

VOLVO



V O L V O

**How to optimize your Volvo truck
to be more energy efficient**

How to improve your truck efficiency

We know that every percentage you can save on energy is not just vital for your bottom line but also equally important for reducing your CO₂ emissions. With the shift towards alternative power sources and tightening emissions regulations, energy efficiency has become more critical than ever.

At Volvo Trucks, we're committed to delivering energy-efficient solutions for every type of truck — whether powered by electricity, gas, diesel or renewable fuels.

By helping you choose the best specifications for your operational needs, we aim to improve energy efficiency across your entire fleet. And because efficiency should never come at the expense of performance, our mission at Volvo Trucks remains the same: to provide advanced powertrains and a smoother, more productive driving experience — no matter the energy source.

This guide considers three key areas and explains how they impact energy efficiency, regardless of driveline, and what you can do to improve your truck:

TRUCK SPECIFICATION

With a focus on the truck's powertrain and rolling resistance.

AERODYNAMICS

How improved aerodynamics can make a difference.

DRIVER PERFORMANCE

In relation to cruising speed, cruise control and braking.



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TRUCK SPECIFICATION





The **powertrain**, **rolling resistance** and **aerodynamics** of a truck have the largest impact on energy efficiency, so how you specify your truck in relation to these areas is crucial. Here we take a closer look at the various factors that need to be considered, including the choice of engine, aerodynamic fittings and Volvo Trucks' innovative features, including I-Save, I-See and I-Torque, all designed to optimize energy efficiency.

The powertrain

Diesel

Volvo diesel engines are known for delivering a high torque level at low engine speeds. This allows the truck to climb hills in a high gear and save fuel. Even at higher speeds, there is a torque build up when you push the throttle. The engine is available in many different output levels to be tailored to your transport needs.

We continuously update our engines and refine components to increase efficiency, reduce internal losses and weight, and optimize the engine management and after treatment systems.



The powertrain

Gas-powered

The Volvo gas-powered Euro 6 engines offer the same performance as the diesel engines. And they do so with lower emissions and the potential to go carbon neutral when using renewable bio-LNG and HVO. Gas power can be perceived as a bit quieter than diesel engines.



The powertrain

Electric

Electric trucks produce no tailpipe emissions and have a very low total climate impact when electricity from renewable sources is used. They also consume significantly less energy than trucks with combustion engines, making them a more sustainable choice. The electric motor combined with I-Shift transmission provide a powerful and productive solution, whatever the assignment. Our electric motors also produce their maximum torque level from zero, meaning there's practically no time needed for torque to build up. The power is there instantly, and the operation is quiet.



I-Save

The Volvo FH with I-Save is the ideal solution for reducing fuel consumption in long-haul operations – and it offers excellent drivability. Central to I-Save is the D13 turbo compound (TC) engine, Volvo Trucks' most fuel-efficient long-haul engine to date. This engine stands out for featuring pistons with a patented wave piston bowl design that improves combustion and increases efficiency by directing heat and energy to the center of each cylinder. Excess energy in the exhaust gases is recovered to power the flywheel, via an additional turbine in the exhaust flow, known as the turbo-compound unit.

