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A REDWOOD REPORT

AS COLD CHAIN COMPLEXITY HEATS UP, CHOOSE YOUR LOGISTICS PARTNER CAREFULLY

Quality control and safe handling are essential for every full truckload, but they're more critical when your shipment demands a temperature-controlled environment. How can you balance delivery speed and cost with stringent monitoring and control? The key is choosing the right logistics partner.

IN THE WORLD OF LOGISTICS, TEMPERATURE CONTROL IS MORE CRITICAL THAN EVER.

The past few years have brought big changes in the global logistics industry. One of those shifts is dramatic growth in temperature-controlled transportation and storage, or **cold chain logistics**.

Valued at \$322.1 billion in 2023, the global market for cold chain logistics is growing at **16.39% per year** — and is forecast to reach \$1.26 trillion by 2032. There are a number of factors behind this growth, including:

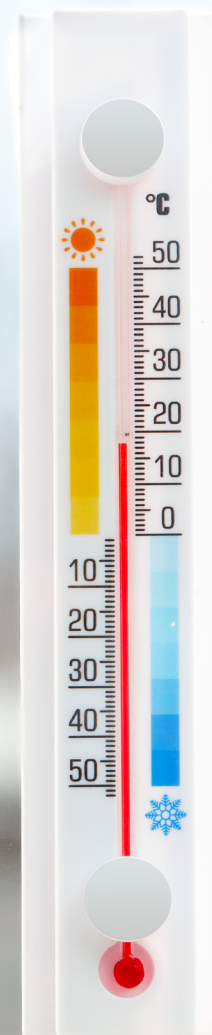
- Expansion of pharmaceuticals and other health care categories
- Growing demand for fresh produce, meats and other farm-to-table products
- Rise of e-commerce food sales, meal kits and home grocery delivery
- More stringent and expanded regulatory requirements

From vaccines to aerospace resins, a surprising array of products are moved across the world every day using a range of refrigeration and monitoring technologies. There's incredible diversity not only in the range of products, but also in the conditions required for quality and safety.

Fresh protein and dairy products must be held under 40°F. Bananas should be stored at 53°F to 57°F. Frozen foods are generally maintained at -10°F to 0°F, while deep freeze conditions, which apply to ice cream, are under -20°F. Both the **World Health Organization** (WHO) and the **US Food and Drug Administration** (FDA) have defined a set of food safety standards for shippers and carriers.

For cold chain shippers, it all adds up to a lot of complexity. It can be challenging to choose the right distribution model, the right shipping mode, the right carrier, and the right refrigeration and temperature-monitoring technology. Shippers might be tempted to focus on cost and profit margins in choosing a cold chain logistics partner, but that would be a mistake. Today, a lot is riding on each and every temperature-controlled shipment.

This report provides an overview of the increased importance of choosing an optimal cold chain partner. It details some key capabilities to look for as you seek to maximize your results in the growing world of temperature-controlled logistics.





QUALITY CONTROL IS ESSENTIAL. THE COST OF A SINGLE MISTAKE IS HIGH.

When discussing cold chain logistics, it's impossible to overstate the importance of food safety and quality control. According to the US Centers for Disease Control and Prevention, **48 million Americans suffer from foodborne illnesses** every year. Of that number, 128,000 are hospitalized and 3,000 die.

Sources of food contamination and temperature abuse across the cold chain include incorrect storage temperatures, fluctuations in temperature during transit, improper sanitation, incorrect loading and unloading procedures, broken seals and unauthorized consolidation, unattended products and a lack of traceability. Think of all the steps involved in getting temperature-controlled products from Point A to Point B, and recognize that, at every step, dozens of things can potentially go wrong.

While consumer health and safety are obviously paramount, there are huge social, economic and financial risk factors as well. At the peak of the COVID-19 pandemic, it was estimated that **30% of scarce vaccines were wasted**, in part due to logistics errors that resulted in vaccine expiration or a loss of product integrity. The Food and Agriculture Organization (FAO) of the United Nations estimates that, worldwide, 14% of food is lost on its way from harvest to the retail shelf, driving **a \$400 billion annual loss**.

