



# The challenge of greenhouse gas emissions

The “why” and “how” of accounting and reporting for GHG emissions

AN INDUSTRY GUIDE  
AUGUST 2002



# Dedicated to making a difference

## WHAT IS THE NEW ZEALAND BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT?

The New Zealand Business Council for Sustainable Development (NZBCSD), established in May 1999, is a coalition of leading businesses united by a shared commitment to sustainable development via the three pillars of economic growth, environmental protection and social progress.

The NZBCSD is a partner organisation to the World Business Council for Sustainable Development, a coalition of over 150 international companies with members drawn from more than 30 countries and 20 major industrial sectors. We also benefit from the WBCSD's global network of 30 national and regional business councils and partner organisations, involving some 700 business leaders globally.

## OUR MISSION

To provide business leadership as a catalyst for change toward sustainable development, and to promote eco-efficiency, innovation and responsible entrepreneurship.

## OUR AIMS

Our objectives and strategic directions, based on this mission, include:

Business leadership – to be the leading advocate on issues connected with sustainable development.

Policy development – to participate in policy development in order to create a framework that allows business to contribute effectively to sustainable development.

Best practice – to demonstrate business progress in environmental and resource management and corporate social responsibility and to share leading-edge practices among our members.

Global outreach – to contribute to a sustainable future for developing nations and nations in transition.

## Members

- 3M New Zealand Ltd
- BOC Gases New Zealand Limited
- BP Oil New Zealand Limited
- City Care Ltd
- Deloitte Touche Tohmatsu
- Fletcher Building Limited
- Fonterra Co-operative Group Ltd
- Hubbard Foods Ltd
- Interface Agencies Ltd
- Landcare Research
- Living Earth Limited
- Meridian Energy Ltd
- Mighty River Power Limited
- Milburn New Zealand Limited
- Minter Ellison Rudd Watts
- Money Matters (NZ) Ltd
- Morel & Co
- Natural Gas Corporation Holdings Limited
- NIWA
- Palliser Estate Wines of Martinborough Ltd
- Port of Tauranga Limited
- PricewaterhouseCoopers
- Richmond Limited
- Sanford Limited
- Shell New Zealand Limited
- Simpson Grierson
- Telecom New Zealand Ltd
- The Boston Consulting Group
- The Warehouse Group Limited
- Toyota New Zealand Limited
- Transfield Services (New Zealand) Limited
- Transpower New Zealand Ltd
- TrustPower Limited
- Urgent Couriers Limited
- URS New Zealand Limited
- Vodafone New Zealand Limited
- Waimangu Volcanic Valley Limited
- Waste Management N.Z. Limited
- Watercare Services Limited

## Contact

**Dr Rodger Spiller**, *Executive Director*

Phone: 09 363 3308

Email: [rodger@nzbcsd.org.nz](mailto:rodger@nzbcsd.org.nz)

Web: [www.nzbcsd.org.nz](http://www.nzbcsd.org.nz)

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# Introduction

## Message from the Chairman



Stephen Tindall,  
Chairman, New Zealand  
Business Council for  
Sustainable Development  
(NZBCSD) and founder  
of The Warehouse

Measuring your greenhouse gas (“GHG”) emissions is an essential first step towards managing them. We’ve produced this “why” and “how” to GHG accounting and reporting to help businesses measure their emissions. After all, what you can measure, you can manage.

There are many good reasons for business to manage their GHG emissions. These include:

- Cost reductions through increased efficiency
- Risk management
- Good corporate citizenship
- Intelligent entrepreneurship - identifying the business opportunities associated with the climate change challenge.

In June 2002 we released a report on our climate change business opportunities study. The study

identified potential opportunities worth \$350 million a year with an emissions reduction equal to taking around two million cars off the road. Our six participating member companies identified 32 additional opportunities.

The Warehouse has proved that companies can make a real difference. Our energy management programme last year received the EECA supreme award. It is currently saving The Warehouse about \$3M per year and is reducing GHG emissions. A number of our energy management initiatives are simply the clever application of common sense.

I challenge all businesses to commit to this journey, to measure their emissions and then set targets to reduce them. This guide is designed to help you do this. Experience shows it will pay a dividend.

Stephen Tindall

## Foreword



Dr Rodger Spiller,  
Executive Director,  
New Zealand Business  
Council for Sustainable  
Development

Climate change, caused by the release of greenhouse gases, is arguably the biggest challenge to sustainable development. Climate change has potentially serious environmental, social and economic consequences for New Zealand and the world as a whole.

The NZBCSD seeks to provide business leadership, to inform the debate and influence policy development around climate change.

On behalf of the NZBCSD I wish to acknowledge all those who have participated in this project. The leadership example of the six participating members deserves special thanks. These pioneering businesses are BP Oil New Zealand Ltd, Hubbard Foods Limited, Landcare Research, Meridian Energy Limited, Milburn New Zealand Limited and Urgent Couriers. Thanks also to the experts from NIWA and Telecom who provided project input. As the project consultants PricewaterhouseCoopers have demonstrated great commitment and expertise in how business can respond

to the climate change challenge. Thanks also to my colleagues on the NZBCSD Executive Team for their substantial contributions to this initiative.

This project has also utilised expertise and co-funding from the Ministry of Economic Development. We have appreciated the opportunity to partner with Government on identifying solutions to a challenge that affects us all.

This guide is the second phase of our Climate Change project. The first phase was the release of the associated Climate Change Businesses Opportunities report in June 2002.

Through these reports and examples from our members, the NZBCSD aims to encourage all businesses to think positively and creatively about the climate change challenge so that we can collaboratively seek win-win solutions and make a difference for sustainable development.

For more information on our activities please visit [www.nzbcsc.org.nz](http://www.nzbcsc.org.nz).

Dr Rodger Spiller

### Note from the Authors

This Industry Guide has been commissioned by the New Zealand Business Council for Sustainable Development (NZBCSD) and the Ministry of Economic Development and has been produced for the sole benefit of the NZBCSD. Our terms of engagement with the NZBCSD are governed by an engagement letter between us.

PricewaterhouseCoopers and the NZBCSD accepts no liability or responsibility whatsoever to any other person or organisation who reads this guide and owes no duty of any sort to such person or organisation. Any person or organisation reading this report must do so strictly on this basis.

We would like to take this opportunity to thank all those who were willing to share their experiences and contribute their time to this guide. We hope this guide will help organisations take their first steps towards understanding, accounting and reporting GHG emissions. For those who have already started on the GHG journey, we hope this guide will allow you to add more depth and international credibility to your information.

### Contact:

Andy Britton, *Partner*

PricewaterhouseCoopers  
Phone: + 64 9 355 8000  
email: [andy.britton@nz.pwcglobal.com](mailto:andy.britton@nz.pwcglobal.com)

Raechel Cummins, *Lead Consultant*

PricewaterhouseCoopers  
Phone: + 64 4 462 7000  
email: [raechel.j.cummins@nz.pwcglobal.com](mailto:raechel.j.cummins@nz.pwcglobal.com)

# The Guide to the Guide – an executive's summary

**While the exact legislative framework around climate change is still unclear, it is almost certain that businesses will be operating within a carbon constrained economy during the next few years. Addressing climate change implications earlier rather than later, and as part of an overall business strategy represents:**

- **intelligent entrepreneurship**
- **responsible risk management**
- and
- **good corporate citizenship.**

For most organisations climate change is a risk management issue, whether formally acknowledged or not. Even though some of the New Zealand Government's climate change policies will only come into effect in 2007, dealing with the risk can and should be acted on now, to maximise your opportunities, and understand and minimise your risks.

