Going Electric:

Making the Switch to EVs

GEOTAB

Fleets are preparing for a greener future

Whether they're driven by government mandates to reduce emissions, the ever-present need to lower fleet fuel costs, or the push towards corporate social responsibility (CSR), commercial fleet managers are increasingly weighing the benefits of fleet electrification. While more technologically advanced electric vehicle (EV) models are becoming more widely available and upfront costs decline, fleet managers are beginning to consider the lifetime financial benefits of EVs as they build their business cases for going electric. Organizations have to compete in an increasingly environmentally-conscious world and a strategic switch to EVs could represent the best possible plan for the future.

A real impact on the environment

The global transportation sector accounts for the largest portion of greenhouse gas (GHG) emissions and so it's no surprise to see aggressive emissions reduction goals along with EV incentives and adoption policies emerging across cities around the globe. Environmental champion California signed a carbon neutral order and looks to have electricity 100% renewable by 2045. Several nations have committed to banning sales of cars powered by internal combustion engines: Norway (by 2025), India (by 2030), France and the UK (by 2040). China, the world's largest car market, has considered the idea, and in the meantime has imposed some of the planet's most stringent environmental standards.

Sustainable fleet leaders

As the idea of fleet sustainability continues to gain traction, sustainable fleet managers are increasingly championing electrification as part of their sustainability plans. As fleets begin their transition to EVs, sustainable fleet leaders must consider the Total Cost of Ownership (TCO) as well as the environmental impact in order to better understand the long-term benefits of fleet electrification. Sustainable fleets can help lessen the environmental impact made by large corporations, as well as help them meet government mandates. And, in many cases can ultimately help reduce costs when paired with telematics data to help ensure fleet efficiency.

Making the switch to electric vehicles

What does all this mean for fleets? As the move to zero-emissions gains traction at every level of government, private fleets are also feeling the pressure to switch to EVs. As fleet managers navigate the path to electrification, they're uncovering opportunities and challenges along the way.

Some of the common questions fleet managers will face on their EV journey are:

+ Do all fleet vehicles need to be fully electric? If not, which vehicles in the fleet are the right candidates for switching?

+ Is switching to EVs going to be viable both operationally and financially? Can EVs even do the job?

+ How many electric vehicles to purchase, and when?

+ Which EV models are available in the local market?

Answering these questions will help organizations build an effective EV adoption strategy. Two of the biggest adoption factors fleet managers must take into account are financial considerations and range.

Maximum range

The maximum range of an EV varies depending on the make and model. Understanding both the maximum range available and the maximum daily range required for a specific fleet vehicle is vital in order to choose the right EV for the job. Do you need a long-range battery EV, with a range over 200 miles? Or will a short-range battery do the job? Is partial electrification with a plug-in hybrid best, given that you are driving 400 miles regularly in one day?

Range anxiety is the fear that an EV won't have enough range to complete its duty cycle on a single charge, forcing it to return to base in order to recharge – costing fleets valuable time and money. This fear is based on the very early days of electric vehicle adoption, where drivers often found manufacturers' mileage claims to be greatly exaggerated.

Thanks to new generation lithium-ion batteries, EV manufacturers have made significant investments to increase the range of newer models. Many light-duty EVs are now capable of driving up to 300 miles on a single charge. However, while EV technology has improved dramatically over the past several years, range anxiety is still often cited as one of the main reasons fleets have not yet made the switch to EVs.

Current running costs

Understanding the current costs associated with the vehicle you are looking to replace can help facilitate choosing an EV that will save you money in the future. The manufacturer's suggested retail price (MSRP) and bid prices of electric vehicles are often higher than conventional internal combustion engine (ICE) vehicles. The higher price tag of an EV is often the second objection fleets have to adoption.

However, this difference in price can often be overcome through the considerable operational savings that EVs offer. With EVs, there are no engines to service, which means there's also none of the associated equipment either. Spark plugs, fuel filters, transmissions, radiators, and other gasoline-specific components are a thing of the past. And, with regenerative braking, the electric motor does most of the work, saving EV owners money on brake pads and rotors.

Understanding your expenses today, and comparing that to the future costs of an electric vehicle can help you determine whether a switch to EVs makes sense for your fleet. Data gathered from your fleet can help with creating an accurate assessment of whether or not a switch to EVs will lead you to break even, or ultimately reduce your fleet budget. But before a detailed assessment can be performed, fleets must be equipped to gather data through telematics.

