



SUPPLY CHAIN NETWORK DESIGN

Explore optimization to keep overall costs down

With a glance at the data, it would appear business logistics costs in the U.S. are on the rise, but a closer look tells another story. Logistics costs were up—\$1.45 trillion in 2014, but so was the Gross Domestic Product (GDP). All business grew in 2014, and the business logistics industry rose to the challenge of enabling a growing economy with supply chain optimization. The facts supporting the idea are plentiful.

According to the 26th Annual State of Logistics Report, presented by the Council of Supply Chain Management Professionals, the logistics industry experienced a 3.1% cost increase in the sector for 2014. Part of the increase is almost certainly due to the concurrent rise in freight transportation costs, at 3.6%.

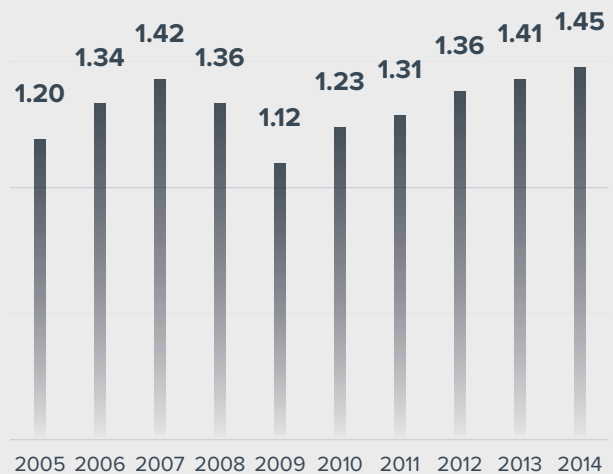
And yet, looking at the numbers in greater depth shows the players across the logistics arena have collaborated in an economic lift for the U.S., enabling the growing GDP and performing better than in previous years.

Though costs were 3.1% greater than in 2013, those costs are also 8.3% of the 2014 GDP—a tenth of a percentage lower than costs in 2013. The percentage of logistics costs relative to GDP has been holding steady for four years.

Therefore, the Gross Domestic Product rose in 2014, and the logistics industry managed supply and demand during that year with greater efficiency through management of even higher transportation costs.

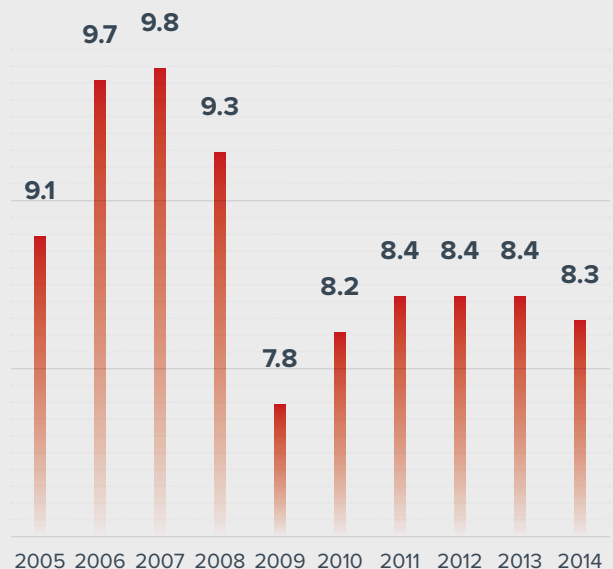
How did logisticians perform with better outcomes given tighter constraints? The answer lies in optimization.

US Business Logistics Costs (\$ Trillions)



Rising U.S. Business Logistics Costs for the past ten years.
Source: CSCMP's Annual State of Logistics Report 2015

Logistics Costs as a Percent of GDP



The same logistics costs presented as a percentage of GDP, indicating a decrease, even as GDP rises.
Source: CSCMP's Annual State of Logistics Report 2015

SUPPLY CHAIN NETWORK OPTIMIZATION

Logisticians are professionals who analyze the freight transportation sector and its regulation to predict an optimal pathway for goods. Some companies perform their logistics operations in-house, while others outsource to third parties. Consulting partners working in Third Party Logistics (3PL) work with both. Exploring supply chain optimization is a best practice across manufacturing and retail sectors.