This guide builds on the "Business Opportunities and Global Climate Change" report issued in June 2002 by the NZ Business Council for Sustainable Development. The report describes 32 potential business opportunities that the six participating companies have identified within their operations. These opportunities range from the provision of knowledge and services, to "climate friendly" branding, to investment in emissions reduction projects at home and in developing countries.

The first step that organisations need to take, to identify and capture GHG opportunities, is to compile a corporate emissions inventory. In other words, account for, calculate and report your GHG emissions. GHG accounting and reporting is not just for big business or heavy industry. Calculating GHG emissions does not require a PhD in science. In fact a good understanding of your systems and accounts payable information is much more important. There are 10 key steps to follow which closely follow the process outlined in the Greenhouse Gas Protocol, a document convened by the World Business Council for Sustainable Development and the World Resources Institute<sup>1</sup>.

1. For further discussion on the GHG Protocol please refer to Appendix 3 – Background to this Report, or go to [www.ghgprotocol.org](http://www.ghgprotocol.org)

The guide is structured into three main sections:

Why – the business case for GHG accounting and reporting. Credible GHG accounting is important because it will form the basis for:

- participating in Government initiatives (such as the proposed Negotiated Greenhouse Agreements)
- participating in GHG trading markets
- understanding and managing your GHG risks
- identifying GHG/cost saving opportunities, for example through energy efficiency
- demonstrating compliance with government regulations

How – the 10 key steps to calculate and report GHG emissions.

These 10 steps will help you to:

- understand what greenhouse gases your organisation may be emitting
- calculate and convert those emissions into tonnes of CO<sub>2</sub> (the recognised standard)
- report your emissions in line with international good practice, and in a manner which your stakeholders can understand

Who – who should use this report, and whose already taking up the GHG challenge

- two case studies are available at the back of this guide and a further four case study examples are available electronically on [www.nzbcscd.org.nz](http://www.nzbcscd.org.nz)

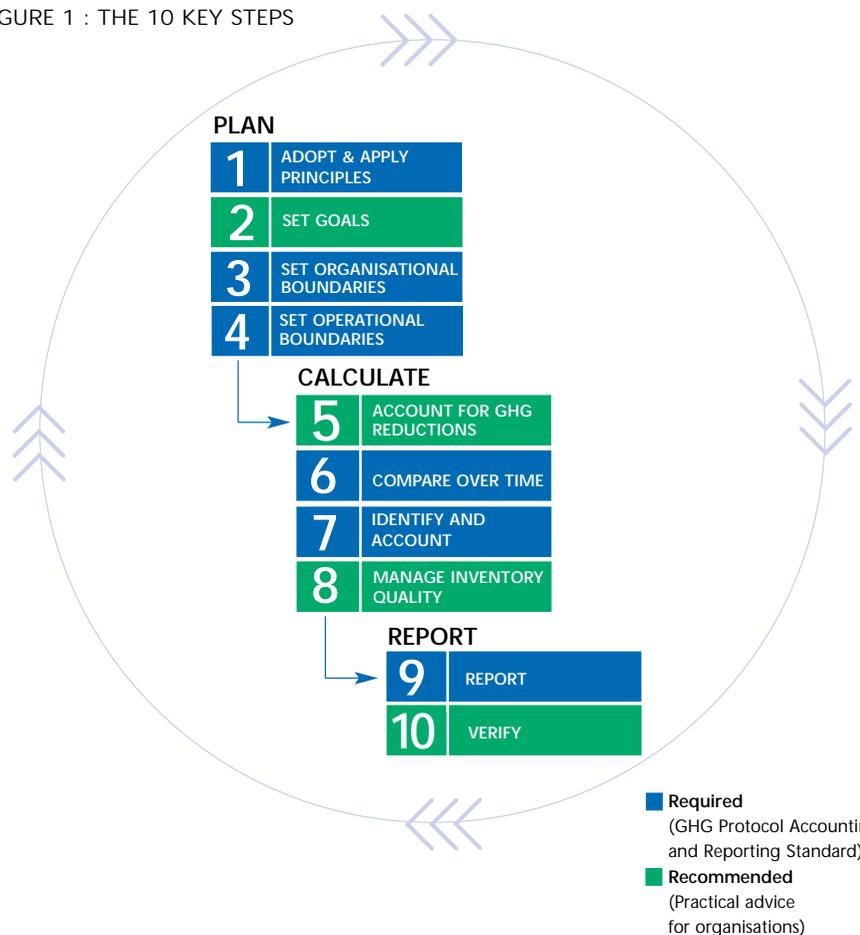
The time and resources needed to prepare emissions inventories will vary depending on the nature and structure of your organisation. By following the 10 steps outlined in this guide, you will be adopting the comprehensive standard outlined in the GHG Protocol with the necessary detail for credible public reporting. It is good business management to account for and calculate your GHG emissions, to understand your emissions profile and start the journey towards GHG management as this management will ultimately lead to new revenue generation or cost reduction opportunities.

**Key Learning**

The business case for climate change is more complex than a simple cost/benefit analysis. Organisations are investing in climate change strategies to:

- understand their issues
- minimise their risks
- maximise their opportunities.

FIGURE 1 : THE 10 KEY STEPS



# Why?

## The business case



*"BP has proved that reducing greenhouse gas emissions can be good for a company's financial bottom line. Since 1997 BP internationally has reduced its greenhouse gases by 10% from a 1990 base line and at the same time created \$US650 million in value. Other companies can also achieve these results."*

**PETER GRIFFITHS, CEO,  
BP OIL NEW ZEALAND LIMITED**

In recent years, global warming and climate change have become international issues for both industrialised and developing countries. They will undoubtedly continue to be important politically and economically for generations to come. Increasingly, businesses will need to understand and manage their GHG risks in order to maintain their license to operate, to ensure long-term success in a competitive business environment, and to comply with national or regional policies aimed at reducing corporate GHG emissions<sup>2</sup>. Now is the time to recognise that climate change is a serious business risk with significant strategic, financial and environmental implications. Simply put, the costs of inaction now outweigh the costs of action, and the sooner positive action is taken, the greater the economic benefits.<sup>3</sup>

2. The World Business Council for Sustainable Development, and the World Resources Institute, "The Greenhouse Gas Protocol, a corporate accounting and reporting standard" available free from [www.ghgprotocol.org](http://www.ghgprotocol.org)

3. Innovest Strategic Value Advisors, Inc, Value at Risk: Climate Change and the Future of Governance, CERES Sustainable Governance Project Report, (2002), page 9

## THE BUSINESS CASE

The main reasons can be summarised as:

### GHG Risk Management

The regulatory risk alone is a strong driver for businesses with potential high cost exposure. An inventory of your emissions, including those emissions that occur both up and downstream of your operations will help assess the business risks and opportunities. It will also help businesses to respond to shifts in consumer preferences based on corporate GHG performance and reputation. Once an emission position is known, reduction opportunities can be evaluated and targets set.

### Competitiveness considerations

What gets measured gets managed. Many leading businesses have already concluded that they can benefit financially by addressing emissions management. By using energy and other resources more efficiently, production costs can be reduced and competitiveness improved. In addition, creating new products or services that use less energy and produce lower GHG emissions can differentiate the business in an increasingly environmentally conscious marketplace.

## GHG Markets

Emissions trading markets are maturing. Over time, the importance of emissions trading will grow. Already several markets are operating internationally, and although each market has specific requirements, a common requirement is an accurate emissions inventory. Participation in GHG markets provides a clear business opportunity for many organisations to generate new revenue.

