



South Australia: Reducing the Greenhouse Effect



An Initiative of
Government of South Australia



Foreword



Global warming is an issue that needs to be tackled for the benefit of ourselves and our children. This has been recognised internationally through the *United Nations Framework Convention on Climate Change* to which Australia is a signatory and has resulted in agreed national targets for the reduction of greenhouse gas emissions in the *Kyoto Protocol*.

South Australia: Reducing the Greenhouse Effect is an indication of how seriously the State Government takes this issue.

South Australians contribute more than 30 million tonnes of greenhouse gases to the atmosphere each year – about 20 tonnes for every person in the State. We all contribute to these emissions and so must all work together to minimise the problem.

The State Government is leading by example by establishing Greenhouse Gas Targets for all South Australian Government agencies, to reduce both greenhouse gases and energy costs. It is working with industry and the Commonwealth through a Memorandum of Understanding on the Greenhouse Challenge program, and with local government through Local Agenda 21 and Cities for Climate Protection. The State Government also supports walking and cycling for the community at large, and sponsors the largest fleet in Australia of the low greenhouse gas emitting, natural gas fuelled buses.

South Australia: Reducing the Greenhouse Effect illustrates the complementary roles of industry, the community and governments in addressing the enhanced greenhouse effect and helping to meet our national and international obligations.

Global warming and the greenhouse effect must be tackled jointly by all sectors of society – it is our responsibility to ensure everything that can be done, is done, to preserve the environment for the next millennium.

John Olsen
Premier of South Australia

A handwritten signature in gold ink, appearing to read 'John Olsen', written in a cursive style.



The greenhouse effect

The atmosphere surrounding the earth's surface acts like the windows of a closed car, sitting in the sun. It lets in most of the sunlight which is absorbed and converted to heat energy. The heat is then re-emitted from the surface but some is trapped by the greenhouse gases in the atmosphere, causing the earth to warm up. Without this natural effect, the temperature of the earth's surface would fall well below freezing.

HOWEVER, THERE IS NOW CONCERN THAT THE EMISSION OF GREENHOUSE GASES SUCH AS CARBON DIOXIDE, METHANE AND NITROUS OXIDE FROM HUMAN ACTIVITIES COULD BE INCREASING THIS EFFECT. THIS COULD RESULT IN GLOBAL WARMING CAUSING CLIMATE CHANGE AND RISING SEA LEVELS.

In late 1995, the second report of the Intergovernmental Panel on Climate Change (the major international scientific body studying these issues) reported that "the balance of evidence suggests a discernible human influence on global climate".



...“the balance of evidence suggests a discernible human influence on global climate”

Tipping the balance

In 1992, Australia signed the United Nations Framework Convention on Climate Change. Developed countries within this Convention made voluntary commitments to stabilise greenhouse gas emissions at 1990 levels.

In 1997 a Conference of the Parties to the Convention developed the *Kyoto Protocol*. The developed countries agreed in the *Protocol* to reduce their greenhouse gas emissions by an average of 5.2% over 1990 levels between the years 2008 and 2012. Targets for individual countries take into account differences in their ability to reduce their greenhouse gas emissions and therefore vary.

Australia's target was set at 8% above its 1990 level reflecting its unique economic and trade circumstances. This increase, in practice involves a reduction from projections of a 28% growth in emissions to 2012. These projections are based on expected economic and population growth.

ONCE AT LEAST 55 SIGNATORIES REPRESENTING COUNTRIES RESPONSIBLE FOR AT LEAST 55% OF CURRENT GLOBAL GREENHOUSE GAS EMISSIONS HAVE RATIFIED THE KYOTO PROTOCOL IT WILL BECOME BINDING UNDER INTERNATIONAL LAW AND THE TARGETS ENFORCEABLE.

