

Drilling for Every Drop of Value

When ChevronTexaco stopped worrying about how much oil it could pump and started worrying about how much its customers wanted, it began driving cost out of its supply chain, increasing efficiency and transforming its business.

by BEN WORTHEN

At 4 in the afternoon on Feb. 25, 2002, Margo Hasselman, a 25-year-old University of California law student, pumps 13.87 gallons of regular unleaded into her white 1998 Toyota Camry at the Chevron station on 145 Love Lane in Danville, Calif. The Love Lane Chevron is the very model of a modern filling station, with all the amenities the residents of this wealthy San Francisco suburb expect: eight pay-at-the-pump lanes, a 24-hour convenience store, there's even a car wash.

Underground, it's just as modern. The 14,250 gallon tank for super unleaded and the 19,000 gallon tank for regular (the midgrade fuel is a mixture of the two) are larger than the 10,000 gallon norm. Each tank is equipped

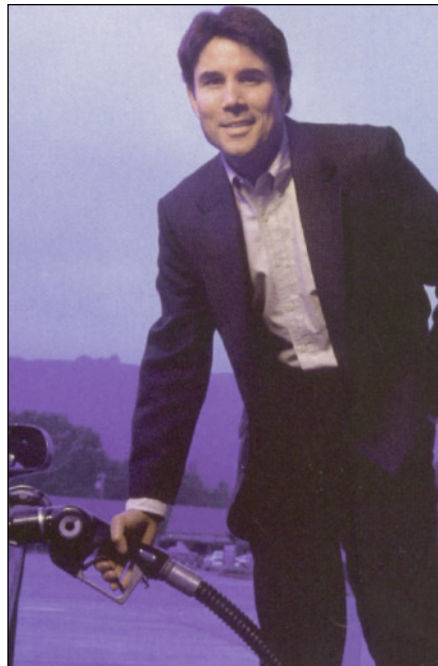
with an electronic level monitor that conveys real-time information about its status through a cable to the station's management system and then via satellite to the main inventory management system for ChevronTexaco, the San Ramon, Calif.-based oil giant. When Hasselman tops off her Toyota, the Love Lane station's tanks hold 3,538 gallons of super and 5,877 of regular. Unless the tanks are filled soon, the station will run out of gas.

Of course, since it opened in August 2001, the Love Lane Chevron has never had a run-out.

It's the Demand, Dummy

During the past 10 years, ChevronTexaco, the nation's eighth largest company, with revenue of \$104 billion, has used detailed consumer demand data to all but eliminate run-outs and retains (the industry term for a delivery aborted because the tank is too full)—the industry's twin evils (see "Run-Outs and Retains," The cost of NOT right). That data,

and the integration work that allowed it to be shared across the company, improved decision making at every point in what the industry calls the downstream, or customer-facing supply chain that begins once the oil is earmarked for the refinery (as opposed to the



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Best-in-Class

How supply chain collaboration pays off

BEST-IN-CLASS VS. MEDIAN

Inventory: 35 days vs. 74 days

Cash-to-cash cycle: 36 days vs. 84 days

Response time for a 20% rise in demand:
9 days vs. 20 days

BEST-IN-CLASS DEFINED AS THE TOP 20 PERCENT IN ITS INDUSTRY
SOURCE: 2001 PRM BENCHMARKING STUDY

upstream chain, which includes hunting, drilling for and pumping oil). In 1997, Chevron's confidence in the reliability of its demand data had reached the point where the company for the first time used demand-forecasting to determine how much oil it would refine on a monthly basis, with weekly and daily checks, thereby transitioning the company from a supply-driven to a demand-driven enterprise. That first year, Chevron's downstream profits jumped from \$290 million to \$662 million on the same refining capacity and number of retail stations.

Louie Ehrlich, ChevronTexaco's CIO for global downstream, says that while it's difficult to isolate the exact percentage of that jump and attribute it to the business model change—as opposed to a booming economy and the increasing ability to replace human workers with technology—the move has revolutionized the business. “It was a fundamental shift to take the customer view,” he says, in a slow, molasses-thick Mississippi drawl. “[Before the shift] we acted like a manufacturing company, just trying to make products, when really the market was customer-driven.”