### Participation in government initiatives

The Government's proposed climate change policy package signals a reliance on market based approaches and voluntary initiatives (for example by way of "Negotiated Greenhouse Agreements"). Measurement of emissions will be required for participants in such schemes.

## Key Learning

Accounting and reporting for GHG emissions is most successful when the exercise is fully integrated into the strategy of the organisation, and not simply done for annual or sustainability reporting purposes.



*"Meridian Energy is committed to exploring business opportunities resulting from the emerging carbon markets with a view to continuing to offer New Zealanders and New Zealand business sustainable energy solutions"*

KEITH TURNER, CEO, MERIDIAN ENERGY LIMITED

# How?

## How to account and report GHG emissions

The first step towards establishing exactly what GHG opportunities, responsibilities and potential liabilities your business may have, is to compile an emissions inventory.

GHG accounting and reporting should be based on the principles of:

- Relevance
- Completeness
- Consistency
- Transparency
- Accuracy

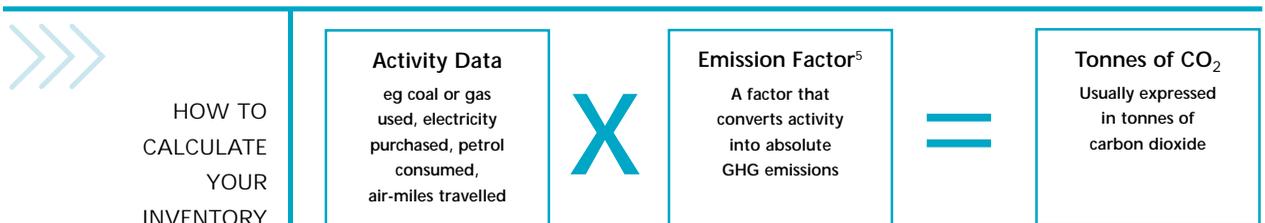
### METHODOLOGY

We have grouped the 10 steps in the GHG Protocol into 3 main actions.

- ACTION 1     PLAN
- ACTION 2     CALCULATE
- ACTION 3     REPORT

The recommended way to compile your emissions inventory is to use the 10 step process outlined in the Greenhouse Gas Protocol which is summarised in this guide. You must then choose calculation tools<sup>4</sup> that are right for your business given the complexity of your organisations structure and processes and your

technical level of understanding. Regardless of the calculation spreadsheets used, it is strongly recommended to ensure all emissions inventories are based on the principles of the GHG Protocol, for international credibility, completeness and consistency.



4. Please see page 11 for further discussion on calculation tools commonly used in NZ

5. See appendix for a full list of emission factors.

# Plan

## STEP 1 - ADOPT AND APPLY GHG PRINCIPLES

The GHG Protocol principles state that all GHG accounting and reporting should be:

- Relevant ■ Complete ■ Consistent
- Accurate ■ Transparent

Understanding and basing your GHG accounting on these principles will ensure a credible emissions inventory.

## STEP 2 - SET GOALS

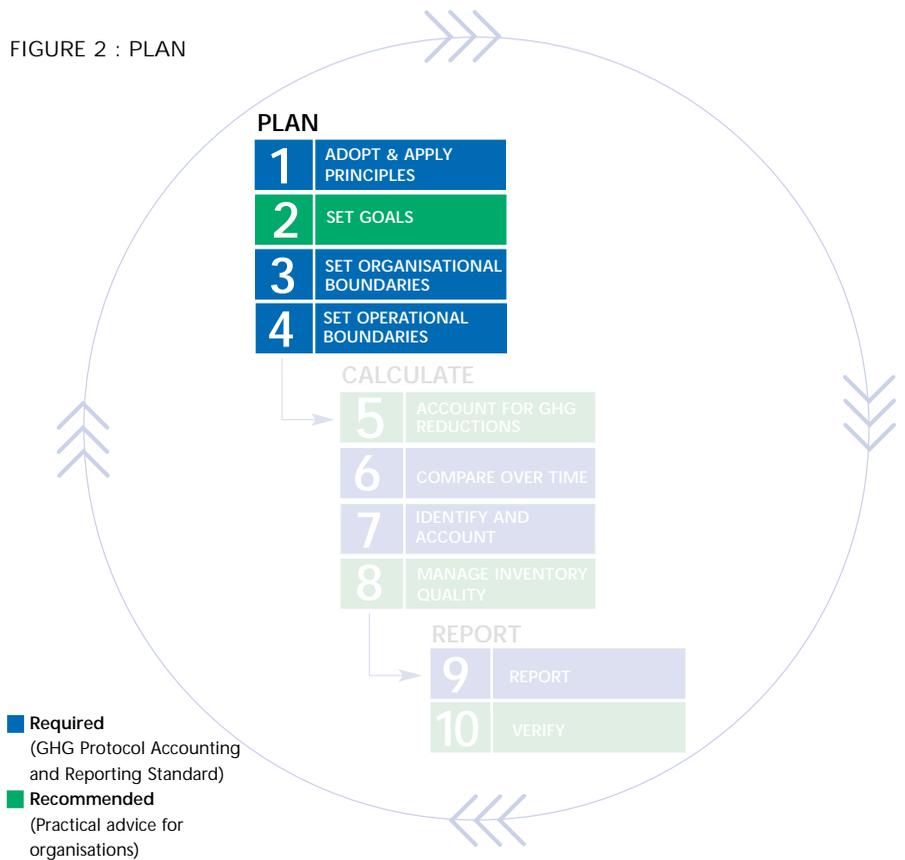
The question organisations often ask when starting to compile an emissions inventory is “Why are we doing this?”. As discussed under the “why”? section of this guide the four categories of business goals most frequently listed by companies as reasons for compiling a GHG inventory are:

- GHG risk management
- Competitiveness considerations
- GHG markets
- Participating in Government initiatives

## STEP 3 - SET ORGANISATIONAL BOUNDARIES

The next question organisations ask is “How should we account for emissions from business units, subsidiaries, joint ventures, or equity investments?” Clear organisational boundaries will ensure your inventory is complete. Businesses vary in their legal and organisational structures. When accounting for GHG emissions from partially-owned entities/facilities, it is important to

FIGURE 2 : PLAN



draw clear organisational boundaries and to apply the concept of “control” and “significant influence”.

Where possible, it makes sense to follow company-specific distinctions already in place for financial accounting, provided these are explicitly explained and followed consistently.