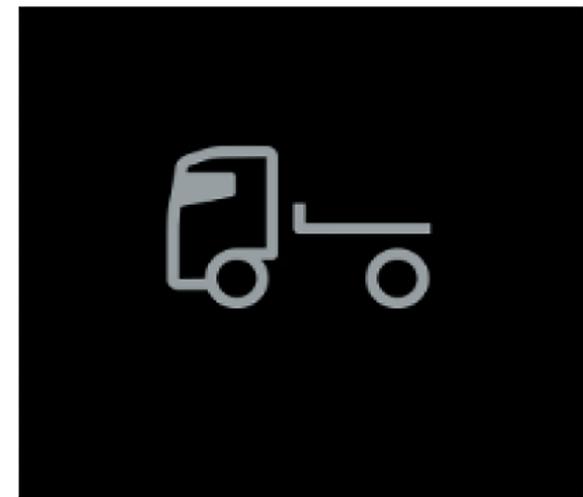
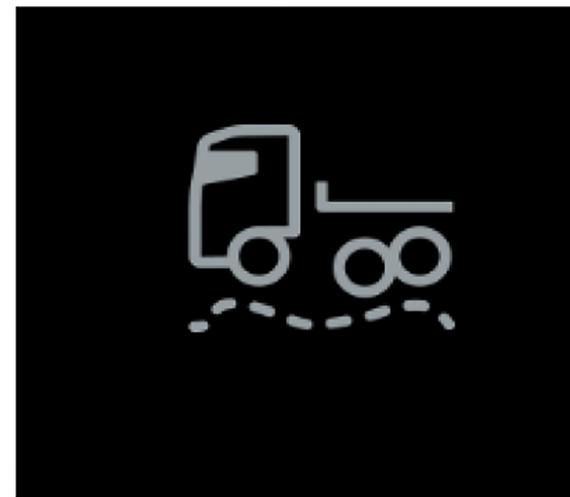
The Volvo FH with I-Save combines the D13 TC engine with Volvo's Fuel Package, which includes the map-based I-See, intelligent torque software I-Torque, and engine idle shutdown. Together, these innovations allow for driving at lower revs and higher gears for longer periods, ensuring a smoother, quieter ride with faster torque response.





I-Shift

I-Shift offers a range of automated transmissions that are designed to make driving easier, safer and more energy-efficient. Every gear change is perfectly timed and smooth to make the most of the energy. I-Shift transmissions are available for electric, gas-powered and diesel-powered trucks.



A range of software packages and drive modes let you tailor I-Shift to your needs:

ECONOMY

The most fuel-efficient mode, where fuel economy is prioritized. Best when driving under normal conditions.

PERFORMANCE

Drivability and power are prioritized, with maximum acceleration and utilization of peak power. Best when driving in, for example, hilly conditions.

OFF-ROAD

Provides maximum drivability in difficult conditions, such as on construction sites.

STANDARD

Provides a good balance between fuel efficiency and drivability.



