



# The Greenhouse Challenge for Energy

Driving investment, creating jobs and reducing emissions

Position Paper

December 2004

# FOREWORD



In June 2003, a consultation paper on *The Greenhouse Challenge for Energy* was released that sought input on how the Bracks Government could best achieve its commitments to reduce greenhouse gas emissions from the energy sector while maintaining a secure, efficient and affordable supply of energy.

This issue remains of critical importance. The Kyoto Protocol will enter into force in February 2005. Victoria faces a future in which greenhouse gas emissions constraints and carbon pricing are inevitable as the world acts to address the serious threat of climate change.

It is critical that the Victorian Government institutes a policy framework to facilitate Victoria's transition to a carbon-constrained future, and that does so in a way that:

- maintains the State's economic prosperity and growth
- provides certainty to investors in both the energy sector and wider economy
- ensures the Latrobe Valley's long-term viability as Victoria's major energy producer.

A strong conclusion from economic modelling conducted by the Allen Consulting Group and reported on in the Position Paper is that we must start this transition now. Early action will ensure Victoria is well placed to minimise the costs and maximise the benefits of this transition. It will also ensure that the energy industry has the certainty it requires to make the long-term investments necessary to meet our growing energy needs. Additionally, it will ensure the Latrobe Valley's future by encouraging investment in new technologies that will reduce greenhouse gas emissions from brown coal usage.

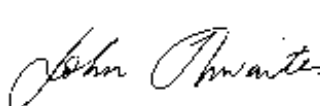
In contrast, deferral of action means that Victoria would face a more difficult and costly task to reduce its greenhouse gas emissions in the future. The lack of federal government leadership will increase this cost.

The policy package set out in this Position Paper is vital to Victoria's economic future. Support for a national emissions trading scheme is essential given the role that this market-based mechanism can play in driving efficient and effective greenhouse gas abatement. In favouring a market based approach, the Victorian Government does not propose the introduction of a carbon tax.

The implementation of other measures to complement emissions trading will ensure that the short-term economic impacts of emissions trading are minimised, and that longer term economic opportunities are exploited.

The package continues the Bracks Government's commitment to pursue policies and programs that achieve economic, environmental and social goals in an integrated way.

Your feedback on the issues raised in this Paper is important to ensure that the elements of the package are implemented in the most efficient and effective manner possible.



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# PURPOSE

This Paper sets out the Government's policy to reduce greenhouse gas emissions from the stationary (non-transport) energy sector while continuing to ensure that Victorians have access to a secure, efficient and affordable supply of energy. It is the culmination of a process that has involved widespread consultation and detailed analysis.

The Paper proposes a comprehensive policy framework, and invites feedback on how the framework should be implemented.

## Responding to the greenhouse challenge – overview of the Victorian Government's policy framework

The Government recognises that there is substantial and growing evidence that climate change poses a major risk to the global environment and for all the world's economies. It applies to Australia and, in particular, Victoria. Our high per capita emissions intensity and significant reliance on fossil fuels makes our economy particularly vulnerable in a carbon-constrained world (that is, a world in which there will be increasingly stringent greenhouse gas emission reduction targets).

Recognising the potential costs and opportunities associated with future adjustments, the Victorian Government believes that action on climate change must be taken now. The stationary energy sector has a major role to play – the production and use of energy accounts for more than half of Australia's total emissions. Australia's stationary energy sector faces a large investment challenge over the coming decades to meet growing demand, and industry is calling for greater certainty on greenhouse policy from governments.

Acting now to provide a more certain policy environment means that costs can be managed and the national and Victorian economies given time to adjust. Delay will run the risk that the future abatement task will be larger and the costs will be much higher.

To achieve its objectives, the Government will pursue policies which:

- facilitate Victoria's transition to a carbon-constrained future
- protect Victoria's economic interests by maintaining a secure, efficient and affordable supply of energy
- create an attractive environment for investment in the energy sector and the wider economy
- ensure the Latrobe Valley's long-term future.

Following detailed analysis of a range of policy options, and consideration of the views of stakeholders in response to *The Greenhouse Challenge for Energy* consultation paper, the Victorian Government has identified a comprehensive policy package (below) to meet both its environmental and economic commitments together. The Government will consult with stakeholders and the wider community on how best to develop and implement these significant new policy initiatives.

- **National emissions trading scheme.** Market mechanisms, such as emissions trading, offer an efficient and effective means of providing incentives for emissions abatement. Victoria supports the development and implementation of a national emissions trading scheme led by the federal government, in close consultation with all States and Territories. However, in the absence of a commitment by the federal government to take the lead on this issue, Victoria is continuing to cooperate with other States and Territories to design a national emissions trading scheme that, when introduced, will address their interests.

A Victorian-only emissions trading scheme is not proposed as this would be an inefficient route to greenhouse gas abatement and would disadvantage Victoria's economy in the absence of equivalent action by other States and Territories. The Victorian Government's view is that an emissions trading scheme should involve all States and Territories.

In progressing the design of a national emissions trading scheme, the Victorian Government will seek to ensure that: the scheme provides for the maintenance of sound economic growth; there is reasonable sharing of any economic burden between jurisdictions; the potential vulnerability of energy-intensive trade-exposed industries and electricity generation from brown coal is recognised and appropriately addressed in the allocation process; and new investment in the best available technology for the power generation sector is encouraged.

- **Emissions reporting and disclosure requirements for large emitters.** Accurate reporting and disclosure of greenhouse gas emissions is a prerequisite for emissions trading. It is also important in its own right to provide data on emissions trends, and to enable emitters to understand the drivers of their emissions and cost-effective opportunities for emissions abatement. Recognising these benefits, the Victorian Government will introduce requirements for large emitters to report and disclose emissions. Those requirements will be appropriately harmonised with existing Victorian and emerging national emissions reporting requirements.

- **Victorian Energy Technology Innovation Strategy.** Low-emission energy technologies are critical to reducing the potential cost of meeting a future greenhouse constraint. The Victorian Government will pursue a strategy to develop and demonstrate those technologies in which Victoria has a particular advantage (that is, cleaner brown coal), and to facilitate technology developments with respect to renewable energy and energy efficiency.
- **Expansion of the mandatory renewable energy target.** The Victorian Government remains committed to its position that the mandatory renewable energy target should be expanded to 19,000 GWh by 2010. In the absence of a federal commitment, Victoria will work with other States and Territories to drive the growth of renewable energy through cooperative action, including the consideration of a State and Territory-based mandatory renewable energy target.
- **Victorian Renewable Energy Strategy.** Renewable energy is making a growing contribution to reducing our greenhouse gas emissions and is providing a more sustainable and distributed (or decentralised) supply of energy. Complementing the expansion of the mandatory renewable energy target, the Victorian Government will develop and implement a Renewable Energy Strategy to deliver the Government's renewable energy targets, including increasing the share of Victoria's electricity consumption from renewable sources to 10 per cent by 2010; and facilitating the development of up to 1000 MW of wind energy in appropriate locations by 2006.
- **Victorian Energy Efficiency Strategy.** Improvement in energy efficiency can provide substantial economic and environmental benefits. The Victorian Government will develop and implement an Energy Efficiency Strategy that will build on existing measures and initiate new policies and programs. It will also incorporate actions from Stage 1 of the National Framework for Energy Efficiency.

