



# MIDYEAR REPORT 2008

## GOING GREEN, SAVING GREEN

FLEETS CAN REDUCE EMISSIONS AND EASE PAIN AT THE PUMP



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# LESS FUEL, BETTER WORLD

For truck fleets, going green makes financial and environmental sense **By Avery Vise**

**W**hat exactly is green? The term is so overused that it defies a universal definition. One can view green as anything that's environmentally friendly – reducing pollution, recycling, growing organic foods or protesting logging to save the spotted owl.

There's nothing wrong with such an expansive definition, but for the trucking industry, the green movement mostly is about one thing: Reducing greenhouse gases (GHGs), which is linked by many scientists to climate change. More and more, fleets are focusing – directly and indirectly – on reducing carbon dioxide. Federal and state governments are pushing vehicle fleets through regulation and enticing them through tax credits and other incentives.

For fleet owners, the real impetus for “going green” is financial – namely the dramatic rise in fuel prices. Less

fuel burned means less carbon emissions, so by reducing fuel use, trucking companies and private fleets can save the planet – and save money, too.

## More work per gallon

Until recently, the major environmental issues fleets faced concerned pollutants – especially oxides of nitrogen and particulate matter. That's what the ever-changing engine technologies we have seen this decade are all about.

Although scientists have warned for years about the link between GHG emissions and climate change, only in the past few years have environmental authorities addressed the issue in the context of trucking. Several years ago, the Environmental Protection Agency launched a voluntary program in conjunction with the transportation industry with the goal of reducing GHG emissions by reducing fuel use.

The SmartWay Transport Partnership ([www.epa.gov/smartway](http://www.epa.gov/smartway)) set out initially to address what its staff calls “low-hanging fruit” – reduction of idling, improved aerodynamics and lower rolling resistance for tires. Carriers could become SmartWay partners by committing to declare and reduce their emissions and operate SmartWay-certified equipment. At the same time, SmartWay encouraged shippers to give preference to carriers that were SmartWay partners.

SmartWay continues to build on its initial successes. For example, it has begun helping truck buyers identify financing sources for technologies to reduce pollution. One of its most far-reaching initiatives is a SmartWay Truck Emissions Test Protocol that would compare the relative emissions and fuel efficiency of heavy vehicle designs and technologies. SmartWay's staff late last year floated a draft protocol and invited comments on it through April.

## PACKAGING TRENDS SPUR FREIGHT DENSITY.

Most of the fleet practices SmartWay promotes address on-highway freight operations where trucks travel at high speeds for extended periods and drivers often sleep in their trucks. The fuel economy dynamics of medium-duty and local frequent-stop applications are quite different, as are the solutions to address them. Improving aerodynamics and lowering rolling resistance have little effect on fuel burn.

For pickup-and-delivery, utility and other local medium-duty applications, hybrid-electric vehicles are an increasingly popular way to address fuel economy and emissions. With hybrids, frequent brake application recharges batteries that run electric motors and reduce the load on diesel engines. Hybrid-electric systems also can replace the diesel

### ALSO IN THE MIDYEAR REPORT

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Technology can help fleets measure their reductions in greenhouse gases.



engine for power takeoff (PTO) needs, reducing fuel use and emissions as well as noise. According to truck makers, hybrids are producing fuel economy improvements of 30 to 40 percent – sometimes more in applications requiring heavy PTO use – over comparable conventional diesel trucks.

## More freight, fewer trucks

Fuel efficiency goes beyond operating trucks on less fuel. It also means operating fewer trucks to carry the same freight. One way to approach this challenge is to increase payload – either by reducing the tare weight of the tractor and/or trailer or by increasing the overall weight of the combination.

The latter approach is highly controversial, of course, although proponents of larger trucks are trying to obtain at least limited liberation of federal weight restrictions. For example, Americans for Safe and Efficient Transportation ([www.aset-safety.org](http://www.aset-safety.org)) has been campaigning for an increase in the federal maximum weight to 97,000 pounds on a three-axle trailer. ASET recently proposed a demonstration project allowing larger truck combinations in five states. One of those states is Maine, and the state's two senators recently introduced legislation in Congress that would allow states to increase weight limits on federal highways from 80,000 pounds to 100,000 pounds when diesel prices are above \$3.50 per gallon.

There are limits, obviously, to how much weight fleet owners can trim from their equipment, and the cube capacity of trailers constrains efficiency benefits. Meanwhile, political pressures likely will delay relief on larger trucks for years to come. But there is another way to improve the freight efficiency of trucks: Reduce the size of the freight. That might sound silly, but it's happening already. Consider televisions: Increasingly popular flat-panel televisions take up less space and weigh less than cathode ray tube TVs of comparable screen size. So you can haul more in a 53-foot trailer than in the past.

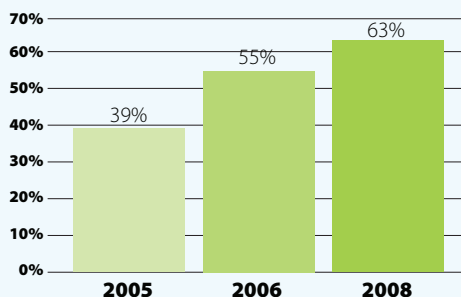
In the case of televisions, smaller packaging is just a side effect of changing consumer preferences, but major players in the supply chain are actively trying to reduce packaging for sustainability purposes. For example, Wal-Mart – the world's largest retailer – worked with a supplier to remove excess packaging from 277 stock keeping units (SKUs) of Kid Connection toys, says Chris Sultemeier, senior vice president of transportation for Wal-Mart.

