



FLEET MANAGER'S GUIDE TO GREEN DRIVING

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Photo by Kjaer Group A/S

A buzz topic for the past decade has been the environmental issue of global warming. The issue was further highlighted by Nobel Peace Prize winner Al Gore's popular documentary, *An Inconvenient Truth*.

Global warming, defined as the warming of the earth by greenhouse gases emitted into the atmosphere either naturally or by mankind, has been the subject of much debate. In the last century alone, the surface temperature of the earth has increased by up to 0.6°C. Is this something we should be concerned about?

Many believe that global warming is a serious problem that requires urgent attention.

As reported on the official website of the film *An Inconvenient Truth* (see www.climatecrisis.net), carbon dioxide (CO₂) and other gases warm the surface of the planet naturally by trapping solar heat in the atmosphere. This is a good thing, as it keeps our planet habitable. However, by burning fossil fuels such as coal, gas and oil and clearing forests we have dramatically increased the amount of carbon dioxide emitted into the Earth's atmosphere, causing temperatures to rise.



Global warming is widely considered to have caused:

- > A doubling in the number of category 4 and 5 hurricanes in the last 30 years.
- > The spread of malaria to higher altitudes in areas such as the Colombian Andes.
- > A dramatic increase in the level of ice melt in Greenland in the past decade.
- > Migration of plants and animals closer to polar regions as a consequence of global warming.

And if global warming continues at its present pace, catastrophic consequences could include:

- > A doubling in the number of deaths attributable to global warming in the next 25 years to 300,000 a year.
- > A rise in global sea levels of more than 20 feet through the loss of the Greenland and Antarctic ice shelves, with a devastating impact on coastal areas worldwide.
- > Greater frequency and intensity of heat waves.
- > Greater frequency of droughts and wildfires.
- > The complete disappearance of ice in summer in the Arctic Ocean by 2050.
- > The extinction of more than one million species of animal and plant life worldwide by 2050.

Sceptics, on the other hand, believe increased temperatures are a natural occurrence and nothing to be unduly worried about. Both sides of the debate claim that scientific data supports their views.

One issue not in dispute, however, is the present global recession and its repercussions - budget cuts, layoffs, cancellation of projects, reductions in aid spending etc. - which are impacting virtually everyone.

With the current economic crisis, compounded by fluctuating fuel costs, fleet managers face even greater challenges in reducing their budgets than they did a year ago. The biggest expenses are usually fuel and maintenance costs. Fleet managers and individuals alike can implement some simple measures to save fuel, reduce wear and tear on vehicles and generally help themselves and their organizations to save money.

Implementing minor changes to employee driving techniques can make a big difference in reducing costs as well as carbon dioxide emissions.

Green Driving or Eco Driving. What is it exactly? And why should I care?

The term Green Driving or Eco-Driving, is now in common usage. But what is it exactly and why should you as a fleet manager or individual care? Green Driving is a way of driving that reduces fuel consumption and greenhouse gas emissions.

Every driver can and should play a part in reducing greenhouse gas emissions, considered the major cause of global warming. And

even those who question this will doubtless be interested in the cost savings afforded by Green Driving.

How much can costs be cut?

Simply by changing the way we drive, fuel consumption can be cut by up to 25 per cent. If your fuel costs per vehicle per month are US\$ 300, this represents a saving of US\$ 75 per month or US\$ 900 per year – per vehicle.

Savings per year:

- > For a fleet of 10 vehicles: US\$ 9,000
- > For a fleet of 100 vehicles: US\$ 90,000

In 2005, the European Climate Change Programme estimated that the implementation of Eco Driving throughout the EU would result in fuel savings of no less than 25 billion litres over a five year period. The monetary benefits alone are substantial, not to mention the significant reduction achieved in green house gas emissions.

Green driving goes hand in hand with proper driving techniques, and organizations should make driver training a key component of their budgets.

Fleet managers have an obligation to their organizations to reduce costs, but since fleet operations represent a major source of greenhouse gas emissions they also have a moral obligation to help reduce these emissions. Fleet managers can play a huge role by regularly enrolling their drivers on driving courses that include green driving techniques. Not only will this help reduce the number of people injured in accidents, it will also reduce fleet repair bills, reduce fuel consumption and lower CO2 emissions, and in so doing help reduce global warming.

