



CLIMATE CHANGE INFORMATION KIT

APRIL 2008

(UPDATED AUGUST 2009)

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*Further information and copies of
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NSW Farmers' Association is Australia's largest State farmer organisation representing the interests of its farmer members – ranging from broad acre, meat, wool and grain producers to horticulture, dairy, poultry meat, egg, pork, oyster and goat industries.

OVERVIEW

While there are various views about the causes of climate change, the Australian Federal Government will introduce an Emissions Trading Scheme ('ETS') designed to reduce anthropogenic (man induced) emissions of greenhouse gasses ('GHGs') in Australia, commencing in 2010. The Government is calling this scheme the Carbon Pollution Reduction Scheme ('CPRS').

The International Panel on Climate Change ('IPCC') has predicted that increasing levels of greenhouse gas emissions are the likely cause of higher global temperatures.

In 2008, the Australian Federal Government agreed to include Australia as a full participant in the Kyoto Protocol during the Bali Conference.

The Government has decided that, an Australian Emissions Trading Scheme will need to be compliant with international carbon accounting rules established under the Kyoto Protocol.

The purpose of this Information Kit is to provide Members with information on the current state of Australian climate change policy.

This Information Kit is comprised of several sections which are as follows:

- Frequently Asked Questions
- Carbon Market Offset Schemes
- Research & Development Needs
- Agricultural Greenhouse Gas Emissions
- Recent Association Policy
- Glossary

FREQUENTLY ASKED QUESTIONS

What is the Carbon Pollution Reduction Scheme (CPRS)?

The CPRS will be a carbon market established by legislation whereby firms can buy and sell emissions credits. Under the CPRS, firms in covered sectors will be required by law to hold permits equivalent to their annual emissions cap. If they exceed their cap they will be fined. Alternatively, they can purchase additional permits from other firms which allow them to legally emit more than their cap. Abatement, therefore, will become a commercial decision. Firms can offset investment in emission reduction by selling excess permits; or they can purchase permits/credits from other firms; or they can pay a fine. In theory, the net result will be a general reduction in emissions as Government progressively lowers the cap and the amount of permits allocated.

Will agriculture be a covered sector?

No decision on agriculture's status under the CPRS has been taken by Government. It is likely that a system that encourages a reduction in agricultural emissions – eg those from livestock and fertilizer – will be built into the scheme. It may be that emissions are capped and to avoid a fine, farmers will need to purchase credits, create offsets or reduce production. The government has not said exactly when or how agriculture will be covered.

Four key options for agricultural participation have been identified by the Government.

1. Full participation in the CPRS as a covered sector with the ability to sell credits but subject an emissions cap which will reduce over time.
2. Remaining an uncovered sector but with the ability to provide offsets into the scheme. Farmers would be encouraged to generate offsets by the potential sale of them into the CPRS.
3. Remaining and uncovered sector but with no ability to sell offsets into the scheme. This would provide no incentive for agriculture to reduce its emissions.
4. The last option was for agriculture to remain completely outside the system and for outcomes to be delivered by regulating farming and farming systems. This was seen as very expensive for government and inflexible for farmers.

Government has indicated that any agricultural involvement will depend upon a practical method for benchmarking and monitoring agricultural emissions, and for establishing the point of obligation. Agricultural emissions are discussed in Information Sheet 3.

What is Association policy on the CPRS?

The NSW Farmers' Association is calling on the Government to exclude Agriculture from emissions liability under the CPRS and, further, to investigate policy that would enable farmers to sell carbon credits created in soil, crops and pasture to other sectors.

This is in line with policy in other developed countries, including Europe, the United States, Canada and Japan, which have excluded agriculture from their emissions trading cap and, instead, have adopted a carrot approach (as opposed to a 'big stick') in encouraging mitigation outcomes from their farm sectors.

There are many compelling reasons for this approach including:

- Techniques used to estimate farm emissions are too imprecise to use as a basis for imposing financial penalties on farmers.
- It is difficult to distinguish emissions caused by farmers from emissions caused by natural factors such as drought.

