VOLVO TRUCKS FUEL EFFICIENCY

BETTER FUEL EFFICIENCY STARTS HERE

VOLVO'S COMMITMENT TO FUEL EFFICIENCY

The benefits of increased fuel efficiency are simple: you save money and reduce CO^2 emissions. Getting the most from every drop of fuel depends on factors that range from engine and transmission performance to truck cab design, the routes you take and the drivers you hire and train.

Since today's fuel prices account for a large portion of your fleet's total operating costs, Volvo continues to drive strategies and innovations to help you log more miles using less fuel.

The strategies featured here are proven tools for saving money. Put them to work and you'll make your fleet more profitable, year after year.

VOLVO TRUCKS: A HISTORY OF FUEL EFFICIENCY INNOVATION

1978 • First Air-to-Air Intercooler

1983 • First Aerodynamic Truck with Tapered Hood and Full Aerodynamic Package

1987 • First Aerodynamic Headlights

1994 • Volvo D12 Overhead Cam Direct Injection Engine

1996 • VN Launch Establishes a New Aerodynamic Standard

2002 • VNL Aerodynamic Restyle

2005 • VNL Aerodynamic Enhancements

2007 • Volvo D11, D13, D16 Global Engine Platforms
• Volvo I-Shift Introduced

2008 • Fuelwatch Initiative

2010 • Volvo's SCR No Regen Engine with Eco- and Dual-Torque

2011 • Redesigned Cab Aerodynamics
• Mass-Based Variable Torque
• Online Driver Development & Fuel Management Analysis
• Volvo introduces the revolutionary XE13 fuel efficiency package

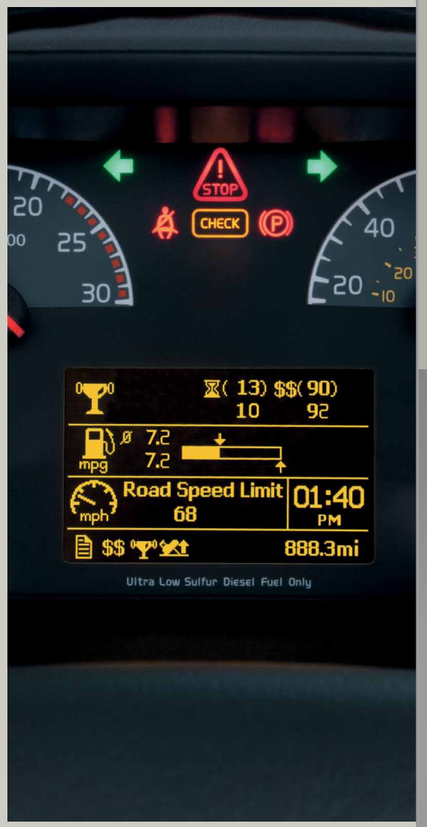
2012 • TWNA Technical Achievement Volvo XE13 Fuel Efficiency Package award
• Volvo extends the award-winning XE fuel efficiency line with the introduction of the XE16, a heavy-spec package rated for combination weights up to 143,000 pounds

FUEL EFFICIENCY INNOVATION

There are a host of vehicle features and variables that can affect fuel efficiency. At Volvo Trucks, we've focused our efforts on factors that can make the biggest difference for fuel-conscious fleets.

Volvo technology is focused on three factors:

- POWERTRAIN
- AERODYNAMICS
- DRIVER TOOLS FOR EFFICIENCY



1% HERE, 1% THERE. IT ALL ADDS UP.

Small increases in fuel efficiency quickly add up to sizeable savings. That's the strategy behind the Volvo innovations that help you get more from every drop. We constantly look for new ways to make our trucks go further with less fuel and less impact on the environment.

It's an approach that's made us a leader in our field.

Our D13 engine and I-Shift transmission create the industry's most efficient powertrain. Our advanced aerodynamics dramatically reduce wind resistance. And our driver tools make every trip more productive.

INTEGRATED POWERTRAIN

A powerful engine that delivers high efficiency and low emissions. Plus an intelligent transmission that automatically keeps the engine running in the sweet spot. Welcome to the fuel-saving Volvo integrated powertrain.

XE13 POWERTRAIN PACKAGE

XE = Exceptional Efficiency. It is your best option for maximum fuel economy.