## STEP 4 - SET OPERATIONAL BOUNDARIES

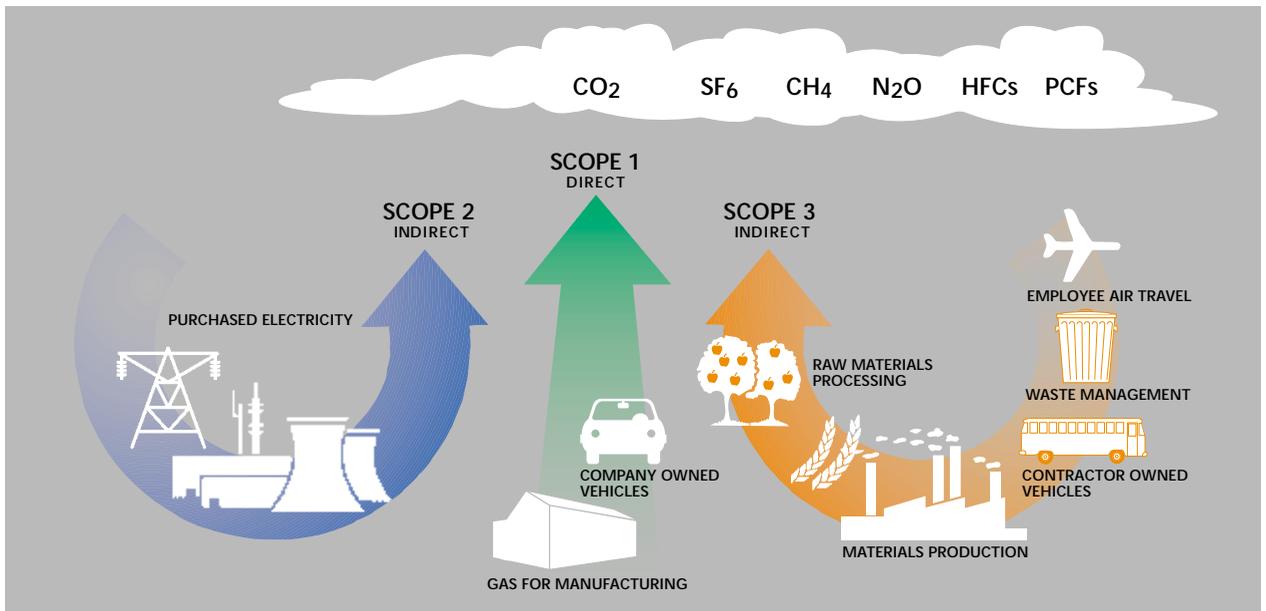
After an organisation has determined its organisational boundaries, it is important to define its operational boundaries. Questions at this stage include “What are my activities? Where are these activities located? What emissions have I directly caused? What emissions are a result of my business, but belong to another entity?”

The GHG Protocol proposes three scopes to help companies categorise their direct and indirect emissions:

- Scope 1            Direct
- Scope 2            Indirect
- Scope 3            Indirect

Direct GHG emissions are emissions from sources that are owned or controlled by the reporting company e.g. company owned vehicles. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting company, but occur from sources owned or controlled by another company e.g. emissions from the production of purchased electricity (Scope 2) or employee travel on scheduled flights (Scope 3).

FIGURE 3 : EXAMPLE OF THE THREE HUBBARD FOODS LIMITED SCOPES



Both direct and indirect emissions contribute to an organisations emissions profile, but the split is important. It is only the DIRECT emissions which a company has direct control over and therefore the direct ability to reduce. See diagram above for further explanation of Scopes.

## Calculate

### STEP 5 - ACCOUNT FOR GHG REDUCTIONS

Once you have a clear strategy around “why” you are calculating your emissions, the next step is to establish “how” to calculate those emissions. It is important to be transparent about why and how your corporate GHG’s are reducing. Questions at this stage include: “Have my absolute emissions changed over time? Have my relative emissions changed over time? Can I

participate in any projects, offsets or credit mechanisms?” Focusing on the overall company GHG impact has the advantage of helping organisations more effectively manage their aggregate GHG risks and opportunities. It also helps guide the transfer of resources to activities resulting in the most cost effective GHG reductions. The GHG Protocol recommends accounting for GHG reductions, although this does not usually happen until a company has been calculating its emissions for at least one year.

### STEP 6 - COMPARE OVER TIME

The next step is to select a base year to start calculating your emissions, and to compare subsequent measurements against. Questions at this stage include “What sort of comparisons do I need to make over time? Do I need to start at 1990?” Base year emissions can be

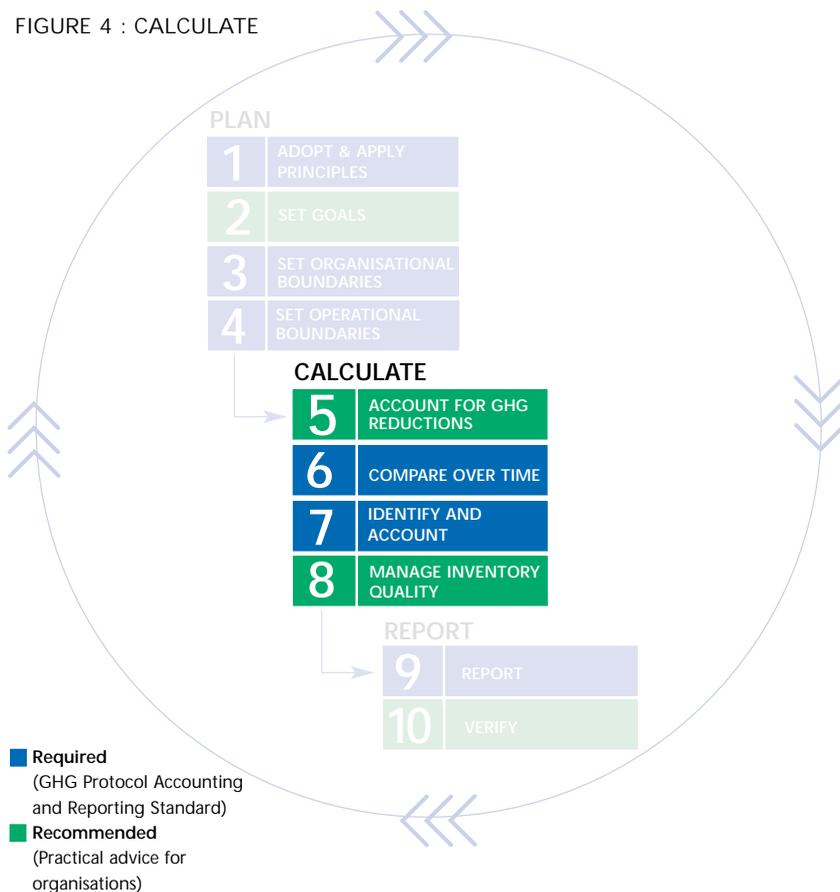
### Key Learning

Good GHG inventory planning will ensure your inventory will provide information for a variety of different uses.

To plan a relevant, complete, consistent, transparent and accurate GHG inventory:

- Set your GHG business goals
- Understand your company structure, including all its investments
- Understand your operations, including those in other business units or locations
- Establish if you are participating in any projects, or have purchased any emissions reductions
- Choose a base year to measure future emissions against

FIGURE 4 : CALCULATE



**Key Learning**

To calculate your emissions and achieve an inventory that is relevant, complete, consistent, transparent and accurate:

- identify your GHG emissions sources
- choose a base year
- calculate your emissions using appropriate tools and emissions factors
- account for any GHG reductions
- review the quality of your GHG information

To gather the information:

- Review key documentation, such as your annual report or GHG emissions data
- Discuss and confirm issues with key staff (e.g. your accountant, operations manager)
- Understand your internal data collection system

differentiated from the term baseline, used in the context of project-based accounting under the Kyoto Protocol. The base year emissions concept aims to compare your emissions performance over time, usually against the last accounting period or against emissions in a selected reference year. However, comparison only against the last accounting period is unlikely to cater for strategic business goals such as establishment of emissions reduction targets and management of risks and opportunities or address the needs of investors and other stakeholders.

**STEP 7 - IDENTIFY AND ACCOUNT**  
It is now time to identify and account your GHG emissions. Questions often

asked at this stage include: How do I measure what I emit? What tool should I use? Emissions calculations tools have been developed as part of the GHG Protocol. These tools are a series of spreadsheets, that are available free from the GHG Protocol website. Use of these tools is encouraged as they have been peer reviewed by experts and industry leaders and are believed to be the best available. The tools however are optional. Companies may use their own GHG calculation tools or other calculation tools available on the market, for example EBEX21<sup>4</sup>, provided they are consistent with the approaches described. A simple emissions calculator is available on the NZBCSD website at [www.nzbcscd.org.nz](http://www.nzbcscd.org.nz) which utilises the emissions factors in Appendix 1.