The role of telematics

Telematics is a method of gathering real-world data from connected vehicles that provides insights to help fleet operators efficiently manage their fleets. Without telematics data to inform decision making around fleet electrification, fleet operators are left making assumptions, which limits their ability to accurately measure the benefits. With access to existing fleet data through telematics, fleet operators can accurately address the concerns around cost and operational range. They can gather daily driving distance readings to compare against the real-world range of EVs available in the market. Plus, fuel consumption readings can refine the fuel savings calculations and increase the accuracy of the financial model.

Performing an Electric Vehicle Suitability Assessment

An Electric Vehicle Suitability Assessment (EVSA) is a tool that assists a fleet in creating a blueprint for electrification. The EVSA delivers the data analysis needed to make the case to transition your fleet to electric in a way that makes sense for the organization's budget and time frame. Based on real-world driving profiles, an EVSA will recommend the best candidates within the fleet to electrify.
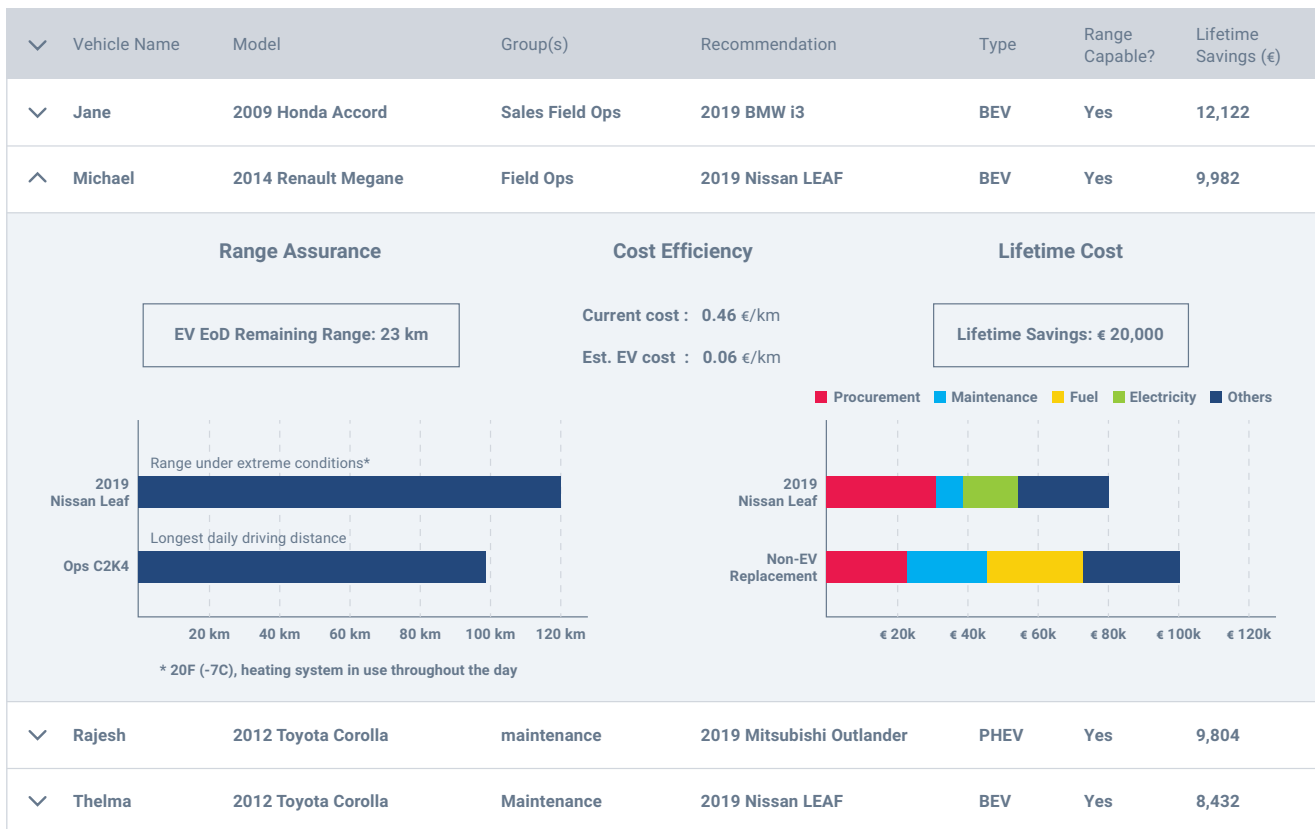
The Geotab EVSA leverages three data sources to make a recommendation:

1. Driving telematics data collected by in-vehicle GO devices

2. Geotab's simulation data for various EV makes and models

3. Localized costs database curated for the EVSA

By analyzing high-fidelity vehicle trip data and engine diagnostics, the EVSA makes it possible to receive EV procurement recommendations that fit each vehicle's driving profile while also understanding the total cost of ownership when switching to EVs.

