc* or as-needed basis. Volumetric balancing between exchange partners is on a shipment-by-shipment basis — a truck for a truck, or a railcar for a railcar — with minor adjustments for differential weights between loads or shipments. Freight savings can easily be 20–40% of the baseline freight cost. The absolute dollar value of savings is constrained by the number of customer or delivery sites.

3. **Regional exchange and plant optimization.** Once swaps have been conducted successfully, a regional exchange and plant optimization program should be considered. These transactions offer a much greater potential for

Table 3. A feasibility study can reveal the potential savings that a swap or exchange program can achieve.									
Objective: Define proven, probable and potential swap and exchange opportunities for multiple suppliers.									
Measure and Analyze: Freight, working capital and distribution expenses to serve customers from all plants. Define impact of product, customer and logistics constraints to completing swaps or exchanges.									
Assumptions: Constraints (e.g., customers, products, transportation) require a 3-quarter implementation. Cost savings are focused on freight-line haul. Savings start within 6 weeks, and the plan is for 23% freight savings in the third quarter of implementation.									
Potential for Improvement									
	Supplier A		Supplier B		A + B "as is"		A & B Optimized Saving \$/yr		
Customer Region	lb/yr	\$/yr	lb/yr	\$/yr	lb/yr	\$/yr	Q1 Proven	Q2 Probable	Q3 Potential
Middle Atlantic	6.3	\$176	4.5	\$279	10.8	455			\$153
South Atlantic	6.2	\$161	3.1	\$208	9.3	369			\$127
Midwest - East	6.3	\$176	4.5	\$279	18.2	619			\$55
Midwest - West	6.2	\$161	3.1	\$208	7.2	252			\$50
<b>Swap Total</b>		\$826		\$870		\$1,695	\$170	225	\$385
Units are in millions of pounds and thousands of dollars per year.									

additional savings because of their broader scope in terms of:

- *products* — exchanges may involve identical, interchangeable, or like-kind products
- *timing* — annual and quarterly volume targets are set for participating companies.
- *volume* — exchange optimization may include 50–70% of shipments to all customers in a distribution region or within a market area such as North or South America.
- *costs* — savings are realized on a wider range of logistics costs (e.g., working capital carrying costs), and distribution assets (e.g., fleets, terminals or warehouses, rail track).

On a broader regional or global basis, exchanges can drive very significant opportunities to optimize logistics and production economics, including volume balancing and minimization of plant switchovers.

### Conducting the feasibility study

An evaluation of trading potential should be the starting point of a swap or exchange program. This is typically conducted by an outside consultant to ensure confidentiality. Here we discuss a few best practices associated with this assessment.

*Nondisclosure agreement.* The first step in all swap and exchange programs is the execution of a nondisclosure agreement by the participants. This agreement ensures confidentiality of information related to customers, products, transport rates, and commercial terms for product delivery.

*Feasibility objective.* Participants should define the target or required economic threshold for their participation beyond the feasibility step. The threshold depends on the products, markets and regions, but, typically, participants like to anticipate savings above \$2–\$3 million/yr before proceeding to an operational pilot or test.

*Feasibility data and measures.* Data are collected to define a historical baseline that outlines shipments, service and cycle, as well as costs (Table 2). Moving freight incurs many additional costs that can often make up half of the freight bill. These additional charges, or “extras,” are known as accessorials, and include costs for cleaning, demurrage, fuel surcharges, hazardous materials surcharges, etc.

*Feasibility analysis.* This consists of six steps:

1. Validate the basic data set with each participant individually.
2. Develop an integrated “as-optimized” model of the optimized distribution regions with unconstrained source points or plants.
3. Review a prioritized list of exchange opportunities for each participant.
4. Define constraints as either technical or commercial.

Technical constraints include the specific grades and sequences in which products can be made at a given production unit. Commercial constraints often include major customers or customer sites that a participant company would not consider including a swap or exchange.

5. Based on the constraints and opportunities, generate revised swap opportunities unique to each participant.

6. Provided the economic threshold is met, each participant selects a list of swaps that they would like to pursue with other participants. Only at this point do the participants enter into formal confidentiality discussions with each other.

*Swap planning.* The participants jointly develop a plan to initiate swaps at the sites with the highest potential. They agree to define very detailed product specifications and may request samples for customer review. The teams jointly review the order management process and the interfaces between customers, swap participants, and freight carriers.

*Performance reporting, compliance and control.* The team defines the performance objectives, constraints, and controls or limits associated with the swaps program.

Table 3 summarizes the results of an example feasibility study conducted using these best practices.

### Closing thoughts

Implementing swaps and exchanges can drive significant cost savings, often providing an improvement exceeding 1% of sales for the typical chemicals or polymers business unit. By keeping chemicals in a smaller geographic region between sourcing and delivery, companies can improve customer service by saving time and shortening the overall delivery cycle. Swaps and exchanges can decrease logistics costs by eliminating or minimizing freight, warehouse, fleet and working capital costs; this supports the growing “green” initiative by reducing unnecessary emissions. The potential for formal long-term exchanges is even more dramatic when production optimization is included in the scope of North American or global exchange programs.

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