

Truck and rail transportation provides a cost-effective means to transport much of America's freight. There are simple actions that can be taken to make ground freight more efficient and cleaner for the environment. The following technologies and practices can help truck carriers save fuel and money, reduce air pollution, and cut carbon dioxide emissions that contribute to climate change.

Idle Reduction

An idling truck burns nearly one gallon of diesel fuel per hour. Reducing unnecessary idling could save each truck over \$3,000 in fuel costs, reduce air pollution, and cut 19 metric tons of carbon dioxide annually.

- On-board idle reduction systems include auxiliary power units that provide electricity to the cab, direct-fired heaters and coolant systems that provide temperature control, and programmable automatic engine shut-off systems.
- Truck plazas equipped with truck stop electrification systems allow trucks to draw electrical power and in some cases heating, cooling, telecommunication, and Internet hookups from a ground source.

Improved Aerodynamics

Reducing the aerodynamic drag of a typical line-haul truck by 15 percent could cut annual fuel use more than 2,000 gallons, save over \$3,500 in fuel costs, and eliminate 20 metric tons of carbon dioxide.

- Tractor aerodynamics can be improved by adding integrated roof fairings, cab extenders, side fairings, and aerodynamic bumpers. New truck buyers can purchase aerodynamic models with streamlined profiles.
- Trailer aerodynamics can be improved by minimizing tractor-trailer gap, adding side skirts and rear air fairings, and arranging cargo and tarpaulins as low, taut and smooth as possible.
- Single-unit trucks can be improved with air deflector bubbles or by purchasing new streamlined models.

Improved Freight Logistics

Improved logistics can reduce the miles that a truck drives empty. Eliminating 15 percent of a line-haul truck's empty miles could save \$3,000 in fuel and reduce 24 metric tons of carbon dioxide annually.

- Improved logistics include load matching, more efficient routes and delivery schedules, and improved shipping and receiving practices.
- A carrier may employ low-cost options like triangular routing, coordinating loads with other fleets, and checking electronic load boards, or the carrier may purchase freight broker services and logistics software.

Automatic Tire Inflation Systems

Retrofitting a line-haul truck with an automatic tire inflation system could save 100 gallons of fuel annually and reduce tire wear and maintenance, while eliminating one metric ton of carbon dioxide.

- Truck fleets that find it too difficult or expensive to monitor tire pressure on a regular basis should consider installing automatic tire inflation (ATI) systems on drive and trailer tires.
- An ATI system used on a typical line-haul truck can generally pay for itself in just over two years, while decreasing the risk of expensive tire failure caused by under inflation.

Single Wide-base Tires

Specifying single wide-base tires on a new combination truck could save \$1,000 immediately and reap annual fuel savings of 2 percent or more while cutting carbon dioxide by more than four metric tons.

- Single wide-base tires save fuel by reducing vehicle weight, rolling resistance and aerodynamic drag. These tires can also improve tank trailer stability by allowing the tank to be mounted lower.
- There are several single wide-base tire models from which to choose, plus these tires can be retreaded.

Driver Training

Even highly experienced drivers can boost their skills with training aimed at raising fuel economy by 5 percent or more, which would save \$1,200 in annual fuel costs and cut eight metric tons of carbon dioxide.

- Effective driver training programs can improve fuel economy by 5 percent or higher. Some fleets report fuel economy gains of up to 20 percent.
- Among other techniques, drivers learn progressive shifting, engine speed optimization, idle reduction, smoother braking and acceleration, anticipatory driving, speed control, and optimal gearing.

Low-Viscosity Lubricants

When used in a line-haul truck, synthetic engine and drive train lubricants can improve fuel economy by up to 3 percent, saving as much as 500 gallons of fuel and cutting up to five metric tons of carbon dioxide annually.

- Low-viscosity synthetic or semi-synthetic lubricants flow more easily and withstand the extreme pressure of engine, transmission, and drive train systems better than conventional mineral oil blends.
- The operator of a typical line-haul truck can save up to \$500 annually by switching to low viscosity lubricants, with additional savings possible due to reduced wear and maintenance of truck systems.

Intermodal Shipping

Intermodal freight transport combines the best attributes of both truck and rail shipping. Over long distances using intermodal can cut fuel and carbon dioxide by 65 percent, compared to truck-only moves.

- Carriers can maximize resources by using freight trains to handle the long-distance portion of a freight move, especially for less time-sensitive cargo that is shipped over 500 miles.
- Intermodal options include trailer on flat car (TOFC), container on flat car (COFC), double stack service, rail bogeys and dual-mode trailers, and rail platforms that can accommodate standard trailers.

Longer Combination Vehicles

A freight truck using longer or multiple trailers can haul more cargo than a standard combination truck, potentially saving up to \$5,000 in fuel costs and 34 tons of carbon dioxide on a ton-mile basis annually.

- Common longer combination vehicle (LCV) configurations include the Rocky Mountain Double, Turnpike Double, Triples, and Eight-Axle Twin Trailers.
- A motor carrier operating in states that permit LCVs can reduce the number of trips required to haul a given amount of freight—saving time, money, and emissions.

Reducing Highway Speed

A line-haul truck with 90 percent highway miles that reduces its top speed from 70 to 65 miles per hour could cut its annual fuel bill nearly \$1,500 while eliminating almost 10 metric tons of carbon dioxide.

- Reducing highway speed also reduces engine and brake wear, which cuts down the cost and frequency of maintenance service, and keeps revenue earning equipment on the road longer.
- Any truck carrier can adopt a speed management policy at little or no cost. The most successful speed reduction policies combine electronic engine controls with driver training and incentives.

Weight Reduction

Reducing 3,000 pounds from a line-haul truck by using lighter-weight components could save up to 300 gallons of fuel annually and eliminate up to three metric tons of carbon dioxide.

- Aluminum alloy wheels, axle hubs, clutch housings, and cab frame can trim hundreds of pounds from a truck tractor. Downsizing to a smaller engine can also provide significant weight savings.
- Thousands of pounds can be reduced from a truck trailer using aluminum roof posts, floor joists, upright posts, and hubs and wheels.

Hybrid Powertrain Technology

Hybrid vehicles can provide roughly \$2,000 in fuel savings and cut carbon dioxide by up to 12 metric tons per year when used in stop-and-go freight applications like parcel delivery service.

- Hybrid vehicles have two propulsion power sources, making it possible to capture energy otherwise lost during braking and provide boost to the main engine which in turn can run more efficiently.
- Most hybrid vehicles use an internal combustion engine for the main power source with various secondary power and energy storage configurations, including electric and hydraulic systems.

Renewable Fuels

In addition to benefiting the environment and helping reduce U.S. dependence on foreign oil, using biodiesel can provide more lubricity which may help extend a vehicle's engine life. Most diesel engines can run on biodiesel without needing any special equipment, and when running on biodiesel, will have similar horsepower and torque as conventional diesel.*

- Biodiesel provides significant reductions in greenhouse gas (GHG) emissions -- B100 reduces lifecycle GHG emissions by more than 50 percent, while B20 reduces emissions by at least 10 percent.
- Biodiesel also reduces emissions of carbon monoxide, particulate matter, sulfates, hydrocarbons and air toxics.
- Biodiesel produced from crops grown in the U.S. can help America's family farmers while bolstering America's energy security.

* Always check with your engine manufacturer before switching to biodiesel, and look for biodiesel that meets applicable ASTM and BQ9000 requirements.