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Information Paper: **Recording Emissions Reduction Schemes in ABS Statistics**

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INFORMATION PAPER: RECORDING EMISSIONS REDUCTION SCHEMES IN ABS STATISTICS

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INTRODUCTION

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
ACCUs	Australian Carbon Credit Units
CERs	Certified Emission Reductions
CFI	Carbon Farming Initiative
CO_2	carbon dioxide
ERUs	Emission Reduction Units
ETS	Emissions Trading Scheme
GFS	Government Finance Statistics
GHG	greenhouse gas (emissions)
GWh	gigawatt hour
ISWGNA	Intersecretariat Working Group on National Accounts
LGCs	Large-scale Generation Certificates
MWh	megawatt hour
NGERS	National Greenhouse and Energy Reporting System
RECs	Renewable Energy Certificates
RPP	Renewable Power Percentage
SEEA	System of Environmental-Economic Accounting
SNA	System of National Accounts
STCs	Small-scale Technology Certificates
UNSC	United Nations Statistical Commission

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1. INTRODUCTION AND SUMMARY

This information paper summarises the nature of measures introduced under the *Clean Energy Acts*[1] from 1 July 2012, a number of greenhouse gas (GHG) emissions reduction schemes that are already in existence or about to be, and the associated statistical treatments in economic and environment statistics. The Australian Bureau of Statistics (ABS) expects to include estimates in economic statistics for the *Clean Energy Acts* and *Renewable Energy Act 2000* measures, commencing from the September reference quarter 2012.

GHG emissions reduction schemes are designed to reduce the volume of carbon dioxide (CO_2) released into the atmosphere. To the extent that these schemes are effective, they help mitigate the effects of climate change and improve the global environment. The Kyoto Protocol proposes achieving this outcome by pricing CO_2 by placing a cap on total emissions to increase the relative price of emissions intensive products. In order to monitor both the environmental and economic effects of GHG emissions reduction schemes, it is essential to have data on the volume, price and economic cost of emissions.

The schemes, and therefore the statistical treatments, are novel, both internationally and in Australia, and various complications arise in principle and in detail. There have been uncertainties about the treatments in statistical, commercial and government accounting standards. The international statistical community has made a decision on treatments as recently as February 2012 after a lengthy debate in which the ABS participated. While there was substantial agreement about the conceptual treatment of many components of the schemes, there was also significant disagreement over valuation and timing of recognition of elements that involve a market trading component, such as cap and trade schemes. It is important to note that the complete statistical treatment is still in development as the physical accounting treatment in environmental–economic accounts is yet to be determined.

The main point of contention was whether the permits and certificates should be valued at historic cost or current market value. Depending on the valuation method chosen, two very different results will be evident in economic statistics for government revenue arising from the schemes and the associated costs to businesses. At the 43rd meeting of the United Nations Statistical Commission (UNSC) in February 2012 the historic cost approach for recording transactions was ratified; however, there was a proviso that gains or losses to business arising from market valuation variation would be recorded as other changes in volume between opening and closing balance sheets. In addition to valuation questions for purchased permits, the decision has implications for the recognition and valuation of free permits and various other schemes that involve governments issuing tradeable instruments in return for GHG friendly activities such as generating renewable energy.

The ABS disagrees with the decision by the UNSC, and considers that the endorsed treatments will distort the impact of these schemes on both government and business statistics, particularly as represented in the national accounts, but also in other bodies of economic and environmental statistics. The ABS has decided to apply fundamental market valuation principles to the current schemes, and not the historic cost method.

1 There are several legislative Acts in the greenhouse energy legislative package, including the *Clean Energy Act (2011)* itself. This paper refers to this package of legislation as the Clean Energy Acts.

1. INTRODUCTION AND SUMMARY *continued*

Accordingly, the ABS has consulted with key stakeholders about the implications of deviating from recommended international standards.

Because of the novel measures and the complications of principle and detail that arise, this paper includes a description of the international GHG emissions reduction context and the mechanisms that have arisen as well as the specifics of the Australian measures. Some appreciation of this context and the economic rationale behind the mechanisms is helpful in moving to apply fundamental statistical concepts to the detail of the measures embodied in the various pieces of legislation.

Section 2 of the paper outlines the Kyoto Protocol and the associated GHG emissions reduction mechanisms. Section 3 examines some of the mechanisms and deduces the underlying statistical principles applicable. Section 4 discusses the policy instruments and mechanisms being implemented by the Australian Government. Section 5 examines how the resulting transactions should be recorded in the national accounts and other economic statistics. Section 6 discusses the relationship between economic and environment statistics, the treatment of monetary transactions in environment statistics and the need for coherence between physical and monetary measures of carbon stocks and flows (including CO_2 emissions).

2. THE KYOTO PROTOCOL AND GREENHOUSE GAS EMISSIONS REDUCTIONS

The United Nations Framework Convention on Climate Change in 1997 created the Kyoto Protocol international agreement. The Kyoto Protocol aims to reduce GHG emissions in the atmosphere thereby improving the quality of the world's environment and mitigate the effects of climate change. Underlying the Kyoto Protocol is scientific evidence that suggests GHG is contributing to global warming by trapping heat in the earth's atmosphere. CO_2 is the principal GHG that arises from human activities and is largely produced from the burning of fossil fuels. The Kyoto Protocol also addresses the impact of methane, nitrous oxide and other industrial gases. Australia is a signatory to the Kyoto Protocol.

Under the Kyoto Protocol, 38 countries have committed to an emissions target. The Kyoto Protocol's first period aim is the reduction of GHG by at least 5 percent, below the 1990 level of GHG between 2008 and 2012. In December 2001, Australia ratified the Kyoto Protocol and it was implemented in 2008. Australia has a 2050 target of reducing emissions by 60 percent to the 2000 level of GHG. The Kyoto Protocol lists a number of mechanisms through which emissions can be controlled and monitored. These mechanisms are economic in nature and operate by increasing the cost of emissions intensive production processes and the relative prices of emissions intensive products.

The effectiveness of the Kyoto Protocol depends on two critical factors:

- whether countries follow the Kyoto Protocol's rules and comply with their commitments; and
- whether the data used to assess a country's compliance are reliable.

The Kyoto Protocol includes a set of monitoring and compliance procedures in order to enforce its rules, address compliance problems and avoid errors in calculating emissions. It establishes three mechanisms through which emissions may be reduced and monitored:

- an Emissions Trading Scheme (ETS) that works on a cap and trade basis;
- a Joint Implementation scheme that works when projects in one country can be sponsored by another country; and
- the Clean Development Mechanism within which countries without targets are encouraged to reduce their emissions.

The Kyoto Protocol does not discuss direct regulation or carbon taxes as 'mechanisms'. In Australia, the Australian Clean Energy Regulator (a statutory agency in the Climate Change Portfolio) monitors emissions and enforces compliance under the *National Greenhouse and Energy Reporting Act (NGER) 2007*.

In essence, the Kyoto Protocol and its associated mechanisms aim to internalise an economic externality. Before the Kyoto Protocol, the emission of GHG was a cost free activity in economic terms. The Kyoto Protocol seeks to impose a cost of emissions on emitters and subsequently the cost of consumption of goods and services that are produced using inputs that result in emissions. In accordance with national accounting practice, economic statistics exclude externalities and should not record emissions values. However, implementation of market mechanisms under the Kyoto Protocol will require economic statistics to value and record the impact of emissions.

2. THE KYOTO PROTOCOL AND GREENHOUSE GAS EMISSIONS REDUCTIONS *continued*

In order to discourage emissions, all GHG emissions reduction mechanisms seek to impose a cost on emitters. The mechanisms for reducing GHG fall into two broad categories:

- mechanisms to regulate the volume of gases and leave the cost/price impacts to market forces, for example, cap and trade schemes and direct regulations; and
- mechanisms that impact the volume of emissions indirectly by setting a price on emissions, for example, a carbon tax.