The Victorian Government believes that this policy package provides the certainty required by industry to make long-term investment plans. Importantly, the package will encourage the development, demonstration and commercialisation of low-emission energy technologies and actively facilitate the development of new low-emission generation capacity in Victoria to meet growing energy demands and ensure a secure, affordable and sustainable supply of electricity.

# 1. BACKGROUND

## 1.1 POLICY CONTEXT

The Intergovernmental Panel on Climate Change (IPCC) has concluded that:<sup>1</sup>

- the majority of recently observed warming of the earth's atmosphere stems from the accumulation in the atmosphere of greenhouse gases due to human activities
- to avoid severe adverse climate change impacts, it will be necessary to reduce greenhouse gas emissions in order to stabilise atmospheric concentrations of these gases – in its Third Assessment Report, the IPCC points to the need for reductions in global emissions of around 40 per cent by 2050 and 75 per cent by 2100 in order to limit global warming to between 1.2 ° and 2.3 °C by the year 2100.

There is growing acceptance internationally of the need for deep cuts in greenhouse gas emissions this century. The United Kingdom, for example, has set a goal to reduce its greenhouse gas emissions by 60 per cent by 2050. In North America, the New England Governors and Eastern Canadian Premiers adopted a joint Climate Change Action Plan in 2001 that sets a long-term target to reduce greenhouse gas emissions by 75 to 85 per cent. Australia's Chief Scientist has indicated that Australia has to move to a position where we accept deep reductions in CO<sub>2</sub> emissions in the order of 50 per cent by 2050.

The international community is responding to the threat of climate change through the United Nations Framework Convention on Climate Change and its associated Kyoto Protocol. The Victorian Government recognises that the Kyoto Protocol is limited because its emissions targets fall well short of those needed to stabilise atmospheric greenhouse gas concentrations at a level that avoids dangerous interference with the earth's climate; and that ultimately all countries, including developing countries, will need to commit to action to reduce greenhouse gas emissions. Nonetheless, the Victorian Government believes that the Kyoto Protocol is a critical first step in engaging the international community in collaborative action to reduce greenhouse gas emissions.

The Victorian Government believes that it is critical that the federal government take immediate steps to ratify this important international agreement – a report by the Kyoto Protocol Ratification Advisory Group to the Victorian, New South Wales and South Australian governments in 2003 clearly indicated that it is in Australia's economic interests to do so.<sup>2</sup>

The Russian Government's recent decision to ratify the Kyoto Protocol means that Australia is now in an even more isolated position because of the federal government's failure to ratify the Protocol.

Paralleling the environmental imperative for action on climate change is an economic driver. Governments and businesses internationally are taking steps to position themselves for a carbon-constrained future. The European Union's emission trading scheme begins operation in January 2005. Emissions trading schemes are being developed or considered by various countries including Canada and Japan. In the USA, nine north-eastern states have agreed to develop a regional emissions trading scheme in the absence of action at the national level.<sup>3</sup>

In countries where emissions trading is regarded as a potential cornerstone of greenhouse policy, efforts are also being directed to policies and programs which support and reinforce it. These complementary measures seek to promote energy efficiency, renewable energy and support the development and deployment of greenhouse gas abatement technologies.

While international policy frameworks and the details of individual national and State level policies and programs will continue to evolve over time, it is clear that:

- a carbon-constrained future is inevitable
- the stationary (non-transport) energy sector, as the single largest source of emissions, has a major role to play in reducing emissions
- greenhouse gas emissions will bear a price in future as governments move to reduce emissions through policies such as emissions trading

1. See <http://www.ipcc.ch>

2. A copy of this report is available at <http://www.greenhouse.vic.gov.au/kyoto.htm>

3. For further information on countries' experiences with emissions trading see [http://www.nrtee-trnee.ca/EmissionsTrading/en/overview\\_countries\\_Canada.htm](http://www.nrtee-trnee.ca/EmissionsTrading/en/overview_countries_Canada.htm)

- the future price of carbon can be expected to increase as the stringency of greenhouse gas reduction targets is increased over time.

In these circumstances, the Victorian Government believes that policies are required to ensure that the economy generally, and the stationary energy sector in particular, can achieve greenhouse gas emissions reductions in a manner that protects Victoria's economic interests, minimises costs to industry, and facilitates the exploitation of domestic and export market opportunities for greenhouse gas abatement techniques and technologies.

## Victoria's policy response

The Victorian Greenhouse Strategy – released in June 2002 – was an important first step in the Government's efforts to position Victoria for a carbon-constrained future. The Strategy includes a number of actions to address greenhouse gas emissions in the production and use of energy, including:

- targets to reduce energy use in government buildings by 15 per cent and to purchase 10 per cent of government energy needs in the form of 'Green Power'
- ongoing support for energy efficiency and renewable energy programs delivered by the Sustainable Energy Authority
- an \$8 million Renewable Energy Support Fund
- requiring exploration rights for new brown coal deposits to be granted subject to proponents committing to substantial improvements in greenhouse gas intensity relative to conventional technology
- support for R&D with respect to the reduction of energy-related greenhouse gas emissions including \$2.78 million for the Cooperative Research Centre (CRC) for Clean Power from Lignite and \$14 million for the establishment of the Centre for Energy and Greenhouse Technologies

- the introduction of requirements under State environment protection policy for businesses subject to Environmental Protection Authority (EPA) licensing to take action to improve their energy efficiency
- the introduction of five-star energy efficiency requirements for new dwellings
- support for local government and community-based efforts to reduce energy consumption.<sup>4</sup>

Subsequent to the release of the Victorian Greenhouse Strategy the State Government has introduced initiatives to promote new technologies to enable the sustainable utilisation of Victoria's vast brown coal reserves as a cheap, reliable and secure source of energy. The Government is taking action through increased investments in the CRC for Clean Power from Lignite (\$700,000 a year over three years from 2004–05); new funding to support the CO<sub>2</sub> CRC to further develop geosequestration technology and to assess sites for geosequestration – some of which will be in Victoria (\$750,000 over three years beginning 2004–05); and hosting the Second International Carbon Sequestration Leadership Forum in Melbourne in September 2004.

In addition, the Victorian Government has a wind energy target of up to 1000 MW of installed capacity by 2006. This reflects the Government's belief that wind energy has an important role to play in reducing Victoria's greenhouse gas emissions, while recognising that wind energy by itself is not the total answer. The Victorian Government has delivered a balanced and sustainable approach to developing this emerging energy source with its focus on protecting high landscape value areas such as the Great Ocean Road.

*The Greenhouse Challenge for Energy* policy package discussed in Section 2 significantly advances the suite of measures outlined above, and will be a centrepiece of an updated Victorian Greenhouse Strategy to be released in 2005.