Sultemeier, who discussed sustainability issues at a recent Arkansas Trucking Association meeting, says just those minor packaging changes have saved the equivalent of 727 shipping containers – saving \$3.5 million on transportation costs and 1,300 barrels of oil. Similarly, product innovations are having an effect on transportation and fuel use. Sultemeier points to the recent transition to concentrated laundry detergent, which effectively has produced the same amount of freight in half the space.

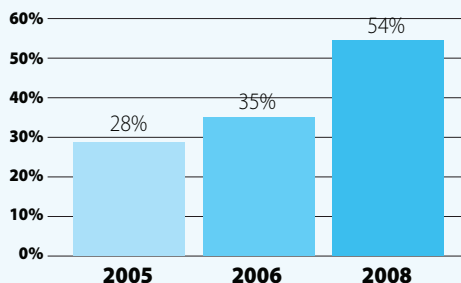
## MORE SPEC'ING FOR FUEL SAVINGS

Not surprisingly, soaring diesel prices have changed the way fleet owners view equipment decisions. In surveys of on-highway fleets conducted in September 2005, September 2006 and June 2008, *CCJ* has confirmed a clear trend toward more fuel-efficient equipment. The number of fleets saying they are spec'ing or installing fuel-saving tire treads, aerodynamic devices like skirts or fairings and auxiliary power units and other anti-idling equipment almost has doubled.

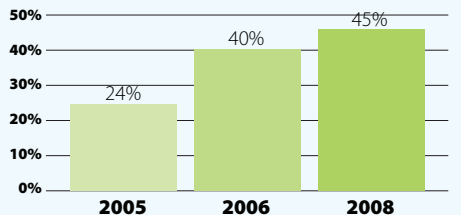
### AERODYNAMIC TRUCKS



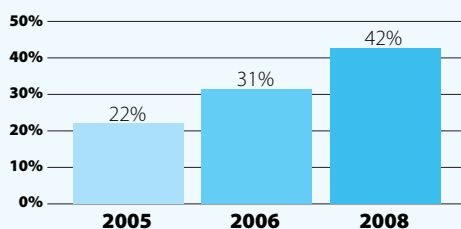
### APU/ANTI-IDLING DEVICES



### AERODYNAMIC DEVICES



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Product and packaging trends could dampen freight demand over time, but they also can help carriers move more freight while burning less fuel and running fewer trucks and trailers. If fuel prices and equipment costs continue to rise, increased efficiency could become almost as important to trucking companies as freight volume.

### Regulating and monetizing carbon

Because truck fleets' emissions are tied directly to energy costs, they already have strong incentives to "go green." The same is true for many industries, but not for some of the largest emitters of GHGs, such as power plants. So a number of state, regional and federal authorities are pursuing ways to quantify GHG emissions for the purpose of developing regulations or market-based incentives.

At the federal level, efforts in Congress to establish a "cap-and-trade" system that would limit and reduce overall emissions appear unlikely to succeed – at least until after the election. And that effort might not have directly regulated trucking anyway, although

## BASIC SPECS FOR EPA SMARTWAY CERTIFICATION

### Highway tractors

- Model year 2007 or later engine;
- Integrated cab-high roof fairing;
- Tractor-mounted side fairing gap reducers;
- Tractor fuel-tank side fairings;
- Aerodynamic bumper and mirrors;
- Options for reducing periods of extended engine idling (auxiliary power units, generator sets, direct fired heaters, battery-powered HVAC system and automatic engine start/stop system); and
- Options for low rolling-resistance tires (single wide or dual) mounted on aluminum wheels.

### Trailers

New long-haul van trailers can be ordered – and existing trailers can be upgraded – to qualify as an EPA-certified SmartWay trailer provided that they are equipped with:

- Side skirts;
- Weight-saving technologies;
- Gap reducer on the front or trailer tails (either extenders or boat tails); and
- Options for low rolling-resistance tires (single wide or dual) mounted on aluminum wheels.



increased energy costs could drive up the price of fuel.

Meanwhile, states and others are pursuing their own climate change efforts, including purely voluntary and market-based solutions. For example, the Chicago Climate Exchange ([www.chicagoclimatex.com](http://www.chicagoclimatex.com)), which was launched in 2003, invites companies and organizations to make voluntary but legally binding commitments to meet annual GHG emissions reduction targets. Those that reduce below the targets have surplus allowances to sell or bank; those who emit above the targets comply by purchasing CCX Carbon Financial Instrument contracts.

Perhaps the most comprehensive climate change initiative in North America is The Climate Registry ([www.theclimateregistry.org](http://www.theclimateregistry.org)), an organization that has developed standards for measuring, reporting and verifying GHG emissions. The Climate Registry isn't a regulatory or policymaking organization, but it would be the standard repository for companies to file and update their GHG emissions for use by states and provinces in their regulatory or market-based climate change efforts.

As of today, 39 U.S. states are members of The Climate Registry, as are most of Canada and all of the Mexican states bordering the United States. States also are joining together to manage GHG emissions jointly. For example, the governors of nine U.S. states late last year signed the Midwestern Regional Greenhouse Gas Reduction Accord, pledging that they would develop a market-based and multi-sector cap-and-trade mechanism using The Climate Registry as a way to track, manage and credit entities for GHG reductions.