Incentives for fleet drivers

Given the substantial savings to be made by reducing fuel consumption and maintenance bills, fleet managers who have enrolled their drivers on professional driving courses with a green driving element could then consider introducing driver incentive programmes. For instance, an analysis could be carried out each month to ascertain how much fuel each driver consumes. Best practice for achieving preset goals could be issued to drivers, with the top five drivers receiving monetary bonuses etc. This would go a long way towards encouraging an interest in green driving techniques among staff members.

Tips on how to “drive green” and save fuel

The average driver can make subtle changes to his driving that can markedly reduce fuel consumption and carbon dioxide emissions. By simply practicing moderate levels of green driving, fuel consumption can be reduced by up to 25%:

Item	Fuel Economy Benefits	Gas Savings	Annual Car Savings	Annual SUV Savings
Tires properly inflated	Up to 3%	Up to \$0.12/gal	\$86.52	\$86.52
Check and replace air filter	Up to 10%	Up to \$0.40/gal	\$226.40	\$288.40
Recommended motor oil	Up to 1-2%	0.05-0.08/gal	\$28.30-44.48	\$36.05-57.68
Engine properly tuned	Up to 4%	\$0.16/gal	\$84.90-90.56	\$115.36
Drive sensibly	From 5-33%	\$0.20-1.32/gal	\$113.20-735.80	\$144.20-951.72
Observe the speed limit	From 7-23%	\$0.28-0.92/gal	\$158.48-520.72	\$201.88-633.32
Remove excess weight	1-2%/100lbs	\$0.05-0.08/gal	\$28.30-44.48	\$36.05-57.68
Loaded roof rack	Reduce FE by 5%	\$0.20/gal	\$88.80	\$115.40
Every 5 mph over 60 mph		\$0.20/gal (0.09/gal)	\$50.94	\$64.89

Total Annual Dollar Savings: \$1,656.86 for cars. \$2,400.97 for SUVs.

Source: Green Driving USA

Avoid aggressive starts and stops

Aggressive starts and stops consume fuel and cost money. Gradual acceleration and braking can save more than \$1 per gallon, according to the U.S. EPA, which states that green driving can improve fuel economy by up to 33%. One second of high-powered driving produces nearly the same amount of carbon monoxide emissions as 30 minutes of normal driving.

Keep moving in traffic

Maintaining a constant speed as you drive increases fuel economy, as it takes much more energy to move a stationary vehicle than to keep a vehicle moving. A vehicle uses 20% more fuel to accelerate from a stationary position than from 5 mph.

Speed considerations and fuel consumption

Driving at 75 mph instead of 65 mph can increase fuel consumption by about 10% and dramatically increase tailpipe pollution in many vehicles. Driving at 50 mph instead of 70 mph reduces fuel consumption by 25%.

Did you know that driving at less than 15 mph creates the most pollution? Increasing your speed to 60 mph reduces the level of pollution. Driving at over 60 mph further increases the level of pollution.

Plan your trips to reduce fuel consumption and carbon dioxide emissions

Planning your route can help reduce fuel consumption and CO2 emissions. One of the easiest ways to plan trips is to purchase a navigation system to show the shortest distance to your destination. If possible, avoid rush hour traffic. "Stop and go" driving is very fuel consuming and increases the emission of smog-forming pollutants.

Avoid idling

Idling consumes fuel. A car can consume more than half a gallon of fuel for every hour spent idling, so turn your engine off for long stops. How long is long? As a rule, switching off the engine for any stop of more than 60 seconds reduces fuel consumption and carbon dioxide emissions.

Use the highest gear possible

When driving with manual gear transmission, shift up a gear as soon as possible. Using overdrive gearing whenever possible reduces fuel consumption, engine wear and carbon dioxide emissions.

Drive your vehicle to warm it up

Unlike older cars, today's vehicles do not need to be warmed up before driving. Even on the coldest mornings, running your engine for 30 seconds is all that is necessary before your vehicle

is ready to drive. This is sufficient time for the oil to circulate throughout the engine. Your vehicle will reach its optimum operating temperature much faster when you are driving rather than idling.

Remove excess weight

Every kilo of extra weight requires your vehicle to work harder to move it, and that effort uses fuel. Weight affects fuel economy and CO2 emissions. Carrying an extra 45 kg reduces fuel economy by 1-2%.

