



# EPA DISCUSSION PAPER

## DRAFT CARBON MANAGEMENT PRINCIPLES

### Foreword

Climate change is a critical issue that can only be addressed through innovation and collaboration. We all have a role to play. Increasingly EPA Victoria is finding that businesses are eager to act. Many companies are approaching EPA for support and advice on how to manage this emerging issue, especially in the area of becoming a 'carbon neutral' organisation.

In order to provide practical support to these companies, we knew that EPA needed to experience the challenges of going carbon neutral first hand. We sought best practice for our carbon neutral plan, and soon found that there were multiple definitions and protocols than could be used and that we needed to develop a new decision framework to guide our approach.

We captured and expressed this framework in a set of draft Carbon Management Principles. Companies have been telling us that they are looking to learn from the experience of others and that such a framework is useful. We have therefore developed this discussion paper on the Principles that can serve as a guide to help organisations in and beyond Victoria practically and strategically manage their carbon emissions.

We encourage your organisation to contribute to improving these principles by assessing their value and applying them to your business. We invite you to provide feedback on the draft principles so that we can publish a finalised version of the discussion paper later in the year. Already, we have received valuable feedback from businesses on the principles and have incorporated their suggestions into this discussion paper.

We would also like to hear from you if there are other types of guidance or tools that would assist your company in reducing its greenhouse impacts. To facilitate this we have established a Carbon Innovators Network aimed at two-way communication between EPA and members on carbon management issues. Companies such as City West Water, Origin Energy, the Plastics and Chemicals Industries Association and Pilkington (Australia) are already participating. We encourage you to join us.



Mick Bourke, Chairman EPA Victoria

**MICK BOURKE**  
Chairman, EPA Victoria

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## Part 1

# Introduction

**Carbon neutral** is a concept where entities measure their full carbon footprint and then implement measures such as energy efficiency, sourcing renewable energy and offsetting residual GHG emissions so that their net greenhouse impact is zero. Products, events and households can all go 'carbon neutral'.

This discussion paper outlines draft Carbon Management Principles ('the Principles') that EPA Victoria (EPA) is developing to help businesses identify and assess strategies to reduce their greenhouse gas (GHG) footprint.

## WHY USE THE PRINCIPLES?

With the impacts of climate change continuing to intensify, we need to take immediate and significant action to reduce GHG emissions. As the pressure for action grows so too does the range of programs, products and technologies aimed at engaging society to reduce our greenhouse footprint. In this context it is often difficult to decide how to prioritise actions and to assess which approaches provide the best environmental and financial outcomes.

The Principles provide a step-by-step framework that organisations can use to maximise environmental outcomes and drive business benefit in relation to energy and greenhouse management. The Principles reflect a continuous improvement model, given the ongoing nature of carbon management and the opportunity to iterate management strategies to optimise environmental and financial outcomes.

The Principles should be applied to decision-making processes having regard to the specific economic, technological and social considerations of each situation. In many cases the environmental, social and economic benefits will coincide. Each organisation will have its own criteria for assessing business value, and EPA is looking to work with businesses to evaluate how the Principles can assist in maximising outcomes from carbon management strategies.

## WHAT ARE THE BENEFITS OF USING THE PRINCIPLES?

The Principles set out actions that provide the basis for a robust carbon management strategy when applied in order. The Principles prompt you to assess your strategy and respond to new opportunities and technologies as they occur. Considering the options in order will drive best environmental outcomes, and best business value.

The Principles can help companies optimise actions, irrespective of whether the goal is modest emissions reductions or achieving carbon neutrality.

The Principles can assist in developing carbon management strategies that provide a range of environmental, financial and social benefits to businesses and the community and provide a framework to maximise where these benefits coincide.

The Principles can be used to drive improved business value by:

### Reducing input costs:

- Avoiding or minimising energy use (and the associated GHG emissions) can reduce business costs. In addition, some processes that capture and store GHG emissions are resource intensive and incur costs in themselves.
- Focusing on process efficiency can drive materials, water and energy efficiency, save money and drive internal business improvements.



*'We couldn't find anywhere around the world a basis to judge the different options.'*

Terry AHearn, Director of Sustainable Development EPA Victoria. *The Business Age*, 12 February 2007, p.2.

On 12 February 2007, EPA announced that it had gone 'carbon neutral' for the 2005–06 financial year.

In becoming carbon neutral, EPA developed and used the draft Carbon Management Principles to ensure that it was seeking the best environmental outcome and gaining long term business value.

Examples of the decisions we made on each of the action items are highlighted in this document. For more information on our carbon neutral strategy go to [www.epa.vic.gov.au/greenhouse](http://www.epa.vic.gov.au/greenhouse).

