

A GUIDE FOR FLEETS

RUN MORE EFFICIENTLY AND SUSTAINABLY



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Running Meaner and Cleaner

As someone involved in fleet operations, be it as a fleet manager or sustainability manager, you have a lot of moving pieces to keep track of and optimizations to achieve.

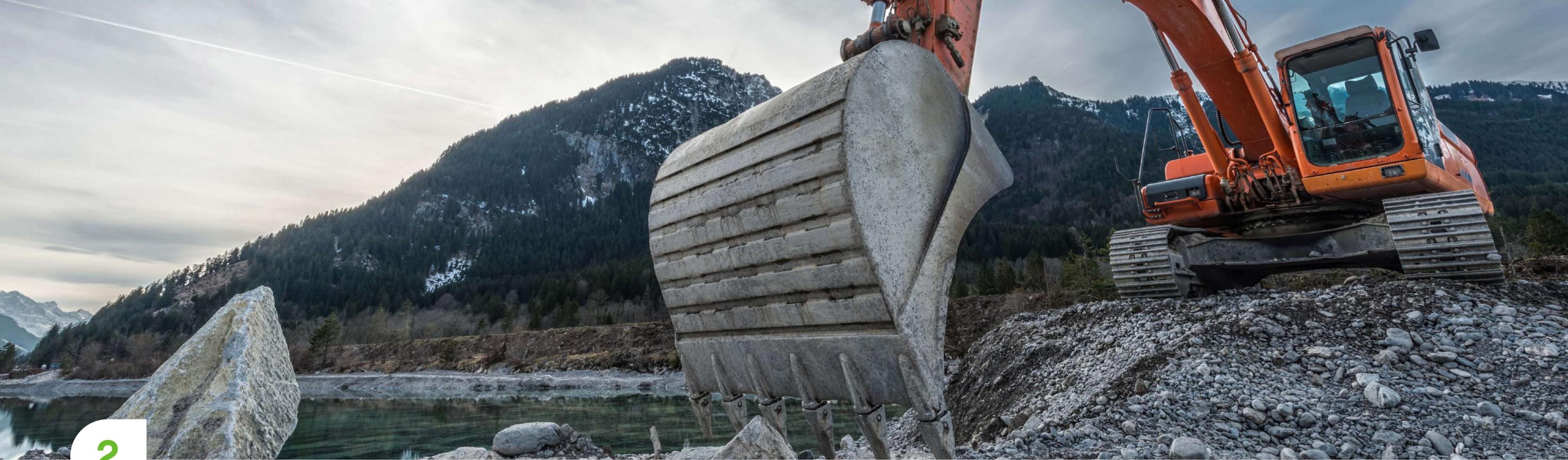
Perhaps the first thing that comes to mind when you think about fleet optimization strategies and technologies is performance—how can you keep your fleet running meaner?

But it's also crucial to consider steps to help your fleet run cleaner. Despite the growing impact and urgency of climate change, many fleet operators continue to rely on fossil fuels to power their vehicles; indeed, transportation continues to be a major source of greenhouse gas (GHG) emissions. Considering today's ever-increasing customer awareness and demand, and the ambitious climate targets set by corporations, governments and NGOs, sustainable solutions are needed now.

And of course, financial implications are always high on the list of priorities.

Sometimes these objectives may seem mutually exclusive—what's good for the environment isn't always good for your bottom line, and vice versa. Fortunately, they don't have to be at odds with each other. Case in point? Renewable Diesel fuel, which we'll address in more detail later on.

Let's explore how to optimize without sacrifice.



2

Optimizing Isn't Optional

A growing number of investors, employees and customers are demanding corporations act on climate, environmental and social justice issues. In response, major brands like Cisco, Campbell's and Nike are setting science-based targets mapped to the [Sustainable Development Goals](#) created by the United Nations. One of the most common goals is to achieve carbon-neutral growth, a journey that often starts by transforming their supply chain, and the fleets that power it, to low-emission standards.