Brand reputations, retail grocery accounts and consumer loyalty are also at stake when food products are spoiled or recalled. **Experts are questioning** if Boar's Head, a premium deli meats provider, can survive following a massive product recall (7 million pounds of meat in total) during the summer of 2024. A listeria outbreak

linked to Boar's Head products caused 10 deaths, dozens of hospitalizations across 18 states, and multiple lawsuits.

Given these risks, it's absolutely essential for food, beverage, pharmaceutical, chemical and other cold chain shippers to choose the right partner to manage their logistics. They can't afford to expose their consumers, their retail customers or their shareholders to the enormous risks associated with product spoilage, waste and contamination.



DOES **YOUR CURRENT** **APPROACH TO TEMPERATURE** CONTROL MEASURE UP?

Considering what's at stake, every temperature-controlled shipper should take a hard, analytical look at the freight brokers, carriers and other logistics partners they rely on every day. They need to ensure that their partners can deliver these critical capabilities:



INNOVATIVE REFRIGERATION TECHNOLOGIES

Today's refrigerated rail cars, air cargo holds, "reefer" trailers and warehouse facilities feature modern cooling technologies that deliver high levels of performance. Shippers should ensure their logistics partners are leveraging new equipment and advanced systems. This equipment should be well-maintained and on a regular maintenance schedule. With so much on the line, cold chain shippers shouldn't rely on outdated technology.



REAL-TIME TRACKING AND MONITORING

All temperature-controlled loads should be moved in trailers that have temperature sensors and the capability to provide that data to shippers. Real-time tracking that leverages mobile apps and electronic logging devices (ELDs) should be used for all loads as well. An extra layer of protection can be added with third-party sensors that utilize cellular technology and provide real-time visibility to temperature and location from inside the trailer. These sensors can also be effective in limiting cargo theft. Delays, disruptions and theft have an immense impact on product quality and safety in the cold chain. Shippers need to identify logistics partners who track shipments in real time and can share that information.

DIGITAL TRANSPORTATION MANAGEMENT TOOLS

Transportation management system (TMS) solutions are becoming imperative to navigate today's complex logistics landscape, but digital tools are especially important in optimizing time-sensitive cold chain shipments. A digital TMS can not only map out routes, build loads and consolidate shipments with temperature in mind, but it can also link to a warehouse management system (WMS) and other solutions to support end-to-end temperature control and delivery speed.

CONTINGENCY PLANNING

Over miles of cold chain transportation, something is likely to go wrong when you're shipping high order volumes. Temperature-conscious shippers need to make sure their brokers, carriers and other partners have a contingency plan in place for when the inevitable happens. That plan needs to include...

BACKUP RESOURCES

That arrive in time to rescue stranded cold chain shipments. Shippers should choose a logistics partner with wide geographic reach, access to large fleet resources, and digital leadership that enables them to identify the emergency and respond quickly, before product quality is compromised. The right partner won't be intimidated by questions about emergency preparedness. It's a cost of doing business as a cold chain logistics provider.





MEET **REDWOOD LOGISTICS**, YOUR TRUSTED ADVISOR FOR TEMPERATURE CONTROL.

It can be downright chilling to think about the complexities of modern cold chain logistics, but here's a warming trend:

Redwood Logistics is a full-service 4PL that stands ready to help you master your temperature-control challenges. **Redwood** has over \$5.5 billion in freight under management, and a significant percentage of that volume is temperature controlled. We moved over 110,000 cold chain loads in 2023 alone.

We offer logistics execution and supply chain technology orchestration through a modern 4PL model to drive product quality, profitability and customer service in your temperature-controlled logistics. Here are just a few ways Redwood can help you heat up your cold chain results:

Supply chain advisory. We can analyze your network model, transportation modes, carrier mix, handling policies and procedures, and other aspects of your daily cold chain operations. Redwood experts identify the big opportunities that drive big returns, while also recommending tactical improvements.