Climate change efforts like this that cover only a state or region are a worry for the trucking industry. In testimony last month before a House subcommittee, a Con-way Inc. executive speaking on behalf of the American Trucking Associations said federal climate change policy must avoid encouraging a patchwork of local, state and regional climate change laws that could make it difficult for trucking companies to function in interstate commerce. The trucking industry supports federal preemption of local, state and regional climate change laws, said Randy Mullet, vice presi-

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## ASTM OKS BIODIESEL SPECS

### Move could spur engine makers' acceptance

A key standards-setting committee last month approved three long-sought specifications for biodiesel blends, capping five years of research and balloting. The National Biodiesel Board ([www.biodiesel.org](http://www.biodiesel.org)) praised the action, saying it should "significantly bolster automaker support and consumer demand for biodiesel." ASTM International's D02 Main Committee approved:

- Changes to the existing B100 biodiesel blend stock specification (ASTM D6751);
- Specifications to include up to 5 percent biodiesel (B5) in the conventional petrodiesel specification (ASTM D975); and
- A new specification for blends of between 6 percent biodiesel (B6) to 20 percent biodiesel (B20) for on- and off-road diesel.

"The new ASTM specifications for B6 to B20 blends will aid engine manufacturers in their engine design and testing processes to optimize the performance of vehicles running on biodiesel," said Steve Howell, chairman of the ASTM Biodiesel Task Force. "The new specifications will also help ensure that only the highest-quality biodiesel blends are made available to consumers at the retail pump."

Automakers and engine manufacturers have been requesting a finished specification for B20 biodiesel blends for several years. Some even cited the need for that spec as the single greatest hurdle preventing their full-scale acceptance of B20 use in their diesel vehicles, NBB said.

Rising fuel prices, tax incentives and improving technology are combining to make hybrids – such as this Freightliner Business Class M2 106 Hybrid drop frame beverage truck equipped with the Eaton medium-duty hybrid-electric system – more attractive financially.

dent of government relations and public affairs.

The localized climate change initiatives currently being enacted are "unworkable and impractical" for regulating a mobile, interstate industry like trucking, Mullet testified. Cap-and-trade systems are applied more effectively to stationary sources, he added.

Because ATA recognizes that it can't "just say no," the organization has recommended six steps that would help reduce fuel consumption and GHG emissions:

- Reduce the national speed limit to 65 mph for all vehicles, and set governors on new trucks to limit speeds to no more than 68 mph;
- Reduce engine idling;
- Increase fuel efficiency by encouraging participation in EPA's SmartWay partnership;
- Reduce congestion by improving highways, if necessary by raising the fuels tax;
- Allow more productive truck combinations; and
- Support national fuel economy standards for medium- and heavy-duty trucks.

Higher fuel taxes, larger trucks and lower speeds would not be popular or easy to achieve. But the trucking industry's message is simple: By helping us burn less fuel, you help us emit less carbon dioxide. It really isn't more complicated than that. ■

## HOW FEDEX FREIGHT GOES GREEN

At FedEx Freight, a commitment to the environment isn't just corporate citizenship, it's self-interest, says Dennis Beal, vice president of physical assets. Many actions that promote sustainability also lower costs, he noted in a recent presentation to the Arkansas Trucking Association. In his presentation, Beal outlined various technologies and systems FedEx Freight is exploring to reduce diesel and other energy costs in the operation of both equipment and facilities. Some of these include:

### Equipment

- Automatic air inflation system for trailing equipment
- Wide-base tires
- Hydrogen fuel injection
- Fuel additives
- Parasitic drag reduction

### Facilities

- Solar power
- Lighting retrofits – interior, exterior and loads
- Hydrogen fuel cell forklifts
- Utility management

Most of these technologies – except for hydrogen fuel cell forklifts – so far have shown an economic payback or at least some promise of one, Beal said.

Beal will be the lead presenter in a CCJ webinar, "Going Green, Saving Green," to be held on July 31.

For more information on the webinar, which is sponsored by Xata, and to register, visit [www.ccjwebinars.com](http://www.ccjwebinars.com).



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# UNDER THE HOOD, BEHIND THE WHEEL

Improve fuel efficiency through proper spec'ing and driver management **By John Baxter**

**T**wo of the most significant things a fleet can do to go green and save fuel involve spec'ing trucks properly and getting drivers to operate them economically. Today's driveline technology merges these two elements by motivating drivers to do what is best – or taking their place in areas where they don't.

## Optimum drivetrains

One helpful specification relates to engine multiple-torque ratings. The engine's electronic control module (ECM) is linked electronically to the transmission. Once top gear is selected, the engine's fueling shifts to increase torque as much as 200 lb-ft and produce a power curve that is much more favorable at the bottom.

Mike Powers, product development manager for Caterpillar, compares the power curves of a C13 430 hp 1550/1750 MT and a C13 with 430 hp and 1,650 lb-ft of torque. At 1,300 rpm, the MT engine produces 30 more hp than the 1,650 lb-ft engine.

"This encourages the operator to cruise in the sweet spot for the majority of the time," Powers says. "With the additional power, the driver will also be able to stay in top gear longer, which will also help save fuel. It also creates less driver fatigue due to reduced shifts." Since the torque shows up only in top gear, more expensive driveline components aren't needed.

According to Cummins, a 10

percent increase in time spent in top gear equates to 0.05 mpg. A drop in axle ratio to the next lower number equates to 0.1 mpg, provided cruise rpm guidelines are met, Cummins says.

Detroit Diesel also supports the use of multi-torque ratings. "DD offers both cruise power and multi-torque options," says Chuck Blake, who oversees customer fuel economy enhancement for the company. "These options encourage and allow drivers to remain in top gear for longer periods of time where the appropriate gearing is generally optimized for maximum efficiency." And while torque rise used to be the name of the game, "torque output is more important than torque rise in combination

with appropriate gearing to maximize top gear running time," Blake says.

It's smart to spec enough horsepower, says Ed Saxman, drivetrain product manager for Volvo Trucks North America. "It's important to keep the engine pulling in top gear as much as possible," Saxman says. "Buyers who choose less horsepower forget that a lower-horsepower engine typically does not have as much high-speed gradeability."

