

*Intermodal freight transport combines the best attributes of both truck and rail shipping, and for long distances, can cut fuel use and greenhouse gas emissions by 65%, compared to truck-only moves.*

## What is the challenge?

A single locomotive pulling 20 or more freight cars can haul more freight than a truck hauling one to three trailers. This makes trains more efficient than trucks on a ton-mile basis. It also means using freight trains to haul cargo has the potential to provide significant greenhouse gas reductions. However, trains generally have fewer capabilities to bring freight “door-to-door” and have more limited scheduling flexibility than trucks. The characteristic swaying motion of train cars may harm certain damage-sensitive freight. Because of these distinctions, trucks move more than four times as much freight as rail.

## What is the solution?

Intermodal ground freight transport combines the best of truck and rail modes. Freight trains carry cargo over long distance, high volume rail corridors, and trucks move the loads between the rail terminals and the cargo’s ultimate origin or destination.

Different intermodal options are available to fit a variety of freight needs. Freight can be shipped via “trailer on flat car,” commonly called TOFC, or “piggyback.” In a TOFC move, reinforced truck trailers mount on railroad flat cars or spine cars (frame-like cars with a middle bar or spine) for the rail leg of the trip, and hook to combination trucks for the rest of the trip.

Oceangoing freight is commonly shipped in 40 foot metal shipping containers. For the inland portion of the trip, this freight can be shipped “container on flat car” or COFC. The container is loaded on a railroad flat or spine car for the rail leg of the trip, and onto a container chassis (a frame-like truck trailer) for the truck portion of the trip. The most efficient way to move containers long distances over land is to “double stack” them one on top of another onto a railroad well car (rail cars with a “well” for the bottom container.) Multiple double stack railroad well cars may be permanently coupled together to decrease stress and cargo damage during train braking and acceleration. A universal railroad well car can also handle unstacked trailers.

Technological advances in freight rail cars have expanded the opportunities intermodal freight moves. One technology allows a truck trailer to travel on railroad tracks. The trailer is backed onto the end of a railroad track, positioned over two sets of railroad axles and wheels (called bogeys), then lowered and attached, so it functions as a railroad car. A second innovation makes it possible to rail virtually any standard truck trailer. In this option, trucks drive onto a rail “car” that consists of 21 rigidly attached rail car platforms, and unload trailers onto this platform. Because the long, articulated platform has no slack action, it can handle standard trailers, unlike TOFC, which requires reinforced trailers.

Intermodal transport may not be suitable for all goods. Time-sensitive products may require faster or more flexible delivery than some railroads offer. Damage-sensitive commodities may call for a smoother ride than freight trains can provide. However, rail car manufacturers are introducing advanced suspension systems and car designs that better stabilize, cushion and protect railed cargo.

## The results are in . . .

Intermodal is an attractive option for shipments over 500 miles. The economic and environmental benefits of intermodal ground freight service are maximized over long hauls, where the fuel and cost savings from the rail part of the trip are high enough to recoup the extra fuel and handling costs to transport and transfer trailers and containers between trains and trucks. For shipments over 1000 miles, using intermodal transport cuts fuel use and greenhouse gas emissions by 65 percent, relative to truck transport, alone.

## Next steps

Shippers, logistics providers, and trucking companies should consider specifying intermodal transport when arranging long distance freight shipments. Many states have information about intermodal facilities within their state transportation systems. State department of transportation contact information can be found at <http://www.fhwa.dot.gov/webstate.htm>.