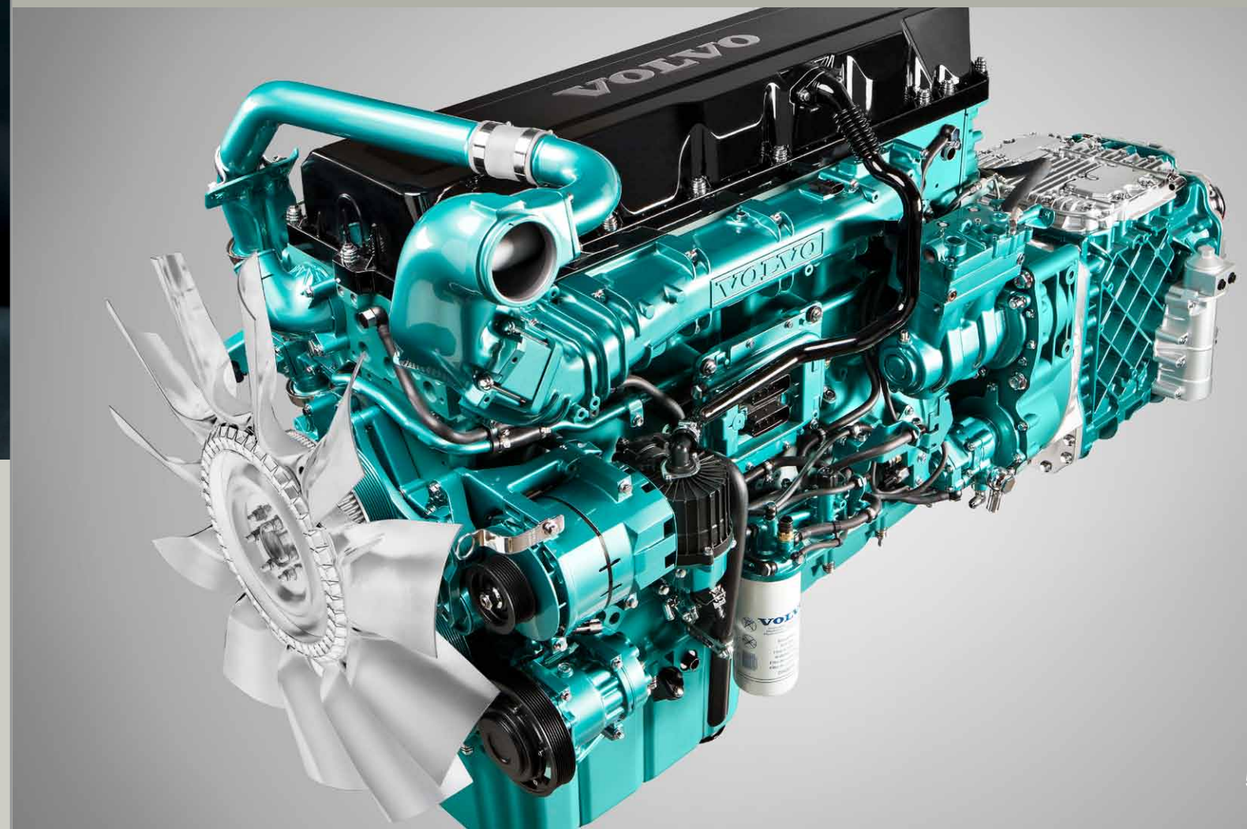
The innovative XE13 powertrain package effectively lowers engine RPM at cruising speed, a concept Volvo calls downspeeding. As you know, the benefit of lower engine RPM is lower fuel consumption.

VOLVO I-SHIFT AND XE13 SOFTWARE WORK TOGETHER TO GET MORE FROM EVERY DROP OF FUEL.

Since the Volvo powertrain is fully integrated, each component always knows the demand placed on the other. This constant communication allows the I-Shift transmission to control the D13 engine, rather than the other way around.

STAYING IN THE SWEET SPOT BOOSTS FUEL EFFICIENCY UP TO THREE PERCENT.

The XE13 package consistently operates in the engine's "sweet spot" – 1050 RPM to 1500 RPM – with the most efficient range typically between 1100 RPM to 1200 RPM. Operating in this range yields about a 1.5 percent fuel efficiency improvement for every 100 RPM of downspeeding, so the XE13 provides a fuel efficiency gain of up to three percent.



DESIGNED FOR VIRTUALLY ALL NORTH AMERICAN INTERSTATE HIGHWAYS.