When it comes to gearing, Volvo's salespeople ask the customer "What is the cruise speed?" Saxman says. "You have to cruise in the sweet spot. Typical engine curves now allow you to maintain speed at a lower rpm and save fuel." Volvo's D13 puts the sweet spot at a fuel-efficient 1,300-1,500 rpm, he says.

## CUMMINS' RULES OF THUMB FOR MPG

**C**ummins offers the following general tips to fleet owners. Actual experience may vary, of course, due to a fleet's particular application, specs and operational profile. A comprehensive "Cummins MPG Guide" covering a full range of vehicle selection and operation considerations is available at <http://everytime.cummins.com>.

- Avoid comparisons on trucks with less than 50,000 miles.
- Expect as much as a 15 percent variation in mpg between winter and summer.
- A 1 mph decrease equals 0.1 mpg improvement.
- A 10 percent increase in top gear distance equals 0.05 mpg.
- A 10 percent decrease in idle percentage equals 0.1 mpg.
- Direct drive provides a 2 to 3 percent fuel economy improvement over overdrive.
- Disabling the fan "on" switch equals up to an 8 percent improvement.
- A drop in axle ratio to the next lower number equates to 0.1 mpg, provided guidelines are met.
- A load weight of 80,000 pounds will burn about 6 percent more fuel than one of 65,000 pounds.



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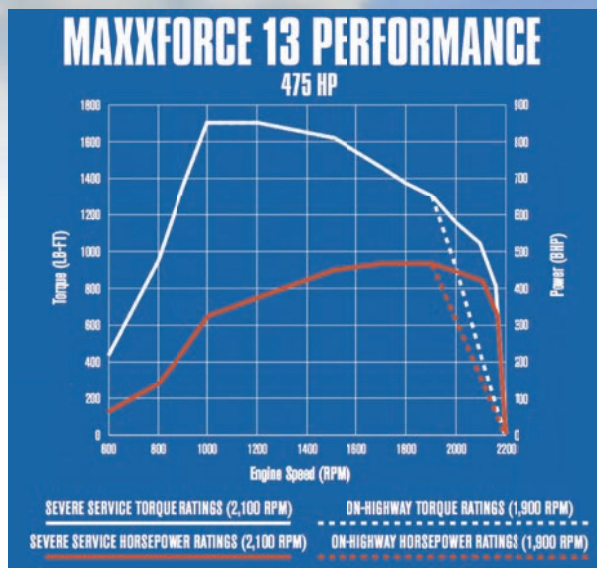
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These graphs show the torque and power curves of an International MaxxForce 13-liter engine. Because the torque reaches a maximum value from 1,000 to 1,200 rpm, the engine can pull hills and cruise while delivering the low rpm power of many larger engines, Navistar says.

Many variables need to be considered, including the loads to be carried and the terrain. However, fleets normally need to adjust the axle ratio so that the truck will be in the sweet spot at their typical running speed, Saxman says. So a fleet that runs at 62 mph will choose a slower axle than one that runs at 70.

Torque and power curves always play a critical role, says Tim Shick, director of business and product strat-

## MAINTAINING LESS FUEL

SAVVY SHOP PRACTICES CAN HELP LOWER DIESEL COSTS

As if vehicle longevity wasn't enough of a reason to adopt sound maintenance practices, the recent unprecedented surge in diesel prices has given fleet managers another compelling motivation. Your shop and drivers' pre-trips can make a big difference in your fuel bill. Here are a few key areas to consider, though this certainly doesn't cover everything you can do in the shop to save fuel.

### Axle alignment

Many fleets focus on front axle alignment because steer tires often develop irregular wear from worn steering components, but they neglect drive and trailer axle alignment. Misaligned tandem axles can have a huge effect on fuel consumption as well as tire wear. Proper axle alignment helps reduce rolling resistance and should be checked at least annually, says Bob Weber, chief engineer of Navistar Trucks' heavy vehicle center.

"If the tractor is dedicated to the same trailer all the time, consider aligning the tractor and trailer together as a unit," says Mike Dozier, Kenworth's chief engineer. "Aligning at the average loaded weight is also beneficial."

### Tire pressure

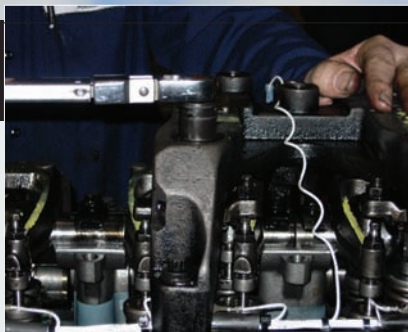
Unless you have spec'd a tire pressure monitoring or inflation system, you are greatly dependent on your drivers for one key maintenance item. "A driver who checks tire pressures and brings them up to the recommended level can make a significant difference in fuel economy," says Ed Saxman, drivetrain product manager for Volvo Trucks North America.

### Lubricants

Many fleets have chosen to extend oil drains as a way to save money on lubricants, but that approach might not always net out as a savings given diesel prices hovering around \$5 a gallon. Following the truck manufacturer's recommendations regarding lubricants for engine, transmission and differentials also will help save fuel, Saxman says.

"Maintenance intervals are set so the engine's performance never deteriorates," says Weber. "The penalty for stretching the interval is immediate."

Using CJ-4 oil instead of CI-4 may save fuel because even minimal ash buildup will mean enough backpressure to decrease fuel mileage, and these slight levels won't trigger a warning that the unit needs cleaning. And while it won't help most fleets most times of the year, one helpful trick is switching to lower-viscosity oils in frigid weather.