Both mechanisms generally raise the relative prices of emissions intensive products. This provides an incentive for producers and consumers to switch to less emissions intensive processes and products. There has been a debate about the design of policy instruments based on the different mechanisms:

- some instruments deliver certainty in the reduction of the volume of emissions but at the expense of some uncertainty about prices;
- other instruments deliver certainty with respect to prices but uncertainty about volumes. The impact on volumes depends on the price elasticity of supply and demand with respect to increased prices for emissions intensive products; and
- there are some instruments which contain elements to reduce both forms of uncertainty, such as the cap and trade scheme.

3. DESIGN OF POLICY INSTRUMENTS AND SCHEMES

There are a number of GHG emissions reduction schemes that can be applied. The following schemes, some of which are recommended under the Kyoto Protocol, are available and implemented by different countries. The schemes implemented in Australia are discussed in section 4.

3.1 Cap and trade schemes

Cap and trade schemes, also known as ETS, set a cap on the total volume of emissions for a given period and the government issues permits to emit that amount. The permits can be sold or freely issued and then traded by the purchasers (which need not be liable GHG emitters) at market prices. Permits must be surrendered to the government by liable GHG emitters to discharge their emission liability. An ETS is favoured by the Kyoto Protocol.

3.2 Carbon tax

A carbon tax is levied by government on the volume of GHG emissions and therefore imposes a fixed price for carbon giving certainty to the price of emissions. However, the impact on the volume of emissions is uncertain as it depends on the price elasticity of supply and demand for emissions intensive products. This makes it difficult to plan targets for emissions reductions.

3.3 Greenhouse gas credits

GHG credits[2] are permits or certificates denominated in units of GHG or renewable energy issued by government in recognition of GHG friendly activity such as generation of electricity from renewable sources or sustainable land use by farmers. For example, carbon credits may be issued with respect to activities designed to increase the amount of carbon stored in soil or vegetation. A certain amount of these tradeable credits can be purchased and surrendered by liable GHG emitters to meet mandatory obligations. In some cases the credits will trade in the same market as emissions permits and will be acceptable by government for acquittal of emissions liabilities.

3.4 Certified Emission Reductions and Emission Reduction Units

The Kyoto Protocol establishes three mechanisms through which countries can create and acquire Kyoto units (one tonne of CO_2 equivalent) from other countries. These mechanisms, outlined in Section 2, result in potentially tradeable instruments. Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs) are internationally traded instruments that allow developed countries to obtain credits for financing emissions reduction projects. CERs are for projects in developing countries. ERUs are for projects in developed countries. They are denominated in volume terms, with one CER/ERU equal to a reduction of one tonne of CO_2 equivalent. Holders of CERs and ERUs are entitled to use them to offset their own GHG emissions to achieve their Kyoto or European Union emissions reduction targets. In effect, they operate as a carbon currency and are accepted in most existing and emerging national and regional ETS. The ERUs are given to the investor country and the emissions allowance of the host country is reduced by the same amount. CER and ERU projects include methane capture and re–use, energy efficiency improvements and renewable projects. Similar schemes can operate within countries, either as part of an ETS or independently. These schemes include bio–sequestration, replenishment of soil carbon and planting trees.

2 A range of policy instruments are designed to reduce GHG emissions many of which are denominated in units besides CO_2. Carbon credits are denominated in tonnes of CO_2 whereas others such as renewable energy certificates are denominated in megawatt hours. This paper refers to these policy instruments collectively as GHG credits.

3.5 Private schemes

Private carbon offset schemes are voluntary schemes that are implemented by institutions and individuals in order to offset their carbon emissions. An example of these are the carbon offsetting schemes offered by certain airlines. Customers can voluntarily pay an additional amount when purchasing a ticket and fly 'carbon neutral' in order to offset the GHG emissions of their flight. The airlines use this money to purchase carbon credits issued by qualifying new renewable energy projects in a number of countries, including China and India. Each carbon credit is the equivalent of one tonne of CO_2. The scheme is similar to the CER scheme, but any reduction in emissions is voluntary as most airlines do not have an official Kyoto reduction target. The offsets are registered under international voluntary offset standards but, unlike Kyoto units, they cannot be traded through intermediaries before reaching end users.

Private carbon offset schemes also operate through direct actions which promote the storage of carbon in vegetation or soil. These actions include tree planting and improving soil fertility.

Other private schemes operate in a similar way. GreenPower, for example, is a joint initiative of the Australian Capital Territory, New South Wales, South Australian, Queensland and Victorian governments. Under this scheme, customers can voluntarily pay an additional amount when purchasing electricity to promote the generation of renewable energy beyond mandatory renewable energy targets. Accredited energy providers use this money to purchase Large–scale Generation Certificates (previously Renewable Energy Certificates (RECs)) that are then voluntarily surrendered for each megawatt hour (MWh) of electricity purchased. Similar to private carbon offsetting schemes, any reduction in emissions is voluntary as this scheme has no specific emissions reduction target.

3.6 Direct regulation

Direct regulation works through setting and enforcing limits on emissions via taxation and subsidies. The impact on the price of emissions is indirect and difficult to separate from other influences on prices. Businesses that reduce emissions below a baseline level can sell their CO_2 abatement to the government and businesses that emit above a baseline level in order to negate penalties.

3.7 The impact of different instruments and schemes

All policy instruments for reducing GHG emissions have the same purpose, namely a targeted reduction in the volume of emissions. However, the various instruments have a different impact on price and volume of emissions. Instruments that impact price have an uncertain impact on volume, whereas instruments that directly impact volume have an uncertain effect on the price of emissions. For example, the ETS cap on emissions directly impacts the volume. However, the impact on the price of the instrument is determined by the market and is therefore uncertain. The price paid by liable GHG emitters is considered a tax on production. The tax is denominated in terms of the volume of carbon and the value of the tax paid by the emitter is uncertain. Table 1 shows the likely impacts of the various schemes on the price and volume of emissions.

TABLE 1 – GREENHOUSE GAS EMISSIONS REDUCTION SCHEMES AND THEIR INFLUENCE ON ECONOMIC AND ENVIRONMENTAL PRICES AND VOLUMES

Scheme	*Effects on carbon price*	*Effects on volume of emissions*
1. Cap and trade schemes	Uncertain as it is determined by the market price of permits	Determined by the cap on emissions
2. Carbon tax	Direct impact on price of CO_2 emissions	Depends on the cost/price elasticity of supply and demand for emissions intensive products
3. GHG credits	Uncertain as it is impacted by the market price	Depends on the specific scheme
4. CER/ERU	Uncertain as it is determined by the market price for CERs and ERUs	As determined by Kyoto Protocol quotas of designated businesses
5. Private schemes	Uncertain as the effects are indirect through emissions reductions	Depends on value of voluntary contributions
6. Direct regulation	Uncertain	As decreed by regulations

3.7 The impact of different instruments and schemes continued

The effect of the various policy instruments is an increase in the relative prices of emissions intensive processes and products. This provides incentives for producers to adopt more environmentally friendly modes of production and for consumers to switch to less emissions intensive products. Changes in relative prices may impact on producer and consumer preferences and adjust the structure of the economy. In theory, consumer preferences should change even when consumers are compensated for increases in energy prices.

4. THE AUSTRALIAN SCHEMES

4.1 The Clean Energy Acts

In December 2011 a number of related Commonwealth parliamentary acts were passed, collectively known as the *Clean Energy Acts* (see the Clean Energy Bill Explanatory Memorandum)[3]. These acts cover a wide range of initiatives, including what is effectively a carbon tax for a period, which will then be replaced by an ETS. These measures are also supplemented by compensation packages for certain classes of consumers and support for trade exposed industries. The carbon tax period is called the fixed price period, and the ETS will be introduced when the flexible price period commences.