- Making farmers pay for emissions will increase production costs and reduce trade competitiveness, which will drive production to nations that have higher agricultural emissions.
- As has been argued by the United Nations Food and Agriculture Organisation, allowing farmers to sell credits based on the carbon captured in soil, crops and pasture is a positive incentive to maximise carbon storage within productive farming systems. This incentive is vitally important, not only to emission mitigation but to ensuring global food security and broader sustainability outcomes.

When considering all factors, other developed nations have concluded that imposing carbon penalties on farmers via emissions trading will have major and unpredictable impacts on global food security and on the overall sustainability of how land is allocated to agriculture.

The solution is to develop alternative policy that gives farmers incentives to manage and reduce net emissions, while, at the same time, ensuring that we do not compromise food production.

What are the likely impacts of the CPRS on agriculture?

Whether or not agricultural emissions are capped, farm input costs will be increased by the scheme. The purpose of the scheme is to make electricity, fuel and emission intensive products such as herbicides and chemical fertilizers more expensive, thus creating an incentive to switch to 'climate friendly' alternatives. In theory, the introduction of a 'carbon price' into the market will drive the desired changes in consumption and a switch to renewable energy sources and practices that reduce emissions. The economists call this a 'price signal'.

If agriculture is made liable for emissions under the CPRS, Centre for International Economics modelling shows that profitability margins for farmers will fall significantly, with the impacts compounded by unstable carbon prices. The study shows that at a carbon price of \$25 per tonne, the average beef farmer's cash income could fall by more than 60 per cent. At \$50 a tonne, most beef farmers would be making a loss, with their cash incomes falling 125 per cent.

Added to this is the concern that other countries, including our major agricultural trading partners the US, EU and Canada, have already ruled out covering their direct agricultural emissions under a cap and trade system.

As a result, if Australian agriculture is included in the CPRS, it will result in an uneven international playing field and will significantly disadvantage our farmers in global markets.

Is human-induced climate change real?

There is no black and white answer to this question. As Professor Garnaut has noted, there continues to be considerable uncertainty regarding climate science. The consensus scientific opinion developed by the International Panel on Climate Change ('IPCC') is that it is *likely* that global temperatures are rising due to human greenhouse gas emissions and *possible* that we can reduce climate change risk by reducing these emissions. In other words, the thousands of scientists collaborating in the IPCC do not claim to be certain that their analysis is correct or that their proposed remedy – reducing emissions – will work. Notwithstanding this uncertainty and at great economic cost, world Governments are acting to reduce emissions. This is because the risks of inaction are perceived to be so great.

Our planet's climate has changed through its history, with cold and warm periods and resulting fluctuations in sea level, snow and ice coverage. The difference today is the degree to which human communities are fixed to specific locations and set up to function within relatively narrow and stable environmental bounds. Even small changes in sea level, the frequency of storms, or average rainfall, can have profound economic and social impacts. While this has always been the case it is

why world Governments and, in particular, economic and security analysts, take climate change risk so seriously. While the cause and progression of climate change itself is uncertain, it is certain that nations, including Australia, are implementing policy designed to manage the supposed risk.

What is the point of obligation?

The 'point of obligation' is the term used to describe the point in the supply chain at which the legal obligation to account and pay for emissions rests. If agriculture is capped, it is not clear how or where the Government will establish the point of obligation – this could be the individual farm or at processor/aggregator level. The latter creates a lower compliance burden but allows free riders – ie the worst performing farm in terms of emissions, drags down the average for all participants. The former has higher administrative costs, but rewards farmers who can reduce their emissions.

Will I be able to create and sell offset credits?

The only kind of farm carbon credit that can be created under currently proposed CPRS rules is in standing vegetation – ie trees and shrubs. Moreover, accounting rules require that the land allocated for such credit schemes is locked up for 100 years to guarantee the permanence of the offsets. In theory, offset credits could become a valuable short term element in farm income and help fund adaptation to climate change. In reality, we are a very long way from achieving this and the Federal Government has not been open to discussing alternatives to credits created in standing vegetation, for example credits for carbon in soil, crops and pasture.