To calculate your emissions:

- identify your GHG emissions sources (taking account of your boundaries)
- select an emissions calculation approach
- collect activity data (e.g. from company vehicle log books, electricity bills)
- choose an emissions factor<sup>5</sup>
- input the data to calculate your GHG emissions
- consolidate the results from each subsidiary or site to get an overall corporate emissions inventory.

4. The EBEX21<sup>®</sup> CO<sub>2</sub> Footprint tool is a web-based CO<sub>2</sub> calculator designed to store information and report on participants CO<sub>2</sub> emissions. Participating organisations use the web site to enter their energy information periodically (usually annually, but data can be entered as more frequently) and generate reports on the amount of CO<sub>2</sub> they emitted. The function of the web site is to give organisations access to the tool 24 hours a day, allow them to run different scenarios to see the

effect of reducing energy consumption, provide a permanent record for their CO<sub>2</sub> emission reporting, and to give the users immediate access to upgrades in the tool. The information stored in the database is confidential and can only be accessed by the organisation through a login name and password. The calculator is divided into three levels. Level 1 deals only with direct energy sources such as fossil fuels and includes electricity. Level 2 is completed in addition to

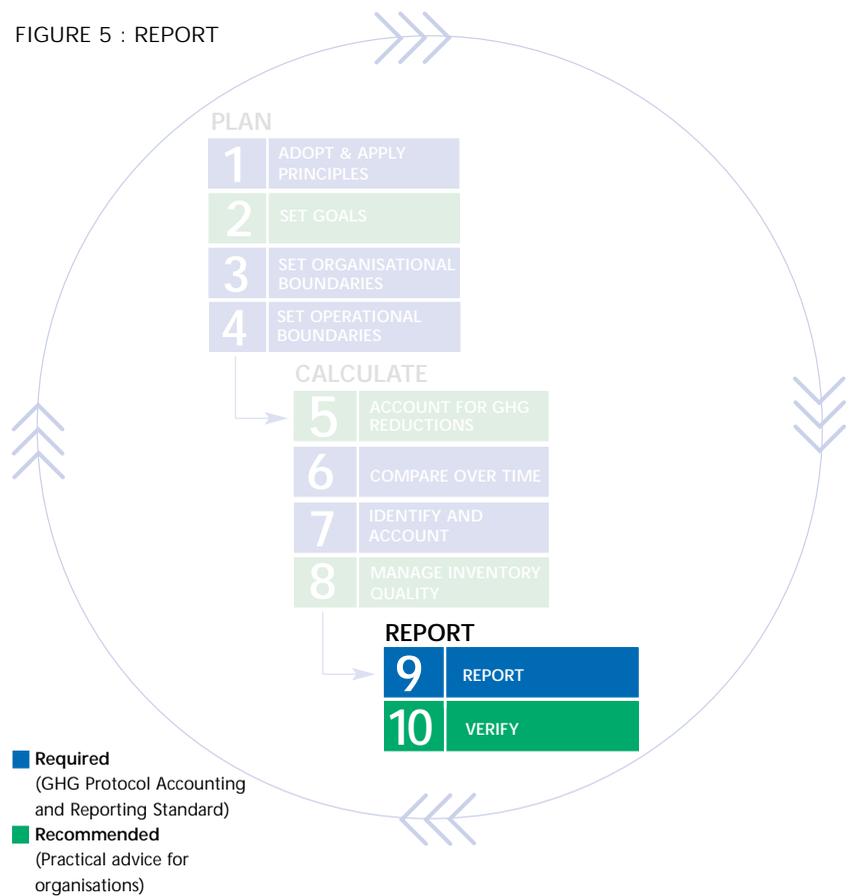
Level 1, and covers controllable indirect energy sources such as business travel (by car or plane) and staff commuting. Level 3 takes a full Life Cycle Assessment (LCA) approach, assessing all of the organisation's direct and indirect CO<sub>2</sub> emissions. Due to the complex nature of the calculations, Level 3 is not offered on the web site, as a trained analyst must assist the organisation in the data collection process. Visit [www.ebex21.co.nz](http://www.ebex21.co.nz)  
5. See Appendix 1 for further discussion on emission factors.

**STEP 8 - MANAGE INVENTORY QUALITY**

It is essential to input accurate and complete information to avoid the “Rubbish in, Rubbish Out” scenario. A high quality emissions inventory will ensure your calculations have credibility with internal management, external stakeholders and current or future GHG markets. The GHG Protocol outlines eleven steps to improve inventory quality:

1. Adopt and apply GHG accounting and reporting principles
2. Use a standardised system for calculation and internal reporting of GHGs across multiple business units/facilities
3. Select an appropriate calculation methodology
4. Set up a robust data collection system
5. Establish appropriate information technology controls
6. Undertake regular accuracy checks for technical errors
7. Conduct periodic internal audits and technical reviews
8. Ensure management review of the GHG information
9. Organise regular training sessions for inventory development team members
10. Perform uncertainty analysis
11. Obtain independent external verification

FIGURE 5 : REPORT

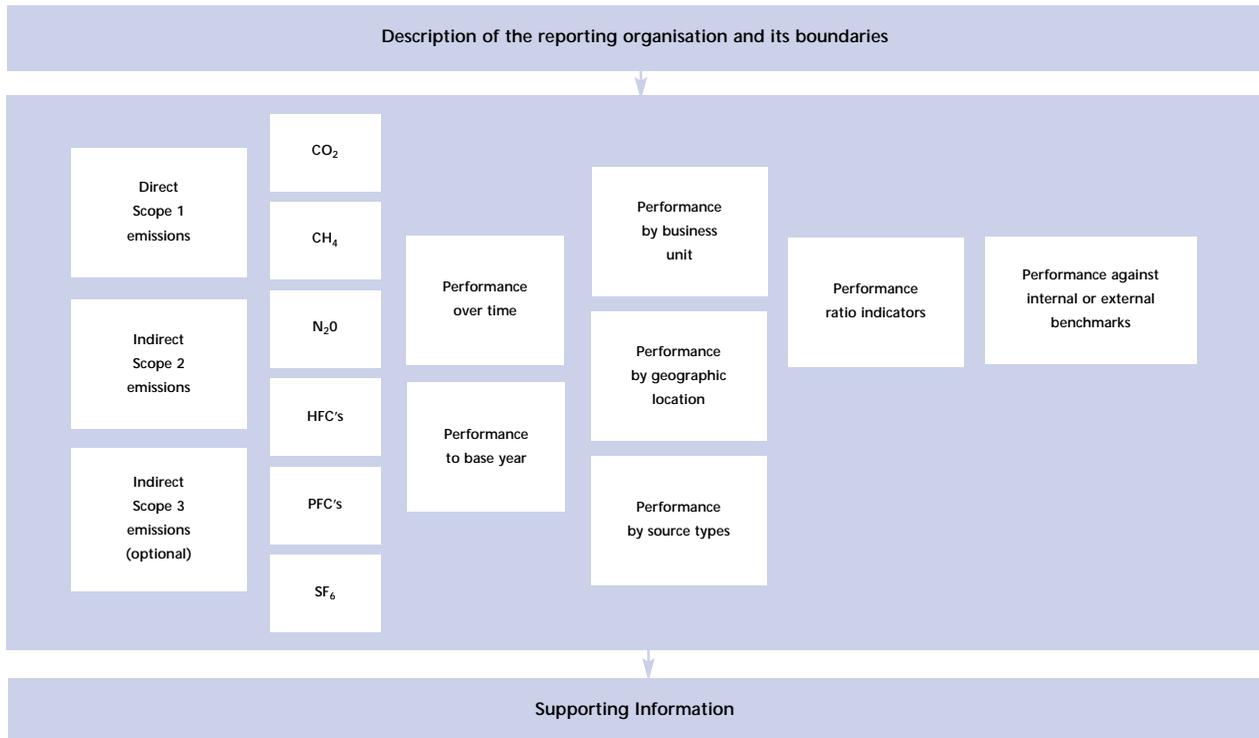


## Report

Once you have calculated your emissions, the next step is to communicate the information to your stakeholders. Questions commonly asked at the reporting stage include: What should I report? What format should I use? The reporting requirements and layout detailed in the GHG Protocol represent current best international practice. To assist organisations with this reporting format, figure 6 shows a summary of the reporting requirements outlined in

