

**THE BUSINESS GUIDE TO THE
LOW CARBON ECONOMY:**

QUEENSLAND

PARTNERS, FUNDERS AND SPONSORS

The Business Guide to the Low Carbon Economy:

Queensland would not have been possible without the contributions of a number of key organisations.

In particular, The Climate Group would like to recognise Arup, a Climate Group member and equal partner in this endeavour. Arup provided extensive support in creating this publication, including dedicated expert staff from Arup's sustainability team.

ABOUT THE CLIMATE GROUP

The **Climate Group** is an independent, non-profit organisation that works with government and business leaders to accelerate the transition to a low carbon economy. The Climate Group was founded in 2004 and has offices in the United Kingdom, the United States, China, India and Australia.

THE CLIMATE GROUP

↳ www.theclimategroup.org

ABOUT ARUP

Arup is a global firm of designers, engineers, planners and business consultants providing a diverse range of professional services to clients around the world. Our innovative and fully-integrated approach brings our full complement of skills and knowledge to bear on any given design problem. We exert a significant influence on the built environment and are the creative force behind many of the world's most innovative and sustainable designs. Our firm has over 10,000 staff working in 92 offices in more than 37 countries. At any one time, we have over 10,000 projects running concurrently.

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FUNDERS

This publication has been developed by The Climate Group with funding from the Queensland Department of Employment, Economic Development and Innovation (DEEDI) and the Department of Environment and Resource Management (DERM). The information, opinions and recommendations expressed in this publication are not necessarily those of the Queensland Government and do not necessarily represent the Queensland Government's policy. To the extent permitted by law, the Queensland Government (including its employees and consultants) excludes all liability to any person for any consequences, including but not limited to all losses, damages, costs, expenses and any other compensation, arising directly or indirectly from using this publication (in part or in whole) and any information or material contained in it.



The Climate Group would like to acknowledge the Dutch National Postcode Lottery for their ongoing support of The Climate Group which helped to make this publication possible.



CONTENTS

FOREWORD FROM THE PREMIER OF QUEENSLAND	1
MESSAGE FROM THE AUTHORS	2
HOW TO USE THIS GUIDE	3
INTRODUCTION	4
GREENHOUSE GASES 101	6
THE NATIONAL APPROACH TO TACKLING CLIMATE CHANGE	7
EXAMPLES OF SUPPORTING STATE POLICIES	8
HOW WILL BUSINESSES BE AFFECTED?	12
TAKING ACTION	14
Overview	14
Step 1. Establish a baseline	15
Step 2. Reduce emissions	22
Scope 1 – Direct emissions	25
Scope 2 – Indirect emissions from purchased electricity	27
Scope 3 – Other indirect emissions	34
Step 3. Purchase offsets	37
Reporting	42
TAKING LEADERSHIP	44
GLOSSARY	46
RESOURCES	48
END NOTES	



FOREWORD FROM THE PREMIER OF QUEENSLAND

Climate change is much more than an environmental issue – it's also a major issue for business. For the first time from July 2011, many parts of the Australian economy will be subject to a carbon price under the Commonwealth Government's Carbon Pollution Reduction Scheme (CPRS).

The introduction of a domestic carbon price under the CPRS will have consequences for the way in which all Queenslanders do business – increasing the cost of emissions-intensive electricity and other inputs and influencing the attitudes of customers. That is why I want Queensland businesses to continue taking a lead role on developing and implementing practical and innovative measures to reduce emissions and secure sustainable low carbon growth and development for our economy.

As the highest greenhouse gas emitter in the country in both absolute and per capita terms, Queensland has much to gain from early action on climate change and forging new opportunities for all sectors of our economy. Our population is the most dispersed in the nation and growing the fastest. Our industries and our households are energy intensive and emissions from land clearing alone continue at a high level compared with other states.

Our state derives great economic benefit from our vast reserves of coal. We are committed to ensuring the coal industry has a sustainable future through major public-private partnerships such as the \$900 million A21 Coal Fund to develop carbon capture and

storage technologies. Huge reserves of gas in Australia can initially support the transition from our current dependency on coal as an energy source.

However, Queensland is no longer just about traditional energy resources like coal and gas. We have huge potential to unlock new and emerging renewable energy resources like solar, geothermal, wind and hydro. Under the Queensland Renewable Energy Plan the Queensland Government is broadening our renewable energy agenda to expand and accelerate action on cleaner energy futures.

ClimateQ, Queensland's revised climate change strategy has produced a suite of new initiatives and investments to take Queensland's long-term response to climate change into a new phase. Critically, the new Strategy complements the CPRS and the national Renewable Energy Target (RET) by supporting industry and households to begin preparations for higher energy costs.

There are a range of initiatives under ClimateQ to support industry transition to the low carbon economy. Our Carbon Outlook study into the effects of a carbon price on Queensland small-to-medium businesses will provide important direction to the \$15 million ClimateSmart Business Service, which is currently under design and will commence in July 2010.

The *Queensland Business Guide to the Low Carbon Economy* is just another example of how we are working to provide Queensland businesses with the information they need to adapt to the CPRS.

It will arm businesses with the knowledge they need to move forward, provide strategies on how to filter information and determine how they fit into the overall picture on climate change. This knowledge transformation will stimulate employment and jobs growth in the state.

Of course, the government will continue to work with businesses large and small on this crucial issue. We are actively working with the Commonwealth to ensure that the CPRS doesn't unnecessarily disadvantage our larger industries which may have a direct emissions liability under the scheme and strengthen opportunities for emerging low-carbon industries.

This *Queensland Business Guide to the Low Carbon Economy* is only possible with the hard work from The Climate Group and I would like to take this opportunity to thank them for their contribution.

I hope you find this Guide a useful introduction to what the low carbon economy means for business, and a gateway to government programs that can assist you to begin making changes. Together, we can make a difference.



Anna Bligh, MP

Premier of Queensland and Minister for the Arts.

MESSAGE FROM THE AUTHORS

Whether it is rising global temperatures or rising energy and fuel costs that motivate our actions, the need to make changes in our business decisions and our economy is increasingly urgent. Queensland has one of the highest levels of greenhouse emissions per capita in the world, and is an energy intensive economy. The introduction of a national Carbon Pollution Reduction Scheme will set new greenhouse gas emissions reduction goals, directly or indirectly affecting every business and citizen of the state.

Business as usual will no longer be business as usual. While energy and fuel prices are likely to go higher, by taking action now, businesses can reduce greenhouse gas emissions and save money at the same time. The future holds both risks and opportunities. Businesses should begin considering how rising sea levels, changing weather patterns and future regulatory requirements might impact their present and future value. Business opportunities will grow for those providing goods or services that enable energy efficiency, provide renewable energy, mitigate climate impact or help others adapt to a changing world.

Economic analysis by the Australian Conservation Foundation and the ACTU¹ predicts that 112,000 jobs and \$23.2 billion in production activity will be generated by introducing strategies to position Australia as a leader in low-carbon markets. Companies in sectors whose emissions are capped will need to implement cost-effective greenhouse gas reduction measures, but other businesses will also benefit from introducing measures that reduce their greenhouse gas emissions.

As outlined in this report, the Queensland Government is assisting business to address this issue with a host of policies and programs.

As businesses large and small are realising that there is significant opportunity in this emerging low carbon economy, too many are struggling to understand what they need to do to save money on energy costs, capitalise on incentives, prepare for new regulations and reduce their climate impact.

The Climate Group and Arup have collaborated on *The Business Guide to the Low Carbon Economy* to provide businesses with an introduction to Queensland's greenhouse gas emissions reduction policies and a practical description of steps businesses can take, whether they are just beginning to consider these issues or have been working on them for some time.

This document is designed to help businesses prioritise strategies as they determine the best mix of abatement, efficiency and offsetting measures. The Business Guide includes case studies and information specific to Queensland so that Queensland businesses can evaluate their situation and develop appropriate measures to reduce greenhouse gas emissions while saving money at the same time.

The Climate Group and Arup are proud to deliver this collaborative effort. We hope this document will assist businesses in meeting the challenge of global warming and inspire many to become climate action leaders.



Rupert Posner,

Australian Director, The Climate Group



Cathy Crawley,

Australasian Sustainability Business Group Leader, Arup

HOW TO USE THIS GUIDE

Who is this guide for?

While sections of this document are applicable to a wide range of audiences, it specifically seeks to provide Queensland businesses with a background in climate policy and preliminary guidance on measuring and reducing greenhouse emissions, and claiming carbon neutrality. It has been developed to be useful to any size of company, type of operation or sector. It provides a good starting point for any organisation—whether at the beginning, middle or end of the process of managing greenhouse emissions. Readers with more detailed questions on their business' unique climate impacts can use the references in this document for further research.

Accessing the most relevant information

This guide walks through Queensland climate change policy and issues that a business needs to consider when developing a climate strategy, including a framework for managing greenhouse emissions, case studies, useful terms and information on government efforts to support business in this process. The Resources Section at the end of the Guide provides web addresses for all internet resources referred to in the Guide, presented in the order they appear and listed by section heading. Some additional links are also provided in the Resources Section under 'Other', within the main section headings.

If a word or phrase is underlined and preceded by a (↗) it is a hyperlink and the full web address is listed in the Resources Section at the end of this guide.

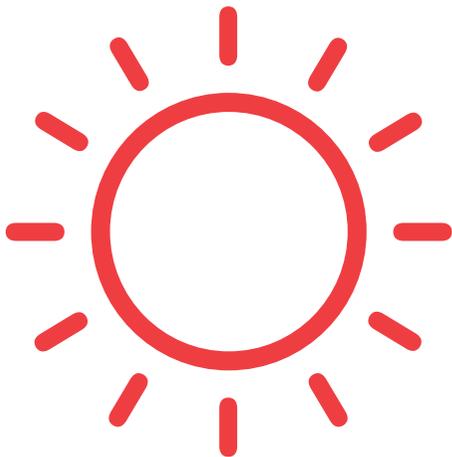
It is designed so that readers can easily refer to those sections that are most relevant to them, depending on where they are in the process. It should serve as a reference tool and can be read in any order, although the steps recommended in the “Taking Action” Section should be followed in order (outlined on p13).

Case studies are provided throughout to highlight some of the ways businesses in Queensland have undertaken the steps outlined in the Guide. The case studies are arranged according to these steps.

“As the highest greenhouse gas emitters in the country in both absolute and per capita terms, Queensland has much to gain from early action on climate change and forging new opportunities for all sectors of our economy.”

Anna Bligh, MP

Premier of Queensland and Minister for the Arts.



INTRODUCTION

Global warming was officially recognised as a problem in 1988, when the World Meteorological Organisation and the United Nations Environment Program established the [UN Intergovernmental Panel on Climate Change](#) (IPCC). The IPCC brings together thousands of scientists from around the world to provide a comprehensive and impartial view of the science of and solutions to climate change.

The results of the first IPCC Assessment Report in 1990 provided the basis for the Rio Earth Summit in 1992, which led to the formation of the [UN United Nations Framework Convention on Climate Change](#). The mounting scientific evidence highlighting the potential perils of climate change led national policy leaders to craft an international climate action treaty at a conference of policy leaders in Kyoto, Japan, in 1997.

In 2007, the IPCC concluded that “warming of the climate system is unequivocal” and that there was a greater than 90 per cent probability that most of the warming we’ve seen since the mid-20th century had been caused by human activity—primarily fossil fuel combustion and changes in land use, such as deforestation².

The emerging consensus is that to avert some of the most serious impacts of global warming, global emissions must stop rising by 2020 and then decline to at least 50 per cent below 1990 levels by 2050.*

Delays in cutting emissions will increase the risk of more severe climate change impacts and also dramatically increase the cost of both cutting emissions and dealing with climate-related damages. The 2006 [UN Stern Review on the Economics of Climate Change](#), by Sir Nicholas Stern, head of the UK Government’s Economic Services and former Chief Economist of the World Bank, found that if no action is taken to control greenhouse emissions “the overall costs and risks... will be equivalent to losing at least five per cent of global GDP each year, now and forever³”. Similar analysis by Australian economist Ross Garnaut in the [UN Garnaut Climate Change Review](#), leads the author to conclude that “on a balance of probabilities, the failure of our generation on climate change mitigation would lead to consequences that would haunt humanity until the end of time”.

It is clear that we must take urgent and decisive action now to drive down greenhouse gas emissions. The good news is that the emissions reductions required can be achieved at a reasonable cost while producing significant benefits for business and society. A 2008 report by the



International Energy Agency estimated that an annual investment of 1.1 per cent of global GDP would be enough to cut worldwide emissions in half by 2050⁴. And, much of the needed investment can be from the redirection of money that would otherwise go into fossil fuel production. In fact, a large portion of what we need to do can be achieved at a net profit. A McKinsey & Company study estimated that fully 35 per cent of the emissions reductions we need to achieve in Australia will actually save money⁵.

* For more information on required international solutions, see The Climate Group’s *Breaking The Climate Deadlock* report and expert briefing papers at www.theclimategroup.org/index.php/special_projects/breaking_the_climate_deadlock/

INTRODUCTION

Nations, states, regions and businesses that are proactive on climate change will enjoy substantial competitive advantages in the future. Achieving a low-carbon economy will create significant advancements and opportunities in technology, process and know-how*.

A new low carbon economy is emerging. Players include businesses of all sizes, government contractors, energy providers, venture capitalists, public sector entities, shareholders, developers of new low carbon solutions and consumers.

The Queensland Government continues to show leadership in its work with the Australian Government to develop policies to reduce greenhouse emissions in areas where state governments are better placed to act. One policy area where this is particularly the case is in assisting businesses and communities adapt to the unavoidable impacts of climate change. That said, many policies that assist businesses to reduce emissions, such as encouraging energy efficiency improvements, will also help them adapt, by reducing the effect of rising electricity prices.

An undertaking of this scale requires every individual, public sector entity and private sector business to make urgent and substantial progress in reducing their emissions. Businesses can take action now by:

- Anticipating rising fuel and energy prices by implementing a comprehensive program to reduce energy and fuel use
- Identifying sources of greenhouse emissions and taking steps to reduce them
- Engaging with government programs designed to assist businesses with their carbon management
- Responding to requirements which will either affect them, their customers or suppliers
- Proactively addressing consumer and investor interest in and demand for transparency and climate-friendly products and services

Businesses that take action now stand a greater chance of being competitive than those who wait, because being on the front foot in an evolving environment has always made business sense.

Queensland Government – Carbon Neutral Office Buildings

The role of the Queensland Government is not only to support community and business to meet the challenges and opportunities associated with climate change, but to also lead by example through reducing its own carbon footprint. The Queensland Government has committed to making all of the office buildings it owns carbon neutral by 2020. Between 2006-2007, operating Queensland Government buildings accounted for more than a million tonnes of CO₂e.† New office buildings and major renovations will target a 5 star (out of 5) energy performance target. In addition to office buildings, the Government will invest \$8 million to reduce energy consumption and greenhouse gas emissions through the retrofit of other government buildings such as schools, hospitals, police stations and public housing.

*The University of Sydney, Centre for Integrated Sustainability Analysis News Limited one Degree Program for NSW and ACT

†ClimateQ: toward a greener Queensland

GREENHOUSE GASES 101

There are six main greenhouse gases that contribute to climate change*: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆). These gases differ in their ability to trap heat in the atmosphere, so each gas' "Global Warming Potential" (GWP) is used to compare these abilities relative to CO₂. Carbon dioxide has a GWP of exactly 1 since it is the baseline unit to which all other greenhouse gases are compared. Table 1 outlines the GWPs of the six gases. For simplicity, the mass of each gas emitted is commonly translated into a carbon dioxide equivalent (CO₂e) by multiplying by the gas' GWP. "Carbon" has become a buzzword, but understanding the breadth of the term is important.

"Carbon" is now often used interchangeably with "carbon dioxide" as well as CO₂e, although it is not technically equivalent to either.†

Where do greenhouse emissions come from?

Producing electricity is a major source of greenhouse emissions because most electricity is made by burning fossil fuels, which produces carbon dioxide. Fuels used in cars, trucks and buses are another major source of greenhouse emissions.

Other sources include deforestation and forest fires (CO₂), waste in landfills (methane), air conditioning systems (HFCs) and electrical transmission and distribution (SF₆).

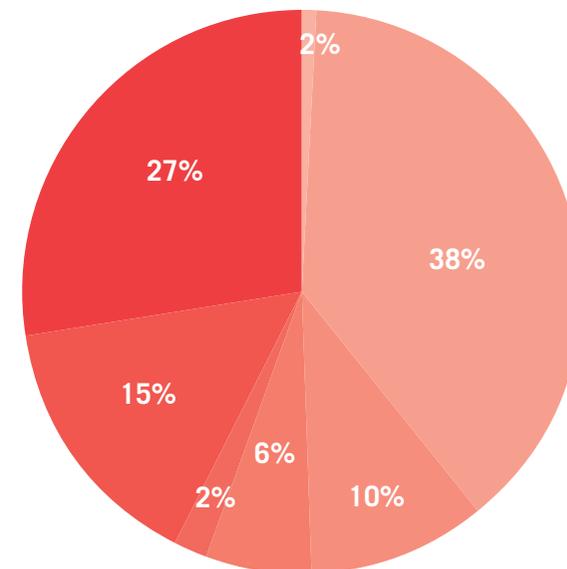
In order to obtain a fuller picture of these emissions it is important to understand the drivers and energy end users (indirect emissions from use or purchase of a product). For example, it is estimated that 23 per cent of Queensland's energy consumption is attributable to manufacturing and 24 per cent to transport and storage.

Table 1 - Global warming potential of the six Kyoto defined greenhouse gasses

Greenhouse Gas	GWP
Carbon Dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous Oxide (N ₂ O)	310
HFCs	140-11,700
PFCs [§]	7,850
Sulfur Hexafluoride (SF ₆)	23,900

[§]This figure is an average for the two PFCs: CF₄ and CF₂F₆

Figure 1 - Where do Queensland's emissions come from?



Queensland Emissions: 181.6 million tonnes in 2007

Stationary energy	38%
Transport	10%
Fugitive emissions	6%
Industrial processes	2%
Agriculture	15%
Land use, land use change and forestry	27%
Waste	2%

Source: DCC, 2009

*As defined by the Kyoto Protocol.