I have been approached to participate in a carbon offset scheme. Should I?

There is a big difference between learning all you can about methods for creating offsets within farming systems (highly desirable) and actually locking into a scheme at this point in time.

The Federal Government is in the process of introducing a National Emission Trading Scheme (CPRS) that will set new rules for offset schemes and which will have major implications for current legislated and voluntary schemes.

Until such time as the details of the CPRS are clarified, the Association recommends that Members keep a close watching brief on the issue and carefully consider your future land use and offset needs before signing any contract that restricts your options post 2010 (the date of CPRS commencement). More information about offsets is available in the Information Sheet titled, *Carbon Market Offset Schemes*.

Are forestry offsets a good thing?

The current restriction of offsets to trees and shrubs reflects a long-standing policy intention at both Federal and State level to return significant areas of already cleared land to native vegetation. While recognizing the valuable role that trees play in farming landscapes, the Association is concerned that the emphasis on forestry offsets is misplaced. Primary production demands flexibility in landuse. Locking excessive amounts of land up under plantations is not compatible with recent Government commitments to food security and the continuing productivity of Australian agriculture. Allowing offsets that are not dependent on standing vegetation is critical to the development of a viable farm carbon market.

Can I create soil carbon offsets?

The current rules do not provide any means to claim credits for soil carbon as part of the CPRS or international legislated carbon markets.

Many challenges face the establishment of a viable market for soil carbon offsets, however:

1. Soil carbon accounting is difficult due to the high degree of variation in how carbon occurs in the soil profile (form, state, particle size) and across paddocks and the labor and time involved in direct physical measurement. Carbon particle and other variables, such as depth in the profile, temperature and moisture can have significant impacts on the mobility of the carbon – ie the likelihood of it escaping to the atmosphere. This is before variations in landuse practice are

taken into account. In short, while these problems are not insurmountable, a practical soil carbon accounting model is not currently available.

2. Under Kyoto rules, offsets must be permanent. It is difficult, however, to establish the permanence of soil carbon storage as soil carbon fluxes are typically rapid, carbon moving in and out of soil on a daily, sometimes hourly basis. This problem could potentially be addressed by adopting a net balance sheet accounting model, which would result in a more stable recognition of soil carbon accrual.
3. Australia has so far elected to exclude soil carbon as a carbon store under its Kyoto commitments (under Kyoto Article 3.4). This means that Australia does not report soil carbon gains and losses under its international obligations. Since the CPRS is intended to be compliant with an international carbon market, Australia would have to change its policy under Article 3.4 to include soil carbon in the next commitment period (post 2012) so as to make soil carbon a valid offset.
4. Current Kyoto accounting rules do not allow exclusion of naturally caused soil carbon losses. This is the primary reason that Australia has so far excluded soil carbon under Article 3.4. Net soil carbon losses occur in dry, hot periods, irrespective of landuse practices. In short, a farmer could create and sell soil carbon offsets, but a period of extended drought could wipe out the soil carbon gains, leaving the farmer (and Australia) with an obligation to restore the carbon that might be difficult to comply with because of climatic conditions.

In summary, conditions for establishing a soil carbon market include:

- Practical measurement and monitoring techniques for soil carbon
- A net balance sheet approach to permanence rules and carbon accounting
- Changing Kyoto rules to distinguish between natural and human induced soil carbon losses (ie to exclude losses that are out of the farmer's control). This would involve a coordinated international lobbying effort.
- Australia electing to include soil carbon under Kyoto Article 3.4.

Can I get credits for switching to renewable fuel and power?