It doesn't make sense to manufacture something simply because you can, but that's exactly what Ehrlich says thousands of companies that don't match production to customer demand are doing. A smart company, he says, realizes that its business is not making a product, it's selling the product. Every time you make too much or too little of whatever it is, you're introducing cost into your supply chain.

And Cutting Cost Is the Name of the Game

John Cross, former CIO of ChevronTexaco rival British Petroleum, says that if you can't get cost out of your supply chain, “indeed, you are dead,” and he adds that this is an area where ChevronTexaco has done particularly well. “They are heavily involved with SAP, and they have done a lot of good work with back-office systems for integrating supply and demand,” he says, referring to an ongoing ChevronTexaco project to integrate the view of customer data across the company.

But in 1997, the year Chevron decided to let demand, and demand only, drive production, the company's systems—station management, terminal management, transportation coordination, refinery scheduling and so on—were still isolated from one another. Planners at the various points across the supply chain had to share data manually or flip between applications, introducing deadly cost. Since then, the company annually invests about \$15 million in supply chain technology in the United States alone—a figure that doesn't include the \$200 million SAP project Cross mentions. With the help of those technologies, which include proprietary

systems that capture real-time data and even more advanced planning systems, Chevron's 2000 profits increased by more than \$100 million to \$778 million. Ehrlich traces all the improvements back to the switch to a demand-driven business model, which, he says, "Allows you to take a bigger picture view of the operation because you have information. It allows you to turn the information into knowledge."

The Future of Business

Peter Wietfeldt, a director in the Stamford, Conn., office of consultancy PRTM, says ChevronTexaco's supply chain provides a glimpse into the future. "Since about the mid-1990s, we've seen companies trying to be much more demand-driven instead of just supply-driven," he says. "Not all industries

have moved as far and as fast [as the oil industry], but there are certainly industries that can almost do what ChevronTexaco can do in their ability to go from exploration to the pump."

For the companies that can use demand data from their trading partners to drive production, the benefits are staggering. PRTM's 2001 benchmarking study, which followed a segment of companies across industries for three successive years, found that best-in-class collaborators—defined as the top 20 percent—operated their supply chains twice as efficiently as median companies. These companies are the ones best able to monitor the demand and adjust their production or inventory accordingly, says Wietfeldt. The study found that best-in-class companies carried half as much inventory (35 days versus 74), completed the cash-to-cash

Run-Outs and Retains

The cost of NOT doing business

THE PETROLEUM INDUSTRY is broken into two halves. Upstream covers refining and distribution. The goal of the downstream half of the oil industry supply chain is to avoid both run-outs and retains. Run-outs are bad. During a run-out, not only is the station not making money, it is turning away customers who will then fill up elsewhere and may never return. Retains—in which a truck is unable to unload a delivery because there isn't enough room in the station's tanks and must return, full, to the terminal—are only slightly better. (Because of safety and environmental policies, once a truck begins pumping gas, it has to empty its tank; if it can't empty its tank, it can't begin pumping.) Every time a truck visits a filling station, it costs ChevronTexaco about \$150. If a visit is wasted, that's \$150 down the drain. With 8,000 Chevron stations in the United States averaging a delivery every 36 hours, retains can add up fast.

Run-outs and retains are not just issues for the retail stations. They figure in at every step of the downstream supply chain, which begins when the raw crude arrives on our shores from wherever it has been pumped out of the ground. For example, a tanker waiting to deliver crude to a refinery can be charged as much as \$30,000 a day in docking and unloading fees. Obviously, the more efficiently ChevronTexaco walks the line between run-outs and retains, the more profitable the company becomes.

—Ben Worthen

cycle more than twice as fast (36 days to 84), and were prepared to meet a sustainable 20 percent rise in demand in nine days compared with 20 days for the median businesses.