†For measurement purposes, one tonne of carbon equals 3.67 tonnes of carbon dioxide.

THE NATIONAL APPROACH TO TACKLING CLIMATE CHANGE

Australia's ratification of the Kyoto Protocol in December 2007 signalled our intention to be part of international efforts to deal with climate change. The Australian Government has committed to emissions reductions of 60 per cent on 2000 levels by 2050 and between 5-25 per cent by 2020, depending on the outcome of international negotiations in Copenhagen at the end of 2009⁸.

The Australian Government is leading a national approach to climate change policy through the Council of Australian Governments. It is introducing the following policies:

- **↘ The Carbon Pollution Reduction Scheme (CRPS)**
a national emissions trading scheme, which will be the main driver of emissions reductions.
- **↘ Expanded Renewable Energy Target Scheme (RET)**
a market incentive to accelerate uptake of renewable energy sources to ensure that 20 per cent of Australia's electricity comes from renewable sources by 2020.
- **↘ National Greenhouse and Energy Reporting Act (NGER)**
introduces a single national reporting framework requiring certain companies to report greenhouse emissions, energy production or energy use at or above specified thresholds.

- **↘ Energy Efficiency Opportunities Act (EEO)** encourages large energy-using businesses to improve their energy efficiency. It does this by requiring businesses to identify, evaluate and report publicly on cost effective energy savings opportunities.
- **↘ Clean Business Australia Fund** - a partnership with Australian business and industry for tackling climate change, the fund will support a range of activities aimed at improving the energy and water efficiency of business operations and increasing sustainability, with a focus on productivity and innovation.
- **↘ Clean Energy Initiative** - supports the research, development and demonstration of low-emission energy technologies, including industrial scale carbon capture and storage (CCS) and solar energy. The flagship funding is expected to create an overall clean energy investment exceeding \$10 billion.

On page 10 is a timeline illustrating the implementation of these key national initiatives. The Government is still evaluating the specific steps that will be used to reach the mandated goals. The information on the following pages is the latest available when this publication went to print. You can track new developments by visiting the Government's website at

↘ <http://www.climatechange.gov.au>

Queensland and the Australian Government

The Queensland Government has a strong track record of leadership on climate change, and has committed to doing its part in meeting the national target of a 60 per cent reduction in greenhouse gas emissions below 2000 levels by 2050.

Queensland works closely with the Australian Government and other state and territory governments to coordinate efforts to tackle climate change through the Council of the Australian Governments (COAG). Queensland launched its first climate change strategy, ClimateSmart 2050, in July 2007 which provided \$1.4 billion in investments.

In August 2009, the Queensland Government launched its updated climate change strategy, **↘ ClimateQ: Toward a greener Queensland**. The \$196 million ClimateQ strategy consolidates and updates the approaches taken in ClimateSmart 2050 and sets out the next crucial steps in Queensland's response to climate change.

ClimateQ takes into account the latest national and international science and policy, including the findings of the 4th Assessment Report from the Intergovernmental Panel on Climate Change, Australia's own Garnaut Review and the Commonwealth's modelling of carbon pricing, which Queensland Treasury contributed to. Importantly, ClimateQ complements the Commonwealth's CPRS and the national Renewable Energy Target by starting to prepare key economic sectors for the future and encourage emissions reductions at least cost to the economy.

EXAMPLES OF SUPPORTING STATE POLICIES

The following are examples of key Queensland climate change policies:

Energy Efficiency and Business

The Queensland Government has been working with 50 firms to assist them in transitioning to a low carbon economy as part of the **Carbon Outlook Project**.

This will assist industry to better understand the risks and opportunities associated with the CPRS. Refer to (p36) for further detail.

The **ClimateSmart Business Service** will assist Queensland's Small and Medium Enterprises (SMEs) in reducing their emissions and preparing for higher energy and other input costs following the introduction of the CPRS. Designed specifically for SMEs, the Service will be similar to the ClimateSmart Home Service, which has been helping households reduce their emissions.

Broadly, the \$15 million ClimateSmart Business Service will provide:

- Information on what the proposed CPRS means for business in terms of energy and supply chain costs
- A plan to manage a business' carbon exposure which outlines short, medium and long-term opportunities to lower energy use and waste
- An energy savings tool or product to complement the plan and help realise quick gains
- Links into other government and industry programs that can continue to help companies become more 'lean and green'

Further details of the Service will be developed in consultation with key industry stakeholders. The Service is due to commence in July 2010.

A vocational education and training Sector and Sustainability Policy and Action Plan will be developed as part of the **Skills Development for the Low Carbon Economy** to meet the green skilling and workforce development needs of industries and individuals. The training will be delivered through private training providers and TAFEs to apprentices, trainees and existing workers through a mix of public, individual and industry funding.

The Queensland Government will partner with industry as part of the **Reducing Green Tape for Business** initiative to explore ways to streamline regulations covering energy, water and pollutants, and simplify state reporting requirements. The aim will be to reduce the regulatory burden on business, and increase the uptake of efficiency measures that lower greenhouse gas emissions and save money.

A new legislative initiative, the **Queensland Smart Energy Savings Program** (SESP) has been introduced through the *Clean Energy Act 2008*. The program aims to drive energy saving improvements in large Queensland businesses that do not report under the Energy Efficiency Opportunities Program.

The SESP will require participating businesses to undertake an energy audit, develop an energy savings plan and publish a public commitment outlining the actions to be undertaken and to update this annually.



EcoBiz is a partnership program between the State Government and Queensland business and industry. The program guides businesses and industry to develop an understanding of their environmental impact and identify financial and environmental benefits which can be attained from waste, water and energy initiatives.

Benefits of the program include:

- Measurement of a firm's footprint including greenhouse gas emissions, energy, water, material and waste.
- A recognised EcoBiz Partner symbol for marketing purposes
- The potential for a 10 per cent discount on fees for EcoBiz Partners who are licensed under the *Environmental Protection Act (1994)*
- The potential for publicity through the EcoBiz e-bulletin, case studies and industry presentations
- Opportunities to network with other businesses undertaking sustainability initiatives

The top 50 EcoBiz partners are collectively achieving Greenhouse Gas emission savings of more than 31,000 tonnes annually. The top 50 EcoBiz partners are also achieving average savings of 30 per cent water, 50 per cent waste reduction and average financial savings of \$45,000 annually.

EXAMPLES OF SUPPORTING STATE POLICIES

Large firms (consuming between 100-500Tj of energy) will be required to participate in the SESP from 2009-2010. This threshold will be lowered over time, requiring more companies to participate in SESP.

The **↘ Queensland Sustainable Energy Innovation Fund** (QSEIF) assists the development of technologies that reduce water and energy consumption with an associated greenhouse gas emissions reduction. Since QSEIF commenced in 1999, \$8.9 million has been committed across 77 projects.

The QSEIF was instrumental in supporting a series of Queensland start-up companies such as Xerocoat, Biolytix, Redflow, Tritium and Polyoptics. Many of these companies are now world leaders in their environmental technology markets.

↘ ClimateSmart Business Clusters guide groups of businesses to improve their environmental performance through better eco-efficiency while also achieving cost savings in energy, water and waste.

There are more than 28 clusters with 455 businesses currently working together across Queensland covering a range of business groups including organisations in areas such as supply chain and logistics, retail, manufacturing, medicine, and hospitality.

The Queensland Water and Energy Sustainable Technology Network (**↘ QWESTNet**) is an initiative connecting Queensland business with sustainable technologies through a series of targeted information and networking forums.

The forums focus on both technology and industry sectors and participants have the opportunity to hear technology presentations, case studies and participate in networking opportunities.

↘ ClimateSmart Retail provides partnering stores with information that will help you compare the environmental performance and running costs of the products you're looking to buy. It also provides retailers with the expertise they need to help customers make the most well-informed, eco-efficient product choices.

Renewable Energy

About 6 per cent of Queensland's total electricity generation capacity is powered by renewable energy sources, primarily biomass, hydroelectricity, solar hot water systems and small amounts of wind, solar photovoltaic and geothermal sources. In 2009, the government launched the **↘ Queensland Renewable Energy Plan** to increase the deployment of renewable energy infrastructure in Queensland by helping industry maximise investment under the national 20 per cent renewable energy target.

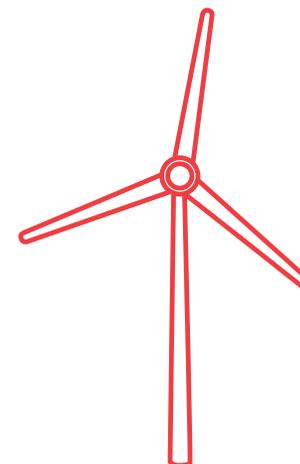
The Plan includes a suite of initiatives such as the **↘ Queensland Solar Hot Water Program** that aims to substantially increase the installation of 200,000 affordable solar hot water systems in Queensland.

Other initiatives include regulatory reform and resource mapping to support deployment in the areas of the best solar thermal, wind and geothermal resources.

To increase the uptake of solar photovoltaic systems, the Queensland Government has introduced the **↘ Solar Bonus Scheme** which pays domestic and small energy customers (such as small business) for the surplus electricity generated from their roof-top solar photovoltaic systems.

The \$50 million **↘ Queensland Renewable Energy Fund** provides funding for the development and deployment of renewable energy generation technologies, including the new Birdsville Geothermal Power Station and Mackay's Sugar Cogeneration Plant.

Through the **↘ Solar Schools Program**, the Queensland Government will be working with the Australian Government to deliver solar panels, smart meters and installation of energy efficient lighting measures to reduce energy consumption in primary schools. The program will also deliver curriculum programs to support teachers and students in energy management.



EXAMPLES OF SUPPORTING STATE POLICIES

Transport

Economic and population growth have contributed to a significant increase in the number of passenger vehicles on Queensland roads since 1990. The Government's new ClimateQ strategy provides \$60 million in investments aimed at reducing transport emissions associated with this growth.

The centrepiece of the strategy's transport initiatives is state-of-the-art computer-based transport management systems to better coordinate traffic flows on key roads and motorways in South-East Queensland to reduce congestion and lower emissions. Vehicles stuck in traffic congestion may produce up to 30% more emissions than those in free-flowing traffic.

Under the [FreightSmart](#) program the government will further reduce congestion, and emissions, by providing grants to industry to explore ways to streamline freight deliveries.

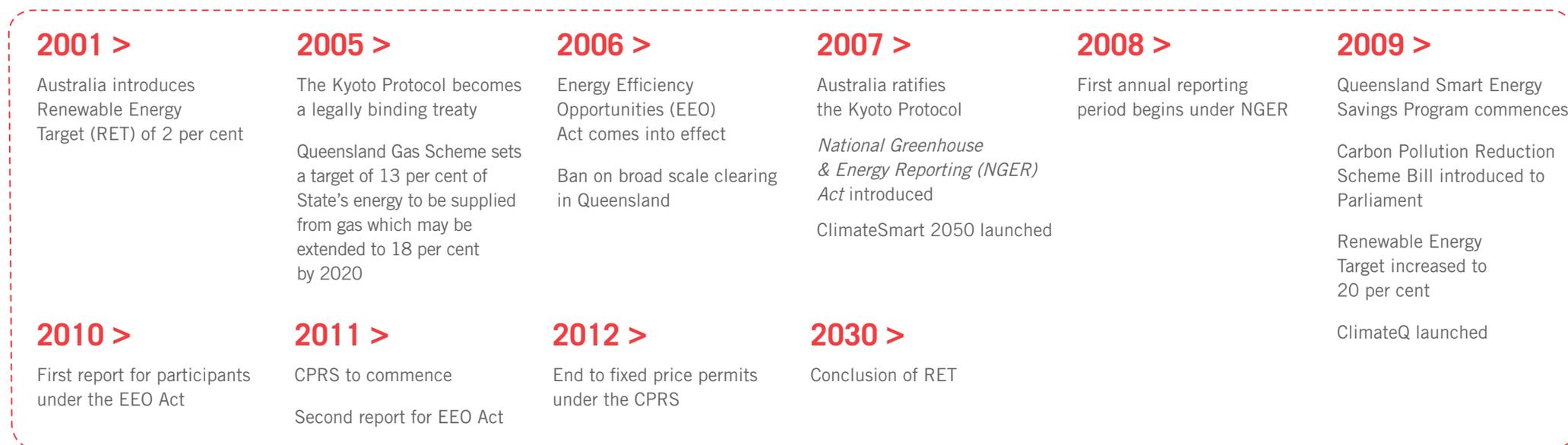
ClimateQ also encourages motorists to offset vehicle emissions, with the Queensland Government contributing dollar for dollar voluntary offsetting purchases made.

To encourage the uptake of more fuel efficient vehicles, the Queensland Government has reduced the vehicle registration duty for hybrid and electric vehicles. It will trial low-emission diesel-electric buses that emit 30 per cent to 40 per cent fewer greenhouse gas emissions than conventional buses.

ClimateQ builds on a number of existing government programs to reduce traffic emissions by improving the use of public transport in the short to medium term. They include:

- The introduction of Translink to coordinate and integrate Queensland public transport service has contributed to increased transport use by 40 percent since 2004.
- The construction of key public transport infrastructure such as new bus ways, rapid transport rail, bikeway and pedestrian networks, rail corridors and bicycle end-of-trip facilities.

Figure 2 - Policy process timeline



EXAMPLES OF SUPPORTING STATE POLICIES

Land Use and Building

Land clearing and land use change have historically been the biggest contributors to Queensland's greenhouse gas emissions profile. While it is still a major contributor compared to other states, the phasing out of broad scale clearing in 2006 under the auspices of the *Vegetation Management Act* has seen a marked reduction in the emissions associated with land use change.

Reafforestation of cleared land is an opportunity for the long term biosequestration of greenhouse gas emissions in carbon sinks.

The Queensland Government has committed to working with the Australian Government to expand opportunities for land owners to participate in carbon markets and diversify income streams by including regrowth vegetation in the CPRS.

Research has been supported into the biosequestration opportunities associated with changes to forestry and agricultural practices such as grazing and cropping. Biosequestration presents a short to medium term opportunity for landholders to generate revenue under the CPRS and voluntary carbon markets.

Additional funding has recently been allocated to help primary producers manage their climate change risks.

The Queensland Government has introduced Regional Plans to better manage land use planning for key areas within the State. The recently released South East Queensland Regional Plan recognises that this particular region is especially vulnerable to the impacts of climate change and has incorporated a Climate Change Management Plan setting out actions for both the state and local governments.

Through the [Cleaner Greener Buildings](#) initiative, the Queensland Government aims to lift environmental standards for Queensland's buildings. Implications for business are:

- Body Corporates and developers will not be allowed to restrict the use of energy efficient building materials
- Electricity sub-metering will be required for new office buildings
- End of Trip facilities for cyclists will be required in all new major developments and in new commercial buildings greater than 2000m².

The Queensland Government is also investigating increasing the minimum energy standard for commercial buildings to five stars (out of five) by 2010.

The Government will fast-track leading edge sustainable and energy efficient developments through a [Green Door](#) using dedicated case managers to expand Ministerial powers to speed up development decisions.

Queensland Government emissions

As well as addressing emissions from its buildings (p5), the Queensland Government has introduced a number of other programs to reduce or offset its own greenhouse gas emissions:

- ClimateSmart Vehicles Policy – a commitment to reduce greenhouse gas emissions from the government vehicle fleet by 15 per cent by 2010 and 50 per cent by 2017 through the purchase of low emissions vehicles, use of E10 fuel and offsetting of residual emissions
- Offsetting air travel – an estimated 31,000t CO_{2e} of greenhouse gas emissions due to government air travel will be offset annually
- Decentralising government – government planners believe that by decentralising government functions from the Brisbane CBD to key localised transport hubs, the need to travel long distances will be reduced, bringing down greenhouse gas emissions
- Climate Change Impact Statement – since July 2008, all Cabinet and Budget submissions are required to include information on how a proposal will impact on the state's greenhouse gas emissions profile. Submissions must also address climate change adaptation measures

HOW WILL BUSINESSES BE AFFECTED?

All businesses will be affected by the range of climate policies described here, either directly in response to mandatory requirements, or indirectly as they adapt to the new regulations, respond to market signals, develop new products and services that take advantage of the new economy, or take other voluntary action. Below is an overview of some of the key policies that are being developed as part of both the Queensland and Australian Governments' response to climate change, and how Queensland businesses can expect to be affected.



Your industry association may assist you to identify industry-specific impacts for your business and industry, as well as provide guidance on efficiency measures, rebates or advocacy.

Some examples of assistance offered by industry associations include:

- The [Queensland Chamber of Commerce and Industry](#) offers members a free initial energy appraisal, provides manufacturers such as metal finishing, food processing, foundries with energy efficiency fact sheets, and also offers discounts on energy efficient equipment and supplies.
- The [Queensland Trucking Association](#) has published a 'Greenhouse Reporting Guide for Trucking Companies'
- The [Australian Industry Group \(AIG\)](#) have a help desk that can assist members with advice on energy and sustainability issues.
- [Restaurant and Catering Queensland](#) has produced an Eco-efficiency Book for the industry. It is a step-by-step guide on how to save money and improve the environment covering water, energy, waste and wastewater

Table 2 - Policies implemented or under development

Policy	Description	Current status	Which businesses will be affected?
STATE Clean Energy Act 2008 and Queensland Smart Energy Savings Program (SESP)	The Act introduces the SESP which will require large energy using businesses that do not report under the Australian Energy Efficiencies Opportunities Program to undertake an energy audit, develop an energy savings plan and publish actions for each relevant site on a five-yearly cycle.	The legislation was effective from the 1st July 2009	In the first year of the Act, those businesses using between 100-500TJ are required to participate. This will decrease gradually to companies using between 10 and 30TJ by July 2015.
STATE Condition for new coal-fired power generation	To support the transition of the energy sector towards a low carbon future, no new coal-fired power station will be approved in Queensland unless it uses world's best practice low emission technology and it is carbon capture and storage (CCS) ready.	Commenced	Will mostly affect power generators.
STATE Electricity Demand Regulation and Electricity Regulation 2006	Through amendments to the Regulation, each Queensland electricity distributor is required to submit annual demand management plans from 2009-10. The plans may include a broad range of measures including offering businesses energy management options and incentives.	Plans must be submitted from 2009-10.	There will be opportunities for a range of business types to take advantage of incentives offered.