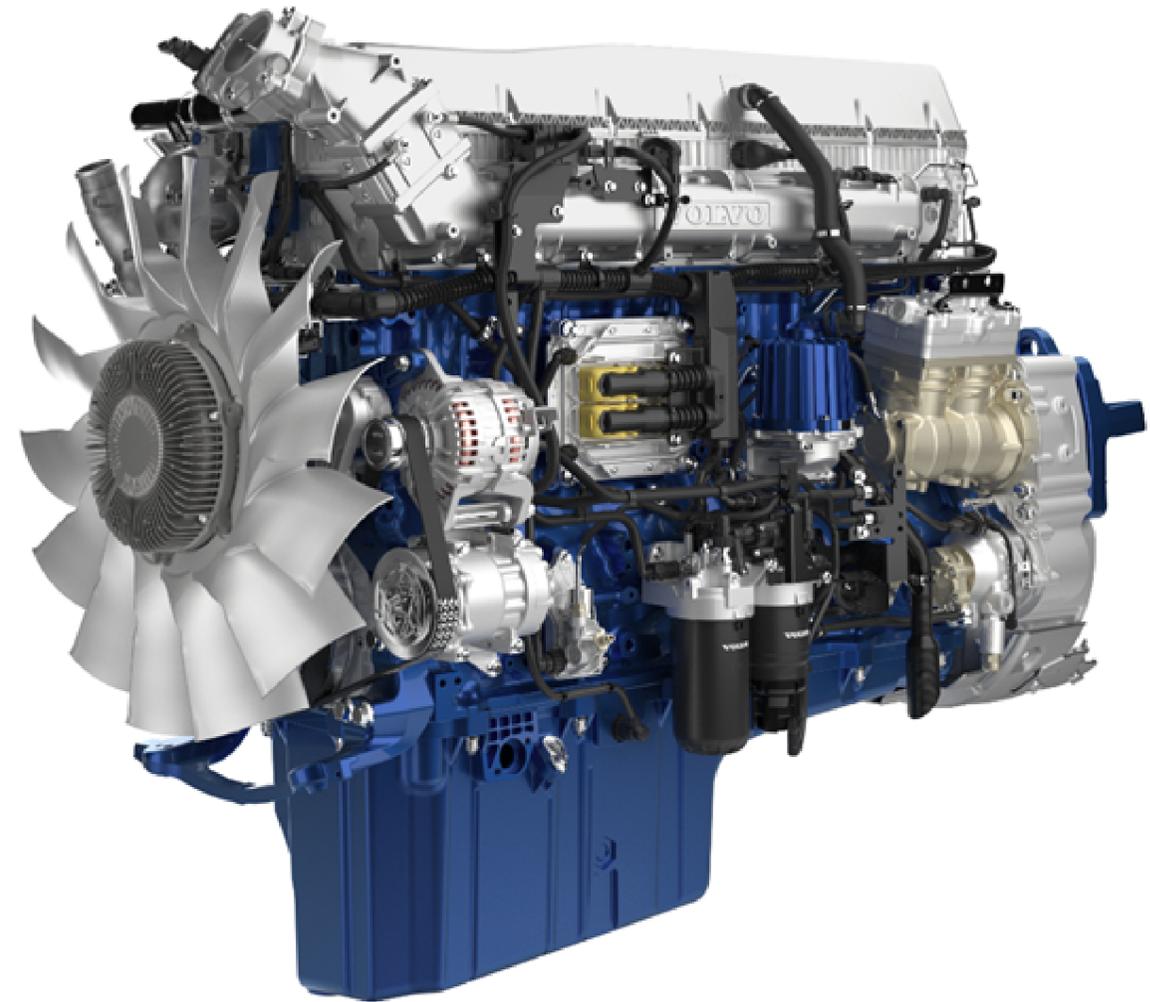
I-See

I-See predictive cruise control improves your truck's efficiency by optimizing speed, gear changes and cruising to the topography, curves, roundabouts and speed limits ahead. It means that the driver can use cruise control in more driving situations than ever before to reduce CO₂ footprint from day one.

When driving with the cruise control activated, I-See adapts to the topography to use the truck's kinetic energy efficiently. When approaching a curve or roundabout, I-See adjusts the speed so the truck can pass in the most energy-efficient way. It also adapts to upcoming speed limits automatically.

I-Torque

I-Torque, Volvo Trucks' intelligent torque software, is designed to improve fuel efficiency. By combining topography data with the truck's gross combination weight, it calculates the optimal engine torque automatically, reducing fuel consumption without compromising on performance. The I-Torque function also manages gear selection, engine torque and braking when I-Cruise is activated. Throughout the truck's entire journey, I-Torque is continuously making decisions to achieve an optimal average speed and minimize gear changes – all to save fuel.



