



**Emissions Measurement and Management
Course Workbook 2010**

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Emissions Measurement & Management 2010

Prepared on behalf of and for use by: The Local Government Association of South Australia

Author: Mr. Stewart Gundy, Senior Energy and Emissions Analyst

Internal Review: Mr. Matthew Shorten, Managing Director

Approved on behalf of Balance Carbon Pty Ltd: Mr. Matthew Shorten, Managing Director

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Balance Carbon Pty Ltd
ABN 15 123 897 012
370 Unley Road, Unley Park SA 5061, Australia
PO Box 3436, Rundle Mall, Adelaide SA 5001, Australia
T: 1300 77 54 10 E: info@balancecarbon.com
www.balancecarbon.com
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Forward

Climate change is one of the greatest social, economic and environmental challenges of our time. Human activity is causing the climate to change. This, in turn, is having an impact on Australia's rainfall, temperatures, bushfire frequency, health, heritage and biodiversity for current and future generations.

With continuing debate around how best to manage Australia's greenhouse gas obligations at the federal level, a clear standard for additional voluntary action has emerged. Due to take effect from 1 July 2010, the National Carbon Offset Standard (NCOS) sets a voluntary minimum standard for:

- carbon offset eligibility and generation
- carbon footprint calculation;
- achieving carbon neutrality; and
- audit and verification of carbon claims

With a direct link to local communities and business, local government is well placed to provide leadership in the area of energy efficiency and carbon management. As a result, many local governments have begun to measure their energy consumption and greenhouse gas (GHG) emissions, develop management strategies and report on their progress towards reduction commitments.

This workbook is developed to be used by participants at the Local Government Association of South Australia's emissions measurement and management training course, which successfully began during 2008. Information, workshop activities and key resources are provided for the following key areas:

- Climate change
- Legislation and standards
- Preparing an emissions inventory
- Reporting and public disclosure
- Preparing an Emissions Management System;
- Reducing emissions
- Achieving carbon neutrality
- Auditing and validation of claims

This workbook should also be utilised in conjunction the Local Government Association of South Australia's briefing paper entitled '*Local Governments and the National Carbon Offset Standard*'.

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1. Introduction

This training workbook has been prepared by BalanceCarbon® to assist participants at the Local Government Association of South Australia's Emissions Measurement and Management training course. It will assist attendees in all aspects of emissions measurement and management including the following 10 key areas:

1. Climate change
2. Legislation and standards
3. Boundary setting
4. Data collection
5. Emissions factors and calculation methods
6. Reporting and public disclosure
7. Creating an emissions management plan and policy
8. Mitigation and carbon neutrality
9. Verification
10. Continual improvement

The information presented throughout the training course relates directly to Local Government organisations with consideration given to common issues and needs that arise as a result of their operations. Instruction is given in the context of the National Carbon Offset Standard (NCOS), the National Greenhouse and Energy Reporting (NGER) Act 2007, and related standards. Users should also refer to the LGA briefing paper entitled *Local Governments and the National Carbon Offset Standard (2010)*, which deals in detail with the requirements of the NCOS and its implications for local governments.

As you will see, effective emissions measurement and management involves the engagement of a broad cross section of staff within your organisation. The process involves effort and expertise from not only the environmental division but staff involved in administration, accounting, finance, asset management, fleet and many more. By attending this training course and completing the workbook, you will be equipped with the understanding necessary to drive the process of effective and efficient emissions measurement and management across your council.

2. Climate change

Climate change is the result of changes in our weather patterns because of an increase in the Earth's average temperature. This is caused by increases in greenhouse gases in the Earth's atmosphere. These gases soak up heat from the sun and trap it within the atmosphere, making the Earth warmer.

The terms 'global warming' and 'climate change' are often used interchangeably, but there is a difference:

- Global warming is the gradual increase of the Earth's average surface temperature, due to greenhouse gases in the atmosphere
- Climate change is a broader term. It refers to long-term changes in climate, including average temperature and rainfall

Greenhouse gases have always been a natural part of the atmosphere. They absorb and re-radiate the sun's warmth, maintaining the Earth's temperature at a level necessary to support life. The problem we now face is that human actions are increasing the amount of the gases that trap heat. This is called the enhanced greenhouse effect, which is contributing to a warming of the Earth's surface.

In 2007 the Intergovernmental Panel on Climate Change (IPCC) released their fourth assessment report, concluding that:

- Warming of the climate system is unequivocal;
- Humans are very likely to be causing most of the warming that has been experienced since 1950; and
- It is very likely that changes in the global climate system will continue well into the future, and that they will be larger than those seen in the recent past.

The main greenhouse gases generated by human activity are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). There are also manufactured gases such as chlorofluorocarbons (CFCs), halocarbons and some of their replacements.

Greenhouse gases are produced by human activity, including:

- burning fossil fuels, such as coal, oil or gas
- using energy generated by burning fossil fuels
- some aspects of farming, such as raising cattle and sheep, using fertilisers and growing some crops
- clearing land, including logging
- breakdown of food and plant wastes and sewerage
- some industrial processes, such as making cement and aluminium.

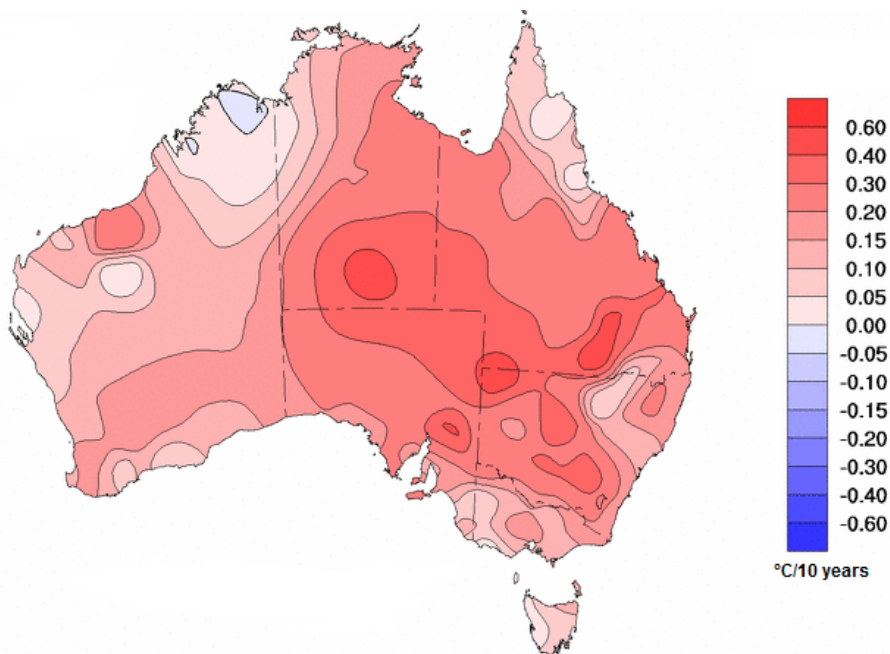
In Australia, greenhouse gas emissions come primarily (70 per cent) from the energy sector. Within this category, electricity generation is the biggest offender, because we rely heavily on burning coal for power. After electricity generation, the largest proportion of emissions comes from road transport.

