



Green Freight Shipping Guide



Solving Inefficiencies with Green Freight Shipping Solutions

Freight shippers are finding more and more that sustainable shipping not only benefits the earth, but also their bottom lines.

Sustainability in the Freight Industry

With nearly 2 billion consumers projected to join the freight market in the next five years, there's potential for LTL companies to experience exponential growth—and also impose a far greater risk to Mother Earth. As natural resources deplete, many shippers are finding an even bigger incentive to adopt sustainable shipping and manufacturing practices throughout their global supply chains to ensure the long-term health of their businesses.

The industry has increasingly turned to sustainable supply chain solutions to help mitigate the ecological effects of both manufacturing and shipping, with freight companies finding more and more that sustainable shipping not only benefits the earth, but also their bottom lines—especially in the avoidance of damaged goods and remanufacturing costs. Consumer packaged goods (CPG) companies especially have a vested interest in taking measures to preserve and/or find alternative resources: to ensure the longevity of their manufacturing output.

LTL-dependent businesses can use a number of solutions to implement greener shipping practices, like exchanging their packaging materials for eco-friendly options and finding alternatives to the hub-and-spoke mode altogether. First, it's important to understand how the traditional LTL shipping model works and identify the inefficiencies that contribute to such widespread consumption of energy and natural resources.

Topics Covered

Inefficiencies in the LTL shipping industry

- The hub-and-spoke model
- Damage and loss risks
- Remanufacturing costs
- Energy consumption of terminals
- Eco-costs of shipping materials

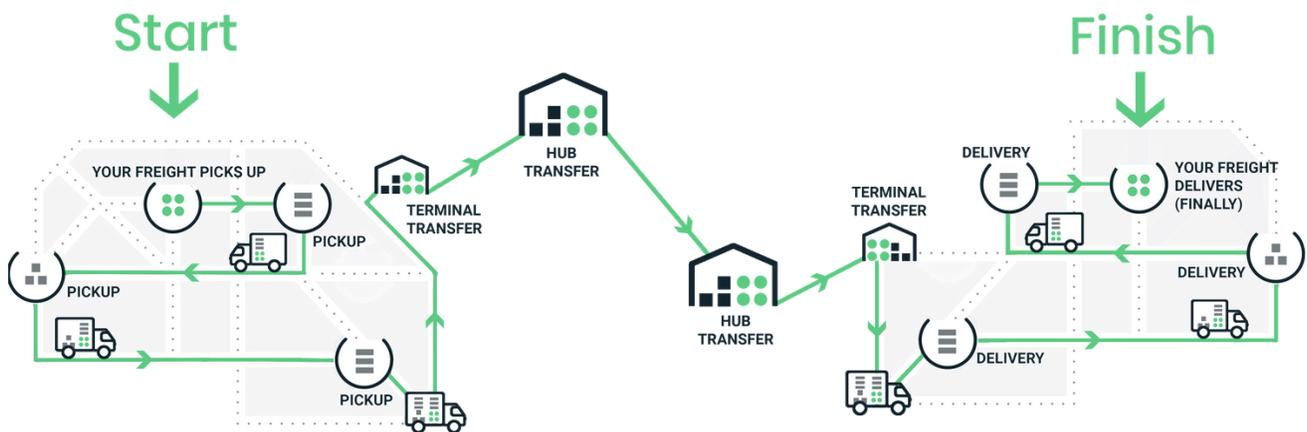
Green solutions for eco-friendly shipping

- Eco-friendly packaging
- Establishing green partnerships
- Hubless pooling

About Flock Freight

Inefficiencies in the LTL Shipping Industry

The Hub-and-Spoke Model



In standard LTL shipping, freight moves through the “hub-and-spoke distribution model,” (pictured above). A shipment is picked up from its origin location and taken to a local satellite terminal, or one of the ends of the “spokes,” where it waits to be grouped with other shipments and put on a fuller truck. These freight terminals receive all shipments from the immediate area that need to be rerouted to continue their journeys to their final destinations, and possibly taken to yet another terminal or two in between. Each time the freight travels to a new terminal, it’s offloaded, organized with other shipments traveling in the same direction, and stored for however long necessary until its next pickup.

This freight zig-zags its way along its designated “spoke” from terminal to terminal until it arrives at a hub. There are centralized primary hubs as well as regional hubs, all of which receive LTL freight from their respective terminals and store, reroute, and reload the shipments to transition to their delivery markets. Then the process repeats, in reverse order, as the shipment winds its way to one or more hubs and terminals (unloading and reloading each time) until it reaches its drop-off location.