Chapter 9 of the GHG Protocol. The case studies illustrate one way this information may be presented. Different stakeholders will have different information needs. Therefore it may be appropriate to prepare a frontline report, which is a summary of your emissions inventory to be used in brochures or on the web, and a background report, which contains the balance of the emissions information. If you choose to report your information using two reports, it is important to provide a link or direct readers of the frontline report to the background report.

FIGURE 6 : GHG INFORMATION SUMMARY



**STEP 9 - REPORT**

Publicly reporting your GHG emissions involves:

- Choosing a reporting format
- Detailing all the information required by your stakeholders

The reports should be based on the best data available at the time of publication. At the outset it is better to be open about any limitations, and over time, correct and communicate any discrepancies identified in subsequent years.

A public GHG emissions report should include the information in Key Learning to the right:

**STEP 10 - VERIFY**

Verification involves the independent review and assessment of your GHG emissions inventory by a suitably qualified verifier. Reasons to get your GHG emissions inventory verified include:

- To add credibility to publicly reported information
- To enhance stakeholder trust in the organisation
- To increase internal confidence in the information
- To improve your internal GHG accounting and reporting practices
- To facilitate learning and transfer of knowledge within the organisation
- To meet or anticipate the requirements of future trading programs

It is best to decide upfront in the planning process if you think you would like your GHG inventory verified, to ensure a good audit trail of your GHG information is kept throughout the year and is readily available for the verifier.

**Key Learning**

Reported information should be relevant, complete, consistent, transparent, accurate, user friendly and if possible, verified.

Companies should report:

- a description of the reporting organisation and its boundaries
- information on emissions and performance (a minimum of Scopes 1 and 2 is required)
- supporting information

# 10 STEPS

TO  
ACCOUNT  
AND  
REPORT  
GHG  
EMISSIONS

<b>1</b>	<b>Adopt and apply GHG accounting and reporting principles</b>	
		Although compiling an emissions inventory can be a complex exercise, the principles of accounting and reporting for GHG emissions are based on financial accounting principles.
<b>2</b>	<b>Set business goals and inventory design</b>	
<p>What do you emit?</p> <p>Why are you calculating your emissions?</p> <p>How are you managing your emissions?</p>		<p>Improving your understanding of your company's GHG emissions by compiling a GHG inventory makes good business sense. The four categories of business goals most frequently listed by companies as reasons for compiling a GHG inventory are the following:</p> <ul style="list-style-type: none"> <li>■ GHG risk management</li> <li>■ Public reporting/participation in voluntary initiatives</li> <li>■ GHG markets</li> <li>■ Regulatory/government reporting</li> </ul>
<b>3</b>	<b>Set organisational boundaries</b>	
<p>How should you account for emissions from business units, subsidiaries, joint ventures, or equity investments?</p>		<p>Businesses vary in their legal and organisational structures. When accounting for GHG emissions from partially-owned entities/facilities, it is important to draw clear organisational boundaries which should be consistent with the organisational boundaries which have been drawn up for financial reporting purposes.</p>
<b>4</b>	<b>Set operational boundaries</b>	
<p>What are your activities?</p> <p>Where are these activities located?</p> <p>What emissions has your business directly caused?</p> <p>What emissions are a result of your business, but belong to another entity?</p>		<p>Direct GHG emissions are emissions from sources that are owned or controlled by the reporting company e.g. company owned vehicles</p> <p>Indirect GHG emissions are emissions that are a consequence of the activities of the reporting company, but occur from sources owned or controlled by another company e.g. emissions from the production of purchased electricity, employee travel on scheduled flights.</p>
<b>5</b>	<b>Account for GHG reductions</b>	
<p>Have your absolute emissions changed over time?</p> <p>Have your relative emissions changed over time?</p> <p>Can your business participate in any projects, offsets or credit mechanisms?</p>		<p>A company's overall emissions may be reduced, even if increases occur at specific sources, facilities, or operations within a given country. Focusing on the overall company GHG impact has the advantage of helping companies more effectively manage their aggregate GHG risks and opportunities. It also helps guide the transfer of resources to activities resulting in the most cost effective GHG reductions.</p>

- **Required**  
(GHG Protocol Accounting and Reporting Standard)
- **Recommended**  
(Practical advice for organisations)

# 6

## Set baseline year



What sort of comparisons do you need to make over time?

Is it necessary to start at 1990?

Emissions performance comparison can be done against the last accounting period as well as against emissions in a selected reference year. Comparison only against the last accounting period is unlikely to cater for strategic business goals such as establishment of emissions reduction targets and management of risks and opportunities or address the needs of investors and other stakeholders.

# 7

## Identify and calculate GHG emissions



How do you calculate your emissions?

What tool should you use?

Once the organisational and operational boundaries have been established, companies generally calculate GHG emissions via the following steps:

- Identify GHG emissions sources
- Select an emissions calculation approach
- Collect activity data and choose emissions factors
- Roll-up GHG data to corporate level

# 8

## Manage inventory quality



How you ensure your information is credible?

- Adopt and apply GHG accounting and reporting principles
- Use a standardised system for calculation and internal reporting of GHGs across multiple business units/facilities
- Select an appropriate calculation methodology
- Set up a robust data collection system
- Establish appropriate information technology controls
- Undertake regular accuracy checks for technical errors
- Conduct periodic internal audits and technical reviews
- Ensure management review of the GHG information
- Organise regular training sessions for inventory development team members
- Perform uncertainty analysis
- Obtain independent external verification

# 9

## Report GHG emissions



What should you report?

What format should it be in?

GHG reports should be based on the best data available at the time of publication. At the outset, it is better to be open about any limitation and over time, correct and communicate any discrepancies identified in subsequent years

Reporting should include the following information:

- A description of the company and its boundaries
- Information on emissions and performance
- Supporting information

# 10

## Verify GHG emissions



Is verification important?

Verification is the objective and independent assessment of whether the reported GHG inventory properly reflects the GHG impact of the company in conformance with the pre-established GHG accounting and reporting standards. Reasons for undertaking verification include:

- To add credibility to publicly reported information and reduction goals
- To enhance stakeholder trust in the reporting organisation
- To increase management and board confidence in reported information
- To improve internal GHG accounting and reporting practices
- To facilitate learning and knowledge transfer within the organisation
- To meet or anticipate the requirements of future trading programs

# Who?

Who should use this guide?