Supply chain costs constitute a significant part of overall product costs. Therefore, becoming conversant with supply chain protocols is essential for managing those costs and generating profits. A supply chain is a group of partners who together have the power to lower costs for delivering finished goods by optimally managing three major components of supply chain network design:

- ✓ Transportation costs
- ✓ Inventory carrying costs
- ✓ Distribution center operating costs



THE IMPACT OF COST AREAS AND COMPONENT PARTS

Transportation costs

From sourcing to delivery, every stop matters for transportation cost assessments. In 2014, the trucking industry was utilized for freight shipping at near 100% capacity. Other shipping areas, from rail to air freight, also approached capacity constraints.¹ Carriers pass the rising cost of truck-driving labor on to shippers, which was part of 2014's 3.6% rise in freight transportation cost.

Designing a supply chain for lowest transportation costs requires a good evaluation of the product transport needs; first, for selecting distribution centers locations, then selecting the best modes of transportation. A primary goal is determining the optimal location of DCs relative to plants, suppliers, and customer demand to reduce miles. For mode selection, it may be that moving from LTL (Less Than Truckload) to multi-stop truckloads, or combining parcel shipments into LTL, will translate into cost-savings.

A different approach may even yield more optimal customer service results, like better on-time delivery rates. Evaluating business needs and options are the first steps in building that optimal transportation network, with the right locations and number of sites.

This closer look at supply chain costs points logistics planners toward solutions that integrate network optimization with inventory optimization. It's not just the shipping method or the route that creates a great cost-saving design. Instead, it is a view of those options integrated with accurate assessments of quantities delivered and their stops on the path to market.

More products from ...

- ✓ Suppliers to plants for manufacturing
- ✓ Plant to distribution centers
- ✓ Distribution centers or plants to customers

¹"26th Annual State of Logistics: Freight Moves the Economy,"
<http://www.logisticsmgmt.com/article/26th_annual_state_of_logistics_freight_moves_the_economy>

Inventory Carrying Costs

Separate analytical tools dedicated to a transportation network and inventory management require more analytical bandwidth. An integrated approach yields results where inventory is in the right place for storage at just the right time. Kenco uses an integrated approach with optimization software that rationalizes inventory using product and delivery details. The result is network optimization with highly accurate inventory planning combined with the lowest costs possible across the entire supply chain structure.

To optimize inventory is to reduce variability where possible and to plan with reserves for variability that cannot be directed.² Inventory should be stored and replenished in both normal, cost-effective cycles, as well as stored at lowest possible levels (safety stock) to supply with good product flow during unusual circumstances while avoiding unnecessary warehousing costs. The ideal outcome is to warehouse inventory at the right locations, at *right-sized* levels.

Costs of storing excess inventory

- ✓ Interest
- ✓ Warehousing
- ✓ Labor/handling costs at distribution centers
- ✓ Real estate costs



²Llamasoft's document: "10 Key Supply Chain Issues and Solutions," page 3.

Distribution Center Operating Costs

Warehousing costs constitute an estimated 30% of carrying costs; together with a small percentage of interest, and the fixed and variable costs of tax, obsolescence, depreciation, and insurance.

Kenco has been in the warehousing business since 1950, working with each customer to reduce overall sourcing costs. Institutional insights and experience from this sector help us to determine the ideal number and locations of distribution centers.

Each of these cost areas factors into the case study that follows. It features a Kenco Network Optimization project, in which a baseline analysis of logistics costs transforms a supply chain into two network designs—one that cuts costs and another that manages costs while emphasizing better service.

The US business logistics system cost is the equivalent of 8.3% of GDP in 2014 (\$ billions)



*Water: International 31, Domestic 9
**Air: International 12, Domestic 16

Note: May not sum to total due to rounding
Source: CSCMP's Annual State of Logistics Report

\$1,449
TOTAL LOGISTICS COSTS

Network Optimization: Potential and Results

The greatest assets for optimizing a supply chain network design are shipping records. Kenco engineers use the most complete optimization applications on the market, developed by LLamasoft, to perform optimization studies. These projects are a collaboration—drawing from shipping history and current information about warehouses, plants, and suppliers. The following pieces of information enable detailed modeling of end-to-end pathways, from tiers of suppliers to customer:

- ✓ Product identification—using freight class, size and shape, origin site, and volumes. Product analysis may also include more detailed information, such as groupings.
- ✓ Shipment history will help us to calculate product demand.