“The old idea of ‘Let’s just be better at forecasting what’s going to happen three months out and put commitments in place that will allow us to meet that’ is going away,” says Wietfeldt. “Companies are realizing that the only accurate demand data they have is what is going to happen tomorrow.”

In other words, the quicker an enterprise can incorporate the most recent demand data, the more efficient it will be. And the only way to do that is to understand what is happening at the point of sale or, where possible, the point of consumption. Of course, this is not the type of data that manufacturers, wholesalers or anyone else who doesn’t sell directly to the end consumer typically has access to. In order to get it, says Wietfeldt, companies need to “collaborate with customers and share information up and down the supply chain.”

In this regard, ChevronTexaco, along with its petroleum-producing counterparts, is in a unique position to harness the advantages of cross-supply-chain information sharing without the usual barriers of cultural or competitive resistance. The petroleum industry is the last haven of the massively vertically integrated company. ChevronTexaco controls the oil from the time the company finds it and pumps it out of the sand or out of the sea to when you fill up your car at one of its stations. And ChevronTexaco controls all the information from every pipe, tank, ship, distribution point and way station along the way.

Even Chevron Buys Gas

The downstream supply chain begins on an office floor in San Ramon and on another in Houston, where oil and gasoline traders are looking at an integrated marketing and refining sales and production plan to decide how much crude and how much gasoline to buy on the open, or spot, market. Traders used to be thought of as cowboys who relied just as much on instinct as they did on information. Now they use up-to-date customer demand data.

Regional coordinating teams consisting of representatives from refining, marketing and logistics use the same data—the information from Love Lane multiplied by all the integrated ChevronTexaco filling stations, plus other points of sale such as airlines and trucking companies—to plan a refinery’s load: for example, 50 percent gasoline, 30 percent diesel and 20 percent jet fuel. ChevronTexaco, however, sells more than the company’s seven domestic refineries can produce. Most of the difference is made up through long-term, agreements with other oil companies. But those agreements don’t take into account the changes in demand from month to month, says Doug Gleason, ChevronTexaco’s regional manager of product supply east.

To respond to those changes, ChevronTexaco must buy gasoline on the spot market. In any given month, the company could buy up to 30 percent of its gasoline that way. “A trader just bought 25,000 barrels this morning,” says Gleason.

The shift to a demand-driven model and the continued refinement of the demand-forecasting technology has allowed spot buyers to

dramatically cut cost. Before, buyers would react to supply shortfalls, buying the gasoline they needed when they needed it, regardless of price. As with any market, when demand spikes so does price. An accurate forecast at the beginning of the month means that buyers know exactly how much they need to buy and can spend the month looking for bargains. During the course of a month, says Gleason, buyers can average savings between a quarter to a third of a cent per gallon. That can add up to as much as \$400,000 a month. "Good demand information causes a person to time their acquisitions much more intelligently," he says.

Why Keeping Tank 108 Filled Is Critical

Tonight, the Love Lane Chevron is scheduled to receive 3,150 gallons of super and 5,950 gallons of regular (gasoline truck tanks have three compartments and hold a total of 10,000 gallons).

Information from Love Lane's monitors is sent via satellite to ChevronTexaco's Customer Order Entry and Dispatch Center in Concord, Calif., where load planning software minimizes the number of deliveries needed to keep a station running while avoiding run-outs or retains. The demand forecasting and scheduling system has tentatively planned the next five deliveries as well, although they will be updated with new information. The demand planning system from Cambridge, Mass.-based AspenTech is new. After a year in development, it went live in the last quarter of 2001. It replaced an 8-year-old system designed around

a proprietary algorithm developed by ChevronTexaco mathematicians. Early returns indicate that the new system will reduce transportation cost by 6 percent. Furthermore, the demand data stored in the systems will inform every decision made in the downstream supply chain.