4. Details of these programs and other actions under the Victorian Greenhouse Strategy are available on the web at [www.greenhouse.vic.gov.au](http://www.greenhouse.vic.gov.au)

## 1.2 VICTORIA'S ENERGY SYSTEM

Victoria's stationary energy sector – that is the energy system excluding transport fuels – comprises a diverse array of supply sources, networks and users.

On the supply side, brown coal from extensive reserves in the Latrobe Valley, dominates electricity production<sup>5</sup> – although gas and renewables (hydro, wind, biomass and solar) make contributions that are expected to continue to increase. Natural gas is a significant fuel in the industrial, commercial and residential sectors. Ongoing exploration successes in Victorian gas basins indicate that reserves are likely to be adequate to meet demands without imports from other regions for at least another twenty years. Propane, solar and wood have heating market niches. Solar water heating is increasing rapidly, albeit from a small base, and wood remains an important heating fuel in areas where natural gas is currently not available.

Almost all Victorian residences and businesses are supplied with electricity through an extensive transmission and distribution system. Natural gas is potentially available to approximately 90 per cent of Victorian households and the gas network continues to expand, assisted by the Victorian Government's \$70 million Natural Gas Extensions Program.

Victoria's electricity and gas systems are interconnected to a significant degree with other eastern States and the Australian Capital Territory. In these jurisdictions the National Electricity Market provides an integrated and competitive wholesale market for electricity. Tasmania will join the National Electricity Market with the completion of the Basslink interconnector in 2005.

Victoria's abundant and reliable supplies of energy, and relatively low cost of electricity, has created a competitive advantage that has contributed significantly to Victoria's position as Australia's leading manufacturing State.

Major demands for stationary energy are process heating and aluminium production in the industrial sector; air-conditioning in the commercial sector; and space and water heating in the residential sector. With growing demands for air-conditioning, peak electricity demands are increasing faster (by some 30 per cent) than annual electricity consumption.

Greenhouse gas emissions from Victoria's stationary energy system are high relative to other States. The high moisture content of brown coal, which fuels more than 90 per cent of Victoria's electricity production, results in low fuel conversion efficiencies and high emissions intensity per unit of electricity produced. The average greenhouse gas intensity of Victorian generators is currently around 1.35 tonnes CO<sub>2</sub>-equivalent per MWh compared with an Australian average of around 0.9 tonnes CO<sub>2</sub>-equivalent per MWh.

The stationary energy sector is responsible for around 72 per cent of Victoria's total net greenhouse gas emissions,<sup>6</sup> and electricity generation alone is responsible for 55 per cent of total net emissions. Between 1990 and 1999, emissions from the stationary energy sector increased by 32 per cent, and emissions from electricity generation rose by 41 per cent over the same period.

Under current policies, Australia's energy sector greenhouse gas emissions are expected to grow by more than 30 per cent to 2020 compared with 2002.<sup>7</sup>

These increases are being driven by economic and population growth, and were significantly influenced by the advent of the National Electricity Market in the mid-1990s which saw low cost Victorian generators increase their capacity utilisation due to their ability to compete strongly in the National Electricity Market.

5. Interest has also been expressed by the private sector regarding the potential for Latrobe Valley coal to be used to produce other energy products such as diesel, methanol and gasoline. Such projects, should they proceed, would generate significant levels of CO<sub>2</sub> emissions. Consequently, gasification and geosequestration will be critical if such projects are to be able to effectively manage greenhouse gas emissions in a carbon-constrained environment. The juxtaposition of coal reserves next to possible geosequestration sites in the Latrobe Valley is a potentially important strategic asset for Victoria's economic development if this technology can be proven to be viable from both a technical and financial perspective.

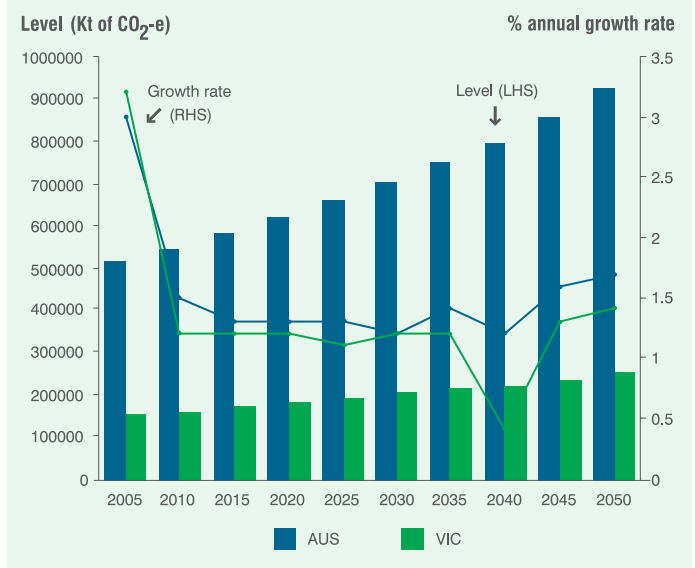
6. See *1999 Victorian Greenhouse Gas Inventory* – available on the web at [www.greenhouse.vic.gov.au](http://www.greenhouse.vic.gov.au)

7. Source: Department of Prime Minister and Cabinet June 2004, *Securing Australia's Energy Future* – [http://www.dpmpc.gov.au/publications/energy\\_future/index.htm](http://www.dpmpc.gov.au/publications/energy_future/index.htm)

Analysis by the Allen Consulting Group – conducted as an input to *The Greenhouse Challenge for Energy* project – forecasts that stationary energy demand will grow by an average of 1.9 per cent a year up to 2010. Beyond 2010, under current policies, demand is expected to continue to grow – albeit at a slightly slower rate of 1.5 per cent a year.

The main factor driving emissions growth is economic activity. Total greenhouse gas emissions are expected to continue to grow in line with real GDP – under current policies emissions growth rates are projected to stabilise in the medium to long run, following a peak in policy-driven emissions reductions in 2012 (see Figure 1).

**Figure 1. Greenhouse gas emissions: 2005–50**



Source: Allen Consulting Group 2004, *Greenhouse Challenge for Energy*.  
 Note that the dip in the annual growth rate of Victorian emissions in 2040 results from a projection that Victorian gas reserves will be depleted around that year. This has an impact in the Allen Consulting Group modelling that results in increased electricity prices and, therefore, reduced demand for energy and a reduction in the rate of growth in emissions.

## 1.3 THE GREENHOUSE CHALLENGE FOR ENERGY PROJECT

*The Greenhouse Challenge for Energy* was initiated by the Victorian Government in 2003 and has involved the following key activities:

- Consultation with stakeholders and the wider community – a discussion paper on *The Greenhouse Challenge for Energy* was released in June 2003 and elicited more than 60 submissions on the issues and policy options for achieving the Government's greenhouse and energy-sector commitments. Information on the submissions received is available at [www.greenhouse.vic.gov.au](http://www.greenhouse.vic.gov.au)
- Detailed analysis of policy options for addressing the greenhouse challenges facing the energy sector – a consortium led by the Allen Consulting Group undertook a review of potential energy and greenhouse futures and, based on this outlook, conducted a comprehensive analysis of policy options for achieving the Government's environmental and energy-sector objectives. This work provides analysis to answer two key questions:
  - i) What policy approach would best position the Victorian energy sector and wider economy for a carbon-constrained future?
  - ii) Is it better for policy action to be taken now or to wait until greater certainty is available with respect to international policy developments and/or until the federal government takes the lead to introduce a national emissions trading system?