These data points, together with inventory optimization data points, create the baseline scenario. Kenco engineers worked with a client to develop a project that started with the following baseline model. Engineers reviewed the model with the client to make sure it accurately reflected the data and then used it for comparison with future supply chain scenarios.



Number of Sites

9



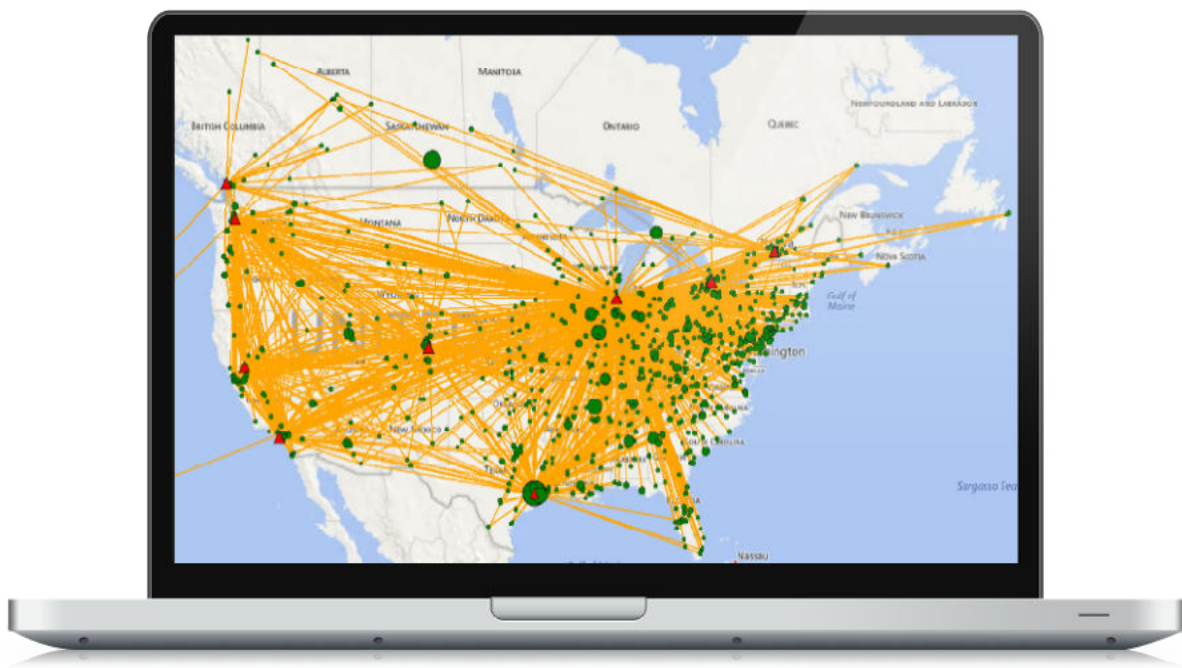
Average Miles to Customer

587



Demand Service within 2 Days

40.55%



Inventory optimization is modeled from more detailed information about ...

- ✓ Average on hand inventory
- ✓ Shipping volumes and variation/distribution of customer demand
- ✓ Vendor/Supplier lead times
- ✓ Service level % goals

Additional information, such as rules for site-to-site transportation, are also useful for optimization. Transportation optimization, such as routing or converting between LTL and FTL (Full Truck Load), is also useful to integrate customer history and a highly defined product delivery, such as the history of shipment sizes and preferred delivery date and times.



Best Cost Scenario

Once the baseline model was established, Kenco engineers added data to generate what-if scenarios, seeking to identify the optimal number and location of distribution centers, possible plant or supplier moves, and possible changes to shipping carrier structures or customer service requirements. These operations allow the simulation of multiple potential network changes, even taking fuel price sensitivities or any other client requests into account.

Typical results from these optimization-simulation studies are an overall reduction in 8-12% of transportation and warehousing costs.