The XE13 package is ideal for long haul and regional haul routes, bulk haulers, and a wide range of over-the-highway applications. Bulk haulers, fleets with lighter payloads and those who go out heavy and return empty will see the greatest improvement in fuel efficiency.

The package is optimized for speeds 62-68 miles per hour, but works well at all speeds. Whether mountain, city or any route in between, there are no highways where the XE package can't go.

THE XE13 POWERTRAIN PACKAGE INCLUDES THE FOLLOWING COMPONENTS:

- Volvo D13 engine with 425 or 455 horsepower rating and 1750 lb-ft of torque
- Volvo I-Shift overdrive transmission with a 0.78:1 ratio
- Axle ratios of 2.64 to 2.69

VOLVO POWER WITH ECO-TORQUE

Volvo D11, D13 and D16 engines with Eco-Torque feature low RPM and top gear operation to save fuel.

VOLVO ENGINES WITH OUR INNOVATIVE ECO-TORQUE FEATURE DELIVER TORQUE RATINGS THAT MAXIMIZE THEIR FUEL EFFICIENCY.

With Eco-Torque, the truck accelerates normally through all bottom gears. In the top two gears, where most fuel is consumed, the engine defaults to a lower torque curve. Higher torque is available on demand, but only under certain conditions.

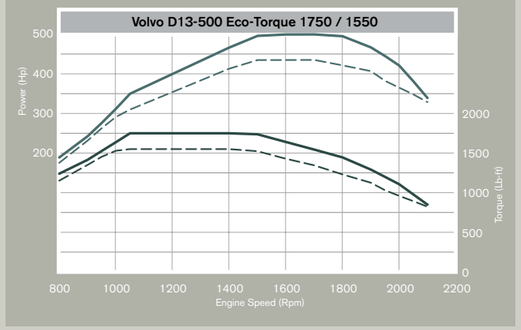
MORE POWER FOR THE HILLS. MORE EFFICIENCY FOR YOUR BOTTOM LINE.

Each Volvo Eco-Torque engine rating has a higher torque curve and a lower torque curve. The nominal horsepower for each rating is associated with the higher torque curve. On a steep grade, performance is enhanced when the engine automatically switches to the higher curve. Engine efficiency under these full-load, low-RPM conditions is at its maximum. The engine will revert to the low curve when the power demand is removed and cruise conditions are resumed. This saves fuel by encouraging operation at a lower, more efficient RPM, and provides a fleet engine that's capable of cresting most hills in the top gear. Plus, the driver quickly learns that this exceptional Eco-Torque performance is obtained by operating at low engine RPM.

RATINGS THAT SAVE YOUR FLEET MONEY NOW, AND PAY YOU BACK AT TRADE-IN.

All Volvo engines may be up-rated to the highest rating within their displacement with only a software flash, limited only by transmission capacity. For example, a fuel efficiency-conscious fleet owner may specify the tractor with a 405 Eco-Torque engine and Volvo I-Shift transmission. At trade-in, the engine may simply be reflashed to a full 500 horsepower and 1750 lb-ft torque for higher residual value. There's no need to replace any driveline or cooling components, and no engine hardware, such as turbo or injectors, needs to be changed.

The Dual-Torque engines have the same dual personality in the top two gears as the Eco-Torque ratings. But by operating on the lower torque curve through all the low gears, they have the added feature that they can use certain vendor transmissions with a 100 or 200 kb-ft lower rating than the maximum engine torque. However, this means that at resale time, they cannot be uprated beyond the torque rating of the installed transmission,



and as well, these ratings will suffer poorer drivability in the mountains, as compared to Eco-Torque.

WHAT KIND OF FUEL EFFICIENCY DOES ECO-TORQUE/ DUAL-TORQUE DELIVER?

A lot depends on driver, payload, terrain and other factors. But with Eco-Torque, you can expect fuel efficiency that delivers more miles from every drop of diesel.

I-SHIFT

Volvo's I-Shift transmission keeps your fleet in the sweet spot.

BETTER FOR YOU, YOUR FLEET AND YOUR BOTTOM LINE.

Volvo I-Shift is a 12-speed, two-pedal, automated manual transmission (AMT) that maximizes driver comfort, payload capacity and fuel efficiency.

I-Shift is designed to integrate seamlessly with Volvo engines and requires virtually no maintenance. It's ideal for applications such as line haul, heavy haul, construction, distribution, pick-up and delivery. Available in four feature-specific packages, I-Shift can be customized to fit the demanding needs of fleets of all sizes.

