



# PRIORITIES FOR **INCREASING** FUEL ECONOMY

SMALL THINGS CAN  
MAKE A BIG DIFFERENCE.

**SHELL LUBRICANTS**  
TOGETHER ANYTHING IS POSSIBLE



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# FOREWORD

## A message from John Walters, Shell Lubricants Global Sector Manager for Fleet

When energy use is reviewed at a national or international level we realize that about **35%** of the western world's total energy and carbon dioxide (CO<sub>2</sub>) footprint is linked to transport and a large fraction of that with freight movement.

Collectively, cars and trucks account for nearly one-fifth of all U.S. emissions, emitting around 24 pounds of CO<sub>2</sub> and other global-warming gases for every gallon of gas<sup>1</sup>.

So, if we are to **reduce energy usage** and abate CO<sub>2</sub> emissions and deliver cost savings, it is essential that a lot of attention is paid to commercial transport.

**Priorities for Increasing Fuel Economy** explores these challenges and provides the essential information you need to help you achieve competitive advantage across your commercial fleet operations.

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1. Union of Concerned Scientists [www.ucsusa.org/clean-vehicles/caremissions-and-global-warming#.WgV5EVi0M2x](http://www.ucsusa.org/clean-vehicles/caremissions-and-global-warming#.WgV5EVi0M2x)