All State, Territory and Commonwealth Governments, with important contributions from the Australian Local Government Association, industry and community groups, contributed to the development of the National Greenhouse Strategy, the primary mechanism for meeting our international commitments. The Strategy outlines a wide range of measures focusing on three themes: improving awareness and understanding greenhouse issues; limiting the growth of greenhouse emissions and enhancing greenhouse sink capacity; and developing adaptation responses. With many of the measures already being undertaken in this State and plans being drawn up to implement others, South Australia is committed to playing its part in implementing the National Greenhouse Strategy.

Government putting its own house in order

In providing services to the community, the South Australian Government controls a considerable portfolio of public buildings and spends around \$40 million a year on gas and electricity charges. (This does not include public lighting and various commercial agencies such as SA Water Corporation, Ports Corporation and the ETSA Group.)

CONTROLLING THE ENERGY COSTS AND GREENHOUSE GAS EMISSIONS OF ITS OWN ACTIVITIES IS AN IMPORTANT GOVERNMENT GOAL.

The Government is working hard to improve the energy efficiency of its own operations by making the best use of its current assets and taking into account whole of life costs for new infrastructure. The true cost of new equipment includes operating costs for its expected life as well as the initial capital cost. Reductions in Government energy use reduce greenhouse gas emissions and allow more money to be spent on better services to the community.



DISPLAY BOARD AT TARGETS LAUNCH

Under the South Australian Government's Greenhouse Targets Program, launched in April 1998, each department and agency has set a target to reduce its greenhouse gas emissions by reducing energy use. The program is being coordinated by the Office of Energy Policy (Department of Primary Industries and Resources), which provides advice and helps departments achieve their targets.

THIS PROGRAM IS EXPECTED TO REDUCE ANNUAL CARBON DIOXIDE EMISSIONS BY 15,000-20,000 TONNES OVER THE NEXT TWO YEARS AND SAVE IN THE ORDER OF \$2-3 MILLION.

The Office of Energy Policy, and the Department for Environment, Heritage and Aboriginal Affairs ran a joint Energy Awareness pilot program to encourage staff to turn off lights and equipment when not in use. The program was highly successful in changing energy use behaviour, as the 17% reduction in energy use (general power and lighting) achieved within 6-8 weeks was being maintained four months later.

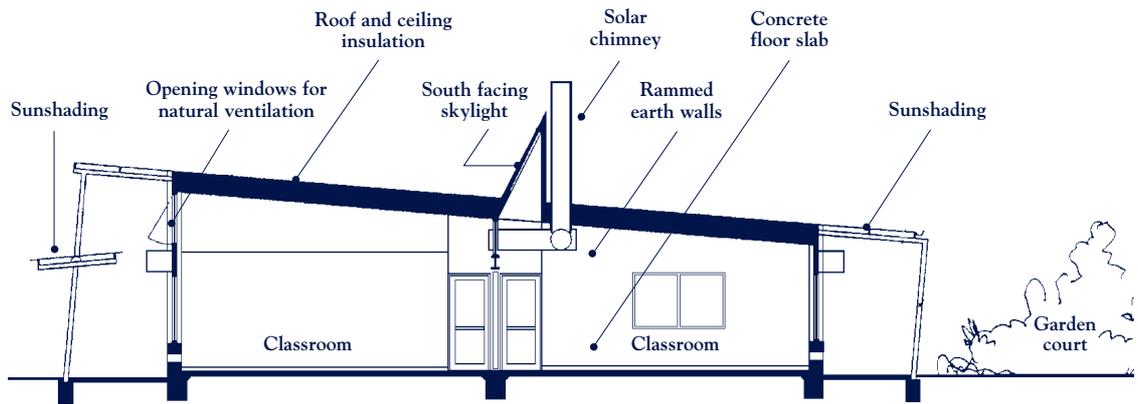
In 1998 the Office of Energy Policy and the Department for Administrative and Information Services released a set of Energy Management Guidelines to complement the Government's existing Strategic Asset Management Framework which is designed to minimise whole of life asset costs. The guidelines promote energy efficiency and reduce operating costs in public assets. A planned Energy Managers Manual will describe practical steps that can be followed to reduce energy use in government operations.