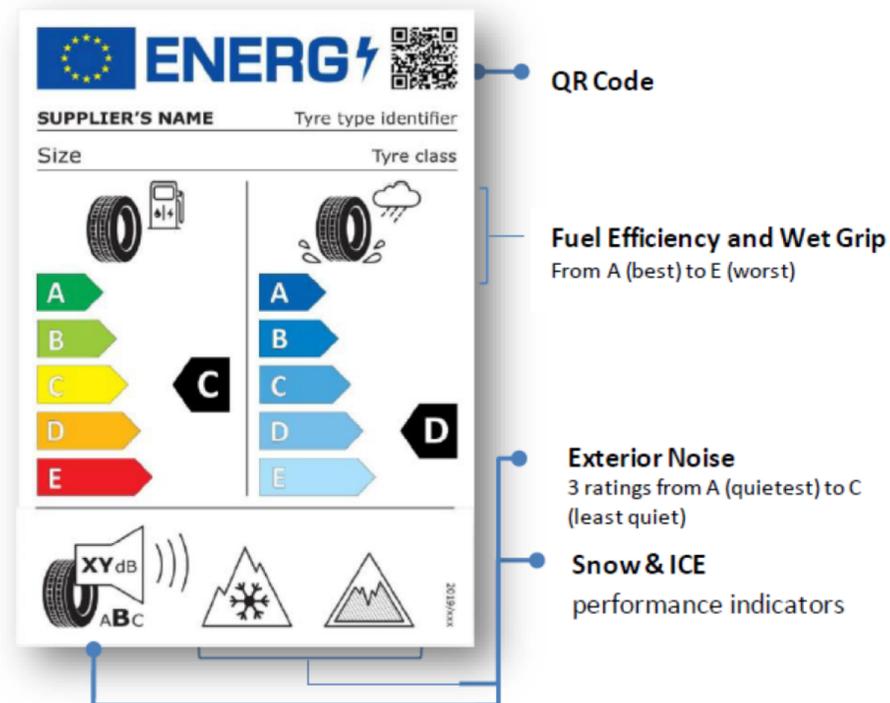
Rear axle selection

To find the optimum axle ratio for your operation, Volvo Trucks assesses real vehicle target speed, GCW and the typical topography encountered by your trucks. Combining the rear axle ratio with a suitable gearbox, engine and tire dimension is also crucial. The lowering of the engine's optimum rev range requires a faster rear axle ratio to correctly match the engine for best fuel consumption.

Specifying a rear axle ratio that is too slow could increase fuel consumption. For long haul, it is important to specify the correct drive axle type and ratio to optimize fuel consumption. When applicable, single reductions should be used. It is also necessary to match the capability of the drive axle with the maximum engine torque, the maximum axle load and the GCW. To avoid over-dimensioning, rear axle types based on the use of the truck should be selected. For example, hub reductions should only be chosen for off-road applications.

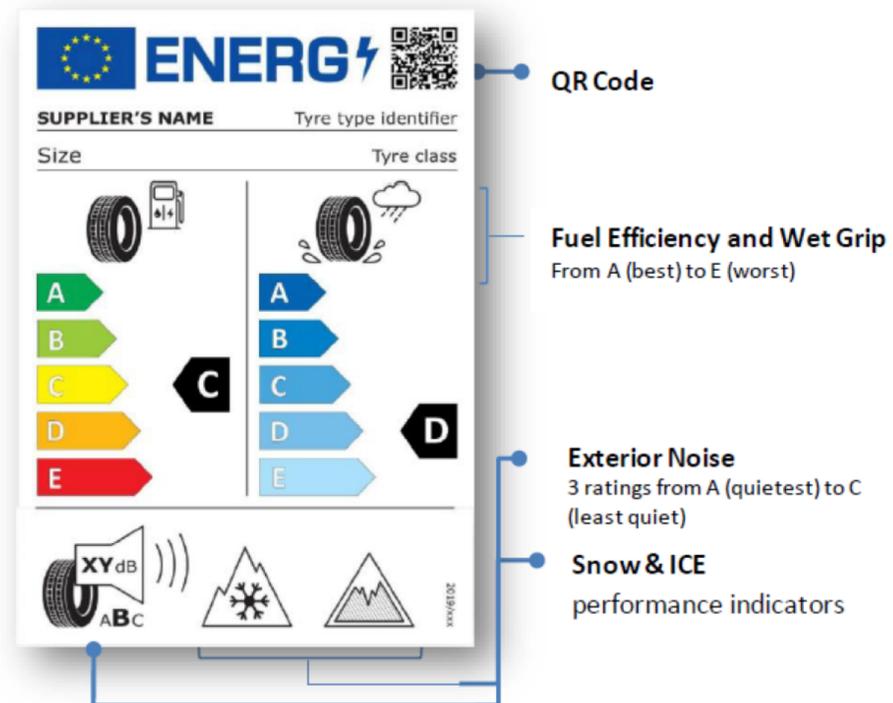


Inflation pressure



Under-inflated tires cause increased braking and loss of maneuverability increasing resistance and fuel consumption. Tire pressure should generally be around 8–9 bars for heavy loads. However, air pressure must be related to the actual axle load – high pressure is recommended for free rolling wheels as this strengthens the shoulder area on the front bogie and trailer axles. On the drive axle, the lowest pressure the load allows will achieve a long and wide footprint.