### Building reputation:

- Caring for the environment by reducing emissions.
- Demonstrating a low carbon footprint and reduced associated environmental impacts.
- Ensuring GHG emissions are reduced in a sustainable way (e.g., credibility of your carbon management strategy can be enhanced by utilising a robust approach to reducing GHG emissions).
- Taking direct responsibility for reducing GHG emissions where practicable, rather than outsourcing this through offsetting schemes (acknowledging that some offsetting is likely to be part of any carbon neutral strategy).
- Reducing non-greenhouse environmental impacts (e.g., reducing fuel use can reduce emissions of other air pollutants).

### REDUCING COST THROUGH REDUCED ENERGY

EPA has been successfully working with business to reduce GHG emissions under the Industry Greenhouse Program.

Businesses were required to measure emissions, conduct an energy audit and develop an action plan to reduce their energy use and GHG emissions. Any actions with a payback period of three years or less were required to be implemented.

Through the identification of reduction actions, industry is expected to achieve annual savings of \$34 million and GHG emission reductions of 1.1 million tonnes.

For more information on this and other greenhouse programs go to [www.epa.vic.gov.au/greenhouse](http://www.epa.vic.gov.au/greenhouse)

### Improving market opportunity:

- Building capacity to succeed in a low carbon economy, (e.g., business positioning as a carbon credit provider in a trading market will provide new business opportunities).
- Increasing market share and customer loyalty by reducing life-cycle GHG impacts of products and in particular GHG emissions during the use of products.

### Reducing business risk:

- Reducing exposure to increasing energy costs, possible future carbon prices, and future regulation;
- Maximising the permanence of GHG abatement measures (e.g., avoiding generation of GHGs results in a permanent outcome, whereas sequestration options require careful management to avoid subsequent release to the atmosphere).
- Reducing risk and uncertainty associated with off-site carbon management (e.g., could the failure of a company providing carbon offsets impact on the carbon management strategy) by focusing on onsite reductions first.

The Principles are intended to assist businesses in sound decision-making to reduce GHGs. The Principles can be applied as a continuous review and improvement framework, consistent with other business strategies. As energy costs and technology change, further avoidance or minimisation options may become practicable or new market opportunities may arise.

#### Question 1

*Do you have any examples from your own business practices that follow the Principles approach? We welcome any business case studies that provide an example of good carbon management.*

### Delivering sustainable business growth

Through a Sustainability Covenant with EPA, Sustainability Victoria and the Australian Industry Group, Pilkington (Australia) will invest \$130 million to upgrade its Victorian manufacturing plant to enable the production of world-class, energy-efficient glass. This glass acts as an insulator, reducing the need for air conditioning and thereby reducing the cost and environmental impact of energy.

Through this initiative, Pilkington is differentiating itself from competitors and setting itself up to thrive in a business environment where there will be a rapidly increasing global demand for energy-efficient products.

For more information on this partnership go to [www.epa.vic.gov.au/bus/sustainability\\_covenants/](http://www.epa.vic.gov.au/bus/sustainability_covenants/)

### HOW THE PRINCIPLES REDUCE BUSINESS RISK

By prioritising avoidance and reduction measures, a number of business risks can be decreased. Most avoidance and reduction measures focus on improving onsite processes, which can lower operating costs. Avoiding or reducing emissions can also reduce business exposure to future carbon costs and other types of regulatory risk. Even where avoidance or reduction measures are not immediately implemented, getting in the practice of considering these measures will help businesses identify more cost effective measures in the future.

In contrast, sequestration and offsetting measures do not reduce onsite GHG emissions and do not provide the financial benefit of avoidance and reduction. Further, sequestering and offsetting emissions involves transactions in which there is currently limited regulatory oversight and possibly some technological risk. While the regulatory environment and understanding of technology will become clearer over time, at present, businesses face a greater risk that reductions will not be seen as credible in the current voluntary marketplace or that they will not be recognised in future regulatory regimes. There is uncertainty about the permanence of sequestration and offsetting, especially where long term responsibility and control of these activities is not clear. Action in this area is important; however, it requires the appropriate safeguards.