Reduce aerodynamic drag

At motorway speeds, about 50% of engine power goes to overcoming aerodynamic drag, according to Consumer Reports. Wind resistance can reduce mileage, so maximize your mileage by removing luggage racks, rooftop carriers, fuel canisters etc. when they are not needed.

Observe the "check engine" light

Today's vehicles have sophisticated onboard diagnostics (OBD) systems that continually monitor the operation of your vehicle. When the OBD alert light comes on, it may be that your emissions have increased and fuel economy has been reduced. For instance, the oxygen sensor may fail and trigger the engine default setting - increasing fuel consumption. Replacing a faulty oxygen sensor can result in fuel economy improving by as much as 40%. When the OBD light goes on, see your auto dealer for more information.

Combine errands on one trip

By planning your week carefully, you can save trips. For instance, consider combining multiple errands in one trip.

Maintenance tips

A car that is not properly maintained can cost more than US\$ 1,600 every year in unnecessary additional fuel costs, according to automotive consultant Greg Dana.

Read the owner's manual

One of the most important sources of fuel economy information, customized for your model and engine, is the owner's manual. Yours may even have a special section on fuel economy. Typically, the owner's manual will provide a recommended service schedule designed to keep your vehicle operating efficiently. Today's cars are designed to run for almost 200,000 kilometres. With proper care and maintenance, many vehicles can run much further.

Use recommended motor oil

Vehicle engines are designed to use a certain oil quality and viscosity; check the owner's manual for the recommended type of motor oil for your vehicle. According to the U.S. EPA, fuel economy can be improved by 1-2% by using the manufacturer's recommended grade of motor oil. Energy conserving motor oil contains friction-reducing additives that provide additional

benefits. More information is available from your service provider. Also, make sure you change the oil regularly in accordance with the manufacturer's recommendations, as degraded motor oil increases fuel costs.

Tune engine periodically

To keep your vehicle running at peak performance, have the engine tuned periodically. Today's cars have been called computers on wheels and auto mechanics use computer diagnostics to check motor timing, fuel injection, valves, spark plugs etc. A single misfiring spark plug can reduce fuel economy by 4%. Typically, a tune-up can improve fuel economy by an average of 4%.

Replace air filter regularly

In today's cars, airflow sensors constantly monitor the amount of air ingested by the engine and fuel is metered accordingly. An air filter that is clogged with dirt or debris requires more fuel to pump air through it. According to the U.S. Department of Energy, replacing a clogged air filter can improve your fuel economy by 10%. It is recommended that you change your air filter every 19,000 kilometres, although road and air conditions must also be taken into consideration. Driving on dirt or gravel roads clogs the air filter much quicker than driving on tarmac roads. The best way to check if the air filter needs replacing is take it out and inspect it. Consult the owner's manual to determine the replacement schedule that will produce optimal results for your model of vehicle.

Check your tyre pressure weekly

The Department of Energy estimates that 1.2 billion gallons of fuel annually wasted as a result of driving on under-inflated tyres. Tyres can deflate naturally by as much as 1.5 PSI (pounds per square inch) a month. Experts estimate that 25% of all vehicles are running on tyres with lower than recommended pressure. Fuel efficiency is reduced by 1% for every 3 PSI that tyres are under-inflated. Keeping tyres properly inflated translates into a free tank of fuel a year and also reduces carbon dioxide emissions. For optimal results, check tyre pressure once a week and at least once a month. The correct tyre pressure in PSI can be found on the tyre label and usually on the edge of the car door, doorframe or sill.

Tighten fuel cap

Petrol evaporates relatively easily and today's vehicles have been engineered to significantly reduce evaporative emissions. Tighten the fuel cap; as much as 30 gallons of fuel can be lost annually to evaporation when the fuel cap is not properly tightened. Loose, damaged or missing fuel caps cause 147 million gallons of fuel to evaporate every year, according to the Car Care Council.

Maintain air conditioning system

Air conditioning refrigerants can have high global warming potential. Insist on professional service with recovery and recycling so that refrigerants can be reused and not released into the atmosphere. Too low or too high a refrigerant level decreases air

conditioner efficiency. For optimum performance, seek professional air conditioner maintenance.