The results of this work are discussed in Section 2.3.1.

### Greenhouse and energy policy objectives

The Victorian Government's energy-related greenhouse policy objectives are to:

- i) reduce greenhouse gas emissions from the production and use of energy
- ii) identify and pursue policy paths which:
  - facilitate Victoria's transition to a carbon-constrained future
  - protect Victoria's economic interests by maintaining a secure, reliable and affordable supply of energy
  - create an attractive environment for investment in the energy sector and the wider economy.
  - ensure the Latrobe Valley's long-term future.

## 2. MEETING THE GREENHOUSE CHALLENGE

### – POLICY POSITION

#### 2.1 WHY ACT NOW?

Responding to the threat of climate change will require large reductions in greenhouse gas emissions this century. This will require action significantly beyond current abatement policies in Australia and internationally. It is generally accepted that international pressure will grow to achieve greater levels of abatement than the Kyoto targets after 2012.

In order to achieve long-term, deep reductions in emissions, Victoria will need a transition to a less greenhouse gas-intensive economy. The Victorian Government believes action to address greenhouse gas emissions now will put Victoria in a stronger position to lower the costs and maximise the benefits of responses to future carbon constraints.

A clear and stable energy and greenhouse policy framework is required to give the energy industry the certainty it needs to make the long-term investments necessary to meet our growing energy needs. If the current uncertainty continues, it will complicate and possibly deter investment in intermediate and baseload generation. It is also likely to dampen private investment in developing, demonstrating and commercialising new low-emission energy technology, and in the uptake of renewable energy and energy efficiency improvements.



## 2.2 THE GREENHOUSE CHALLENGE FOR ENERGY POLICY PACKAGE

The Victorian Government strongly believes that no single policy instrument can efficiently and effectively meet its greenhouse and energy policy objectives – rather a suite of policy measures will be required.

As a result of the analysis and stakeholder consultation that has been undertaken in the course of *The Greenhouse Challenge for Energy* project, the following suite of measures is supported:

- a national emissions trading scheme
- emissions reporting and disclosure requirements for large emitters
- a Victorian Energy Technology Innovation Strategy
- expansion of the mandatory renewable energy target
- a Victorian Renewable Energy Strategy
- a Victorian Energy Efficiency Strategy.

### Support for national emissions trading

Emissions trading offers an efficient and effective approach to the abatement of greenhouse gas emissions. The Kyoto Protocol provides for the use of international emissions trading to ensure that parties to the Protocol have sufficient flexibility to meet their abatement targets at least cost. The European Union will be implementing its emissions trading scheme from January 2005, and schemes are under development or consideration in a number of other countries.

### Emissions trading

Under an emissions trading scheme, a limit (or cap) is set for the amount of emissions permitted by sectors subject to the scheme. In the case of greenhouse gas emissions, the limit could be related to a country's Kyoto target.

Permits are then allocated among participants consistent with the limit on total emissions. There are different ways of allocating permits – for example, they could be allocated free of charge based on the historical emissions of participants in the scheme ('grandfathering'); they could be auctioned; or a combination of grandfathering and auctioning could be used.

At the end of each monitoring period, participants in the scheme are required to hold emissions permits equivalent to their actual emissions for the period.

Firms can reduce their emissions to a level below their allocation. If they do so, they have excess permits that they can sell to other firms whose emissions exceed their allocation.

A firm will decide whether it wants to reduce its own emissions or buy permits on the trading market depending on the relative costs of taking abatement action versus buying permits. For example, if emissions permit prices on the market are \$X per tonne of CO<sub>2</sub>, a firm would reduce its emissions (for example, through adopting new technologies or improving energy efficiency) if it costs less than \$X per tonne to do so. If it would cost more than \$X per tonne to reduce its emissions, the firm would be better off buying permits from other participants.

Studies of the potential cost savings of emissions trading programs and simulations indicate that costs are more than 20 per cent lower than if emitters were required to reduce emissions through regulated measures (see [www.margaree.ca/reports/AGuidetoEmissionsTrading.pdf](http://www.margaree.ca/reports/AGuidetoEmissionsTrading.pdf))

Key emissions trading scheme design issues include:

- the level of the emissions limit and the possible phasing of its application over time
- the scope of the scheme (that is, coverage of gases and liable parties)
- the approach to permit allocation
- means of dealing with new businesses entering the market after emissions trading has commenced
- how best to address the impacts of emissions trading on potentially vulnerable sectors and groups.

Further information on emissions trading is available at [www.iea.org](http://www.iea.org)

The Victorian Government supports the application of emissions trading as a key element of its policy package. It would be inefficient from an economic and environmental perspective for Victoria to introduce an emissions trading scheme that would operate solely in Victoria – to do so would mean that Victoria's economy would face a competitive disadvantage in the absence of equivalent action by other States and Territories. The Victorian Government's view is that an emissions trading scheme should involve all States and Territories.

An efficient emissions trading requires a sufficient number of buyers and sellers to encourage the development of a competitive market in emissions permits. In the Australian context, this cannot be achieved in just one State. The Victorian Government would prefer that the federal government take the lead on emissions trading, but to do so in close collaboration with all States and Territories in designing and implementing the scheme.

In the absence of action at the federal level, the States and Territories have established an inter-jurisdictional emissions trading working group to design a scheme that can deliver efficient and effective greenhouse gas abatement while recognising the economic interests of each State and Territory. The Victorian Government is strongly committed to this inter-jurisdictional process.

Victoria's engagement in the working group's deliberations are being guided by the following principles – namely that an emissions trading scheme should:

- be designed to deliver greenhouse gas emission reductions while maintaining a prosperous economy;
- result in the reasonable sharing of any economic burden between jurisdictions;
- seek to ensure that both the potential vulnerability of energy-intensive trade-exposed industries and electricity generation from brown coal are recognised and appropriately addressed through the allocation process;
- encourage new investment in the best available technology for the power generation sector; and
- appropriately deal with the issue of maintaining policy flexibility for governments while providing certainty for investors.

The Victorian Government also believes that, once a national emissions trading scheme is introduced, it will be important to review existing policies addressing greenhouse gas emissions from the energy sector to ensure that overall policy settings are efficient and that duplication or unnecessary imposts are removed.

### **Comment is sought on:**

- the principles outlined above that are guiding Victoria's engagement in the inter-jurisdictional working group on emissions trading
- key design features of a national emissions trading scheme, including views on: the process for setting an emissions cap; feasible coverage of greenhouse gases; method of permit allocation; feasible coverage within the stationary energy sector; emissions liability point; trade-offs between investment and environmental certainty; permit duration options; options for offsets; and approaches to emissions permit allocation.