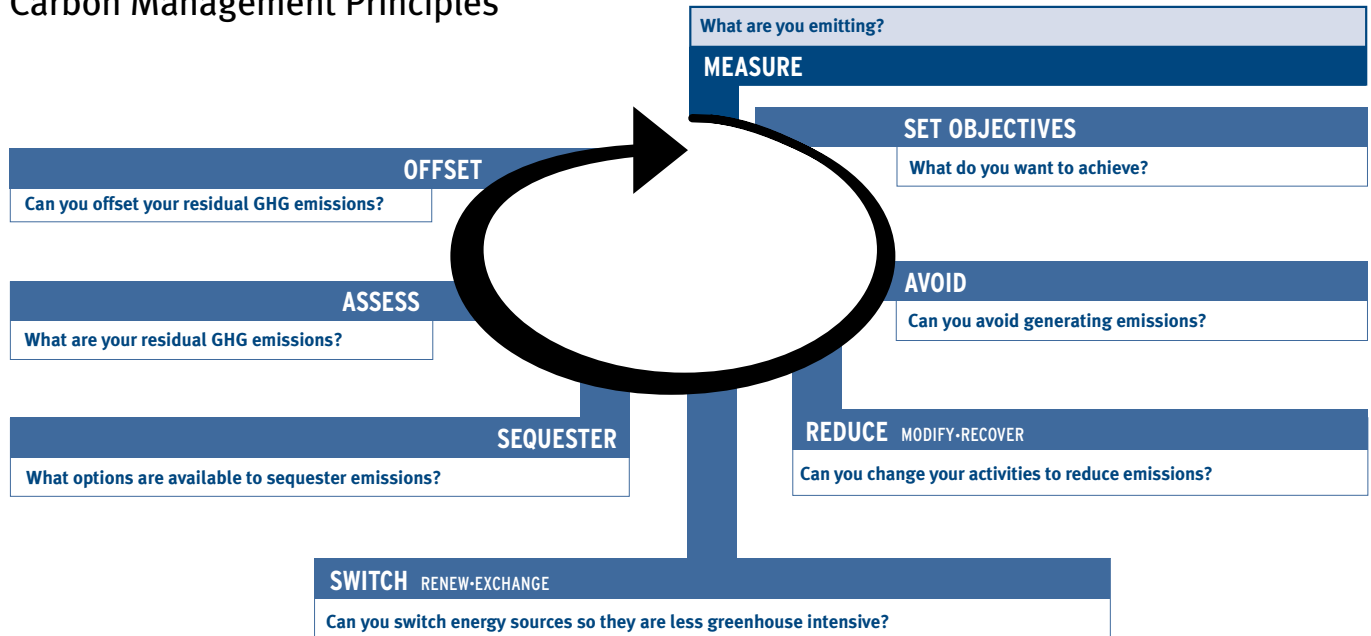
#### Question 2

*Is the rationale for the Principles clear?*

## Part 2

# Carbon Management Principles

## Carbon Management Principles



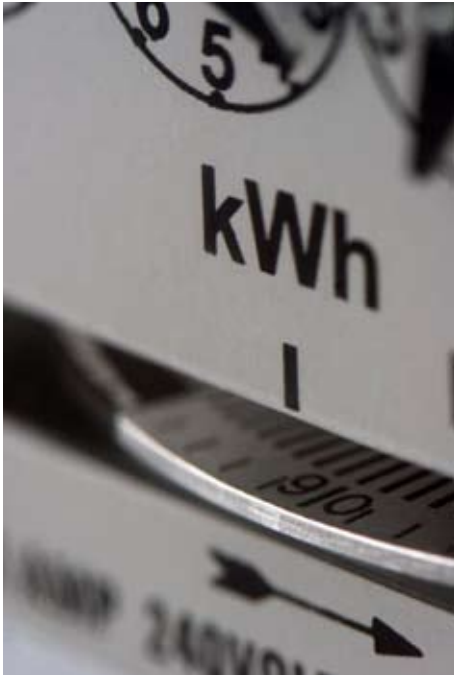
The Principles set out a framework for measuring GHG emissions. Some businesses will find that the majority of their emissions may be from energy sources and therefore the applicability of some options (for example sequester) will be limited. The framework should therefore be applied on a case-by-case basis. Wherever possible, the steps set out in the Carbon Management Principles should be considered in order to ensure that opportunities for reducing GHG emissions and increasing business value are maximised.

In practice, the Principles can be best applied through an iterative process. Depending on how far advanced your organisation is in managing carbon, the first cycle through the Principles may just enable identification of opportunities. The second cycle can then be used to confirm objectives and develop a strategy that optimises outcomes.

Detailed guidance on each of these action items – including practical tips and case studies – is provided in the following pages.

### Question 3

*How clear is the order in which it is suggested each step be considered?*



## 1. MEASURE

### You can't manage what you can't measure

It is important to know the quantity and source of your GHG emissions.

Depending on how robust an inventory you require this may be as simple as looking at your energy bills or as comprehensive as measuring each:

- stationary combustion source (e.g., boilers, power generation)
- transportation source (e.g., cars, boats, planes)
- process emission source (e.g., refrigeration, landfill methane).

At a minimum your emissions profile should include GHG emissions directly produced on site (such as fuels for boilers and vehicles) and indirect emissions from purchased electricity, heat or steam. The inclusion of other indirect emissions, such as from commercial air travel and emissions associated with purchased materials should be evaluated on a case-by-case basis.

The most commonly used international standard is the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (GHG Protocol). It provides guidance on which emissions sources to include in a corporate inventory and how to quantify these emissions ([www.ghgprotocol.org](http://www.ghgprotocol.org)).

Companies may wish to get their inventory independently verified to ensure accuracy and enhance credibility.

Once you have measured your carbon footprint, it is important to monitor your emissions regularly and keep accurate records to track progress against your objectives.

