



# FleetWise Knowledge Pool

## Operational Strategies



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This document provides information about operational strategies that could be used to reduce a fleet's emissions.

Reducing fleet emissions by the fullest possible extent requires coordinated action using a range of strategies. Many organisations focus solely on the composition of their vehicle fleet, but the way a vehicle is operated also has a major impact on annual fuel use and emissions.

Operational strategies for reducing fleet emissions fall into two broad categories:

**fleet practices** – the measures that can be implemented on an organisation-wide basis to alter patterns of vehicle use in favour of less emission intensive practices

**driver practices** – the measures that can be implemented at an employee level to encourage individual drivers to reduce emissions from the vehicle they operate.

Several options are presented here, grouped under these two headings. For each option there is an estimate of the abatement potential for greenhouse gas (GHG) emissions. These potential GHG reductions are an estimate and not a definitive measure.



## 1. Fleet practices

### Reducing vehicle use

The most effective way to reduce fleet emissions is to reduce the total number of vehicle kilometres travelled. In addition to reducing emissions, this action can reduce both annual fuel and maintenance costs whilst improving road safety. Options to reduce vehicle use include:

#### Encouraging corporate car pooling

*Abatement potential 50% per vehicle trip*

While operational needs are likely to determine whether car pooling is a viable emissions reduction strategy, increasing staff awareness of the travel plans of other employees can be a useful way to increase car sharing. One simple way to encourage carpooling is to establish an electronic vehicle booking system and then ensure that the system is readily accessible to all staff (possibly via the corporate intranet system) with such information including the proposed trip itinerary and the number of staff travelling.

#### Introducing corporate car sharing programs

*Abatement potential 15 to 20% per vehicle per year*

Car sharing programs remove the need for someone to own a car and involve individuals paying for the use of a vehicle on an as-required basis.. Car share programmes can be tailored for corporate organisations to provide employees with exclusive access to a pool of vehicles for business and private use as an alternative to provision of a vehicle as a part of their salary package. This action would not only reduce the cost of salary-packaged vehicles for employees, but could also reduce

the proportion of discretionary travel and reduce the total number of non-essential vehicles within a given vehicle fleet. Organisations wishing to explore this option could introduce it on a trial basis in conjunction with an established car share operator. Further information about these programs can be obtained by contacting one of the current commercial car share operators e.g. Charterdrive [www.charterdrive.com.au](http://www.charterdrive.com.au) Flexicar [www.flexicar.com.au](http://www.flexicar.com.au) or Goget [www.goget.com.au](http://www.goget.com.au).



### Introducing corporate shuttle buses between facilities

*Abatement potential 80% per vehicle trip*

A variation on the corporate car pooling strategy is to introduce a corporate shuttle bus service to support regular movements of employees between different business locations. The viability of these services depends on the volume and frequency of travel between company-owned facilities. These services can be provided on a part-time (e.g. start of day and end of day) or full-time basis. The cost of these services can be offset by reduced fuel costs or reduced annual expenditure on taxis. For organisations with significant volumes of regular travel, this action can potentially reduce annual fleet emissions by 10% to 12%.

### Increasing the use of teleconferencing

*Abatement potential 100% per vehicle trip*

Improvements in broadband technology and communication hardware have enabled people to conduct an increasing proportion of meetings without face-to-face interaction, providing an opportunity to reduce employee travel to business meetings. While it is unlikely that teleconferencing could completely replace the need for face-to-face meetings, keeping a record of staff meeting-related vehicle travel could be a useful starting point for assessing the case for increasing teleconferencing.

### Introducing corporate telecommuting

*Abatement potential up to 30% per vehicle per year*

This practice is not merely working from home, but involves setting up employees in a home office environment that is both supported by remote access to the organisation's computer systems and compliant with key occupational health and safety provisions. This measure is typically best suited to employees engaged in clerical and/or project-based work but has been utilised by call centre operations.

Ideally, telecommuting programs would be highly structured to maximise the potential for success. There are several useful guidelines available for organisations considering this option. For example, see the guidelines developed by the US human resources company Auxillium West at [www.auxillium.com/telecomu.shtml](http://www.auxillium.com/telecomu.shtml).