## Emissions reporting and disclosure requirements for large emitters

Reporting and disclosure of greenhouse gas emissions by large emitters is important because:

- it will provide data to enable monitoring of emissions trends
- it is a prerequisite for emissions trading
- knowledge by emitters of their emissions profile is a critical input to understanding the drivers of their emissions and the opportunities for emissions abatement – in many cases, emissions abatement opportunities can also deliver cost savings to business (for example, through improvements in energy efficiency).

The Environment Protection and Heritage Council (EPHC) and the Ministerial Council on Energy (MCE) have initiated a process to consider how emissions reporting and disclosure might be progressed nationally in a manner that meets government and public reporting needs.<sup>8</sup> This process is scheduled for completion by July 2005.

Progress with the EPHC and MCE process will be closely monitored. Should it transpire that an appropriate approach to reporting and disclosure will not be achieved within a reasonable time frame, Victoria will introduce its own reporting and disclosure requirements for large emitters in Victoria.

### Comment is sought on:

- the form and frequency of reporting and disclosure
- the nature of the information that should be reported
- the most appropriate mechanism(s) to facilitate reporting and disclosure
- how best to avoid the risk of duplication of reporting arrangements for different purposes.

## Victorian Energy Technology Innovation Strategy

Emissions trading – particularly in the early years with likely modest carbon constraints and prices – is not expected to bring promising new low-emission technologies to commercialisation, except where new technologies promise substantial cost advantages.

Consequently, the Victorian Government will establish an Energy Technology Innovation Strategy to support the development of technologies that will maximise our ability to reduce emissions in the long term. The Strategy will build on existing actions to promote low-emission technologies (see Section 1.1) and strengthen Victoria's capacity to progress technologies along the technology 'supply chain' (Research, Development, Demonstration and Commercialisation – [RDD&C]).

Brown coal is likely to remain the most abundant and low cost primary energy source available to Victoria for some time. RDD&C is being conducted and needs to continue to occur with respect to low-emission technologies based on brown coal, such as coal drying technologies, supercritical boilers, and gasification (for example, Integrated Drying Gasification Combined Cycle [IDGCC]). In this context, it is important to recognise that Victoria has a substantial share of the global intellectual property in the use of brown coal and may stand to gain from technology transfers to developing economies with substantial lignite reserves.

Like the Victorian Government, the federal government has recognised the importance of demonstrating low-emission technologies by committing \$500 million to this issue as part of its Energy White Paper. The Victorian Government will actively engage the federal government in identifying potential demonstration projects in Victoria.

At the same time, Victoria – through the Energy Technology Innovation Strategy – will seek to stimulate the smaller-scale development and demonstration of technologies using other energy sources – including renewables – and of energy efficiency technologies. This could be progressed through the Centre for Energy and Greenhouse Technologies and by determining whether additional basic research and development should be encouraged through other means.

8. [www.industry.gov.au/assets/documents/itrinternet/MCECommunique27August200420040827141945.pdf](http://www.industry.gov.au/assets/documents/itrinternet/MCECommunique27August200420040827141945.pdf)

## Aims of the Energy Technology Innovation Strategy

The Energy Technology Innovation Strategy will seek to:

- ensure that Victoria's total investment in pre-commercial energy and energy-related greenhouse technologies is coordinated to maximise the efficiency and effectiveness of program investments across the entire RDD&C supply chain
- ensure that Victorian investments attract technology partners (including intellectual property owners, industry, financiers and other governments) to demonstrate new technologies in Victoria on a large scale
- identify and assess technologies that are applicable to Victoria's energy resources and capable of delivering significant greenhouse gas abatement
- ensure that Victoria's investment supports technologies that are most prospective in terms of their practical, commercial and cost-effective potential for adoption by industry
- leverage federal government and industry funding.

## Expansion of the Mandatory Renewable Energy Target

The renewable energy industry is at an early stage of its development. Support is necessary to provide the industry with the scope and time to improve new technologies and develop economies of scale. In this way, a commercially competitive industry can develop and provide the community with the long-term benefits of renewable energy.

The Victorian Government remains committed to its position that the mandatory renewable energy target should be expanded to 19,000 GWh by 2010. The federal government's decision in June 2004 to leave the mandatory renewable energy target unchanged will stall investment in Australia's renewable energy industry. In the light of that decision, State Energy Ministers have agreed to work together on mechanisms – including consideration of a State and Territory-based the mandatory renewable energy target – to drive the growth of renewable energy through cooperative action at the State level. The level of increase in renewable energy to be sought will be determined through discussions between the States and Territories.

The framework and directions of the Energy Technology Innovation Strategy will be developed by mid-2005.

## Comment is sought on:

- priority areas for energy-greenhouse RDD&C in the Victorian context
- the relative responsibilities of the private and public sectors in RDD&C.

## Victorian Renewable Energy Strategy

Continued development of the renewable energy sector is an important element of efforts to position Victoria for a carbon-constrained future. The Victorian Government will implement a Renewable Energy Strategy to drive the development of a viable renewable energy sector utilising the State's substantial renewable energy resources.

An expanded mandatory renewable energy target would be the key driver of investment in the sector in the near future. The level of carbon prices expected to occur with the introduction of an emissions trading system that is designed to deliver abatement in line with Australia's Kyoto target, would not be sufficient to promote significant development of renewable energy.

The Victorian Government has established the following targets with respect to renewable energy:

- to have 10 per cent of Victoria's electricity consumption provided by renewable energy by 2010
- to facilitate the development of up to 1000 MW of wind energy in appropriate locations by 2006.

The Victorian Government is supporting the development of renewable energy through actions such as the purchase of 10 per cent of the Government's own energy needs in the form of Green Power; establishment of an \$8 million Renewable Energy Support Fund; a solar hot water rebate program; support for the promotion of Green Power; development of the Victorian Wind Energy Atlas; and the completion of assessment and mapping of Victoria's other renewable energy resources.<sup>9</sup> Other recent initiatives include the:

- introduction to Parliament of the Wind Energy Development Bill to facilitate the development and construction of wind energy facilities in Victoria by removing barriers to grid connection and providing an assured buyer for power from small wind generators
- establishment of a Wind Energy Support Package to facilitate the development of wind farms in appropriate locations
- introduction of a Geothermal Energy Resources Bill to facilitate exploration and extraction by providing security of tenure over geothermal energy resources and regulating the industry's environmental performance.

The Renewable Energy Strategy will build on these measures to achieve Victoria's renewable energy targets. Work on the Strategy is already under way – recommendations will be considered by the Government in the first half of 2005.

### Comment is sought on:

- the issues that the State Government should consider in progressing development of the Renewable Energy Strategy.

9. See [www.seav.vic.gov.au](http://www.seav.vic.gov.au) for information on these measures.

## Victorian Energy Efficiency Strategy

Energy efficiency has an important role to play in addressing the greenhouse challenge facing the energy sector. Analysis by the Allen Consulting Group demonstrates that the application of energy efficiency measures can significantly reduce the impacts on economic and employment growth rates arising from the introduction of an emissions trading system (see Section 2.3.1).