FIXED PRICE PERIOD

The *Clean Energy Acts* impose a carbon tax as a precursor to the introduction of an ETS. This came into effect from 1 July 2012. The carbon tax is expected to apply to 294 of the nation's carbon polluters in the first year. These liable GHG emitters will be obliged to surrender emission units in respect of their carbon pollution. The emission units are analogous to ETS permits, but they will be issued at a fixed price. The tax will be replaced by an ETS from 1 July 2015. During the fixed price period the following conditions apply:

- a carbon unit (tonne of CO_2) has a fixed price, initially $23;
- the emission is the taxable event, recorded by the Clean Energy Regulator;
- 75 percent of a liable GHG emitter's tax liability is payable by mid–June (similar to provisional tax, based on the previous year pattern);
- final acquittal is due the following February, for example February 2014 for the 2012–13 tax year;
- registered parties can purchase permits from the Government at any time at a discounted fixed price (the permits cannot be traded, but the Government may buy them back and there may be some limited transferability);
- free permits will be issued to disadvantaged parties, for example trade exposed industries (the Government will buy back permits at a discounted value);
- the permits will be recorded in a register system maintained by the Clean Energy Regulator; and
- foreign issued permits will not be acceptable to discharge a tax liability.

In addition to these conditions, there is also a comprehensive set of measures to encourage environmentally friendly activities and compensation for disadvantaged consumers.

FLEXIBLE PRICE PERIOD

The *Clean Energy Acts* provide for the introduction of an ETS from 1 July 2015 to replace the carbon tax. During the flexible price period the following conditions apply:

- large emitters will be required to acquire and surrender carbon emission permits for each tonne of CO_2 equivalent emissions;
- the number of permits will be capped. Some permits will be freely allocated (approximately 30 percent) while the majority will be sold at auction (approximately 70 percent);
- permits will be auctioned well in advance of emission events;
- details of mechanisms for auctions, for example vintages and reserve prices, are still being determined;
- the first auction is likely to be in 2014;

3 See Commonwealth of Australia 2011, Explanatory Memorandum, Clean Energy Bill 2011. *http://www.comlaw.gov.au/Details/C2011B00166/Explanatory%20Memorandum/Text*

4.1 The Clean Energy Acts continued

FLEXIBLE PRICE PERIOD *continued*

- liable GHG emitters will be required to participate in the first year, accounting for 75 percent of Australia's total carbon emissions;
- any entity will be able to buy permits, including banks and non–residents. The permits will be transferable in secondary markets;
- derivatives will be permitted, for example, futures contracts and options to provide risk management strategies;
- the Government buy back facility which existed during the fixed price period will not be available; and
- selected foreign permits up to 50 percent of liability will be acceptable for surrender (but re–priced to domestic reserve price via extra payment if necessary).

The Government has committed to using part of the revenue to compensate households for the expected increases in the prices of emissions intensive products.

4.2 Renewable Energy Certificates

RECs are an example of a GHG credit scheme but one which also contains elements of an ETS. RECs are created by the Australian Government under the *Renewable Energy Act 2000* and are issued to large–scale generators of electricity from renewable sources (solar, wind etc.) and installers of small–scale solar, wind and hydro electricity systems. They are tradeable in the market and a certain amount must be purchased and surrendered by liable GHG emitters under the scheme (usually electricity retailers). One REC represents one MWh of renewable energy. Since January 2011, RECs have been divided into two certificate types: those promoting large scale renewable energy generation, Large–scale Generation Certificates (LGCs), for example commercial wind farms, and those promoting small scale renewable energy, Small–scale Technology Certificates (STCs), for example domestic solar panels. Liable GHG emitters must surrender RECs created under both schemes to discharge separate liabilities. Once issued, these certificates have all the characteristics of the trading component of an ETS.

The number of RECs purchased and surrendered by liable GHG emitters is set by the Government. This is determined by the Renewable Power Percentage (RPP) and the Small–scale Technology Percentage. The RPP is calculated to meet the Large–scale National Renewable Energy Target which aims for 41,850 gigawatt hours (GWhs) to be produced from renewable energy sources by 2020. This amount is approximately 20 percent of Australia's electricity supply[4]. The target is regulated by the Clean Energy Regulator.

Similar schemes operate at state level, including:

- the Victorian Energy Efficiency Target scheme (under the *Victorian Energy Efficiency Target Act 2007*) that issues Victorian Energy Efficiency Certificates;
- the New South Wales Greenhouse Gas Reduction Scheme (under the *Electricity Supply Amendment (Greenhouse Gas Emission Reduction) Act 2002*) that issues Energy Saving Certificates; and
- the Queensland Gas Scheme (under Chapter 5A of the *Electricity Act 1994*) that issues Queensland Gas Electricity Certificates.

4 See Office of the Renewable Energy Regulator (ORER) 2011, Financial Annual Report 2010-2011, Australian Government, Canberra.
http://ret.cleanenergyregulator.gov.au/ArticleDocuments/205/financial-report-2011.pdf.aspx

4.3 Carbon Farming Initiative

The Carbon Farming Initiative (CFI) is a carbon credit scheme that gives landholders, farmers and forest growers incentives to undertake abatement projects. Australian Carbon Credit Units (ACCUs) are created by the Australian Government under the *Carbon Credits (Carbon Farming Initiative) Act 2011* and are issued free of charge for eligible GHG abatement activities undertaken as part of the scheme. Eligible activities generate GHG abatement by either reducing or avoiding emissions or removing carbon from the atmosphere and storing it in soil or vegetation. Abatement practices that are in use prior to July 1 2012 are not eligible, but obligations created under previous schemes, such as the Greenhouse Gas Reduction Scheme and Greenhouse Friendly, can be transferred to the CFI.

ACCUs are tradeable certificates that can be sold to liable GHG emitters who can then surrender them to the Clean Energy Regulator to discharge part of their emissions liabilities. Each ACCU represents one tonne of CO_2 equivalent net abatement achieved through the performance of eligible activities. It is not mandatory that emitters purchase ACCUs specifically, but rather they are one form of certificate to enable emitters to discharge their emissions liability. Liable GHG emitters will only be able to surrender ACCUs totalling no more than five per cent of their liability during the fixed price period for carbon units. This limit will not apply during the flexible price period. CFI credits will be financial products for the purposes of the *Corporations Act 2001* and the *Australian Securities and Investments Commission Act 2001*[5].

5 See Department of Climate Change and Energy Efficiency 2012, Carbon Farming Initiative Handbook. Australian Government. Canberra.
http://www.climatechange.gov.au/en/government/initiatives/carbon-farming-inituiative/~/media/government/initiatives/cfi/handbook/CFI-Handbook-20120403-PDF.pdf

5. STATISTICAL TREATMENT OF EMISSIONS PERMITS AND CREDITS IN ECONOMIC STATISTICS

5.1 International statistical standards

Emissions permits are unique policy instruments designed to achieve specific economic and environmental objectives. They have some properties of the broad category of contracts, leases and licenses and share certain characteristics with other types of permits issued by governments. However, emission permits have distinct features that make an exact comparison with other types of permits impossible.

The key standard in economic statistics is the United Nations System of National Accounts, the latest edition being 2008 (2008 SNA). The discussion of emissions trading schemes in this standard was found to be inadequate in the face of rapid development of schemes resulting from the climate change agenda. After a lengthy process of discussion by an international task force and consultation with countries by the Advisory Expert Group to the Intersecretariat Working Group on National Accounts (ISWGNA) that reports to the UNSC, the UNSC endorsed a recommendation to revise 2008 SNA[6,7].

During the discussions and consultation there was broad agreement on most of the conceptual treatments that related to cap and trade ETS. The following builds on that broad agreement to include schemes other than ETS. There are four phenomena arising from different policy instruments that may result in economic transactions (an exchange of value between willing parties):

- The issue of a permit or certificate creates an asset for the holder, and a liability for government.
- The emission of GHG subject to penalty creates a tax payable (by the emitter) and receivable (by the government).
- Surrender of a permit or certificate to acquit the tax payable reduces the asset of the holder and extinguishes the liability of government.
- Secondary market trading of permits and certificates (where allowed).