HOW WILL BUSINESSES BE AFFECTED?

<p>NATIONAL</p> <p>Energy Efficiency Opportunities Act</p>	<p>The Energy Efficiency Opportunities program encourages large energy-using businesses to improve their energy efficiency. It does this by requiring businesses to identify, evaluate and report publicly on cost effective energy savings opportunities.</p>	<p>Came into effect 1 July 2006.</p>	<p>Participation in Energy Efficiency Opportunities is mandatory for corporations that use more than 0.5 petajoules (PJ) of energy per year. There are approximately 220 corporations registered for the Energy Efficiency Opportunities program.</p>
<p>NATIONAL</p> <p>Carbon Pollution Reduction Scheme (CPRS)</p>	<p>A market-based mechanism that sets a limit or “cap” on greenhouse emissions from specific entities or sectors. Australian Emission Units (AEU’s) will be distributed either by auction or free allocation. Each AEU authorises the release of one ton of CO₂e. Entities covered by the scheme have to submit AEU’s equivalent to their level of emissions. The total number of AEU’s issued annually decreases over time.</p> <p>Secondary trading in AEU’s is permitted, to enable parties with relatively abundant low-cost ways of cutting greenhouse gas emissions to sell permits to parties with higher costs. Trading is designed to enable emissions reduction to occur at least-cost to business and the economy.</p>	<p>The Government introduced the CPRS legislative package into the Parliament on 14 May 2009. The Senate is next due to vote on the legislation in November 2009.</p>	<p>It is estimated that around 1000 companies will be liable parties under the CPRS and will therefore have obligations to purchase and acquit permits to cover their emissions. These entities are upstream fuel suppliers and companies that emit 25,000 tonnes of CO₂e per year or more of direct (Scope 1) emissions.</p> <p>Other businesses will be affected indirectly as the cost of carbon flows through the economy and is reflected in the higher price of carbon-intensive goods and services.</p> <p>Many businesses will benefit from opportunities created by the market such as the sale of carbon reduction management products and services, permit trading and market intelligence.</p>
<p>NATIONAL</p> <p>The National Greenhouse and Energy Reporting System (NGERS Act)</p>	<p>Businesses covered by the legislation need to apply to be registered by the Greenhouse and Energy Data Officer and then report annually on their energy production, energy consumption and greenhouse gas emissions. The data collected under the NGER Act will underpin the Carbon Pollution Reduction Scheme.</p> <p>The Greenhouse and Energy External Audit Legislative Instrument to be established under the NGER Act will provide a framework for preparing for, conducting and reporting on audits of entities required to report under the Act.</p>	<p>Adopted on 29 September 2007.</p> <p>The first reporting period commenced on 1 July 2008.</p> <p>The External Audit Legislative Instrument will be available later in 2009.</p>	<p>Reporting is mandatory for businesses whose energy production, energy consumption, or greenhouse gas emissions meet certain corporate or facility thresholds outlined in the NGER Act.</p> <p>Most SMEs will not be required to report.</p> <p>Businesses that will benefit are those that provide carbon accounting, measuring and monitoring services.</p>
<p>NATIONAL</p> <p>Renewable Energy Target (RET)</p>	<p>The Act provides for the creation of Renewable Energy Certificates (RECs) by generators of renewable energy. One REC represents one megawatt-hour (MWh) of electricity from eligible renewable energy sources. Installations of solar water heaters and small generation units (including rooftop solar PV, small wind turbines and micro-hydro systems) are able to create RECs. Once registered, the RECs are able to be traded and sold to liable parties who may surrender them to the Renewable Energy Regulator to demonstrate their compliance, in order to deliver on the Government’s goal of 20 per cent renewable energy in Australia’s electricity supply by 2020.</p>	<p>The legislation passed in August 2009, and will be effective from 2010.</p>	<p>Businesses wishing to install small-scale solar, wind and hydro systems will be able to receive financial assistance, in the form of ‘Solar Credits’.</p> <p>Businesses providing the technology and installation of systems will benefit from increased demand.</p> <p>The RET will provide significant opportunities for businesses that offer renewable energy technologies, installation and advice.</p>

TAKING ACTION - OVERVIEW

This Guide provides your business with a roadmap for developing a climate change strategy so you can play an active role in transforming Queensland into a low carbon economy. As demonstrated by Figure 3, this Guide shows how to “step down the carbon ladder” from current (or baseline) greenhouse emission levels to a reduced or potentially net zero emission level. A net zero emissions level is achieved by implementing appropriate reduction strategies, and offsetting any residual emissions to achieve carbon neutrality.

The remainder of this Guide is organised as follows:

Step 1. Establish a Baseline - describes how to calculate current greenhouse emissions and manage the inventory process.

Step 2. Reduce Emissions - provides guidance on setting reduction targets, prioritising your approach, carrying out energy conservation and efficiency measures, and sourcing energy from clean sources.

Step 3. Purchase Offsets - explains how businesses can offset any emissions which remain after the implementation of reduction strategies by paying for carbon-reducing projects.

Reporting - provides guidance on how best to communicate the process and subsequent outcomes to internal and external stakeholders.

Taking Leadership - describes what it means to go beyond addressing your company’s carbon footprint to enabling emissions reductions in other businesses or sectors.

As with any new initiative being implemented by a business, it is essential for all levels of the organisation to commit to the effort. From the CEO to the shop floor worker, creating a culture of commitment to climate change action is vital if your strategy is to be successful.

At the beginning of this journey, you may discover that you don’t have the necessary skills in-house to complete the job. You may choose to outsource some of the tasks outlined in this guide to consultants, or you might prefer to train your staff in the necessary skills. This guide provides lots of information about the resources out there at your disposal. Just look out for the information boxes throughout and the resource links at the end of the Guide.



Eco-efficiency for Queensland manufacturers

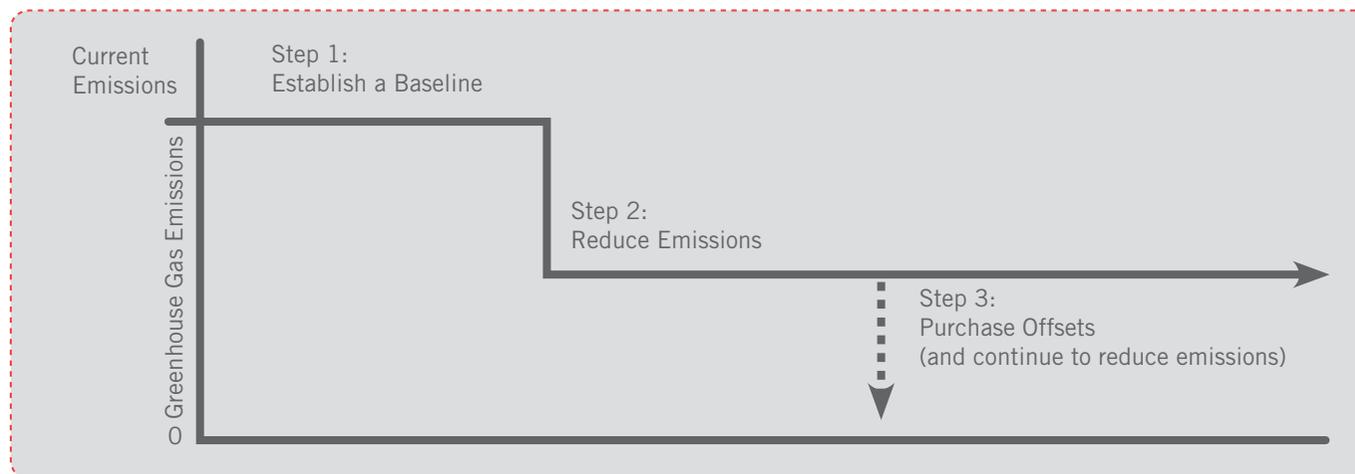
The Queensland Government, in association with the University of Queensland, has prepared a website to help the Queensland’s manufacturing industry be more eco-efficient and adapt to a carbon-constrained economy.

The website provides a series of materials and case studies for a variety of industries including metal finishing, food manufacturers and the marine industry. It provides industry-specific guidance on issues such as lighting efficiency, refrigeration, good environmental practice, minimising water use and boiler maintenance.

Further information can be found at:

➤ www.ecoefficiency.com.au

Figure 3 - Stepping down the carbon ladder



STEP 1 – ESTABLISH A BASELINE

Terms to know

Scope of emissions (1, 2 and 3)

The categories of greenhouse emissions for the operations of a business as defined by The Greenhouse Gas Protocol. Figure 5 and Table 4 provide descriptions of each of the emission scopes.

Baseline / greenhouse inventory

A reference or starting point for calculating and documenting the six main greenhouse gases for which a business is responsible.

Establishing a baseline is the first critical step in addressing your business' contribution to climate change. This step is often also referred to as developing a greenhouse gas emissions inventory or a carbon footprint. Once established, your business will need to update the emissions inventory annually to monitor how the emissions footprint evolves.

Developing a baseline involves calculating and documenting the six greenhouse gases for which a business is responsible. These gases are calculated in tonnes and are normalised into a unit of carbon dioxide equivalents (CO₂e).

You cannot manage what you don't measure. While it is normal practice for a business to account for profitability, productivity and revenue, managing and accounting for carbon emissions is new to many businesses. The process of establishing a greenhouse emissions baseline is often helpful to developing the rest of a company's climate change strategy; it can help identify opportunities and potential strategies for reducing emissions through some of the activities suggested in this guide.

By calculating the quantity and source of emissions, a business can make informed decisions regarding emission reductions.

Developing a baseline or inventory of greenhouse gas emissions involves the following steps:

1. Assign resources
2. Establish a methodology
3. Commit to greenhouse gas accounting and reporting principles
4. Define organisational and operational boundaries
5. Establish a baseline year
6. Develop a data collection and management system
7. Calculate emissions
8. Seek third party verification

The rest of this section outlines these steps in more detail.

1. Assign resources

Preparing a carbon inventory is something you should do every year. If you make the inventory part of your normal business systems and operations, this will help to make sure that it isn't neglected.

Specific staff should be assigned to the task. The person or team responsible for the inventory need not be expert with numbers, but training in the method you use to measure emissions will certainly help the process run smoothly. Encourage ownership of the process and results by making this an important part of the employees' role.



STEP 1 – ESTABLISH A BASELINE

Make sure that you allocate enough time and money for the job to be done properly. How much is needed will depend on the size of your business, but the rewards in terms of cost savings further down the line will make it a worthwhile investment.

2. Establish a methodology

There are a number of methodologies that provide guidance on creating a greenhouse gas inventory. Regardless of which one you select, it is important to apply the chosen methodology consistently.

The country's largest emitting businesses are required by the [↘ National Greenhouse and Energy Reporting Systems \(NGERS\) Act](#) to develop emissions inventories and report annually using the methodology outlined in the National Greenhouse and Energy Reporting Guidelines.

For businesses that elect to report voluntarily on emissions, they can select from a number of methodologies, including NGERS, as outlined in Table 3.

The most internationally recognised framework for developing an emissions inventory is [↘ The Greenhouse Gas Protocol](#), led by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). The Protocol provides clear standards for measuring and documenting greenhouse emissions for an organisation, including inventory design, calculating emissions, managing inventory quality, verification of emissions and setting greenhouse gas targets. Other international standards such as ISO 14064 are based on the Greenhouse Gas Protocol.

As a first step, some organisations may decide to use online emissions calculators to quickly quantify the emissions from simple data such as building characteristics, average vehicle miles travelled or the number of aeroplane trips undertaken.

It is however difficult to ensure the transparency of methodology and the consistency of results when using these internet-based tools. Therefore the recommendation is that a business begins the inventory process by using a formal protocol, and if preliminary guidance is required, the use of calculators which clearly state the assumptions and sources is suggested. Be wary of using online calculators that do not state their assumptions.

The Australian Government is developing a Carbon Trust, which will include resources for small businesses to measure their footprint. In the meantime, employing the Greenhouse Gas Protocol together with National Greenhouse Accounts Factors is the best approach.

[↘ http://www.climatechange.gov.au/workbook/index.html](http://www.climatechange.gov.au/workbook/index.html)

Table 3 - Greenhouse gas reporting protocols available to Queensland businesses

Creator	Name of Protocol	Used for mandatory reporting
World Resources Institute and World Business Council for Sustainable Development	↘ Greenhouse Gas Protocol : Corporate Accounting and Reporting Standard	No
International Standards Organisation	↘ ISO14064-1 Specifications with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals	No
Australian Department of Climate Change	↘ National Greenhouse and Energy Reporting Systems	Yes

STEP 1 – ESTABLISH A BASELINE

3. Commit to greenhouse gas accounting and reporting principles

Make sure your greenhouse gas inventory follows the five accounting and reporting principles: relevance, completeness, consistency, transparency and accuracy.

4. Define organisational and operational boundaries

This is perhaps the most important aspect of the inventory. It involves deciding which greenhouse emissions will be included and excluded in the baseline. For example, you will need to decide whether to include the emissions of your subsidiaries, joint ventures, customers and suppliers, or the emissions of your employees as they travel to and from work.

Figure 4 - Defining the boundaries for the emissions inventory

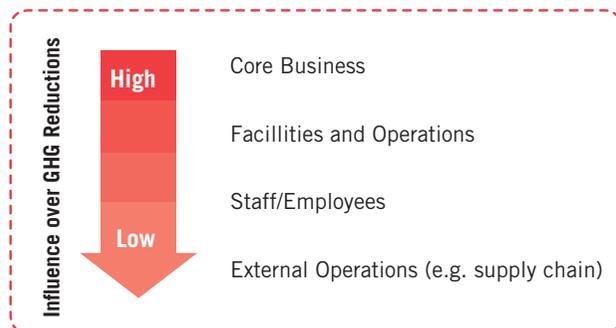


Figure 4 below illustrates the extent to which an organisation can influence its business activities. Understanding the extent of influence can help you better measure and manage your greenhouse emissions. It is important to take a prioritised approach.

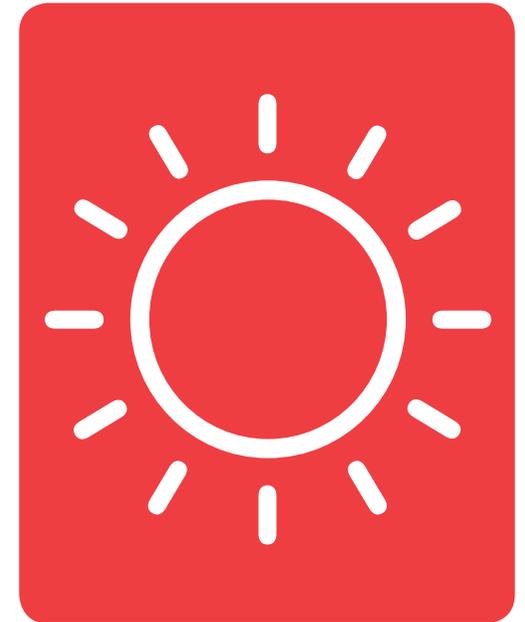
Begin with what you can influence directly (core operations) before addressing other parts of the value chain where reducing emissions often presents a greater challenge.

Organisational boundaries

For larger businesses, identifying which parts of the business to include in the greenhouse inventory is an important first step. The Greenhouse Gas Protocol recognises different business structures by defining two boundary approaches for organisations—the equity share approach and the control approach:

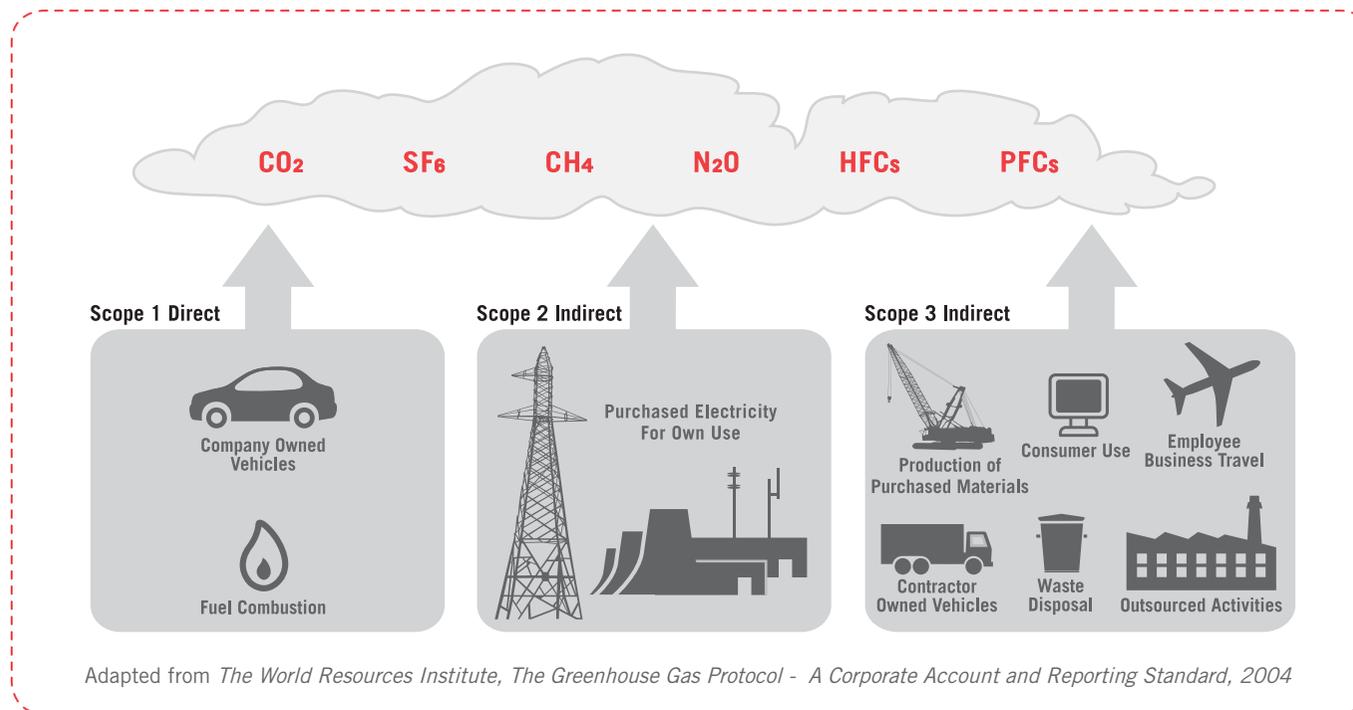
- **Equity share approach:** a business accounts for greenhouse emissions from operations according to its share of equity in the operation.
- **Control approach:** a business accounts for all the emissions from operations over which it has financial or operational control.