At the same time, cities, states and the federal government are passing new or strengthening existing regulations designed to limit emissions and create a low-carbon transport system. The cost and pace of this change is unclear, but what's certain is that fleet operators require more alternative solutions to replace the fuels of yesterday like fossil diesel. **In the United States, California is leading the charge—with big markets like Washington, Oregon and New York moving quickly to catch up.**

Current State

Only [43 percent of diesel-powered commercial vehicles](#) in the U.S. —from heavy-duty pickup trucks to 18-wheelers—are powered by the newest generation of diesel technologies. Meanwhile, early 2020 marked a regulatory turning point. In California the majority of trucks running on outdated technology were [supposed to either be replaced](#), or have their diesel engines upgraded to model years 2010 and newer to meet today's federal nitrogen oxide (NOx) emissions standard of 0.2 g/bhp-hr.

This presents a challenge for diesel operators who conduct business in California, as the state recently adopted a rule requiring heavy-duty diesel trucks to reach 0.02 g/bhp-h by 2027, continuing on its path toward the goal of carbon neutrality concurrent with NOx reductions. Most notably, truck registration is now [contingent on emissions compliance](#). The California Air Resource Board (CARB) has coordinated with the state's Department of Motor Vehicles on regulations to deny the registration of vehicles if a heavy-duty truck is not powered by engines newer than model year 2010.

Imminent State

California aspires to carbon neutrality by 2045. Considering transportation contributes 41 percent of the state's GHG emissions—nearly twice that of the next sector—the pressure is especially high.

To make progress toward that ambitious goal, diesel fleet operators face the following requirements:

Diesel Deadlines in California

| 2020 | 2021 | 2022 | 2023 | 2025 | 2030 |
|---|---|--|--|---|--|
| <p>Heavy vehicles* with 1999 or older engines must be replaced or repowered with engines from 2010 model year or newer</p> <p>Department of Motor Vehicles (DMV) registrations will be married with California Air Resources Board (CARB) compliance status</p> <p>California will automatically reject registration of noncompliant diesel trucks</p> | <p>Heavy vehicles with 2004 or older engines must be replaced or repowered</p> | <p>Heavy vehicles with 2006 or older engines must be replaced or repowered</p> <p>On-board diagnostics (OBD) systems will be required to collect and store emissions data from NOx on medium-and heavy duty vehicles beginning with model year 2022 vehicles</p> <p>State regulators will be able to retrieve the data from vehicles by plugging a scan tool or dta reader into the vehicles</p> | <p>Heavy vehicles with 2009 or older engines must be relaced or repowered</p> | <p>New vehicles must emit about half the GHG and achieve nearly twice the fuel efficiency of 2010 vehicles</p> | <p>The Low Carbon Fuel Standard requires diesel that reduces GHG emissions by 20 percent-up from 10 percent in 2020</p> |