Managed transportation and distribution. Why not leave the driving and cold storage to us? Redwood can provide hands-on execution, based on our deep temperature-control experience. You can

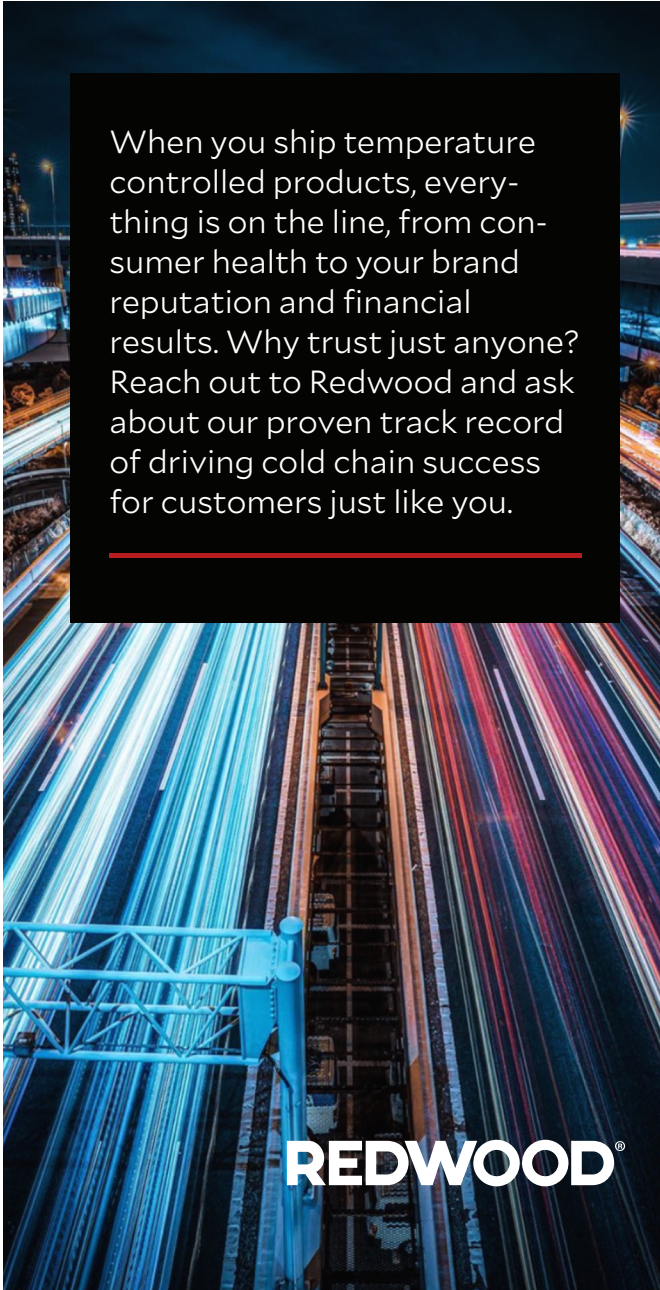
focus on your core business while we operate your cold chain at significant cost savings.

Freight brokerage. Redwood will connect you with our extensive carrier network. Dozens of top temperature-control specialists implement the modern equipment you're looking for, at below-market rates. Redwood will continue to monitor and protect your valuable shipments, even when we're not doing the driving ourselves.