Table 2 outlines the treatment of different policy instruments available. In all cases (except voluntary schemes), the emission event results in an impost by government on emitters. Likewise, the impost is treated as a tax in all cases.

6 See United Nations Statistical Division, Intersecretariat Working Group in National Accounts (ISWGNA), SNA News, New York. Number 30/31 2011 *http://unstats.un.org/unsd/nationalaccount/sna/nn30-31-en.pdf*

7 See United Nations Statistical Division, Intersecretariat Working Group in National Accounts (ISWGNA), SNA News, New York. Number 32/33 2012 *http://unstats.un.org/unsd/nationalaccount/sna/nn32-33-En.pdf*

TABLE 2 – TREATMENT OF DIFFERENT EMISSIONS POLICY INSTRUMENTS IN ECONOMIC STATISTICS

Policy instrument/event	*Issue of permit (in advance of emission)*	*Emission*	*Payment for emission*	*Secondary market trading*
1. Cap and trade schemes	Creation of a financial asset denominated in tonnes of CO_2 (financial asset/liability pair) at auction and government grant of financial asset/liability if issued free	Tax payable by emitter/tax receivable by government	Tax liability extinguished by purchasing and surrendering permit denominated in tonnes of CO_2, extinguishes government liability	Financial asset trading (but note split asset treatment discussed later)
2. Carbon tax	Not applicable unless issued in advance in which case a tax prepayment	Tax payable by emitter/tax receivable by government	Tax liability extinguished by payment of cash at the price of CO_2 set by government	Not applicable
3. GHG credits	Government grant of permit to green generator, liability of emitter to purchase and liability of government to recognise acquittal	Tax payable by emitter/tax receivable by government	Tax liability of emitter extinguished through purchase and surrender of credits denominated in scheme units, extinguishes government liability	Financial asset trading (but note split asset treatment discussed later)
4. CER/ERU	Permit issued (credit created) as a result of green initiative which is a contingent liability by all governments committed to the Kyoto Protocol.	Tax payable by emitter/tax receivable by government	Tax liability of emitter extinguished through purchase and surrender of CER/ERU credit denominated in tonnes of CO_2 so the contingency is extinguished	Financial asset trading (but note split asset treatment discussed later)
5. Private schemes	Not applicable	No penalty	Transfer from emitter to green energy project	Not applicable

5.1 International statistical standards continued

The treatment indicated in Table 2 was broadly agreed to internationally, but there have been differences of opinion about valuation and timing. This reflects the different aspects of uncertainty that result from the different policy instruments.

The main point of contention was whether the permits and certificates should be valued at historic cost or current market value. Depending on the valuation method chosen, two very different results will be evident in economic statistics for government revenue arising from the schemes and the associated costs to businesses. At the 43rd meeting of the UNSC in 2012 the historic cost approach was ratified. In addition to valuation questions for purchased permits, the decision has implications for the recognition and valuation of free permits and various other schemes that involve governments issuing tradeable instruments in return for greenhouse friendly activities.

To give effect to the recording of transactions at historic cost, a treatment named the split asset approach is recommended by the revised 2008 SNA. The asset (a permit or credit certificate) issued by government in relation to an ETS or other schemes is considered to have two components in the hands of the holder: a financial asset valued at historic cost, and a market valuation component to accommodate secondary market price variations. Thus the value of taxation revenue received on surrender of the permit or certificate will be the same as the cash received by the government at the time of auction or sale, possibly years earlier. The financial asset / liability component is classified as a tax prepayment (account payable / receivable) and the market price variation component is classified as a non–produced, non–financial asset. Market price variations are treated as other changes in volume for the asset. Following is the text of the decision:

The payments for emission permits, issued by governments under cap and trade schemes, should be recorded at the time the emissions occur as taxes, specifically other taxes on production (D29), on an accrual basis. The timing difference between the payments received by government for the permits and the time the emission occurs gives rise to a financial liability (accounts payable) for government and a financial

5.1 International statistical standards continued

asset (accounts receivable) for the holder. The difference between the pre–paid tax value of the permit and the market value of the permit represents a marketable contract (non–produced non–financial asset) for the holder. The creation and disappearance of the non–produced non–financial asset are recorded as an other change in volume of assets.

The approach to accruing payments for emission permits should be based on the underlying assumption that permits issued by a particular country are more likely than not to be surrendered in that country.

In the simple case of a pure national scheme, the taxes should be accrued in the following way. The tax recorded for any single permit surrendered in relation to emissions that occurred in period t is equivalent to the total stock of relevant other accounts payable divided by the total number of active permits issued (and remaining in circulation) at time t. The relevant other accounts payable should in theory exclude any permits that were surrendered after time t in respect of emissions that occurred before time t. Equally, the total number of active permits (and remaining in circulation) at time t, should also exclude these permits. In practice, however, it can be assumed, for simplicity, that the time the permit is surrendered is the same as the time that emissions occur, as long as there is no significant lag between the two events and the lag is constant[8].

5.2 Consideration of the UNSC Decision by the ABS

The ABS disagrees with the decision by the UNSC, and considers that the endorsed treatments will distort the impact of these schemes on both government and business statistics, particularly as represented in the national accounts, but also in other bodies of economic and environmental statistics. To the extent that market prices for permits at time of emission or time of surrender of permit will be under or over cash paid at the time of their issue, the ABS considers that the split asset approach will misrepresent:

- the costs to emitters;
- the debt of government (liability to recognise permits issued); and
- the taxes received by government.

Accordingly, the ABS has consulted with stakeholders about the implications of deviating from recommended international standards.

The alternative considered and rejected by the ISWGNA to the split asset approach is named the financial asset approach. Under this treatment every transaction (exchange of value) is valued at market price. The auction of a permit is recorded at the price paid, the resulting asset (holder of permit) and liability (of government to recognise the permit) is valued at market price of CO_2 on balance sheets with valuation variation being recorded in the revaluation accounts, the tax liabilities of emitters and tax receivables by government valued at the prevailing price of CO_2, and the surrender of the permit that discharges the tax liability at the price of CO_2 prevailing at the date of surrender. To the extent that the financial asset and liability represented by the permits or certificates are tradeable on secondary markets, the asset / liability should be classified as a debt security, not a tax prepayment in the national accounts.

8 See United Nations Statistical Division, Intersecretariat Working Group in National Accounts (ISWGNA), SNA News, New York. Number 32/33 2012 *http://unstats.un.org/unsd/nationalaccount/sna/nn32-33-En.pdf*

5.2 Consideration of the UNSC Decision by the ABS continued

The ABS considers that the financial asset approach is in line with the fundamental principles of the 2008 SNA, including:

- use of observable market values where relevant;
- matching the recording of economic activity with the values that prevailed at the time of the activity;
- recording taxes paid by the parties that incurred the liability rather than non–liable participants in secondary markets; and
- aligning the emissions costs incurred by business with revenue received by government.

The principal argument against the financial asset approach is that tax revenues will not necessarily equal cash paid. The ABS does not consider this equality to be a necessary property of accrual accounting, particularly given the presence of financial assets that are denominated in prices other than domestic currency, in this case the price of CO_2. Pricing CO_2 is the central objective of an ETS.

Consultation to date with stakeholders concerning the ABS preference for the financial asset approach has resulted in the clarification that a priority is measurement of the cash flow statement of government. As both approaches to emissions permits measurement are concerned with the accrual basis for government accounts, the main concern was that assets and liabilities arising from a treatment would impact the Government Finance Statistics (GFS) cash surplus/deficit, as the emission permits are for an operational purpose. Under cash flow statement conventions creation and extinguishment of:

- accounts payable / receivable are classified as *operating* flows; and
- debt securities are classified as *financing* flows.