No. Under the proposed model, the point of obligation for energy related emissions will be the bulk energy producers and only these producers will be able create and trade avoided-emission credits. In other words, a fuel company can claim a credit by including bio-diesel in its products, but a farmer cannot claim a credit for switching to bio-diesel. The Government argues that allowing energy users to claim avoided-emission credits would be double counting. It argues, further, that the higher price of fossil energy created by the CPRS is the only incentive needed for farmers and other market participants to switch to renewable energy.

What is the Association doing?

The Association is working closely with the National Farmers' Federation and other State Farming Organisations to represent the needs of agriculture in relation to the CPRS and climate change policy in general. NFF submissions that the Association has contributed to can be found at <http://www.nff.org.au/policy/submissions.html>

INFORMATION SHEET 1: **CARBON MARKET OFFSET SCHEMES**

The prospect of making money from the sale of carbon credits has spawned a new industry in rural Australia. Firms entering this market create offset schemes either in partnership with landholders or directly by buying land. Some firms are offering schemes that are compliant with forest offset programs previously established under NSW or Commonwealth legislation. Others are simply creating offsets for sale into the voluntary carbon market – ie where firms or individuals voluntarily purchase credits so as to be 'carbon neutral'. The nature and quality of these schemes varies widely, as do the terms of the associated contracts. The majority of existing commercial schemes involve planting vegetation with long-term binding restrictions on future landuse. Soil carbon schemes are also starting to emerge with plans to sell credits into voluntary (non-legislated) markets.

It is anticipated that the CPRS legislation will establish a framework for all carbon trading in Australia and that this will introduce more rigor to the carbon trading industry. While there is likely to be a role for carbon brokers and other professionals to support the market, the Association is calling on the Government to ensure that the CPRS rules and administrative infrastructure enable farmers to establish offsets without necessarily involving third parties.

If agriculture is made a covered sector under the CPRS farmers may need to establish offsets to cover their own emissions. Your own need for offsets is impossible to quantify prior to the release of scheme details and is a critical issue to consider when contemplating sale of offsets at this point in time.

Before signing up for an offset scheme you should consider:

- **The terms of the contract** – what caveats or other controls will be placed on your land. For how long will these apply and how will this affect your ability to manage, finance and potentially sell the property? If vegetation is involved, who is liable for replacing it post a fire event?
- **The return to risk ratio** - does the return reflect the long term value of what you are giving up in terms of landuse flexibility, future land value, and the future value of offsets once a national carbon market is in place? Do the sums and remember to include land rates, insurance (if available) and risk factors (eg replanting post fire).
- **Finance and land value** – If the contract establishes a burden on title this may affect land value and/or your finance arrangements so consult your banker and/or local valuer before signing.
- **Whether you will need the offsets yourself under the national scheme** - If emissions from your farm are capped, then you must maintain emissions at or below that cap, or create/purchase offsets to cover any additional emissions. If you sell offsets now, you may limit your future ability to create offsets to balance increased production.
- **The likely future value of offsets** – the future carbon price/value of offsets is impossible to predict prior to commencement of the national market.

Until such time as the details of the CPRS are clarified, the Association advises Members to keep a close watching brief on the issue and to carefully consider all issues and their specific business plan before locking into any contract that restricts their future options.

INFORMATION SHEET 2: RESEARCH AND DEVELOPMENT NEEDS

The Association, with the National Farmers Federation ('NFF') has called on the Federal Government to provide significant funding for climate change related Research & Development and for this to be delivered via an agricultural industry research body such as a Climate Change Research and Development Corporation.

The Research & Development body is needed to:

- Provide practical policy, marketing and technological solutions to climate change that are directly owned and driven by the agricultural industry.
- Enable the agricultural sector to provide detailed, relevant technical input to the development of Australian climate change policy including carbon market design, structural adjustment programs, industry adaptation and drought preparedness.
- Help coordinate climate change adaptation work undertaken by the existing sector specific Research and Development Corporation (eg: new breeds and varieties).

The Association has identified the following key R&D themes.

Theme 1: Adaptation to climate change

Australian farmers have historically demonstrated a high capacity for adaptation and the ability to achieve excellent outcomes from investment in R&D.