Australia generates only 1.5 per cent of total global greenhouse gas emissions, so its actions alone cannot avert the worst consequences of climate change. However, Australia is one of the world's biggest polluters on a per capita basis, so it is essential we play our part in the global effort.

Since the middle of the 20th century, Australian temperatures have, on average, risen by about 1°C with an increase in the frequency of heatwaves and a decrease in the numbers of frosts and cold days. Rainfall patterns have also changed - the northwest has seen an increase in rainfall over the last 50 years while much of eastern Australia and the far southwest have experienced a decline. It is difficult to precisely predict what the impacts of climate change will be into the future, as they vary with each region. Best estimates are that by 2030 Australia will face:

- a further 1°C of warming in temperatures
- up to 20 per cent more months of drought
- up to 25 per cent increase in days of very high or extreme fire danger
- increases in storm surges and severe weather events.

Figure 1: Trend in mean temperature 1970-2009 (°C/10 years)



Source: Australian Bureau of Meteorology (2010) - <http://www.bom.gov.au/cgi-bin/climate/change/trendmaps.cgi>

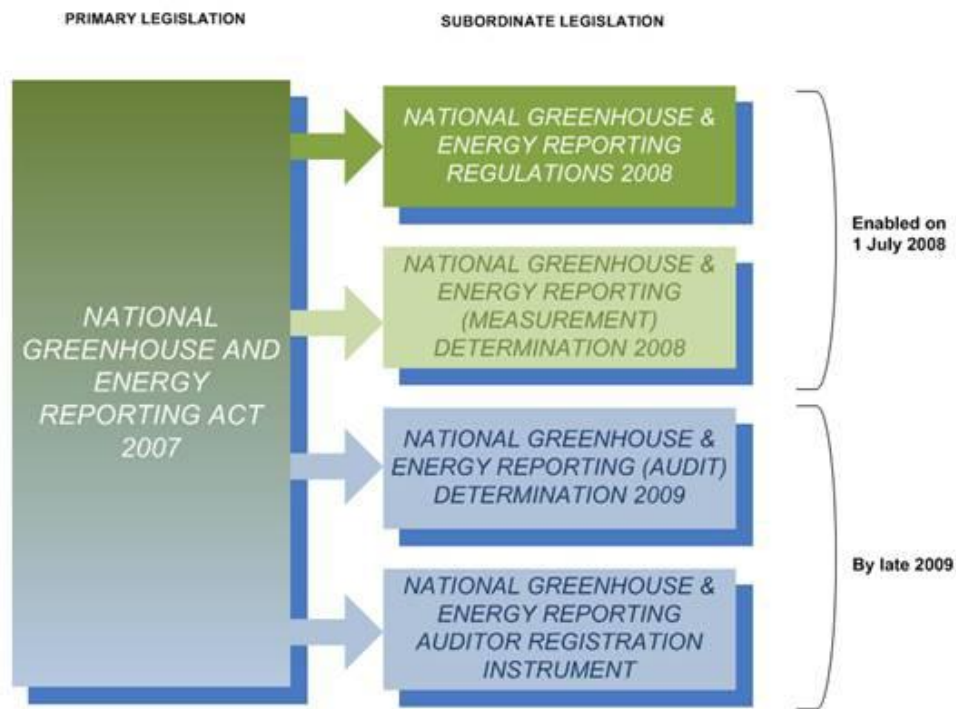
3. Legislation and Standards

In Australia there are essentially two levels of greenhouse and energy reporting: voluntary and compliance.

3.1 The National Greenhouse and Energy Reporting (NGER) Act 2007

For large emitters, the National Greenhouse and Energy Reporting Act 2007, and its subordinate legislation establish a national framework for mandatory reporting by corporations on their energy production, energy consumption and greenhouse gas emissions. Only corporations whose energy production, energy consumption or greenhouse gas emissions are large enough to meet certain thresholds are required to report under the Act. At present, most local governments are unlikely to have reporting obligations under the Act. This is because the Act applies only to constitutional corporations and local councils in most cases are not considered to be constitutional corporations. The figure below illustrates how the various elements of the NGER legislative framework fit together.

Figure 2: The NGER Act 2007 Legislative Framework



Source: Department of Climate Change and Energy Efficiency (2010) – www.greenhouse.gov.au

3.2 The National Carbon Offset Standard (NCOS)

Taking effect from 1 July 2010, the National Carbon Offset Standard (NCOS) provides guidance on what constitutes a genuine, additional voluntary offset in the context of the Carbon Pollution Reduction Scheme. It sets a voluntary minimum standard for:

- carbon offset eligibility and generation;
- carbon footprint calculation;
- achieving carbon neutrality; and
- audit and verification of carbon claims

The National Carbon Offset Standard is a 'living' document that will be regularly reviewed and updated to reflect the dynamic nature of the voluntary carbon market and provide ongoing opportunities for Australian businesses.

The list of eligible offsets and eligible emissions sources for domestic offsets is therefore likely to change over time in line with domestic and international carbon market developments and changes in international emissions accounting rules.

The Australian Competition and Consumer Commission (ACCC) has noted that as the voluntary carbon market has grown, concerns have emerged about what consumers and businesses are really purchasing when they buy carbon offsets. Varied levels of understanding about carbon offsets and carbon neutrality and varied assessment methodologies can create confusion as to the legitimacy of claims and products.

The Standard addresses consumer concerns that some of the offset products being sold in the voluntary carbon market are not genuine, that they have been illegitimately resold, or will not achieve the emissions reductions claimed. It also clarifies for businesses and providers of offset and carbon neutral products what constitutes a credible carbon offset and carbon neutral claim within the context of the Carbon Pollution Reduction Scheme.

3.3 The Greenhouse Gas Protocol

The GHG Protocol Corporate Standard provides standards and guidance for companies and other organizations preparing a GHG emissions inventory. It covers the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol — carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆). Key areas covered include:

- GHG accounting and reporting principles
- Business goals and inventory design
- Setting organisational boundaries
- Tracking emissions over time
- Identifying and calculating GHG emissions
- Managing inventory quality

4. Boundary setting

There are essentially two levels to setting the boundary or scope of an energy and emissions inventory. First, an organisation must set an organisational boundary to define the businesses and operations that constitute the company for the purpose of accounting and reporting GHG emissions. Second, after a company has determined its organisational boundaries in terms of the operations that it owns or controls, it then sets its operational boundaries. This involves identifying emissions associated with its operations, categorizing them as direct and indirect emissions, and choosing the scope of accounting and reporting for indirect emissions.

4.1 Defining the organisational boundary

The boundary of an organisation defines the activities that should be included in its carbon footprint calculation. Under the National Carbon Offset Standard an organisation may choose to measure the greenhouse gas emissions attributable to the whole organisation or only a part of the organisation. If an organisation wishes to calculate the carbon footprint for the entire organisation, it should follow the definition of an organisation's boundary used in the NGER Act.