Under cash accounting conventions cash payments received in respect of a future tax receivable are operating revenue, regardless of whether the deferred receipt is carried forward under accrual accounting conventions in the form of a debt security. Therefore, the ABS has decided that for GFS only, tradeable permits will be classified as accounts payable / receivable on the balance sheet to align with cash flow conventions. This approach will not result in any difference in the measure of net worth in the GFS balance sheet. Tradeable permits will be classified as debt securities in the national accounts.

5.3 The treatment of economic transactions and Australian policy instruments in ABS economic statistics

Table 3 summarises the treatment in national accounts and other ABS economic statistics of the emissions policy instruments currently in existence in Australia, or soon to be so, under the financial asset approach preferred by the ABS.

TABLE 3 – TREATMENT OF AUSTRALIAN EMISSIONS POLICY INSTRUMENTS IN ECONOMIC STATISTICS

Policy instrument/event	*Issue of permit (in advance of emission)*	*Emission*	*Payment for emission*	*Secondary market trading*
1. *Clean Energy Acts* Fixed Price Period (Carbon Tax) 1 July 2012 to 30 June 2015	Prepaid tax (account payable / receivable) valued at fixed price; Additionally government current grant if issued free	Tax on production payable by emitter/tax receivable by government, valued at price of CO_2 set by government	Tax liability extinguished by purchase and surrender of permits at the price of CO_2 set by government	Not applicable (permits not tradeable)
2. *Clean Energy Acts* Flexible Price Period (Cap and trade ETS) from 1 July 2015	Creation of a financial asset / liability (debt security) denominated in tonnes of CO_2 at auction and additionally government current grant if issued free(a)	Tax on production payable by emitter/tax receivable by government, valued at market price of CO_2	Tax liability extinguished by purchasing and surrendering permit denominated in tonnes of CO_2, extinguishes government liability	Trading in debt securities issued by government at market prices of CO_2
3. GHG credits (including RECs)(b)	Government grant (current or capital grant, depending on scheme) of permit to green generator or other specified activity; valued at market price of the unit specified in the scheme	Tax on production payable by emitter/tax receivable by government valued at market price of unit specified in scheme	Tax liability of emitter extinguished through purchase and surrender of RECs denominated in megawatt hours or other units for other schemes, extinguishes government liability	Trading in debt securities issued by government at market prices of scheme units
4. Recognition of foreign permits (CER/ERU) from 1 July 2015	Certificate issued (credit created) as a result of green initiative which is a contingent liability by all governments committed to the Kyoto Protocol. The details for recognising foreign permits under the *Clean Energy Acts* is still under development	Tax on production payable by domestic emitter/tax receivable by Australian government	Tax liability of emitter extinguished through purchase and surrender of qualifying CER/ERU credit denominated in tonnes of CO_2 so the contingency is extinguished. Details still under development	Trading in debt securities issued by foreign governments at market prices of CO_2

(a) Except for GFS where classification will be accounts payable / receivable.

(b) GHG credit schemes may have units other than tonnes of CO_2, for example units of green electricity.

5.3 The treatment of economic transactions and Australian policy instruments in ABS economic statistics continued

The Appendix provides a worked example of how an ETS would be treated in a national accounting framework during the flexible price period under both the UNSC split asset approach and the financial asset approach favoured by the ABS. A worked example of accounting under the fixed price period has not been provided because there is no market price variation, and therefore no difference between the financial asset and split asset approaches. However, a worked example of accounting under the fixed price period has been prepared an can be made available on request.

5.4 Development of data sources

The ABS is developing methods of measuring the schemes listed in the above table in consultation with other government agencies. Estimates for stocks and flows of RECs have been compiled with the assistance of the Clean Energy Regulator back to the commencement of the scheme in 2000. Initial estimates for RECs and fixed price period *Clean Energy Acts* permits are expected to be incorporated into economic statistics commencing with the September 2012 reference quarter. A particular challenge in achieving this is the compilation of accruals data from permits register data that reflects reporting and acquittals delays.

The data being developed are stocks and flows for permits, taxes and grants paid and received in nominal and volume terms. In general the method is to account for permits and other items in physical terms (tonnes of CO_2 or MWh of green energy), and generate monetary (nominal) values by applying market prices to the physical volumes. The nominal values will be deflated where necessary into chain volume (monetary volumes) by using appropriate deflators. The datasets compiled by this method will be useful for both economic and environmental accounting.

5.5 Compensation and incentive packages

The Government has announced comprehensive compensation packages for consumers and industries impacted by the introduction of the policy instruments and incentives for development of renewable energy supply. Delivery of compensation and incentives will be through a wide variety of methods.

Some delivery methods are embedded in the emissions permits schemes (free permits for trade exposed industries) and other schemes for certain activities. The ABS will measure these along with the methods being developed for the other components of these schemes. Other delivery methods use social security, the taxation system and development fund processes. The ABS expects that compensation and incentives delivered by these means will be measured via normal data sources.

Because of the different methods of delivery and measurement of compensation and incentive packages, the ABS will not provide an assessment of the net impacts of the packages.

5.6 Impact on ABS economic statistics

Carbon pricing changes the relative prices of high and low emissions intensive goods. The extent that any carbon costs translate into general increases in prices depends on a range of factors. Carbon pricing will be occurring at the same time as normal variations in prices are occurring driven by productivity, the terms of trade or changing preferences. The extent to which businesses pass on the carbon price will depend on their consideration of issues such as operating costs, margins, and other economic factors (such as degree of competition).

From the September quarter 2012, ABS economic statistics will reflect the impact of measures under the fixed price period. The statistics likely to be impacted are the *Australian National Accounts: National Income, Expenditure and Product*, (cat. no. 5206.0), *Government Finance Statistics, Australia,* (cat. no. 5512.0), *Consumer Price Index, Australia,* (cat. no. 6401.0) and many survey results. The ABS will not be able to quantify the impact of carbon pricing, compensation or other government incentives and will not be producing estimates of price change exclusive of the carbon price or measuring the impact of the carbon price. Any changes in the prices charged by companies for their outputs, paid by companies for their inputs or paid by consumers, will be reflected in the suite of price indexes and other economic statistics compiled and published by the ABS. Further information on the expected impacts of the introduction of carbon pricing is available in the publication *Strong Growth, Low Pollution – Modelling a Carbon Price*[9].

9 See The Australian Treasury 2011, Strong Growth, Low Pollution: Modelling A Carbon Price, Commonwealth of Australia, Canberra.
http://cache.treasury.gov.au/treasury/carbonpricemodelling/content/report/downloads/Modelling_Report_Consolidated.pdf

6. STATISTICAL TREATMENT OF EMISSIONS PERMITS AND CREDITS IN ENVIRONMENTAL STATISTICS AND ACCOUNTS

The linkage between the environment and the economy has been recognised by the development of the System of Environmental and Economic Accounting (SEEA).

6.1 The System of Environmental-Economic Accounting

The UNSC adopted the international statistical standard, the SEEA, on 2 March 2012[10]. This standard has since been adopted by the ABS and the international statistical community for environmental accounts. The SEEA is a stand-alone system that is coherent and complementary with other international standards including 2008 SNA. Accounts and statistics produced under this standard bring environmental and economic information together in a common framework. This allows for consistent analysis of the contribution of the environment to the economy, the impact of the economy on the environment and the efficiency of the use of environmental resources within the economy.

The global atmosphere is not subject to international boundaries or ownership rights. In environmental terms it is an important asset and plays a vital role in the health of the biosphere. It does not constitute an economic asset in that proprietary rights cannot be exercised. However, pricing carbon does bring some aspects of atmospheric pollution within the scope of economic statistics, and brings economic and environment accounts closer.

ABS economic and environment statistics will adopt the same conceptual treatments for the monetary transactions related to emissions permits and other schemes. As outlined in section 5.4, construction of datasets that can meet both economic and environment statistics coherently is a goal. It is expected that these will be based on administrative datasets such as those maintained by the Clean Energy Regulator.