### EPA'S EMISSIONS MEASUREMENTS

EPA's 2005–06 GHG inventory was developed in accordance with the WRI/WBCSD GHG Protocol ([www.ghgprotocol.org](http://www.ghgprotocol.org)) and externally assured by Net Balance Management Group. It will be updated and externally verified on an annual basis. A summary of our current emissions inventory, including design principles, is available on EPA's website.

#### Question 4

*What assistance do you require to measure emissions?*

*'We are not expecting a significant cost increase at all through this, in fact we have a little side ambition that it is a zero net greenhouse at zero net additional cost – that is very much our focus.'*

Anne Barker, Managing Director of City West Water Authority speaking about the authority's announcement to be carbon neutral by 30 June 2007.

*The Age, Business Day, Mathew Murphy, 26 March 2007, p.1.*

## 2. SET OBJECTIVES

### What do you want to achieve?

As with any business strategy, it is important to set clear objectives.

When setting carbon management objectives it is worth considering short and long-term goals. If the overall goal is to go carbon neutral, then intermediate GHG reduction targets will help to keep you on track and ensure that early reductions are achieved.

Deciding on appropriate objectives for your company will depend on a number of factors. For example, if your company has reduced emissions in the past, there may be fewer opportunities available compared to a company that has never had an energy or carbon management strategy. If your company is unsure about what is achievable, it may help to research best practice in your industry to see what others are achieving or to undertake an opportunities assessment (audit) to assist in the decision.

Setting objectives may also mean establishing criteria for determining whether to implement identified actions. For example, are you going to implement everything with a specific financial rate of return? Are you going to set aside a specific budget to reduce your GHG emissions? Will the preferred strategy optimise value against your established business criteria (e.g., environmental, financial, market, reputation)?

### EPA'S OBJECTIVES

- Be carbon neutral each year.
- 10 per cent reduction on our 2005–06 energy-related GHG emissions by 2010.
- At a minimum, implement any measures with a 4-year payback or less.
- Green power for all electricity GHG emissions.



### Murray Goulburn achieves massive savings

Under the EPA Industry Greenhouse Program, Murray Goulburn has identified significant energy savings across its six main plants.

Significant savings have been achieved through changes such as installing variable speed drives on equipment, recovering waste heat and installing insulation.

Murray Goulburn is continuing to identify cost-effective actions at all its plants and, in 2007, it will install steam turbines and invest in co-generation to further improve efficiency.

For more information on what Murray Goulburn and other companies have done go to [www.epa.vic.gov.au/greenhouse](http://www.epa.vic.gov.au/greenhouse).

#### Key achievements

- 55,000-tonne reduction in greenhouse gas emissions per year
  - equivalent to taking 13,000 cars off the road permanently.
- Over \$6 million dollars saved per year on energy bills.
- Only \$5.5 million in implementation costs.
- 8 per cent reduction in greenhouse gas emissions from energy since 2003.
- Financial payback period is less than 11 months.

## 3. AVOID

### Can you avoid generating emissions?

The best way to reduce your carbon impact is by avoiding direct GHG emissions and energy related indirect emissions. In addition to downsizing your carbon footprint, avoidance leads business sustainability through minimising other environmental impacts, reducing energy and other resource costs and minimising exposure to a potential carbon price.

Avoiding energy use, for example, reduces the need for energy production, whether from greenhouse intensive fossil-fuel sources or renewable sources. Avoiding fossil fuel energy sources has the benefit of reducing direct GHG emissions, indirect emissions from fuel transport and impacts associated with extraction of natural resources.

The specific avoidance activities that you can undertake will depend on the type and magnitude of emissions sources in your inventory. When looking for avoidance opportunities, don't forget that many won't require capital outlay at all, and often will be about changing behaviour within your business. For example:

- ensuring appliances and equipment are not idling or on stand-by
- shutting down production lines when not in use. If your current appliances or machinery require power between use, factor this into your purchasing decisions in the future
- ensuring energy is not being consumed when rooms or buildings are vacant – key things to consider are lighting, heating and cooling settings
- walking or riding a bike instead of driving.

Other opportunities may involve some capital outlay, but in the long term, will more than likely result in cost savings; for example:

- purchasing materials that are sourced locally to avoid emissions associated with transportation
- meeting via telephone or videoconferencing instead of travelling to meet in person.

#### AVOID AND REDUCE – WHAT'S THE DIFFERENCE?

'Avoid' describes activities through which emissions can be completely stopped, for example, not having a light on in a vacant room. 'Reduce' describes measures that decrease the emissions intensity of essential activities, for example, making lighting more efficient.

#### Question 5

*Is the difference between 'Avoid' and 'Reduce' action items clear and appropriate?*

### Reducing costs as well as emissions

Under the EPA Industry Greenhouse Program, business found that the most cost effective actions were either 'avoidance' or 'modification' actions; for example:

- installing variable-speed drives –  
> \$6 million saved, 1.3 year payback
- modifying air conditioning and heating –  
> \$2 million saved, 1.0 year payback
- boiler upgrades and improvements –  
> \$5 million saved, 1.0 year payback
- turning off compressed air when not in use and fixing leaks –  
> \$2 million saved, 1.2 year payback.