Significant advances in remote access software and internet security systems, coupled with ever increasing business and personal time lost in peak hour traffic congestion, suggest that it may be time to revisit this longstanding strategy as a means of sharing the benefits of the associated travel time reductions between the employee and the business.

## Workplace travel planning

*Varying levels of organisation-wide abatement potential*

Each of the individual interventions described above can be implemented as part of an organisation-wide strategy to encourage more sustainable car travel by all employees under the umbrella of a Workplace Travel Plan. Essentially, these plans advance a portfolio of potential actions for car use reduction and allow employees to pick the strategy that is best suited to their personal needs. From an organisational perspective, the preparation of a workplace travel plan promotes the adoption of a system wide approach to fleet emissions reduction and provides an opportunity to remove non-complementary organisational policies and practices. Ideally, these plans are supported by appropriate corporate policies and incentives.

Preparation of a workplace travel plan requires engagement of all key stakeholders within an organisation in the development of the travel plan. Useful guidelines and resources for the assembly of a workplace travel plan can be sourced from the UK Department of Transport ([www.dft.gov.uk/pgr/sustainable/travelplans/work/](http://www.dft.gov.uk/pgr/sustainable/travelplans/work/)), the NSW Government ([www.pcal.nsw.gov.au/workplace\\_travel\\_plan](http://www.pcal.nsw.gov.au/workplace_travel_plan)), and the New Zealand Transport Agency ([www.nzta.govt.nz/traffic/info/businesses/workplace.html](http://www.nzta.govt.nz/traffic/info/businesses/workplace.html)).

## Increasing public transport use

*Abatement potential 100% per vehicle trip*

Increasing the use of public transport can significantly reduce fleet emissions, and may also help to reduce travel times (particularly in the case of urban and peak hour travel). To encourage the use of public transport organisations might provide staff with periodic public transport tickets (e.g. monthly or quarterly tickets), or provide an incentive for employees to opt for inclusion of an annual rail or bus passes as part of their salaries.

## Improving cycling facilities

*Abatement potential 100% per vehicle trip*

Replacing a portion of vehicle travel with bicycle travel is particularly applicable for staff normally using salary-packaged vehicles for commuting to work. Bicycle travel has a number of potential health benefits and can also be used for some aspects of business travel. Fleet managers can encourage bicycle use by providing employee information about cycling routes, by encouraging management to provide workplace bike storage and showering facilities, and by allowing employees the option of salary packaging the purchase price of bikes.

## Promoting walking for short business trips

*Abatement potential 100% per vehicle trip*

Encouraging staff to walk for short trips has obvious abatement potential, which is made all the more attractive by the employee health benefits of walking. From a fleet management perspective, walking for short trips may be particularly beneficial because emissions per kilometre on short trips are higher than on longer trips due to the impacts of cold starts. From an organisation-wide perspective, this action can reduce sedentary employee activity and save time.

## Making trips more efficient

Measures that fleet managers can implement to make vehicle trips more efficient include:

### Using advanced navigation assistance

*Abatement potential 5% to 50% per trip*

Navigation technology is now well developed and is often included as a bonus item when a new vehicle is purchased. Providing navigation assistance to users through satellite navigation units can be a cost effective way to help reduce fuel costs and emissions, particularly for longer and unfamiliar trips. Utilising navigation technology can result in better dispatching and routing, monitoring inefficient employee practices and can potentially eliminate any unauthorised vehicle use (FleetMatics 2010). Eco-driving in-car devices have been developed in the United States and Europe in the form of eco-navigating and real-time fuel consumption devices. Similar dedicated eco-driving devices are yet to be made commercially available in Australia (excluding current general navigation devices).



### Providing information on travel time and route selection

*Abatement potential up to 50% per trip*

Travelling in peak hours on congested routes can significantly increase fuel cost and emissions. Providing real-time information to drivers about likely congestion bottlenecks via sophisticated in-vehicle information systems together with information about the best routes for frequent destinations can help to reduce trip times. Significant time savings and emission abatement can also be made by scheduling business activities outside peak traffic periods wherever possible.

### Better trip planning

*Abatement potential up to 30% per trip*

Efficient journey planning for multiple stops can work for an ordinary driver in the same way it does for a courier. Making multi-purpose trips instead of multiple sets of trips generally means that less vehicle kilometres are needed to complete the same amount of work. This can save time, fuel and emissions. Trip planning and vehicle scheduling software systems can be readily purchased for vehicle fleets for mobile sales or maintenance forces.