For the purpose of greenhouse gas accounting, you should select a boundary for emissions and consistently apply this to your inventory over time. Note that businesses reporting under NERS will have specific guidelines to follow on organisational boundaries.



STEP 1 – ESTABLISH A BASELINE

Figure 5 Understanding greenhouse gas sources



Scope 3 emissions are those not covered by scope 1 and 2. It is your decision whether or not to include scope 3 emissions in your inventory. At this time, there are no clear voluntary or regulatory protocols that provide guidance on where the boundary should be drawn for these downstream and upstream emissions. Calculating scope 3 emissions in addition to scope 1 and 2 provides a more holistic and inclusive measurement of your greenhouse emissions. If data is available or can be collected for any of these sources, it is recommended they be measured.

To assist with the question of what emissions sources to include, see the Greenhouse Gas Protocol for guidance. You may want to report on the three most relevant emission sources and do so consistently over time. Emission sources may be relevant because they are large, are seen as important to key stakeholders such as customers or because they contribute to your risk exposure.

Operational boundaries

Once the organisational boundaries are set, the next step is to identify which sources of emissions should be included in the inventory. Most reporting protocols describe business activities as fitting into one of three different “scopes” of operational boundaries as illustrated in Figure 5.

Many organisations are unsure of where to draw the boundary for their operations. Limiting your accounting of greenhouse emissions to direct emissions from core

operations may lead you to miss major emissions reductions opportunities or underestimate your greenhouse gas exposure and subsequent risk. At the end of the day, what gets measured gets managed. Scope 1 and 2 emissions can usually be quantified relatively easily using readily available fuel and electricity bills and existing environmental management reports. Most emission reporting programs therefore require these emissions be calculated.

STEP 1 – ESTABLISH A BASELINE

5. Establish a Baseline Year

Businesses should update their greenhouse gas inventories annually. This will allow the tracking of a business' emissions profile over time.

To track emissions over time, it is important for a business to establish a reference point with which to make a comparison with current emissions. Depending on the reason for developing a greenhouse gas inventory (e.g. voluntary program or internal management goal) there are different approaches for selecting a baseline year. This could be a single year (most likely the first inventory year) or the average of emissions over a number of years (to level-out any variations [high or low emissions] that would bias the selection of one particular year).

The Kyoto Protocol identifies 1990 as the baseline year to which industrialised countries must reduce their emissions; therefore, in order to stay consistent with the Kyoto Protocol, 1990 may be selected as the baseline year although it may be difficult to obtain reliable data. The Greenhouse Gas Protocol recommends selecting a base year as “the earliest relevant point in time for which you have reliable data”.

Should a business undergo changes to its organisational structure, such as an acquisition or divestment, the baseline may be recalculated to take into account any added or subtracted emissions. Organic growth or decline (such as increase or decrease in production output or closing and opening of new facilities) will not require a recalculation of the baseline.

These changes will be reflected in the greenhouse gas inventory as additional or reduced emissions in the year the change occurred.

6. Develop a data collection and management system

Developing a data collection and management system will help create an efficient and simple inventory. The system should list the data required, identify the source of the data, assign responsibility for data collection, provide data quality control to avoid errors, and manage the data via a central source such as a database.

Software is available for emissions data management such as the Australian Department of [Climate Change's Online System for Comprehensive Activity Reporting \(OSCAR\)](#). Some businesses with larger inventories may choose to hire a third party to maintain and monitor their inventory data.

Table 4 - Examples of emission generating activities and associated data sources

Scope	Examples of emission-generating activities	Data sources
Scope 1	Mobile combustion (e.g., owned/controlled mobile sources such as trucks, trains, ships, airplanes, etc.) Stationary combustion (e.g., on-site combustion of fuel in furnaces, boilers, turbines) Process emissions (e.g., manufacture or processing of chemicals and materials such as cement) Fugitive emissions (e.g., equipment leaks, HFC emissions from refrigeration and air conditioning)	Fuel purchase receipts or records Vehicle logbooks (odometer readings; fleet make, model, year) Refrigerant purchases, equipment nameplates Natural gas bills or meter readings
Scope 2	Purchased electricity (e.g., electricity produced off-site) Purchased heat, steam or cooling (e.g., natural gas for heating)	Utility electricity bills or meter readings Square-meter measurements of space
Scope 3	All activities not included in the above, such as emissions from: Extraction and production of purchased materials Use of sold products and services waste disposal Other transportation (e.g., employees, business travel, transporting purchased fuel/goods/waste)	Depends on which emissions source is selected Examples include staff survey for employee commuting or life cycle emissions data from product manufacturers Note: data for Scope 3 emissions is often more difficult to obtain

STEP 1 – ESTABLISH A BASELINE

7. Calculate emissions

Most businesses do not have the time or financial means to measure emissions at their source, so emissions factors have become the most popular method for quantifying greenhouse emissions. An emissions factor allows the conversion of activity data (such as the amount of fuel used) to emissions data. Activity data is usually sourced from monthly electricity bills and fuel purchase or use records. An example of this calculation is given below. Australian and state-based emission factors are published regularly by the Australian Department of Climate Change

➤ www.climatechange.gov.au.

The Greenhouse Gas Protocol website provides tools with clear guidance and explanations for a variety of activities across a number of sectors. You may also want to hire a consultant to assist with the process.

8. Seek third party verification

The independent assessment of emissions information by a third party is international best practice for greenhouse gas inventories. The verifier evaluates the accuracy of inventory information and issues an opinion of the data's quality and completeness, which provides an indication of its reliability. Both voluntary and mandatory emissions reporting programs now require third party verification of emissions inventories.

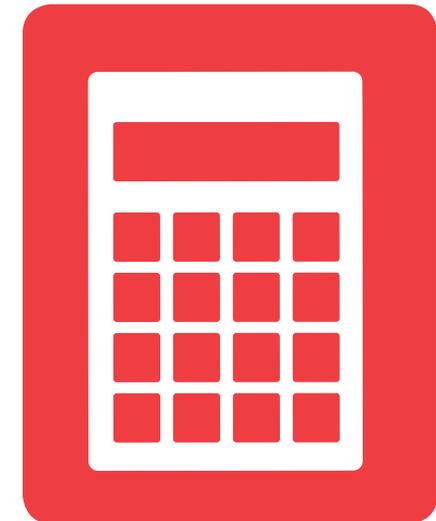
➤ **The ISO 14064-3 verification standard** is a program and policy-neutral internationally accepted standard.

Challenge: Collecting data

Collecting data for a greenhouse gas inventory can be time consuming, especially for larger businesses. Sourcing the correct activity data takes effort but once data collection systems and methods are established, the process becomes more straightforward. Some activity data (such as electricity use) will need to be sourced from a third party such as a landlord or a local utility provider.

Table 5 - Illustration of calculating greenhouse emissions

Equation	Activity Data	X	Emissions Factor	=	Emissions
Description	Annual fuel consumption	X	Amount of CO ₂ emitted per litre of fuel consumed	=	Total annual CO ₂ emissions for vehicle
Example	100 kilolitres	X	3.4 tonnes kg CO ₂ / kilolitre	=	11.76 tonnes CO ₂



STEP 1 – ESTABLISH A BASELINE



Establishing a baseline: transport and logistics

As part of the Carbon Outlook project (refer to p36), the baseline greenhouse gas emissions of a South-east Queensland transport and logistics company was established. The Department of Employment, Economic Development and Innovation worked closely with the company to assist them through the data collation process to establish a greenhouse gas emissions baseline.

The total scope 1 and 2 emissions were estimated to be 19,111 tonnes of CO₂e in 2007/2008. Ninety seven per cent of this figure was related to diesel fuel

use; amounting to 23.7 per cent of the company's total costs. With the introduction of the CPRS, it has been estimated that the company's total costs will increase by 1.6 per cent.

Using this baseline information, a range of tailored short, medium and long term actions were developed for the company:

- Increase employee awareness of electricity and fuel use
- Visual displays to monitor and communicate to operational staff the real time usage of electricity and efficiency gains
- Initiate discussions with key players in the company's supply chain to assess and analyse carbon impact and potential opportunities to reduce this impact
- Consider technology enablers such as video conferencing to reduce domestic travel
- Work with the Australian Trucking Association to identify opportunities for improvements in reducing emissions
- Address sustainability through an improved procurement strategy



Network Ten: Managing emissions from media operations

Network Ten recognises its responsibility to its audience, clients, suppliers, shareholders and employees to be both a successful and sustainable business. Such understanding has informed the decision to include scope 1, 2 and 3 emissions within its auditing assessments. This decision applied the 'operational control approach' to calculating the carbon footprint, meaning the inclusion of 100 per cent of emissions over which Network Ten retains full authority.

Establish a baseline

To coordinate this comprehensive audit across its stations Network Ten employed the environmental consultancy firm Environ. This revealed Network Ten's baseline carbon footprint for scope 1 and 2 activities in the 2006/2007 year was 13,191 tonnes of carbon dioxide equivalent (tCO₂e). Scope 3 emissions for the same period were 12,370 tCO₂e.

Reduce emissions

As part of this process Network Ten confirmed that the majority of emissions stemmed from electricity consumption (scope 1 and 2) and power consumed

in the transmission of broadcast signals and air travel (scope 3). In response Network Ten initiated plans to reduce greenhouse emissions by a minimum of 30 per cent by 2020 from 2006/7 levels.

Following an independent review by Environ, Network Ten reduced its carbon footprint by 18 per cent in 2007-08. This included a reduction in waste sent to landfill by 41 per cent (or 281 tonnes). Measures implemented included energy efficiency initiatives to adjust air conditioning systems, mandatory switch-off policies for lighting and equipment not in use, introduction of energy efficient lighting and recycling facilities.

STEP 2 – REDUCE EMISSIONS Overview



Terms to know

Absolute reductions

Reductions in total greenhouse emissions over time.

Intensity reductions

A reduction in greenhouse emissions relative to a unit of activity (e.g. CO₂ per unit of output delivered) over time.

After completing the greenhouse gas inventory and identifying emissions sources, the next step is to find ways to reduce emissions. For most businesses, this means reducing electricity or direct fuel consumption. Opportunities can be found across operations, in buildings, manufacturing processes and transportation.

Even simple changes in employee behaviour can achieve positive impacts. While the baseline exercise will help you understand under which scope the most significant emissions lie, the emissions reduction strategy will need to be developed to suit the needs of your business.

How to reduce emissions

There are a number of compelling reasons for a company to reduce greenhouse emissions, including reduced operating costs, improved brand reputation and corporate social responsibility (CSR) performance, and incentives offered under new Queensland and Australian Government policies.

Each business' emissions will vary in source and quantity, and there will be a mix of possible solutions of varying cost. Different industries will have different focus areas. In office-based operations, the majority of emissions will be from air conditioning systems, indoor lighting use and business travel. In retail, display lighting is often a major use of energy. In manufacturing, emissions from production processes can far outweigh those relating to the buildings themselves.

The inventory provides a clear picture of emissions so that you can begin to address your most significant impacts. Once you have identified major sources of emissions in the baseline exercise, it is time to tackle the problem areas.

Setting a target for reducing emissions from this baseline gives you something to work towards. Some companies set targets and then figure out how to meet them. Others take an iterative approach, deciding what is achievable within a given timeframe. Either way, the target should be developed with clear support from management. Different ways to express the target are given in Table 6, below.

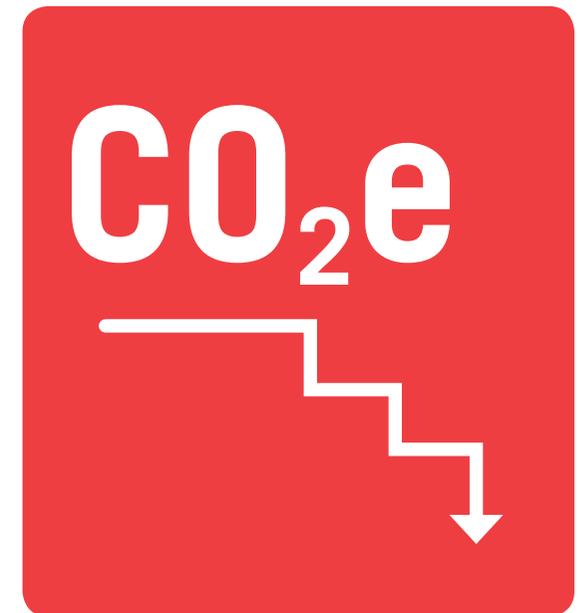


Table 6 - Emissions reductions targets

Target type	Description	Example
Absolute	Reduce absolute emission over time	Reduce emissions by 25 per cent from baseline by 2010
Intensity	Reduce the ratio of emissions relative to a business activity over time	Reduce emissions by 10 per cent per “widget” produced between 2004 and 2009

STEP 2 – REDUCE EMISSIONS Overview

Setting a target will also depend upon the feasibility of different approaches. Ideally, there will be a range of emissions reduction strategies to choose from. Which actions take priority will depend upon the cost, effectiveness and complexity of implementation. The process of identifying promising ideas will result in a list of emission reduction activities that can be categorised according to criteria that matter most to a business such as:

- Capital costs
- Operating costs
- Payback period
- Greenhouse gas reduction potential
- Ease of implementation

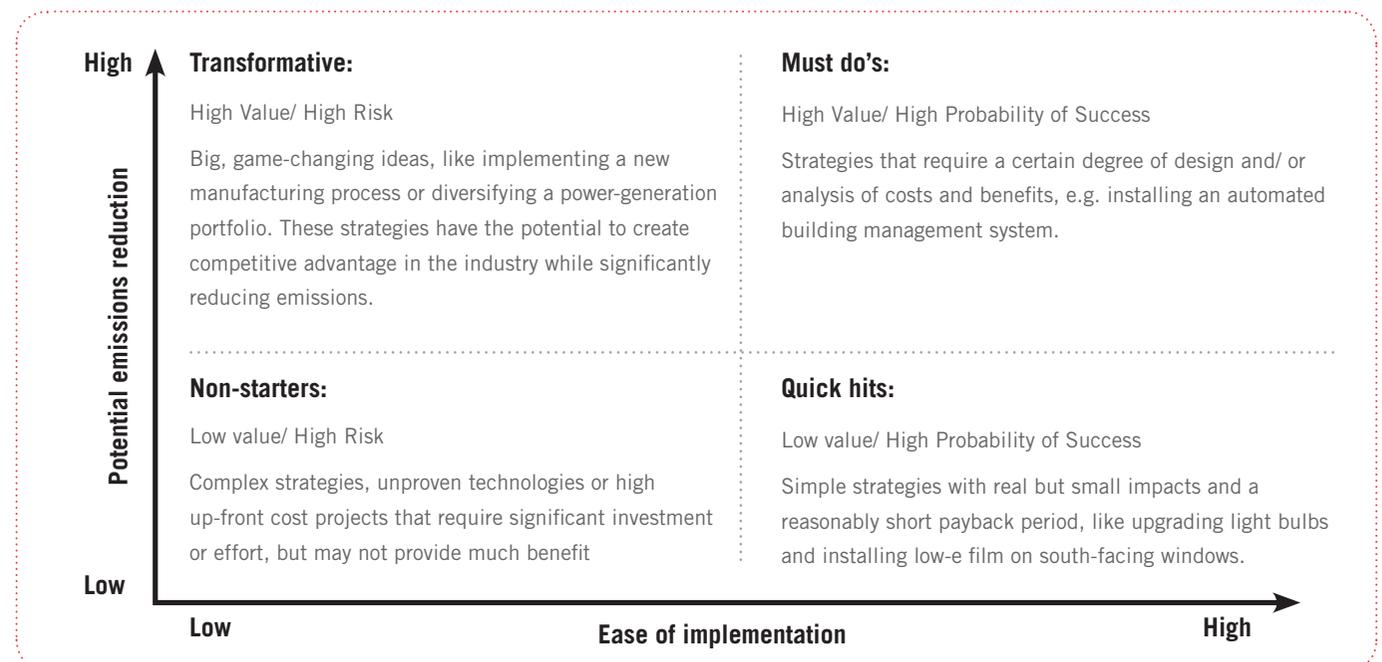
Where possible, target your major emissions sources first, taking into consideration the potential impact and ease of implementation. Examining these, it is possible to identify the “quick hits” and the larger, more strategic actions. Figure 6 below shows how this process can help identify the most suitable initiatives for implementation. You may need outside help for some of the actions that demand more sophisticated analysis of the costs and benefits. Overall, developing your carbon reduction strategy will be part science, part art, and will most certainly change over time.

Engage the whole company

The ultimate success of an emissions reduction program depends on the understanding, patience and buy-in of major stakeholders. Divisional leaders, human resources, finance and logistics departments should all be involved in the process, as these groups will lead a culture of conservation throughout a business. During implementation, keep staff informed and find ways to get people involved on an ongoing basis.

- **Brainstorm together:** Conduct a brainstorming session to generate ideas for specific emissions reductions and business opportunities.

Figure 6 - Exploring greenhouse gas reduction strategies



STEP 2 – REDUCE EMISSIONS Overview

- **Decide on the vision:** If key stakeholders are engaged in setting goals, targets and budget allocations, they will be more committed to helping achieve them. Determine what is possible using available resources.
- **Educate the workforce:** As different strategies are implemented, it is important to keep staff informed to avoid misunderstandings, e.g. adjusting the summertime space temperature could cause some complaints among those who are still dressing for 18°C.
- **Identify existing levels of awareness, skills and knowledge:** Look for staff that can help implement your reduction strategy. Finance staff can assist by identifying existing financial systems that help with data collection; marketing and PR staff can communicate an appropriate message to your staff and customers; HR staff can organise awareness and training programs; technical staff can be encouraged to identify emission reduction opportunities.
- **Identify champions:** There will be many staff within your business that have an interest in energy and climate issues. Such staff can assist in identifying energy efficiency measures and champion the implementation of plans. They should have sufficient authority to perform the assigned tasks.