A TRANSMISSION WITH INTELLIGENCE.

The I-Shift transmission management system employs a next-generation microprocessor to deliver "intelligent" features that improve driveability and fuel efficiency. For example, I-Shift knows the efficiency map for each Volvo engine. By continuously monitoring the changing grade, vehicle speed, acceleration, torque demand, weight, rolling and air resistance, I-Shift can instantly predict and select the most efficient utilization of the engine. In other words, it knows when and where a shift would be beneficial.

ADVANTAGES TO REDUCE YOUR FUEL COSTS.

I-Shift lets every driver shift like a fuel efficiency expert, reducing your fleet's fuel costs. Smooth shifting puts less stress on the driveline and the tires, and can extend the useful life of the driveline and minimize maintenance. I-Shift is also light in weight, increasing your payload opportunity.

Drivers can trust I-Shift to always select the right gear to stay in the engine's "sweet spot." This level of ease reduces fatigue, helps with driver retention and reduces the time it takes for a driver to make a profit on the road.

THE BEST AMT ON THE ROAD IS THE BEST AMT FOR YOUR FLEET.

Volvo I-Shift has the highest torque capacity in the industry. It's almost 200 pounds lighter than the competition, and requires little maintenance. It's the only AMT with features like Eco-Roll® to save fuel, and Kick-Down to maximize acceleration. And only I-Shift is available with enhanced PTO functions.

ADVANCED AERODYNAMICS

Our innovative cab design reduces aerodynamic drag from every angle.

It's been shown that above 50 MPH, 50% of a truck's power can be consumed by wind drag. Obviously, that has a major impact on fuel efficiency. And it's why Volvo continually makes a major investment in aerodynamic research, testing and redesign.

In 1996 we changed the way the industry looked at aerodynamics and its impact on fuel efficiency. In 2002 we enhanced the VN's aerodynamic features to further reduce drag and improve fuel efficiency. We refined the aerodynamic design again in 2010, improving fuel efficiency by an additional 1%. Today, we've added even more aerodynamic innovations to further reduce wind resistance and increase mpg.

Some enhancements have been big, others deceptively small. But regardless of size, they all add up to make a significant improvement in your fleet's fuel efficiency.

NO TRACTOR HANDLES AIR BETTER THAN A VOLVO VN

Controlling the air. That's the key to fuel efficiency.

Research tells us that a 1% reduction in drag can increase fuel economy by 0.3 to 0.5% at highway speeds. It's also true that about 50% of the drag of a tractor-trailer combination is attributed to trailer. That's right: 50%.

But trailer drag is affected by how well the truck moves through the air, and how it passes the air from tractor to trailer. And the better a tractor handles the air, the lower the drag from the trailer. Which is good news for Volvo fleets.

THERE ARE THREE RULES FOR MAXIMIZING A TRUCK'S AERODYNAMICS

1. ATTACH the air as close to the front of the truck as possible.
2. Keep it attached.
3. PASS the air along as EFFICIENTLY as possible.

The more quickly a truck attaches and takes control of the air, the better it can maintain control of the air – all the way to the end of the trailer.

Rounded surfaces are best for taking control of air. That's why Volvo trucks have a sloping nose and smooth curves designed for reducing drag. Volvo cabs are smooth sided, without obstructions to catch the air and cause drag. We've removed airflow obstacles such as air cleaners, door handles and exterior grab handles. Even our mirrors and headlights are designed to reduce air drag.

ATTACH THE AIR. CONTROL IT. SAVE FUEL.

With the right design, every part of the truck can increase your fuel efficiency.

Controlling the air is the key to fuel efficiency, and the Volvo VN takes control from the front bumper to the back of the trailer.

AERODYNAMICS FUEL EFFICIENCY BY THE NUMBERS:

- 10% fuel efficiency increase by reducing speed from 65 to 55 MPH.
- 2% fuel efficiency increase by removing bug deflector.
- 10% fuel efficiency lost by hauling a high trailer with mid-roof cab.
- 3% fuel efficiency increase by closing the trailer gap from 60" to 40".
- 1% fuel efficiency increase by using an Adjustable Trim Tab.

THE VOLVO VNL 670

DRIVER TOOLS FOR FUEL EFFICIENCY

DRIVER INFORMATION DISPLAYS

The information you need to be fuel-efficient, all in one place.

INDICATORS FOR FUEL EFFICIENCY AND PERFORMANCE.