Purchase fuel-efficient tyres

Tyres can make a difference. Lower rolling resistance tyres are now available and can improve mileage. However, tyre traction and handling characteristics should be priorities when considering these tyres. A dealer or tyre expert can advise, and consult the vehicle's owner guide.

Refuelling tips

1) Avoid overfilling the tank, as spilled fuel evaporates and releases harmful emissions.

2) Consider only filling up your car in the early morning when the ground temperature is still cool. Bear in mind that all service stations have their storage tanks buried below ground. The colder the ground temperature the denser the fuel, and when it gets warmer petrol expands, so buying in the afternoon or evening means the litre you buy is not exactly one litre. In the petroleum business the specific gravity and temperature of the petrol, diesel, jet fuel, ethanol and other petroleum products plays an important role. A 1°C rise in temperature is a money earner in this business.

3) Use low sulphur diesel or unleaded fuel.

Green challenges for fleet managers

A fleet manager not only has to deal with budgets and cost cutting, but also day-to-day "green issues". For instance, vehicle waste disposal and recycling requires extra effort. And in developing countries the challenges are greater, as recycling centres are rare.

Oil changes – disposing of waste oil

For large fleet owners, disposing of waste oil can be a problem. In developed countries with access to recycling centres it is very easy, but in the middle of Africa there may be no such centres available. And every gallon of used motor oil that is improperly disposed of can contaminate up to one million gallons of drinking water.

The following link has some useful tips about disposing of waste oil, such as using it to paint fence posts, clean old engines on lawnmowers etc. and applying it as a lubricant for hinges, latches and other rough exterior hardware: <http://sourcery.blogspot.com/2007/07/what-to-do-with-used-motor-oil.html>

Disposing of old tyres

This is another major challenge for large fleet owners. According to the California Integrated Waste Management Board, discarded tyres present a variety of environmental and public health hazards, including providing a habitat for disease-carrying vectors and creating the potential for fires at both illegal dumps and regulated tyre stockpiles. Read more at <http://www.ciwmb.ca.gov/LGlibrary/Innovations/Tires/Program.htm>

Earth 911 states that another important benefit of recycling and reusing tyres is a reduction in energy consumption and an increase in energy recovery. On average, 22 gallons of oil are required to create a new truck tyre. However, to retread a tyre (a process in which a new tread is applied to a used tyre casing), only seven gallons of oil are required. Retreading a tyre costs 30% to 70% less than manufacturing a new tyre, thus reducing consumer costs.

Diesel oxidation catalyst (DOC)

Many fleet managers choose diesel engines for their enhanced fuel economy and long-term reliability. However, there are certain health and environmental issues posed by diesel emissions. The United States Environmental Protection Agency (EPA) reports: The fine particles in diesel exhaust (known as particulate matter) can penetrate deep into the lungs and pose serious health risks including aggravated asthma, lung damage and other serious health problems. In addition, diesel exhaust is a likely human carcinogen. Children are more susceptible to air pollution than healthy adults because their respiratory systems are still developing and they have a faster breathing rate.

Diesel exhaust also impacts the environment. Particulate matter from diesel engines contributes to haze, which restricts visibility. In addition, diesel exhaust contributes to ozone formation (a component of smog), acid rain and global climate change.

Fortunately, there are several technologies that can help diesel engines reduce harmful emissions and a diesel oxidation catalyst (DOC) is an excellent option.

A DOC is a flow-through device that consists of a canister containing a honeycomb-like structure or substrate. The substrate has a large surface area that is coated with an active catalyst layer. This layer contains a small, well-dispersed amount of precious metals such as platinum or palladium. As the exhaust gases flow through the catalyst, carbon monoxide, gaseous hydrocarbons and liquid hydrocarbon particles (unburned fuel and oil) are oxidized, thereby reducing harmful emissions.

Although Diesel Oxidation Catalysts (DOC) are common in Europe and America, most vehicles in developing countries are not fitted with these devices. Fleet managers would do well to consider fitting DOCs to their fleet vehicles to reduce hazardous diesel exhaust emissions.

Alternatives to petrol powered vehicles

High fuel costs and environmental considerations have driven researchers to look for non-petroleum based fuel solutions. Is exchanging your fleet for hybrids or electric cars another option to reduce fuel costs, pollution and carbon dioxide emissions - and save the planet? Or is the technology not really ready yet?