Emissions reduction strategies

The following section is organised according to the various scopes for emissions sources: scope 1 (direct emissions), scope 2 (indirect emissions from purchased electricity), and scope 3 (other indirect emissions). It is important to consider each initiative within the context of your business' facilities and operations.

Rating greenhouse gas reduction initiatives

The following pages provide ideas for getting started on the pathway to reducing emissions. In addition to a basic description, each initiative includes a high level indication of the associated financial cost and greenhouse gas reduction benefit.

Financial costs may include items such as capital expenditure or ongoing operating and maintenance expenses. Greenhouse gas reduction benefits refers to the scale of emissions reductions that can be achieved.

Where appropriate, Guide users should undertake their own financial and greenhouse gas benefit analyses as each initiative will have unique characteristics. For instance financial costs may be influenced by issues such as energy prices, carbon costs and government rebates. Greenhouse emissions reductions may be influenced by the emergence of alternate fuel sources and may fluctuate over time.

For example, a project with a high capital cost may still save money over the longer term, and may be quite affordable in the short term once available rebates are taken into account.

Table 7 - Key to rating greenhouse gas reduction initiatives

Financial cost		Greenhouse gas reduction benefits	
None	No cost	None	No benefit
\$	Low cost		Slight benefit
\$\$	Mid-range cost		Reasonable benefit
\$\$\$	High cost		Great benefit

This approach to rating greenhouse gas reduction initiatives is also utilised in the [Existing Buildings Survival Strategies](#) guide developed by Arup in conjunction with the Property Council of Australia.

The guide provides a framework for the refurbishment, rejuvenation and retrofit of existing buildings with a particular emphasis upon emissions reductions which can be applied by nearly every organisation.

STEP 2 – REDUCE EMISSIONS Scope 1 Direct emissions

Terms to know

Stationary combustion

Burning of fuels to generate electricity, steam or heat.

Fugitive emissions

Uncontrolled or unintentional emissions from fuels and chemicals typically arising from storage, transfer or replacement, e.g. HFC leaks from refrigeration systems, SF₆ from electrical transformers, and methane from landfills.

Mobile combustion

Burning of fuels by transportation devices such as cars, trucks, airplanes, vessels, etc.



Scope 1 Direct emissions

Stationary combustion

If fuel is burned on-site, for example for electricity generation, space heating or domestic hot water, changing from a non-renewable to a cleaner fuel (i.e. “fuel-switching”) will not only reduce emissions but may also qualify for a renewable energy certificate or an energy efficiency certificate which can be sold to subsidise some of the cost.

On-site electricity generation from a renewable source is often the most capital intensive of the emissions reduction strategies however, this approach has many benefits, including fewer emissions from other air pollutants, reduced peak power operating costs, availability of financial incentives such as feed-in tariffs and the increased reliability of energy supply.

Some ideas to get started:

Solar water heating \$\$\$

This technology consists of a series of collectors, typically roof-mounted, which are oriented to capture the sun’s energy. Heat is collected and redistributed to create hot water for a variety of uses ranging from domestic hot water systems to process applications and radiant floor heating. A standard gas boiler can be used to supplement the solar collectors when required. There are obvious constraints related to available roof or ground area and the ability of existing structures to bear this load.

Combined heat and power \$\$\$

Combined heat and power systems capture waste heat from the power generation process and use it to produce heating and/or cooling. If you are already generating power on-site using an engine or turbine, this approach can result in significant emission reductions. Known as cogeneration, combining these processes is much more efficient and cost-effective than buying each service separately.

Cogeneration systems find ideal applications in facilities with a large demand for domestic hot water or space heating such as hotels, swimming pools, shopping centres and some manufacturing processes.

Depending on the type of generator, the “engine” usually runs on gas, hydrogen, propane or diesel, resulting in comparatively clean energy. However, it is now possible to run generators on biodiesel, which would add a renewable quality to the system.

Fuel cells also have the potential to be used for this type of application, although the technology is only emerging and not produced on a commercially viable scale for common application. Fuel cells use an electrochemical process to generate electricity from hydrogen and oxygen and are not only highly efficient, but also very clean as the main by-product of the reaction is water. Natural gas is the most readily available and affordable source of hydrogen and while greenhouse gases still arise from its use, these are low compared to more traditional combustion technologies.

STEP 2 – REDUCE EMISSIONS

Scope 1 Direct emissions



Rebates and incentives

The Commonwealth Government has provided for \$240 million over four years for Clean Business Australia partnerships. This will support activities aimed at energy and water efficiency through productivity and innovation and includes grants for manufacturers to reduce their environmental impact through energy and water projects that make their production processes more efficient. For more information, see www.ausindustry.gov.au

In recent times, absorption chillers that use heat to generate chilled water are making a comeback. “Tri-generation”, where both heating and cooling are derived from waste heat, is approximately 90 per cent efficient.

The attractiveness of cogeneration solutions is usually dependent on the local cost of electricity, fuel costs, and the capacity to use the heating or cooling created.

Absorption chillers can also be used in conjunction with solar water heating technologies described above.

Scope 1 Fugitive emissions

For the majority of businesses, the main sources of fugitive emissions are refrigeration equipment and landfill:

Refrigeration equipment \$\$\$ 🔴🔴🔴

Ongoing refrigerant leaks and the act of replacing the refrigerant fluid both result in the release of fugitive emissions into the atmosphere. When equipment needs to be replaced, choose models that use refrigerants with a low global warming potential, e.g. ammonia or water. (Note: be aware that the use of ammonia requires specific safety measures.)

Landfills \$\$\$ 🔴🔴🔴

Methane gas generated by the decomposition of organic waste can be captured prior to entering the atmosphere. In some cases, the collected gas is used to generate electricity and/or heat.

Mobile combustion \$\$\$ 🔴🔴🔴

There are many opportunities to reduce emissions from mobile sources. Scope 1 (direct) emissions include those from vehicles owned or leased by business. Vehicles that are owned or leased by another organisation such as rental or contractor-owned vehicles, are classified as scope 3 (other indirect) emissions.

Fleets \$\$\$ 🔴🔴🔴

Organisations with vehicle fleets have an opportunity to specify the most fuel efficient, lowest emitting vehicles available. As older vehicles are retired, they should be replaced with more efficient models. As such procurement policies have been implemented, vehicle choice has also increased so that many types of low emissions and alternatively-fuelled passenger and service vehicles are now available. Some major car companies now offer hybrid versions of standard models.

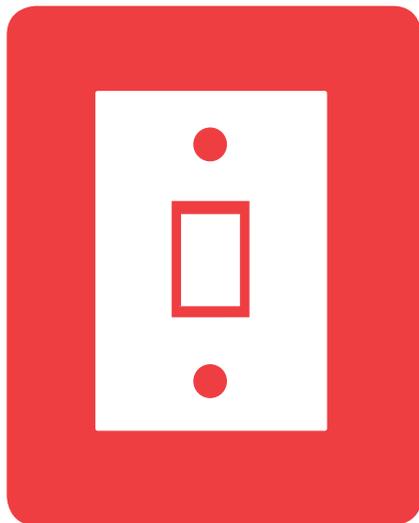
Fuels \$\$\$ 🔴🔴🔴

Some organisations have switched a portion or all of their vehicle fuel from standard petrol or diesel to biodiesel where appropriate and available. However, the greenhouse emissions reductions from fuel-switching may be complicated to determine, as the source of the biofuel can significantly influence its associated emissions.

Process emissions \$\$\$ 🔴🔴🔴

Emissions from manufacturing processes are beyond the reach of this document because there are so many different processes to consider. However, we encourage manufacturers to identify process changes that would reduce greenhouse emissions where possible. These may include actions as simple as replacing older, less efficient pumps or motors with newer, more efficient ones

STEP 2 – REDUCE EMISSIONS **Scope 2 Indirect emissions from purchased electricity**



Conservation and efficiency

The first, most cost-effective steps are to improve energy conservation and efficiency. You should only consider installing clean electricity generation on-site or purchasing carbon offsets once these steps have been taken.

Approximately 25 per cent of Queensland's greenhouse gas emissions can be attributed to buildings[†].

The buildings your business occupies and the equipment used inside them will likely be responsible for a significant portion of your emissions, particularly if your business is office based.

* Calculated by the authors from data obtained from the Australian Greenhouse Emissions Inventory System for Scope 1 and Scope 2 emissions attributable to the commercial sector. See ageis.climatechange.gov.au/

[†]ClimateQ: toward a greener Queensland

The easiest place to begin is with simple behavioural changes, such as switching off lights and making use of the auto-sleep function in computers and monitors when they are not in use. Again, to ensure the long-term success of these initiatives, it is important to involve the workforce through “advertising” or other approaches.

An **energy audit** is often the first step in developing an energy reduction strategy. This is the easiest way to determine where energy is being used and what changes might be recommended. Many electricity retailers will conduct an energy audit for free, and consultants can also provide this service. If you want to conduct an audit in-house, the *Greenhouse Challenge Plus Energy Audit Tool* has been developed to assist non-technical or semi-technical energy managers in small to medium organisations.

There are also some simple purchasing decisions that can have a positive impact, including:

Purchase Energy Star® products \$ 🔴🔴

Energy Star® is an international standard for a range of products from office equipment to household appliances and air conditioners. ↘ www.energystar.gov.au/

↘ [The ClimateSmart retail service](#) also provides advice on buying energy and water efficient appliances.

Use LCD computer monitor screens \$ 🔴🔴🔴

These use less energy than traditional cathode ray tube monitors.

Install internal blinds \$ 🔴🔴

These can be used to reduce internal heat gain from the sun during hours of peak direct sunshine, therefore reducing the need for air conditioning.

Lighting

Label light switches clearly \$ 🔴🔴

A simple strategy that help users identify the correct switch for required lighting.

Retrofit for energy-efficient lighting \$ 🔴🔴

Compact fluorescent light (CFL) bulbs are about 75 per cent more efficient than standard incandescent bulbs and last much longer. Light Emitting Diodes (LEDs) which last even longer than CFLs, require even less energy and do not contain mercury, are now coming into the market in a wide variety of cost effective applications thereby reducing the costs and hazards of disposal.

Install task lighting \$\$ 🔴🔴

Designing lighting systems that illuminate specific tasks or work areas allows reductions in overhead lighting density, reducing the amount of electricity use in lighting.

Install daylighting controls \$\$\$ 🔴🔴

Daylight sensors can be installed to reduce artificial lighting levels when there is sufficient light coming through the windows. There are two types of control — on/off, and dimming. Dimming systems are more complex, help maintain consistent lighting levels year-round, but can cost more.

STEP 2 – REDUCE EMISSIONS Scope 2 Indirect emissions from purchased electricity

Install occupancy sensors \$\$ 🌿🌿

Occupancy sensors switch off artificial lighting when no one is present. This is particularly effective in transient or intermittent spaces such as hallways, parking garages, conference rooms, guest rooms and bathrooms.

Install light tubes and skylights \$ 🌿🌿

In areas without much access to daylight, interior lighting can be reduced by installing either of these features, which both create a link with the outdoors. Light tubes are especially suited to spaces without windows, as the tube can bend through the roof structure and HVAC system, delivering light where needed.

HVAC systems

Heating, ventilation and air-conditioning (HVAC) systems provide thermal comfort to building occupants. Energy consumption can often be reduced through minor adjustments to the way the systems operate, or through major design changes and/or retrofits.



Incentives, rebates and free services

Queensland's electricity retailers offer extensive rebates, incentives and free services to help businesses with energy conservation and efficiency initiatives. For example, some electricity retailers offer free energy audits, which identify operational inefficiencies and outline suggested improvements.

In addition, many electricity retailers offer basic incentives and rebates for the installation of efficient lighting and sometimes for equipment such as refrigeration, air conditioning, motors and power management software. Through an amendment to the *Electricity Regulation 2006*, Queensland's electricity distributors will be required to submit demand management plans from 2009. These are expected to include a range of additional incentives and industry collaboration for businesses.

Following is a sample of programs offered by some of the state's largest electricity retailers. For the most up-to-date information on the full range of available programs, call your electricity retailer or visit their website.

AGL

- ↘ **The Greenhouse Audits program** conducts greenhouse auditing, carbon auditing and environmental studies for customers across all industries; measuring current levels of greenhouse emissions and providing an environmental management plan.

Origin Energy

- ↘ **The Business Green Earth Plan** provides businesses with 20 per cent GreenPower at no additional cost for the first 12 months. The GreenEarth Welcome Pack provides a personalised Origin GreenPower certificate and a selection of stickers to promote a businesses commitment to the environment when signing up to Green Earth; Origin's accredited GreenPower product.

Ergon Energy

- ↘ **Ergon Energy** is leading the Townsville Solar Cities Program which aims to demonstrate how solar power, smart meters and innovative approaches to electricity pricing can improve energy efficiency. The trial aims to cut greenhouse gas emissions by 50,000 tonnes of CO_{2e}.

STEP 2 – REDUCE EMISSIONS Scope 2 Indirect emissions from purchased electricity

Reset thermostats **None**

In the Australia, indoor temperatures are typically set to 20-21°C year round. Resetting the thermostat by increasing room temperature by one degree can save up to 10 percent of operating costs. Set your air conditioner at 24°C in south east Queensland in summer, 25°C in other areas of Queensland. just one or two degrees in either direction (19°C in winter, 23°C in summer) will start saving energy immediately.

Install a building management system (BMS) **\$\$**

A BMS is a software program that interacts directly with building systems to monitor and control the environment and thereby optimise efficiency. These systems often realise significant energy reductions but are better suited to situations where the business owns and/or operates a whole building.

Upgrade motors **\$\$**

Used throughout HVAC systems and manufacturing, modern motors are much more efficient. Significant savings may be realised by replacing older models with new, premium-efficiency or variable speed motors.

Insulate exposed ductwork and pipework **\$\$**

This reduces the heat lost or gained within the system.

Capture waste heat **\$\$**

Look for opportunities to recover and reuse waste heat. In the HVAC system, warm exhaust air can be used to pre-heat incoming cold air using a variety of technologies. Process heat can be captured to pre-heat air for adjacent offices or other processes.

Building envelope

The building envelope refers to the built structure housing business operations and people consisting of walls, windows, doors, floors and roofs. Most envelope retrofits are expensive, and so need to be timed appropriately (e.g. facade upgrade), but there are some that are less costly. Such building envelope retrofits may include the following.

Provide Shade **\$\$**

In the Queensland environment, exposure to sunlight can increase energy use associated with building cooling. The installation of overhangs, shading devices and light coloured exteriors can reduce the amount of energy needed to cool a space.

Install tinted windows or reflective coatings **\$\$**

These two strategies are effective in reducing cooling loads within the building which is often a source of great energy consumption when compared with other building systems.

Paint roof with light coloured or reflective paint **\$**

This will reduce the amount of solar heat gained through the roof, thus reducing the need for air-conditioning indoors.

Limit air infiltration **\$\$**

Older buildings are prone to “leakage,” meaning that outside air can enter the building and place a greater load on the HVAC systems. A building pressure test can help identify any serious issues in this area and can usually be rectified with a standard sealant or caulking.

Insulation **\$\$**

Improving the level of insulation within wall and roof cavities can reduce heat loss in the winter, thus reducing the need for heating and keeping cool in summer.

GREEN BUILDINGS – NABERS

NABERS is a national, voluntary performance-based rating system for existing buildings. NABERS Energy assists owners and tenants to reduce energy use, reduce energy costs and reduce greenhouse emissions. It benchmarks a building’s greenhouse impact on a scale of one to five, one star being the most polluting and five stars the least. Experience shows that by implementing energy efficiency practices many buildings can save 20 to 40 per cent on their energy bills and reduce the emission of greenhouse gases. You can undertake NABERS Energy ratings through the website:

➔ <http://www.nabers.com.au>

STEP 2 – REDUCE EMISSIONS Scope 2 Indirect emissions from purchased electricity

Challenge: Working with the landlord

Obtaining electricity consumption data for leased office space often poses a challenge. If you are a tenant and your individual space is not metered, it is likely that you are paying a flat rent that includes electricity retailers. This will make it difficult to calculate your business' emissions associated with indirect electricity generation and use. Moreover, it could also be difficult to make significant efficiency improvements to building systems, since these often serve multiple tenants.

Challenge: Beware the 'rebound effect'

Energy efficiency improvements can give rise to an unexpected response known as the 'rebound effect'. When savings are realised in one aspect of operations, it gives false freedom to increase emissions elsewhere. For example, retrofitting all lighting with CFL bulbs, only to leave them on for longer periods, does not reduce overall emissions. This can be counteracted by effective communication with staff while changes are being made.



News Limited: Gaining from energy efficiency

News Limited has been actively involved in greenhouse initiatives since 2000. The great catalyst to the company's enhanced commitment to energy efficiency came in 2007, when Rupert Murdoch announced that News Corporation would tackle climate change globally through a 'Global Energy Initiative'. This set the goal of being carbon neutral in 2010, and reducing emissions globally by 10 per cent in 2012. The One Degree program is News Limited's strategy for achieving its greenhouse gas reduction goals, which includes measures to reduce greenhouse gas emissions across its operations, work with staff, partners and suppliers to reduce their emissions and raise awareness of climate change among the broader community.

Reduce emissions

In addressing the operational scope of the One Degree program News Limited has initiated comprehensive energy assessments. Everything from the electricity used to power News Limited presses, the fuel in fleet cars, the carbon impacts of air travel, the heating and cooling of News Limited buildings, waste handling and recycling is being reviewed.

Such reviews have been critical in informing and identifying areas for improved efficiency. Within the Chullora Print Centre in Queensland an energy management improvement plan highlighted numerous opportunities for emission reductions. This included, for example, application of an infrared reflecting

paint to the metallic roof surfaces to reduce heat absorption through the press hall roof. This measure has been forecast to reduce the emissions from the HVAC operation in the Print Centre by 452 tCO₂e per annum – The Queensland Newspapers office at Bowen Hills in Brisbane has been able to save 125 000kwh per annum through air conditioning modifications and an additional 30,000 kwh per annum through lighting modifications. Over the next four years, all company vehicles will be replaced with low emission vehicles. In the Cairns Post office, infra-red paint is being trialled on the roof. Further improvements being considered include wake-on-LAN technology for desktop computers, bio-diesel for generators and more energy efficient air compressors.