Kenco projects designed with Llamasoft applications use a highly flexible costing model to better represent unique supply chain characteristics. The “what if” scenario below is the best cost scenario over the baseline model, resulting in a reduction in costs of 8.31% with an 80% customer 2-day delivery requirement. The diagram is a snapshot of the overall network—an interactive flow diagram with rich visualization capabilities for exploring transportation routes.



Number of Sites

10



Average Miles to Customer

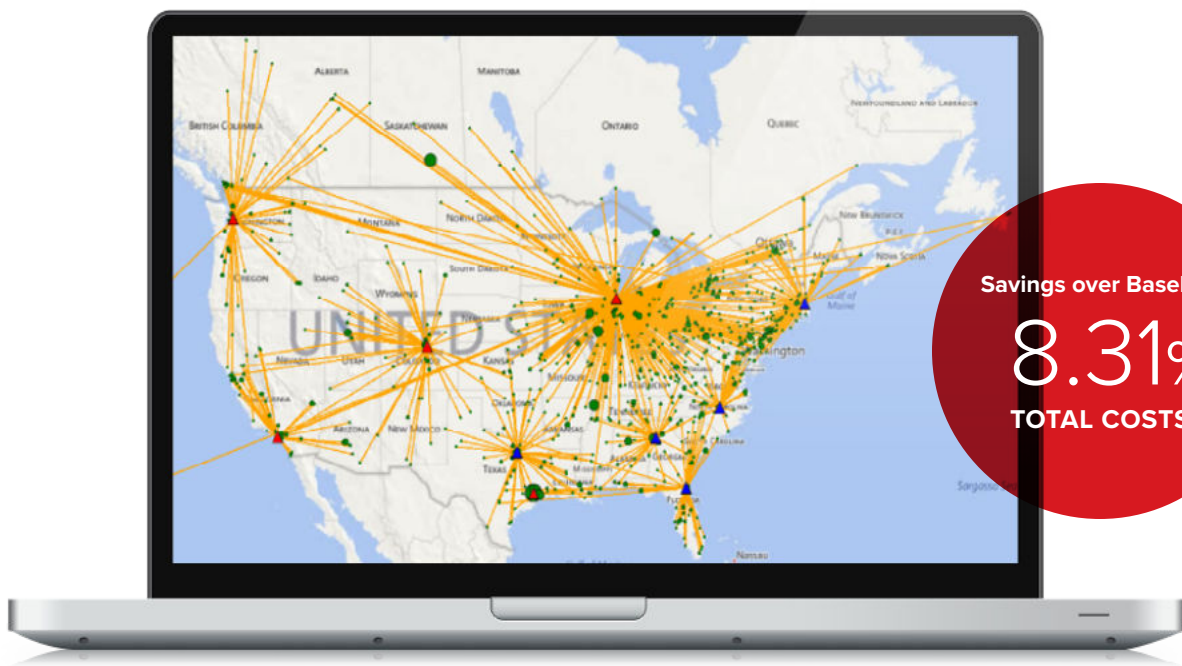
286.9



Demand Service within 2 Days

80%

(Required at 80%, hit 84%)



Best Service Scenario

The following “what if” scenario highlights a possible supply chain configuration that accomplishes an increase in customer service within 2-day delivery to 95% (up 15% from the best cost scenario and 55% from the baseline), while still saving costs over the baseline at a rate of 5.53%.

The number of supply chain sites is increased to 13 in this scenario (up from 10 in the best costs scenario and nine from the baseline), diminishing the average miles to the customer to 253 (just 30 less than the best cost scenario, but approximately half that of the baseline).

Both future scenarios developed by Kenco and the client partner take advantage of existing data to predict an optimized supply chain network design. The partnership continues with implementation and monitoring of new operations. These models exemplify the efficiency tools available to logistics managers.