It should be noted that the physical accounting for CO_2 is still in development as part of the development of the SEEA ecosystem accounts. It is apparent that not all physical flows have a monetary counterpart and vice versa. Some adjustments to accounting treatments may be needed to ensure coherence between physical and monetary measures of carbon stocks and flows.

6.2 Emissions reporting arrangements in Australia

Corporations registered under the *National Greenhouse and Energy Reporting Act 2007* are obliged to report their GHG emissions, energy production and energy consumption to the Clean Energy Regulator. Reported emissions fall into two categories:

- emissions are the release of gases as a result of activity carried out at a facility controlled by the reporting corporation. For example, gases emitted when burning coal to generate electricity; and
- emissions are the release of gases as a result of electricity consumed at a facility, but it is generated elsewhere.

10 See Australian Bureau of Statistics 2012, Completing the Picture - Environmental Accounting in Practice, cat. no. 4628.0.55.001, ABS, Canberra. *http://www.abs.gov.au/ausstats/abs@.nsf/mf/4628.0.55.001*

6.2 Emissions reporting arrangements in Australia continued

It should be noted that the second type of emissions from one facility are emissions from an up-stream facility. The Clean Energy Regulator is required to publish the reported totals of GHG emissions and energy consumption in an attempt to keep the public informed about Australian corporations GHG emissions and energy flows. The National Greenhouse and Energy Reporting System (NGERS) data are also intended to underpin the introduction of an ETS in future and to meet Australia's international reporting obligations.

The reported emissions are potentially taxable. In the event of a cap being placed on total emissions registered emitters would be obliged to acquire permits, either at auction or on the market, in order to acquit their tax liabilities to government.

In 2010, information published by the Clean Energy Regulator only included corporations that emitted 87.5+ kilotonnes of emissions. The reporting threshold was reduced from the 125 kilotonnes threshold in 2000. The reporting requirements do not apply to individuals or the majority of government entities. They also do not apply to GHG emissions from agriculture, land use change and forestry sources in relation to biological processes.

7. INQUIRIES

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RELATED PUBLICATIONS

The following ABS publications also address issues about emission reduction schemes or carbon pricing:

Producer Price Indexes, Australia, June 2012 (cat. no. 6427.0)

Contains a range of producer price indexes. Firstly, economy–wide indexes are presented within a Stage of Production (SOP) framework, followed by a set of partial, stand–alone measures relating to specific industry sectors of the economy (selected manufacturing, construction, mining and service industries).
Released 23 July 2012.

Consumer Price Index, Australia, June 2012 (cat. no. 6401.0)

Movements in retail prices of goods and services commonly purchased by metropolitan households. The goods and services are divided into the following groups: food and non–alcoholic beverages; alcohol and tobacco; clothing and footwear; housing; furnishings, household equipment and services; health; transport; communication; recreation and culture; education; and insurance and financial services. Indexes for each of these groups and for 'All Groups CPI' are published for each of the state capitals along with Canberra and Darwin, and for the weighted average of the eight capital cities. Details are also shown for about 40 sub–groups and analytical series, for the weighted average of the eight capital cities.
Released 25 July 2012.

International Trade Price Indexes, Australia, June 2012 (cat. no. 6457.0)

Contains indexes measuring changes in the prices of imports of merchandise that are landed in Australia each quarter (the Import Price Index), and exports of merchandise that are shipped from Australia each quarter (the Export Price Index).
Released 20 July 2012.

Australian National Accounts: National Income, Expenditure and Product, June 2012 (cat. no. 5206.0)

Detailed presentation of quarterly national accounts showing both current price estimates and chain volume measures in original, seasonally adjusted and trend terms. State details for components of state final demand are also included.
Expected release date 5 September 2012.

Australian System of National Accounts, 2011–12 (cat. no. 5204.0)

Detailed presentation of annual national accounts data. Includes: main aggregates and productivity measures; sectoral accounts for households, financial and non–financial corporations, general government and the rest of the world; estimates of product, operating surplus, compensation of employees and other aggregates dissected by industry; tables of capital formation and capital stock; national balance sheets; flow of funds tables. Includes both current price and chain volume measures.
Expected release date 2 November 2012

RELATED PUBLICATIONS *continued*

Australian National Accounts: Financial Accounts, June 2012 (cat. no. 5232.0)

Contains information about the level (stock) of financial assets and liabilities of each sector of the economy, as well as information about financial transactions (i.e. flows of funds) between the sectors. Tables show the characteristics of the market for each financial instrument (e.g. which sectors borrow by issuing bills of exchange and which buy bills as investments).
Expected release date 27 September 2012

Government Finance Statistics, Australia, June Quarter 2012 (cat. no. 5519.0.55.001)

This release presents Government Finance Statistics (GFS) on an accrual accounting basis for the general government sector and the non–financial public sector. The key statement presented is the operating statement.
Expected release date 4 September 2012

Government Finance Statistics, Australia, 2011–12 (cat. no. 5512.0)

This publication presents Government Finance Statistics (GFS) on an accrual accounting basis for each jurisdiction for the general government sector, the non–financial public sector and the total public sector. Three key statements are presented; the operating statement, the cash flow statement, and the balance sheet.
Expected release date April 2013

Energy Account, Australia, 2009–10 (cat. no. 4604.0)

Additional information. This release presents the experimental Hybrid table (of physical energy use and associated monetary values) for 2008–09, as additional information to the December 2011.
Released 26 July 2012

Environmental and Energy Use Management, Australia (cat. no. 4660.0)

The Energy, Water and Environment Survey (EWES) contains information on energy and environment management practices for selected Australian industries in respect of the 2011–12 financial year. The product contains data on energy and water management activities, as well as expenditure and quantity data for purchases and generation of renewable and non–renewable fuels.
Proposed new issue due February 2013.

Energy Consumption and Electricity Generation (cat. no. 4664.0)

Proposed 1st issue due February 2013.

APPENDIX

A WORKED EXAMPLE OF AN ETS IN A NATIONAL ACCOUNTING FRAMEWORK

This example shows the difference between the split asset approach, recommended by the SNA, and the financial asset approach, favoured by the ABS, in recording tradeable emissions permits in a national accounts framework. The four significant economic phenomena involved, (sale of permits, taxable emission of pollution, market trading, and surrender of permits) are represented. The example is unrealistic in that it separates the phenomena in time, whereas all are expected to occur simultaneously once the scheme has been operating for some time. The example is structured as follows:

- Period 1: Government auctions tradeable permits to financial corporations for $100 (10 units of CO_2, price of $10 per unit).
- Period 2: Liable non–financial corporations emit 10 units of CO_2; the market price of CO_2 is now $11.
- Period 3: Market price is now $10.50 per unit; liable non–financial corporations buy permits from financial corporations, and surrender them to government.

Period 1: Government auctions tradeable permits to financial corporations for $100 (10 units of CO_2, price of $10 per unit)

Under both the split asset approach and the financial asset approach, a sale of permits (for example via an auction) creates transactions to be recorded in the financial account and balance sheet only. In this example it is assumed that financial corporations buy permits as an investment, and not for surrender against a future emission liability.

The financial account transactions are:

- Financial corporations pay cash (reduction in financial asset) to government (increase in financial asset).
- Under the split asset approach, the permits bought will be recorded as tax prepayments: an account receivable (increase in financial asset) of financial corporations and an account payable (increase in liability) of government.
- Under the financial asset approach, the permits bought (increase in financial asset) will be recorded as debt security assets of financial corporations and an increase in debt security liabilities of government, except for GFS[11].
- In all cases the transactions will be recorded at sale price of $100 (10 units of CO_2, price of $10 per unit)[12].
- The transactions will result in changes in the composition of financial corporation and government balance sheets.
- No change in net worth of either groups of transactor arises from the exchange of financial assets and liabilities.

The only difference between the split asset approach and the financial asset approach for period 1 is the classification of the financial asset/liability: tax prepayment (split asset approach) or debt security (financial asset approach).