The GHG Protocol outlines additional corporate level boundaries not covered by the NGER Act that are also suitable for calculating a carbon footprint for carbon neutrality purposes. They are the equity share and financial control approaches. In all cases, the organisation boundary chosen should be transparently documented and disclosed when making assertions relating to the achievement of carbon neutrality by the organisation.

The following table provides a summary of the GHG Protocol definitions of corporate group members used in financial accounting and how GHG emissions would be treated under two different consolidation approaches.

Table 1: Financial accounting categories used to define corporate group members

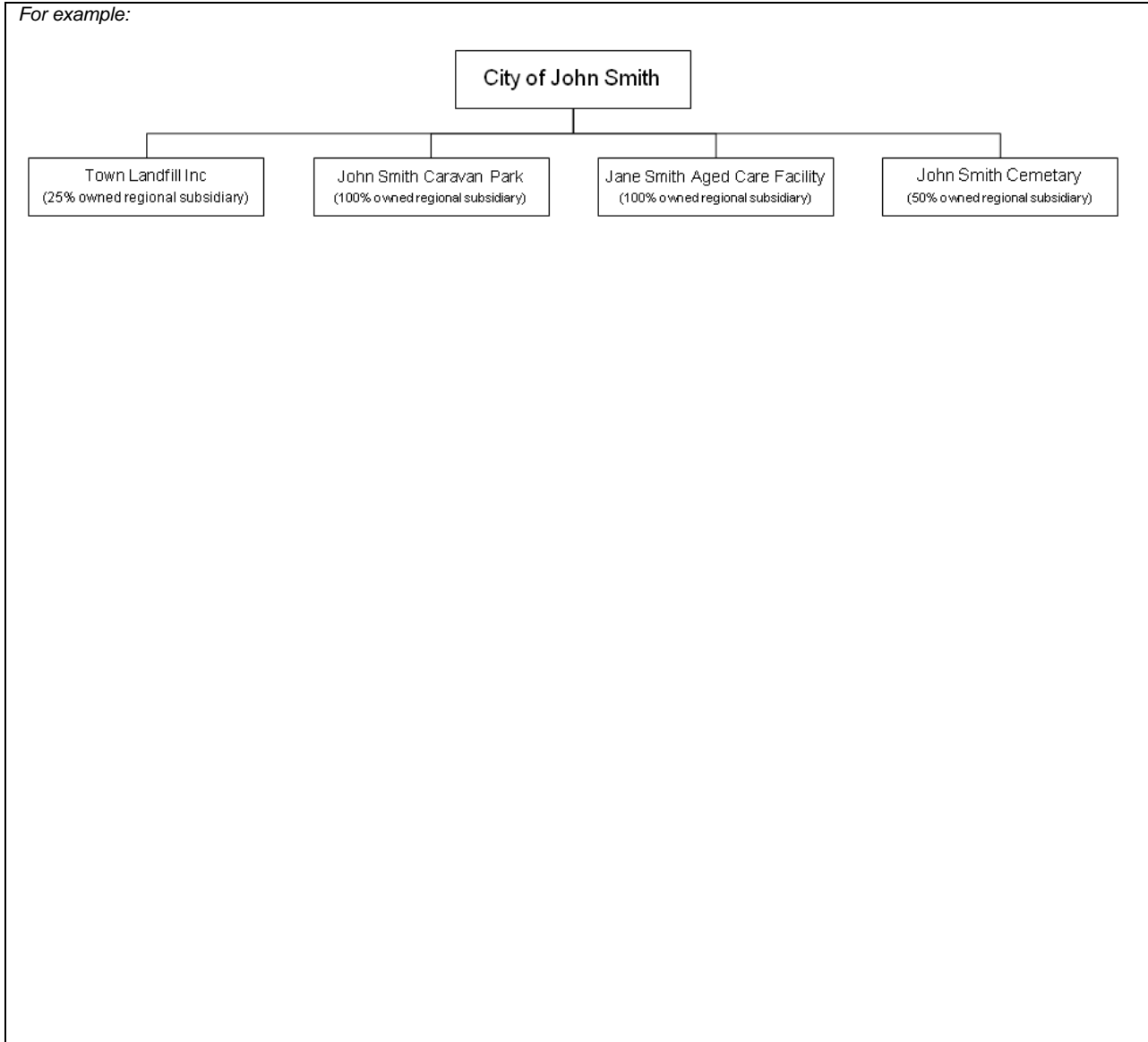
Accounting Category	Financial Accounting Definition	Accounting for GHG Emissions According to GHG Protocol Corporate Standard	
		Based on Equity Share	Based on Operational Control
Group companies / subsidiaries	The parent company has the ability to direct the financial and operating policies of the company with a view to gaining economic benefits from its activities. Normally, this category also includes incorporated and non-incorporated joint ventures and partnerships over which the parent company has financial control. Group companies/ subsidiaries are fully consolidated, which implies that 100 percent of the subsidiary's income, expenses, assets, and liabilities are taken into the parent company's profit and loss account and balance sheet, respectively. Where the parent's interest does not equal 100 percent, the consolidated profit and loss account and balance sheet shows a deduction for the profits and net assets belonging to minority owners.	Equity share of GHG emissions	100% of GHG emissions
Associated / affiliated companies	The parent company has significant influence over the operating and financial policies of the company, but does not have financial control. Normally, this category also includes incorporated and non-incorporated joint ventures and partnerships over which the parent company has significant influence, but not financial control. Financial accounting applies the equity share method to associated/ affiliated companies, which recognizes the parent company's share of the associate's profits and net assets.	Equity share of GHG emissions	0% of GHG emissions
Non-incorporated joint ventures / partnerships / operations where partners have joint financial control	Joint ventures/ partnerships/operations are proportionally consolidated, i.e., each partner accounts for their proportionate interest of the joint venture's income, expenses, assets, and liabilities.	Equity share of GHG emissions	Agreement must be reached between each party as to who will take responsibility for GHG emissions
Fixed asset investments	The parent company has neither significant influence nor financial control. This category also includes incorporated and non- incorporated joint ventures and partnerships over which the parent company has neither significant influence nor financial control. Financial accounting applies the cost/ dividend method to fixed asset investments. This implies that only dividends received are recognized as income and the investment is carried at cost.	0% of GHG emissions	0% of GHG emissions
Franchises	Franchises are separate legal entities. In most cases, the franchiser will not have equity rights or control over the franchise. Therefore, franchises should not be included in consolidation of GHG emissions data. However, if the franchiser does have equity rights or operational/ financial control, then the same rules for consolidation under the equity or control approaches apply.	Equity share of GHG emissions	100% of GHG emissions

Reproduced from: WRI/WBCSD (2004) GHG Protocol, p. 19

Activity 1 – Mapping the organisational boundary of your council

In the space provided below, draw the organisational boundary of your council including all corporate group members and utilising the operational control approach

For example:



- Would any of these organisations meet one of the financial accounting definitions listed in Table 1 and would they be included under the operational control approach?