The Geotab EVSA answers the most pertinent electrification questions including:

+ Will an EV be able to perform the required tasks in my fleet and meet my driver's range requirements even in extreme weather conditions?

+ Which vehicles in my fleet are the best candidates for replacement by EVs?

+ What will the impact of EVs be on my fleet's operational budget?

+ By how much will my fleet's carbon emissions go down?

	Vehicle Name	Model	Group(s)	Recommendation	Type	Range Capable?	Lifetime Savings (€)
⌄	Jane	2009 Honda Accord	Sales Field Ops	2019 BMW i3	BEV	Yes	12,122
⌃	Michael	2014 Renault Megane	Field Ops	2019 Nissan LEAF	BEV	Yes	9,982

Range Assurance

EV EoD Remaining Range: 23 km

Cost Efficiency

Current cost : 0.46 €/km
Est. EV cost : 0.06 €/km

Lifetime Cost

Lifetime Savings: € 20,000

* 20F (-7C), heating system in use throughout the day

	Rajesh	2012 Toyota Corolla	maintenance	2019 Mitsubishi Outlander	PHEV	Yes	9,804
⌄	Thelma	2012 Toyota Corolla	Maintenance	2019 Nissan LEAF	BEV	Yes	8,432

Sample EVSA report compares range and lifetime cost analysis for EVs to non-EVs within the fleet

GEOTAB®

Operational requirements

Before replacing an ICE vehicle with an EV, it is critical to ensure that it can complete the required daily range. An EVSA will analyze the daily driving range requirements over a specified time period to verify that the selected EV can complete the required distance on a single charge.

The EVSA looks at each fleet vehicle and calculates the longest daily driving distance recorded. This is then compared to an EV's worst-case range to determine if it is range capable for the job. EV worst-case range verifies that the EV can perform its daily requirement, even in extreme weather conditions. It takes into account performance in the fleet's area of operation when battery deficiency is diminished and the heating/cooling system is on all day. It's also worth noting that Plug-in Hybrid EVs (PHEVs) are always range capable considering their ability to switch to a traditional gas engine.

Ensuring that an EV can perform the same job and meet range requirements are the biggest elements of the electrification process. An EVSA arms fleet managers with data-driven recommendations on the ideal candidates for replacing vehicles based on their unique duty cycles.

Financial analytics

After confirming that there are EVs capable of doing the job required, it is also important to understand the financial impact of acquiring EVs. Ultimately, it's critical to examine whether or not the switch can potentially save the fleet money over the lifetime of the vehicles.

To determine whether an EV is a cost-effective replacement, the EVSA looks at each selected fleet vehicle and calculates the lifetime costs of two scenarios:

1. Replacing the vehicle with an EV

2. Replacing the vehicle with a new non-EV

If the EV's lifetime cost is lower than that of the non-EV, then that EV is recommended as a replacement for the fleet vehicle.

The following cost components are considered when calculating the lifetime cost:

- Vehicle acquisition costs
  (whether it's a purchase or a lease)