Damage and Loss Risks

Due to the fractured nature of the hub-and-spoke model, LTL shipping carries inherent risks that jeopardize safe and successful delivery. **The reasons are varied and equally troublesome:**



Increased freight handling: Every time it visits a terminal or hub, a shipment is unloaded, stored, and reloaded onto a different truck. This frequency of handling causes an exponential rise in damage—most high-profile LTL freight carriers experience claims ratios of over 1%, with thousands of shipments damaged each day.



Terminal storage: Storage at terminals and hubs leaves a shipment vulnerable not only to incidental damage but also loss. The combination of massive warehouse layouts and the lack of pallet-level tracking for most freight leaves shippers unable to account for their orders over a large portion of the shipment's journey. The longer the storage period is extended, the higher the risk of loss.



Dependency on multiple parties: Because of the multiplicity of moving parts, an LTL shipment can be derailed by a single setback in the transportation chain. If one truck, terminal, or hub has a delay, every piece of freight relying on that aspect of the shipping process is subsequently affected, leading to a higher likelihood of shipments getting lost in the confusion.



Lack of individualized responsibility: Many carriers hand off shipments to other partner carriers at hubs and terminals, all of whom are working to cross-dock freight as quickly as possible to get it to the next truck on time. This lack of individualized responsibility for cargo, coupled with the time crunch, can lead to crucial handling and/or storage instructions being glossed over in favor of the clock.

Remanufacturing Costs

The higher risk of damage through the standard LTL model consequently leads to higher remanufacturing costs. Whether goods are slightly broken or entirely lost, the affected product still needs to be remade. While full truckload carriers often offer up to \$100,000 in cargo insurance (a benefit Flock Freight also offers on all FlockDirect shipments), most LTL companies turn to a comparatively anemic “cents per pound” coverage policy, leaving shippers on the hook for the majority of the costs to remake and reship their product.

If goods require remaking, each resource that went into the actual product is doubled, along with the output of the entire manufacturing chain, including:

- The electricity to power the machines and keep the lights on
- The natural gas that provides heating and cooling
- The non-renewable fossil fuels like oil and certain metals
- The energy costs associated with shipping and storing that product through the hub-and-spoke system as outlined above

"Shipping LTL is rife with inefficiencies. Complex networks and irregular freight patterns make it difficult to identify when and where opportunities for reduced handling arise."

- Zach Strickland, Director of Freight Market Intelligence at FreightWaves

Energy Consumption of Terminals

Each time freight flows through the hub-and-spoke model, the process requires a variety of energy outputs, including (but certainly not limited to) the following:



General power needs: Though variables like building size and location make each freight terminal unique, in general, most warehouses use around 6.1 kilowatt-hours (kWh) of electricity per square foot every year. The simple need to keep the lights on equals a massive energy output before a single piece of freight enters the building. *Example: A 10,000 square foot terminal uses 61,000 kWh of electricity per year, which is equivalent to powering about 6 households for an entire year.*



Forklift usage: Palletized shipments require a forklift to transport the pallet from the truck, across the terminal, into its temporary storage location, then back out again when it's ready to load onto its next carrier. Forklifts can either be powered by electricity or fuel (such as propane, natural gas, etc.). Either configuration results in extra energy consumption—with electric forklifts consuming between 12,900 and 26,000 kWh per year and engine-powered machines using 6 pounds of gas per hour. Don't forget to factor in the required oil and/or lubricant, tire replacement, and other maintenance needs, all of which require energy.



Terminal layout: Floor plan is often overlooked but equally crucial when considering energy consumption associated with LTL terminals. Factors such as the terminal's shape, the height (and number) of its racks, and floor plan/routes all contribute to how many miles a cart or forklift has to travel and how much electricity or gas it uses in order to move pallets around the facility.



Climate control: Because freight is often stored at terminals as it’s reorganized and rerouted, the facilities must stay at optimal levels of temperature and humidity. When shipping certain consumer packaged goods, those needs becomes even more crucial—especially when refrigeration is required. On average, non-refrigerated warehouses use up 13,400 British thermal units (Btu) of natural gas per square foot per year, much of which is related to HVAC systems. Naturally, refrigerated terminals (or sections thereof) require even more energy output to maintain the optimal temperature for fresh goods, averaging an annual consumption of 9,200 Btu plus 24.9 kWh per square foot.



Staff: Handling and maintaining all of that freight requires a team of people—all of whom need their own means of transportation in order to get to and from their jobs. Commuting hours for workers add up to yet another layer of emissions output associated with the terminal system.

Eco-Costs of Shipping Materials

Many companies utilize tried-and-true packing and shipping materials that, though reliable, take a heavy toll on the earth. Non-biodegradable items like foam packing peanuts take hundreds of years to break down; Styrofoam is not only unable to be recycled, it’s also a petroleum-based material, meaning it generates an even more extreme carbon output during its manufacturing process.