Number of Sites

13



Average Miles to Customer

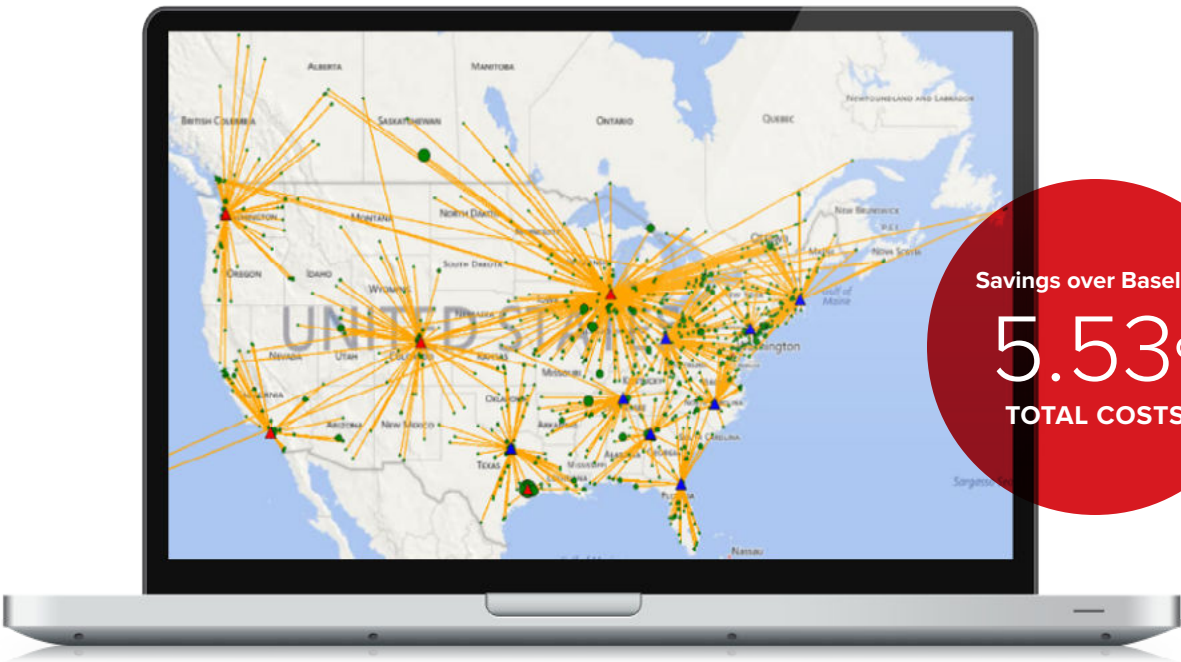
253



Demand Service within 2 Days

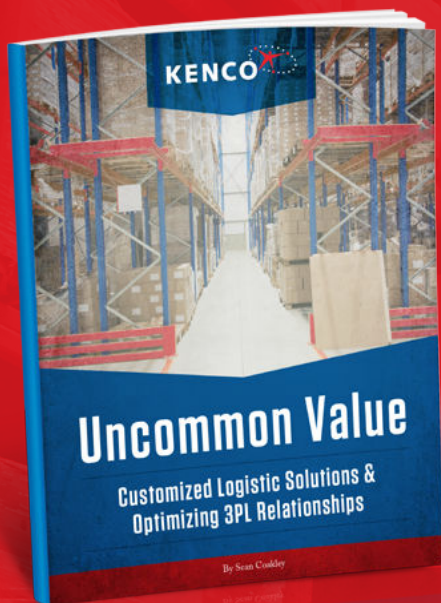
95%

(Required at 95%, hit 95%)



CONCLUSION

Though the logistics industry is always in flux, always in a complex relationship with other operators—from suppliers to regulators—network optimization engineers are continually rising to the challenge. Optimizing a supply chain enables business through tools that are informed by up-to-date analysis of other operators. Managers expend less bandwidth. Operations across transportation and inventory integrate. The overall result is a designed network that benefits business and customers. For businesses that feel their distribution network has an area for improvement from either an overall cost and a service level performance, network optimization can be key in driving future success.



Supply chain network design and optimization are two of the services Kenco excels in.

If you're ready to compare 3PLs and fit a great cultural alignment for your company, see what sets Kenco apart from our competitors. It's all right here in our guide, ***Uncommon Value: Customized Logistic Solutions***.

DOWNLOAD YOUR COPY NOW



2001 Riverside Drive, Chattanooga, TN 37406
1-800-758-3289 | KencoGroup.com