Despite its significance, there are technical and economic limits to the gains that can be realised from improvements in energy efficiency. In addition, even though improvements in energy efficiency will reduce the energy intensity of economic activity, they will not reduce total energy use to the same extent, given that economic growth will continue.

For most businesses and households, energy costs represent a small proportion of total costs. Research for the Victorian Government by the National Institute of Economic and Industry Research indicates, for example, that for the vast majority of industry subgroups, energy costs represent less than 3 per cent of total turnover.<sup>10</sup> In this context, it is not surprising that the demand for energy does not respond strongly to changes in price.

Consequently, targeted policies and programs to complement an emissions trading scheme will be critical to driving the uptake of energy efficiency opportunities. In turn, the exploitation of these opportunities is critical to an efficient greenhouse response in the energy sector because:

- energy efficiency improvements provide a positive economic return to businesses and households – making them important in their own right

- the net<sup>11</sup> emissions abatement that results from cost-effective improvements in energy efficiency as a result of targeted energy efficiency policies and programs reduces the abatement task to be delivered by emissions trading – this will result in lower carbon prices than would otherwise be necessary to achieve the same total level of abatement.

The Victorian Government already has a number of measures in place to support the pursuit of energy efficiency gains, including:

- a range of programs administered by the Sustainable Energy Authority<sup>12</sup>
- the introduction from July 2004 of requirements for new housing to achieve a 4 star energy efficiency rating with 5 star ratings to be achieved from July 2005<sup>13</sup>
- requirements for all EPA licensees to conduct energy audits and to implement energy efficiency improvements with a payback of up to three years – businesses applying for a new works approval or license from the EPA are required to adopt best practice with respect to energy efficiency.<sup>14</sup>

The Victorian Government will implement an Energy Efficiency Strategy that will build on existing measures and initiate new policies and programs. This Strategy – which will be developed by mid-2005 – will also incorporate actions from Stage 1 of the National Framework for Energy Efficiency (NFEE) that was agreed by the MCE in August 2004. Stage 1 consists of nine elements (see Box). These actions are forecast to save between 45 and 57 PJ of energy across the Australian economy by 2015 and result in an increase in GDP of around \$400 million a year.

The NFEE is being developed to ensure action on energy efficiency by jurisdictions across Australia is coordinated where such coordination is necessary for achieving effective and efficient outcomes.

10. A copy of this report is available on the web at [www.greenhouse.vic.gov.au](http://www.greenhouse.vic.gov.au)

11. Total energy savings due to energy efficiency improvements can be reduced by a 'rebound' effect. This occurs when the positive economic impact enhances economic growth and tends to increase energy demands. This 'rebound' effect must be recognised in estimating the net economic and greenhouse impacts of energy efficiency programs.

12. See [www.seav.vic.gov.au](http://www.seav.vic.gov.au)

13. See [www.buildingcommission.vic.gov.au](http://www.buildingcommission.vic.gov.au)

14. See [www.epa.vic.gov.au](http://www.epa.vic.gov.au)

## **National Framework for Energy Efficiency: Stage 1 Measures**

NFEE Stage 1 comprises nine elements as set out below:

### **Residential buildings**

Improve the energy performance of the residential building stock by measures including nationally consistent minimum energy efficiency design standards for new homes, units and apartments; minimum energy efficiency design standards for major renovations; and mandatory disclosure of the energy performance of homes, units and apartments at the time of sale or lease.

### **Commercial buildings**

Improve the energy performance of the commercial building stock and inform owner and tenant decision-making by measures including nationally consistent minimum energy efficiency design standards for new and refurbished buildings; and mandatory disclosure of building energy performance at time of sale or lease.

### **Commercial/industrial energy efficiency**

Raise the awareness of and motivate action by senior management, and improve the skill base to identify energy efficiency opportunities.

### **Government energy efficiency**

Demonstrate leadership to the business sector and wider community by developing nationally consistent standards for measuring and reporting on government energy efficiency programs; annual reporting by all jurisdictions on energy use and progress towards achieving the targets set for government agencies; establishing minimum energy performance standards for government buildings; and developing best practice models for government departments to implement energy efficiency programs.

### **Appliance and equipment energy efficiency**

Improve the energy efficiency of major energy using appliances and equipment by enhancing the National Appliance and Equipment Energy Efficiency Program (NAEEEP) for electrical products.

### **Trade and professional training and accreditation**

Develop the capacity of relevant professions and trades to identify opportunities and implement energy efficient solutions.

### **Commercial/industrial sector capacity building**

Demonstrate the benefits of energy efficiency, build industry capacity to deliver energy efficient solutions, and reduce energy efficiency investment risks.

### **General consumer awareness**

Raise the awareness of general consumers (householders and small business) and motivate energy-saving action.

### **Finance sector awareness**

Government agencies will work with the finance sector to increase the type and availability of finance products for energy efficiency.

Information on the NFEE is available at [www.seav.vic.gov.au/energy\\_efficiency/NFEE/index.asp](http://www.seav.vic.gov.au/energy_efficiency/NFEE/index.asp)

Victoria is already advanced in the implementation of elements of NFEES Stage 1, including:

- minimum five-star energy efficiency requirements for new residential buildings
- requirements for large energy consumers that are subject to EPA licensing to undertake energy audits and to implement actions with a payback of up to three years
- establishment of targets for reductions in energy use in government buildings and reporting against these targets.

Development of the Victorian Energy Efficiency Strategy will also inform Victoria's participation in NFEES Stage 2 and Victoria's submission to the Productivity Commission's inquiry into the economic and environmental potential offered by energy efficiency.

#### **Comment is sought on:**

- issues that Victoria should take into consideration in implementing the nine elements of NFEES Stage 1
- measures additional to the nine elements of NFEES Stage 1 that should be pursued through the Victorian Energy Efficiency Strategy and through NFEES Stage 2.

### **An interim measure in advance of national emissions trading?**

The Victorian Government believes it is unlikely that a national emissions trading scheme would start operation before 2008. In this context, it is important to consider whether an interim policy is needed to send signals to investors regarding the importance of taking greenhouse gas emissions into account in making investment decisions. The Government will be giving further consideration to options that are compatible with the later introduction of a national emissions trading scheme, if it is decided that an interim policy is warranted.

In some respects, interim policy measures have already been pursued by the Government. For example, the Brown Coal Tender provides access to new coal fields while reducing greenhouse gas emissions below current best practice. Similarly, the negotiations with Hazelwood Power Station are based on identifiable greenhouse gas reductions in exchange for access to new coal. While these policy initiatives are important, it may still be appropriate to integrate these with a clearer interim policy.

#### **Comment is sought on:**

- whether an interim Victorian policy is needed in advance of the operation of a national emissions trading scheme
- if so, what policy options should be considered.