Consumer Reports outlines the pros and cons of alternatives to petrol powered vehicles:

Hybrids

PROS: Potential for excellent fuel economy, run on existing petrol supplies and drive exactly like regular cars.

CONS: Some hybrids cost much more than similar conventional cars. Some do not meet buyer expectations in terms of fuel mileage, especially given the price premium.

Plug-in hybrids

PROS: Up to 65 km range for all-electric models. Home recharging infrastructure available, petrol powered engine can extend range for long trips, fuel economy claimed to exceed 40 kpl, cheaper per km costs and no emissions when running in electric mode.

CONS: Expensive additional batteries increase production costs, daytime recharging could strain electric grid, requires plugging in to reap the benefits.

Ethanol

PROS: Domestically produced from corn, future potential for production from a wide variety of waste materials. 10% blends (called E10) can be burned in any new car. Over 5 million cars can use E85.

CONS: Cars achieve about 25% lower fuel economy running on E85 than on petrol. Less than 1% of U.S. petrol stations carry E85. U.S. fuel economy credits awarded to carmakers for E85 cars lower the overall fuel economy for all cars. Ethanol made from any food crop can adversely affect food prices. Farm equipment involved in crop production runs on petroleum, limiting the net benefits.

Compressed natural gas

PROS: Costs much less than petrol, burns much cleaner and provides comparable power.

CONS: The need for huge gas tanks reduces trunk space yet only carries the equivalent of a few gallons of petrol. Limited range, few places for consumers to refuel and refuelling can be a very slow operation.

Diesel/bio-diesel

PROS: 30% better fuel economy than equivalent petrol powered vehicles, widely available, lower cost premium than for hybrid vehicles, engines deliver lots of torque for a given displacement and any diesel car can run on a blend of renewable bio-diesel fuel (a 5% blend is typical). With effort and investment, diesel engines can be converted to run on pure waste vegetable oil.

CONS: Traditionally more engine noise and vibration. Current higher cost of diesel can cut into fuel savings.

Hydrogen fuel cells

PROS: No emissions other than benign water vapour, equivalent fuel economy about twice that of petrol powered vehicles. Hydrogen is abundant and some of it can be made from renewable energy.

CONS: Fuel cells are expensive, durability is limited, acceptable range requires high-pressure on-board hydrogen storage. Few places to refuel and hydrogen is very expensive to transport, no infrastructure in place yet. At present hydrogen fuel is made from non-renewable natural gas.

Battery electric vehicles

PROS: No emissions from the vehicle, a fraction of the cost per kilometre compared to a petrol powered vehicle, universally available recharging infrastructure, electricity can be partially derived from renewable sources and instant torque from an electric motor.

CONS: Long recharging times, limited range, expensive batteries, electricity production often uses coal and not a clean burning source.

Summary

The term “green fleet” describes a motor vehicle fleet that operates efficiently and with minimum environmental impact. Green fleets offer numerous benefits such as reduced expenditure through improved fuel economy, overall fleet efficiency and less environmental impact through cleaner fuels and vehicles.

As a fleet manager, there are many things to consider when it comes to “greening your fleet”. Whether you decide to “green your fleet” for environmental reasons or to help improve the organization’s bottom line, there is an increasing demand for environmentally responsive programmes worldwide.

According to Karen Healey, Director of Product Development at fleet management service company PHH Arval, “green” is a very hot topic these days and more and more organizations are taking steps to reduce their carbon footprints.

The Puget Sound Green Fleets Guide reports: “Since fleet operations represent the largest source of greenhouse gas emissions for many agencies, fleet managers can expect their departments to be the focus of much attention when agencies move to address these emissions. Taking action first will put the forward-thinking fleet manager in a better position to control and guide the process when this inevitable attention comes.”

The Puget Sound Green Fleets Guide also encourages companies to become leaders in the green fleet movement: “Greening your fleet gives you the opportunity to demonstrate your environmental commitment and enhance your public image. As more and more people focus on environmental issues and climate change in particular, demonstrating that you are doing everything you can becomes increasingly important. Plus, greening your fleet gives you the opportunity to be a leader and demonstrate to other organizations just what is possible.”





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