Period 2: Non–financial corporations emit 10 units of CO_2; the market price of CO_2 is now $11

Emissions by liable entities, assumed to be only non–financial corporations, incur an accrued tax liability as they occur. These accruals are recorded as an expense of non–financial corporations and as revenue of government in the income and use of income accounts under both the split asset and the financial asset approaches. Under this scenario, the accruals are assumed to be unpaid at the end of the period, giving rise to a new account payable liability (of non–financial corporations) and account receivable (of government) through financial account transactions which result in changes of balance sheet position. However, the value of these accruals and unpaid accounts will differ depending on the approach taken. In this scenario it is assumed that the market

11 In GFS, these entries will be classified as accounts payable / receivable (see discussion in Section 5.2).
12 To simplify the example all transactions are assumed to occur at end of period. Transactional prices applicable through the period should be used; in practice this is likely to be proxied by using average prices for the period.

A WORKED EXAMPLE OF AN ETS IN A NATIONAL ACCOUNTING FRAMEWORK *continued*

value of the carbon units represented by the permits issued in period 1 has risen 10% to $11 by the end of period 2.

Under the split asset approach:

- the tax accruals will be valued at issue (period 1) price of $100 (10 units of CO_2, price of $10 per unit);
- the unpaid value of the accrual will create a new account payable / receivable asset (of government) and liability (of non–financial corporations) in the financial account also valued in period 1 prices;
- the difference between the period 1 price and the period 2 price of $10 (10 units of CO_2, $1 per unit) will create a new non–produced non–financial asset for the holders of permits, in this case the financial corporations that purchased them at auction in period 1; and
- this new asset does not emerge as a transaction (there has been no exchange of value) but as an entry in the other change in volume account of financial corporations, and as an additional non–produced non–financial asset on their balance sheet at the end of period 2, valued at $10.

Under the financial asset approach:

- the tax accruals will be valued at current market prices (period 2) at $110 (10 units of CO_2, price of $11 per unit);
- the unpaid value of the accrual will also be $110 for non–financial corporations accounts payable and government accounts receivable in the financial account and balance sheets;
- the difference between period 1 and period 2 permit values of $10 (10 units of CO_2, $1 per unit), will be recorded in the revaluation account for both permit asset holders, in this case financial corporations, and permit issuer, government; and
- both the revaluation account entries and the changed balance sheet entries will be classified as debt securities[13].

It is in the period 2 scenario that the essential differences between the split asset and financial asset become evident:

- the tax accrual for non–financial corporations under this scenario is different to the extent of market price variation of CO_2, in this case $10, which is also the difference in change in net worth for non–financial corporations and government under the two treatments;
- the market price variation of permits is treated differently, as a revaluation of a debt security[14] under the financial asset approach, and as the emergence of a new non–produced non–financial asset in the other change in volume account under the split asset approach; and
- Government debt is recorded at market price under the financial asset approach and at historic cost under the split asset approach.

Period 3: The market price is now $10.50 per unit; non–financial corporations buy permits from financial corporations and surrender them to government

The liable non–financial corporations that emitted in period 2 have to surrender permits to discharge their unpaid tax liability. They will have to buy these permits from permit holders, financial corporations, at market prices. At the end of period 3, the market price has fallen to $10.50 per CO_2 unit. The surrender of the permit not only acquits the account payable liability of non–financial corporations to government but also liquidates the liability government has to recognise permits that were created at sale in period 1.

13 In GFS, these entries will be classified as accounts payable / receivable (see discussion in Section 5.2).
14 In GFS, these entries will be classified as accounts payable / receivable (see discussion in Section 5.2).

A WORKED EXAMPLE OF AN ETS IN A NATIONAL ACCOUNTING FRAMEWORK *continued*

Under the split asset approach:

- the decrease in the market value of permits in period 3 of $5 (10 units of CO_2, $0.50 per unit) will be recorded as a disappearance of non–produced non–financial assets in the other changes of volume account for asset holders (financial corporations);
- the sale of permits by financial corporations to non–financial corporations will result in an exchange of cash of $105 (decrease for non–financial corporations, increase for financial corporations) and an exchange of permits (increase for non–financial corporations, decrease for financial corporations);
- however, the exchange of permits will be recorded in two parts: $100 in the financial account in accounts receivable assets for the historic cost component, and $5 in the capital account for the exchange of the non–produced non–financial asset that represents the market price variation since period 1 in this approach;
- the surrender of the permits by non–financial corporations to government is likewise recorded in two steps. The financial account records an exchange of permits in the financial account, decrease in accounts receivable (non–financial corporations) and accounts payable (government) at historic cost ($100) of the permits. The market price variation since period 1, $5, is recorded as a disappearance of the non–produced non–financial asset of non–financial corporations in the other changes of volume account. The surrender effectively cancels the permit and they disappear from balance sheets; and
- the surrender of the permits liquidates the tax accrual (account payable) liability of non–financial corporations created by emission in period 2 valued at $100 and the tax accrual (account receivable) of government. In effect, the tax prepayment created in period 1 offsets the period 2 tax accrual on delivery of the permits in period 3, even though the permits may be surrendered by a different entity to the period 1 purchaser.

Under the financial asset approach:

- the decrease in the market value of permits in period 3 of $5 (10 units of CO_2, $0.50 per unit) will be recorded as a revaluation of debt securities in the revaluation account for asset holders (financial corporations) and the liability issuer (Government);
- the sale of permits by financial corporations to non–financial corporations will result in financial account entries for an exchange of cash of $105 (decrease for non–financial corporations, increase for financial corporations) and an exchange of permits (increase in debt security assets for non–financial corporations, decrease in debt security assets for financial corporations) also valued at $105, at period 3 prices;
- the surrender of the permits by non–financial corporations to government is recorded as an exchange of permits in the financial account, decrease in debt security assets (non–financial corporations) and decrease in debt security liabilities (government) at period 3 prices ($105). The surrender effectively cancels the permits (both asset and liability are held by government), and they disappear from balance sheets; and
- the surrender of the permits liquidates the tax accrual (account payable) liability of non–financial corporations created by emission in period 2 now valued at $105 and the tax accrual (account receivable) of government. In effect, the debt security created in period 1 offsets the period 2 tax accrual on delivery of the permits in period 3 valued at period 3 prices even though the permits may be surrendered by a different entity to the period 1 purchaser.

A WORKED EXAMPLE OF AN ETS IN A NATIONAL ACCOUNTING FRAMEWORK *continued*

The market trading and surrender phenomena illustrated in period 3 show how the split asset approach received its name. The non–produced non–financial asset absorbs all market price variations allowing the surrender transactions to be valued at historic cost by government, with non–government participants recording capital gains and losses. It should be noted that under certain market conditions the non–produced non–financial asset could have a negative value. The ABS argues that this isolation of government from the impacts of market pricing of CO_2 by these artificial means is contrary to the fundamental principles of both the design of ETS schemes and to the principles of SNA.

Extension of the accounting treatments illustrated for ETS to free permits, internationally traded permits and similar schemes, such as RECs and the CFI, will show that under the split asset approach, all permits or certificates for which cash was not received by government on issue will not be reflected in government accounts as they will only be recognised as non–produced non–financial assets. For example, a free permit issued in period 1 of the above example will have zero historic cost but will have a market value on issue. The ABS argues that historic cost is an unrealistic representation of these schemes to the extent that government will accept such permits and certificates to acquit emissions liabilities of liable entities, or require mandatory purchase of credits by liable entities, such as in the RECs scheme, and that liable entities will incur market based costs to acquit their liabilities.