Box 1 – Leased assets

A common consideration for councils is the inclusion or exclusion of leased assets in their energy and emissions inventory. Many companies lease some of their assets, such as building space or vehicles, and must decide how to account for and report GHG emissions associated with these assets. This issue is dealt with in detail in a paper entitled 'Categorizing GHG Emissions Associated with Leased Assets' (WRI/WBCSD 2006). Under the operational control approach, it is important to consider who has control over the emissions generating activities that occur as a result of the operation of leased assets. However, some councils may also wish to account for emissions from assets that they own but do not actively control. Such considerations should be assessed on a case-by-case basis along with the organisation's specific goals.

Once an organisation has compiled a list of facilities that will be included in the operational boundary, the next step is to consider the emissions sources. Direct and indirect emission sources are categorised using the concept of 'scope'. Three scopes are defined for GHG accounting and reporting purposes.

4.4 The Concept of Scope

To help delineate direct and indirect emission sources, improve transparency, and provide utility for different types of organisations and different types of climate policies and organisational goals, three 'scopes' (scope 1, scope 2 and scope 3) are defined for GHG accounting and reporting purposes¹.

Scope 1: Direct emissions

Scope 1 emissions are direct emissions that occur from sources that are owned or controlled by the organisation.

Scope 2: Electricity indirect emissions

Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the organisation. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the organisation from an offsite location such as a power plant or the national electricity grid. Scope 2 emissions physically occur at the facility where electricity is generated.

Scope 3: Other indirect emissions

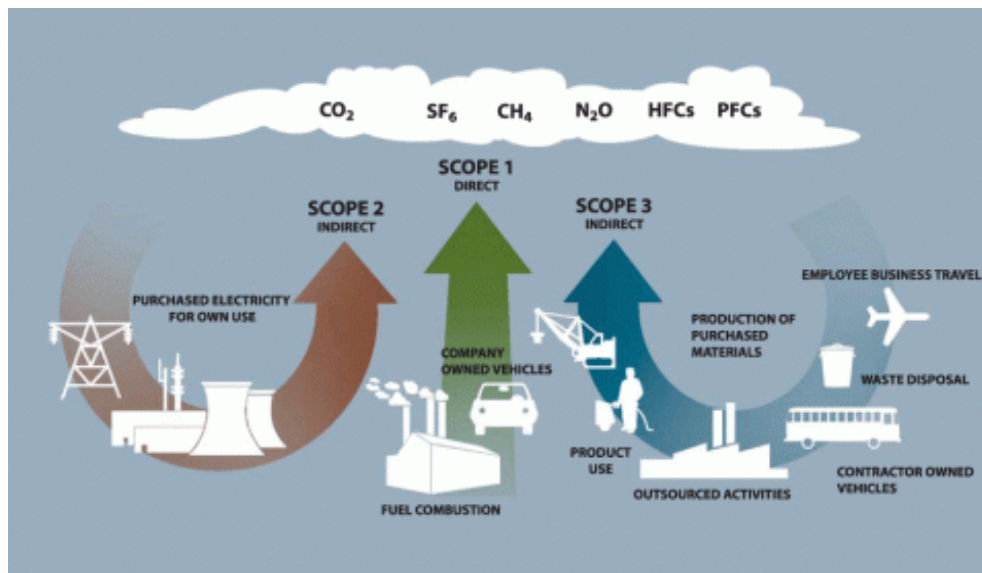
Scope 3 is an additional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the organisation, but occur from sources not owned or controlled by the organisation. Scope 3 emissions are outside of your operational control and are difficult to accurately measure. However, it is standard practice to include some material scope 3 emissions in line with international guidelines.

¹ Reproduced from the GHG Protocol: A corporate accounting and reporting Standard, Revised Edition (2004), p. 25

Box 2 – The concept of materiality

The concept of materiality simply outlines the significance of emission generating activities to your operation. It is standard practice to include scope 3 emissions that can be easily measured and influenced by an organisation within the scope of their audit. International standards recommend the inclusion of waste, business travel (in non-owned vehicles) and full fuel cycle emissions from transport fuels and electricity in all greenhouse gas audits.

Figure 3: Overview of scopes and emissions across a value chain



Source: WRI/WBCSD (2004) GHG Protocol, Chapter 4 p. 26

Under the NGER Act 2007, organisations need only account for scope 1 and 2 emissions sources. However, the NCOS specifies that an organisation should consider calculation of other indirect (scope 3) emissions sources in addition to scopes 1 and 2.

In considering the calculation of scope 3 emissions, an organisation should refer to the GHG Protocol which provides guidelines for determining the relevance of scope 3 emissions sources. Scope 3 emissions considerations in the context of local government are dealt with in detail in the LGA 'Local Governments and the National Carbon Offset Standard' briefing paper (2010, Chapter 5).

Activity 2 – Facilities and emissions sources

In the table below list some of the facilities or facility groups that your council has operational control over. Next to each facility detail the Scope 1, 2 and 3 emissions sources present. Consider also facilities that may not be under the organisation’s operational control but could be included in the inventory.

Facility / Facility Group Name	Scope 1 (direct) emissions sources	Scope 2 (indirect) emissions	Scope 3 (other indirect) emissions sources

5. Data Collection

Collecting the information required to populate an inventory and calculate your organisation's footprint is often one of the most challenging steps in the process. Once the emissions sources from each of your organisation's facilities have been identified, you will need to determine the required 'activity data' and its location or availability. Once the required activity data has been identified, the challenge is in collecting that data for an entire reporting period in appropriate units.

Activity 3 - Data types

- List the activity data required in order to estimate the emissions from the sources listed above
- Consider the strengths and weaknesses in your council's current data capture systems and procedures

Activity (Source)	Required data	Strength	Weakness

Box 3 – Reporting periods

Emissions reporting is similar to taxation in that the result is usually reported for one year (calendar or financial) prior to the analysis. The period that an organisation chooses to examine and whether the inventory is aligned with calendar or financial year reporting is dependent on the organisation's specific needs or goals. However, there are specified reporting periods (aligned with the financial year) under the NGER Act 2007.

It will be important to engage a wide range of staff to assist in data collection for each activity or facility and one should consider the nature of the organisation's records management systems in order to facilitate improvement moving forward.

Activity 4 – Data collection

Considering the following common sources of emissions, identify the location or availability of required activity data and think about who might assist in data collection.

Activity (source)	Activity data	Availability / location	Person / department

6. Emissions Factors and Calculation Methods

Once complete and accurate activity data for the period being examined has been collected and the operational input/outputs examined, the emissions footprint can be estimated using appropriate methods and factors. Both the NGER Act 2007 and the NCOS require that greenhouse gas emissions from scope 1 and scope 2 emissions sources should be calculated in accordance with the methods and guidance provided in the NGER (Measurement) Determination. Options for calculating emissions include:

- i. Method 1 – using default emissions factors derived from the latest version of the National Greenhouse Account Factors;
- ii. Method 2 – a method using industry sampling and Australian or international standards listed in the NGER (Measurement) Determination or equivalent for analysis;
- iii. Method 3 – a method using Australian or international standards listed in the Determination or equivalent standards for both sampling and analysis of fuels and raw materials. Method 3 is very similar to method 2, but it requires compliance with Australian or equivalent documentary standards for sampling; and
- iv. Method 4 – direct measurement using continuous or periodic emissions monitoring.