*...more money
to be spent on
better services to
the community*



A new primary school being built in the northern Adelaide suburb of Craigmore is setting a new benchmark for environmentally friendly building design. Energy consumption is being reduced in both the construction and running of the school. Everything from the shape and orientation of the buildings to the materials used is designed to reduce heat gain in summer and heat loss in winter. Some of these measures add a small premium to the initial cost of the project, but the reduced energy consumption will cover this cost within a few years. The direct energy costs saved are expected to be approximately \$4000 per year and carbon dioxide emissions will be reduced by about 35 tonnes. And, with good environmental management, further savings can be anticipated.

AN ENVIRONMENTALLY
FRIENDLY SCHOOL BUILDING

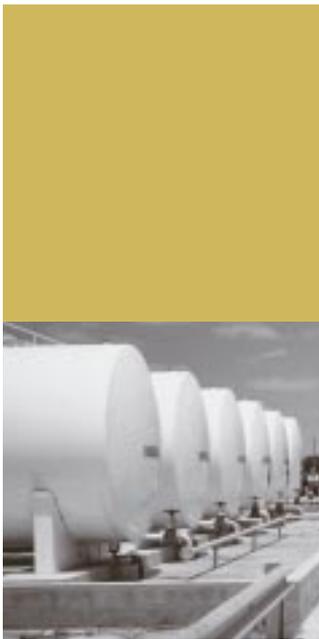


Forming partnerships

The South Australian Government is forming effective partnerships wherever it can to ensure the best possible outcomes from its resources. Everyone must work together if we are to achieve the maximum benefit from minimising greenhouse emissions in South Australia.

The Commonwealth Government has developed, with industry, the very successful Greenhouse Challenge program, in which companies voluntarily agree on targets for reducing their greenhouse gas emissions with rigorous accounting of the reductions achieved. The program is primarily for larger industries and corporations. The South Australian Government has signed a Memorandum of Understanding with the Commonwealth to encourage South Australian firms and Government enterprises to join the Challenge. TransAdelaide and the Women and Children's Hospital have already signed up for the Greenhouse Challenge. The South Australian Government is also directly participating in the Greenhouse Allies program for groups of smaller firms.

It has lent its support, with the Employers Chamber of Commerce and Industry, to the commitment of the Motor Trades Association of South Australia to reducing greenhouse emissions among its members. About 50 of its membership, including crash repairers, car and heavy vehicle dealers, motor vehicle engineers and service station proprietors, have signed an agreement to participate in this inaugural Greenhouse Allies program. The program uses the successful and well received Small Business Energy Saver kit, published by the Energy Information Centre, which outlines a positive course of action that saves energy and reduces greenhouse gases.



The State Government has a long-standing environmental partnership with local government through the Local Agenda 21 program. This is currently being extended to the Cities for Climate Protection program which has been embraced by a number of metropolitan councils representing about 60% of the population of South Australia. Cities for Climate Protection requires local governments to establish detailed emissions inventories, forecast future growth, develop emissions reduction targets, and develop and implement an action plan.

ATHELSTONE KIWANIS
ASSIST WITH PLANTING
IN WILDFLOWER
GARDEN, BLACK HILL
CONSERVATION PARK

A wide range of partnerships has also been established by Government in community programs through the Natural Heritage Trust, Bushcare, National Landcare and Farm Forestry programs, all of which are increasing 'sinks' for carbon. Carbon dioxide from the atmosphere is 'fixed' in plants through photosynthesis, countering emissions from the burning of fossil fuels.



*... the South
Australian
community
has a vital role
in reducing
greenhouse gas
emissions*

Why community action is needed

South Australians contribute nearly 30 million tonnes of greenhouse gases to the atmosphere per year – equivalent to about 20 tonnes for every person in the State, with the main sources being electricity (27%), agriculture (21%) and transport (19%). South Australia's emissions account for only 7.4% of Australia's emissions, but per capita are close to the national average and among the highest in the world.