### Reducing vehicle loads

*Abatement potential 10% per vehicle per year*

Service and maintenance vehicles typically carry around equipment and parts in the course of their daily duties. The combined weight of these goods decreases the fuel efficiency of the vehicle. Periodic reviews of the tools and parts inventory of service vehicles can be used to remove unnecessary equipment, thereby reducing the vehicle load and improving fuel consumption. As a further option, it may be possible to segment the fleet to create a small number of specialist response vehicles that carry all equipment, with the remainder of the service fleet carrying a reduced inventory. For every extra 50 kilograms, fuel usage can increase by as much as 2% (Australasian Fleet Managers Association 2002).

### Improving vehicle efficiency

Improving the way vehicles are maintained can help to reduce average fuel consumption and may also increase vehicle resale values. Many fleet managers will be aware of the importance of the following measures but it is useful to consider them in the context of their potential contribution to reducing emissions.

### Vehicle tuning

*Abatement potential 4% on average*

Regular maintenance – specifically vehicle tuning – can help vehicles operate more reliably and more efficiently. Well-tuned vehicles on average have 4% lower emissions than their poorly tuned counterparts because the engine is able to operate more efficiently (Energy and Environmental Analysis Inc. 2001).

### Professional air conditioning maintenance

Air conditioning refrigerants can have a high global warming potential. The efficiency of a vehicle's air conditioner decreases as the refrigerant level decreases. Similarly, too much refrigerant also decreases efficiency. Having a professionally maintained air conditioner will help to ensure optimum performance (Eco Driving USA 2011).

### Replacing air filters

*Abatement potential 3% on average*

Vehicles emit a range of pollutants that can be harmful for both the vehicle occupants and other road users. Replacing a clogged air filter can reduce gases released into the atmosphere and can also improve fuel consumption. It also has the benefit of protecting the engine (OECD 1981).





### Removing unnecessary external fixtures

*Abatement potential 1% to 2%*

External fixtures, such as luggage and bike racks, increase wind resistance and drag when driving. Removing such equipment can reduce fuel consumption and hence emissions. This is particularly important for highway driving. Equipment used around town should be removed before long trips if it won't be required (Australasian Fleet Managers Association 2002).

### Using the recommended grade of fuel and oil

*Abatement potential 1% to 2%*

Using the recommended octane fuel can improve vehicle performance and reduce average fuel consumption. Fuel efficiency can also be improved by using the manufacturer's recommended grade of motor oil (Energy and Environmental Analysis Inc. 2001). Used motor oil should also be replaced consistently according to manufacturer's recommendations to ensure vehicles are operating in optimal condition.

### Correctly fitting fuel caps

*Abatement potential 1% to 2%*

Having loosely fitted fuel caps can allow fuel evaporation. Tightening the caps and replacing broken or lost caps with properly fitted caps can avoid such losses.

### Maintaining tyres at the correct air pressure

*Abatement potential 1% to 3%*

Under-inflated tyres increase rolling resistance, which can worsen fuel economy, wear out tyres and decrease safety performance. Driving a vehicle with only one under-inflated tyre (by 8 psi) can reduce the life of the tyre by 15,000 km whilst increasing fuel consumption by 4% (Natural Resources Canada 2010). Checking tyres for uneven wear should also be undertaken on a regular basis to monitor over-inflation, under-inflation and improper wheel alignment which affects vehicle performance. Fitting energy efficient (low roll resistant) tyres can also provide up to 3% fuel savings in passenger cars.

### Making the fleet more efficient

Longer term measures, generally requiring the support of senior management, may be used to reduce vehicle use and improve operational efficiency. Some options are presented below. To get the most out of these measures, it is suggested they be combined with a low-emission vehicle procurement strategy.

The abatement potential will vary widely depending on existing fleet policies, numbers of employees and current fleet composition and size. The abatement potential figures are based on case studies and, as such, are indicative figures.

### Reviewing vehicle travel reimbursement policies

*Abatement potential 10% on average*

Companies often over-reimburse employees who use their private vehicle for business purposes. This can unwittingly provide an incentive to encourage employees to travel more than required. Guidelines and checks on use may save unnecessary trips (UK Energy Saving Trust).