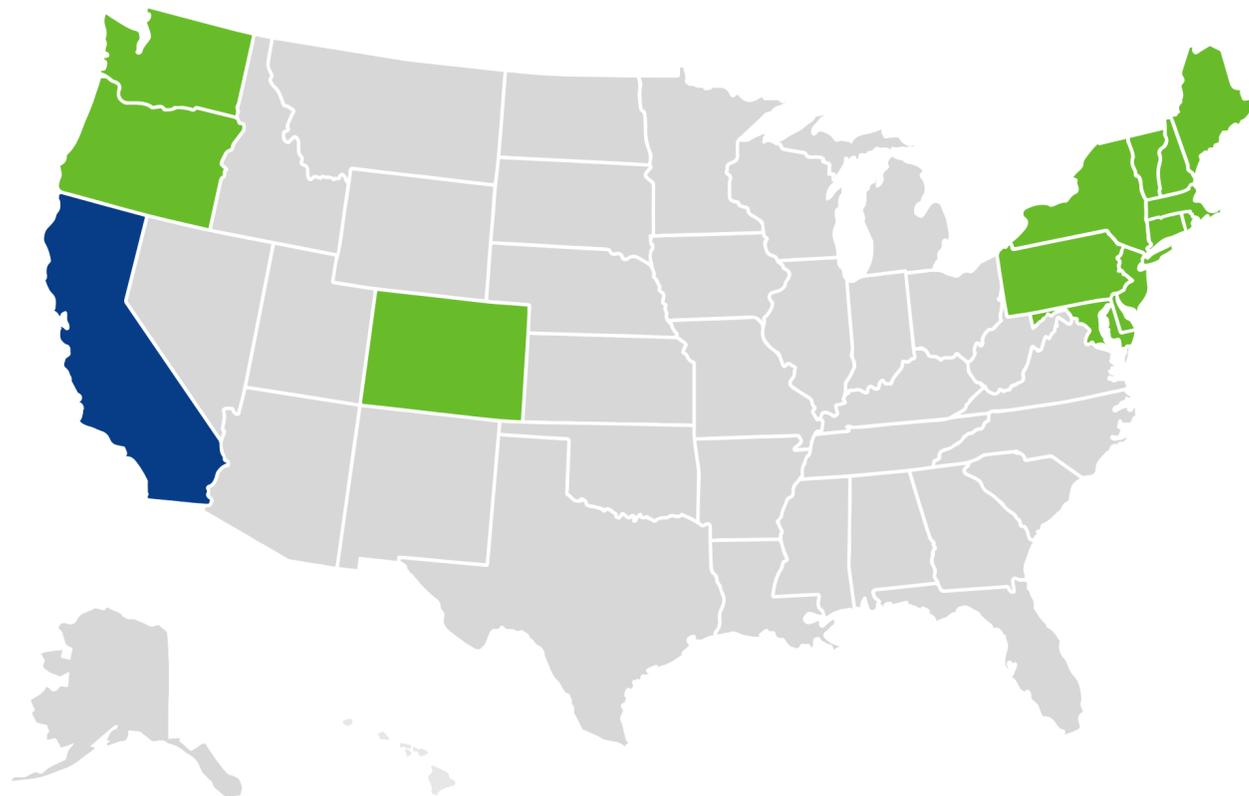


Beyond California

While California is on the leading edge of creating a carbon-neutral transport system, it's not the only state to implement such standards. Notably, Oregon's Clean Fuels Program (CFP), recently expanded to [double the carbon reduction requirement](#) for all transportation fuels—targeting a GHG drop of 20% by 2030 and 25% by 2035, relative to 2015 levels. In fact, more than a quarter of the country is following California's lead.

California Influences Clean Air Standards Across the United States

Some or all of California's emissions and low-carbon fuel regulations have been adopted in 13 other states, plus the District of Columbia.



Source: Bloomberg Environmental

50% of Fortune 500 companies have now set clean energy or climate targets.



Beyond Regulations

The serious threat from climate change is becoming increasingly clear, with a growing number of communities and businesses feeling the impacts first-hand. According to the most recent [U.S. National Climate Assessment in 2018](#), climate change is “presenting growing challenges to human health and safety, quality of life and the rate of economic growth.”

As a result, more and more people are taking to the streets and making their voices heard to demand action on climate change. In response, the business community is increasingly taking up the mantle, with companies making the link between the health of the climate and the health of their business. At this point, [50% of Fortune 500 companies](#) have now set clean energy or climate targets.

3

Roadblocks for Road Professionals

It's clear: As fleet operators move to optimize, they must do so with an eye on sustainability. Such updates not only help future-proof fleets against evolving regulatory requirements, but can also boost competitive advantage, serving as a tool to attract and retain business. Still, the pace of transitioning to low-emission fleets, both in the private and public sector, has been slow. There are hurdles to overcome, including:



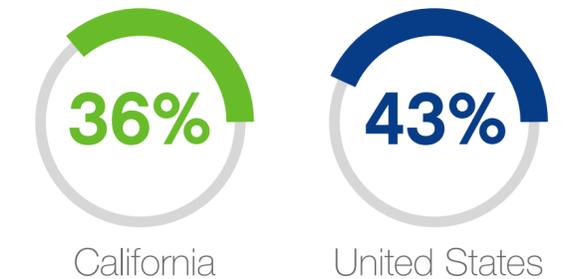
Aging Trucks

Heavy-duty trucks are exceptionally durable, with an [estimated service life of 23 years](#)—about twice that of cars. It comes as little surprise, then, that operators continue to run older vehicles. In fact, despite its progressive regulations, California actually lags behind most of the country in terms of the prevalence of new

generation, clean diesel trucks, [ranking 40th in the U.S.](#) This lag has been attributed to fleet owners waiting to comply with the CARB “Truck and Bus Fleet Rule,” which requires fleets to convert trucks to the federal 2010 model year NOx emissions standards by 2023.

Class 3-8 Vehicles in Operation, Model Year 2010 and Newer

Source: IHS Markit



This trend is only likely to increase as the COVID-19 pandemic caused Class 8 orders to reach a [25-year low this April](#), as truck dealers reported a 70 percent decline in new truck sales. While numbers improved subsequently, the following months still saw year-over-year declines of [more than 40 percent](#).