A focus of the R&D body would be to:

- Develop, implement and monitor a sector-wide strategic plan for investment in research for agricultural adaptation to climate change and variability.
- Research and develop more accurate climate models and decision tools to allow effective forward planning for agricultural businesses and governments.
- Research and develop farming system responses required by agriculture to deal with the effects of climate change and variability.
- Research and develop ways for agriculture to reduce GHG emissions and sequester more carbon from commercial farming systems.
- Related 'sustainable production' initiatives.

Theme 2: Agricultural sinks and sources

Presently farmers have negligible involvement in the process of measuring, monitoring and accounting for agricultural greenhouse emissions and sequestration. The National Greenhouse Gas Accounting System estimates land sector CO₂e fluxes using satellite imagery and models.

The R&D would address:

- Practical tools for measurement and monitoring of CO₂e fluxes at property scale.
- Examination of methodologies used by AGO and internationally, and development of alternative/improved methodologies.
- Evaluation of accounting rules that might apply to agriculture.

Theme 3: The carbon market

Considerable uncertainty exists about the role of farmers in any national carbon market and market design issues that may affect the sector.

Targeted R&D would address:

- The design of any compensation models/assistance model under a national market to evaluate their impact on the economics of agricultural systems and the general economy.
- Design of potential integrated farm offset schemes/instruments (soil carbon, agroforestry, credits for reductions in fuel and fertilizer use etc);
- Legal and contractual solutions applying to the creation of offset schemes

- Industry partnerships (e.g. with the renewable sector to integrate solar and other technologies in farming landscapes)

Theme 4: Marketing/trade issues

Agriculture is a highly trade exposed sector. Establishing a carbon price in Australia will affect the ability of farmers to compete in international markets. It also seems likely that carbon certification of some kind will become a factor.

R&D would include:

- Analysis of impacts of a carbon price on terms of trade, market share and competitive advantage.
- The trade impacts of emerging international carbon certification systems (eg 'carbon miles') and recommendations regarding Australia's role in developing an international system that does not penalize Australian exports.
- Evaluating the effects upon Australian exports of the climate change policies of other nations and their implications for trade negotiations in the future.

Theme 5: Related policy

The ability of farmers to adapt to climate change will be affected strongly by overarching planning, NRM, environmental, economic and social policy frameworks. Better integration and a review of some of the key assumptions underlying current regulatory models is required.

R&D in this challenging area may include:

- Mechanisms for improving coordination of rural policy
- An agricultural perspective on the current review of drought relief and adjustment policies
- Social and economic effects of adaptation scenarios and policy scenarios that reflect the needs and aspirations of agricultural communities.

INFORMATION SHEET 3: AGRICULTURAL GREENHOUSE GAS EMISSIONS

Every farmer wants to know exactly what they would be liable for if agricultural emissions are capped. This data has not been made available by Government and it is doubtful that the Department of Climate Change has the capacity to produce it, due to the difficulty of accurately and comprehensively measuring land system emissions and sequestration.

In a worst case scenario, Government would make farms liable for an average share of the emissions estimated and reported under Australia's Kyoto obligations.

The Australian Government reports net agricultural greenhouse gas emissions as being 16% of total national emissions (Table 1).

Table 1: Net Australian Emissions (CO_{2e}), 2005

Category	Gg(1000 Tonnes)	Percentage
Total Kyoto		
Energy	391019	69.94
Industrial Processes	29462.7	5.27
Agriculture	87888.9	15.72
Land Use, Land-Use Change and Forestry	33666.9	6.02
Waste	17036.6	3.05
Total	559074	

Source: Australian Greenhouse Emissions Information System, Australian Greenhouse Office, Department of the Environment and Water Resources, 2008.

Table 2 shows that emissions from livestock (mainly methane from enteric fermentation) represent 67% of agricultural emissions and 10% of the national total. The next largest source of agricultural emissions is Agricultural Soils, at 19% of agricultural emissions and 3% of national emissions. The Agricultural Soils category includes emissions from fertiliser use.