By choosing energy efficient appliances, committing to energy efficient practices and building energy efficient houses, we can reduce greenhouse gas emissions.

By conscientiously conserving energy use in the home and reducing fuel consumption, the community can contribute to protecting the environment and still enjoy a comfortable lifestyle.

For example, using a clothes drier can add more than 40 kg extra carbon dioxide to the atmosphere each quarter. Hanging clothes on the line whenever possible uses solar energy, emitting no greenhouse gases. However, if the drier is needed it should be used fully loaded less often, not partially loaded more often.

Driving a car with incorrectly inflated tyres wastes petrol and adds a further 60 kg of carbon dioxide each quarter. The average medium-sized car uses 12 litres of petrol to travel 150 km each week, releasing about 2.2 tonnes of carbon dioxide into the atmosphere annually.

Helping the community reduce greenhouse gases

The South Australian Government provides a range of energy information, education and advisory services, and programs. Community energy efficiency programs and advice initiated, developed and promoted through the Energy Information Centre resulted in \$3.6 million worth of energy related savings in the 1997-98 financial year and greenhouse gas reductions totalling about 19,000 tonnes of carbon dioxide.

Open and competitive national markets for electricity and gas, based on competitive forces are expected to influence the appliance manufacturing and retailing industry. As new energy service companies become active and national Energy Labelling and Minimum Energy Performance Standards for domestic appliances take effect, the appliance manufacturing and retailing industry will be able to offer consumers more choices in products, cost-reflective energy prices and energy conservation measures aimed at reducing greenhouse gas emissions.



SOLAR SENSE HOME

developed nationally by State and Commonwealth governments, is being introduced to the market. Rating systems will allow the community, developers and councils to assess the energy efficiency of houses at the time the plans are submitted for council approval. Energy rating can also be used to estimate the energy impacts of upgrading existing dwellings.

The Government is preparing to introduce minimum energy performance standards for all new residential developments. These measures will improve comfort levels and provide cost effective reductions in greenhouse gas emissions from the residential sector.

The Government, through joint initiatives with the building industry and local government, promotes energy efficient housing design. Following the success of the first energy efficient display home at Seaford, the Southern Right Home, a second display home has been built at Seaford Rise Estate. The Easy Living Home is currently the only energy efficient house available for public inspection in the State. It incorporates an adaptable design for the aged or disabled and has asthma friendly interiors. Energy efficient homes can cut energy use by 30-50%.

THE OFFICE OF ENERGY POLICY HAS RECENTLY PREPARED ENERGY EFFICIENCY GUIDELINES FOR THE MAWSON LAKES DEVELOPMENT TO REDUCE AVERAGE HOUSEHOLD ENERGY USE BY 40% THROUGHOUT THE ESTATE THROUGH BETTER HOUSE DESIGNS, IMPROVED ORIENTATION OF HOUSES ON THE BLOCKS AND FEATURES SUCH AS FULL INSULATION.

A range of energy rating systems for houses, including NatHERS (Nationwide House Energy Rating Scheme)



Reducing the use of fossil fuels for energy production

The most significant source of greenhouse emissions is from the use of fossil fuels such as coal, oil and gas as a source of energy. The Government is planning for an increased proportion of South Australia's energy to be derived from 'green' sources. Already, the Government has facilitated several 'green' energy projects:

- Stand-alone solar power systems serve various National Parks and Wildlife Service dwellings including Troubridge Island (off Edithburgh) and Seal Bay, Kangaroo Island.
- A \$25 million solar/diesel hybrid power station supplies the electricity for the Wilpena Tourist Centre in the Flinders Ranges – and 40% of the energy comes from the sun. The station combines 100 kW of solar cells converting sunlight into electrical energy with 400 kWh of battery storage and three diesel generators totalling 440 kW. They are all controlled by a hi-tech computer system. This is the largest off-grid solar power station in Australia.
- There are several household renewable energy demonstration projects including the 3.6 kW solar photovoltaic power system at Maldorky homestead, in the far north of the State; and homes located at Mount Barker, Cape Jervis, Kangaroo Island, Peterborough, and Moonaree Station near Lake Gairdner.
- The SolarSense home at New Haven Village incorporates a unique roof which integrates solar hot water heating and photovoltaic solar modules for electricity generation.