- Maintenance

- Fuel & electricity

- EV incentives

- Tolls for non-EVs or low emission zone charges
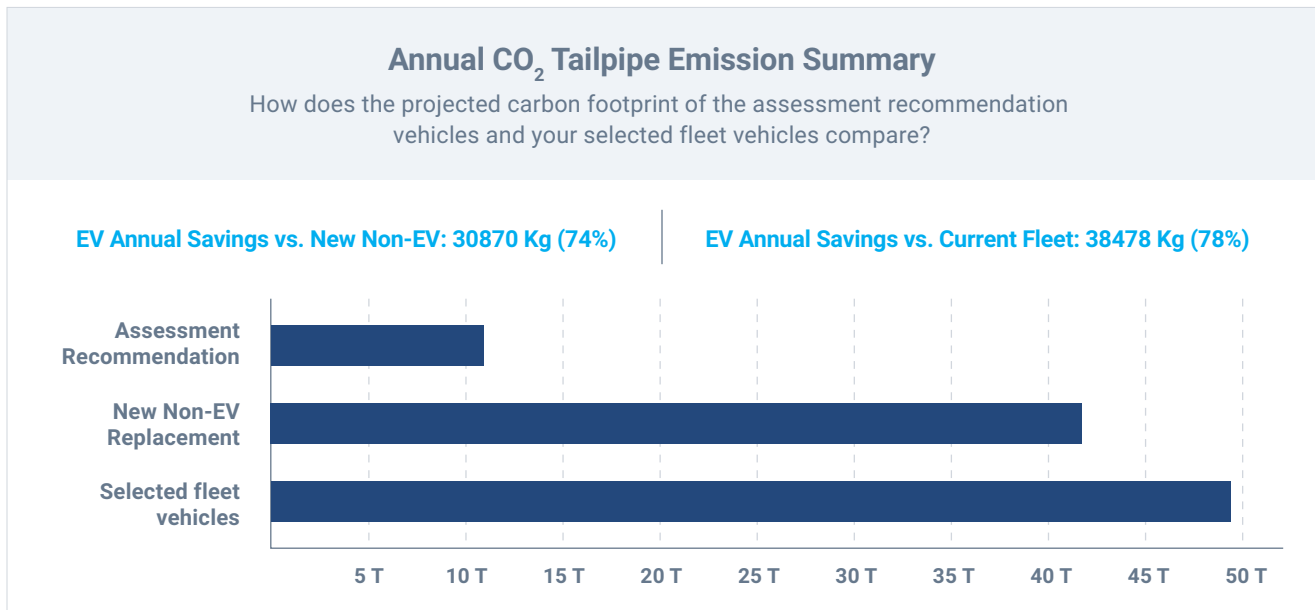
- Vehicle registration & taxes

- Insurance

The EVSA gives fleet managers a clear picture of the changes in cost structure should they elect to acquire EVs. Typically, the upfront acquisition costs are higher for EVs and many fleet managers have a difficult time making the business case for the switch. However, examining the total cost of an EV over its lifetime shows significant cost savings on fuel and maintenance that often make up the difference in upfront cost. Another important factor to consider is the availability of government incentives available for fleets that can have a huge impact on the bottom line when adopting EVs.

Environmental impact

Sustainability efforts are driving fleets down the path to electrification faster than ever. EVs provide a great opportunity for fleets to reduce their fuel consumption and carbon footprint. Consider even just the immediate impact of eliminating idling emissions from the fleet. With the environmental regulations discussed earlier weighing heavily on fleets it's no wonder that a growing concern is the ability to quantify the emission reductions when switching to EVs.

By helping fleets calculate their tailpipe emissions reduction, fuel cost savings and any congestion toll savings, the EVSA is an invaluable tool for operators considering the adoption of EVs into their fleets.

Annual CO_2 Tailpipe Emission Summary

How does the projected carbon footprint of the assessment recommendation vehicles and your selected fleet vehicles compare?

EV Annual Savings vs. New Non-EV: 30870 Kg (74%) | **EV Annual Savings vs. Current Fleet: 38478 Kg (78%)**

CO2 emission summary calculates the projected carbon footprint of the fleet

Ensuring the rollout is successful

Once EVs are brought into the fleet, it's imperative that fleet operators are able to monitor their performance similar to their ICE counterparts within the fleet. This is why a telematics solution that captures the necessary data off EVs is so important to understand the overall efficiency and productivity of the entire fleet. The Geotab platform is capable of providing critical performance metrics for EVs such as energy efficiency and range analysis, charging status and history as well as a live look into state of charge. For more information on EV fleet management, visit geotab.com/ev.

Conclusion

With more technologically advanced EV models available than ever before, commercial fleet managers are increasingly evaluating the benefits of electrification as they prepare for a greener future. The EVSA is vital to fleet operators weighing the switch to EVs. With real-world, fleet-specific telematics they can make informed decisions about the benefits of bringing EVs into their fleet.

To learn more about how Geotab and the EVSA can help you go electric, visit us online at **geotab.com/evsa**.

GEOTAB®

About Geotab

Geotab is advancing security, connecting commercial vehicles to the internet and providing web-based analytics to help customers better manage their fleets. Geotab's open platform and Marketplace, offering hundreds of third-party solution options, allows both small and large businesses to automate operations by integrating vehicle data with their other data assets. As an IoT hub, the in-vehicle device provides additional functionality through IOX Add-Ons. Processing billions of data points a day, Geotab leverages data analytics and machine learning to help customers improve productivity, optimize fleets through the reduction of fuel consumption, enhance driver safety, and achieve strong compliance to regulatory changes. Geotab's products are represented and sold worldwide through Authorized Geotab Resellers. To learn more, please visit www.geotab.com and follow us @GEOTAB and on LinkedIn.

For fleet tips and best practices, visit: www.geotab.com/blog

GEOTAB®

management by measurement

—— www.geotab.com ——

f 🐦 ▶ in