

SEPTEMBER 2010



Sustainability and Climate Change Strategy 2010-2015



keeping victorians connected

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At VicRoads we plan, manage and develop Victoria's road network and its use in a way that is sustainable and meets the challenge of reducing greenhouse gas emissions from transport.

Our actions, in partnership with other agencies, are critical to the ongoing prosperity and liveability of Victorian communities. While keeping Victorians connected, we also strive to meet the needs of business and industry and help deliver the Government's overall sustainable transport strategy.

VicRoads Strategic Directions 2010-2012 released in January 2010 included a new direction: *Make the transport system more sustainable*. To help guide our actions and work in support of this direction, VicRoads Sustainability and Climate Change Strategy 2010- 2015 has now been released.

This strategy provides a targeted focus for the next five years to help tackle the impacts of climate change, reduce greenhouse emissions and minimise VicRoads' own impact on the environment. It also reflects our emphasis on stakeholder engagement and partnerships in developing solutions to address environmental challenges.

Three strategic directions are identified in the strategy:

- Reducing Environmental and Climate Change Impacts from the Built Environment.
- Protecting and Enhancing the Natural and Cultural Environment.
- Fostering a Culture of Leadership and Best Practice on Sustainability and Climate Change.

This strategy is an important guide to help VicRoads staff in our daily work, and for our stakeholders to understand and share our commitment on the directions we are taking to achieve better climate change and sustainability outcomes—today, and for the future.

Gary Liddle
Chief Executive

Victoria aspires to have an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible state.

VicRoads Purpose

Our purpose is to deliver social, economic and environmental benefits to communities throughout Victoria by managing the Victorian road network and its use as an integral part of the overall transport system.

As of 2008-09, the Victorian arterial road network comprised over 52,000 lane kilometres and 3,000 bridges, and facilitated the movement of more than 500 million tonnes of freight representing approximately 58 billion kilometres of travel.

In managing this network, VicRoads must meet the demanding and often competing requirements of a broad range of road users including car drivers, freight operators, train, tram and bus passengers, motorcyclists, cyclists, pedestrians and people with disabilities.

VicRoads' organisational aims include:¹

- achieving ongoing reductions in the number and severity of road crashes and the resultant cost of road trauma
- assisting economic and regional development by managing and improving the effectiveness and efficiency of the road transport system
- developing a more integrated and sustainable road transport system
- minimising the impact of roads and traffic on the community and enhancing the environment through the responsible planning, design and management of the transport system
- building effective and efficient relationships with all customers by providing them with convenient access to services that meet their needs and enable VicRoads to deliver cost effective services to the community.

To effectively meet these aims, VicRoads has developed seven strategic directions of which one specifically relates to sustainability.

VicRoads Strategic Directions

VicRoads is working towards a more sustainable road network.

VicRoads Strategic Directions 2010-2012 states that to make the transport system more sustainable:

We will minimise the environmental and amenity impact of road based transport through making the best use of existing transport assets, encouraging the current shift to more sustainable transport modes, helping make the current transport system more efficient and reducing the environmental footprint of VicRoads' operations and facilities.

Improving the sustainability of Victoria's road network contributes to the Victorian Government's overall approach to sustainability in the transport sector. Providing reliable access and minimising congestion, improving road safety and the management of roads assets will all contribute to a more sustainable road network.

VicRoads Strategic Directions:

- Provide reliable access and minimise congestion
- Improve road safety
- **Make the transport system more sustainable**
 - Improve asset management
 - Collect, manage and use information to better support decision making
 - Improve customer service and community engagement
 - Develop organisational capability and culture.

¹ The organisational aims reflect VicRoads' functions and objectives in the Transport Act 1983, Road Safety Act 1986, Road Management Act 2004 and *Transport Integration Act 2010*.

The *Transport Integration Act 2010 (Vic)* also sets a clear direction for transport policy in Victoria, providing strong legislative support for the development of an integrated and sustainable transport system.

One of the key objectives of this legislation is environmental sustainability. Section 10 of the Act specifies that the transport system will contribute to an inclusive, prosperous and environmentally sustainable state by:

- protecting, conserving and improving the natural environment
- avoiding, minimising and offsetting harm to the local and global environment
- promoting forms of transport and the use of forms of energy and transport technologies which have the least impact on the natural environment
- improving the environmental performance of all forms of transport and greater utilisation of renewable forms of energy used in transport.

To achieve the vision statement set out in the *Transport Integration Act 2010*, VicRoads plans, manages and operates the road network to actively contribute to environmental sustainability.

A Sustainable Transport System

A sustainable transport system is one that:

- contributes to meeting the social and economic needs of the present generation without compromising the capacity for future generations to meet their own social and economic needs
- ensures the short-term and long-term protection of the environment, locally and globally
- promotes and provides for transport options with a smaller carbon footprint
- is safe and supports ongoing health and wellbeing
- provides for the future prosperity of Victoria.



Directions and Goals of VicRoads Sustainability and Climate Change Strategy

The two most pressing sustainability challenges that emerge for the road network are related to climate change: the need to reduce emissions from the use of our roads, and the long-term sustainability of the road network itself in a changing climate. The substantial growth in the demand for transport predicted over the coming decades will need to be managed in a way that is sustainable and, in particular, meets the challenge of reducing greenhouse gas emissions from transport.

There are of course a wide range of other sustainability challenges that face VicRoads. These include the need to protect and enhance our State's biodiversity and heritage values, the need to preserve our water supplies and catchments, the need to minimise our operational environmental impact and the need to protect community health and amenity by reducing air and noise emissions associated with the vehicles that use the road network. None of this can be achieved without the development of a strong sustainability culture within VicRoads.

In 2005, the *VicRoads Environment Strategy 2005-2015* was developed to set broad environmental directions for VicRoads and explain to employees and external stakeholders our environmental priorities. The *VicRoads Sustainability and Climate Change Strategy 2010-2015*

replaces the 2005 Strategy but builds on its key directions and puts in place a new plan of action to meet the challenges of climate change.

The *Sustainability and Climate Change Strategy 2010-2015* outlines three key directions for the next five years:

Direction 1:

Reducing environmental and climate change impacts from the built environment – managing the road network to minimise greenhouse gas emissions, adapt to the effects of climate change and minimise impacts to communities.

Direction 2:

Protecting and enhancing the natural and cultural environment – avoiding, minimising and offsetting our biodiversity, heritage and water resource impacts, and improving the management of environmental values in roadsides.

Direction 3:

Fostering a culture of leadership and best practice on sustainability and climate change – developing culture and capabilities, understanding the environmental impacts of our actions and demonstrating best practice on sustainability and climate change issues.





The key goals of the Strategy are:

Emissions Reduction– reduced congestion and emissions from use of the road network.

Land Use Integration– integrated land use and transport planning (design, construction and management) decisions having regard to the demands and amenity of communities to encourage more sustainable forms of transport (e.g. walking, cycling and public transport).

Mitigation – increased opportunities to reduce environmental impacts, resource use and the carbon intensity of roads.

Biodiversity – improved biodiversity and carbon sequestration² opportunities.

Adaptation – adapted capability of the road network to respond to a changing climate.

Relationship Development – key relationships developed with our stakeholders to work collaboratively to address the direct impact of our own operations, the emissions and impacts of our contractors, the impact of vehicles on Victorian roads and the impact of the transport sector in Victoria overall.

In order to quantify the greenhouse gas savings associated with this Strategy, VicRoads has drawn on prior work undertaken by the Department of Premier and Cabinet.

In December 2007, the NOUS Group³ developed a model to represent Victoria's greenhouse gas emissions to 2050 and apply a "wedges analysis" to determine the potential for greenhouse reductions based on changes in behaviour and technology and combinations thereof. (*Note: The*

term wedge refers to the shape of the area on a chart showing emission profiles between curves with and without particular emission reduction initiatives).

A base case or reference case for Victoria was developed as an indicative scenario of future greenhouse gas emissions from the State in the absence of policy or other initiatives. The outcomes of this modelling is summarised in Figure 1 overleaf.

Actions undertaken by VicRoads to manage the road network to reduce emissions will contribute significantly to "wedge 2" estimated to deliver reductions of greenhouse gases of 1.6 megatonne (Mt) through changed travel patterns (changed travel patterns incorporates changes in urban form, a range of infrastructure projects and travel demand initiatives).

The same modelling approach has been adopted to assess the impact of VicRoads' directions outlined in this Strategy (refer Figure 2). For VicRoads, the reference case is based on 5% growth in emissions per year. The combined impact of actions – excluding improvements to the road network – are estimated to deliver approximately 173,000 tonnes of greenhouse gas savings over the five year period – equivalent to the average energy consumption of over 13,000 households. The significant benefit would result from reducing the impacts to the built environment through actions such as improved street lighting and upgrading of traffic lights.

Additional initiatives, such as increasing the sustainability of materials, improving air quality and reduced noise impacts, may not have a direct impact on greenhouse gas reductions but will lead to improved sustainability outcomes for the community.