All Driver Information Displays feature menu-driven commands to help manage Volvo's SCR aftertreatment system. Base and Premium displays also feature menus for additional features and functions. Drivers can scroll through digital gauges, view fuel data, review trip and distance data, and more.

PERFORMANCE BONUS GUIDE

The Performance Bonus Guide option is designed to encourage drivers to operate their Volvo truck for optimum efficiency. Efficient operation can be rewarded with an increase to their Road Speed Limit, or drivers can receive other incentives as you see fit.

The Performance Bonus display provides real-time status of vehicle performance, so drivers know exactly when they're getting the most from every drop of fuel—for example, when they're in the "sweet spot" and achieving the best mileage.

SWEET SPOT INDICATOR

When drivers are in the "sweet spot," they're achieving the best fuel economy. The integrated Sweet Spot indicator is standard with all Volvo engines, and assists the driver by automatically calculating what percentage of time the truck has been operating in optimum engine speed for driving conditions.

On the display, one dollar sign means the engine is operating in a 'less efficient' area of the sweet spot. Fuel consumed in this mode will count 50% towards calculated sweet spot percentage.

Two dollar signs means the engine is in the sweet spot. Fuel consumed in this mode will count 100% towards sweet spot percentage.

SWEET SPOT FUEL SAVINGS:

$80,000 Fuel cost 125,000 miles, $4.00/gallon
$800 Savings with 1% average improvement
$3,200 Over 4-year vehicle life
$48,000 Savings for a fleet of 15 trucks
$0 Cost of the Sweet Spot Indicator

DRIVING TIPS

Proven ways to increase fuel efficiency and lower costs.

Nothing affects your bottom line more than driver performance. Here are proven tips that tell drivers what to do—and what not to do—to maximize truck performance and get more out of every drop of fuel.

WHAT TO DO:

- Slow down! Above 55 mph, each 1 mph increase reduces fuel efficiency by 0.1 mpg.
- Coast when possible. When approaching the crown of a hill or a red light, release the accelerator. Using the truck's own momentum can save fuel.
- Operate at a constant speed. On smooth, flat stretches, use cruise control to supply a more even amount of fuel.
- Driving technique can impact fuel efficiency up to 5%. The most efficient drivers can get about 30% better fuel efficiency than the least efficient drivers.
- Try to stay in top gear at least 85% of the distance in a normal highway application; let the engine lug down when slowing.
- Make as few shifts as possible (skip shift). This avoids unnecessary high revs that can rob fuel. Shift between 1150 and 1500 rpm.

WHAT NOT TO DO:

- Avoid speed changes (speeding up and slowing down). Each 0 to 65 mph acceleration uses up to ½ gallon of fuel.
- Avoid idling whenever possible. Each hour of idle time (in long-haul operation) can decrease fuel efficiency by 1%. Fuel used during idle does not move your freight and reduces overall fuel efficiency. Also, be aware of idling restrictions in many states.

EXTRA STEPS YOU CAN TAKE:

- Minimize your trailer gap. If possible, move stationary fifth wheels forward, or add some rear stops on sliders. Decrease your trailer gap (especially on box vans) for best fuel savings. Reducing trailer gap 10" can save up to 1% or more. The best gap is approximately 38" to 43".
- Evaluate electronic engine settings. Electronic settings are easily changed; settings that match your application can yield the best savings. Use optimum Road Speed Limits.
- Use Gear Down Protection. Your best fuel efficiency is in high gear, not one gear down.

OTHER FACTORS THAT AFFECT FUEL EFFICIENCY:

- At any speed, the driver is the biggest contributor to MPG. After that, tires are the most important factor in mpg below 55 MPH; aerodynamics contributes most above 55 MPH.
- Above 55 MPH, each 2% reduction in aerodynamic drag results in approximately 1% improvement in fuel efficiency.
- Fuel efficiency can increase up to 7% after tires are broken in (35,000–50,000 miles).
- Used lug drive tires can get up to 0.4 MPG better fuel efficiency than new lug tires.
- Ribbed tires on drive axles can get 2-4% better fuel efficiency than lug tires.
- Each 10 PSI that a truck tire is underinflated can reduce fuel efficiency by 1%.

DRIVER DEVELOPMENT

Cut your fuel costs with effective driver training.