This is just one aspect of a comprehensive approach to identifying opportunities for energy efficiency. Others also include:

- Improving green ratings of existing buildings
- Implementing variable speed drives as electric motors are installed or replaced
- Consolidating servers, printers and copiers
- Switching from old-fashioned CRT to lower-energy LCD screens
- Implementing a Green Procurement Policy

The total energy and other savings from these opportunities were identified by News Limited through its reporting under the *Energy Efficiency Opportunities Act* to total \$1,414,766 (with a payback period of two years).

STEP 2 – REDUCE EMISSIONS

Scope 2 Indirect emissions from purchased electricity

Terms to know

Renewable energy

Energy from a source that replenishes for example solar, hydropower or wind.

Clean energy

Energy that produces little or no air pollutants when generated. The energy source is not necessarily self-replenishing for example natural gas.

GreenPower

An accredited renewable energy product managed by the Government and sold by numerous electricity companies. www.greenpower.Queensland.gov.au/

Renewable Energy Certificate (REC)

Tradable environmental commodity signifying that an electricity provider supplied 1 megawatt-hour (MWh) of renewable electricity (e.g. solar, wind or biomass) to the grid. www.orer.gov.au/recs/index.html

Low carbon supply

Once a business has implemented the selected conservation and efficiency strategies, it is time to explore low carbon options to address the remaining energy demand.

A business can generate electricity on-site using low-carbon sources, purchase electricity from a utility using only low-carbon sources, or pursue a combination of the two options.

When stand-alone on-site energy generation systems are generating more electricity than required by a facility, interconnection allows excess electricity to be sold back to the local utility. The Queensland Solar Bonus Scheme pays small businesses and households with solar power systems for excess electricity generated. The payment, often referred to as a ‘feed-in-tariff’ is 44 cents per kilowatt hour.

Businesses wanting to investigate this option should start by consulting with a local installer to receive guidance on the potential generation capacity of a site, as well as a quote for installation, operation and maintenance. The different technologies have varying payback periods and a thorough cost-benefit analysis will support your decision-making process.

The following renewable energy technologies are becoming increasingly popular:

Building-integrated wind

There are two types of small-scale wind power:

- Horizontal axis turbines: These are smaller versions of the utility-size turbines which require space onsite and might encounter zoning issues.
- Vertical axis turbines: These turbines are much smaller and are designed specifically for roof-mounted applications.

The viability of a wind installation depends on the available wind resources and the average annual wind speed. Many turbines do not generate any power below a given wind speed otherwise known as the “cut-in speed”. Regional wind speed information can be found at www.bom.gov.au

Solar photovoltaics

Solar photovoltaic cells (PV) are made from silicon and convert solar radiation directly into electrical energy. Silicon cells come manufactured into solar panels that are then mounted onto buildings or on the ground. Alternatively, “thin film” PV requires the silicon to be deposited directly onto a glass or metal substrate which is then used in place of typical window or roof material, providing both electricity and roofing or shading at the same time.

Both types of PV cells can also be used in building-integrated applications such as canopies and window shading devices. Building-integrated applications often reduce the cost of installation and materials because the purchase only needs to occur once.

STEP 2 – REDUCE EMISSIONS Scope 2 Indirect emissions from purchased electricity

Addressing costs

The most common obstacle to any emissions reduction strategy is the capital expenditure required. In addition, cheap grid electricity can often skew the cost-benefit analysis for reductions in scope 2 emissions.

There are many incentives available for building, lighting and HVAC upgrades as well as for renewable energy installations (see p28). For the latter in particular, it is important to determine an acceptable return-on-investment early on, and work with the electricity provider to agree on the best rate structure possible. Businesses should investigate all possible incentives to offset capital costs including tax breaks and grants.

Make sure that your business is working with the most up-to-date information and is able to make an informed decision about whether to proceed, remembering that it is possible that the intangible positive impacts of brand equity and reputation outweigh any initial financial outlay.

As an alternative to internal investment, a business may consider a utility or build-own-operate-transfer (BOOT) partner i.e. a company that builds, owns and operates and then potentially transfers the system. BOOT arrangements and energy service companies design, install, maintain and, in many cases, finance renewable energy installations with the latter offering guaranteed energy, cost and carbon reductions. Energy performance contracting is an excellent example of how this works (see Box opposite).

A common operating structure for this arrangement is a power purchase agreement (PPA). Put simply, the PPA lays out the terms of ownership, operation, and negotiated rates for generated electricity. This arrangement releases the customer from capital investment; allowing them to pay only for the electricity generated on-site. These agreements typically run for 10-25 years, locking in agreeable rates and reducing exposure to increasing electricity prices. These systems may be especially attractive if a business is looking for ways to reduce high cost energy during peak hours as solar electrical generation peaks at about the same time of day as the need for air-conditioning and the cost of electricity. In most PPAs, operation and maintenance remains the responsibility of the owner.



Energy performance contracting

Energy Performance Contracting (EPC) is a way to achieve guaranteed energy savings and returns of investment. Under an EPC an energy service company will provide your company with a complete energy efficiency solution. The energy service company will examine your facility, work out how much energy you can save while saving money, and install, tune and maintain all the right equipment. The energy service company has a strong incentive to help you meet your

goal, and is typically obliged to pay you any shortfall if you don't achieve your saving goals. These guaranteed energy savings will pay back your initial investment, generally over a period of three to seven years, and improve the profitability of your business. Energy service companies can even arrange finance so that you don't have to outlay capital.

For more information on EPCs, including whether or not an EPC is suitable for your business, visit:

➤ www.eec.org.au

STEP 2 – REDUCE EMISSIONS Scope 2 Indirect emissions from purchased electricity

Ergon Energy: Reducing travel emissions

Ergon Energy is a regional electricity distributor with more than 4500 employees, servicing more than 650,000 customers and covering an area that extends across 97 per cent of Queensland and providing supply to many isolated communities.

In addition to establishing electricity use reduction targets, the organisation has set its sights on reducing greenhouse gas emissions associated with its small-scale power generation plants, passenger and light commercial vehicle fleet and air travel.

Given the enormous geographic area the Ergon Energy network services, air travel is a critical aspect conducting business.

Since the baseline year of 2007/08, emissions from air travel by Ergon Energy employees have been reduced by 7 per cent, placing the organisation on track to meet its targeted 20 per cent reduction by June 2011. All remaining emissions have been offset since July 2008. Ergon's reduced demand for air travel was driven by a desire to reduce costs and increase productivity.

There has been a renewed focus on booking processes, supported by a change in organisational attitude and behaviour and the introduction of desktop and enhanced room-based video-conferencing technology. The resulting 20 per cent reduction in total travel expenditure over the past year is a powerful reinforcement of the financial

value delivered by integrating climate change response and business efficiency programs.

Ergon has also found that its energy efficiency program has produced some valuable knock on benefits for its business: employee dissatisfaction due to travel and time away from home has dropped, as have the risks involved in employee travel. The resulting time saving has also meant that employees can be more productive. The measures mean that 250 tonnes of greenhouse gas emissions have been avoided, with another 3700 tonnes offset in the first year.

Queensland Complete Printing Services (QPrint): Leading the printing industry

This Nambour-based business with 13 employees has recently won several awards for its sustainability initiatives, including the 2009 Queensland Sustainable Industry Awards. QPrint is one of the founding members of the Department of Environment and Resource Management's EcoBiz program (refer to p9).

The printing business has reduced its power consumption by 30 per cent since it encouraged its staff to do some simple things like turning off machinery, lights and computers when they were not in use, replacing fluoro tubes with low energy lighting and only running the air-conditioner at peak heat times. Qprint worked hard to get the active participation of every staff member, a key factor in its achievements.

This reduction in energy consumption has allowed Qprint to purchase 100 per cent GreenPower, without increasing the cost of production and passing this on to the customer. It aims to demonstrate industry leadership and become 100 per cent carbon neutral. Following on from its previous successes, Qprint's next aim is to switch to solar hot water and paint the building with a NASA developed solar deflecting paint.

As well reducing its carbon emissions, QPrint has implemented a number of other measures to make its business more sustainable and influence other businesses including:

- Using only biodegradable soy-based inks in its printing processes

- Recycling more than 95 per cent of all waste
- Using biodegradable packaging and corn-starch book coverings
- Harvesting 100 per cent of the water used in printing processes from roofwater
- Purchasing from suppliers that have strong environment credentials
- Partnering with the 1000 trees initiative to provide native plants for Sunshine Coast schools and not-for-profit groups
- Publishing an annual sustainability report to document its objectives, achievements and plans for the future
- Participating in the Sunshine Coast Sustainable Business Alliance and the Queensland Printing Industry's Sustainable Green Print Pilot Group

STEP 2 – REDUCE EMISSIONS **Scope 3 Other indirect emissions**



Indirect emissions that do not arise from electricity purchases include:

- Business-related travel
- Employee commuting
- Waste disposal
- Contractor-owned vehicles
- Outsourced activities
- Product use
- Production of purchased materials
- Material and product transport

Transport

The transportation sector accounts for 10.4 per cent of Queensland's emissions, with passenger cars being the major contributor.

For example, a small office-based business located in a CBD will have transport needs very different from a national retailer. Scope 3 emissions include those from vehicles that are owned or leased by an organisation external to the business rather than vehicles that are owned or leased directly by the organisation (which are classified as scope 1 emissions).

How to reduce business-related travel

Use video-conference facilities **\$ \$**

Advances in video-conferencing have come a long way in recent years. Additional cameras allow parties to view documents on the conference table, and “smart-boards” allow participants to record and e-mail notes and actions at the touch of a button.

Remote Access **\$**

It is now possible to invite remote users to access a central PC desktop and teleconference at the same time.

Multi-task **None**

If it is necessary to travel by air, use the opportunity to meet with other potential clients or interview a prospective employee. Consider combining trips using a multi-city itinerary instead of two roundtrips.

Rent hybrid or electric cars **\$**

Many major car rental companies now offer hybrid vehicles in response to an increase in business' requests. If more businesses request these, rental companies will respond by making more available.

How to reduce emissions from employee commuting

Your employees' commute is not explicitly covered by inventory frameworks, but clearly work-related commuting has an impact on greenhouse gas emissions in Queensland and is something that employers can influence.

The results of an employee survey will give insight into commuter patterns and help a business to decide how to reduce these emissions.

Offer telecommuting **\$**

Where possible, allow some flexibility in employee schedules, encouraging staff to work from home as often as appropriate.

Offer incentives to take public transport to work **\$**

Provide tax-free public transport tickets and provide on-site cars for employee use to attend off-site meetings during the day.

Offer incentives to walk or cycle to work **\$**

Provide bicycle parking and changing/shower facilities.

Support carpools **None**

Provide information on internal and local carpool options.

The Department of Transport and Main Roads can prepare Workplace Travel Plans under the [Travel Smart Workplace](#) program. A workplace travel plan can assist your business to:

- Promote alternative travel choices for your staff
- Offer personalised timetables for staff and regular visitors
- Provide incentives for users of alternative transport modes
- Promote technologies that may reduce the need to travel to work
- Monitor progress in reducing greenhouse gas emissions from workplace travel

STEP 2 – REDUCE EMISSIONS Scope 3 Other indirect emissions

Supply Chain

Greenhouse emissions resulting from individual products as they pass through the supply chain can account for a significant amount of a businesses emissions.

A product's carbon footprint takes into account all associated impacts of a product, from sourcing the raw materials, to manufacture, through to use and disposal. An example carbon footprint of a can of soft drink is illustrated in Figure 7.

Understanding these impacts is called a lifecycle analysis (LCA), and moves away from single-company carbon management to covering multiple sites and multiple businesses operating in a supply chain.

Many businesses are taking responsibility for their extended carbon footprint by working closely with stakeholders in their supply chain to reduce emissions, or identifying new suppliers who have already taken

steps to reduce emissions in their operations. Businesses need to collaborate closely with suppliers and distributors (upstream and downstream) to understand issues such as:

- Practices and energy use in order to identify where efficiency improvements can be made
- Opportunities to use materials that are less emissions intensive
- Use of local materials
- Benefits of centralised manufacturing compared to increasing distribution miles

Some companies have elected to develop carbon neutral products through the Australian Government's voluntary Greenhouse Friendly program. The program requires that businesses undertake a verified LCA of a particular product or service, and for each product sold, the business will purchase and retire verified

➤ **Greenhouse Friendly** carbon offsets. See Step 3 for more information on carbon offsets.

Undertaking an LCA enables companies to:

- Potentially make a product or service carbon neutral
- Identify areas for efficiency improvements
- Identify options for less emissions intensive materials
- Compare the benefits of centralised manufacturing to increased distribution kilometres

Carbon trading schemes, like the CPRS, will add a cost of carbon into the production of materials. By looking beyond core operations, businesses often discover unexpected carbon spikes in their supply chain and as a result are able to take more effective action to reduce emissions, improve efficiencies and gain financial benefit. Many businesses are at different stages in the process of calculating, tracking, managing and reducing emissions across their supply chain and are adopting various approaches such as:

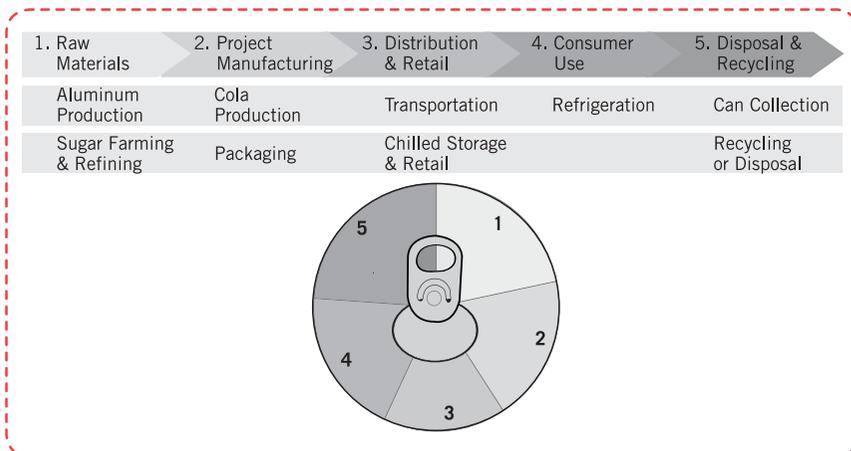
- Conducting a full LCA for some products
- Tackling distinct parts of the supply chain such as distribution logistics or packaging
- Working with individual suppliers to encourage fuel efficiency
- Providing tools, financing and models to suppliers to guide reductions without becoming directly involved

Recommendations and resources

Following are some ideas to help you address your business' liability for carbon emissions through the supply chain.

- 1. Encourage suppliers to disclose their greenhouse emissions** in order to better understand how they are considering climate change and emissions reductions.
- 2. Work with suppliers** by sharing information and resources to help suppliers address and reduce scope 1 and 2 emissions such as encouraging them to follow the steps laid out in this guide. This will assist in making carbon an integral part of supply chain management like other issues such as child labor, chemical management and human rights.

Figure 7 - Sample carbon footprint of a can of soft drink



Based on The Carbon Trust, *Carbon Footprints in the Supply Chain*, 2006.

STEP 2 – REDUCE EMISSIONS Scope 3 Other indirect emissions

3. Influence the value chain through:

- Purchasing decisions guided by a low carbon purchasing policy which is designed to direct businesses towards suppliers that have taken steps to reduce emissions
- Participation in sector collaborations that determine supply chain management best practices standards

4. Use recognised and widely-used LCA software tools to ensure the quality of data when analysing supply chains (refer to p47).

LCA Standard for product labelling

In 2008, Arup worked with the [UK Carbon Trust](#) and the UK Department for Environment, Food and Rural Affairs to develop a BSI British Standard to help businesses assess the carbon footprint of their goods and services. The standard, called PAS 2050, measures the greenhouse emissions in goods and services throughout their entire life cycle, from sourcing raw materials, through to manufacture, distribution, use and disposal.

The Carbon Trust has signed an agreement with Planet Ark, a leading Australian environmental organisation, to establish its Carbon Reduction Label in Australia. The first products bearing the label will be available in 2010.

5. Use accepted protocols such as outlined in the Draft National Carbon Offset Standard published by the Department of Climate Change. This standard is the initial guidance for calculating product lifecycle and supply chain emissions.

6. Be aware of resources such as the Greenhouse Friendly Guidelines which provide guidance on the completion of carbon-related supply chain analyses or the [ISO 14000 Family of International Standards](#) related to life cycle assessment.

Businesses that act as suppliers need to be aware that their customers may be following the steps above, and should be prepared to measure, disclose, and reduce greenhouse emissions for customers that demand it.

The Carbon Disclosure Project (CDP) formed a [Supply Chain Leadership Collaboration \(SCLC\)](#) group in 2007 and provides guidance for suppliers on how to disclose their greenhouse emissions. The CDP sent a questionnaire to a targeted number of suppliers on behalf of SCLC members to elicit information on greenhouse emissions, climate strategy and associated risks and opportunities.

Carbon Outlook Report: Helping businesses adjust to the CPRS

DEEDI has recently undertaken a study into the impact of the CPRS on Queensland's Small to Medium Enterprises (SMEs). The Carbon Outlook Report found that on average, the potential operating cost to a small number of SMEs from the proposed CPRS was 1.9 per cent, with a potential 18.7 per cent fall in the EBITDA (Earnings Before Interest, Tax, Depreciation and Amortisation) margins for the 50 businesses participating in the study. This assumes that no compensation for additional costs is provided and that suppliers pass down 100 per cent of their CPRS-related costs.

The greatest impact to businesses will be associated with costs passed down the supply chain, rather than the direct costs of energy, water or waste which represented only 16 per cent of the potential risk to business.