Some guidance on calculation of scope 3 emissions for limited categories of emissions sources is provided in the National Greenhouse Account Factors and GHG Protocol.

Additionally, an organisation should assess the uncertainty of its direct (scope 1) greenhouse gas emissions estimates in accordance with the NGER (Measurement) Determination.

Reproduced from: The National Carbon Offset Standard, Sec 4.2.3(b), p. 10

Due to the nature of local government activities, the use of default factors derived from the National Greenhouse Account (NGA) Factors is sufficient. At the time of writing, the latest version was published in June 2009 containing detailed emissions factors for energy consumption (fuel, gas, electricity), Industrial processes including use of synthetic gases, and waste. Other information such as greenhouse gas global warming potentials; units and conversions; and scope 3 emission factors is also provided.

The following activity provides you with the opportunity to estimate an energy and emissions footprint utilising a set of activity data and relevant factors.

Activity 5 – Calculating your footprint

This activity requires you to conduct a brief inventory building exercise and calculate the emissions from several emissions generating activities at a hypothetical organisation. Activity data is provided below with emissions factors provided on the following page. Emissions should be calculated by facility, activity and scope.

Activity data for the 2009/10 financial year

Activity	Facility	
	Civic centre	Depot
Stationary fuel combustion (ULP)	No stationary fuel combustion reported	5,000 Litres of ULP consumed in generators used for maintenance work.
Fleet fuel (ULP)	30,000 Litres of ULP consumed in 30 staff vehicles during the period.	No unleaded fuel consumption reported
Fleet fuel (Diesel)	5,000 Litres of Diesel consumed in 10 staff vehicles.	45,000 Litres of Diesel consumed in Depot trucks and machinery (sweepers, diggers, garbage trucks).
Natural Gas combustion	5,000 MJ Gas consumed for heating and kitchens	No natural gas consumption reported
Fugitive emissions (A/C)	5 major air-conditioning systems each with 100kg charge of R22 refrigerant gas.	2 major air-conditioning systems each with 50kg charge of R134a
Electricity consumption	120,000 kWh electricity consumed	60,000 kWh electricity consumed
Waste	1 x 1.5m ³ general waste skip collected fortnightly	1 x 1.5m ³ general waste skip collected fortnightly

Energy content and emissions factors

Fuel combustion emission factors – liquid fuels for stationary energy purposes

Fuel combusted	Energy content factor (GJ / kL)	Emission factor kg CO ₂ -e / GJ
Unleaded petroleum	34.2	67.1

Source: National Greenhouse Accounts (NGA) Factors July 2010, Table 3, p. 15

Fuel combustion emission factors – fuels used for transport energy purposes

Fuel combusted	Energy content factor (GJ / kL)	Emission factor kg CO ₂ -e / GJ
Unleaded petroleum	34.2	69.6
Diesel	38.6	69.9

Source: National Greenhouse Accounts (NGA) Factors July 2010, Table 4, p. 17

Emissions factor for the consumption of natural gas

Fuel combusted	Emission factor kgCO ₂ -e / GJ
Natural gas distributed in a pipeline	51.33

Source: National Greenhouse Accounts (NGA) Factors July 2010, Table 2, p. 13

Global Warming Potential and default annual leakage rates of refrigerant gas

Equipment type	Gas type	Global Warming Potential	Default annual leakage rate of gas (Hydrofluorocarbons)
Commercial air conditioning - chillers	R22	1,700	0.09
	R134a	1,300	

Note - Global Warming Potential (also known as GWP) is defined in the Glossary published by the UNFCCC as an index representing the combined effect of the differing times greenhouse gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation. *Note 2* The Global Warming Potential figures in the above table are the figures published by the Intergovernmental Panel on Climate Change in *Climate Change 1995: The Science of Climate Change* (Cambridge, UK: Cambridge University Press, 1996). These GWPs are currently used by Governments for all international reporting under the UNFCCC. Source - National Greenhouse Accounts (NGA) Factors, June 2009.

Indirect (scope 2) emission factor for consumption of purchased electricity from the South Australian grid

State, Territory or grid description	Emission factor kgCO ₂ -e/kWh
South Australia	0.72

Source: National Greenhouse Accounts (NGA) Factors July 2010, Table 5, p. 19

Waste volume to mass and emission factors for total waste disposed to landfill by broad waste stream category

Waste stream	Volume-to-mass conversion factor	Emission factor (tCO ₂ -e / t waste)
Municipal solid waste	1.1 tonnes per m ³	1.0
Commercial and industrial waste	1.1 tonnes per m ³	1.1
Construction and demolition waste	1.1 tonnes per m ³	0.3

Source(s): National Greenhouse and Energy Reporting (Measurement) Determination 2008 as amended, p. 166; National Greenhouse Accounts (NGA) Factors July 2010, Table 43, p. 69

Emissions inventory for the 2009/10 financial year

- Complete the following table with both emissions (tCO₂-e) and energy consumption (GJ)

Activity	Civic centre		Depot		Total	
	Energy cons (GJ)	Emissions (tCO ₂ -e)	Energy cons (GJ)	Emissions (tCO ₂ -e)	Energy cons (GJ)	Emissions (tCO ₂ -e)
Stationary fuel combustion (ULP)	—	—	= 5 x 34.2 =171 GJ	=171 x 67.1 =11,474 kgCO ₂ -e =11.5 tCO ₂ -e	171 GJ	11.5 tCO ₂ -e
Fleet fuel (ULP)			—	—		
Fleet fuel (Diesel)						
Natural Gas combustion			—	—		
Fugitive emissions (A/C)	—		—	=2 x 50 kg r134a =100 x 1300 x 0.09 =11,700 kgCO ₂ -e =11.7 tCO ₂ -e	—	
Electricity consumption			=60,000 x 0.0036 =216 GJ	=60,000 x 0.72 =43,200 kgCO ₂ -e =43.2 tCO ₂ -e	216 GJ	43.2 tCO ₂ -e
Waste	—		—	=1.5 x 26 =39 m ³ x 1.1 =42.9 t x 1.1 =47.2 tCO ₂ -e	—	
Total						

Box 4 – Target audience

It is critical to consider your organisation's goals in reporting. Whether the results are made available internally, to external stakeholders/organisations, or to the public will need to be decided based on your council's unique needs. Where a report is made available to the public, extra care will need to be taken to ensure that the methods, factors and underlying assumptions have been presented in a transparent manner and the report is not misleading.