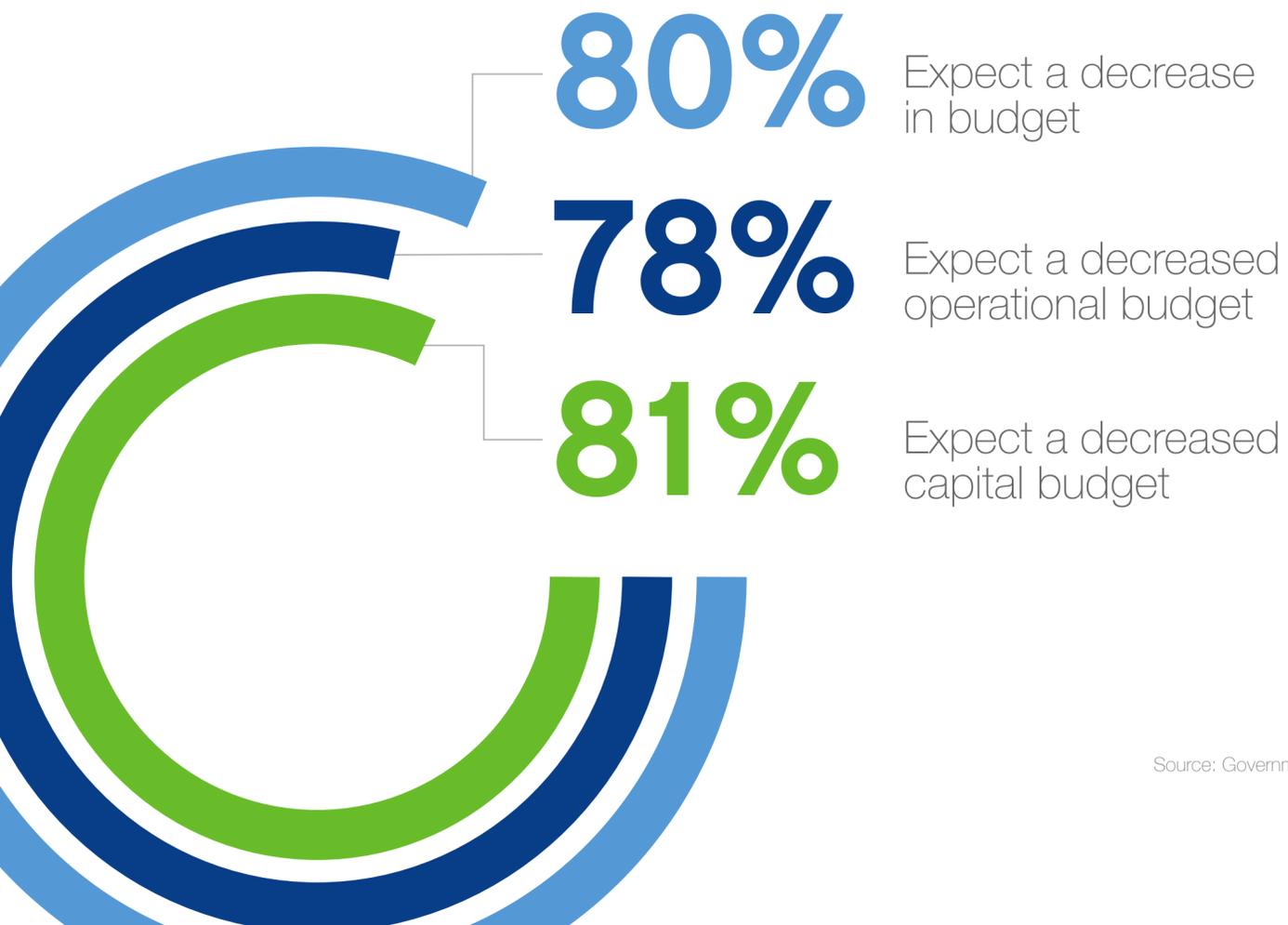
Meanwhile, industry associations representing America’s truckers continue to point out that the 12% federal excise tax levied on new heavy-duty truck sales—which effectively raises the purchase price of a new truck by [\\$22,000 on average](#)—serves as a disincentive for prospective buyers seeking to adopt new technologies.