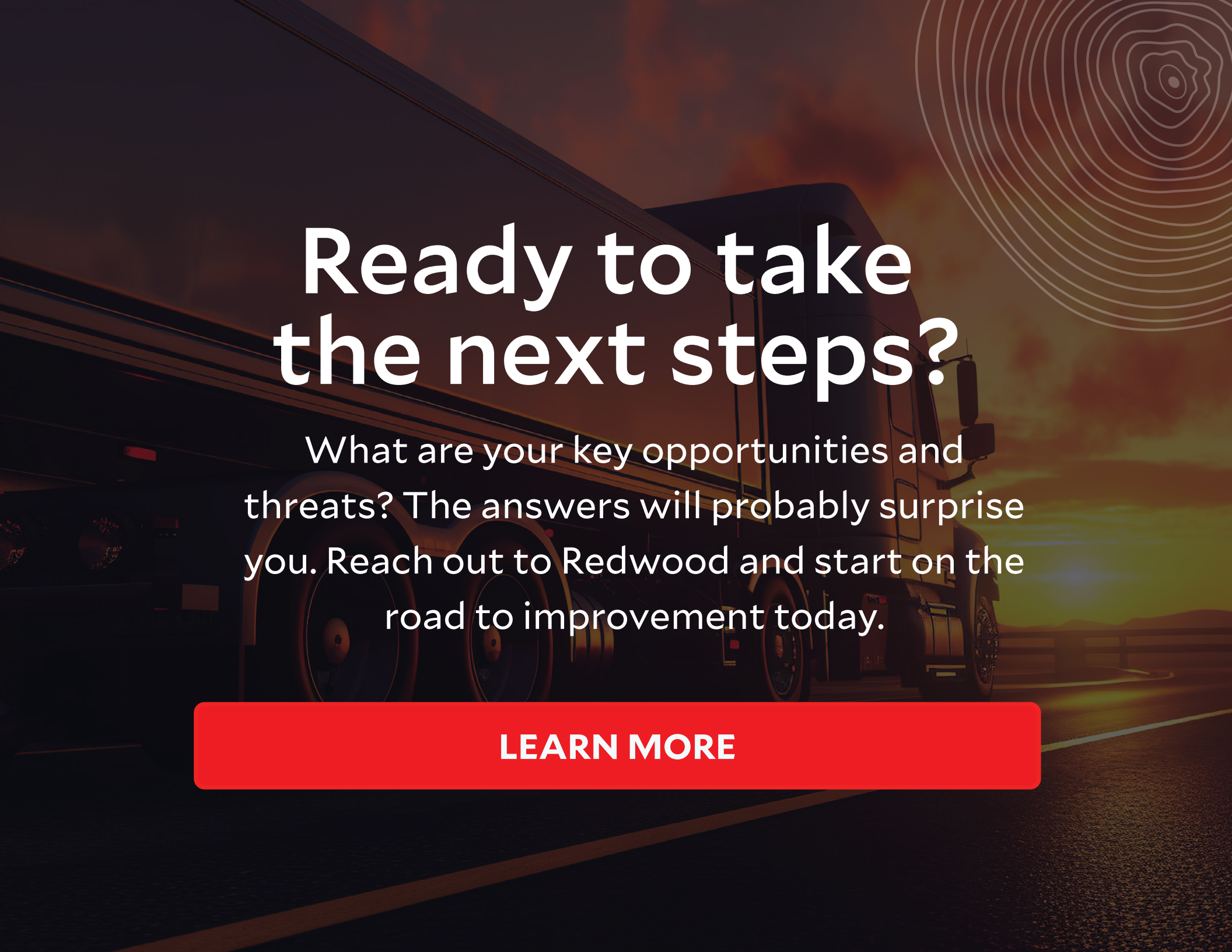
Digitalization and systems integration. Advanced technology is critical to achieving real-time visibility and connectivity across all your cold chain activities. Redwood can help identify and install advanced TMS, WMS and other solutions. We then connect them via our proprietary RedwoodConnect integration platform.

Cross-border logistics. Are you combining the complexity of cold chain with the complexity of cross-border shipping? Don't worry! Redwood has you covered. With six facilities on both sides of the border, along with 150 bilingual experts, Redwood Mexico will guide you through customs, exchange rates and other international trade challenges.

When you ship temperature controlled products, everything is on the line, from consumer health to your brand reputation and financial results. Why trust just anyone? Reach out to Redwood and ask about our proven track record of driving cold chain success for customers just like you.



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A semi-truck is shown from a low angle, driving on a road towards the viewer. The scene is set at sunset or sunrise, with a warm orange and yellow glow in the sky. In the top right corner, there is a white graphic of concentric circles, resembling a fingerprint.

Ready to take the next steps?

What are your key opportunities and threats? The answers will probably surprise you. Reach out to Redwood and start on the road to improvement today.

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