### Supporting public transport commuters

*Abatement potential 90% per substituted vehicle trip*

Policies to encourage public transport commuting include options such as allowing employees to salary sacrifice the purchase of monthly or annual travel passes. Where company locations are outside walking distance from rail stations and bus connections are poor, shuttle services to the station might be considered.

### Benchmarking vehicles and drivers

*Abatement potential between 10% and 15%*

Measuring and reporting fuel consumption and kilometres travelled on a per vehicle basis can help to identify potential ways to reduce fuel use. Benchmarking can be conducted for drivers who drive similar vehicles, in similar areas and time periods. Similar vehicles operating in similar circumstances can also be compared to see if there are any poorly performing and thus potentially faulty vehicles, or alternatively highlighting inefficient

driving behaviour or unauthorised fuel usage. Typical fuel usage for each model can be found in the Green Vehicle Guide at [www.greenvehicleguide.gov.au](http://www.greenvehicleguide.gov.au). Fleet fuel use and emissions tracking via the FleetWise program can assist in this process.

### Offering financial incentives for small vehicle selection

*Abatement potential 5% to 10% per fleet*

Packaged vehicles with salary-sacrificed and novated leases are commonly left to drivers' discretion, and it can be common for senior staff to opt for larger, more expensive vehicles, with relatively high average fuel consumption. While it may not be possible to specify which vehicles are purchased, staff could be encouraged to choose models with low average fuel consumption. Potential financial incentives, such as allowing staff to use a portion of their fuel cost savings on their next vehicle could also be considered.

## 2. Driver practices

Vehicle fuel use also depends on individual driver behaviour. Drivers can reduce their fuel use through driver knowledge and training.

### Improving driver knowledge

Improved driver knowledge can help to reduce fuel consumption in the following ways:

#### Using cruise control

*Abatement potential 5% on average*

Using cruise control on the highway helps to maintain a constant speed and allows the engine to operate at smooth and optimal levels. This can save an average of 5% in fuel use (Wilbers 1999).

#### Reducing unnecessary idling

*Abatement potential between 5% and 7%*

Idling consumes fuel and lowers a vehicle's fuel economy. Switching off and restarting an engine when loading or unloading stock or when stopped in heavy traffic, rather than idling for lengthy periods, can reduce petrol consumption by 2.5–4 litres of fuel per hour (Energy and Environmental Analysis Inc. 2001).

#### Reducing air conditioner usage

*Abatement potential between 2% and 10%*

Using accessories such as the air conditioner requires a vehicle to use additional power. For example, air conditioner usage can increase fuel consumption by up to 10%. As an alternative, staff could be encouraged to consider opening a window when travelling in urban conditions and parking in the shade to reduce vehicle heating in summer (Wilbers 1999).

### Managing speed

*Abatement potential between 7% and 23%*

A vehicle is generally less fuel efficient when travelling at high speeds. For instance, vehicles use up to 25% more fuel travelling at 110 kilometres per hour than when travelling at 90 kilometres per hour. While the choice of speed also needs to be determined according to local conditions, staff may find it useful to know the potential fuel savings achievable by driving slightly more slowly (West et al. 1999).

### Driving in high gear

*Abatement potential 7% on average (up to 14%)*

The Fiat eco:Drive trial in 2010 highlighted the areas that drivers find easiest to change their behaviour in, and that therefore show savings in efficiency are the way drivers accelerate, and the way they change gears (Fiat, 2010). Car engines run most efficiently in high gear. When accelerating change up through the gears as soon as the car allows before 2500 rpm for a petrol car or 2000 rpm for a diesel car. The optimum efficiency range for driving a car is between 1500 and 2500 rpm (UK Energy Saving Trust 2010).

### Avoid overfilling the fuel tank

*Abatement potential between 2% and 5%*

Fuel can be lost through the overflow pipe when driving if tanks are overfilled. When the fuel tank contains more fuel than its intended capacity, fuel is likely to be lost or spilled when the driver accelerates or turns. Filling should stop when the automated sensor on the fuel nozzle clicks off.