## 2.3 RATIONALE FOR THE POLICY PACKAGE

### 2.3.1 RESULTS OF ANALYSIS BY THE ALLEN CONSULTING GROUP

A consortium led by the Allen Consulting Group conducted a detailed analysis of policy options for achieving the Government's greenhouse objectives in the energy sector. The study considered the economic impacts (using the Monash Centre of Policy Studies model) of a number of policy options including:

- national emissions trading
- national emissions trading complemented by measures to address the potential vulnerability of energy-intensive trade-exposed industries and to drive improvements in energy efficiency
- extension of the New South Wales energy retailer benchmark scheme
- introduction of Generator Efficiency Standards for existing and new electricity generators in Victoria.

The approach taken by the Allen Consulting Group was to assess the economic impact of introducing the various policy options from 2008 (that is, the start of the first commitment period of the Kyoto Protocol), with the impacts considered over two periods:

- 2008–12
- post-2012.

For the 2008–12 period, economic impacts were assessed by comparing the impact of the policy measures against a business-as-usual (current policies) or 'reference case' scenario.

For the post-2012 period, four scenarios for the economy were developed – each with differing levels of carbon price reflecting different possible futures regarding the extent and strength of international action to reduce greenhouse gas emissions. Allen Consulting Group then assessed the extent to which the introduction of policy options during 2008–12 influences economic trends under each of the four scenarios post-2012. In other words, the assessment identifies the costs and benefits of taking action over the period 2008–12 to position the economy for possible global carbon prices resulting from international agreements operating from 2013.

Details of the results of the Allen Consulting Group analysis for each of these options is available on the web at [www.greenhouse.vic.gov.au](http://www.greenhouse.vic.gov.au)

The analysis found that the most cost-effective policy approach is one that involves emissions trading complemented by measures to drive improvements in energy efficiency. The results of the assessment of economic impacts for this policy package are presented in Table 1. It indicates that the package would result in a small moderation in the rate of growth in gross state product (GSP) and employment over the period 2008–12 relative to the business-as-usual reference scenario. For example:

- GSP is estimated to be an average of \$233,408 million a year over the period 2008–12 under the reference scenario and \$233,364 million a year with the modelled policy package – this means that the introduction of the modelled package would see average GSP over 2008–12 being 17.84 per cent above 2004 levels compared with 17.87 per cent without the policy package – a difference of 0.03 per cent\*
- employment in Victoria is estimated to be an average of 2,473,230 over 2008–12 under the reference scenario and 2,472,760 with the modelled policy package – this means that the introduction of the modelled package would see average employment over 2008–12 being 6.69 per cent higher than in 2004 rather than 6.71 per cent – a difference of 0.02 per cent\*
- retail electricity prices are expected to be 3.5 per cent higher compared to the reference scenario over the period 2008–12 – this is equivalent to 0.6 per cent a year

Consequently, the policy approach would result in continued strong economic outcomes in parallel with a strengthening of greenhouse abatement action at both the national and state level.

Most importantly, the results in Table 1 show that implementation of the policy package over 2008–12 provides economic benefits post-2012. Under all scenarios considered by the Allen Consulting Group, these benefits outweigh the economic impacts between 2008–12. There is a positive net present value (NPV) for GSP, and a positive net impact on employment.

The benefits of introducing a national emissions trading scheme complemented by supporting measures are due to the early positioning of the economy for more stringent future carbon price signals. Taking early action will drive energy efficiency improvements and influence investment behaviour, thereby enabling the economy to better respond to stronger carbon constraints and, therefore, higher carbon prices that are expected to be imposed in the longer term (post-2012). This will lower the costs of transition to a carbon-constrained future.

Although Allen Consulting Group did not conduct a quantitative assessment of policy options for promoting renewable energy or for driving RDD&C into less greenhouse-intensive energy producing and using technologies, its report notes that:

A recurring theme of the report is the importance of technological change in providing the ultimate path to stabilising the concentration of greenhouse gases in the atmosphere and arresting global warming. There are a number of technologies that are either currently available or on the horizon that are capable of providing electricity with a very low greenhouse footprint. All of them currently have problems, however, either in terms of the cost of generation or environmental sustainability. Substantial RDD&C will be required, both to reduce the cost of generation from greenhouse friendly sources and to reduce the greenhouse footprint of the cleaner fossil fuel technologies. It has also been argued in this report that it will take some considerable time before market signals are transmitted with sufficient strength to provide a major incentive for innovation in this area. In the interests of reducing adjustment costs in the future, there is a clear case for supply side measures to be employed to provide an additional and early stimulus to such innovation.



**Table 1. Impacts in Victoria of national emissions trading\* plus energy efficiency plus exemptions for trade-exposed energy-intensive industries compared with reference scenario\*\***

	Real GSP \$ million (2002 prices)	Employment	Average real electricity retail price impact	Greenhouse gas emissions
2004	198,026	2,317,600		
Reference scenario				
• average 2008–12	233,408	2,473,230		
• difference between 2004 and 2008–12 average	35,382 (17.87%)	155,580 (6.71%)		
With policy package of emissions trading, energy efficiency and exemptions for trade-exposed energy-intensive industry				
• average 2008–12	233,364	2,472,760		
• difference between 2004 and 2008–12 average	35,338 (17.84%)	155,110 (6.69%)		
• change compared with reference scenario 2008–12	- 44 (0.03%)	- 470 (0.02%)	+ 3.5% (0.6 % a year)	- 7.6 Mt CO <sub>2</sub> -e average
Impact 2008–25 relative to reference scenario	Increase in GSP due to positioning benefits from operation of the policy package over 2008–12  On average, GSP is \$281 million higher a year	After 2012 there are, on average, 3,200 more jobs compared with Reference Scenario due to positioning benefits	On average, real retail electricity prices increase by 0.6 per cent	On average, emissions are reduced by 7.3 Mt CO <sub>2</sub> -e

Source: Allen Consulting Group 2004, *Greenhouse Challenge for Energy*

\* In its Report, Allen Consulting Group notes that such changes are 'negligible – amounting to a near zero deviation away from the underlying Reference case expectations.'

\*\* In its analysis, the Allen Consulting Group assumed that a national emissions trading scheme operating in Australia over the period 2008–12 would result in an estimated price of \$5 per tonne of CO<sub>2</sub>-equivalent. This was assumed on the basis that the gap between Australia's Kyoto target and projected emissions is small. Figures published by the Australian Government in September 2003 suggest this gap to be only 13 megatonnes CO<sub>2</sub>-e. A carbon price of \$5 per tonne of CO<sub>2</sub>-e would be sufficient to deliver abatement from the stationary energy sector consistent with this gap.

In its report, Allen Consulting Group also notes that: 'the modelling of the scenarios is only a partial picture of the overall economic costs and benefits of the scenario outcomes. In particular, the modelling does not incorporate the economic benefits of reducing greenhouse gas emissions. As such it is a cost-effectiveness assessment ... rather than a cost-benefit analysis, which would seek to value the benefit of the foregone emissions'.

\*\*The Reference Scenario is a 'business-as-usual' scenario in which it is assumed that existing global energy and greenhouse policy approaches are maintained into the future – as a result, average global carbon prices remain low. Allen Consulting Group also considered other possible future scenarios, including those in which global greenhouse action is strengthened. Under these scenarios – 'Greenhouse Action Scenario' and 'Greenhouse Crisis Scenario' – the positive economic benefits in terms of stronger GSP and employment growth post-2012 are greater than those shown in this table for the Reference Case comparison (see Allen Consulting Group report for details).