Setting the overheads on an engine helps optimize fuel economy, along with protecting related hardware. Following up with an adjustment of the engine brake, as is being done on this Series 60, will optimize brake performance and minimize component wear.



A clutch needs to slip a lot to affect fuel economy. Nevertheless, replacing a worn or malfunctioning clutch as soon as it fails could save a significant amount of fuel, while also minimizing the cost of the repair.



Regular inspection of all air intake parts not only will preserve engine life, but also will help ensure efficient performance. Post-turbo leaks will deprive the engine of air, thus upsetting combustion parameters.

### Airflow

Aerodynamics figure enormously into fuel economy, but performance deteriorates from even minor changes. "Cracked, bent or broken aerodynamic devices should be repaired or replaced as soon as possible," Dozier says. These devices are designed to work as a system, and redirected airflow from a bent piece could render the next piece downstream useless. "Sometimes just noticing a new bug splatter pattern on the tractor can indicate that an aerodynamic piece has been moved or tweaked," Dozier says.

Timely service on the air cleaner, turbo, overheads and charge air cooler also pays, Weber says. "Anything that restricts airflow or alters it will upset the balance of the engine as tuned and designed." External cleaning of the charge air cooler is helpful, Weber says, because anything that raises intake air temperature effectively reduces airflow. Attention to changing and servicing coolant also will be helpful, he says.

### Exhaust

"If running a 2007 engine, pay special attention to the portion of your exhaust from the turbo to the DPF (diesel particulate filter)," Dozier says. "Any cracks or misaligned clamps can cause longer or more frequent regenerations, which uses more fuel." Dozier also recommends similar consistent attention to fuel filters.

"Older trucks may suffer from internal muffler failure, but this is generally associated with power complaints," says Chuck Blake of Detroit Diesel. "DPF cleaning has recommended schedules unless triggered by diagnostic codes."

In general, a vehicle that isn't maintained properly won't perform as efficiently as possible. That's one more reason to invest in a savvy maintenance program.

egy for Big Bore engine business at Navistar. Shick says the designers of the MaxxForce engine wanted the new 11- and 13-liter engines to behave like their 15-liter big brothers in cruise situations. "The old maxim that you need to run a 15-liter to save fuel and cruise at the right rpm is starting to change," he says.

Shick admits that those who need more than 500 hp, along with the additional cubic inches for maximum engine braking, to run through the Appalachian or Rocky Mountains may be better off ordering a 15-liter engine. However, the MaxxForce 11- and 13-liter engines are ideal for most fleets and have potent low rpm power because their torque is still at its peak at 1,000 rpm, he says. Under common cruise conditions, these engines will deliver the cruise power of their big brothers at "a fuel-efficient low rpm, which equates to low friction," Shick says.

The power curve results in part from the common-rail injection system designed to deliver 26,000 psi even at the low rpm torque peak. Another factor is the sophisticated twin-series turbo arrangement, designed to give each its own coolant-cooled charge air cooler; the smaller turbo that gets the air first offers ideal response at those bass-note rpms, and the extra cooler further enhances performance.

### Directly automatic

Another fuel economy enhancer is direct drive, which, it turns out, is ideal in some applications and often enhanced by multi-torque options. "It is worth a 1 to 2 percent improvement, but its use is dependent on the terrain," says Gerard DeVito, director of engineering for Eaton's heavy-duty transmission





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group. “Direct works only when you’re spending a high percentage of the time in top gear. You save because you are not driving through meshed gears, and because there are lower churning losses.”

It’s not recommended for vocational applications because overdrive gives a “balanced” drivetrain, where the torque the driveline sees is much less, Blake says. “With direct, you need to run axles below 2.64:1, and down in first or reverse, you can damage driveline components because you can get extremely high driveline torques,” he says. For over-the-road applications, the ideal setup is a 1550/1750 torque spec where the higher torque only shows up in the top two transmission gears, Blake says.

## Torque and power curves play a critical role.

Bob Weber, chief engineer of Navistar Trucks’ heavy vehicle center, agrees that direct drive can help. “Direct-drive 10-speed transmissions are also recommended to maximize powertrain efficiency and save over 2 percent as compared to overdrive transmissions,” Weber says. “Fewer transmission gears also force the driver to hold in gear longer before downshifting, allowing the engine to run more efficiently at a lower average engine speed.”

Automated transmissions can bring the fuel economy of a fleet’s less skilled drivers, and the fleet average, up near to where the best drivers now perform. “One-tenth of a mile per gallon is worth \$1.5 million for

a 100-truck fleet each year,” says DeVito. The Eaton UltraShift LEP 13-speed automated transmission is designed to offer eight close gear-steps above fifth gear, allowing efficient operation even at varying cruise speeds. The transmission’s processor is tailored to the engine to help the truck always cruise in the particular engine’s sweet spot, as manufacturers’ cruise rpm recommendations vary significantly, DeVito says.

Volvo’s 12-speed I-shift, a fully automated gearbox, skips gears with abandon – often shifting a pattern such as 1, 4, 7, 9, 11 and 12 – because one of the best ways to get good fuel economy is to avoid languishing in the lower gears, Saxman says. The transmission also is designed to keep itself in top gear when ideal – usually 85 to 90 percent of the time – and offers an option called “Eco-roll” that helps the engine return to idle on slight downgrades when the truck can power itself, saving the 30 hp needed to spin the engine over at cruise rpm even when it’s neither pushing nor holding back. The I-shift is also a direct-drive transmission, saving perhaps another 1 to 2 percent in fuel, Saxman says.