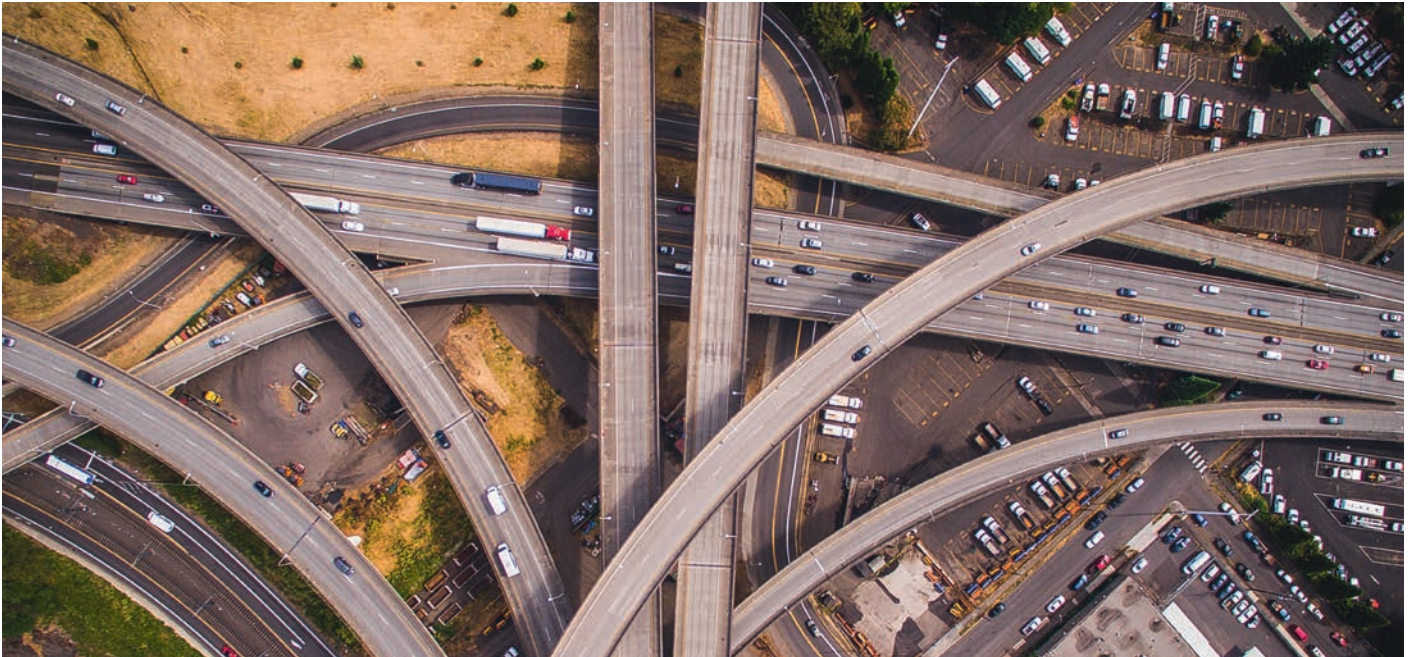


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# 1. INDUSTRY ISSUES



Commercial transport is critical for the global economy, keeping goods and trade flowing. In the U.S. alone, trucks haul 70% of all freight. But it comes at a cost. It's estimated that the sector accounts for **over 25% of all fuel consumed globally**. And in tandem with fuel use, managing CO<sub>2</sub> emissions is a global industry and societal concern. To avoid the worst effects of climate change the world must halve carbon dioxide emissions by 2050.

Since 2000, emissions attributable to road freight vehicles have risen by almost **3% per year**, with well over half of this increase coming from heavy-duty trucks.

For fleet owners and operators, fuel is the second highest cost; on average, as much as **38% of total fleet operating costs**. So, taking steps to reducing fuel consumption of trucks by improving fuel economy is not only good for the bottom line, but also a contributor to tackling emissions. Shell estimates that an improvement in fuel economy of just 1% for Class 8 trucks would save about **one-million gallons of fuel per day\*** in the U.S. alone.

Of course, technological advancements will play an important role in improving fuel economy. However, with fleets typically spanning a 14-year period, new and desirable technological features that can have an impact are seldom introduced rapidly (unless an enforced scrappage and/or incentive schemes are involved). For sure we can be

excited about the prospect of a battery-powered heavy-duty vehicle that can travel long distances on a single charge, but there needs to be a balance between what's possible now and what can be achieved in the context of the lifetime of the average fleet.

In a sense, it puts the onus back onto the fleet owner/operator to find intelligent approaches to improve efficiency, while continuing to address new fuel economy regulations and wider societal concerns over issues such as air quality and pollution.

Shell is committed to helping fleets meet these challenges. We are regularly working with businesses of all sizes to help them improve fuel economy, vehicle reliability and achieve lower maintenance.

In a later section, you can discover how **Shell StarShip** is providing solutions to address energy loss in Class 8 trucks. Emerging aerodynamic improvements for minimum wind resistance with maximum efficiency, side skirts designed to reduce drag for up to **14% savings in fuel** and auto-inflate tires which provide consistent pressure to create maximum efficiency are some of the new features being explored, along with a tried and trusted solution: lubrication.

Indeed, as the next section explains, effective lubrication will remain as important today, as it will be in the future.

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\*Based on annual diesel consumption reported by the EIA.gov

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## 2. LUBRICANTS MATTER

A truck's main purpose is to carry goods, often heavy goods. All of the major mechanical systems within the vehicle are lubricated – the wheel bearings, the axle differential, the gearbox and the engine.

The primary role of the lubricants is to keep adjacent components apart so as to prevent wear and allow the truck to keep on trucking. And when the combined impact of engine, gearbox and axle effects are considered together, they can have an impact on fuel bills.

However, many commercial fleets underestimate the influence of lubrication on these impacts. Shell polled decision makers in eight countries<sup>2</sup>, discovering that only a third (31%) understand how lubricants can **help improve fuel efficiency**, while only one in two owners/operators realize that different brands of lubricants deliver different levels of performance. So, not only do lubricants matter, **but choosing the right lubricants matters most.**

**A FUEL SAVING OF 1%  
BY U.S. HIGHWAY TRUCKS  
WOULD SAVE 1 MILLION  
DIESEL GALLONS PER DAY.**

**THAT'S THE EQUIVALENT  
TO A DAILY FUEL SAVING  
OF \$2,700,000**

## THE POWER OF PARTNERSHIPS

Helping customers to choose the right engine lubricant delivers unquestionable business value. In the last five years, we have worked with fleets to help them save \$23 million. Fuel savings are an integral part of the savings they are making. But other benefits are important, like reduced unplanned downtime and lower maintenance costs.