Table 2: Net Australian Agricultural Emissions (CO_{2e}), 2005

	Gg(1000 Tonnes)	% Agricultural emissions	% National Emissions
Agriculture			
Enteric Fermentation	58678.4	66.76	10.496
Manure Management	3434.36	3.91	0.614
Rice Cultivation	216.01	0.25	0.039
Agricultural Soils	16558	18.84	2.962
Prescribed Burning of Savannas	8650.18	9.84	1.547
Field Burning of Agricultural Residues	351.94	0.40	0.063
Total	87888.9		15.72

Source: Australian Greenhouse Emissions Information System, Australian Greenhouse Office, Department of the Environment and Water Resources, 2008.

The data shown in these tables is drawn from the National Greenhouse Gas Inventory. This data has been collected using Kyoto greenhouse gas accounting methodology and represents the government's current view of agricultural emissions.

It is important to note that this data significantly misrepresents agricultural emissions as it excludes agricultural sequestration in soil, crops and pasture. In other words, it ignores the 'plus' side of the farm carbon balance sheet. Obviously, the only reasonable measure of agriculture's carbon footprint is emission minus sequestration.

INFORMATION SHEET 4: **RECENT ASSOCIATION POLICY**

The following policy was passed at Annual Conference 2009.

Inclusion of Agricultural Emissions in the CPRS

That the Association opposes the inclusion of food and fibre production emissions in the CPRS until:

- a) Major economies, including the USA, the EU and China, also include agricultural emissions in emissions trading schemes;
- b) Australian food and fibre production emissions can be estimated with a degree of accuracy and confidence comparable to the estimation of emissions from other sectors;
- c) Technically and economically feasible abatement options have been proven and accredited for all sectors of agriculture;
- d) A feasible and efficient administration model for point of obligation has been articulated by government that provides a clear positive incentive to individual farmers, and which also prevents the transfer of administrative costs or carbon liability to farmers by other participants in the agricultural supply chain; and
- e) Credit is given for all carbon sequestration occurring within farming systems including short duration carbon storage.

GLOSSARY OF CLIMATE CHANGE AND CARBON MARKET TERMS

Abatement incentives

This term is used loosely to apply to any kind of incentive to reduce greenhouse gas emissions. Incentives can be positive, such as carbon credits and assistance programs, or negative, such as higher fuel, fertilizer and energy costs.

Additionality

Under the [Kyoto Protocol](#), projects that achieve reductions that are additional to those that otherwise would occur are eligible to earn emission reduction units. Financial additionality means projects will only earn credit if funds additional to existing commitments are specifically committed to achieve the greenhouse gas reductions. Environmental additionality requires that emission reductions represent a physical reduction or avoidance of emissions over what would have occurred under a business as usual scenario.

Afforestation/Carbon plantations

The process of establishing and growing forests on bare or cultivated land which has not been forested since 1990. Vegetation pre 1990 is excluded from offset scheme as it has been already counted as part of national baselines under Kyoto. Carbon credits can be established via carbon plantations, guaranteed by caveats on title that bind the landholder to maintain the forest for 100 or more years and to replace the vegetation in the event of fire or other natural disaster.

Avoided Emissions

Emissions that would have been emitted under a [business as usual](#) scenario but were avoided due to the implementation of an emission reduction project.

Baseline

The emission of greenhouse gases that would occur without the contemplated policy intervention or project activity. The baseline is critical to establishing the amount of permits required under a capped carbon market. It is not clear how the Government proposes to establish baselines for agricultural firms given the variable nature of production and related emissions and distortions to the emissions in recent years due to the drought. An averaging, or 'business as usual' approach would be needed.

Business As Usual Scenario

Estimate of a company's future and current emissions under normal operating circumstances.

Cap and Trade

The Cap and Trade system involves trading of emission allowances, where the total allowance is strictly limited or 'capped'. Trading occurs when an entity has excess allowances, either through actions taken or improvements made, and sells them to an entity requiring allowances because of growth in emissions or an inability to make cost-effective reductions. This is the model proposed for Australia under the CPRS.