Shortly after 11 p.m., a truck picks up the gas destined for Love Lane at the Chevron terminal in Avon, about a half hour away. The Avon terminal has eight tanks ranging in height from 43 feet to 54 feet, two truck-filling lanes and a one-story tin-roofed office building on about 10 acres of land. Tank 108, one of the terminal's largest, holds 2.5 million gallons of unleaded gasoline. It is 70 percent full right now. Trucks enter and leave, taking 9,100 gallons at a time. Like at the filling station, terminal inventory is tracked in real-time. The terminal's inventory, combined with the demand data from the stations that it serves, helps ChevronTexaco determine how often Tank 108 needs to be filled.

Avoiding terminal run-outs isn't simply a matter of waiting until a tank is two-thirds empty and then filling it back up. Tank 108 alone takes two and a half days to fill, and if the tank is low when a sudden spike in demand caused by unusually warm weather, a sudden drop in prices or a special event like the Olympics happens, the event could run it out and force delivery trucks to be rerouted from terminals farther away, adding costs up and down the supply chain. A bigger problem is the demanding pipeline schedule. There are only a limited number of pipelines from each refinery, which are reconfigured based on the

Bigger is Better

Why Chevron and Texaco merged

The October 2001 merger between Chevron and Texaco produced a company with \$104 billion in annual revenue and created cost-cutting opportunities through economies of scale. While it is too soon to report any long-term savings from the merger, says Paul Larson, an analyst who covers ChevronTexaco for Chicago-based financial analyst Morningstar, “that is clearly what the market is expecting and what the stock price indicates.” Since the merger, ChevronTexaco stock has hovered around \$90 a share.

There are other advantages as well. The combined entity now has operations in 180 countries and is the largest oil producer in the lower 48 states. John Cross, former CIO of competitor British Petroleum, says that the merger makes ChevronTexaco a global power. “Being midsize helps nothing. The old companies were not big enough to take on the big guys, but they were too big to be efficient like the small guys.”

—Ben Worthen

target terminal. And they are constantly in use. When Tank 108 isn't receiving gas, another tank—or another terminal—is. Schedulers use the demand data and the terminal inventory to create a tank-refilling plan that optimizes the use of the pipeline for all the terminals a refinery serves.

What This Means to You

Information technology, which enabled business to capture accurate demand information and allowed it to share that information between systems, made the move to a demand-driven business model possible. However, Ehrlich stresses that this was not just an IT project but a business-model transformation. The systems that managed the information across the supply chain were important but not as important as how the business used the information. In fact, even today most of ChevronTexaco's downstream supply chain systems are custom-built and poorly integrated.

For example, the filling stations and the terminals and the refineries all have separate management systems. Schedulers and traders who want to find information from different parts of the supply chain have to flip back and forth between applications. ChevronTexaco is only now finishing a master system, the SAP project set to go live in the first quarter of 2003, that will replace its legacy back-office systems and a suite of proprietary terminal and refinery management systems. But for now, just like for the past five years, the company shares information by linking different systems together through work-arounds—just like a vertically disintegrated company would have to do.

Dwight Klappich, an analyst with Stamford, Conn.-based Meta Group, says that from a technical standpoint any company could do what ChevronTexaco is doing; companies are simply reluctant to share numbers that have traditionally been considered closely guarded competitive secrets. If Goodyear knew when

GM was almost out of tires, it could replenish the carmaker's stock before it ran out, saving GM a lot of grief and lost revenue opportunities. But GM is scared that if it shares the low inventory information, the supplier would jack up the price. The only collaborative successes to date, says Klappich, "are when you have a channel master that can dictate participation."

Wal-Mart, for example, is famous for its ability to combine information from companies across their supply chain with demand and inventory data from its stores to minimize operating cost and reduce prices. Of course, that requires a lot from its suppliers. Nestlé

USA, for example, created a vice-president-level position exclusively to manage business with Wal-Mart. That's an illustration why, despite the myriad advantages of collaboration, change is slow.

Ehrlich's own experience is enough to convince him that the benefits of sharing information outweigh any possible negatives.

"Fundamentally it is all about making sure we have product where it needs to be, when it needs to be there, in the cheapest possible way we can get it there," he says. The bottom line is that using demand information is simply "the most cost-effective way of doing it."