More industry savings are detailed at [www.epa.vic.gov.au/greenhouse](http://www.epa.vic.gov.au/greenhouse).

## 4. REDUCE

### Can you change your activities to reduce your emissions?

Once you have identified all the ways in which you can avoid GHG emissions, the next best option is to reduce emissions from essential activities.

The preferred approach to emissions reduction will depend on your circumstances. For simplicity, reduction activities have been divided into two categories – modify and recover.

#### 4.1 MODIFY

Options to modify essential activities vary in terms of the required level of effort and cost. Options range from the 'low-hanging fruit' of changing standard light bulbs to compact fluorescents through to undertaking complete building retrofits. Some key measures include:

- ensuring appliance and equipment are running efficiently; if buying new equipment, ensure it has a high efficiency rating
- ensuring smart building design for new buildings and retrofitting old buildings (factory, office and home). Considerations include better orientation, materials, insulation and shading
- considering fuel efficiency when buying a new vehicle – see [www.greenvehicleguide.gov.au](http://www.greenvehicleguide.gov.au).

Behaviour change can also provide cost effective emissions reductions. For example:

- take public transport where possible
- if you are using your car, ensure it is being driven in the most fuel efficient way.

Reducing the use of other resources will also often have a significant impact on GHG emissions. For example, more efficient use of hot water can reduce GHG emissions, in addition to reducing water consumption.

#### EPA'S MODIFICATIONS

- EPA has retrofitted new leased space at Wangaratta regional office according to GreenStar guidelines developed by the Green Building Council of Australia.
- All offices now have videoconferencing equipment.
- A lighting audit was undertaken and motion sensors installed.
- In 2003 EPA purchased its first hybrid vehicle. Today we have nine hybrid vehicles and a range of low greenhouse intensity vehicles in our corporate fleet.

#### Question 6

*Do the action categories 'Modify' and 'Recover' merit being separate steps in the Principles?*

### Biomass benefits

A project is currently under way at Hazelwood Power Station to trial the use of biomass as an alternative energy source.

Dead wood is sourced from a timber plantation near Morwell in the Latrobe Valley and is converted to mulch and co-fired with coal.

The project aims to contribute to reducing emissions intensity at the site.

*EcoGeneration*, Issue 38, Jan/Feb 2007, p.18.

## 4.2 RECOVER

There may be potential to recover energy from existing processes.

The three major methods of energy recovery are cogeneration, waste gas recovery and waste to energy.

### **Cogeneration**

Cogeneration is the production of two forms of energy from a single process. Most cogeneration is a combination of electricity and heat production. In traditional operating facilities, heat produced as a by-product of electricity generation is released to the atmosphere through, for instance, cooling towers. Cogeneration plants capture waste heat so that it can be used in industrial processes or for domestic, commercial or industrial space or water heating.

Utilising waste heat increases the efficiency of the electricity generation process and reduces or eliminates the need for additional energy production for the processes being supplied by the waste heat. Cogeneration provides significant financial savings for both the supplier and the consumer, with the added benefit of reduced GHG emissions.

### **Waste gas to energy**

Methane is a GHG with a global warming potential 21 times that of carbon dioxide. It is produced by the decomposition of organic materials in municipal solid waste in landfills and anaerobic conditions in wastewater treatment plants.

It is important that landfills and wastewater treatment plants seek to reduce their emissions, but this will not completely eliminate GHG emissions. Capturing methane and using it as a fuel provides the dual benefit of dramatically reducing GHG emissions and providing usable energy. EPA has developed *Environmental guidelines for reducing greenhouse gas emissions from landfills and wastewater treatment facilities* (EPA publication 722), which are available on EPA's website ([www.epa.vic.gov.au](http://www.epa.vic.gov.au)).

### **Waste to energy**

This option involves extracting the energy embedded within waste as a way of producing energy. Energy can be in the form of heat and steam, liquid fuel or fuel gas. A common application is the use of waste as a supplementary fuel in cement kilns, for example, using waste tyres as an energy source.

When making a decision about whether to recover energy from waste, there is a need to first evaluate whether better options are available in accordance with the waste hierarchy. If the material can be recycled or reused, this is likely to have greater environmental benefits than energy recovery options.

It is important that in assessing each option other environmental impacts are also considered. Lifecycle analysis can help assess whether the energy harnessed from the waste outweighs the energy costs associated with processing and other environmental impacts arising from the energy recovery process.



## 5. SWITCH

### Can you switch energy source so that it is less greenhouse intensive?

As well as opportunities to reduce your net energy end use, there are also opportunities to ensure that the primary energy source you are using is being delivered in the most GHG-efficient way. This can be delivered through renewable sources, or by exchanging fuel sources to minimise GHG intensity.

#### 5.1 RENEW

Renewable resources are not destroyed or are readily replenished when energy is harvested. Onsite installation or purchase of renewable forms of energy such as solar, wind, hydro and biomass reduces dependence on fossil fuels and significantly reduces GHG emissions.