Seizing the cost saving opportunity very much depends on selecting the right product and ensuring you have an effective lubrication management strategy in place. Even the best product cannot perform effectively if it is not properly applied and managed. Through specialist technical services and expertise, Shell Lubricants enables fleets to realize the full value of a high-performing lubricants and grease portfolio.

Shell is working with fleets of all sizes, across every continent. We have selected two Case study from many across the portfolio – Van der Lee Transport from Europe, and Qingdao Public Transportation Group from Asia – to shed light on how effective lubrication strategies achieve improved fuel economy and other benefits.

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2. Brazil, Canada, China, Germany, India, Russia, UK and U.S. from November–December 2015



# DUTCH HAULIER SAVES \$132,273 IN FUEL COSTS

### The Challenge

Van der Lee Transport specializes in transporting dangerous goods, chemicals and other liquids in bulk, using tank-trucks. The company has a fleet of 230 trucks in the Netherlands, driving on average 100,000 Km per year. Around 70% of the fleet are Volvo trucks. Considering fuel consumption and fuel costs to be one of their biggest costs, improving the fuel efficiency of its trucks is always an area of focus.

### The Solution

Shell Lubricants technical experts suggested that the company implemented a field trial to compare the fuel economy benefits of Shell Rimula R4 L 15W-40 to Shell Rimula R5 LE 10W-30. Six Volvo trucks running similar duties were selected for the trial, which took place over a period of six months. Three trucks started with Shell Rimula R4 L 15W-40, the other three with Shell Rimula R5 LE 10W-30. After three months, this was switched to prevent any possible truck-specific deficiencies. Throughout the trial, fuel consumption was closely monitored by Volvo fleet management on-board computers.

### The Results

- Test results showed an average fuel saving benefit of 2.1% for Shell Rimula R5 LE 10W-30 compared to Shell Rimula R4 L 15W-40.
- Based on this significant benefit, Van der Lee decided to switch over to Shell Rimula R5 LE 10W-30 for all Volvo trucks of their fleet.
- Total reported cost savings calculated, based on 160 trucks driving on average 100,000 Km per year, amounted to \$132,273<sup>3</sup> per year.

## DELIVERING BUSINESS VALUE THROUGH LUBRICATION SERVICES

### Shell LubeMatch

Use this free online service to find the right lubricants for your vehicles and equipment in seconds.

### Shell LubeAnalyst

This early warning system lets you identify potential oil or equipment failures before they become critical.

### Shell LubeCoach

We coach your team to deliver better performance through this in-depth lubrication training program.

### Shell LubeAdvisor

This sophisticated fiber optic tool lets you inspect the inside of your engine, enabling an inspection of all the key components, without dismantling.

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3. Savings indicated are specific to the calculation date and mentioned site. These calculations may vary from site to site, depending on application, operating conditions, current products used, condition of equipment and maintenance practices

# QINGDAO PUBLIC TRANSPORTATION GROUP SAVES \$264,000 PER YEAR



### The Challenge

Qingdao Public Transportation Group is a large-scale, state-owned bus company, responsible for the entire public transportation system of Qingdao City, a huge second-tier city in China. The company has more than **5,500 buses**, nearly **2,200** of which are equipped with natural gas engines to help **reduce emissions**.

The company was using another brand of oil for natural gas engines, which delivered an oil drain interval (ODI) of 14,000 Km. As the buses frequently drive more than 1,000 Km per week, this meant each vehicle was taken out of circulation once every three months for an oil change. Qingdao wanted a solution to avoid this frequent downtime and reduce the cost of lubrication.

### The Solution

Shell Lubricants recommended a **cost-efficient engine oil** for natural gas vehicles, Shell Rimula R3 NG 10W-40, and presented examples of other public transportation companies, which had realized the **benefits of switching**.