² Carbon sequestration is the term used to describe the process of absorbing and storing carbon

³ The NOUS Group, 2007, Understanding the Potential to Reduce Victoria's Greenhouse Gas Emissions

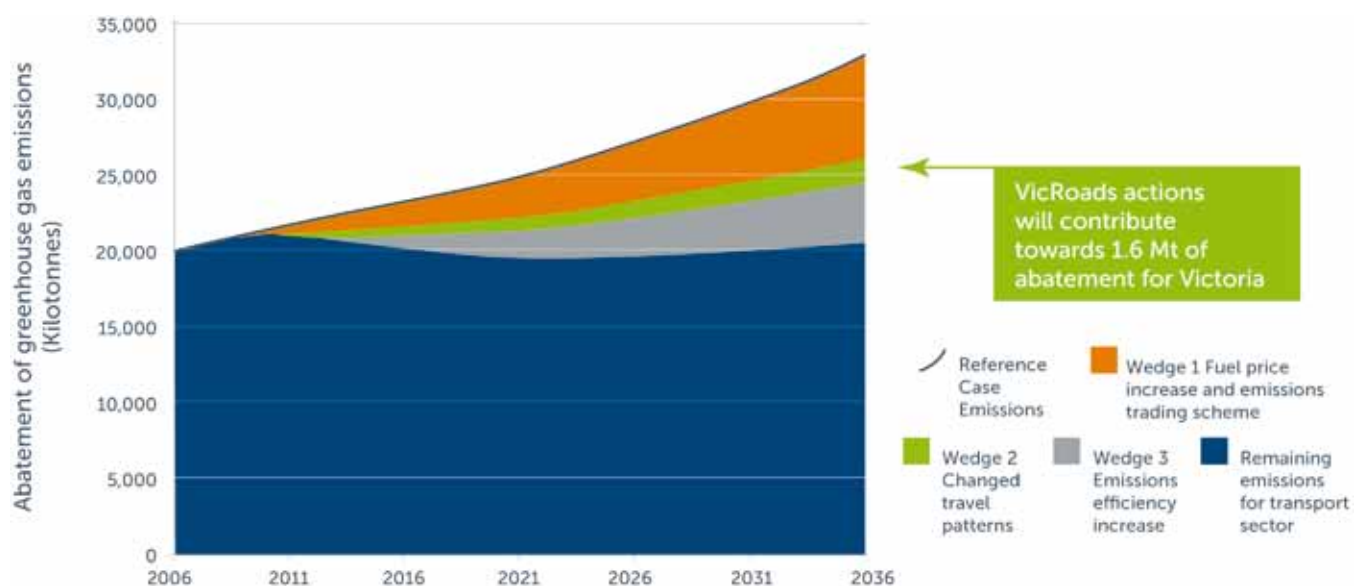


Figure 1: Greenhouse Emissions Abatement Potential within the Transport Sector

Source: Greenhouse gas emissions abatement potential of the Victorian Transport Plan, Nous Group, 2008

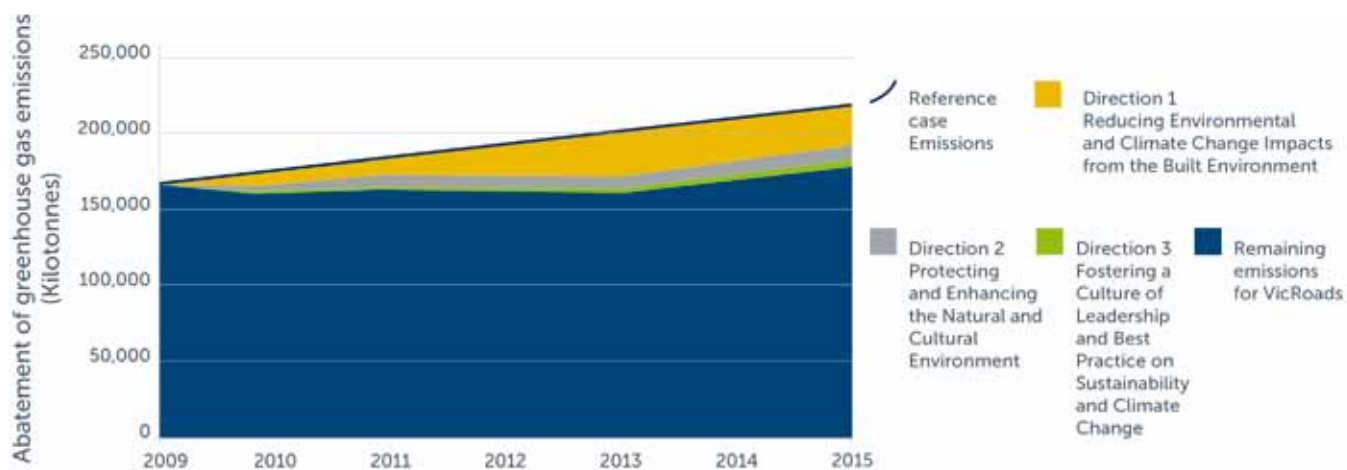


Figure 2: Greenhouse Emissions Abatement Potential within VicRoads⁴

⁴ Verified by Carbon Market Economics Pty Ltd Aug 2010

Objective 1.1 – A Reduction in Greenhouse Gas Emissions from the Road Network

Increased Priority for Low Emission Transport Modes

VicRoads will manage the road network in a way that maximises its ability to move people and goods, on the most efficient modes, in a way that is sensitive to local amenity.

The average greenhouse gas intensity of different transport modes in Melbourne is shown in Figure 3 below. A key way to reduce greenhouse gas emissions is to promote the use of transport modes that have a lower impact. The clear message from Figure 3 is the potential for greatest benefit from walking and cycling. Mode switching from sole occupant cars to public transport and car pooling will also improve greenhouse outcomes.

Adopt SmartRoads principles into road network management

SmartRoads, developed by VicRoads in association with the Department of Transport (DoT) and local councils, represents a smarter, more proactive approach to managing the arterial road network. *SmartRoads* uses a set of guiding principles to establish a 'Road Use Hierarchy' to determine the priority use of roads by transport mode, time and place of activity. It will ensure that decisions about the operation of the road network will better consider the effects on the surrounding community, Melbourne's activity area and the environment.

SmartRoads maximises efficient movement of people and goods through urban areas, and so encourage a shift away from inefficient travel modes. Under *SmartRoads*, certain routes will be managed better to work for more sustainable modes such as public transport, cycling and walking, whilst others will be managed for cars and freight vehicles.

Prioritising access to key activity areas by more sustainable modes and promoting through traffic on bypass routes or at times of day less critical to the operation of these areas, will reduce the impacts on travel, and further attract users of these areas to use sustainable modes thereby gradually transforming travel behaviour into more efficient and amenable patterns.

The alignment of programs with the objectives of *SmartRoads* will result in making the best use of the existing network and will better cater for growth in travel, through more sustainable modes. The creation of additional capacity for on road based public transport and the provision of improved facilities for bicycles and pedestrians into activity areas will make these sustainable modes more attractive and viable alternatives for accessing these areas.

This approach will help resolve competing interests for limited road space, make the best use of existing roads and assist people to make smarter choices about what type of transport to use and when. Changes to the operation of the road network will be implemented gradually and involve more effective use of traffic signals to allow extra time for pedestrians, improved coordination to assist traffic flow and increased use of intelligent transport systems and real time information.

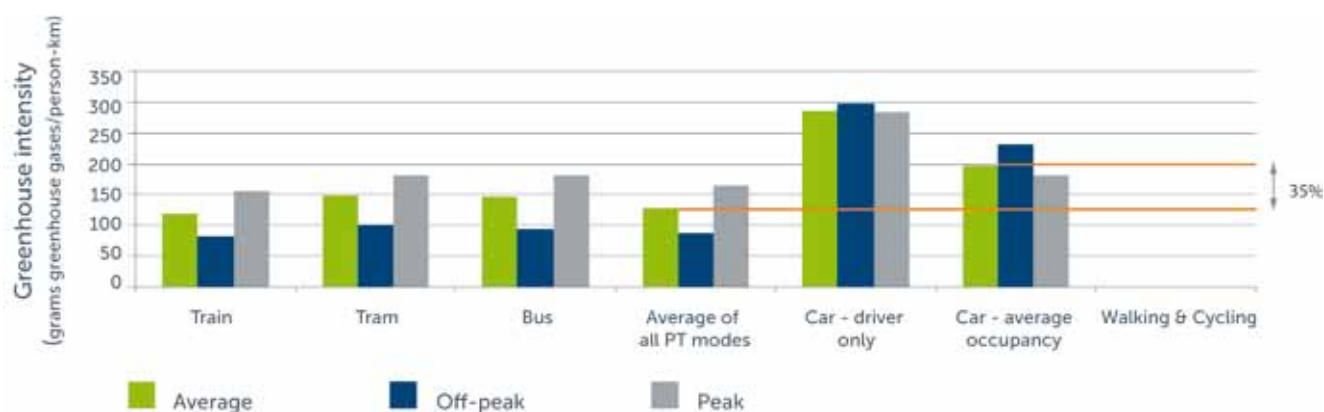


Figure 3: Average Greenhouse Intensity of Passenger Transport Modes in Melbourne, 2007/08 (State of Victoria, Department of Transport, 2008)

Implementation of the Tram and Bus Priority Program

The Tram and Bus Priority Program helps to reduce greenhouse gas emissions through encouraging a mode shift towards sustainable road based public transport. This is achieved through providing road space for trams and buses through the use of clearways and bus lanes, which improve travel time and reliability for road-based public transport.

Increased facilitation of walking and cycling

One of the main objectives of the VicRoads Bicycle and Pedestrian Program is to increase the numbers of people who ride bicycles and walk, particularly for transportation. An outcome of this objective is reduced congestion on the roads and reduced greenhouse gas emissions.