Greenhouse gas emissions from South Australian electricity generation are less than the Australian average because we rely more on natural gas and less on coal for our electricity needs.

Natural gas emits only half the greenhouse gases of coal to produce the same amount of energy.

It is also more easily used for cogeneration in which the gas is burned in a gas turbine to generate electricity and the hot exhaust is used to produce steam for process heating or for generating more electricity through a steam turbine.

...the Government has facilitated several 'green' energy projects



WILPENNA SOLAR POWER STATION



South Australia's largest cogeneration facility is now operating at Osborne, north of Adelaide. The \$175 million power plant is the largest, most modern cogeneration plant in Australia with greater efficiencies in electricity generation and heat recovery processes. It has been designed to provide bulk steam for the Penrice Products Soda ash plant while generating 184 MW of electricity for the South Australian grid.

The plant has an electrical efficiency of 49% compared to 33% for Torrens Island Power Station and a thermal efficiency including the cogenerated steam of more than 70%. As a result, it is expected to emit about 600,000 tonnes of carbon dioxide less than if the electricity was generated by a coal fired power station and the process steam was generated separately.

The project is a joint initiative of Penrice Soda Products Pty Ltd, Boral Energy Ltd, CU Power International Ltd, ETSA Corporation and the South Australian Government.

A state of the art, new, natural gas fuelled, combined cycle power station is being constructed at Pelican Point, facilitated by the Government, following successful tendering by National Power to build, own and operate within the National Electricity Market. It will emit 30% less greenhouse gas per unit of electricity generated than is currently emitted by Adelaide's Torrens Island gas fired power station and nearly 80% less than for a brown coal fired power station. Additionally, sustainable electricity generation from wind power, solar power and landfill gas, has the potential to significantly contribute to South Australia's greenhouse gas emission reduction effort.

South Australia is particularly advantaged with wind energy, because of the early monitoring work undertaken by the South Australian Government. A 150 kW wind turbine generator installed by the Government is operating at Coober Pedy and development approval has been sought for a wind farm by a private developer near Lake Bonney in the South East of the State.

Vortec Energy Ltd, a New Zealand incorporated company, has been invited by the Government to operate in the South Australian electricity market on a build, own and operate basis. In New Zealand, Vortec has constructed and erected a novel turbine – a diffuser augmented wind turbine generator. The concept is based on effectively increasing the speed of wind through the turbine by means of a shroud (diffuser) around the turbine blades. Vortec have expressed interest in the South Australian invitation.

GREEN POWER SCHEMES ALLOW ELECTRICITY CONSUMERS TO SUPPORT SUSTAINABLE ENERGY GENERATION BY ALLOWING THEM TO COVER SOME OR ALL OF THEIR ELECTRICITY CONSUMPTION WITH SUSTAINABLE ELECTRICITY SUPPLIED TO THE GRID.

South Australian Government accreditation of green power products will help encourage green power schemes in the emerging competitive retail energy market, and will help assure green power customers that their contributions go to supporting sustainable electricity generation.

Reducing transport emissions

Transport is a major user of fossil fuels with cars and small trucks being the main consumers of energy. Changes will be needed in travelling and transporting goods to make a significant impact on reducing greenhouse gas emissions.

Urban development has a major influence on the use of transport. In transport and urban development South Australian Government policy and leadership is laying the foundation for a sustainable and more greenhouse friendly transport system.