### The Results

Qingdao ran a field trial to test the impact on ODIs. Two vehicles were selected to trial the new product, and oil samples were taken at intervals of 16,000, 24,000, 30,000 and 33,000 Km using the Shell LubeAnalyst service. Satisfied with the results, Qingdao implemented the product across its whole fleet of natural gas buses.

- ODI more than doubled, from **14,000 to 30,000 Km**.
- Reported savings totaled **\$264,000 per year**, thanks to extended ODIs and reduced vehicle downtime.

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## 3. INVESTMENT IN INNOVATION



### Technology Advances

Innovation, product application and technical collaboration are at the heart of Shell Lubricants.

We invest significant resources in developing lubricants and greases to **deliver value to our customers**. We are continually developing lubricants technology, which will continue to help give transport companies a **competitive edge**. These include lubricants to reduce friction, flush away contaminants, absorb excess heat and form a protective barrier between surfaces.

The importance of greases can be overlooked as they generally represent only **3%** of transport equipment's total lubricant needs. However, they make an **important contribution to overall performance**. We are constantly exploring the ways that base oils and additives are used in grease formulation to deliver good water resistance, excellent mechanical stability and corrosion resistance, and remain fully viscous at high temperatures. Features that contribute towards keeping trucks **on the road for longer** between services, and thereby helping drive profit for their business.

### Research & Development

Shell has research centers dedicated to lubricants in China, Germany, Japan (in a joint venture with Showa Shell), and the USA.

We have a patent portfolio with **150+ patent series for lubricants**, base oils and greases; more than **200 scientists** and **lubricants engineers** dedicated to lubricants research and development.

One of the unique ways we innovate in lubricant technology is by working closely with top motor racing teams, such as **Scuderia Ferrari**, **BMW Motorsport** and **Penske Racing**. These technical partnerships enable us to expand our knowledge of lubrication science and transfer cutting-edge technology from the racetrack to our commercial products.



# REACHING FOR THE STARS

Pushing the boundaries of what's possible in fuel efficiency

With new fuel economy regulations on the horizon and the need for continuing advances in fuel economy, Shell Lubricants recognizes that a holistic approach to making fuel economy gain is important.

Shell is working with the **Airflow Truck Company** to collaborate on a futuristic, hyper-aerodynamic, super fuel-efficient Class 8 concept truck.

We've nicknamed it **StarShip** and, by bringing together the best of recent technologies we aim to find out just how energy-efficient goods transport by road can be and elevate the conversation about the energy transition.

We are looking at low cost and high cost components on the StarShip, which could be implemented by owners and operators to improve fuel economy.

With commercial transport mindful that low cost solutions cannot only deliver fuel savings, but also increase component life, the driveline will be lubricated using Shell's industry leading low viscosity **Rotella/Rimula** engine lubricants and the complementary **Shell Spirax** and **Shell Gadus** transmission system lubricant and greases. When combined with all of the structural and driveline hardware changes we expect to be setting a high bar for efficient goods transport.

We're shooting for the stars, but at the same time being wholly pragmatic about what can be achieved. After all, the primary role of the lubricants in each of the driveline components – the engine, transmission and axle – is to enable their effective operation with an acceptably long lifetime. That's been our focus from the outset. And it's the lens through which we will continue to leverage the full power of innovation: the capacity for doing things differently and better than before.

With StarShip, we are pushing the boundaries of what is possible in fuel efficiency. As part of the project, we are aiming to **break the world record** for freight-ton efficiency for heavy duty diesel trucks. Follow the progress and join the conversation at **#ShellStarShip**.

## DID YOU KNOW?

Global energy demand is expected to increase

**25%** by 2035



Trucks contribute

**35%**

of global transport-related CO<sub>2</sub> emissions



## OUR MISSION

To jointly design, test and build an ultra energy-efficient concept truck, using only advanced technologies available today.