Period 1: Government Auctions Tradeable Permits to Financial Corps for $100 (10 units CO_2), price $10 per unit

	Financial Account						Revaluation Account						Other Changes in Volume Account						Closing Balance Sheet					
	Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government	
	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab
Cash and Deposits			-100		100																-100		100	
Debt Securities			**100***			**100***															**100***			**100***
Accounts payable / receivable			*100**			*100**															*100**			*100**
Change in Net Worth			0		0																			
* The only difference between split asset (italics) and financial asset (bold) is classification																								

Period 2: Non-Financial Corp Emits 10 units CO_2; market price of CO_2 now $11

	Income and Expenditure Account					
	Non-Fin Corp		Financial Corp		Government	
	Income	Expense	Income	Expense	Income	Expense
Tax Accrual Financial asset		**110**			**110**	
Tax accrual split asset		*100*			*100*	
Difference between fin asset and split asset is due to price change						

	Financial Account						Revaluation Account						Other Changes in Volume Account						Closing Balance Sheet					
	Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government	
	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab
Cash and Deposits																					x		y	
Financial Asset Approach																								
Debt Securities									**10**			**10**									**110**			**110**
Accounts payable / receivable		**110**			**110**															**110**			**110**	
Change in Net Worth	**-110**				**110**																			
Split Asset Approach																								
Debt Securities																								
Accounts payable / receivable		*100*			*100*															*100*	*100*		*100*	*100*
Non-financial Intangible															*10*						*10*			
Change in Net Worth	*-100*				*100*																			

Period 3: Market price is now $10.5 per unit; non-financial corp buys permits from financial corp, and surrenders to government to pay tax accrual

	Financial Account						Revaluation Account						Other Changes in Volume Account						Closing Balance Sheet					
	Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government		Non-Fin Corp		Financial Corp		Government	
	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab	Asset	Liab
Cash and Deposits	-105		105																-105		-105		y	
Financial Asset Approach																								
Debt Securities	**105-105**		**-105**			**-105**			**-5**			**-5**												
Accounts payable / receivable		**-105**			**-105**																			
Change in Net Worth	**0**		**0**		**0**																			
Split Asset Approach																								
Debt Securities																								
Accounts payable / receivable	*100-100*	*-100*	*-100*		*-100*	*-100*																		
Non-financial Intangible	*5*	*0*	*-5*										*-5*		*-5*									
Change in Net Worth	*0*		*0*		*0*																			

BIBLIOGRAPHY

Ahmad, N 2010, *OECD/Eurostat Task Force on the Treatment of Emission Allowances and Emission Permits in the National Accounts: Outcome,* OECD/Eurostat Task Force, Paris.
http://www.oecd.org/dataoecd/11/49/46424606.pdf

Australian Bureau of Statistics 2010, *Linking the Environment and Economy: Towards an Integrated Environmental–economic Account for Australia*, (ABS, cat. no. 4655.0.55.001).
http://www.abs.gov.au/ausstats/abs@.nsf/mf/4655.0.55.001

Australian Bureau of Statistics 2012, *Completing the Picture – Environmental Accounting in Practice*, (ABS, cat. no. 4628.0.55.001).
http://www.abs.gov.au/ausstats/abs@.nsf/mf/4628.0.55.001

Commonwealth of Australia 2011, Explanatory Memorandum, Clean Energy Bill 2011.
http://www.comlaw.gov.au/Details/C2011B00166/Explanatory%20Memorandum/Text

Department of Climate Change and Energy Efficiency 2008, *Carbon Pollution Reduction Scheme Green Paper*, Commonwealth of Australia, Canberra.
http://www.climatechange.gov.au/~/media/publications/green–paper/greenpaper.pdf

Department of Climate Change and Energy Efficiency 2010, *Enhancing the Renewable Energy Target – Discussion Paper*, Commonwealth of Australia, Canberra.
http://www.climatechange.gov.au/government/initiatives/renewable–target/~/media/publications/renewable–energy/enhancing–ret–discussion–paper–pdf.ashx

Department of Climate Change and Energy Efficiency 2010, *Clean Energy Legislative Package – Summary of Legislation*, Commonwealth of Australia, Canberra.
http://climatechange.gov.au/government/submissions/~/media/publications/clean–energy–legislation/110803–Clean–Energy–Legislation–Summary–of–legislation–pdf.pdf

Department of Climate Change and Energy Efficiency 2012, *Carbon Farming Initiative Handbook*, Commonwealth of Australia, Canberra.
http://www.climatechange.gov.au/en/government/initiatives/carbon-farming-initiative/~/media/government/initiatives/cfi/handbook/CFI-Handbook-20120403-PDF.pdf

European Commission, Food and Agriculture Organization, International Monetary Fund, Organisation for Economic Co–operation and Development, United Nations and World Bank 2012, *System of Environmental–Economic Accounting Central Framework*, White cover.
http://unstats.un.org/unsd/envaccounting/White_cover.pdf

European Commission, International Monetary Fund, Organisation for Economic Co–operation and Development, United Nations and World Bank 2009, *System of National Accounts 2008*, New York.
http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf

Harper, P 2008, *The Treatment of Emissions Trading Scheme (ETS) Permits in the Australian System of National Accounts*, Sixth meeting of the Advisory Expert Group on National Accounts, Washington.
http://unstats.un.org/unsd/envaccounting/londongroup/meeting14/LG14_Bk5.pdf

Harrison, A 2008, *Recording Emissions Permits in the National Accounts*, Sixth Meeting of the Advisory Expert Group on National Accounts, Washington.
http://unstats.un.org/unsd/nationalaccount/aeg/papers/m6emission.pdf

International Carbon Reduction and Offset Alliance (ICROA) 2009, *Submission to the Australia Department of Climate Change in Response to the National Carbon Offset Standard Discussion Paper*, ICROA, United Kingdom. http://www.climatechange.gov.au/government/submissions/~/media/submissions/ncos–consultation/90InternationalCarbonReductionandOffsetAlliance.ashx

Maher, S & Shanahan, D 2011, *Labour to Impose Carbon Tax Next Year, ETS in 2015, The Australian*, NSW. http://www.theaustralian.com.au/national–affairs/climate/labor–to–impose–carbon–tax–next–year–ets–in–2015/story–e6frg6xf–1226004719022

National GreenPower Accreditation Program 2012, *GreenPower Accreditation Program for Renewable Energy*, Version 8, National GreenPower Accreditation Program, (accessed 12 July 2012). http://www.greenpower.gov.au/News/Consultation–for–Program–Rules–Version–8/~/media/CCFEFEC46B3D4743A13A362939F26EBE.pdf

Office of the Renewable Energy Regulator (ORER) 2011, *Financial Annual Report 2010–2011*, Australian Government, Canberra. http://ret.cleanenergyregulator.gov.au/ArticleDocuments/205/financial–report–2011.pdf.aspx

Olsen, T 2008, *Emission Permits,* Sixth Meeting of the Advisory Expert Group on National Accounts, Washington. http://mdgs.un.org/unsd/nationalaccount/aeg/papers/m6emissionadd1.pdf

The Australian Treasury 2011, *Strong Growth, Low Pollution: Modelling A Carbon Price*, Commonwealth of Australia, Canberra. http://cache.treasury.gov.au/treasury/carbonpricemodelling/content/report/downloads/Modelling_Report_Consolidated.pdf

United Nations 2008, *List of Documents*, Sixth Meeting of the Advisory Expert Group on National Accounts, Washington. http://unstats.un.org/unsd/nationalaccount/aeg/m1–08.asp

United Nations 2012, *Guidelines under Articles 5, 7 and 8: Methodological Issues, Reporting and Review under the Kyoto Protocol*, United Nations Framework Convention on Climate Change, Germany. http://unfccc.int/national_reports/accounting_reporting_and_review_under_the_kyoto_protocol/items/1029.php

United Nations 2012, *Status of Ratification of the Kyoto Protocol*, United Nations Framework Convention on Climate Change, Germany. http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php

United Nations Statistical Division, Intersecretariat Working Group in National Accounts (ISWGNA), *SNA News,* New York.
Number 30/31 2011.
http://unstats.un.org/unsd/nationalaccount/sna/nn30–31–en.pdf
Number 32/33 2012
http://unstats.un.org/unsd/nationalaccount/sna/nn32–33–En.pdf

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