Transport and Urban Planning

Urban Regeneration is an important initiative in the Government's commitment to reducing greenhouse gas emissions from the transport sector. The initiative focuses on rejuvenating established metropolitan areas, particularly those experiencing population decline, using existing infrastructure and achieving social, environmental and economic benefits. The Urban Regeneration initiative seeks to better utilise Adelaide's existing housing, land, infrastructure and employment opportunities, a benefit of which will be improved transport efficiency. Urban Regeneration is being implemented through the State Planning Strategy.

More Efficient Transport Systems

The Metropolitan Road Transport Strategy is currently investigating integrated land use and transport planning with the aim of reducing total vehicle kilometres travelled and therefore greenhouse gas emissions. It underpins the current thrust of the Metropolitan Adelaide Planning Strategy which endeavours to bring activities closer to those people or businesses who need to access them the most.

THIS WILL REDUCE THE RELIANCE ON LONG DISTANCE TRAVEL AND, THEREFORE, ACROSS THE TRANSPORT SYSTEM, WILL REDUCE CONGESTION, GREENHOUSE GAS EMISSIONS AND POLLUTION.

Coordinated land use and transport planning and management could help achieve these reductions. Information could be shared and coordinated in areas such as costing, providing infrastructure and services, and assessing performance.

Improving freight transport efficiency is an important objective of the Government's transport policy. Freight councils are addressing the logistics of cargoes moved by air and sea. The freight chains for the grain and citrus industries have been studied to assess how greenhouse gas emissions can be limited. Further opportunities to shift freight to less greenhouse intensive modes are being investigated as are opportunities for increasing the use of electronic trading.

Living Neighbourhoods

The technique of travel blending – an individual action approach to reducing the impact of the car – has now been trialled in a number of locations in Adelaide. The method uses simple principles to help people make equally simple changes to their travel behaviour to fit in with their lifestyles. It is based on: giving people an understandable, overall goal (eg improving the quality of life in Adelaide through less car use), letting them measure their existing travel behaviour, giving them personalised tips for change that fit into their existing lifestyle, and providing an environment of reinforcement (eg family, work or school situation). It will also reduce distances travelled, fuel used and greenhouse gas emissions.

In Adelaide travel blending has been implemented in a series of trials, each building on the experience of its predecessor. Through this process a program has been developed to meet the specific needs of South Australian communities. Results so far indicate that participants have reduced car use by 20% and that these reductions are sustainable.

Transport SA is currently working with a number of metropolitan councils to extend the program under the banner of *Living Neighbourhoods*.



Cleaner Vehicles

Cleaner more efficient vehicles are a key to reducing local and global air pollution from transport and achieving lower greenhouse gas emissions. Government has made a commitment to cleaner fuels by purchasing nearly 200 compressed natural gas buses and establishing refuelling facilities. These buses emit about 10% less greenhouse gas than the diesels they have replaced.

Events such as the World Solar Challenge are important catalysts for developing new technologies to reduce greenhouse gas emissions.

THE SOUTH AUSTRALIAN GOVERNMENT RECOGNISES THE VALUE OF THE EVENT AND PROVIDES DIRECT FUNDING AND LOGISTICAL SUPPORT.



COMPRESSED NATURAL GAS BUS



CYCLE PATHS IN ADELAIDE

Cleaner Modes

State and local governments recognise the potential for reducing greenhouse gas emissions through cleaner transport modes. Since the State Cycling Strategy began in 1996, the downward trend in cycling has been turned around with a 12% increase reported for the 1996-98 period. A further target to double cycling by 2010 has been set.

Safe Routes to School combines traffic safety education with engineering improvements and community awareness to provide a safer environment for children using the road system. Parents, children, staff, police, the local council and Transport SA all contribute to this integrated community-based traffic safety.

The program's main aim is to reduce the incidence and severity of pedestrian, cyclist and passenger crashes involving primary school children but it has the added benefit of encouraging children to walk or cycle to school and recreational activities more frequently, thereby contributing to the reduction of greenhouse gas emissions.