The aim is to increase the number of cycling and walking trips in inner Melbourne by 15,000 and grow cycling in the rest of the State by 2020. To date, steady increases in cycling of around 10 per cent per annum have been recorded across the inner suburbs of Melbourne since 2005.

Increases in cycling will be achieved by the continued development of Victoria's on-road and off-road bicycle network in a way that separates cyclists from motor vehicles and provides access to key destinations. This will result in bicycle facilities attractive to a larger part of the commuter market, and make important linkages to key activity areas, public transport and other key local destinations such as universities and schools.

The State Government has committed \$115 million in improvements to cycling infrastructure. This includes new bicycle lanes and shared walking and cycling paths on priority bicycle routes and a public bicycle hire program for Melbourne's central business district. The Victorian Cycling Strategy also provides that cycling infrastructure should be incorporated into road and rail investment wherever possible.

Investing in the community where we operate is integral to long term sustainability. For example, November 2009 marked the nineteenth consecutive year that VicRoads has sponsored the Great Victorian Bike Ride. Supporting the Great Victorian Bike Ride, is consistent with the VicRoads' objective to deliver safe cycling programs and encourage cycling in the community as an environmentally friendly and healthy transport alternative.

Following on from the successful bicycle hire programs in Paris and the Netherlands, VicRoads is responsible for the administration of the Melbourne Bike Hire Scheme. This scheme now has 43 docking stations and 398 bikes for hire across the CBD, with a further 7 stations anticipated in the near future.



Public Bicycle Hire Stands in Melbourne

To support the Victorian Government *Pedestrian Access Strategy*, more walking will be achieved by providing more pedestrian crossings such as pedestrian operated signals, 'zebra' crossings and median refuges in priority pedestrian precincts.

Increased Efficiency and Integration of the Existing Transport Network

Increased provision of real-time traffic information

Smoother traffic flow is known to produce significantly less emissions than congested, stop-start travel over the same distance. The provision of real time traffic information is one of the most cost effective services to achieve smoother traffic flow and reduced congestion. It is particularly effective for highly congested areas where critical information can inform motorists to divert to other routes to avoid traffic congestion, or to find destinations or parking more directly.

Introduction of freeway management systems on key routes

Managed freeways involve the implementation of additional and enhanced technology (such as freeway ramp signals, variable speed limits, travel information, lane use signals and CCTV) on key sections of urban freeways to improve safety and efficiency. Freeway management systems meter entering traffic in such a way that maximum traffic flow is maintained on the freeway main carriageways. An increase in the number of managed freeways in Victoria will reduce emissions and greenhouse gases for freeway travel, particularly on a per-vehicle basis due to smoother and more efficient travel, and will reduce resource usage by delaying or limiting freeway widening through increased freeway capacity.

Upgrade of level crossings

Level crossings can also contribute to congestion. Upgrade of level crossings will provide more reliable travel times for drivers and road based public transport as well as improving safety.

Improved intersection design

Other contributions to smoother traffic flow include intersection designs that "keep wheels rolling". Intersection design options include left turn slip lanes, more right-turn passing lanes, use of roundabouts instead of traffic signals – all of which limit the number of times that vehicles must restart from a dead stop. Design options that keep the wheels rolling lead to greater fuel efficiencies and reduce overall greenhouse emissions and air pollutants.

Reduced trip length

We can change our trips by better land-use transport planning to make the average trip distance shorter and more easily served by low-impact modes. Opportunities to more closely link jobs, services and homes in Melbourne and provincial centres, underpinned by the development of six key activity areas in addition to Melbourne's central business district, is clearly dependant upon integrated land use and transport planning. VicRoads has a key role, working with the Department of Planning and Community Development and DoT, to contribute to planning and then implementing projects that are consistent with the overall vision for Melbourne.

Reduced Greenhouse Gas Emissions from Road Construction

Measuring the greenhouse impact of road construction activities

VicRoads has developed a 'carbon calculator' to assess the greenhouse impacts of road construction activities. In what is considered to be an Australian 'first', the calculator was used to identify offsets required for VicRoads' Mickleham Road Duplication Project, making it the first carbon neutral road construction project for a state road authority in Australia.

The carbon calculator is an important first step in measuring the carbon footprint of road construction and understanding which materials have the highest embodied carbon (i.e. carbon generated in the production of materials). Since completing the calculator, it has provided the platform to highlight other environmental initiatives and is providing the opportunity to explore

Springvale Road Grade Separation

The separation of Nunawading crossing allows for safer and more reliable travel for train and bus passengers, motorists and pedestrians. The grade separation, integrated with the design of the new railway station, has created a new pedestrian spine under Springvale Road to minimise conflicts with road traffic. This has greatly improved the quality of public spaces with the station now functioning as an inviting and vibrant transport hub for the surrounding community. Design excellence, integration and sustainability underpin these urban design concepts.



Springvale Road Grade Separation (Artists Impression)

alternative materials so that changes can be made at the design stage to reduce the carbon footprint of roads. VicRoads has committed to the modification of the carbon calculator to enable whole-of-life impacts of road construction and maintenance projects to be assessed and to enable benchmarking across all Australian road projects.

Encouraging the purchase of low emissions materials

Currently, 70% of the embodied energy and greenhouse emissions of the road construction process are associated with construction materials (i.e. concrete, steel, asphalt). To support a focus on reducing emissions, VicRoads is working to reduce the demand for primary aggregate through research into the development and use of recycled materials and secondary aggregates in a variety of different applications. Key within this research is the need to develop new approaches to construction and maintenance (such as accelerated construction methods) and to facilitate trials with key stakeholders to assess the performance of new concrete and asphalt products such as warm mix asphalt and eco-friendly geopolymer concrete, both of which have the potential to significantly reduce greenhouse emissions during manufacture. Further research will also target new maintenance management processes to provide tools and introduce repair methods to realise improved sustainability outcomes, with the aim of significantly reducing carbon emissions and maintenance costs.

Overall, this work will deliver a better understanding of structural behaviour including protection of materials using techniques such as cathodic protection to extend the life of structures. Whole of life costing of options will also ensure that the selected solution is the most effective considering both the construction and maintenance desired outcomes. This will apply not only to construction and maintenance of roads but to roadside furniture including the increasing uptake of renewable energy in roadside furniture, such as help phones, monitoring stations, warning signs, variable speed signs and school speed zones.

Increased offsetting of emissions through carbon sequestration

Photosynthesis is the natural process that trees and plants use to grow. This process uses carbon dioxide from the atmosphere together with sunlight in a chemical reaction to produce oxygen and glucose. It is because of photosynthesis that growing trees can help reduce the emission of greenhouse gases to the atmosphere. Carbon sequestration is the term used to describe this process of absorbing and storing carbon.

Offsetting of carbon emissions from road construction projects is one initiative that VicRoads has already explored. However, our primary aim is to reduce the emissions at source, rather than offsetting from the outset. Nonetheless, options for increasing the carbon sequestration potential of our roadsides will be investigated as part of improving the environmental value and biodiversity of our roadsides (refer to Objective 2.3)



Native vegetation on the Midland Highway

Reduced Greenhouse Emissions from VicRoads Operations

Increased efficiency in street lighting

VicRoads is responsible for lighting on freeways and declared arterial roads, whereas this responsibility rests with councils for local roads. Freeways and arterial roads account for approximately 28% of all street lighting. The great majority of VicRoads' street lighting is provided by high pressure sodium lamps, with the occasional use of metal halide and mercury vapour lamps. Of these three lamp types, high pressure sodium lamps are the most efficient and are recommended for all new street lighting schemes.

Technological innovation has seen a range of new street lighting products emerging in the marketplace that have significantly lower carbon emissions. However, the suitability of these products as replacements for high pressure sodium lamps is yet to be demonstrated. VicRoads will be actively monitoring the technology developments and demonstration of new technologies and once compliant with Australian Standards, will undertake trials of their suitability for the road network.

VicRoads has already concluded a review of design guidelines which will require the installation of more efficient lighting schemes that would reduce the total number of poles, reduce maintenance costs and improve energy efficiency. Additionally, maintenance contracts are to be more specific for the use of efficient luminaries.

Through the Public Lighting Taskforce, established in May 2008, VicRoads will work with the Department of Sustainability and Environment (DSE), Victoria's energy distribution businesses, the Municipal Association Victoria, the Victorian Local Governance Association, the Essential Services Commission, and other interested state government departments to progress the introduction of sustainable public lighting technologies across Victoria.

Increased efficiency in traffic signals

VicRoads owns and manages approximately 3400 sets of traffic signals across Victoria. In 2001, VicRoads adopted a policy to have all new traffic lights fitted with Light Emitting Diodes (LED) fittings which are 87% more efficient than incandescent traffic signal lamps. The

benefits associated with the use of LED fittings are broader than greenhouse emissions and include:

- reduced maintenance costs including globe replacement
- improved traffic signal reliability
- improved traffic signal visibility and road safety
- reduced interruption to traffic flow resulting from reduced signal maintenance events and more coordinated signal maintenance.

Commencing in 2010, VicRoads will upgrade over 30% of its traffic signals from incandescent technology to LED technology with the support of funding from the Department of Treasury and Finance. This three year program is anticipated to deliver approximately 20,000 tonnes of greenhouse savings which over the life of the Strategy will equate to approximately 70,410 tonnes.