Using renewable energy does not always have the immediate financial benefits that avoiding, modifying or recovering action items can have. The payback periods for investments in onsite renewable energy are usually medium term (4–10 years). Purchasing renewable energy is currently more costly than energy derived from fossil fuels. However, as more is invested in renewable resources, renewable technology and, economies of scale will improve and the cost of renewable energy will decrease.

#### **Direct renewable**

Installing solar panels, wind turbines or other forms of renewable energy at your home, office or industrial facility reduces reliance on fossil fuel based electricity. These systems can either be stand alone, providing energy for just your premises, or connected back to the electricity grid. They have the added benefit of reducing distribution losses inherent in centralised power generation.

#### **Purchased renewable**

Electricity from renewable energy sources can be purchased from accredited electricity retailers through the GreenPower scheme. Through this scheme, accredited renewable energy such as solar, wind, hydro, biomass or wave is purchased on your behalf. Every unit of accredited GreenPower energy purchased will ensure equivalent renewable energy is supplied to the grid reducing the energy supplied from other sources. It comes at a small additional cost to your regular electricity bill, but ensures that your power has very low greenhouse impact. Your electricity provider will be able to offer you different levels of GreenPower based on your budget and technology preference. For more information go to [www.greenpower.com.au](http://www.greenpower.com.au).

### Banking sector seeing the benefits of neutrality

On 6 December 2004, HSBC Holdings plc made a commitment to become the world's first major bank to achieve carbon neutrality. It achieved this in 2006 by putting in place a Carbon Management Plan, which consists of three parts:

- to manage and reduce direct emissions
- to reduce the carbon intensity of electricity by buying 'green electricity' where feasible
- to offset the remaining emissions in order to achieve carbon neutrality. The bank has committed to offsets being credible, genuinely incremental and cost-effective.

For more information visit:

[www.hsbc.com/carbonneutral](http://www.hsbc.com/carbonneutral).

Recently, the National Australia Bank (nab) announced it would be carbon neutral by 2010.

nab has committed to *'improving energy efficiency and use across its international operations and purchasing offset credits where emissions can't be avoided'*\*

\* 'National Australia Bank to become carbon neutral by 2010', available at [www.nab.com.au](http://www.nab.com.au)

### EPA'S RENEWABLES

EPA has purchased accredited green power since 2000. Prior to going carbon neutral, 28 per cent of our electricity consumption was linked to green power. EPA has now committed to purchasing 100 per cent accredited GreenPower for its electricity use.

Biofuels are made from renewable sources and can be blended with traditional fuels to lower greenhouse intensity or used as the sole fuel source. A full life-cycle assessment should be undertaken to examine the full greenhouse and other environmental impacts and benefits of this fuel source.

### 5.2 EXCHANGE

If you can't avoid using fossil fuels, you can still try to choose fossil fuels with lower greenhouse intensity. For example, electricity generation from natural gas has lower greenhouse intensity than coal-fired electricity. Using LPG to power your vehicle has a lower greenhouse impact than petrol. When considering these options, it is important to take into account the efficiency of energy sources. If the efficiency of delivery is low this can have a negative impact on the net greenhouse outcome.

### EPA'S EXCHANGES

As well as having nine hybrid and a number of other fuel-efficient vehicles, EPA has increased the percentage of LPG vehicles in its fleet to 47 per cent.

#### Question 7

*Are the differences between 'Reduce' and 'Switch' distinct?*



### Otway Basin trial

Australian research group CO2CRC (the Cooperative Research Centre for Greenhouse Gas Technologies) is currently conducting the first carbon capture and storage (CCS) project in Australia.

The project in Victoria's Otway basin simulates the capture of carbon dioxide by extracting naturally occurring carbon dioxide and methane from a gas well and storing it approximately two kilometres beneath the earth's surface in depleted gas reservoirs.

The project, which has been granted a Research Demonstration and Development Approval by EPA, hopes to demonstrate the safety, effectiveness and sustainability of the technology.

## 6. SEQUESTER

### Should you consider sequestering your emissions?

The action items prior to Sequester have focused on decreasing the sources of GHG emissions to the maximum extent achievable. Another key component of carbon management can be to reduce atmospheric GHG concentrations through natural or artificial GHG (usually carbon) sequestration.

#### 6.1 NATURAL CARBON SEQUESTRATION

Naturally occurring carbon is present in forests and vegetation, soils and the ocean. If a tree is destroyed, carbon dioxide is released into the atmosphere as it burns or decays and as soil is disturbed. However, a growing tree absorbs carbon as it undergoes photosynthesis, storing it in both its mass and in the surrounding soil.

Soil contributes to the storage of carbon through the build-up of slowly decaying organic materials. Through managing these natural carbon stores, atmospheric GHG concentrations can be reduced.

The process of naturally storing carbon is often referred to as bio-sequestration. The most common form is tree planting.