The Walk With Care program operates in a similar manner, but is targeted at pedestrians over the age of 60. Local councils, community groups and Transport SA together identify and develop solutions to the safety concerns raised by older pedestrians, through engineering improvements and road safety awareness. Increasing the confidence of older pedestrians to walk in their area lessens their reliance on the car, again reducing greenhouse gas emissions.

Competitive Tendering and Contracting (CTC) of public transport services in metropolitan Adelaide aims to improve effectiveness of the service as well as encourage innovations to maximise use of transport facilities and hence reduce greenhouse gas emission. The CTC program also directly encourages the service contractors to reduce greenhouse gas emissions.

Regulations introduced by the Passenger Transport Board in 1998 require all replacement taxis to have an entry age limit of 3.5 years and a maximum age limit of 6.5 years.

This regulation is minimising exhaust gas emissions because later model vehicles must comply with vehicle emission controls. In addition, most taxis operating in Adelaide are fitted with Liquid Petroleum Gas (LPG) which has lower greenhouse gas emissions and is generally less harmful to the environment.



All forms of growing vegetation absorb and remove carbon dioxide from the atmosphere...

Environmental management

Maintaining and Enhancing Carbon Sink Capacity

South Australia's natural and planted vegetation plays a significant role in helping to reduce our net greenhouse emissions. All forms of growing vegetation absorb and remove carbon dioxide from the atmosphere and effectively act as carbon stores or greenhouse 'sinks'.

The following initiatives will actively contribute towards maintaining and enhancing South Australia's carbon sink capacity.

THROUGH THESE AND SIMILAR INITIATIVES INVOLVING MANAGED PLANTATIONS AND VEGETATION THICKENING, SOUTH AUSTRALIA IS SEEKING TO INCREASE THE ABSORPTION OF GREENHOUSE GASES IN THE FORM OF SUSTAINABLE CARBON SINKS.

Plantations and Farm Forestry

South Australia is committed to continuing to develop and expand plantation forests for the many benefits they offer, including their significant environmental value in increasing the size and carbon absorption capacity of our existing greenhouse 'sinks'.

Both existing and new plantations can contribute towards the State's greenhouse reduction efforts and with sustainable management practices, their carbon absorption capacity can be further increased.





PLANTATION FOREST

An existing forestry expansion initiative is the collaboration between Commonwealth, State and Territory governments, and industry in Plantations for Australia – The 2020 Vision. As part of this national program to treble Australia’s current plantation estate, South Australia forecasts an increase to approximately 330,000 hectares by the year 2020.

The South Australian Government is also actively supporting the integration of commercial tree growing into existing farming systems for wood and non-wood production, under various State and Commonwealth programs. It is supporting regional farm forestry networks and providing landholders with information on farm forestry planning and management.

The Commonwealth’s Farm Forestry Program encourages farm forestry, especially on land cleared in the past for other purposes. Commercial tree growing incorporated into farming systems can provide significant environment benefits other than the greenhouse benefits.

THE SOUTH AUSTRALIAN GOVERNMENT CONTINUES TO SUPPORT THE STATE’S PRIVATE FORESTRY SECTOR THROUGH ITS COMMITMENT TO THE NATIONAL FOREST POLICY STATEMENT AND, IN PARTICULAR, THROUGH A SUPPORTIVE POLICY FRAMEWORK ENCOURAGING INCREASED PLANTATION DEVELOPMENT AND INVESTMENT.

Forest owners might also have the opportunity of additional financial benefits under a possible future emissions trading system. Such systems are provided for under the *Kyoto Protocol* as one of the allowable mechanisms to help countries meet their overall greenhouse reduction targets.

Subject to further negotiations and decisions at both a domestic and international level relating to emission trading, it may be possible for carbon credits to be assigned to certain eligible forest activities based on their carbon absorption capacity. If such a system eventuates, forest owners could sell their credits as part of a possible future domestic and/or international trading regime, however, the actual commercial potential of forest sinks is largely unknown at this stage.







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