And really, when you think about it, scrapping a vehicle a decade or so before it’s end of life isn’t sustainable at all. Therein lies the challenge: Turning existing, high-emission fleets into the low-emission fleets operators want and need.

Shrinking Budgets

The notion of strictly scrutinized budgets, with every penny spent given close attention, is nothing new. And while investments in sustainability haven't fallen by the wayside, money is even tighter these days across many industries—from state and local governments to higher education and healthcare—thanks to COVID-19. Fleet professionals aren't immune from feeling the pinch, and expect it to continue into next year.

Anticipated impact of coronavirus on FY 2021 Fleet budgets



Source: Government Fleet

Resourcing

As baby boomers retire from the workforce, hiring qualified technicians to replace them becomes difficult; it takes years to develop comparable skills and knowledge. Moreover, new vehicle technologies only heighten the need for training. Whereas formerly one day of training every three months may have been sufficient, now technicians require triple or even quadruple that amount to stay current. Because of this, operators are looking for advancements that don't require OEM recertification, or retraining for new maintenance techniques.



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Near-term Solutions, Far-reaching Benefits

With means stretched, how can fleet operators move forward manageably? By killing two (or more) birds with one stone. Optimization initiatives that reduce a fleet's carbon footprint can simultaneously achieve other operational objectives, like improved efficiency, profitability, driver safety and productivity. Additionally, these efforts don't have to require costly infrastructure overhauls. Here are some steps to consider:



Renewable Diesel Fuel

For many industries, diesel remains the engine/fuel technology of choice due to its driving range, reliability, durability and availability of fueling, servicing and parts networks. Of course, the fossil diesel that continues to power many of these industries comes with its downsides.

In California, medium- and heavy-duty trucks represent about 7 percent of all vehicles on the road, but are responsible for **35 percent of the state's nitrogen oxide emissions.**

Near-term Solutions, Far-reaching Benefits

Renewable Diesel offers the benefits of Fossil diesel without leaving the same environmental footprint. It is:

Made From waste, residue and other renewable raw materials, like used cooking oil, instead of crude oil pumped out of the ground

Similar in chemical composition to Fossil diesel but emits up to 80% fewer GHG emissions on a lifecycle basis

A high-cetane Fuel with a low cloud point, conducive to cold start and greater pickup

A drop-in replacement, requiring no new infrastructure

Comparable in cost to other diesel products in markets with low-carbon fuel standards (the fuel's final price is set by Neste's authorized distributors)

Compliant, meeting all ASTM D975 and state and federal diesel specifications, including those set by CARB; it also presents no risk to engine warranties

Renewable diesel can help to future-proof fleets as more governments and businesses act on climate change. Indeed, it has already proven to be one of the biggest contributors to the success of California's Low Carbon Fuel Standard (LCFS) program, with other states taking note of the important role Renewable Diesel will play in their own programs.

Neste MY Renewable Diesel

Fossil diesel



Non-diesel alternatives continue to evolve but still have their challenges. Here's how Renewable Diesel compares with electricity and compressed natural gas:

| | Compressed Natural Gas (CNG) | Electricity | Renewable Diesel |
|--|---|--|---|
| What is it? | Natural gas that is compressed for storage and transport. Is used to fuel CNG spark-ignited engines. | Energy stored in batteries. Is used to power electric motors to drive a vehicle. | Diesel fuel that meets all ASTM D975 and state and federal diesel specifications. |
| Fuel Material (Feedstocks) | Can be non-renewable or renewable. Non-renewable CNG (CNG) comes from underground reserves by drilling and fracking. Renewable CNG (RNG) is renewable biogas from farm and refuse operations. | Can be non-renewable or renewable. Non-renewable electricity includes coal, nuclear, and natural gas powered generators. Renewable electricity includes hydro, wind, and solar powered generators. | Made completely from renewable and sustainable biomass including wastes and residues from animal and fish fat, as well as used cooking oils and vegetable oils. |
| Carbon Intensity <small>*CARB Approved Pathways</small> | CNG: Minimal reductions from the baseline. RNG: Average of 50% lower than baseline (source dependent). | Electricity for transportation: Average of greater than 150% of baseline. | 45% - 81% lower than baseline (source dependent). |
| Logistics | Pipeline infrastructure; compressors; limited, specialized fueling stations | Electricity grid; limited, specialized charging locations | Fully fungible with conventional diesel; multiple, standard fueling stations; seamlessly interchangeable with CARB diesel |
| Cost to Switch | Requires new engine investment plus additional fueling and distribution infrastructure, especially if project is new. | Requires new equipment investment plus additional charging infrastructure, especially if project is new. | \$0 - zero cost |
| Challenges | Reduced engine power and range compared to diesel. Limited fueling locations. | Reduced vehicle range and payload capacity compared to diesel. Limited charging locations. | None |
| Maintenance Issues | High-pressure tanks require periodic inspection and certification. Additional permitting and regulation on fueling and maintenance locations. | Battery will usually need replacement before vehicle is retired. | None |
| Environmental Impact | Natural gas methane emissions prior to compression are a significant contributor to greenhouse gases. | Power plant emissions can result in air pollution. EV batteries contain rare-earth metals which are limited. | Converts wastes and residues that would normally go unused into high-quality, premium fuels. |