### Optimizing aerodynamics, cutting weight

At speeds above 55 mph, vehicle drag or aerodynamics make up more than 50 percent of the effort needed



Cummins says Load-Based Speed Control, a patented electronic feature of

its heavy-duty engines, can provide up to a 3 percent improvement in fuel economy by limiting usable engine speed during low and intermediate power requirements.

to move the vehicle, increasing four times faster than the speed differential, says Mike Dozier, Kenworth chief engineer. “A rule of thumb is that fuel economy decreases by 1 to 1.5 percent for every 1 mph of increase, even for aerodynamic products,” Dozier says. An aerodynamically spec’d vehicle can have 10 to 20 percent lower drag than a traditionally shaped and spec’d vehicle, equating to 5 to 10 percent improved fuel economy for the aerodynamic vehicle, he says.

Navistar’s engineers say that cruising at 65 mph and below is a great way to take maximum advantage of an aerodynamic tractor design. “Speed has a powerful influence on fuel consumption,” Weber says. Ideally, if dropping the cruise

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A detail change like a rounded bumper and headlight, shown here on a Kenworth T660, can make all the difference in keeping air smoothly attached to the body as it races around a tractor.

Side fairings with rounded steps are another form of detail that can do a lot to keep air flowing smoothly. Such items need to be repaired shortly after damage if a fleet is to optimize fuel consumption.

speed significantly, a fleet should alter axle ratios to keep the rpm in the sweet spot, he says.

Anything that closes the tractor-trailer gap helps the combination to perform better aerodynamically, Weber says. Details such as external air cleaners and protruding grab handles can cause air to detach and increase aerodynamic drag significantly. "A bug screen can detach enough air to cost you 1 to 2 percent in fuel," he says. Other helpful details include a bumper design that helps air flow smoothly under a tractor, side fairings and skirts that minimize the air that's blown underneath.

"Using the full range of aero options and treatments like roof and chassis fairings, aero bumpers, mirrors and visors, along with cab or sleeper side extenders, are very useful enhancements," Dozier says.

With diesel prices above \$4 a gallon, fleets are beginning to seek weight savings as a way to improve fuel economy, not just a way to haul more freight.

A 1,000-pound weight savings



generally gives as much as 0.3 percent better fuel economy, says Don Baldwin, Michelin North America's product manager for commercial truck tires. Baldwin notes that the weight savings by spec'ing wide singles can amount to as much as 740 pounds in a combination, which can help retain payload by offset-

ting the weight of other fuel-saving devices such as aerodynamic add-ons and an auxiliary power unit. Also, the lower rolling resistance may save as much as 4 percent of the fuel bill, Baldwin says. Other tire makers point out, however, that the benefits of low rolling resistance are hardly exclusive to wide singles. ■



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# MILES<sup>TO GO</sup>-OR NOT

Technology helps fleets save on fuel costs by cutting back wasteful miles **By Aaron Huff**

**U**ntil recently, when DistTech drivers delivered loads, they returned to a company terminal to wash their tank trailers. High fuel costs have changed this routine. Drivers now stop at commercial wash locations on the way to their next pickup.

"You increase your wash costs but decrease your fuel costs," says John Hazenfield, chief information officer for Newbury, Ohio-based DistTech, a dedicated contract carrier of bulk liquid commodities. The company is looking at other options to reduce "stem" miles — the distance vehicles travel between service centers and load origins and destinations.

DistTech is hardly alone in adjusting its routes in response to record fuel prices. The cost of an unpaid mile — from deadhead, out-of-route and

other movements not compensated by rates or fuel surcharges — can be 75 cents or more. Consider that even at fleets that work to improve efficiency, unpaid miles might represent 15 to 20 percent of the total.

For years, carriers have used information technology to help reduce fuel costs by tracking fuel economy and finding the best diesel prices. With diesel prices approaching \$5 a gallon — with an increase of almost 45 percent in just four months — many fleet owners are taking a closer look at what technology can do to cut fuel costs by improving load planning, route

monitoring and post-trip analysis.

## Planning to save

To find the shortest and most practical truck route between any two points, you can just plug in the origin and destination into any commercial mapping and mileage software. Few fleets waste fuel because they don't know the shortest route. Rather, the root cause for excessive mileage and fuel costs usually lies with human decisionmaking, especially during the load planning process.

Dispatch and transportation management systems now include decision support tools to match available equipment with available loads, helping managers bring equipment and loads, point-to-point mileages, vehicle location and other information

together in one load planning screen.

Managers even can set up rules and alerts to catch mistakes before they happen. American Central Transport requires its load planners to get authorization for any loads with deadhead miles of more than 12 percent, says Bob Kretsinger, senior vice president and CIO for the Liberty, Mo.-based truckload carrier.

To enforce this rule, ACT uses a feature called LoadOffer in its Innovative Enterprise System (IES) from Innovative Computing Corp. ACT uses LoadOffer to send drivers a choice of up to three loads via in-

cab mobile communications. In the load planning screen, a dispatcher selects loads to send to drivers based on drivers' current status. The system automatically prevents planners from offering loads with more than 12 percent deadhead.

Tight control over deadhead mileage is especially critical for ACT. The company pays owner-operators a fuel surcharge on all loaded and deadhead miles, but customers do not pay a fuel surcharge on deadhead miles, Kretsinger says.

In the McLeod LoadMaster software system, users can find the nearest truck to a load by highlighting the load in the planning screen. To add a layer of protection, McLeod Software developed a new Rapid Alert module that gives supervisors instant notification

via a "screen splash" or e-mail message when any action is out of bounds — such as dispatching a truck with too many empty miles, says Tom McLeod, president of McLeod Software.