These other nearly-ubiquitous packing materials pose equally troublesome threats to the environment:

- Printed labels leach their ink and glue into the earth, poisoning surrounding plant and animal life.
- Standard wood pallets are often difficult and expensive to dispose of; many landfills now reject their acceptance entirely.
- Plastic packaging has been the standard solution, but it poses ecological problems in both its manufacturing process as well as its ability to be recycled, depending on the materials used.

Green Solutions for Eco-friendly Shipping

Eco-friendly Packaging

New technologies and packaging innovations have revolutionized the potential shipping of consumer goods with minimum carbon impact, and recyclable packaging materials are at the forefront of this movement.



Corrugated pallets: Industrial corrugated pallets are 100% recyclable, and reputable manufacturers source their paper from responsibly managed forestry sources and use recycled material themselves. Corrugated pallets also weigh far less than wood, lowering overall shipping fees, and are smaller and easier to handle, allowing for conservation of warehouse space. Lastly, they're less expensive to manufacture, so outright purchase costs also drop.

Plant-based fillers and materials: Microfibrillated cellulose (or MFC) is a material derived entirely from plant byproducts. It's proven to be more damage-resistant than both [carbon fiber and glass](#), but more lightweight (again, reducing shipping costs) and breathable while still providing a strong moisture barrier. It's therefore an excellent alternative for shipping food, refrigerated items, and other perishable CPGs.



Culinary solutions: Cornstarch has emerged as an alternative for plastic-like materials due to its similar properties, and can be found in products ranging from eco-friendly bottles to packing peanuts. Similarly, soy-based inks provide the same quality and sharpness as their petroleum-based counterparts but with an infinitely more renewable source and can be recycled.

Establishing Green Partnerships



One way to find sustainably-aligned shippers and carriers is through SmartWay, a voluntary sustainability program through the U.S. Environmental Protection Agency (EPA). SmartWay tracks and measures emissions output, fuel efficiency, and other environmental data across the shipping industry in order to further green shipping efforts. Participants provide accountability metrics to track the impact their businesses have on the environment and reduce carbon emissions within the freight industry.

SmartWay offers a streamlined system that affiliated partners, like Flock Freight, can use to measure and report their emissions output and fuel consumption. Interested parties can not only research and choose shippers, carriers, brokers, and other logistics companies that align with their environmental values—there’s also information on a plethora of shipping and freight-related topics, including:

- High-efficiency freight equipment
- Eco-friendly and fuel-saving operational strategies
- Alternative fuels and green technologies

Hubless Pooling



Hubless Pooling Continued

Adopting eco-friendly materials into supply chains is half the battle—there’s still the issue of the environmental impact consequent of the hub-and-spoke LTL model. The solution: avoid terminals entirely with pooled freight.

Hubless pooling is the approach Flock Freight takes to mitigate the risks and costs associated with traditional LTL, through our FlockDirect service. By tapping into the full truckload (FTL) network, we algorithmically pool your freight to find a route and carrier that creates the full truckload shipment. When your freight moves via FTL, it skips the hub-and-spoke terminal system, which is the most energy-consuming aspect of LTL shipping. Instead, your shipment travels directly to its central or regional hubs, then straight on to its final delivery address.

Outside of the energy costs from freight terminals themselves, emissions generated from traveling through the terminals are also greatly reduced. Pickup and delivery routes to and from an LTL terminal account for 59% of fuel used by an LTL carrier. When you utilize hubless pooling, you completely eliminate that mileage. And though out-of-route anomalies still occur on FTL shipments—on average, around 20% of pooled shipments find themselves carried out of route—even factoring this percentage back in, **a pooled shipment still results in up to 40% less fuel than standard LTL service.**

Traditional LTL Fuel and Energy Consumption



Hubless Pooling Fuel and Energy Consumption



Hubless Pooling Continued

And lastly, because items are shipped directly via FTL service, the risk of damage drops to .001%. This leads to fewer remanufacturing costs—both to companies' bottom lines and to the natural resources needed to remake said goods.

**Traditional LTL
Risk of Damage**



1%+

**Hubless Pooling
Risk of Damage**



.001%

As a proud SmartWay partner, Flock Freight believes pooled freight is greener freight.

About Flock Freight

Working at the intersection of cutting-edge technology and human-centric logistics management since 2015, Flock Freight is redefining the truckload and LTL experience—and everything in between. Backed by Google Ventures, SignalFire, and several other leaders in the digital supply chain transformation, Flock Freight leverages proprietary pooling technology and algorithms that eliminate terminals and optimize underutilized supply. The company is headquartered in Solana Beach, CA with an additional location in Chicago, IL. To learn more, visit www.flockfreight.com