### Driving off immediately

*Abatement potential 2% to 4% on average*

Modern vehicles are now much better designed than earlier models. The vehicle's engine can now operate at optimal levels soon after start-up. This means the old practice of warming the engine before driving off is now an inefficient practice. Driving off immediately reduces the emissions from a cold start (Australasian Fleet Managers Association 2002).

### Providing Eco-Driver training programs

Advanced driver training has well-recognised safety benefits, and it also can reduce fuel consumption, emissions and vehicle wear and tear.

Driver training can be conducted either via advanced driving courses or simple classroom instructions. A number of the fuel efficiency elements of these traditional driver training programs have recently been repackaged under the banner of eco-driving.

An example of eco-driving benefits can be seen through a trial conducted by Fiat in Europe involving 5,697 drivers in 5 countries over 150 days. Fiat's eco:Drive program works by enabling drivers to plug a usb stick into new Fiat models helping to record the cars journey data which can then be anonymously analysed on the driver's computer returning a performance index score (out of 100). Drivers participating in the trial were able to achieve a fuel reduction of up to 16% and a CO2 reduction of 3,300 tonnes by employing eco driving techniques (Fiat, 2010). The Fiat (2010) eco:Drive trial highlighted that eco driving knowledge and training can improve driver behaviour and vehicle efficiency with the following outcomes:

- Changes in drivers' behaviour are possible if eco-driving tuition is undertaken in an engaging, personal and regular manner, with qualitative feedback that enables them to understand their performance and how to improve it.
- The effectiveness of eco-driving in everyday situations is limited by a driver's personal commitment, the prevailing driving culture in the area, and their interaction with external conditions and road systems.



- Some elements of driving style are easier to improve on, and bring more savings, than others. Changing gear at the right time contributed to 31% to overall improvements in driving efficiency, and smooth acceleration 29%. Efficient deceleration contributed 25% to overall improvements, and maintaining a steady average speed contributed 15%.
- Eco-driving brings benefits beyond reducing emissions – it also creates more fluid, more aware and safer drivers. By thinking ahead and avoiding sharp acceleration and deceleration, eco-drivers stop far less often (13% less often, on average), driving more fluidly overall.

Other eco-driving measures can include the following:

#### **Easing back on the accelerator** *Abatement potential 5% to 15%*

When a driver unnecessarily pushes the accelerator the engine is forced to work unnecessarily hard and consume extra fuel. Easing back on the accelerator helps the automatic transmissions shift up faster and more smoothly.

#### **Anticipating traffic**

*Abatement potential up to 20%*

Scanning the road ahead as far as possible and anticipating traffic ahead can help to avoid unnecessary acceleration and braking. Maintaining a constant speed during travel increases fuel efficiency as more fuel is required to stop a vehicle and return to speed than is required to keep a vehicle moving (UK Energy Saving Trust 2010).

#### **Improving braking**

*Abatement potential between 3% and 5% per vehicle per year*

Resting feet on the brake while driving or driving with the handbrake on increases friction and resistance forces. This can cause the vehicle to use additional energy and thus increase fuel consumption. It also increases vehicle wear and tear and deteriorates braking efficiency.

#### **Reducing aggressive driving**

*Abatement potential between 5% and 33% per vehicle trip*

Aggressive driving can increase wear on brakes, increase maintenance costs and lead to road accidents. Driving smoothly by avoiding hard acceleration and deceleration can reduce emissions by up to 33%. Keeping detailed vehicle records can help to determine which fleet vehicles consume above or below the fleet average in terms of fuel consumption, and drivers with lower average fuel consumption could be rewarded accordingly (Haworth and Symmons 2001).

Guidelines detailing how an Ecodriving program might operate have been produced by a number of organisations including Eco-Driving Europe at [www.aatas.com/files/eco\\_driving.pdf](http://www.aatas.com/files/eco_driving.pdf) ) and EcoDriving USA at [www.ecodrivingusa.com](http://www.ecodrivingusa.com).

#### **Improved road safety**

One of the primary positive side effects of eco-driving is an improvement in road safety. As previously mentioned the notions behind eco-driving including planning ahead, maintaining a consistent and steady speed, preparing for intersections, non-aggressing driving are similar techniques that are taught in advanced driving courses and are all measures that make for more aware, safer drivers (Fiat, 2010).

### **3. Further information**

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