TMW Systems offers continuous visibility to performance metrics, such as deadhead percentage, with a real-time performance monitoring and scoring module called ResultsNow. TMW also offers a real-time alert mechanism called the Dawg, which can trigger e-mail alerts if a dispatcher assigns a load with an empty move greater than 100 miles, says Dave Wangler, chief executive officer.

**The root cause of waste usually is human error.**





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## The optimal match

Software also can determine automatically the optimal load assignments and routes for each vehicle and driver, within the bounds or constraints of driver hours, appointment times, etc.

For truckload operations, vendors that provide power-to-load optimization software include TMW Systems and Manhattan Associates. Less-than-truckload carriers have a wide selection of vendors. (For more information, see "The best way to go," *CCJ*, February 2007, page 62.)

Some dispatch software systems for LTL carriers provide load and route optimization tools within their base software package. Transportation Solution Set (TSS), a dispatch software system from Enterprise Information Systems (EIS), uses an algorithm to determine the best load assignments and load sequences for each power unit given the mileages, appointment times, weights and dimensions of each available shipment, says Marc Mitchell, EIS transportation practice director.

Most dispatch providers, however, offer route optimization tools as a separate module or integrate with software from third-party providers.

In 2005, Columbia, S.C.-based Southeastern Freight Lines began using a route design system called P&D Study from its LTL dispatch software provider, Synergistic Systems. SEFL has used software to plan routes for many years, but in 2007, the second full year of using P&D Study, SEFL reduced its labor



Transport America monitors its operations daily for out-of-route mileages. The truckload carrier currently uses PC Miller FleetCommander from ALK Technologies to compare real-time satellite tracking with planned truck routes.

hours and miles by 4.6 percent over 2006, says Braxton Vick, SEFL's senior vice president of corporate planning and development.

## Staying on track

Once the driver is dispatched, the focus turns to limiting out-of-route (OOR) mileage, which is the difference between planned and actual miles on a route. Traditionally, few fleets have aggressively tried to reduce OOR because of the delay in captur-

ing all of the necessary details, such as odometer readings, fuel purchases, satellite tracking and dispatch information. But based on current fuel prices, a typical truckload carrier can save about \$1,500 per truck by reducing OOR by 1 percentage point.

One way to monitor OOR miles is via the same vendors that provide paperless automated fuel-tax services. Besides automating fuel taxes, these companies use their software to report OOR mileage.

Lee TranService offers this type of integrated, online fuel-tax reporting service. Many of its clients use the online electronic trip report to see a vehicle's planned route with an overlay of the actual route on a digital map. Fleets also can pull up reports that identify OOR miles, fuel economy and wasted fuel costs by any segment of a trip, by an individual vehicle or group, and for any timeframe.

"In most instances we pull the data daily," says John Vosters, vice president of national sales for Lee TranServices. "Many of our clients look at out-of-route information through the course of the week."

Other software solutions that monitor OOR mileage can issue immediate alerts when drivers veer off course.

Transport America, a 1,300-truck carrier based in Eagan, Minn., uses PC Miller FleetCommander from ALK Technologies to monitor OOR mileage. The system notifies fleet managers when any driver passes an established threshold for OOR miles along a route. The FleetCommander software compares point-to-point mileages for the route from the PC



Miler mileage database to the actual distance traveled that is captured by onboard computers. Fleet managers are responsible for following up with drivers that violate the threshold.

"It is more of a coachable event for newer drivers," says Tom Benusa, CIO for Transport America. Ultimately, Transport America plans to design more powerful business intelligence tools in order to scorecard business and driver performance across many dimensions, including OOR mileage, Benusa says.

For real-time monitoring of OOR mileage, TMW Systems offers a tool called Trip Alert that takes the current position of a vehicle and extrapolates the remaining distance of the trip. If the software determines the driver will incur extra miles, it sends an alert, Wangler says.

Fleets have been able to monitor OOR for years with Xata's onboard computing and mobile communications system, says Tom Flies, senior vice president of product management for Xata. With the Web-based XataNet product, fleet managers can set up instant alerts if any vehicle exceeds a set percentage for excess time or mileage between an origin and destination. XataNet also can monitor OOR by using proximity alerts — if a vehicle has not reached a specific location by a specific time, Flies says.

### Cutting losses while lost


While fleets can monitor route compliance from afar, an effective tool for preventing OOR from happening in the first place is in-cab navigation. Navigation alone could provide enough return-on-investment to justify the cost of an onboard computing and wireless communications platform.

"If you can save 10 to 15 miles per


week, per truck, that will almost pay for your investment in a new in-cab system," Benusa says, basing his cal-

culation on 1,800 to 2,300 miles per truck per week.

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computing and wireless communications now offer, or soon will offer, in-cab navigation solutions from providers such as ALK Technologies and Maptuit. (For more information on in-cab navigation, see “Pinpointing solutions,” *CCJ*, June 2008, page 63.)

Spoken turn-by-turn navigation also is available for smart phones, although in many cases, just having text directions may fit the bill. Ward Trucking, an LTL carrier based in Altoona, Pa., has used Cheetah Software for about four years. The Cheetah system works in conjunction with Sprint Nextel’s digital cellular service, which allows Ward to track the movement of its fleet, offer accurate ETAs to customers, and provide drivers with directions when needed.

Most Ward Trucking drivers operate in the same area every day and don’t need directions, but being able to pull up instant directions to the next stop comes in handy with temporary drivers. “As fuel continues to climb, every mile counts now,” says Greg Confer, vice president of asset management.

The company also uses the Cheetah software to improve dispatch and routing decisions. Since adopting the system, Ward Trucking has shaved off 4.75 miles per truck per day. With 350 drivers, that’s 1,663 miles a day, Confer says.