### 2.3.2 OTHER CONSIDERATIONS – THE BENEFITS OF EARLY ACTION IN IMPLEMENTING THE PACKAGE

The current small gap between Australia's projected emissions and the Kyoto target<sup>15</sup> represents an ideal opportunity for the early introduction of a policy package that includes a national emissions trading scheme. Emissions trading could be introduced with the expectation that carbon prices resulting from trading would be modest but that the capacity of the economy to respond to more stringent targets in future years would be strengthened. As noted above, such a price would have negligible short-term impacts but with net benefits to the economy in the medium to long term.<sup>16</sup>

The early introduction of emissions trading supported by complementary measures also provides an important opportunity for learning and capacity building in trading at a time when the negative economic impacts associated with gaining this experience are not expected to be significant.

Early action to work with other States and Territories in designing an emissions trading scheme offers the opportunity to develop a system which recognises and addresses the particular needs and interests of individual jurisdictions.



15. Australia's target under the Kyoto Protocol is to limit greenhouse gas emissions growth to 8 per cent above 1990 levels over the Protocol's first commitment period (2008–12). Projections by the federal government indicate that Australia is 'within striking distance' of meeting this target. The gap between projected emissions and the Kyoto target is estimated to be 13 megatonnes or around 2 per cent of total emissions (see <http://www.deh.gov.au/minister/env/2003/mr18sep03.html>)

16. Note that design options that would result in even lower electricity prices than those modelled by Allen Consulting Group are being considered.

### 3. VICTORIA'S FUTURE ENERGY SYSTEM

The Victorian Government recognises that the potential costs and opportunities of future international action on climate change mean that Victoria's ongoing energy needs cannot be met by mirroring past patterns of energy production and use.

The policy package discussed in Section 2 seeks to place Victoria on a more sustainable energy path that ensures greenhouse gas emissions from the energy sector are reduced and that Victoria's economy and community continue to prosper from access to reliable, secure and affordable supplies of energy.

Moving to a more sustainable energy path will ensure that Victoria meets its future energy needs through a combination of the more efficient use of brown coal, gas, renewables and energy efficiency. Analysis for *The Greenhouse Challenge for Energy* suggests that investment opportunities will exist for peaking generation (most likely open cycle gas turbines) in the near term, and intermediate generation (for example, combined cycle gas turbines) by 2010. Additional baseload generation (for example, low-emission brown coal technologies) will be needed next decade, together with renewables and possibly additional import capacity throughout the period (see Box). The Government will actively facilitate the necessary investment, noting that the level of investment and fuels and technologies used will be determined by economic growth, trends in the energy intensity of the economy, technological development and government policy settings.

#### Victoria's future energy system

Brown coal will continue to play an important role in the energy mix, but to do so, new technologies will need to be introduced which deliver greenhouse gas emissions intensities significantly lower than current technologies. New low-emission energy technologies are being developed which show promise of being competitive with current technologies within 10 years. Ultimately, however, carbon capture and sequestration will be required. While this technology appears technically feasible, it is still commercially unproven in relation to the capture and storage of emissions from electricity generation – based on current technologies, it would result in substantially higher electricity prices than those from gas and renewables using current technologies and fuel prices. The relative merits of brown coal power may change substantially in coming decades if promising new technologies are further developed and commercialised.

Surplus generation capacity in the National Electricity Market, capacity additions to existing brown coal generators, inter-connector augmentation and moderate base load growth rates indicate that new base load generation located in Victoria is unlikely to be required until 2015. However, with continued strong growth in air-conditioning, gas-fired peak and intermediate capacity will be required over the next 10 years. The type of capacity will depend on the relative costs of plant and trends in the pattern of demand growth. Major new loads would bring forward requirements for base load generation.

Gas is much less greenhouse intensive than brown coal, but is currently more expensive when used for large-scale baseload power. Gas is a more limited resource than coal, although there are substantial reserves adjacent to Victoria and large reserves off Western Australia and the Northern Territory. The price of gas may increasingly be determined by international market forces over coming decades as international trade in liquefied natural gas grows. This situation would create greater risk of price volatility than is likely with brown coal, although the price of gas-fired power will be far less sensitive to movements in global carbon prices. Gas has greater scope than coal to be used for electricity production from distributed small-scale applications such as cogeneration, but at this time the cost of electricity from distributed technologies is relatively high.

Renewables produce near-zero emissions but often at substantially higher prices than electricity from brown coal or gas. However, renewable electricity prices are expected to fall significantly over the next 20 years. The introduction of carbon pricing and other supporting policy measures should assist in stimulating the development of the renewables sector and increase its

relative contribution to Victoria's energy supply. Renewables will play an important role in improving the flexibility of the stationary energy sector to respond to future greenhouse gas abatement obligations.

Energy efficiency has the potential to play an important role in reducing greenhouse emissions – there are substantial energy savings to be made at commercial rates of return and, hence, a net economic benefit. However, energy efficiency improvements face a number of barriers, including access to capital, information barriers and the problem of 'split incentives' through which those making decisions on the design performance of a building with respect to energy efficiency (that is, landlords) are not those who pay the energy bills (that is, tenants). Even though energy efficiency gains will reduce the energy intensity of economic activity, they will not reduce total energy use to the same extent due to continued economic growth – indeed, absolute energy use is likely to continue to increase. While energy efficiency, on its own, is unlikely to avoid the need for additional sources of reliable energy in the future, efficiency improvements are an important complementary measure for achieving reductions in energy-related greenhouse gas emissions.

It is not possible or necessary at this time to identify the precise share of different energy sources that will reliably meet future energy needs at acceptable emission levels and lowest cost – ultimately, this is something that the market will determine. It is important, however, to ensure that all sources are well positioned to contribute, and that long-term market regulation, energy technology and greenhouse abatement policies are directed to ensure that Victoria's energy and environmental objectives are met at least economic cost.

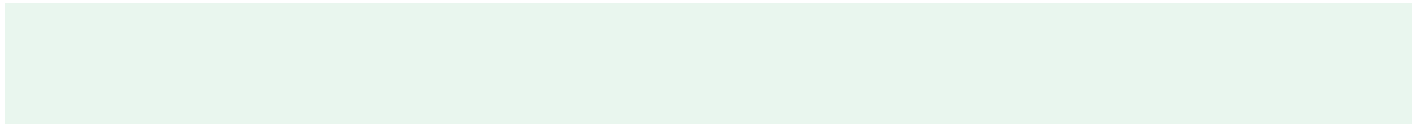
## 4. NEXT STEPS

Submissions relating to this Paper close on 18 February 2005 – comment is sought on the issues identified in Section 2 or on any other relevant matters which either stakeholders or the community wishes to raise.

The Government will take these submissions into account in:

- finalising implementation arrangements for various components of the policy package described in Section 2
- discussions with other jurisdictions in progressing the design of a national emissions trading scheme.







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