The driver is the key to vehicle performance. That's why effective driver training can pay off almost immediately. Tests show that drivers who adopt more fuel-efficient driving techniques can reduce fuel costs 5% or greater. Volvo driver development is designed to teach drivers what to do in any situation when the engine is running. Here are our top tips for driving, setting the engine and using Volvo's Performance Bonus Guide to train your drivers.

ENGINE SETTINGS:

- Electronic settings available with every Volvo engine can be set to help the driver in specific—and often less obvious—activities. Maximum Road Speed has a dramatic effect on fuel efficiency, and the Volvo Road Speed Limit—set for reasonable road speeds—helps many operators reduce fuel consumption.
- The Eco Road Speed Limit Control allows the truck to slow 2 mph on upgrades before responding to the throttle, for maximum power to maintain road speed. Volvo's Gear Down Vehicle Speed Limiter encourages the driver to operate in top gear for maxmum fuel efficiency.

VEHICLE OPERATION:

- Allow engine to lug down (shift between 1150 and 1500 rpm).
- Try to stay in top gear at least 85-90% of the time in normal highway driving.
- When approaching the crown of a hill or red light, release the accelerator and use the truck's own momentum to save fuel.

IDLE TIME:

- With an idle time of 10% of total engine hours, you'll see a 1% fuel efficiency loss.

SPEED:

- Slow down: an increase of 1 mph equals a loss of 0.1 mpg.

TERRAIN AND ROUTES:

- Steady (average) speed is better than many small up and down speed changes; each acceleration between 0 and 65 mph uses about ½ gallon of fuel or the equivalent of 4-5 minutes of typical highway driving.
- Stop/go/traffic accelerations have a HUGE impact.
- On a smooth, flat stretch of road, utilize cruise control to supply a more even amount of fuel.

VOLVO'S PERFORMANCE BONUS GUIDE GIVES DRIVERS IMMEDIATE FUEL EFFICIENCY FEEDBACK.

The Performance Bonus Guide is a unique ride-along "coach" in the Volvo Driver Instrumentation Display that tells the driver how to operate the engine for best fuel efficiency. The Performance Bonus Guide is active over 25 mph.

SMARTWAY CERTIFIED SPECIFICATIONS

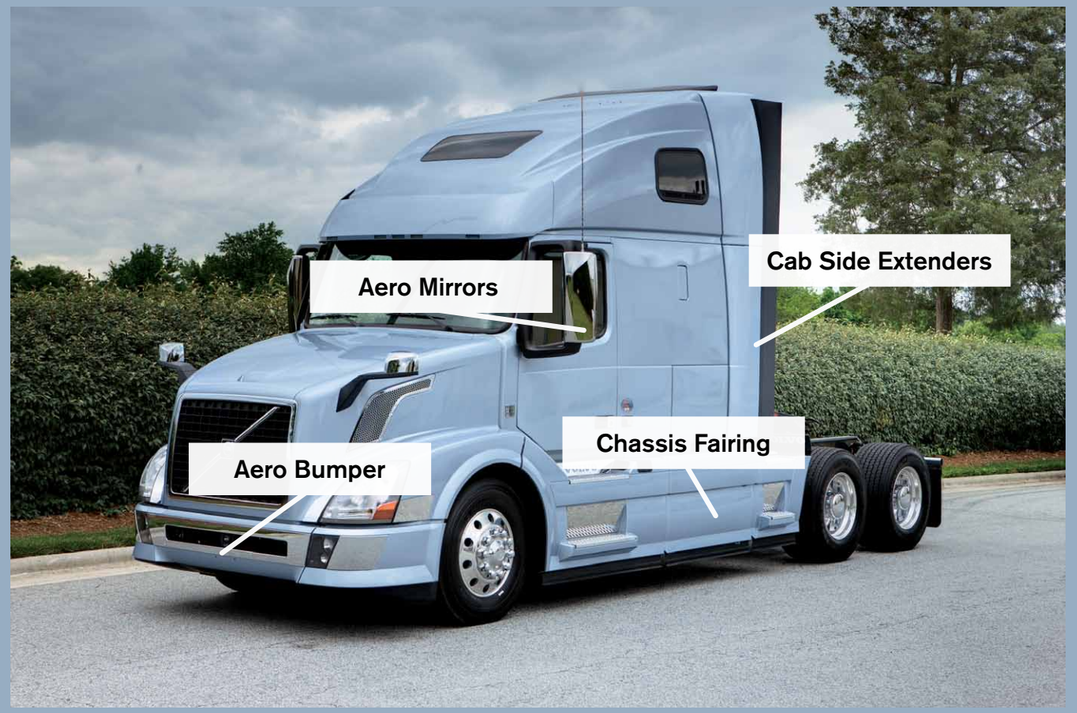
Getting more from every drop of fuel makes sense for your fleet. And for our planet.