Carbon cycle

The carbon cycle is the biogeochemical cycle by which carbon is exchanged between the biosphere, geosphere, hydrosphere and atmosphere of the Earth. The cycle is usually described as four major reservoirs of carbon interconnected by pathways of exchange. The reservoirs are the atmosphere, the terrestrial biosphere (including soil), the oceans, and the sediments (which includes fossil fuels). The movement of carbon between reservoirs occurs over widely varying time frames, from seconds to millions of years. Carbon fluxes associated with agriculture are typically

rapid, which creates problems under the Kyoto accounting model, due to its requirement for [permanence](#) in carbon storage.

Carbon Dioxide Equivalent (CO₂eq)

The universal unit of measurement used to indicate the [global warming potential](#) (GWP) of each of the 6 greenhouse gases. It is used to evaluate the impacts of releasing (or avoiding the release of) different greenhouse gases.

Carbon Dioxide or CO₂

A naturally occurring gas that is a by-product of burning fossil fuels and biomass, land use changes and other industrial processes and which is the reference gas against which other greenhouse gases are measured.

Carbon Sequestration

Sequestration refers to capture of carbon dioxide in a manner that prevents it from being released into the atmosphere for a specified period of time. For example, the Australian government requires forestry offset projects to be in place for 100 years.

Carbon sink

A carbon sink is a reservoir that can absorb or “sequester” carbon dioxide from the atmosphere such as forests, soils and oceans.

Carbon Market

A scheme established by legislation whereby firms can buy and sell emissions credits. Under a carbon market, firms are required by law to hold permits equivalent to their annual emissions cap. If they exceed their cap they are fined. Alternatively, they can purchase additional permits from other firms which allow them to legally emit more than their cap. Abatement, therefore, becomes a commercial decision. Firms can offset investment in emission reduction by selling excess permits; or they can purchase permits/credits from other firms; or they can pay a fine. In principle, the net result is a general reduction in emissions as Government progressively lowers the cap and the amount of permits allocated. Arguably, this approach is more efficient than Governments directly funding emission abatement activities as the market will decide the least-cost solution for society.

Carbon Taxes

A tax on commodities such as oil, coal, gas, fertiliser to discourage the use of fossil fuels, with the aim of reducing carbon dioxide emissions. The Australian government has rejected a taxation approach in favour of an emissions trading scheme.

Commitment Period

The five year [Kyoto Protocol](#) Commitment Period is scheduled to run from calendar year 2008 to calendar year 2012 inclusive.

Covered Sector

Covered sectors will include those industries participating directly in an emissions trading scheme.

Emission Cap

A regulatory device that sets a ceiling on emissions that can be released into the atmosphere within a designated timeframe such as under the Kyoto Protocol or other regional trading scheme.

Global Warming

The continuous gradual rise of the earth's surface temperature thought to be caused by the greenhouse effect and responsible for changes in global climate pattern.

Global Warming Potential (GWP)

The GWP is an index that compares the relative potential of the 6 greenhouse gases to contribute to global warming i.e. The additional heat/energy which is retained in the Earth's ecosystem through the release of this gas into the atmosphere. i.e. Carbon dioxide has been designated a GWP of 1, Methane has a GWP of 23.

Grandfathering

Method for issuing emission permits to emitters and firms in a domestic emission trading scheme according to their historical emissions and which may be combined with auctioning to present a hybrid approach to allocation of allowances.

Greenhouse Effect

The absorption of solar energy due to accumulation of greenhouse gases in the atmosphere.

Greenhouse Gases (GHGs)

The greenhouse gases are the gases regulated under the Kyoto Protocol, determined to be the main contributors to the Greenhouse Effect. The principle gases are, Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide(N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur Hexafluoride (SF₆).