Further considerations are present where an organisation wishes to achieve carbon neutrality. These are discussed in chapter 9 of this workbook and section 6.4 of the *Local Governments and the National Carbon Offset Standard briefing paper (2010)*.

8. Creating an Emissions Management System

An Emissions Management System provides a framework for co-coordinating actions leading to ongoing GHG emission measurement, management and mitigation. The core of the system will be the Emissions Management Plan, which details the key actions that your council will pursue in order to maintain ongoing measurement and reporting. The Emissions Management Plan should also link to key organisational policies and procedures relating to all aspects of emissions measurement, management and mitigation.

Broadly, an Emissions Management System aims to:

- Provide a unified program for energy and emissions management ;
- Identify responsibility for data collection, reporting, training, reduction actions, etc;
- Identify goals;
- Provide a mechanism for monitoring and reporting progress;
- Maintain transparency and inventory quality; and
- Allow reporting to the community, key partners and other stakeholders on progress.

Emissions management follows from the measurement phase (as completed). Once an accurate picture of your council's emission profile is known, then the process of management begins. The act of managing emission causing activities, with a target of reducing energy consumption and emission outputs through the improvement of energy and material use efficiency, can be achieved in a financially sustainable manner by implementing actions or activities that reduce operational overheads while improving productivity. It extends from both internal activities to external activities, which are integrated across your supply chain. Ultimately, it is about understanding and incorporating carbon data and management processes into strategic corporate decision making.

Importantly the Emissions Management System should be used to guide your organisation moving forward with integrating energy and GHG emissions measurement, management and mitigation into core operational process and planning. The policies, targets, actions and procedures are required to be reviewed at least annually to ensure progress can be monitored and recognised actions can be reviewed for their effectiveness.

Under the NCOS organisations that calculate their carbon footprint and purchase offsets to become carbon neutral are required to develop an Emissions Management Plan and complete a

public disclosure statement. The Emissions Management Plan should demonstrate that appropriate systems are in place to monitor and reduce the greenhouse gas emissions associated with the organisation or product, and to purchase and retire carbon offsets. An Emissions Management Plan must identify:

- the greenhouse gas emissions attributable to the activities of an organisation (or specified part of an organisation) or product within a given period;
- an emissions reduction strategy including the emissions reduction measures undertaken and quantity of emissions reduced;
- the equivalent quantity of carbon offsets required to offset the remaining emissions attributed to the product or organisation for each reporting period;
- records required, and the process for establishing and maintaining those records, to ensure that the greenhouse gas emissions attributable to the product or organisation, and any changes in these, are recorded in a timely manner; and
- quality control practices in place to ensure data quality is maintained.

Utilising the systems approach favoured by ISO standards for environmental management and reporting, it is important to demonstrate that your council has appropriate measures in place to ensure that your approach to emissions management is robust and auditable. BalanceCarbon recommend the following components form part of a comprehensive Emissions Management System:

- Energy and Greenhouse Gas Emissions Steering Group (holding regular minuted meetings)
- Emissions Management Plan (including action plan)
- Public Disclosure Statement (endorsed by CEO or senior management)
- Greenhouse gas emissions or climate change policy
- Carbon Offset Policy
- Data Collection Procedure
- Inventory Quality and Internal Audit Procedure
- Staff Training Log

Once a reduction goal or carbon neutral target has been set, an organisation must determine the options for the most favorable mix of energy efficiency, renewable energy and carbon offsets. This requires a detailed examination of the cost and payback periods for each option as well as the social and political implications of a chosen path. The most important factor will be the ability of your organisation to accurately quantify the benefits of any mitigation activities and report on them in a transparent manner. You should also consider whether your chosen pathway is acceptable in line with the NCOS and related standards and guidelines.

9.2 Carbon Neutrality

The LGA 'Local Governments and the National Carbon Offset Standard Briefing Paper' deals in detail with the key considerations for a council considering or aiming to achieve carbon neutrality. According to NCOS requirements there are essentially four key requirements for organisations in achieving carbon neutrality.

To be carbon neutral commonly means that the net emissions associated with a product or an organisation's activities are equal to zero. For an organisation or product to become carbon neutral, it is generally accepted as best practice that an organisation would:

- 1. measure its carbon footprint;*
- 2. reduce emissions; and*
- 3. offset any residual emissions.*

Through this approach a company's investment in measurement of its carbon footprint can serve multiple goals. When greenhouse gas emissions are measured and reported, they are generally better managed.

Best practice also requires that an organisation make transparent to the public steps taken to measure, reduce and offset emissions so that any carbon neutral claims can be objectively assessed.

Reproduced from: National Carbon Offset Standard 2009, p. 1

9.3 Carbon offsets

The NCOS provides a comprehensive list of 'eligible offset units' for the purposes of voluntary carbon offsetting. Only the following may be used for the purposes of achieving carbon neutrality or making public carbon claims in line with the NCOS. The Government has reserved the right to amend eligible offset units as required to reflect carbon market developments both internationally and domestically. The list of eligible offset units will be reviewed regularly and is expected to change over time.

Organisations should voluntarily surrender and retire into a registry the equivalent number of eligible units to offset the total emissions associated with any product or organisation (or specified part of an organisation). Evidence of the retirement of eligible offset units needs to be reported by the organisation in line with their Emissions Management Plan.

Reproduced from: The National Carbon Offset Standard (NCOS) 2009, Section 3.1, p. 3 & Section 5.2, p. 14

The EPA Victoria has purchased a comprehensive fact sheet relating to the purchase of carbon offsets. Box 5 (below) outlines the key considerations from their checklist for purchasing carbon offsets.

Councils seeking further information on carbon offsets should consult the LGA SA briefing paper entitled '*Carbon Offsets and Local Government*' (29 October 2010).

Box 5 - Checklist for purchasing carbon offsets

Before investigating offsets

- Have you considered cost-effective avoidance and reduction opportunities within your business? Offset purchases should be used as one part of a business's carbon management strategy based on the Carbon Management Principles.
- What are your primary objectives for purchasing offsets? What level of certainty do you need so that you can credibly claim that you have achieved your carbon management objectives (for example, going carbon neutral)? Is reputational risk an issue?
- How constrained are you by offset costs? At present, offsets can range from less than \$10 up to \$55 per tonne of carbon dioxide equivalents.
- Do you have a preference for a certain type of project (such as renewable energy versus forestry) or project location (domestic versus international)? Are you looking for co-benefits from the projects, such as biodiversity benefits from Biosequestration or public or staff education benefits from the installation of new, energy-efficient technologies?

When investigating offset products

- Is it clear what you are being offered? For example, does the offset provider specify the source of the emissions reduction? Can you select credits from a specific project as opposed to receiving credits rising from an unspecified portfolio of projects?
- Can the offset provider demonstrate that the offsets meet your quality requirements? For example, would the project(s) have happened without the GHG offset market? Can they demonstrate that the same offsets are not sold to multiple buyers?
- In line with a recognised standard or regulation? Have the offsets been verified by a credible third party?
- Does the provider give additional information to buyers about climate change and the impact of greenhouse gas emissions? Does the provider offer information about other carbon management actions, such as avoiding and reducing your organisation's own emissions?