VOLVO MANUFACTURES EPA SMARTWAY-VERIFIED TECHNOLOGIES.

Volvo Trucks is proud to partner with the U.S. Environmental Protection Agency to manufacture EPA SmartWay-verified technologies. This type of technology is found on our SmartWay Certified VN Tractors. Volvo has developed a comprehensive package of SmartWay components that deliver high fuel efficiency and low emissions.

WHAT MAKES A VOLVO VN A CERTIFIED SMARTWAY VEHICLE?

The EPA's SmartWay program has strict requirements that each truck must meet to become a Certified SmartWay truck. Volvo starts with a sophisticated aerodynamic design, honed through extensive computer simulation and wind tunnel testing. Then we add enhancements.



AERO BUMPER

Volvo's aerodynamic bumper optimizes airflow around andunder the vehicle, and has an optional extended drag reduction plate to reduce turbulence behind the bumper for even better airflow.

CHASSIS FAIRING

The full-length chassis fairing reduces wind resistance over chassis-mounted components such as fuel tanks.

AERO MIRRORS

Even a small component can make a difference for wind resistance, so Volvo's mirrors are smoothed and rounded to catch as little air as possible when traveling down the road.

ROOF FAIRING

Moving the air smoothly from over the cab to over the trailer makes a huge difference. Our integrated cab high roof fairings bridge the gap, whether the cab has a flat, mid- or full-height roof. We even offer a patented adjustable fairing extension with a trim tab, so operators can precisely tailor their aerodynamics to their trailer, for up to a 1% increase in fuel efficiency.

CAB SIDE EXTENDERS

Cab side extenders reduce the distance between the back of the cab and the front of the trailer, for a major aerodynamic boost. Volvo's extenders and optional extended fairings feature a compound curve that matches the cab curve to the trailer. This allows the truck to pass the air to the trailer with minimum turbulence.

LOWER EMISSIONS PLUS GREATER FUEL EFFICIENCY. THAT'S SMART.

Low emissions are central to SmartWay goals, and Volvo's D11, D13 and D16 SCR engines are certified to the stringent EPA '10 emissions requirements. Volvo SCR engines can deliver up to 5% better fuel efficiency than our previous generation of engines. So you get more from every drop.

FUEL EFFICIENCY DOWN THE ROAD

VOLVO LINK

Onboard monitoring to improve efficiency and uptime.

THE MORE YOU KNOW ABOUT YOUR FLEET, THE MORE EFFICIENCY YOU'LL GAIN.

Volvo Link supports a wide range of vehicle and fleet management services that help you stay connected to your trucks and drivers. Monitor and manage your fleet's productivity as you receive regular updates on vehicle performance, track locations, manage fuel efficiency, and more. Volvo Link hardware is standard equipment on Volvo engine equipped Volvo trucks, and can be retrofit into most trucks. With affordable monthly service packages, Volvo Link brings the advantages of integrated vehicle communication to any fleet operating anywhere in the United States and Canada.

SIMPLE TRACKING FOR EVERY TRUCK IN YOUR FLEET.

Data on your trucks can be accessed through any PC, which means you can easily check a truck's location and monitor the performance of both truck and driver. The services supported by Volvo Link are designed to help save time and money through services like fuel tax reporting and Volvo Link's ability to find the lowest priced diesel along the route. And with critical information just a keystroke away, you can quickly zero in on vehicle performance issues that may be costing you money.

PUTTING THESE STRATEGIES TO WORK

Start saving money on every truck in your fleet.

VOLVO TRUCKS HAS A LONG HISTORY OF FUEL EFFICIENCY INNOVATION.

And since today's fuel prices account for a large portion of your fleet's total operating costs, we're constantly pioneering new strategies to help you reduce fuel consumption.

THESE PROVEN STRATEGIES FOR FUEL EFFICIENCY WILL HELP YOU GET MORE OUT OF EVERY DROP.

By saving fuel, you'll save money. And you'll do it truck after truck, mile after mile. Have questions or need more information? Contact your Volvo dealer today and learn more about maximizing your savings and profitability.

VOLVO

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Some vehicles shown with optional equipment.