Inflation pressure



Tire Monitoring Service

Our Tire Monitoring Service lets drivers keep a close eye on their tires' health to increase safety, reduce fuel consumption and minimize wear and tear. The service gives a real-time overview of the fleet's tire status and warns about any issues, such as a drop in tire pressure or rise in temperature.

Labeling

Tire labeling helps guide transport operators on choosing a product that is more fuel efficient. Aim for fuel efficiency class A-B on the European Commission labeling scale

Wheel alignment

Misaligned front and rear axles reduce fuel efficiency, as it leads to steering instability and higher air resistance. It also has a negative effect on tire wear. Naturally, the same applies to trailers – if all trailer axles are misaligned, fuel consumption can significantly increase. Wheel alignment can be inspected and adjusted by a service technician during maintenance and is included in some Volvo Service Contracts.





Axle configuration

Compared to a 4x2, a 6x2 fully loaded truck will always have a tag or pusher axle with additional rolling resistance and weight that will lower fuel efficiency. If the 6x2 runs empty for half of the time, the positive effect of a liftable axle also results in a small decrease in fuel consumption. For some applications, such as tippers, a 6x4 is often necessary, although only for a portion of the transport cycle. The Tandem Axle Lift, a declutchable and liftable axle for 6x4 operations, can provide both the benefits of a 6x4 when needed, and a 4x2 when not. The fuel efficiency of a 6x2 or 6x4 is influenced by the transport cycle and speed.

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AERODYNAMICS

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Aerodynamics is key to reducing drag, which leads to improved efficiency. By optimizing air flow around the truck, less power is required to maintain speed, significantly reducing both fuel costs and emissions.

Air resistance can account for as much as a third of fuel losses on a typical long-haul diesel operation. For electric trucks, the energy losses can be as high as 50%. This makes aerodynamics one of the most important factors impacting a truck's fuel and energy efficiency, together with the powertrain and tires.

The Volvo FH Aero and Volvo FH16 Aero are designed for efficient driving at high speeds, no matter if you choose the electric, gas or diesel powertrain. On top of the aerodynamic extended front and the Camera Monitor System, the drag-free disc brakes, enhanced I-See and renowned I-Save can reduce the carbon footprint even further.

Roof spoilers and cab side fenders

The type of trailer used in your daily operations will have an impact on how your aerodynamic devices work. For example, when combined, simulations show that the cab roof spoiler and cab side fenders can reduce fuel consumption by as much as 4 percent in a typical long-haul operation with a standard box trailer configuration. In other operations with different types of trailers, the simulation results vary, but it is clear they still have a positive impact. This is because when the air flow is released from the back of the cab, it is sucked into the gap between the cab and the cargo, creating significant air resistance. To shelter a non-aerodynamic load from this air pattern, a roof spoiler and cab side fenders are necessary.

The roof spoiler alone is the most important aerodynamic device for reducing fuel consumption and must be



correctly adjusted to gain full potential. Recent findings at Volvo Trucks indicate that the correct setting can save between 2–6% in fuel. Ideally, the roof spoiler should be factory fitted from the start.

Upper and lower side skirt extensions

The upper and lower side skirt extensions on both tractor and rigid configurations are designed to minimize aerodynamic drag. By extending the skirts, they close the gap between the body and chassis frame, reducing the turbulence caused by air sneaking through. This not only enhances the vehicle's efficiency but also contributes to a smoother overall airflow, critical for long-haul operations where aerodynamics play a significant role in energy savings.



I-ParkCool

I-ParkCool produces cool air at standstill to generate a comfortable cab climate, without the need to run the engine. Integrated with the cab, it weighs less than alternative coolers on the market. It is quiet, offers excellent air distribution and no compromise on space, so the aerodynamics of the cab is not impacted. I-ParkCool can also cut down on idling time.



Chassis height

Truck driving height is important for both comfort and fuel consumption. With air suspension, speed dependent lowered chassis (4×2 and 6×2), the truck will automatically lower 10–30 mm at the rear depending on specification and when the speed reaches 60 km/h. The front will follow to prevent the chassis from pitching. While slowing down below 30 km/h, the truck will automatically return to the default driving level. Overall, lower driving height gives improved aerodynamics and lower fuel consumption.