*“Reducing Urgent Couriers’ CO<sub>2</sub> emissions through fuel use management reduces our impact on the natural environment while improving our contractors’ financial sustainability.”*

STEVE BONNICI, MANAGING DIRECTOR,  
URGENT COURIERS LTD

GHG accounting and reporting is not just for big business or heavy industry. Many organisations have a large emissions inventory, and are often surprised at their relative impact. Calculating GHG emissions does not require a PhD in Science. In fact, a good understanding of your systems and accounts payable information is much more important. GHG emissions inventories are usually compiled using a team of people within the business. However, it is strongly recommended that one person within the business act as a central liaison point to compile all the information, drive the process and be accountable.

## WHO SHOULD USE THIS GUIDE

- your Chief Executive Officer
- your accountant (or Chief Financial Officer)
- your accounting and finance team
- your operations manager
- your maintenance team
- your building manager
- your marketing manager
- specialist technicians (if required)
- any other interested party

## Who's already taking the challenge: The Case Studies

Six members of the New Zealand Business Council for Sustainable Development have volunteered to participate in this project to:

- Identify business opportunities
- Account and report their GHG emissions inventory

These organisations are:

- BP Oil New Zealand Limited
- Hubbard Foods Limited
- Landcare Research
- Meridian Energy Ltd
- Milburn New Zealand Ltd
- Urgent Couriers Limited

Each of these organisations had previously compiled an emissions inventory for either public reporting or internal requirements. Hubbard Foods Limited, Landcare Research, Meridian Energy and Urgent Couriers had used the Landcare Research EBEX21® model to work out and report their "carbon footprint" in their 2001 annual or sustainability reports. (An emissions inventory is commonly termed a "carbon footprint".)

BP Oil New Zealand Limited have their own global Greenhouse Gas Protocol which they follow and have been reporting the emissions of their NZ operation to the BP global head office for a number of years. Milburn New Zealand Limited have also been calculating their emissions, based on their own corporate calculation tool, and recently reported to Holcim (Milburn's parent company).

This project has applied the principles of the GHG Protocol to each of these organisations existing emissions calculations to ensure the reported information:

- Represents a true and fair account of each organisation's emissions, and
- Is credible and unbiased in its treatment and presentation of issues

In doing so, a series of "gaps" have emerged. These gaps represent the differences between the principles of the GHG Protocol and that of other methodologies.

Each participant now has a broader understanding of the issues, such as boundary setting, which will be used in reports going forward as they see relevant.

A good starting point for developing your GHG report may be to review the case study that represents the sector that is most relevant to you. Two case studies are included for reference in this guide. The other four are available at [www.nzbcscd.org.nz](http://www.nzbcscd.org.nz).

*"By understanding our GHG emissions inventory Milburn has identified a number of potential opportunities to reduce our emissions. These opportunities include fuel substitution, resource recovery and participation in the Clean Development Mechanism (CDM)."*

REX WILLIAMS, CEO  
MILBURN NEW ZEALAND LIMITED



# Case Study Hubbard Foods Limited

## THE BUSINESS CASE

Hubbard Foods Limited (“Hubbard’s”) have prepared a GHG emissions inventory to demonstrate sustainable development responsibility and leadership.

Understanding Hubbard’s GHG emissions is intrinsic to achieving the company vision and makes good business sense for the following reasons:

- GHG Risk Management

Hubbards are seeking to manage their actual and potential GHG risks by:

1. Understanding, calculating and reporting GHG emissions to minimise potential risks.

2. Protecting current and future trade sales (emissions accounting for products issue)
  3. Estimating the potential exposure to a capped carbon charge (if such a charge is introduced in the future)
  4. Identifying efficiency improvement options (identifying cost effective reduction opportunities such as an EECA audit)
  5. Continuing to enhance Hubbard’s reputation as a leader in social responsibility.
- Public reporting/participation in voluntary initiatives

Stakeholder Reporting - Hubbard’s calculated their emissions inventory for the first time in March 2001 using the Landcare Research EBEX21® model. The results were reported in Hubbard Foods Limited first Sustainable Development Report for the year ending 31 March 2001.

- GHG markets

Assess the quantity and potential sale ability of any available GHG emission reduction units.

- Regulatory/Government reporting

Hubbard’s want to be part of the GHG emissions solution in NZ and demonstrate business leadership. Hubbards have the opportunity to get involved by providing information to government for policy decision makers.

# Frontline Report

SUMMARY OF CO<sub>2</sub> EMISSIONS FOR THE PERIOD 1 APRIL 2000 TO 31 MARCH 2001

 <b>1</b> DIRECT SCOPE		SOURCE OF EMISSION	DESCRIPTION	EMISSION FACTOR <sup>6</sup>	TONNES OF CO <sub>2</sub>
	Petrol	6,200 litres	0.00228	14	
	Gas	4,657,503 kWh	0.000188	876	
				TOTAL	890 tCO <sub>2</sub>

 <b>2</b> INDIRECT SCOPE		SOURCE OF EMISSION	DESCRIPTION	EMISSION FACTOR <sup>6</sup>	TONNES OF CO <sub>2</sub>
	Electricity Purchased	1,114,707 kWh	0.000450	502	
				TOTAL	502 tCO <sub>2</sub>

 <b>3</b> INDIRECT SCOPE		SOURCE OF EMISSION	DESCRIPTION	EMISSION FACTOR <sup>6</sup>	TONNES OF CO <sub>2</sub>
	Air Travel Domestic	36,000 km	0.000126	5	
	Air Travel International	112,000 km	0.000110	12	
				TOTAL	17 tCO <sub>2</sub>

TOTAL DIRECT AND INDIRECT EMISSIONS				1,409 tCO <sub>2</sub>
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6. An emission factor is the number used to convert raw data into tonnes of CO<sub>2</sub> equivalent. For more information on the emission factors used, please see Appendix 1

# Background Report

## DESCRIPTION OF THE ORGANISATION AND BOUNDARIES

Hubbard Foods Ltd is primarily a manufacturer of breakfast cereal products. The Hubbard's brand represents approximately 11% of NZ breakfast cereal sales. The company was established in 1988 and is based at Mangere, South Auckland. In March 2001 the company manufactured 23 products under the Hubbard's brand and various other "housebrands" for supermarkets. Hubbard Foods Limited exported approximately 14% of all 2000/2001 production to the following countries:

- United Kingdom
- Hong Kong
- Singapore
- Australia
- Kenya

Hubbard's primary energy consumption comes from the purchase of electricity and gas, purchased from the local energy retailer. Hubbard's operate one natural gas fired boiler to produce steam for the plant for cooking and drying (Direct Scope 1 emissions). In addition, purchased electricity is used in the manufacturing and cooking process (Indirect Scope 2 emissions).

Hubbard's have significant Indirect Scope 3 emissions but for this period, have decided to measure the emissions resulting only from air travel. However

other Scope 3 emission sources have been listed on the following page to help identify potential business opportunities.

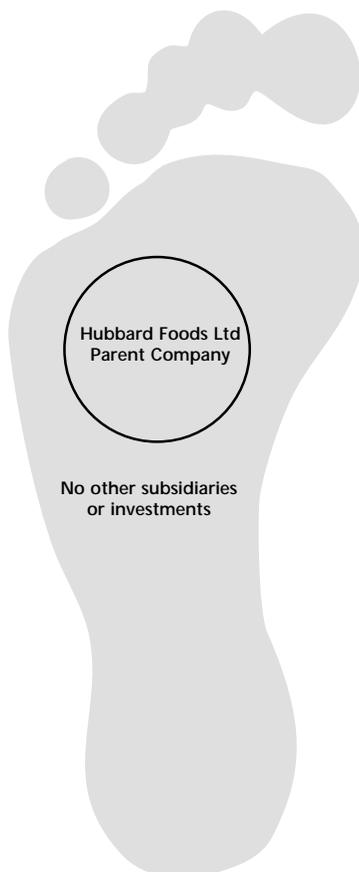
## REPORTING BOUNDARIES CHOSEN

### Organisational Boundaries

Hubbard Foods Limited is a privately owned company with no active subsidiaries or equity investments.