For most individuals and organisations there is limited opportunity to be directly involved in reforestation projects. Investing in bio-sequestration or forestry projects undertaken by others as carbon offsets is more common (see section 7, Offsets).

Farming communities and enterprises are more likely to have opportunity to directly participate in reforestation or other bio-sequestration projects. Forest sinks can help reduce GHG emissions and can also provide additional revenue streams and natural resource management benefits, including salinity mitigation, enhanced biodiversity, and improved water or soil quality.

A robust approach to reducing GHG emissions requires bio-sequestration projects to be carefully managed, controlled and monitored in accordance with strict standards. It is not as simple as just planting trees (see boxed text 'Accounting for sequestration and offsets').

#### 6.2 ARTIFICIAL CARBON SEQUESTRATION

Artificial carbon sequestration involves direct capture of carbon dioxide from the combustion of fossil fuels or from industrial processes and the long-term storage of these emissions beneath the Earth's surface.

Carbon capture and storage (CCS) or geo-sequestration involves injection and long-term storage of GHGs in a stable subsurface geological reservoir. CCS is currently being applied in overseas projects to store emissions relating to oil and gas recovery (for example, Sleipner in Norway). The technology has not been applied commercially in Australia to date, but it is being tested at demonstration scale for application in the stationary energy sector.

While CCS also has the potential to be developed for other industrial processes that emit GHG gases, it is likely to have limited application in the short to medium term outside the stationary energy sector.



## 7. ASSESS

### What are your residual GHG emissions?

Now that you have gone through the process of reducing your on-site GHG concentrations you should look back on your original objectives.

If you are not meeting the objectives you set for energy use or greenhouse gas emissions reduction, are there reduction opportunities you have not considered? Do you need to change the decision criteria for which opportunities you implement?

### ACCOUNTING FOR SEQUESTRATION AND OFFSETS

It is important to be sure when assessing sequestration options or purchasing carbon offsets that there are appropriate systems in place to ensure the integrity of these approaches.

While many of the mechanisms and rules in this area are still emerging, there is a range of issues that should generally be accounted for:

#### **Baseline scenario**

A 'baseline' scenario should be in place to show what level of GHG emissions would occur in the absence of the project.

#### **Additionality**

Offset projects should meet appropriate 'additionality' requirements, meaning that any reductions are additional to what would have happened in the absence of the project. Generally this will include being satisfied that the project is beyond business as usual and additional to existing legal obligations. Additionality is generally not an issue in sequestration.

#### **Permanence**

The 'permanence' of the project should be assured, meaning that that emission reductions achieved are not temporary and will be maintained in the long term (this is particularly important for reforestation projects).

#### **Independent verification**

Projects should be independently verified by an accredited third party in accordance with an appropriate standard.

#### **Monitoring**

Any changes to emissions that take place beyond the project boundary (leakages) should be measured and quantified and incorporated into actual emissions reductions achieved by the project. An appropriate regime should be in place to monitor any changes in carbon stocks, stored carbon dioxide or the operation of emission reduction projects.

#### **Environmental impacts**

The impact of the project on other environmental parameters should be considered – for example, the project's impact on energy, water use or other pollutants and on biological diversity.



## 8. OFFSET

### Can you offset your residual greenhouse emissions?

A carbon offset is any project that indirectly reduces GHG emissions at one source by investing in GHG emissions reductions elsewhere. Offset products most typically involve projects that invest in renewable energy, energy efficiency and reforestation. Including offsets in a carbon management strategy generally involves purchasing GHG reduction credits from an offset scheme provider.

Carbon offsets provide a legitimate means of reducing the net impact of energy use and GHG emissions, provided that they form part of a broader greenhouse management strategy and are derived from verified projects that create actual emissions reductions. Offsets are the last in the order of carbon management action because of the importance of first considering at-source options for reducing energy use and GHG emissions, and not because they should be considered the 'worst' option. Indeed, for those wanting to become carbon neutral in their operations, offsetting will in most cases form a necessary component in an integrated carbon management strategy.

An ever-increasing range of carbon offset products are entering a largely unregulated market. It is important that anyone planning to purchase carbon offsets conducts appropriate research to ensure that products have been appropriately verified to deliver the net environmental outcomes claimed. For further guidance on purchasing offsets go to [www.epa.vic.gov.au/greenhouse](http://www.epa.vic.gov.au/greenhouse).

### EPA'S OFFSETS

EPA's primary approach to carbon management is to implement cost-effective, direct emission reduction projects in our operation.

For 2005–06, EPA's vehicle emissions were offset through a range of energy efficiency and afforestation schemes managed by the Victorian Department of Sustainability and Environment. We neutralised the remaining emissions by investing in a diverse portfolio of products, including composting and energy efficiency upgrade projects. We purchased additional credits to cover any possible uncertainty in the offsetting products purchased.

#### Question 8

*Is the reasoning for offsets being the last action step clear?*

*'The real change for me is when the annual report is the sustainability report, not a separate report.'*

Paul Tebo, environmental sustainability leader.