Increased use of renewable energy to power street lighting and traffic lights

Additional opportunities will be investigated to increase renewable energy options such as solar and wind for street lighting and traffic lights either directly or indirectly through the purchase of green power.

Improved Vehicle Fuel Efficiency

Increased promotion of lower emission vehicles

Currently, VicRoads offers all hybrid vehicles a \$50 registration discount. In 2010 there were 5701 hybrid vehicles registered in Victoria.

VicRoads will continue to investigate opportunities to influence the purchase decisions of car buyers in regard to low emission vehicles and bring about an increased awareness, in all vehicle operators, of the need for improved eco-friendly vehicle use. Programs such as the ACT's "Green Vehicle Duty Scheme" will be monitored, to assist in the development of future policies that support the use of eco-friendly vehicles.

VicRoads will also work with DoT and the Environment Protection Authority (EPA) to:

- collate and disseminate information on the fuel efficiency and emissions of powered two wheelers and develop advice on eco-riding
- promote the introduction or wider application of alternative fuels, low emission technology vehicles and technologies that have overall environmental and energy efficiency benefits.

In collaboration with other agencies, VicRoads will contribute information or research on what fiscal measures could be applied to shape vehicle owner decisions or the use of transport modes using pricing signals.

Progressing the investigation of potential vehicle emission standards

With Victoria's road fleet expected to increase by 32.5 percent (approximately 1.2 million vehicles) by 2014/2015, there is a need to reconcile legitimate aspirations for mobility with a reduction in greenhouse gas emissions and improvements in fuel economy across all vehicles using our roads.

VicRoads supports the initiatives of the 50by50 Global Fuel Economy Initiative. This is the joint initiative of the Fédération Internationale de l'Automobile Foundation, International Energy Agency, International Transport Forum and United Nations Environment Programme, and seeks to achieve a 50% improvement in fuel economy by 2050 for the world car fleet; a 50% improvement by 2030 for new cars worldwide and a 30% improvement by 2020 for new cars in Organisation for Economic Co-operation and Development member countries. The potential benefits associated with these improved fuel efficiencies are expected to reduce worldwide emissions of greenhouse gas emissions by over 1 gigatonne (Gt) a year by 2025 and over 2 Gt by 2050.

The National Strategy on Energy Efficiency (NSEE) developed by the Council of Australian Governments, outlines a range of potential measures to address emissions from the transport sector. The potential measures to be considered include:

- carbon dioxide standards for new light vehicles
- fiscal measures to encourage the demand and supply of low emissions vehicles
- standards for non engine components
- consumer information measures.

VicRoads is participating in the working group established by the Environmental Subcommittee of the Standing Committee on Transport to coordinate national action on the NSEE transport initiatives particularly as they relate to vehicle fuel efficiency.

Improved Driver Behaviour

Eco-driving programs that educate drivers on the benefits of maintenance for vehicles and fuel economy will contribute to reducing greenhouse gas emissions in Victoria. Key parameters for eco-driving are tyre pressure, tyre balance and wheel alignment, scheduled maintenance of the engine, minimising vehicle loads and removing common unnecessary accessories such as roof racks, or wind deflectors (or "spoilers"). Maintaining an efficient speed is an important factor in fuel efficiency with optimal efficiency achieved while cruising with no stops, at minimal throttle and with the transmission in the highest gear (refer Table 1 over page).

Table 1: Effect of Different Driving Styles on Fuel Consumption and Emissions⁵

Driving Style		Fuel Consumption (L/100 km)	Average Speed (km/h)	Greenhouse gas emissions (g/km)	CO (g/km)	HC (g/km)	NOx (g/km)
Calm	Anticipation, avoidance of sharp accelerations	11.45	28.0	255.8	4.76	0.74	0.21
Normal	Moderate acceleration & braking	12.51	27.0	260.2	15.12	2.37	0.27
Aggressive	Sudden acceleration, heavy braking	15.86	29.2	321.7	26.66	3.80	0.48

Driver behaviour is also important in emissions reduction, as “aggressive” driving styles can lead to disproportionately high emissions of carbon monoxide, oxides of nitrogen and carbon dioxide. The age of the vehicle is also a critical component in determining the level of emissions.

Increased vehicle occupancy rates

Car occupancy has been slowly but steadily declining in recent years while congestion has been increasing. Initiatives to increase vehicle occupancy include:

- installation of high-occupancy vehicle lanes on key freeways and arterials
- education/encouragement/incentives for car pooling initiatives
- technology improvements (e.g. GPS, supply chain management techniques, intelligent vehicle and transport systems).

Safely increasing the average number of occupants in private cars, particularly in peak hour will help reduce congestion as well as reducing emissions associated with car travel.

VicRoads will work closely with DoT to support car pooling initiatives that will ultimately reduce the number of cars on the road.

Improved vehicle safety

Improving road safety is one of the key priorities for building friendly, confident and safe communities. Improving road safety can also have an indirect impact on greenhouse gases generated within the State. As the life cycle impact associated with the manufacture of a new car is in the order of 10 tonnes of greenhouse gas emissions⁶, any initiatives that reduce the need for vehicle repair or replacement of cars provide an indirect reduction in the amount of greenhouse gases generated within the economy.

Objective 1.2 – Improved Sustainability in Road Construction and Maintenance

Increased Use of Recycled Materials in Road Construction and Maintenance

The construction and maintenance of freeways and arterial roads demands significant amounts of materials. As such, the procurement of suitable and cost effective roadmaking materials is an essential component of VicRoads construction and maintenance activities. The necessity for earth-based materials such as gravel, aggregate, crushed rock and sand, creates impacts for resource depletion, environmental degradation and energy consumption. Most of these materials can be fully or partially replaced with recycled materials (provided they meet specified performance criteria). In addition, asphalt used for maintenance on existing roads can be partially substituted with recycled asphalt products.

VicRoads has a key role in resource conservation through ensuring that roadwork specifications encourage the use of recycled materials and sustainable procurement. In doing this we can help to conserve natural resources as well as reducing embodied energy content of road construction and consequently greenhouse gas emissions.

VicRoads will investigate ways of encouraging the increased use of recycled materials in road construction and maintenance including the following:

- excavated soil
- crushed concrete and crushed brick reclaimed from demolition material and excavation stone from land development, used as road pavement material
- cement containing significant quantities of supplementary cementitious materials such as fly ash and ground blast furnace slag

⁵ Institute of Transport Studies. Passive measurement of on-road driving style: a precursor to outcome evaluation of the EcoDrive Program. November 2003

⁶ <http://www.3mercedes-benz.com/fleet-sales/en>

- waste products as a blend component of fill or pavement material to reduce use of natural materials and to limit material being disposed to landfill, (e.g. biosolids, mine tailings, furnace slag, recycled glass, recycling crumbed rubber from discarded tyres and by-products from tyre manufacturing in bituminous binders for sprayed sealing works subject to environmental constraints)
- recycled or non-potable water from a variety of sources (e.g. sewage treatment plants and industrial wash waters) [see Objective 2.4]
- 100% recycled high-density polyethylene (HDPE) pipe in place of concrete pipe on road shoulders and for new guideposts along our roadsides
- reclaimed asphalt from roadworks for re-use in pavement asphalt mixes.

Increased use of contract incentives to encourage project sustainability

VicRoads has recently launched a sustainability rating tool for road construction projects. Named 'INVEST' it will be used to drive innovative environmental outcomes on new projects and propel the road construction industry towards a triple bottom line approach which will promote environmental, social and economic benefits to the community.



INVEST – Integrated VicRoads Environmental Sustainability Tool

Tools such as INVEST and the carbon calculator will be used to assess sustainability and climate change outcomes within tender evaluation processes. VicRoads has already applied contractual incentives to reduce the carbon footprint of road construction works. Further contractual options are being investigated to encourage a reduced carbon footprint at tender stage as well as during construction and maintenance projects. This is consistent with the decision making principles set out in the *Transport Integration Act* in relation to the assessment of economic, social and environmental costs and benefits.

Objective 1.3 – Adaptation of the Road Network to Meet the Challenges of a Changing Climate

Climate change, resulting in more extreme and frequent severe weather, may have an effect on Victoria's road infrastructure in a number of ways including the following:

- increased range of temperatures leading to increased thermal loading effects and degradation of structural material
- more severe and frequent flooding and/or flowing water volumes leading to increased hydraulic loading on structures and more severe scour-damage to foundations
- sea level rise near the coast and storms may result in flooding of roads
- increased flow-volumes and maximum water-levels leading to need for longer and higher bridges
- more severe wind-loading and more frequent exposure to high wind loads
- higher tides and frequent storms in coastal areas leading to more severe exposure to saline environments and as a consequence, higher initial cost/resource usage in new structures and shorter life/higher maintenance costs in existing structures
- reduced rainfall in dry areas leading to higher salinity in soils and groundwater, desiccation and shrinkage of clay soils all of which can lead to damaging effects on structures.

Managing Infrastructure Risk

There is increasing evidence that climate change is already having an impact on the condition of the road network. The changes in rainfall patterns, higher temperatures and more regular severe and/or frequent adverse weather events over recent years have resulted in a noticeable deterioration in the condition of the road network in many parts of Victoria and an escalation in asset management costs.

VicRoads in conjunction with DoT and DSE are reviewing information regarding sea level rises and rainfall patterns (frequency and severity) to assess the impact of climate change on bridges, structures and the arterial road network.