After purchasing offsets

- Continue to review your carbon management strategy. In most instances, onsite reductions are the most cost-effective way to achieve your organisation's goals or targets.
- Communicate your actions. Let your staff, stakeholders and customers know the steps you took to purchase your offsets. Be transparent about which standards or accreditation processes apply to the offsets purchased.

Adopted from: EPA Victoria 'Tips for purchasing carbon offsets', Publication number 1193, December 2007

9.5 The NCOS Carbon Neutral Program²

The National Carbon Offset Standard (NCOS) Carbon Neutral Program allows the Australian operations of organisations or Australian produced products to be certified under the Standard as carbon neutral.

Carbon neutrality commonly refers to a situation where the net emissions associated with an organisation or a product's activities are equal to zero through the acquisition and cancellation of carbon offsets that meet stringent criteria.

In line with best practice under the Standard, the following key actions must be undertaken for an organisation or a product to be certified carbon neutral under the NCOS Carbon Neutral Program:

- measure the carbon footprint of your organisation or product;
- monitor and reduce emissions (to the extent possible); and
- purchase and cancel sufficient eligible carbon offset units to offset the remaining emissions associated with the organisation or product.

Through this approach a company's investment in the measurement of its carbon footprint can serve multiple goals. When greenhouse gas emissions are measured and reported, they are generally better managed.

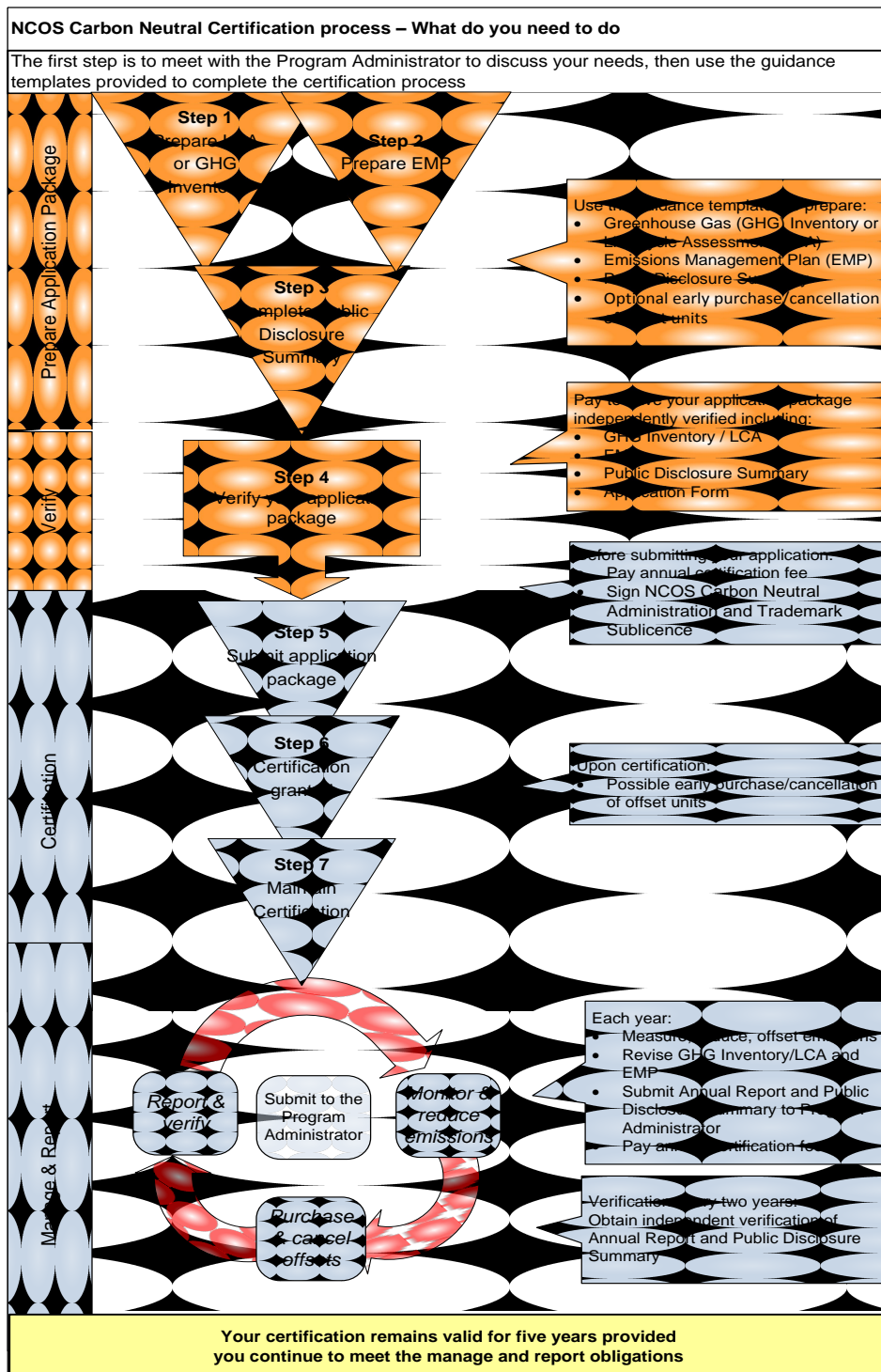
Best practice also requires that an organisation make transparent to the public steps taken to measure, reduce and offset emissions so that any carbon neutral claims can be objectively assessed.

Participating in the NCOS Carbon Neutral Program encourages best practice to measure, reduce and offset the greenhouse gas emissions associated with the carbon footprint of your organisation or product. The key phases associated with participating under the Standard are preparing an application package, verifying and certifying your claims, and managing and reporting your emissions.

The key steps outlining what you need to do are represented below:

² Reproduced from the Australian Government Department of Climate Change & Energy Efficiency, Carbon Neutral Program Guidelines, Version 1.0, 1 July 2010

Figure 4: Process for achieving NCOS Carbon Neutral Certification



Source: Australian Government Department of Climate Change & Energy Efficiency, Carbon Neutral Program Guidelines, Version 1.0, 1 July 2010, p. 2

10. Verification

In order to add credibility to your organisation's emissions inventory and/ or emissions management actions, some form of third party verification is recommended. This can be spread across the data collection, emissions estimates, mitigation actions, and progress towards targets or simply focused on one specific component of the emissions measurement and management approach. Verification is particularly important where the results of measurement and management activities will be communicated outside of the organisation and/or completed in line with a relevant standard. The NCOS states that:

A robust and transparent audit model is fundamental to provide confidence in offset projects and carbon neutral claims. Independent audit validates the eligibility and robustness of offset project methodologies, the amount of emissions reductions offset projects achieve, and the accuracy and completeness of carbon footprint calculation. Audits of offset methodologies, projects and carbon footprint calculation required under the NCOS should be undertaken by a suitably qualified auditor.