Intergovernmental Panel on Climate Change (IPCC)

The IPCC represents the collective work of over 2,000 scientists, principally in the atmospheric sciences. The IPCC is the global authority on climate science to which governments refer when making decisions on climate change policy.

Kyoto Commitment Period

The Kyoto commitment period is the period in which [Annex B](#) countries have committed to reduce their collective emissions of greenhouse gases by an average of 5.2%. There are currently no emissions targets after the commitment period specified in the [Kyoto Protocol](#) from 2008 to 2012 although debate is underway to determine a mechanism for post-2012 emission reductions.

Kyoto Protocol

The Kyoto Protocol was signed by Australia and other participating nations in Kyoto, Japan in December 1997. It specifies the level of emission reductions, the deadlines and methodologies that signatory countries are to achieve. Australia ratified the treaty in December 2007.

LULUCF

Land use, land use change and forestry. The term given to tree-planting projects, reforestation and afforestation, designed to remove carbon from the atmosphere.

Marginal Abatement Cost (MAC)

The cost of reducing emissions by one tonne of CO₂eq. An aggregation of these costs against total tonnes abated creates a firm's marginal abatement cost curve. The lower the MAC curve, the more effective the firm's emission reduction strategies. There is little data available regarding MACs for agriculture.

Methane (CH₄)

Greenhouse gas with a Global Warming Potential of 23. The primary sources of methane are landfills, coal mines, paddy fields, natural gas systems and livestock (e.g. cows and sheep).

National Emissions Trading Scheme (CPRS)

The National Emissions Trading Scheme (CPRS) is the Australian carbon market. This is likely to be compliant with international carbon market rules established via the Kyoto process. The government has announced that the CPRS will commence in 2010. This scheme will place a cap (upper limit) on the emissions of firms that are major sources of greenhouse gases. The federal government has indicated that 'initially' a cap will not be placed on agricultural firms as they do not yet have a practical way of measuring and monitoring agricultural emissions.

Nitrous Oxide (N₂O)

Greenhouse gas with a Global Warming Potential of 296. Results from burning fossil fuels and the manufacture and use of fertiliser.

Offsets

Offsets are a form of credit-based emissions trading product that can be used within a carbon market, or under voluntary schemes to offset the source of emissions. Offsets are project-based credits produced through projects such as energy efficiency, renewable energy and forestry.

Permanence

The Kyoto permanence principle is a key element in the international carbon market model being adopted by Australia. It requires that credits created through avoided emissions and sequestration credits used to offset emissions are permanent. In other words, a prevented emission is prevented forever. If there were no guarantee of permanence, a glut of empty credits would rapidly destroy the market. However, the permanence principle creates significant practical problems for land-based offset schemes. In forestry based schemes, permanence is defined as greater than 100 years. It is clearly impractical, however, to lock up land for such periods in the context of productive agriculture. The objective of permanence is to guarantee the validity of the carbon credit (and assign liability for preserving the offset) and thus preserve the integrity of the carbon market. This can be achieved by other means, however, for example by renting, rather than selling credits. A rental contract for emissions credits could establish continuous responsibility for sequestered carbon; credit would be assigned when carbon is sequestered and debits would accrue when carbon is emitted. This would be compatible with a balance sheet approach to farm carbon accounting, whereby farmers maintain a certain net balance across an operation, without having to lock into specific landuses and complex contractual arrangements involving land title, as is currently required under forestry based offset schemes.

Point of obligation

The point in the supply chain at which emissions are legally accounted for under an emissions trading scheme – this could be the individual farm, or the processor.

Soil carbon credits

The creation of carbon credits by increasing the carbon content of soil. Currently there is no means to claim credits for soil carbon as part of the CPRS or international legislated carbon markets.

United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC was established in June 1992 at the Rio Earth Summit with the primary aim of stabilising greenhouse gas emissions.

Voluntary Trading

Actions taken by an entity that reduce emissions outside of regulatory requirements (offsets purchased by firms that have no legal obligation to offset emissions but wish to be seen as 'carbon neutral').