This will generate a specific work program which may include a range of responses such as:

- improving slope stability
- increased resourcing to emergency response requirements as a result of flooding of coastal roads
- more frequent warnings on bridges during high wind events.

Existing methods of evaluating safety risk within the road network will be evaluated in the context of national disasters (such as bushfires and climate change).

Objective 1.4 – Improved Air Quality

The EPA notes that Melbourne's air quality has improved since the 1980s. In an international context (compared to similar urban centres) Victoria's air quality is relatively good. However, the largest polluter (particularly in relation to nitrogen oxides and hydrocarbons) is the motor vehicle.

Implementation of National Fuel Quality Standards

At a national level, VicRoads and EPA are involved in the development and implementation of Australian Design Rules for national fuel quality standards to further improve the pollution levels of new vehicles. National fuel quality and vehicle emission standards mean emissions from petrol vehicles will continue to improve. As a result of these standards, it is predicted that by 2021, emissions from passenger vehicles will reduce as follows:

- volatile organic hydrocarbons will fall by 48.9 per cent
- nitrogen oxides will fall by 9.5 per cent
- carbon monoxide will fall by 11.3 per cent
- particles less than 10 microns in diameter will fall by 1.3 per cent.⁷

Improved Dust Control on Road Construction Projects

For all of VicRoads' road construction and maintenance projects, contracts require that dusts generated will not create a hazard or nuisance to the public, disperse from the site or across roadways, or interfere with crops, stock or dust-sensitive receptors. Further work is underway to improve construction activities including the potential inclusion within contracts requiring catalytic converters and particulate filters on all diesel plant and equipment.

Reduced Freight Volumes in Active Spaces

Currently, road trucks carry most of the freight in Victoria by volume, moving 89 per cent of the task in tonnes. Since 1995, the freight task has grown by 5% per year.

Looking forward, it is anticipated that:

- by 2020, the freight volume across all transport modes will increase by 47 per cent from today's levels
- by 2030, the freight task will be almost double its current size
- the number of kilometres travelled by road freight vehicles within metropolitan Melbourne will increase by 77 per cent by 2020
- the number of tonnes of freight moving around Melbourne by road will at least double by 2030 from today's levels

- by 2030 there will be an increase of 85 per cent in the number of freight vehicles registered in Victoria and an increase of more than 100 per cent in the number of light commercial vehicles registered in the State
- by 2030, the Port of Melbourne will be handling nearly seven million containers (twenty foot equivalent units) each year, over three times the current levels and accommodating at least a 57 per cent increase in the number of ships visiting the port.

The concerns relating to freight in urban centres also extends to regional Victoria. Growth in tonne-kilometres in the regional and interstate Victorian road task has increased 128% from 1991 to 2007 from 12.89 to 29.34 billion tonne kilometres, with regional Victoria responsible for 70 per cent of the total road tonne-kilometre. Improving agricultural productivity combined with growth in timber plantations, mineral sands and coal development will alter and add to the freight task which is expected to grow to 160 million tonnes by 2020.

Freight often causes particular concern for land owners and occupiers. The noise of freight and its sheer bulkiness can reduce the amenity of urban and rural areas.

The future vision for freight involves the development of freight centres to support the network of freight movements across the State. The idea is that by concentrating freight destinations together as much as possible and linking them primarily by freeways and higher order arterial roads, the growth in freight on the remainder of the network will be slower.

The impact of freight is particularly relevant where the main road goes through town centres, carrying high volumes of through freight. Increasingly, local Councils are working with VicRoads to identify truck bypass towns that may use a combination of local and arterial roads, and require minimal improvement works to make them useable by heavy vehicles. Successful truck bypass routes provide better travel time or reliability outcomes for trucks, do not bypass significant truck stopping facilities and improve amenity in town centres.

Development of Air Quality Mitigation Measures

An air quality research programme will be developed, in conjunction with EPA, to better understand the impact of vehicle emissions on the Melbourne metropolitan area. This will assist in determining the most appropriate mitigation measures such as freeway management systems to control traffic speed or the impact of noise barriers as pollutant barriers.

⁷ Environment Protection Authority, Victoria. Victorian Emission Factors 2006-2011-2021 Dated 29 January 2010. Based on a petrol passenger vehicle driving at 80 km per hour

Objective 1.5 – A Reduction in Road Traffic Noise Impacts

Traffic noise is a cause of ongoing disturbance for residents adjacent to major roads throughout Victoria. A survey conducted for EPA in February 2007 indicated that of all noise related issues, road traffic noise was the single most significant problem reported by Victorians, with 28 per cent of respondents being moderately to extremely disturbed by traffic noise. The most commonly described impact of traffic noise was sleep disturbance.

Reduced Use of Engine Brakes in Residential Areas

A particular challenge for the future management of traffic noise is the growth in night time freight traffic, which is expected to increase as a result of Victoria's increasing population and economic activity. This is of particular concern given the increasing number of community complaints regarding the inappropriate use of engine brakes.

Research undertaken by the National Transport Commission has led to the development of an in-service standard and test procedure for engine brake noise. In late 2007, all State and Territory transport ministers approved model laws to implement the standard and test procedure for engine brake noise. The implementation of the national laws is a key action to minimising the amenity, environmental and climate change impact of freight transport.

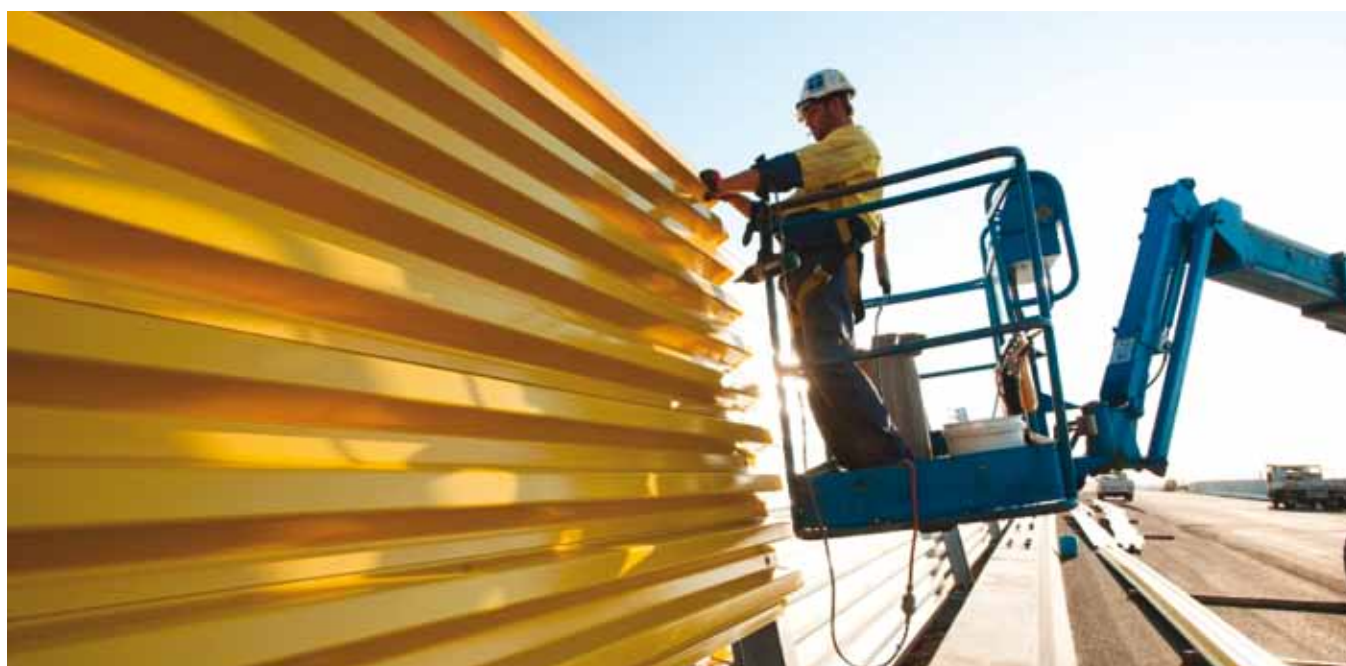
Continued Noise Attenuation in Accordance with VicRoads Traffic Noise Reduction Policy

As well as addressing the source of noise, attenuation of noise can also be achieved through infrastructure improvements. The State Government has committed \$100 million over 12 years to an ongoing program of retrofitting noise walls on Melbourne's freeways. Properties recognised as meeting VicRoads' *Traffic Noise Reduction Policy* are eligible for consideration in the program. Measured noise levels, the number of affected households and the cost of attenuating the noise are all factors in the prioritisation of sites each year.

Whilst typically installing reflective noise walls, VicRoads has also installed sound absorbent noise walls at a number of sites in Melbourne. These walls act to soak up traffic noise rather than simply reflect it back toward the road. Whilst the use of absorbent walls has reduced in recent times due to maintenance difficulties, VicRoads is investigating options to install modern absorbent noise walls similar to those in use in some European and Asian countries. It is expected that these will result in reduced traffic noise levels, particularly during meteorological conditions which normally cause traffic noise to travel over long distances.

In addition to noise walls, open grade asphalt may be used for paving freeways in urban areas. Open graded asphalt addresses the most significant cause of traffic noise, which is the interaction between vehicle tyres and the road surface. Because it is porous, noise from tyres actually goes down into the road where it is absorbed.