*The Age, Business News, Peter Hannam  
5 March 2007, p.2.*

## 9. REVIEW

### What can you do differently?

Carbon management is not a static process. Regular review is essential to ensure you make the most of new practices and technologies as they emerge over time. Energy and other costs (including the cost of offsets) will change over time, necessitating regular review and optimisation of the carbon management strategy.

As the implementation of avoidance and reduction actions increases, the need to sequester or offset your emissions should decrease, increasing environmental and broad business benefits over time.

### EPA'S STAFF INVOLVEMENT

EPA is keen to engage staff in identifying emissions reduction opportunities. This is being achieved through a cross-organisational GreenStars committee as well as a new incentive scheme to encourage staff to identify carbon reduction measures.



### Question 9

*How does the continuous improvement model fit with your other business decision-making?*



## Part 3

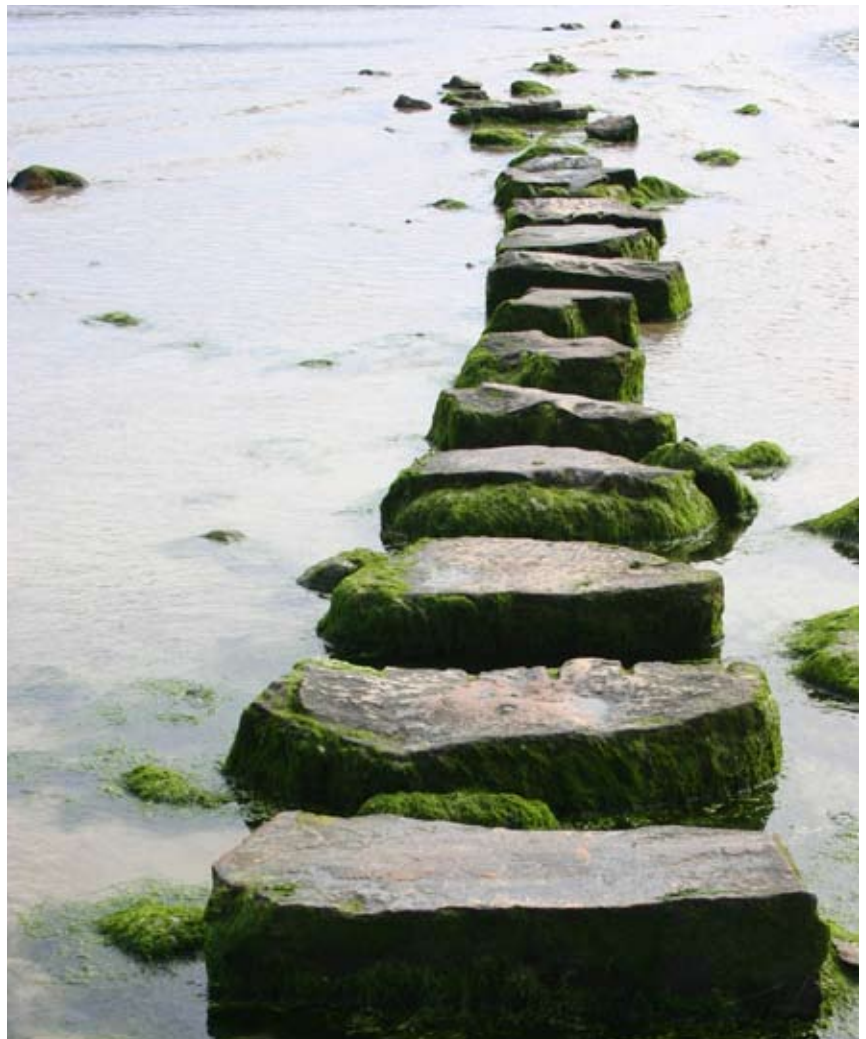
# Consultation

EPA invites comments on this discussion paper. Our aim in developing these Principles is to assist businesses to develop strategies to reduce their GHG emissions. Feedback on the Principles and their application is therefore important to help EPA in further developing the Principles and associated tools to assist business.

We have included questions through the paper to prompt discussion; however, we welcome feedback on any aspect of the paper, including the concepts and applicability of the Principles, the order of action items and the description of individual action items.

EPA will also be working with companies in 2007 through the Carbon Innovators Network and other forums to develop further guidance and tools to help businesses implement the Principles and optimise carbon management strategies. We would welcome feedback on where your company may benefit from EPA developing further guidance. For more information on the Network or to be kept informed of developments please email: [carbon.innovators@epa.vic.gov.au](mailto:carbon.innovators@epa.vic.gov.au).

To provide comments on the discussion paper please send your comments to [greenhouse@epa.vic.gov.au](mailto:greenhouse@epa.vic.gov.au) by **Friday, 26 October 2007**.



### DRAFT CARBON MANAGEMENT PRINCIPLES DISCUSSION PAPER

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