Camera Monitor System

The Camera Monitor System improves the truck's aerodynamics and reduces energy consumption significantly at higher speeds. It includes three cameras and offers improved direct vision, enhanced night vision and reduced blind spot areas close to the truck. The Camera Monitor System further improves rearview visibility in rainy and misty conditions and minimizes disturbances caused by direct sunlight. All contributing to a better driver experience.



Drag-free disc brakes

Minimizing unnecessary friction plays a crucial role in improving efficiency across vehicle systems, including brakes. Volvo Trucks has introduced patented brake discs, pads, and hubs with updated materials and technology. This reduces drag or friction against the disc when not braking, and it helps the brake pads to move away from the disc faster when the brake is released.

As a result, diesel or gas consumption can be reduced and the range of electric trucks can be extended. Additionally, it reduces wear and tear on the braking system.



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DRIVER PERFORMANCE



DRIVER PERFORMANCE

Even small changes in driver behavior can make a big difference to fuel and energy efficiency. Volvo trucks are designed to combine high productivity, drivability and efficiency. However, how the truck is driven is an important factor in reaching full potential in these areas, especially when it comes to improving fuel and energy efficiency.

Driving in urban areas

This is where driver behavior makes the biggest difference. The amount of braking and how to reduce it are the main factors in influencing fuel and energy efficiency. The auxiliary brake stalk should be in position A when braking is needed, at speeds under 50 km/h. This allows you to control the engine brake with the brake pedal, easily adjust braking power to changes in traffic and adapt to different situations. If you need to brake, apply the brakes over a long distance rather than heavily at the end. If possible, use the momentum of the vehicle rather than stopping at junctions and roundabouts as it will save energy.

For electric trucks, the regenerative braking function automatically charges the batteries when the accelerator is released, and at the same time reduces the need for manually braking.





Standstill

Heating the engine up by idling is not fuel efficient, and turbo cooling off is not needed after normal driving for long-haul operations. If you need to supply air, charge batteries or use the Power Take Out, run the engine for just the amount of time you need in order to complete the task.

Increasing speed

Where you increase speed matters more than your accelerating strategy. Where possible – avoid doing it uphill. If you can delay acceleration until going downhill, it's the best way to save fuel while increasing speed. Generally, increasing speed slowly saves fuel.

Cruising on flat terrain

Cruising speed has a major influence on fuel and energy efficiency. High cruising speed also negates the benefits of I-Roll. The ideal cruising speed for optimal energy efficiency is up to 85 km/h. Try to minimize braking by using I-Roll or coasting. At speeds below 50 km/h, use brake blending to achieve a controlled approach to the junction.



Driving on hills

Always use Economy drive mode for the best fuel and energy efficiency. The largest saving potential is found in managing speed effectively on crests and valleys. Set the cruising speed and overspeed settings to allow as much speed fluctuation as possible within the legal speed limits. Volvo Engine Brake (VEB) or retarder are good tools for maintaining steady speeds during downhill driving. When used in automatic mode with cruise control overspeed, braking adjustments become smoother and more precise. For added support, the Downhill Cruise function helps maintain control during steep descents.

In addition, I-See predictive cruise control further enhances efficiency by adapting your truck's performance to the topography, curves, roundabouts, and speed limits ahead. Using GPS and map data, I-See optimizes gear changes, speed, and cruising, allowing for lower CO₂ emissions.



External factors

These may be external and sometimes unavoidable, but it is also possible to make decisions to alleviate fuel consumption when it comes to GCW, transport cycles, routes, traffic intensity, weather conditions and fuel quality.



At Volvo Trucks, we continuously strive to find new ways to provide energy efficient transport solutions, not only to improve your bottom line, but also to reduce the environmental impact. However, fuel and energy advice are dependent on your operation's specific needs and requirements. Therefore, it is essential that you contact your local dealer when it comes to truck specification and driver training to improve fuel and energy efficiency. To find your nearest dealer, you can use our online dealer locator.



<https://www.volvotrucks.com/en-en/dealer-locator.html>