Acoustic treatments such as double glazing to individual houses may also be considered when noise walls are inappropriate.



Installation of Noise Wall at Deer Park Bypass

Direction 2 – Protecting and Enhancing the Natural and Cultural Environment

Objective 2.1 – Improved Mapping of Environmental Values within VicRoads-Managed Roadsides

VicRoads manages approximately 80,000 hectares of roadsides across the State. These roadsides contain important biodiversity, aesthetic, social and cultural heritage values, as well as critical pieces of environmental infrastructure (e.g. water sensitive urban design elements) that need to be carefully managed.

VicRoads will work with key Government stakeholders to develop and implement a consistent mapping system that enables all significant environmental values on VicRoads-managed land to be tracked and maintained. This will assist with environmentally responsible project planning, and will also form the basis for specific environmental management clauses to be included in new and existing maintenance contracts to ensure these values are appropriately managed.

Objective 2.2 – Improved Recognition and Management of Heritage and Native Title

Australia has a history of Aboriginal and non-Aboriginal human occupation covering more than 40,000 years. Human beings leave many different records of their history – some are intentional monuments and documents of their time, others are contained in the landscape we see around us or in the objects used and discarded by people every day. It is this diverse record of the past which is our cultural heritage.

Road construction activities can impact on both heritage values and native title rights and interests, which are underlying rights of Indigenous people in traditional lands and waters. VicRoads recognises the importance of protecting and managing cultural heritage and native title rights for current and future generations, and seeks to avoid these impacts wherever possible.

Area-based Operational Agreements with Key Indigenous Stakeholders

Engagement and agreement making with key Indigenous stakeholders is seen by VicRoads as a critical component of our effective management of Victoria's Aboriginal cultural heritage and native title interests.

As part of our ongoing commitment in this area, VicRoads will develop area-based operational agreements with all Registered Aboriginal Parties under the *Aboriginal Heritage Act 2006 (Vic)* by 2015. These agreements will outline standard commitments and processes on all aspects of VicRoads service delivery to Indigenous communities, including Aboriginal heritage management, Indigenous engagement, delivery of roads safety and vehicle registration and licensing programs, training and employment.

VicRoads will also actively participate in the implementation of the Victorian Government's *Traditional Owner Settlement Act 2010* in consultation with key traditional owner claimant groups.

Greater Recognition of Heritage and Native Title Values

To assist in the effective management and recognition of cultural heritage in Victoria, VicRoads will release policies on cultural heritage recognition and interpretation including 'Welcome to Country' signage, interpretative displays and Indigenous road naming.



VicRoads 'Welcome to Country' Signage Template

Improved Cultural Heritage Management Training to all Road Construction Personnel

VicRoads has also committed resources to develop an "ochre card" training program in partnership with Aboriginal Affairs Victoria (AAV) to facilitate better on-site Aboriginal cultural heritage management during construction projects. This supports existing training requirements for "red card" (occupational health and safety awareness for construction employees) and "green card" (environmental awareness training for delivery staff within VicRoads).

Improved Management of Roadside Heritage Values

Many of the cultural heritage assets managed by VicRoads are highly significant places that are valued by local communities and which contribute to community identity and 'sense of place'. These assets include bridges, building remains, historic road surfaces, mining sites and Avenues of Honour, as well as Aboriginal heritage places. To better facilitate this, VicRoads supports the *Victorian Cultural Heritage Asset Management Principles 2009* and will incorporate ongoing heritage management and maintenance requirements into updated road management plans for key Victorian roads. VicRoads will also develop specific heritage management plans in consultation with Heritage Victoria, AAV and relevant Indigenous stakeholders for identified high significance heritage sites within VicRoads managed road reserves.

Objective 2.3 – Improved Biodiversity Values

Enhancement of Native Vegetation Values

Protecting biodiversity through the management and protection of native plants and animals is a high priority for VicRoads. VicRoads is committed to the protection of biodiversity within Victoria and where possible, to enhancing biodiversity values within its control to meet the State Government objective to reverse the long term decline in the extent and quality of native vegetation leading to a 'net gain'.

VicRoads recognises that its operations may impact on native vegetation. When this occurs, VicRoads is committed to:

- adopting the three step approach which is the hierarchy of avoid, minimise and offset impacts on native vegetation as outlined in *Victoria's Native Vegetation Management: a Framework for Action* (DNRE 2000)
- avoiding, where possible, areas of significant vegetation as we develop the road network
- identifying opportunities to enhance the habitat values in our network for banking of offsets for future projects.

In recent years, VicRoads has adopted a more strategic approach to acquiring larger land parcels as vegetation offsets for future projects (5-10 year time frames), which will be able to assist in maintaining greater functionality of corridor connectivity, creating biolinks and recreating otherwise fragmented habitats.



Growling Grass Frog

Increased 'banking' of native vegetation and threatened species offsets

VicRoads will continue to develop a forward planning program to enable more extensive strategic pre-purchasing of native vegetation and threatened species offsets for upcoming road construction projects. VicRoads will also work with key Government stakeholders and third-party offset providers to facilitate ongoing process and market improvements in relation to offset sourcing.

Increased facilitation of biolinks

Many of the connections between Victoria's natural habitats have been severed by land clearing and changed land uses, leaving some habitats isolated. The additional challenges of climate change make it increasingly important for species to be able to migrate and for ecosystems to reorganise as they adapt.

One of the three strategic directions outlined in Chapter 2 of the Department of Sustainability and Environment's *Securing Our Natural Future: A White Paper for Land and Biodiversity at a Time of Climate Change 2009* is to improve connectivity in areas identified as biolinks. Biolinks are identified areas where ecological function and connectivity is restored or enhanced, improving the potential of plants and animals to disperse, recolonise, evolve and adapt naturally to climate change.

VicRoads will work with DSE to develop a more strategic approach to native vegetation offsetting and revegetation in the context of road construction activity that facilitates increased connectivity within biolinks through improving the condition of existing habitat, or connecting separated habitats.

Where roadside vegetation and transport corridors are included in the implementation of biolinks, careful consideration will be given to health and safety issues to ensure that connectivity outcomes are compatible with road and fire safety objectives and with operation of the transport corridor.

More strategic treatment of roadside weeds

VicRoads will collaborate with the Department of Primary Industries (DPI) on a strategic approach to weed management that ensures that weed management funding is targeted at Victoria's most significant risks, including a greater focus on prevention rather than eradication or control.

Reduced Habitat Fragmentation and Road-kill through Improved Implementation of Fauna Crossings

The road network has the potential to have a significant effect on wildlife and ecosystems through habitat fragmentation, reduced dispersal and mortality by collision with vehicles.

VicRoads is committed to investigating opportunities to facilitate fauna movement, where possible, through the provision of fauna crossings (underpasses or overpasses), aiming to reduce fragmentation of habitats and improve and maintain species diversity. This will involve the investigation of best practice in this area to inform the development of detailed guidelines on fauna crossings to assist in more consistent implementation.

Installed crossings will be subject to a monitoring regime that will yield information on their effectiveness enabling better decisions to be made on future mitigation measures.

Improved Roadside Landscaping

VicRoads will continue to promote the use of indigenous plants grown from locally sourced seed for roadside landscaping, particularly in rural areas where biodiversity conservation is a primary objective. Non-indigenous plant selection will only be adopted where other constraints preclude the use of local species. In a drying and warming climate, the requirements for planting design are likely to change. Higher drought and heat tolerance in plants will be required in the landscape, particularly for longer lived species.

When new roads are built, seed from local trees and plants will be collected prior to any vegetation clearance to ensure the continuation of local species.

Objective 2.4 – A Reduction in Impacts to Water Resources

A key component of urban design is the need to protect natural water systems and integrate stormwater treatment into the landscape to protect water quality, preserve the natural hydrological regime of catchments and reduce future flood risks in urban areas.

Road and traffic infrastructure development activities contribute to alterations of natural drainage patterns of both surface waters and groundwater. During the

operation and maintenance of roads, a variety of pollutants may enter into the roadside environment affecting water quality. Therefore management of both water quality and quantity is important and needs to be addressed at the different stages such as planning, design, construction, operation and maintenance. It is important that VicRoads ensures it incorporates appropriate water management practices in these stages, in order to preserve water, protect the quality of water resources and preserve ecosystems.

In recognising its responsibility in protecting Victoria's water resources and quality, VicRoads will continue to implement best practice site management techniques on all its construction projects and maintenance activities and design and develop an integrated approach to identify and mitigate risk and implement solutions to minimise the impact on waterways and catchments.