### Analyzing results

When it’s time for fleet managers to review route compliance and other items, they often are afraid to take remedial action with drivers, says Mark Kadlec, vice president of safety and human resources for DistTech.

“As an HR manager, I find it is

## THE GREEN SIDE OF TELEMATICS

### New technologies, services focus on carbon reduction

As if the price of fuel wasn’t enough of an incentive to change habits, fleets are being pressured by customers, the government and society to reduce their emissions of greenhouse gases. Now, technology solutions are coming to the market to help fleets measure and improve their fleet performance from an environmental or “green” basis.

In June, Ivbox ([www.ivboxdata.com](http://www.ivboxdata.com)), a company that provides risk analysis and mitigation services using onboard data collection, released DriverScoregrn (pronounced “driver score green”). Its DriverScore product is a Web-based program that fleets can use as a standard to assess, compare and analyze individual driver behaviors for risk. The lower the score, the better.

By using the same GPS and g-force data points that Ivbox collects from the vehicle, the company can correlate the carbon output for each vehicle based on the way the vehicle is being driven.

“Drivers may have the same vehicle, but how they drive it determines the output of carbon,” says Craig Lotz, president of Ivbox’s commercial auto group. By measuring and scoring drivers, fleets can target specific driver behaviors that impact fuel economy and carbon output. “We are trying to keep it simple and easy for fleets to use,” Lotz says.

GE Capital Solutions Fleet Services offers a subscription-based service for a mobile resource management and environmental performance solution. The company works with fleets to analyze data from their vehicles and to establish a baseline number for the gallons of gas or diesel consumed over a time period. To calculate CO2 emissions, it applies a standard conversion factor for the pounds of CO2 per gallon of gasoline or diesel.

“If you track fuel consumption, then you are able to get to a CO2 calculation,” says John Righini, chief marketing officer. “You can see a less efficient driver or route could cause higher emissions because of higher fuel consumption.” With a baseline for fuel consumption and CO2 emissions, GE Fleet Services provides input to fleet managers on how to develop or guide drivers to be more fuel-efficient. The company also helps customers optimize their vehicle selection and routes for fuel efficiency, Righini says; it even can take over the entire management of a fleet.

#### GE Capital Solutions Fleet Services

Performance Indicators			Setup
<b>SAFETY</b>	Summary	Status	Update
Accident Rate	0.0%		05/19
Accident Cost Per Mile	\$0.0465		05/19
<b>COMPLIANCE</b>	Summary	Status	Update
Average CO2 Emission Per Unit	1476.16 lb		05/22
Emissions Status	100%		05/19
Vehicle Event Compliance	14%		05/19
<b>ASSET UTILIZATION</b>	Summary	Status	Update
Miles Per Month	777		05/19
Stops Per Day	3.90		05/19
Unused Vehicle	2.74%		06/17
Drive Time	1.76 hrs		05/19
<b>FUEL</b>	Summary	Status	Update
Fuel Consumption Savings Opportunity	33.06%		06/16
<b>ACCIDENT</b>	Summary	Status	Update
Accident Rate	0.00%		05/19

What Needs My Attention			Setup
<b>Alerts</b>	Count	Update	
<b>MAINTENANCE</b>			
Vehicle with Diagnostic Trouble Codes	1		06/10
<b>Exceptions</b>	Count	Update	
<b>SAFETY</b>			
Speeding	43		06/16
<b>COMPLIANCE</b>	Count	Update	
Usage	61		06/16
Vehicle Event Compliance	22		05/19
<b>ASSET UTILIZATION</b>	Count	Update	
High Mileage	19		05/19
Low Drive Time	19		05/19
Low Mileage	36		05/19
Low Stops	13		05/19
Unused Vehicle	6		06/17
<b>FUEL</b>	Count	Update	
Fuel Consumption	11		06/17
Idling	19		06/16
<b>ACCIDENT</b>	Count	Update	
Multiple Incidents	2		06/15

GE Commercial Finance Fleet Services offers a telematics service to track carbon emissions.



easier to provide people with objective data," Kadlec says. That's why one of the most effective tools for continuous improvement of driver compliance and performance is a scorecard, he says.

Fleets that use PeopleNet's onboard computing and mobile communications platform have an easy tool for designing custom driver scorecards, says Randy Boyles, vice president of tailored solutions. All of the data collected from the vehicle is available in a standard database format through PeopleNet Link, a server that resides at a customer's location and is updated continuously with new data from the field.

Many fleets also use PeopleNet Link to capture the route plans from a separate routing software package to include metrics such as OOR percentage or actual miles versus planned miles. Having the data in a usable database format makes it easy to mine historical data by date range, by groups of drivers, or by vehicle, Boyles says.

This fall, Qualcomm Enterprise Services plans to release a new analytics model for its OmniVision suite of products. "At \$4 per gallon, you are going to see people get really smart about how they operate," says Norm Ellis, vice president and general manager of transportation and logistics. "As information comes together, you can really mine the data."

Fleets will be able to use the analytics model to drill down to determine the impact of weight on fuel economy, Ellis says. Over the long term, the analytics model will be used more for predictive modeling. "That is a very significant part of the future of the industry," he says.

In the case of fuel, predictive modeling can be used to learn why, where and when you burn fuel, and even how to put drivers on the right loads. For example, you might learn that certain drivers perform better on

certain types of loads or routes. You might even decide, based on predictive modeling, to combine routes to reduce the amount of fuel wasted by

traffic congestion, Ellis says.

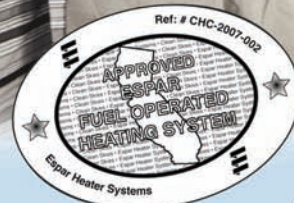
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