Safe Driving Behaviors + telematics = Good Results.

There's a direct correlation between safe driving and GHG emissions—which means driving for safety and driving for sustainability can be achieved at same time. Up to [30 percent of a vehicle's fuel efficiency](#) is impacted by driver behavior. Actions that put safety at risk like speeding, sudden acceleration, and harsh braking can lower fuel economy by 33 percent in highway driving and 5 percent in urban driving.

By monitoring driver behavior, telematics can help ensure drivers adhere to eco-safe driving standards. The technology provides visibility into all manner of vehicle data, including fuel usage and GPS-driven routing information.

In fact, due to its pioneering use of telematics, UPS has transformed its routes to virtually eliminate left turns. **The logistics company has found that if each driver spends an extra minute on the road every day, it adds up to \$14.5 million annually.** It doesn't take much to get to that minute, either: With an undesirable left turn, UPS' telematics program can add 20 seconds to a [driver's estimated route time](#). By eliminating extra idling time, the courier has saved an estimated 10 million gallons of fuel and 100,000 tons of CO2 per year. Another result is safer routes: Left turns are 18 times more likely to result in crashes and three times more likely to kill pedestrians than right ones.



Actions that put safety at risk like speeding, sudden acceleration, and harsh braking can lower fuel economy by 33 percent in highway driving and 5 percent in urban driving.

Preventive Maintenance

Don't ignore those manufacturer guidelines. Adherence to preventive maintenance recommendations helps reduce downtime, avoid costly and unscheduled repairs, maintain warranties and increase productivity. Compared to reactive maintenance, a preventive maintenance program can help operators save [12-18 percent on costs](#). It can also contribute to fuel savings.

The link between maintenance and fuel

A dirty DPF increases the need for greater engine power output, resulting in increased fuel consumption of 4.5-7%

Under-inflated tires can reduce fuel efficiency by about 0.2% for every 1-psi drop in the average pressure of all tires

Collectively, improper maintenance reduces fuel efficiency by 10-30%



Even when operating in a time of diminished budgets and scarce resources, sustainability within supply chains and fleet optimization will continue to be a top priority. Fleet operators have multiple choices at their disposal, but the case for prioritizing Renewable Diesel—with its high performance, environmental benefits, and ease of implementation—is clear.

Neste MY Renewable Diesel™ has played a significant role in California's LCFS, replacing more than 1.6 billion gallons of fossil diesel. Neste, the world's largest producer of Renewable Diesel, is actively expanding its footprint on the West Coast. **Keep your eyes peeled for more content about why Renewable Diesel should be on your short list.**

And in the meantime, you can explore just how easy it is to achieve sustainability without sacrifice.

Discover More

About Neste

Neste (NESTE, Nasdaq Helsinki) creates sustainable solutions for transport, business, and consumer needs. Our wide range of renewable products enable our customers to reduce climate emissions. We are the world's largest producer of renewable diesel refined from waste and residues, introducing renewable solutions also to the aviation and plastics industries. We are also a technologically advanced refiner of high-quality oil products. We want to be a reliable partner with widely valued expertise, research, and sustainable operations. In 2019, Neste's revenue stood at EUR 15.8 billion. In 2020, Neste placed 3rd on the Global 100 list of the most sustainable companies in the world. Read more: neste.com and follow us on [Twitter](#) and [LinkedIn](#).

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