Reduced Water Consumption through the Increased Use of Non-Potable Water

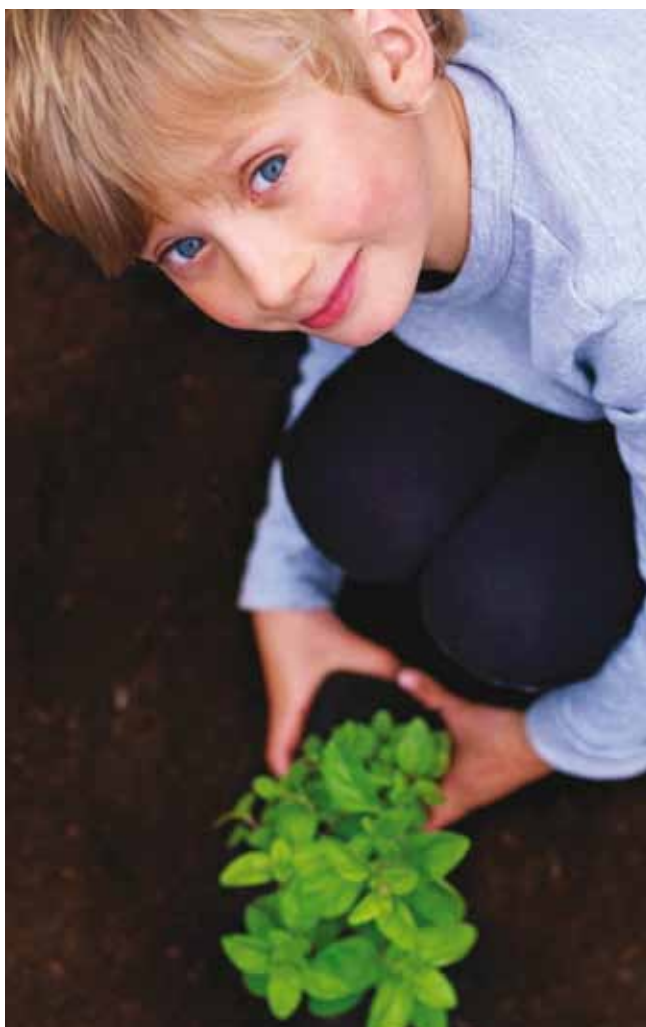
Given the impacts of the current drought and the long term projections under climate change scenarios, VicRoads, like many organisations, recognises that water is a valuable and scarce resource that must be managed for future generations. In road construction, there is the potential for large amounts of water to be used for dust suppression and material compaction work. Therefore, VicRoads aims to ensure that any road related activities minimise their potable water use by using alternative low quality sources (including sewage treatment plants, quarries, industrial and waste waters and groundwater not suitable for domestic or stock use) and seeks to identify practices to reduce water consumption and to use water in a more sustainable manner.

VicRoads will continue to identify non-potable water sources for use in road construction and maintenance activities, and will minimise the use of potable water in the future for all activities associated with the construction of the road network, its maintenance and operational activities. To this end VicRoads objectives are that, by 2015, 80% (by volume) of all water used during road construction, and 40% of all water used for regional projects and maintenance, is non-potable.

In addition, no groundwater extraction or surface water will be used where a higher fit for purpose use can be identified (i.e. drinking water, stock watering or irrigation).

Improved Protection of Catchments through Water Sensitive Road Design

Water sensitive urban design is closely allied to vegetation design and management, particularly in an era of declining rainfall and reduced soil moisture. While the first principle of water sensitive road design is to maintain the natural patterns of hydrology and water quality, there is an emerging concept for the design to support vegetation and contribute to shading and cooling in urban areas. VicRoads will seek to further improve road design so that road runoff is better used as a source of passive irrigation for roadside plantings.



Direction 3 – Fostering a Culture of Leadership and Best Practice on Sustainability and Climate Change

Objective 3.1 – Development of Environmental Leadership and a Sustainability Culture

Building a Sustainable Culture

VicRoads recognises the importance and impact of culture on achievement of our Strategic Directions. In October 2009, VicRoads embarked on the *Many Voices, One Culture* project to define and improve our culture.

A significant outcome of this project has been the identification of the culture that will best support us to achieve improved outcomes into the future by focussing on how we do what we do.

This culture identifies *key ways of being* with specific behaviours that are focused on *accountability, customer focus, innovation* and *being one team*. In the ensuing months and years, these ways of being will support us to work more effectively and make the best decisions about how we use our resources and time as we work towards making the transport system and our own actions more sustainable.

A first step in achieving a new sustainable culture will be the delivery of our first sustainability report. Consistent with a growing trend, both globally and in Australia, in which a number of public agencies have produced sustainability reports, VicRoads will seek to deliver its first corporate sustainability report in 2010/2011.

The Corporate Sustainability Report will help escalate the value of sustainable practices and assist VicRoads' communications with stakeholders to provide insight into environmental, social and governance practices and how they are integrated into core business strategy.

While road construction and maintenance activities make up the greatest proportion of VicRoads' environmental footprint, we also have an impact on the environment through our day-to-day office based activities. Building on the achievements already implemented through the *Eco-office Challenge*, a further program of awareness, learning, values and sustainability practices will be initiated to reward behaviours that support sustainability in our everyday activities; from our use of resources (paper, water, energy, fuel) to our generation of waste (both construction and office based).

Outside the construction and maintenance areas our commitment to water conservation measures will require water and energy audits to be undertaken for all major offices and depots and performance contracting arrangements to be implemented to pursue any measures identified.

Influencing Policy Change through Collaboration

Continue to participate in national collaboration with other Government departments and agencies with respect to national transport reforms

VicRoads has been a leader in national collaboration contributing to improved national laws, guidelines and practices. VicRoads, in conjunction with DoT, and other Victorian Government Departments has in recent years been actively engaged in proposing and designing national transport reforms addressing heavy vehicle regulation, transport research, transport and land-use planning, congestion management, safety initiatives and environmental strategies.

VicRoads will continue to work with other government stakeholders including DoT, EPA, DSE, the DPI, AAV,



Melbourne Water, the Country Fire Authority and local Government on key sustainability and climate change issues.

VicRoads will also continue to collaborate with the COAG (through the Transport and Infrastructure Standing Council), the National Transport Commission and other State and National Road Authorities on any initiatives of mutual benefit intended to encourage the protection of our environment and the improvement of health through building and investing in transport systems that minimise emissions and consumption of energy and resources.

Continue to develop key partnerships with industry partners

VicRoads recognises the importance of stakeholder engagement and partnerships in developing better solutions to address many of the key environmental challenges currently facing the Victorian transport system. Strong partnerships with external stakeholders are critical in terms of garnering input into key environmental policies and initiatives, the streamlining of administrative and legislative processes, and the continued effectiveness of 'joined up Government'.

VicRoads has also established strong partnerships with industry associations to deliver benefits to industry and the broader community. Working with our industry partners assists both our workforce as well as our contractors prepare for the challenges of sustainability and climate change in developing innovative new tools, materials, or methodologies that can realise improved sustainability outcomes which can contribute towards reducing carbon emissions and maintenance costs.

VicRoads will continue to collaborate with industry partners such as the Civil Contractors Federation, Australia Asphalt Pavement Association, and the Intelligent Transport Systems industry on key sustainability and climate change issues.

Continue to develop key partnerships with the community

Stakeholder engagement is an essential element of VicRoads decision-making process. Effective engagement provides an opportunity for individuals and organisations to be informed about particular initiatives and, where possible, assist with risk identification and provide input into decision-making.

It is critical that VicRoads engages effectively with the community and interest groups to ensure they feel connected and part of decisions that affect them and their neighbourhoods from an environmental, social, economic and cultural perspective.

VicRoads is committed to developing and implementing an updated community and stakeholder engagement model including staff training, systems and tools. This model will enable stakeholder engagement to be tailored to meet specific project objectives and target the stakeholders unique to the project by enabling the selection of engagement processes and activities that are the best fit for the relevant project or decision. It will also facilitate transparent and honest communication to stakeholders about the purpose and scope of engagement, so that stakeholders are aware of how their participation may influence outcomes.

Objective 3.2 – Improved Organisational Capability on Sustainability and Climate Change

Investing in the skills and capabilities of our employees to enable them to reach their potential and contribute to the sustainability outcomes is at the heart of this strategy.

In the last year, "green card training" has been made mandatory for all project delivery personnel to aid in improving environmental outcomes on construction projects. To date, ten courses have been run which were attended by approximately 200 staff and contractors.

In addition, a technical capability building program will be developed to map staff capability in managing and delivering sustainable and environmentally sensitive services and projects across all of the VicRoads divisions. The analysis of staff capability data generated by this program will be used to identify key capability gaps for learning and development interventions designed to increase capability levels to enable the implementation of the actions designed to deliver on the objectives of this strategy.

Objective 3.3 – A Reduction in the Environmental Impacts of Our Vehicle Fleet

Improve the fuel efficiency of VicRoads fleet vehicles

VicRoads currently manages a fleet of approximately 650 vehicles of which 12% are hybrid and 6% are LPG⁸. Greenhouse gas emissions from the vehicle fleet per 1000km in 2008-2009 were 0.23 tonnes of greenhouse gas emissions per 1,000 km, a reduction of approximately 10% on the previous year. Biodiesel (E10) purchases represented less than 1% of the total fuel purchased.

⁸ Total energy consumption for 2008/2009 for the vehicle fleet was 62,405,465 MJ

Over the last four years, there has been a 20% decrease in the purchase of 6 cylinder vehicles and a corresponding take up of 4 cylinder cars now representing 51% of the fleet. Over the coming years, it is anticipated that the percentage of hybrid vehicles will increase by approximately 5% per year. This will ensure VicRoads will meet the government target of reducing overall fleet emissions by 20% by 2015. Further measures may be required to meet a national vehicle efficiency target, however, in the meantime a combination of changes in vehicle type across the VicRoads vehicle fleet and eco-driving programmes will be implemented to promote awareness and uptake of more economical driving practices that improve fuel efficiency and safety, with consequential benefits in reduced greenhouse gas and air pollution emissions.