**Shell**  
**ROTELLA**  
HEAVY DUTY DIESEL ENGINE OIL

## HOW WILL STARSHIP MAXIMIZE FREIGHT TON EFFICIENCY?

Operational Efficiencies



Advanced Lubricants

Aerodynamic Improvements



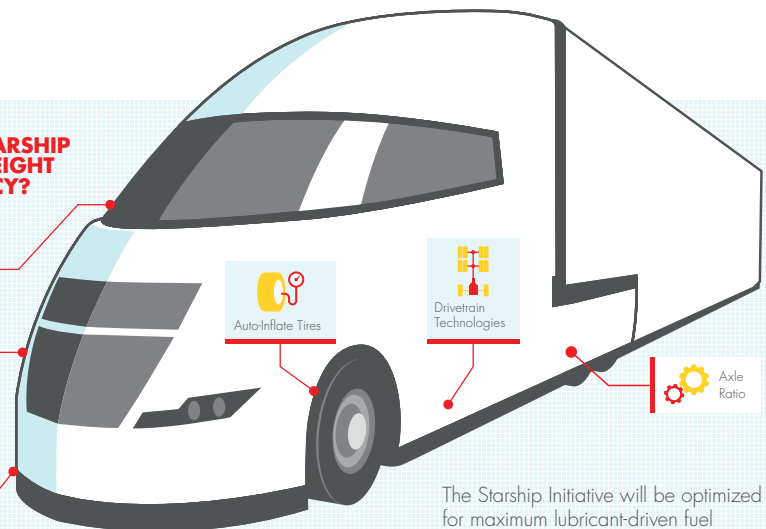
Auto-Inflate Tires



Drivetrain Technologies



Axle Ratio



The Starship Initiative will be optimized for maximum lubricant-driven fuel economy using top-tier, low viscosity synthetic Shell Lubricants products.

**LAUNCHING 2018.** WATCH FOR MORE INFORMATION.

To find out more, visit:  
[www.rotella.com/starship](http://www.rotella.com/starship)

# RUN ON LESS

## Advancements in fuel efficiency in long-haul trucking

Shell has also partnered with the North American Council for Freight Efficiency (NACFE) and **Carbon War Room** on **Run on Less**, a first-of-its-kind cross-country roadshow to showcase advancements in fuel efficiency in long-haul trucking.

Taking place on real routes hauling real freights across the States, seven Class 8 trucks used current, commercially available technologies to demonstrate that it's possible to reduce energy and emissions. The drivers also had to additionally cope with the impact of Hurricanes Harvey and Irma, which caused route changes and made driving often difficult due to wind speeds and directions. A true real-life test.

Aiming to improve upon the national average of 6.4 miles per gallon (MPG) of diesel, the trucks were fitted with technology to pore over every data point, such as vehicle speed, gallons burned, elevation of the route, miles traveled and more.

Crossing the United States in **17 days** and covering over **50,000 miles**, the truckers averaged **10.1 MPG**. That's significantly higher than expectations of what was considered possible.

Today, there are **1.7 million** Class 8 type trucks in use in the States and Canada alone. If these vehicles could meet the levels of efficiency of Run on Less, it's estimated that the commercial transport sector in North America would save **9.8 billion gallons** of fuel, the equivalent of **\$24.3 billion** per annum. And these bottom-line costs would cut carbon emission by **98 million tonnes** each year. It's been a great run. Think about how much further you could go.



# 4. SHELL LUBRICANTS APPLICATIONS

The term 'Shell Lubricants' collectively refers to Shell Group companies engaged in the lubricants business. Shell sells a wide variety of lubricants to meet customer needs across a range of applications. These include consumer motoring, heavy-duty transport, mining, power generation and general engineering. Shell's portfolio of lubricants includes **Pennzoil**, **Quaker State**, **Shell Helix**, **Shell Rotella**, **Shell Tellus** and **Shell Rimula**. We are active across the full lubricant supply chain. We manufacture base oils in seven plants, blend them with additives to make lubricants in over 40 plants, and distribute, market and sell lubricants in over 100 countries.



To find out more, visit:  
[www.runonless.com](http://www.runonless.com)