According to the NCOS, suitably qualified auditors may include individuals or bodies that:

- (a) Are registered under the greenhouse and energy audit framework currently being established by the Department of Climate Change for the NGER Act and CPRS;
- (b) Have demonstrated knowledge and expertise in the relevant Australian and international standards, specifically AS ISO 14064 and ISO 14040 series; or
- (c) Are accredited to the international standard ISO 14065:2007 or recognised international standards based on ISO 14040.

Once offset projects are established or carbon neutrality is achieved for an organisation or product, emissions reductions and offsetting activities should be reported and independently audited on a regular basis. Audited progress reports should be made publicly available.

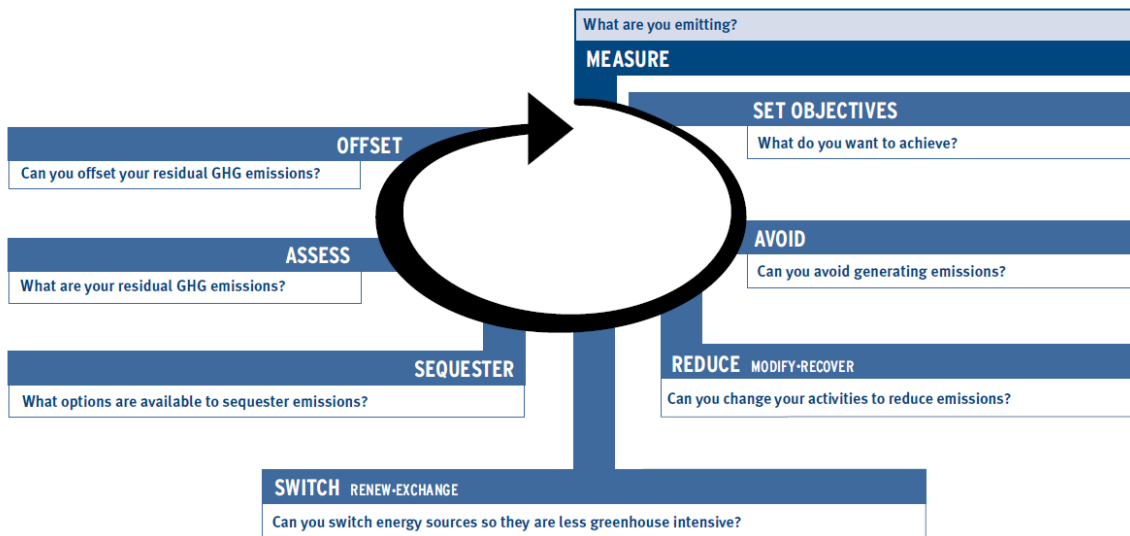
Project proponents and organisations making carbon neutral claims are responsible for having activities independently audited and bearing the associated costs. Appropriate records must be maintained to allow emissions reductions and carbon neutral claims to be audited.

Reproduced from: The National Carbon Offset Standard, p. 16

11. Continual Improvement

Overall, the process of measuring your organisation's energy and emissions then setting policies, strategies and actions to mitigate your impact on climate change is a continuing process. Inventory analysis is undertaken on a periodic (usually yearly) basis with progress towards targets assessed using the base year as an indicator of performance. As with any management system, the key is to be able to demonstrate that you have effective measures in place to record information and monitor progress. This facilitates accurate and transparent reporting whilst enabling the organisation to demonstrate improvement.

Figure 5: The principles of carbon management



Source: EPA Victoria, EPA Discussion Paper – Draft Carbon Management Principles, 2007, p. 4

In conjunction with the LGA SA Emissions Measurement and Management training course, this workbook has stepped through a comprehensive approach to corporate transition. The process begins with the measurement of resource inputs and outputs from a defined boundary. Energy consumption is then calculated with emissions estimated using relevant factors. Once the size and dynamic of the emissions profile is known, the organisation can begin the process of setting goals and implementing actions to reduce emissions. The success of such actions is continually monitored with the results verified. Unavoidable emissions can be offset using eligible offset units and carbon neutrality can be pursued. The process cycles back to measurement after a specified period when emissions must again be quantified.

12. Further information

Further information relating to each section of this workbook, the one-day training course content, and the LGA briefing paper can be sourced via the following organisations, websites and reports. Please contact BalanceCarbon if you require any further assistance.

Bureau of Meteorology

<http://www.bom.gov.au/climate/change/>

The Bureau of Meteorology is Australia's national weather, climate and water agency. Among other services, the Bureau's provides decision makers and the general public with accurate observations and information about our changing climate.

Carbon Offset Guide Australia

www.carbonoffsetguide.com.au

Developed through a partnership between EPA Victoria and Global Sustainability at RMIT the Carbon Offset Guide is intended to be a resource for businesses, government agencies, **NGO** organisations and individuals seeking information about offsets.

The *Climate change in Australia* report

www.climatechangeinaustralia.gov.au

Climate change in Australia is based upon international climate change research including conclusions from the IPCC's fourth assessment report. It also builds on a large body of climate research that has been undertaken for the Australian region in recent years.

Climate change in Australia provides essential tools for government, industry and the community to understand the likely magnitude of climate change in Australia and the possible impacts.

Commonwealth of Australia Law (ComLaw)

www.comlaw.gov.au

ComLaw provides the full suite of National Greenhouse and Energy Reporting Act 2007 legislation free to the public.

Department of Climate Change and Energy Efficiency

www.climatechange.gov.au

The department is charged with leading the development and coordination of Australia's climate change policies. Links to freely download information about climate change, relevant guidelines, legislation and more are all provided at the website address listed above.

The Greenhouse Gas Protocol Initiative

www.ghgprotocol.org

The Greenhouse Gas Protocol (GHG Protocol) is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas

emissions. The following standards are freely available at the above website along with a number of other tools and resources:

- The GHG Protocol Corporate Standard
- Product Life Cycle Accounting and Reporting Standard (draft)
- Scope 3 Accounting and Reporting Standard (draft)

References

- Department of Climate Change and Energy Efficiency, Carbon Neutral Program Guidelines, Version 1.0, 1 July 2010
- Department of Climate Change and Energy Efficiency, NGER Legislation Framework (Online), Available: <http://www.climatechange.gov.au/government/initiatives/national-greenhouse-energy-reporting/reporting-legislation.aspx> [12 May 2010]
- EPA Victoria 'Tips for purchasing carbon offsets', Publication number 1193, December 2007
- EPA Victoria Worksheet – Calculating your greenhouse gas emissions from paper, February 2009
- National Greenhouse and Energy Reporting (Measurement) Determination 2008 (NGER (Measurement) Determination)
- National Greenhouse Account Factors, June 2009
- The Local Government Association of South Australia Briefing Paper – Local Governments and the National Carbon Offset Standard, April 2010
- The National Carbon Offset Standard (NCOS) 2009
- WRI/WBCSD, The Greenhouse Gas Protocol, Revised Edition (2001)
- WRI, Working 9 to 5 on climate change: An office guide (2001)