Increased use of alternative fuels by the VicRoads fleet vehicles

Alternative fuels have been identified as a potential path to reduce emissions and dependency on petroleum, although one that is less economically attractive than adopting more efficient engine technologies. Widespread adoption of alternative fuels may require substantial national investment in infrastructure to distribute and safely and conveniently dispense. Any progress is likely to be nationally coordinated.

The Commonwealth is preparing an Energy Green Paper which is expected to consider energy sources for transport. Depending on the national directions, VicRoads will provide advice on the planning and operational impacts of alternative fuels progressively adopted by the Victorian fleet.

Trial of electric vehicles

There is considerable interest in electric vehicles across Australia. This highlights the need for a national forum for information exchange on electric vehicle impacts and related activities. Proponents of electric vehicle leasing schemes are indicating potential for very rapid take-up of electric vehicles over the next few years. A major driver for this will not be limited to transport but the ability with a large electric vehicle fleet to spread power demands across the day.

As part of this process, VicRoads will identify the potential planning and operational issues associated with various rates of adoption of the technology. There are likely to be significant changes in service centre needs, changed land-uses in regional areas to support energy generation with transport impacts and consideration given to configuration of parking to enable recharging points across cities and towns.

VicRoads will also contribute to national developments in vehicle standards and design rules to develop nationally consistent technical, regulatory and safety standards for electric vehicles and recharging infrastructure.

More Sustainable Staff Travel

Together with the Low Emission Vehicle Partnership and DoT, VicRoads is trialling eco-driving training with its own fleet and drivers. Eco-driving is a driving style that reduces fuel use and emissions. This offers a potentially low cost and relatively immediate reduction in emissions and brings other safety and workplace benefits according to available research. With a long history of achieving major changes in driver behaviour changes to improve road safety, VicRoads is interested in the potential for developing



improved training and attitudinal programs to improve driving efficiency and the emissions footprint of its own operations. Lessons learned with the VicRoads fleet may be applied to other fleets and ultimately be offered to the public.

VicRoads is also currently participating in a TravelSmart program with Boroondara Council to develop a workplace travel plan which will outline the actions to increase sustainable travel.

The VicRoads Green Travel Plan released in 2010 identifies a number of short-term, medium-term and long-term initiatives to encourage VicRoads' employees to take alternative methods of transport to and from work and to support cycling options through improved physical and social infrastructure.

The targets for VicRoads' Kew and Camberwell sites over a two year timeframe (2010-12) are:

- reduce staff driving to work alone to 52.5% (currently averaging 62.5%)
- increase public transport use to and from work by 5% (currently 24.4% Camberwell; 9.5% Kew)
- increase carpooling take-up by 2.1% (currently averaging 7.5%)
- increase number of staff that change to 1 day/week using sustainable transport
- increase % staff walking to and from work (currently averaging 2.1%)
- increase % staff cycling to and from work (currently averaging 2.6%).

By 2015 this program will be extended to all VicRoads major offices.

Further work is also planned to reduce the need to travel and to provide more sustainable transport choices (e.g. video-conferencing and greater encouragement and uptake of remote access to allow employees to work from home).

Objective 3.4 – Improved Sustainable Procurement Practices

All products and services have some impact on the environment, which may occur at any or all stages of the product's life cycle – raw material acquisition, manufacture, distribution, use and disposal. Where possible, environmentally friendly or green products and services are preferred as they contribute less to the harmful effects on human health and the environment than competing products and services serving the same purpose.

Increased Purchase of Renewable Energy

VicRoads is committed to the purchase of 25% green energy for sites using greater than 160 MWh per year (representing 22% of all VicRoads sites) from 2010 increasing to 35% by 2015 and 50% by 2020 in line with Government commitments.

Development of a VicRoads Sustainable Procurement Strategy

Whilst certain areas of VicRoads are already purchasing green products/services, this needs to be integrated across the organisation.

To co-ordinate sustainable procurement practices across the organisation, VicRoads will undertake a review of barriers to sustainable procurement and develop a comprehensive procurement strategy to overcome them. This strategy will develop a resource of preferred green suppliers, products and services (including green office stationery and furniture) through consideration of the whole-of-life of a product or service that has the lowest overall environmental impact. Educating manufacturers and suppliers to have greater responsibility for the life cycle impacts of their products (e.g. product stewardship schemes) will be undertaken by incorporating a clause within contract specifications (for road and non-road products) that indicates a preference for green products and services whenever they are fit-for-purpose.

Increased Sustainable Procurement in Information Technology

In developing an approach to 'Green IT' VicRoads is engaging actively with Victorian Government agencies in the development of a Whole of Victorian Government framework. In advance of the finalisation of the framework, VicRoads is working to improve environmental sustainability in a number of areas, namely:

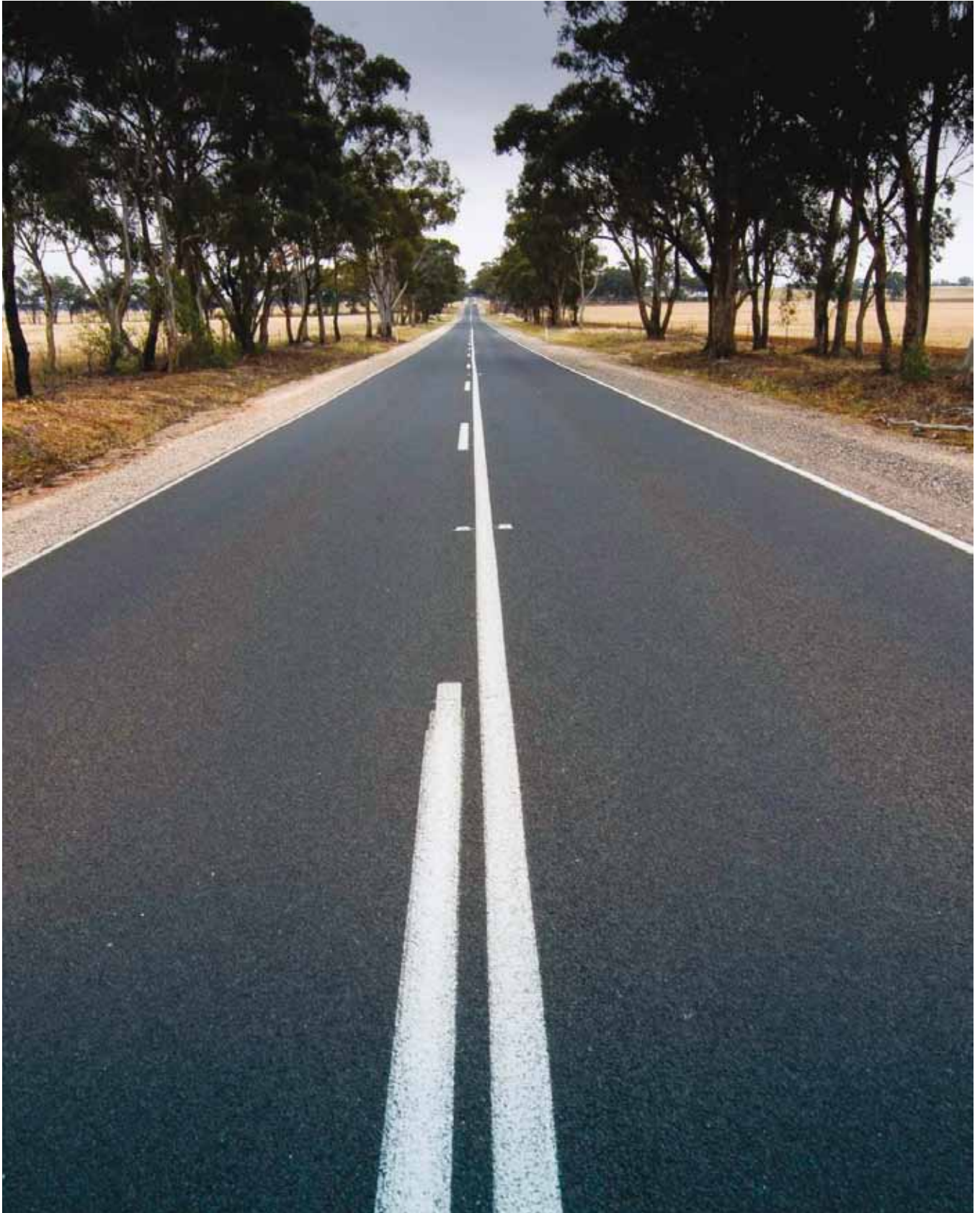
- adoption and implementation of server and storage virtualisation to consolidate infrastructure and reduce energy consumption
- consideration of environmental impacts as part of VicRoads Information Management and Technology Strategy development, including but not limited to the hosting, telecommunications, and sourcing strategies
- establishing green procurement contracts for information and communications technology (ICT) consumables where appropriate.

Measures to increase sustainable procurement will include the release of a Green IT plan incorporating strategies such as:

- exploring opportunities to build Green IT outcomes into contracts with third party ICT service provider contracts
- improving awareness of Green IT policy and objectives
- and building Green IT objectives and outcomes into VicRoads projects
- further consolidation of common ICT services and infrastructure as part of the Department of Treasury and Finances Efficient Technology Services program.

The goals of the Sustainability and Climate Change Strategy will be supported by a Sustainability and Climate Change Action Statement, which will be a 'living document' that will be reviewed and updated annually.

The Action Statement will outline key actions to be implemented in relation to each strategic direction, and will specify desired objectives, outcomes, key performance indicators (where relevant) and implementation responsibilities and timeframes.





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