The study identified a number of opportunities for SMEs to reduce the carbon intensity of their business, and hence, their exposure to the impacts of the CPRS. These include 'quick-wins such as:

- Reviewing contracts and arrangements with customers and suppliers
- Engaging with suppliers to understand how they will manage the risks of CPRS
- Incorporating a carbon strategy into the broader business planning process

Medium and longer-term opportunities include:

- Reviewing supply chain and procurements strategies
- Evaluation and implementation of technological developments
- Undertaking an energy and/or fuel audit to clearly understand where and how energy and fuel is being used and opportunities for reduction

Many of the opportunities available are considered to be good business that would be of benefit regardless of the introduction of the CPRS.

The proposed ClimateSmart Business Service will be designed to help SMEs access targeted information on risks for their business and potential business solutions.

STEP 3 – PURCHASE OFFSETS



A carbon offset is a unit of reduction, removal or avoidance of a tonne of emissions (CO₂e) from a specific project. These units are called offsets or credits, and are traded and used to compensate for unavoidable emissions from other activities. Offsets are not required. They are a voluntary action for firms to reduce their own carbon footprint.

The approach outlined within this Guide is based on a hierarchy, which emphasises the need to reduce emissions, where possible, prior to purchasing offsets. By following this recommended approach a business is undertaking the offsetting process with integrity.

Carbon offsetting is often a necessary component for organisations claiming carbon neutrality. While the definition of carbon neutrality can differ, it is generally accepted that if a business offsets all emissions that cannot be reduced then it can claim carbon neutrality. Carbon neutrality can also be claimed for a particular product and is often an effective way to gain competitive advantage in the marketplace.

Regardless of whether a business is offsetting all or a portion of its emissions, the following can be used as a guide for purchasing quality carbon offsets.

The demand for offsets in Australia and internationally reflects the desire of organisations to demonstrate corporate social responsibility and environmental leadership. The value of offsets generated through the voluntary carbon market internationally was estimated to be US \$750 million in 2008¹². For some organisations this also represents an opportunity to provide brokering and professional services.

National Carbon Offset Standard

In December 2008, the Australian Government released the [National Carbon Offset Discussion Paper](#).

The paper was produced in response to the need for an Australian standard to identify what constitutes a robust, permanent and verifiable carbon offset. It is intended that a national offset standard will provide a means of ensuring the integrity of the products available for taking additional voluntary action, and assist consumers in making carbon offset purchase decisions.

The paper outlines the implications for carbon offsetting within the CPRS, including an assessment of the voluntary surrender of CPRS permits, Kyoto units, non-regulated international offsets and domestic offsets. It also provides guidelines for claiming carbon neutrality.

More than 100 individuals and companies provided submissions to the Department of Climate Change on the Draft Carbon Offset Standard.

The National Carbon Offset Standard continues to be developed in consultation with the public, and is expected to be finalised by the end of 2009. At this stage it will replace the current Greenhouse Friendly offset program.



Terms to know

Offset

Reduction, removal or avoidance of greenhouse emissions from a specific project that is used to compensate for emissions occurring elsewhere. An offset credit is 1 tCO₂e.

Carbon neutral

When an organisation or a specific activity emits no net carbon emissions to the atmosphere because its carbon impact has been reduced and offset.

Additional

Emission reductions that are in addition to reductions that would have occurred without the incentive provided by offset credits. The revenue from selling the project's emission reductions should have incentivised the project's implementation to ensure that reductions are not business as usual.

STEP 3 – PURCHASE OFFSETS

Carbon offset standards

A number of credible international and national carbon offset standards have been established to develop

more confidence and reduce risk. It is anticipated that the National Offset Standard would embrace other standards both domestic and international and act as the only standard for Australian projects.

The table below indicates whether the Draft National Offset Standard currently accepts the standards listed, which may change. However all the standards listed do generate credible, additional emissions reductions.

Standard	Description	Price \$AUD*	Project type	Project location	Draft National Carbon Offset Standard - complies
CPRS Permit – voluntarily cancelled	Cancelling a permit reduces the amount of permits available to polluters and so contributes indirectly to additional emissions reductions. It should be possible to select for those permits generated through forestry activities.	Not yet available	N/A	Australia	Yes
Clean Development Mechanism (CDM)	CDM is one of two programs by which project based emissions reductions can be certified under the Kyoto Protocol. CDM projects take place in countries not party to the Protocol. A removal unit (RMU) on the basis of land use, land-use change and forestry (LULUCF) activities such as reforestation. A certified emission reduction (CER) is the unit of offset generated from all other CDM project activities.	\$9.83 - \$35.19	LULUCF, RE, EE, IG (but not new HFC)	International	Yes
Joint Implementation (JI)	JI is one of two programs by which project based emissions reductions can be certified under the Kyoto Protocol. JI projects take place in countries that are party to the Protocol. An emission reduction unit (ERU) is the unit of offset generated by a JI project.	as above	RE, EE, IG (but not new HFC)	International	Yes
Voluntary Carbon Standard (VCS)	The VCS is based on CDM framework and creates a tradable Voluntary Carbon Unit (VCU). It focuses on greenhouse gas reduction attributes only and does not require projects to have additional environmental or social benefits. The VCS aims to foster innovation in offset design.	\$2.67 - \$10.19	LULUCF, REDD, RE, EE, IG (but not new HFC)	International	No
Gold Standard (GS)	The GS requires social and environmental benefits of its carbon offset projects and can be applied to voluntary offset projects as well as to CDM projects. A VER is the unit of offset generated by a GS project.	\$8.37 - \$16.62	EE, RE	International	No
Climate, Community and Biodiversity (CCB) Standard	The CCB Standards evaluate land-based projects in the early stages of development. It does not verify quantified carbon offsets nor does it provide a registry. The CCB Standards support local communities and conserve biodiversity, as well as foster innovation in offset design.	\$4.13 - \$15.77	LULUCF, REDD	International	No

*Price ranges indicated are based on information available at the time of writing.

Project Types: Each standard accepts different types of offset projects as listed in the column.

LULUCF: Land Use, Land-Use Change and Forestry (Bio-Sequestration)

REDD: Reduced Emissions from Degradation and Deforestation of Existing Forests

RE: Renewable Energy

EE: Energy Efficiency

IG: Industrial Gases, e.g., HFC, SF₆, N₂O

Note: There are other standards for project-based tradable emissions reductions in Australia, such as Greenhouse Friendly (there are no Queensland specific standards).

STEP 3 – PURCHASE OFFSETS

How to purchase offsets

1. Develop a tailored, robust strategy to determine the type and amount of offsets to purchase.

Businesses should consider questions such as:

- What emissions will the offsets cover (e.g. organisational boundaries, specific product services, or certain events)
- What is the budget? When purchasing offsets, the least cost option may lack quality, and conversely, the most expensive option is no substitute for due diligence.
- How will the decision to purchase offsets be communicated, both internally to employees and shareholders, and externally to customers and the media? What claims and messages are you hoping to convey?
- Who will pay for offsets? In order to encourage accountability and responsibility, consider requiring individual business units to purchase offsets in proportion to their emissions.

Offset projects vary in their advantages, disadvantages and co-benefits, and it is important to understand these in order to identify which project aligns best with your organisation's goals. Some questions to consider:

- Does a business have preferred areas of geographic or sector focus? Investing in a specific area may have valuable co-benefits for your operations in that region
- Are there particular technology types that a business wishes to support or avoid?

- How important are the sustainable development attributes of projects?

2. Determine who to buy offsets from

Offset sellers should provide transparent and easily accessible information about the types of projects they use to generate offsets. Established businesses may have more experience and carry reputational risks if they sell poor quality offset credits.

Here are some additional questions for businesses to ask of offset sellers:

- What standard are the offsets? (see previous page)
- Does the offset result from specific or single project, or from a pool of projects (which can spread risk)?
- Is the offset provider selling credits that have already been issued or credits that represent emission reductions that will occur in the future? While it is acceptable for companies to sell the rights to future emission reductions prior to an offset project's implementation, these offsets cannot be applied by the purchasing company until the actual emission reduction project has been verified and credited
- What is the offset provider doing to educate buyers about global warming and the need to take direct action?
- From what type of projects do the offsets come from? Your organisation may wish to purchase offsets from a particular type of project

A useful resource when selecting an offset provider in Australia, according to these and other criteria, is the Carbon Offset Guide Australia, developed by RMIT Univeristy: www.carbonoffsetguide.com.au

3. Choose an offset standard suited to your needs

Offset sellers should be using recognised standards to ensure the quality of the product (refer to p38).

4. Undertake due diligence

Before and after purchasing offsets, a business should assess projects to ensure they are delivering what is promised. Consultants can help with this.

5. Ensure offsets are retired on a credible registry

By retiring the credits, they will be taken out of circulation, removing the risk of being sold to another organisation and double counted. There are several registries offering these services and many offset retailers also operate independently audited internal registries.

6. Be transparent about offset purchases

Disclose information on carbon footprint calculations, emission reduction activities, the type of offsets being used, where offsets have been retired and any uncertainties related to these issues.

STEP 3 – PURCHASE OFFSETS

7. Review your approach on a regular basis

Undertake internal reviews to ensure that a businesses approach to purchasing offsets is still in line with best practice. This includes following developments with the Australian National Offset Standard.

8. Be smart about how you communicate your achievements

The Australian Competition and Consumer Commission (ACCC) has produced a guide to [↘ Green marketing and the Trade Practices Act](#) to assist companies in improving the accuracy and usefulness to consumers of their labeling, packaging and advertising (see p43 for more detail).

Challenge: the Credibility of offsets

The market for offsets has grown quickly and some dubious practices have led to criticism in the media around the credibility of offsets. The ACCC has also released the background paper [↘ Carbon offset claims and the Trade Practices Act](#) which examines some issues surrounding carbon offset and neutrality claims.

An important condition for an offset is that the emissions reductions it represents are additional to what would have occurred otherwise. The introduction of a national emissions trading scheme (the CPRS), which places a cap on national emissions, increases the need for vigilance in sourcing truly additional offsets. Currently, the following options for purchasing credible, additional offsets would be available:

- Purchase of CPRS permits that are voluntarily retired, through the Australian Carbon Trust and potentially other means
- Purchase of credits generated through the Kyoto Protocol's Clean Development Mechanism and Joint Implementation Mechanism
- Purchase of credible international, voluntary offsets, such as the Voluntary Carbon Standard and the Gold Standard
- Purchase of credits from domestic suppliers of offsets sectors not accounted for in complying with the Kyoto Protocol e.g. some land-use management practices, such as avoided deforestation, revegetation and soil and crop management

The Australian Government is reviewing its policy on a national carbon offset standard and is exploring ways in which to provide its support for a broader range of offset sources, both domestic and international. The ACCC material is also currently under review in light of the development of National Government policy.

The Voluntary Carbon Standard: Fostering innovation in offsets

A key objective of the VCS is to experiment and stimulate innovation in emission reduction technologies and offer lessons that can be build into future regulation. As part of its drive for credibility and innovation, the VCS includes Agriculture, Forestry and Other Land Uses (AFOLU) in the list of eligible project activities based on a new approach to manage risks associated with these project types. Currently the following four categories of AFOLU project activities are eligible under the VCS Program:

- Afforestation, Reforestation and Revegetation (ARR)
- Agricultural Land Management (ALM)
- Improved Forest Management (IFM)
- Reducing Emissions from Deforestation and Degradation (REDD)

For more information on the VCS, please visit

[↘ www.v-c-s.org](http://www.v-c-s.org)

STEP 3 – PURCHASE OFFSETS



Powerlink – Purchasing Offsets and benefiting Queensland's environment

In June 2009, Powerlink Queensland, Queensland's electricity transmission provider, purchased air travel and vehicle fleet carbon offsets from Ecofund, as well as green electricity for its premises.

Powerlink purchased 7,404 tonnes of carbon offsets as part of its commitment to address the greenhouse gas emissions associated with employee air and vehicle travel.

The carbon offsets were equivalent to protecting 9.03 hectares of forest, powering 951 Queensland homes with clean energy or removing 1,898 family-sized cars from the road for 12 months.

Powerlink also purchased 4,835 MWh of Queensland-based GreenPower™ Renewable Energy Certificates from Ecofund to offset 50 per cent of its office electricity consumption.

In addition, Powerlink contributed to the acquisition of national park land to support the Queensland Government's protected area target. The contribution was used to access a two-for-one funding deal from the Australian Government to purchase a new national park for Queensland worth more than \$1 million.



Ecofund – Queensland based Carbon and Environmental Offset Provider

Ecofund is the Queensland Government's advisory and trading service providing carbon, renewable energy and environmental offsets. It is intended that Ecofund will also service the private sector, non-government organisations and households from November 2009.

Ecofund's carbon and renewable energy services include:

- Carbon footprinting and emission reduction strategies
- Carbon and renewable energy market analysis and trading
- Projects that create accredited carbon supply (i.e. permanent biodiverse carbon forests)
- Education and training

Ecofund specialises in sourcing Queensland-based accredited carbon credits from a variety of carbon reduction projects.

Ecofund is also committed to expanding Queensland's national parks through its Give to the Earth trust that seeks philanthropic donations. Ecofund will expand other protected areas through the [Balance the Earth](#) trust. Through these trusts, Ecofund will directly contribute to expanding Queensland's protected areas to 20 million hectares by 2020.

Offset Products	Regulator / Accreditation
Household energy efficiency	Greenhouse Friendly
Landfill methane destruction	Greenhouse Friendly
Biodiverse reforestation	Greenhouse Friendly
Renewable energy	Office of Renewable Energy Regulator and the National GreenPower Program
International offsets	Multiple regulators

REPORTING



Reporting greenhouse emissions involves communicating the results of your inventory and emissions reductions activities to an external audience.

By disclosing greenhouse emissions information to stakeholders and ensuring that the data and emission reductions activities are good quality, your business can realise significant benefits such as:

- Communicating performance to concerned stakeholders and the public to improve brand reputation
- Improving understanding of climate change impacts to better influence future policy
- Meeting and addressing any mandatory reporting requirements, such as NGERs

How to report emissions

When reporting greenhouse emissions to the public there are several ways to organise and display emissions data. Emissions can be reported for individual entities such as factories and offices, or reported centrally for the entire organisation.

For comprehensive reporting of your greenhouse gas inventory, it is important to:

- Calculate the emissions of all six greenhouse gases to demonstrate a clear picture of the total emissions.
- Report greenhouse gases in metric tonnes emitted annually with CO₂ equivalents. The inventory may divide the emissions sources into key activities (e.g. fuel use, electricity use) or key facilities (e.g. by office, by factory). Tonnes of greenhouse gases produced can also be normalised to profiling aspects of a business (e.g. per capita, per \$M turnover, per fiscal year, per product, etc.).
- Disclose the baseline and recalculation policy, and methodologies used to calculate emissions (e.g. emissions factors or calculation tools). Businesses may also opt to report on the process and any challenges or successes experienced throughout the process. Many reporting programs provide clear guidance and rules on how emissions should be reported.

- Illustrate emissions reductions achievements as you annually report your performance. Graphs, diagrams, tables, dashboards and meters have been used to illustrate successful emissions reductions achievements.
- Maintain relevance, consistency, completeness, transparency and accuracy, and use the best data available at the time of reporting.

Shareholders, employees, other businesses, the environmental community and the public all may want to learn about your business' commitment to protecting the climate.

You may also wish to report the emissions inventory and reduction achievements in internal or external reporting such as intranet sites, newsletters and bulletins and corporate annual reports and sustainability reports.

REPORTING

Challenge: 'Greenwash'

Consumers will reward environmentally preferable products and business practices, but are also wary of unmerited green marketing tactics and reporting.

This prompted the ACCC to undertake research in the area of green marketing (see p40). The key message from the ACCC research is for organisations to exercise care when it comes to marketing their environmental initiatives and to consider whether claims can be substantiated. The research further identified the following five areas of concern when communicating issues of carbon management:

- Effectiveness of the offset: The lack of accepted standards relating to carbon credits means that consumers may be misled as to the effectiveness of particular offsets at yielding reductions in carbon emissions. For example, the effectiveness of tree-planting as a method of offsetting carbon emissions is highly variable, and often disputed.
- Accuracy of the carbon footprint calculation: Similarly, the process of auditing carbon emissions is currently unregulated, so that there are no legal standards as to how a carbon footprint is to be measured. As a result, a product or a service claiming to be carbon neutral may only be "green" to the extent of a potentially inaccurate carbon calculation. The National Carbon Offset Standard is expected to provide guidelines for accreditation of carbon neutral products and services, including on methodologies for conducting life-cycle assessments of greenhouse emissions.

- False claims of carbon-neutrality: The ACCC is also concerned that companies may make claims as to carbon neutrality that are simply false, and clearly in breach of the *Trades Practices Act*. Further information can be found in the ACCC's [↘ Green Marketing and the Trade Practices Act](#) and the [↘ Carbon Offset Claims: Trade Practices issues and other key concerns](#).
- Claims as to future carbon neutrality: Claims as to future carbon neutrality are also potentially misleading where there are insufficient disclaimers as to expected timeframes of the offset process.
- Claims of "low carbon": Where the proportion of carbon neutrality is not specified, the ACCC is concerned that consumers could be misled as to the extent to which carbon emissions associated with a product or service have been offset.

It is recommended that any green marketing claims are clearly and accurately explained. Many organisations find it useful to have a webpage which explains exactly what has been reduced, measured or offset.

The following provides a simple guide about how a business should communicate environmental considerations:

- Be honest and truthful
- Detail the specific part of the product or process which is referred to
- Use language which the average member of the public can understand
- Explain the significance of the benefit
- Ensure any claims can be substantiated

Carbon Disclosure Project (CDP): The benefits of reporting

Voluntary reporting is an important catalyst for action. Over the past few years, the Carbon Disclosure Project, on behalf of institutional investors with a combined US\$57 trillion of assets under management, has been asking 3,700 of the world's biggest companies to complete a questionnaire about the commercial risks and opportunities posed by climate change.

A 2007 study by [↘ Goldman Sachs](#) found that businesses with leading environmental, social and governance track records have outperformed the Morgan Stanley Capital International (MSCI) World index by 25 per cent since August 2005. What's more, 72 per cent of these companies have outperformed their competitors over the same period.

CDP plays a vital role in encouraging private and public sector organisations to measure, manage and reduce emissions and climate change impacts. Since its formation in 2000, CDP has become the gold standard for carbon disclosure methodology and process, providing primary climate change data to the global market place. For more information, visit: [↘ www.cdproject.net](#)

TAKING LEADERSHIP

“
There is a deep desire from companies to take the lead on climate change, and doing so presents a real opportunity for Australian businesses.”

Lend Lease CEO Rod Leaver.

More and more businesses are showing leadership on climate change as they recognise what it means to operate responsibly and sustainably. Many organisations are finding that developing a progressive climate policy also makes good business sense, increasing their appeal to consumers, allowing them to expand into new products and markets and significantly cutting their operating costs.

What constitutes leadership in this area is changing fast. When emissions trading comes in, the management of greenhouse emissions will soon become a standard business practice and those who do not manage their emissions strategically will be well behind the curve. Reducing and offset your businesses emissions now is still commendable but there is much more that you can do to claim leadership on climate change and identifying opportunities early on can really benefit your business.

The IT industry provides a good example. Emissions from the IT sector are expected to increase six per cent per year and double by 2020 due to growing demand for PCs, mobile phones and server space¹³. Currently, the industry is looking for solutions and is taking positive steps to reduce energy consumption. However, the IT sector also has the unique ability to monitor energy use and maximise energy efficiency both within and outside of its own sector. By enabling other sectors to reduce their emissions, the IT industry could reduce global emissions by as much as 15 per cent by 2020—five times its own footprint in 2020¹⁴.

Think about what your industry sector is uniquely positioned to offer that might contribute to reducing emissions beyond your own organisational boundaries. Network Ten has dedicated TV programming and air time to educate the community about climate change and encourage action among its viewers. HSBC is looking at how it can use its expertise in financial markets to create new opportunities, like financing renewable energy, and has launched a Climate Change Benchmark Index for institutional investors. There are many other examples where business leaders have realised their unique ability to drive change and generate new markets.

Here are some pointers which may help you to identify what taking leadership might mean for your business:

- Does your organisation’s position in the supply chain provide you with a particular advantage in leveraging action from others?
- Could you design your products in a way which will help end-users reduce their carbon footprint?

- Is there a unique aspect to your business or sector that could be used to drive emissions reductions in other sectors?
- How could you incentivise your employees to be climate leaders, multiplying the effect that you have on the community?
- Are you in a position to generate innovation?

Addressing these questions can be an integral part of the development and execution of your greenhouse gas strategy, and go to the heart of what it means to be a socially responsible business.



News Limited: Employee engagement

Through its **One Degree Program**, News Limited is providing employees with opportunities to cut their own emissions both at work and at home. Office car-pooling and the introduction of individual paper recycling are examples of initiatives that provide staff with the opportunity to reduce their own carbon footprint.

Divisional launches, competitions and giveaways have provided greater incentive for such changes. The ‘How eco would you go?’ competition, for example, encouraged staff to pledge one degree of action on climate change by rewarding the top performer with a Toyota Prius giveaway and employee discounts on laptops and the low emissions Toyota Prius.

TAKING LEADERSHIP



Network Ten: Leadership in broadcasting

Utilising its powerful on-air and digital presence Network Ten increased community and on-air initiatives aimed at raising awareness of climate change. Such goals are important in aligning Network Ten with other leaders and activists of climate change. This included dedicated on-air education campaigns and increased environmentally-themed programming content including a green-themed long weekend in June 2008 and June 2009, reaching almost 6 million viewers. Australia's first commercial free-to-air environmental News unit was established with a dedicated environmental reporter.

On-air time for environmentally-themed community service announcements was allocated.

A weekly segment is broadcast on Channel Ten's Queensland nightly news featuring regular references to water usage and state based carbon emissions.

Channel Ten also broadcasts dedicated Queensland-based environmental programs for children such as Totally Wild (wildlife and environment program) and Scope (a science based children's program).

Network Ten offset of emissions from the production of TEN's 2008 AFL coverage and provided community grants valued at more than \$100,000 awarded to 40 individuals and community groups for local

environmental projects in conjunction with a corporate partner.

Network Ten's activities resulted in inclusion on the FTSE4Good Index, the leading global responsibility index.

Ten also provides strong local Queensland media support for the environment including:

- Being a principal media supporter for the Queensland Sustainable Industry Awards
- Supporting the Brisbane City Council's 'Green Heart City Smart' programmes
- Being a media representative on the Queensland Premier's Climate Council



HSBC: Leadership in the finance sector

HSBC Bank has demonstrated its commitment to environmental sustainability through a number of key steps that began almost a decade ago.

First, HSBC began to monitor its energy and water use and waste produced, allowing the bank to introduce a program to reduce waste, as well as water and energy consumption. Carbon dioxide emissions that HSBC couldn't eliminate, it offset by buying emissions reductions from projects like wind farms and small

scale hydro-electric dams. As a result, since 2005, HSBC has been carbon neutral.

The second step in HSBC's journey was to recognise that while its direct impact was relatively modest, it needs to manage its indirect impact – the sustainability of the businesses that it funds. HSBC has guidelines outlining how it will and will not do business in environmentally sensitive sectors like forestry, water, energy and mining. HSBC is also an active participant in organisations that promote sustainability and was a founding signatory of the **Climate Principles** for the Finance Sector launched in 2008.

The next phase of HSBC's journey was to recognise that climate change is not simply a business risk to be managed, but a business opportunity to be developed. HSBC can use its competitive strengths to address the challenge of climate change – and write new business. This means looking at how HSBC can use its expertise in financial markets to create new opportunities, like financing renewable energy. HSBC has launched a Climate Change Centre of Excellence and a Climate Change Benchmark Index for institutional investors. In these ways HSBC is harnessing its expertise to develop a sustainable business.

GLOSSARY

Absolute Reductions	Reductions in total greenhouse gas emissions over time.
Additional	Emission reductions that are “in addition to” reductions that would have occurred without the incentive provided by offset credits. In other words, the revenue from selling the project’s emission reductions should have incentivised the project’s implementation to ensure that emissions reductions are not “business as usual.”
Baseline/Inventory	A reference or starting point to addressing climate change impacts by calculating and documenting the six main greenhouse gases for which a business is responsible.
Biofuel	Gas or liquid fuel made from plant material (biomass).
Cap-and-trade	An emissions trading scheme that sets an overall limit on the emission of a certain pollutant and allows participating entities to trade emission allowances.
Carbon Capture and Storage	Proposed method of reducing greenhouse gas emissions by capturing them from large stationary sources and storing them deep underground or deep in the ocean.
Carbon Footprint	The total amount of CO ₂ and other greenhouse gases emitted over the full life cycle of a product or entity.
Carbon Neutrality	When an organisation or activity emits no net carbon emissions to the atmosphere by taking steps to reduce and offset their carbon impact. (There is no widely accepted definition of this term.)
CFL	Compact fluorescent light bulb
Clean Energy	Energy that produces little or no pollutants in the air when generated. The energy source is not necessarily self-replenishing, for example natural gas.
CO₂e	Carbon dioxide equivalent. A unit, measured in tonnes, that allows emissions of non- CO ₂ greenhouse gas emissions to be expressed as if they were CO ₂ emissions, using global warming potential coefficients to make the conversion.
Energy Star	Voluntary labelling program created by the US Environmental Protection Agency and is a joint initiative of the Australian Government, and State and Territory Governments to identify energy-efficient products and buildings.
Eco-efficiency	Creating more goods and services while using fewer resources and creating less waste and pollution.
Fugitive Emissions	Uncontrolled or unintentional emissions from fuels and chemicals, typically arising from storage, transfer or replacement, e.g. HFC leaks from refrigeration systems, SF ₆ from electrical transformers and methane from landfills.
Greenhouse Gases (GHGs)	A group of gases that absorb and re-emit infrared radiation. These gases occur through both natural and human-influenced processes and include: carbon dioxide, nitrous oxide, methane, sulphur hexafluoride, hydrofluorocarbon and perfluorocompounds.

GLOSSARY

HVAC	Heating, ventilation and air conditioning systems and/or equipment and related control systems.
Intensity Reductions	Reductions in greenhouse gas emissions relative to a unit of activity (eg. CO ₂ per gallon of water delivered) over time.
kWh	Kilowatt-hour of energy (1,000 watt-hours).
LED	Light emitting diode. Semiconductor diode that emits visible or infrared light when current passes through it.
Mobile Combustion	Burning of fuels by transportation devices such as cars, trucks, airplanes, vessels, etc.
MW	Megawatt of power (one million watts).
Offset	Reduction, removal or avoidance of greenhouse gas emissions from a specific project that is used to compensate for emissions occurring elsewhere.
Offset Credit	An offset of one metric tonne of CO ₂ e.
Operational boundaries	The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company. This assessment allows a company to decide which indirect emissions to include that are a consequence of its operations
Organisational boundaries	The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).
Photovoltaic	Solar power technology that uses solar cells to convert light from the sun directly into electricity.
Renewable Energy	Energy made from a source that replenishes itself, for example solar, hydropower, or wind.
Renewable Energy Certificates (RECs)	Tradable environmental commodities proving that an electricity provider supplied 1 megawatt-hour (MWh) of renewable power (such as solar, wind or biomass) on the grid.
Renewable Portfolio	Policies mandating a state to generate a per cent of its electricity from renewable sources.
Scope of Emissions (1, 2 and 3)	Table 4 provides definitions of each of the emissions scopes.
Stationary Combustion	Burning of fuels to generate electricity, steam, or heat.

RESOURCES

Below are a selection of suggested resources and information sources to help businesses learn more about what is outlined in this publication.

Partners, Sponsors and Funders

The Climate Group

www.theclimategroup.org

Arup

www.arup.com

Introduction

Intergovernmental Panel on Climate Change

www.ipcc.ch/

United Nations Framework Convention on Climate Change

unfccc.int/2860.php

Stern Review on the Economics of Climate Change

www.hm-treasury.gov.uk/sternreview_index.htm

Garnaut Climate Change Review

www.garnautreview.org.au/index.htm#pdf

National Initiatives

Carbon Pollution Reduction Scheme

www.climatechange.gov.au/emissionstrading/index.html

Expanded Renewable Energy Target

www.climatechange.gov.au/renewabletarget/

National Greenhouse Emissions Reporting Act:

www.climatechange.gov.au/reporting/index.html

Energy Efficiency Opportunities Act:

www.ret.gov.au/energy/efficiency/eoo/eeolegislation/act2006/Pages/default.aspx

Clean Business Australia Fund:

www.ausindustry.gov.au/InnovationandRandD/CleanBusinessAustralia/Pages/CleanBusinessAustralia.aspx

Clean Energy Initiative

[www.ret.gov.au/Department/Documents/CEI%20Fact%20Sheet%20\(13%20May%2009\).pdf](http://www.ret.gov.au/Department/Documents/CEI%20Fact%20Sheet%20(13%20May%2009).pdf)

AUS Department of Climate Change

www.climatechange.gov.au

Other

Australian Department of Environment, Water, Heritage and the Arts

(Business and Industry Sustainability Publications)

www.environment.gov.au/settlements/industry/publications/index.html

International Standards & Reports

United Nations Framework Convention on Climate Change

unfccc.int/2860.php/

The Group of 100

www.group100.com.au/

Corporate Responsibility Index

www.corporate-responsibility.com.au

RESOURCES

Queenslands' Low Carbon Future

ClimateQ: Toward a Greener Queensland	www.climatechange.qld.gov.au/whats_being_done/queensland_climate_change_strategy
Queensland Smart Energy Savings Program	www.dme.qld.gov.au/Energy/smart_energy_savings_program_.cfm
EcoBiz	www.derm.qld.gov.au/ecobiz
ClimateSmart Business Service	www.business.qld.gov.au/dsdweb/v4/apps/web/content.cfm?id=13504
Queensland Sustainable Energy Innovation Fund (QSEIF)	www.derm.qld.gov.au/qseif
ClimateSmart Business Clusters	www.climatesmart.qld.gov.au/your_business/networking
Queensland Renewable Energy Plan	www.cleanenergy.qld.gov.au/queensland_renewable_energy_plan.cfm
Solar Hot Water Program	www.cleanenergy.qld.gov.au/queensland_solar_hot_water_program.cfm
Queensland Renewable Energy Fund	www.cleanenergy.qld.gov.au/queensland_renewable.cfm
TravelSmart Workplace	www.transport.qld.gov.au/Home/General_information/Travelsmart/
Vegetation Management in Queensland	www.nrw.qld.gov.au/vegetation/index.html
South East Queensland Regional Plan	www.dip.qld.gov.au/seq
Queensland Chamber of Commerce and Industry	www.cciq.com.au
Queensland Trucking Association	www.qta.com.au/

Step 1 - Establish A Baseline

National Greenhouse and Energy Reporting Act 2007	www.climatechange.gov.au/reporting
The GHG Protocol	www.ghgprotocol.org

RESOURCES

National Greenhouse Accounts (NGA) Factors

www.climatechange.gov.au/workbook/index.html

International Standards Organisation

www.iso.org

Online System for Comprehensive Activity Reporting (OSCAR)

www.climatechange.gov.au/oscar/index.html

ISO1404 standard under which third party verifiers should be trained:

www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38700

Other

GHG Management Institute

www.ghginstitute.org

Joint Accreditation System of Australia & New Zealand (JAS-ANZ)

www.jas-anz.com.au/index.php

Step 2 - Reduce Emissions, Scope 1

Clean Business Australia

www.ausindustry.gov.au/InnovationandRandD/CleanBusinessAustralia/Pages/CleanBusinessAustralia.aspx

Queensland Water and Energy Sustainability technology Network (QWESTNet)

www.derm.qld.gov.au/qwestnet

Step 2 - Reduce Emissions, Scope 2

Renewable Energy Certificates

www.orer.gov.au/recs/index.html

Energy Star Australia

www.energystar.gov.au/

AGL Greenhouse Audits program

www.agl.com.au/environment/Pages/GreenEnergyforyourBusiness.aspx

Origin Energy' Business Green Earth Plan

www.originenergy.com.au/2662/Business-GreenEarth

NABERS

www.nabers.com.au

Bureau of Meteorology

www.bom.gov.au

Energy Efficiency Council

www.eec.org.au

Ergon's participation in the Solar Cities Program

<http://evolve.ergon.com.au/WhatisErgonEnergydoing/Inthecommunity/Solarcity.aspx>

Ergon Energy

<http://evolve.ergon.com.au/CleanEnergy.aspx#Clean%20Energy%20for%20your%20business>

Energex

http://www.energex.com.au/environment/connecting_solar/connecting_solar.html

RESOURCES

Step 2 - Reduce Emissions, Scope 3

Greenhouse Friendly program

www.climatechange.gov.au/greenhousefriendly/

ISO 14000 Family of International Standards

www.iso.org/iso/en/prods-services/otherpubs/iso14000/index.html

The Carbon Trust

www.carbontrust.co.uk

Carbon Disclosure Project - Supply Chain Leadership

www.cdproject.net/corporate-supply-chain.asp

Other

TravelSmart Australia

www.travelsmart.gov.au/index.html

Step 3 - Purchase Offsets

National Carbon Offset Standard

www.climatechange.gov.au/nav/carbon_offset.html

Clean Development Mechanisms (CDM)

www.global-greenhouse-warming.com/clean-development-mechanism.html

Gold Standard

www.cdmgoldstandard.org

Voluntary Carbon Standard (VCS)

www.v-c-s.org

Climate, Community and Biodiversity Standard (CCB)

www.climate-standards.org

Carbon Offset Guide Australia

www.carbonoffsetguide.com.au/

ACCC: Green Marketing and the Trade Practices Act

www.accc.gov.au/content/index.phtml/itemId/815763

ACCC: Carbon Offset Claims and the Trade Practices Act

www.accc.gov.au/content/index.phtml/itemId/833279

Other

Carbon Offset Watch

www.carbonoffsetwatch.org.au/

Offset Quality Initiative

www.offsetquality.org

Australian Life Cycle Assessment Society

www.alcas.asn.au

Life cycle analysis tools: SimaPro7

www.pre.nl/simapro

Reporting

Goldman Sachs SUSTAIN Report

www.unglobalcompact.org/docs/summit2007/g_s_esg_embargoed_until030707pdf.pdf

Carbon Disclosure Project

www.cdproject.net

RESOURCES

Other

Global Reporting Initiative

www.globalreporting.org

Leadership

News Limited One Degree Program for Queensland:

www.1degree.com.au/what_are_we_doing/australia/Queensland

The Climate Principles

www.theclimateprinciples.org/

FTSE4Good

www.ftse.com/Indices/FTSE4Good_Index_Series/index.jsp

Other

Green Capital - Advancing Corporate Sustainability

www.greencapital.org.au/index.php

END NOTES

¹ACF and ACTU (2008) Green Gold Rush: How Ambitious Environmental Policy Can Make Australia a Leader in the Global Race for Green Jobs.

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³ Stern, N., Stern Review on the Economics of Climate Change, 2006, www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

⁴ International Energy Agency, Energy Technology Perspectives 2008, www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=2012

⁵ McKinsey & Company, (2008). An Australian Cost Curve for Greenhouse Gas Reduction, McKinsey Australia Climate Change Initiative.

⁶ ACF and ACTU (2008) Green Gold Rush: How Ambitious Environmental Policy Can Make Australia a Leader in the Global Race for Green Jobs.

⁷ United Nations Environment Programme and New Energy Finance Ltd. "Global Trends in Sustainable Energy Investment 2008," www.ren21.org/pdf/Global_Trends_sustainable_energy_investment_2008.pdf

⁸ The 5 per cent reduction is a minimum commitment irrespective of actions by other nations, with the 25 per cent commitment in the context of a global agreement with all major economies agreeing to comparable reductions.

⁹ McKinsey & Company, (2008). An Australian Cost Curve for Greenhouse Gas Reduction, McKinsey Australia Climate Change Initiative.

¹⁰ Queensland Government (Department of Environment and Resource Management (2009) ClimateQ: Toward a greener Queensland

¹¹ Commonwealth of Australia (2009) Australian National Greenhouse Accounts: State and Territory Greenhouse Gas Inventories 2007

¹² Capoor, K. and P. Ambrosi, (2008). State and Trends of the Carbon Market 2008, The World Bank, Washington DC.

¹³ The Climate Group and the Global eSustainability Initiative, Smart2020: Enabling the Low Carbon Economy in the Information Age, 2008, www.smart2020.org.

¹⁴ Ibid.

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