All emissions are captured in the parent company.

FIGURE 7 - HUBBARD FOODS LTD ORGANISATIONAL BOUNDARIES



## Discussion Point

Hubbard's is a privately owned company. At 31 March 2001 there were 116 souls on board including part-timers and a variety of contractors.

Question:

Should Hubbard's include their contractors GHG emissions in their corporate GHG emissions inventory?

Discussion:

From a tax perspective, contractors are recognised by the IRD as independent contractors, and not as employees.

The contractors are not restricted to working solely for Hubbard's and Hubbard's does not have the ability to direct the operating policies of their contractors. There is no shareholding interest in any contractors or suppliers.

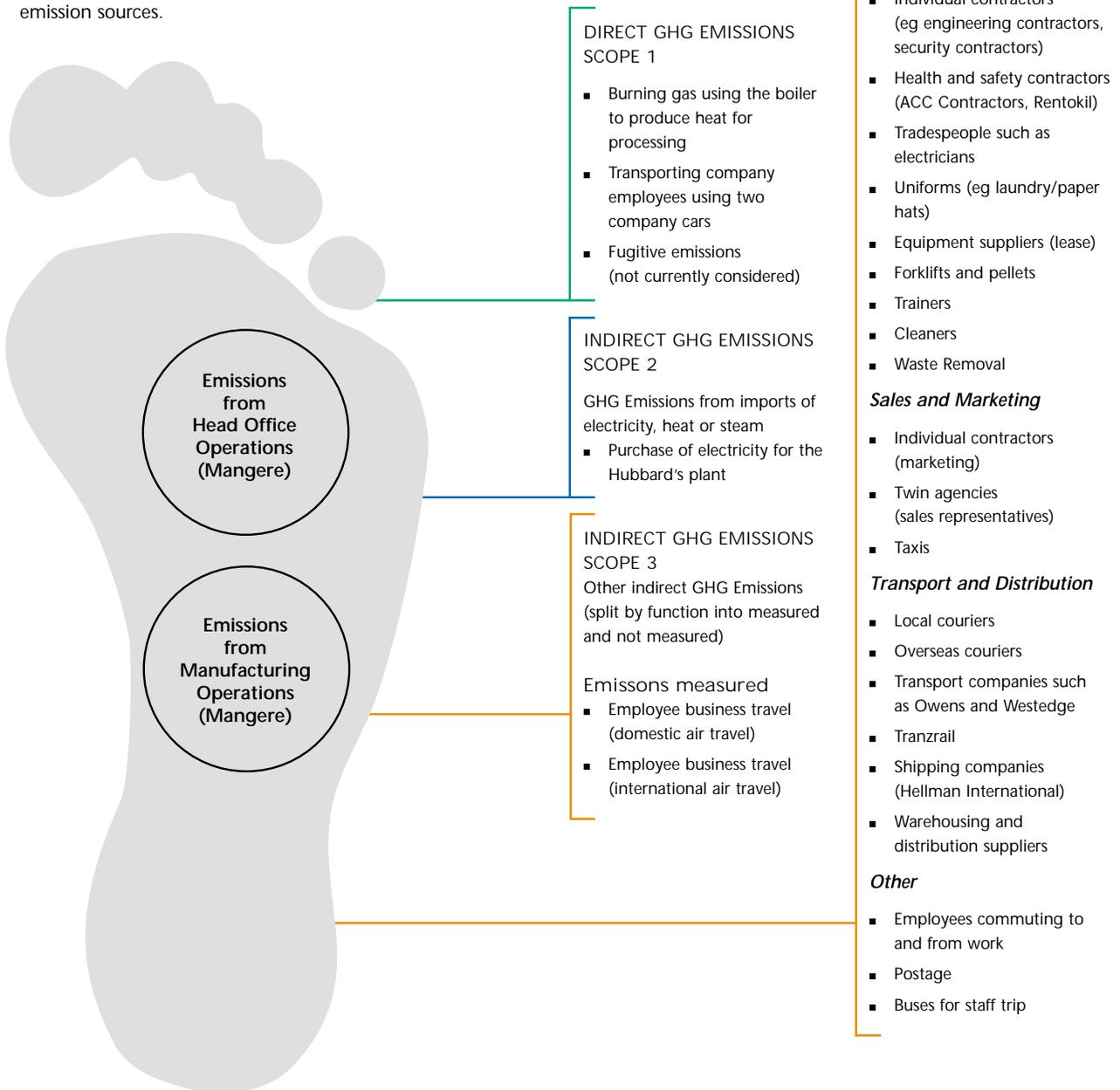
Conclusion:

Hubbards do not have control or significant influence over their contractors. Therefore the emissions from all contractors have been treated as Scope 3 Indirect emission sources.

Operational Boundaries

Hubbard's operate solely from their Mangere plant. The company uses a wide network of transport contractors. As Hubbard's do not have control or significant influence over their contractors, all GHG emissions associated with contractors are deemed to be Scope 3 Indirect emission sources.

FIGURE 8 - HUBBARD FOODS LTD OPERATIONAL ACTIVITIES



#### Reporting Period Covered

Hubbard Foods Limited balance date is 31 March. This GHG emissions inventory covers the period 1 April 2000 to 31 March 2001.

#### Establishing Internal Data Collection Systems

Collating data for the 31 March 2001 Sustainable Development Report was a complex and manual exercise. For the purposes of this project, we have used the data that was compiled for the initial emissions inventory, but where possible, updated the information to ensure completeness and accuracy.

#### Performance over time

This is the first year Hubbard Foods Limited has prepared their emissions inventory so no historic data is available to compare performance against.

#### Assumptions, Exclusions and Justifications

- As at 31 March 2001 all Hubbard's operations were based in Auckland.
- Hubbard's has an accounting period 1 April to 31 March. To ensure consistency between the active participants of this project, the year ending 31 March 2001 has been chosen.
- All petrol purchased was for use in the Hubbard's company owned cars.
- Currently emissions from CH<sub>4</sub>, N<sub>2</sub>O, HFC, PFC and SF<sub>6</sub> are not considered, due to resource constraints.

SUPPORTING INFORMATION

1. Methodology

The emissions inventory disclosed in this report has been calculated using the emissions factors disclosed in Appendix 1 of this guide.

2. Changes

Apart from electricity there were no significant changes in emissions resulting from extended process shut down, acquisitions, divestitures, outsourcing/in sourcing, process changes, changes in reporting boundaries or calculation methodologies. The electricity emissions factor used for this case study is the NZ specific best estimate at this time. The emissions factor used in the original EBEX21® calculation of 0.0001399 is based on annual electricity generation emissions information published by the New Zealand Ministry of Economic Development.

3. Emissions reductions

There were no emissions reductions credits purchased, sold or banked in the period.

4. Other Emissions

There were no emissions from biologically sequestered carbon or emissions attributable to the generation of exported electricity and steam.

5. GHG Strategies

Hubbard's have contracted an external energy auditor to assess their operations to reduce both GHG emissions and power use. Initial findings of the energy audit show Hubbard's may save up to 30% of their current energy use.

6. Other GHG emissions

There were no other emissions accounted for from GHG's not covered by the Kyoto Protocol.

7. Verification

There is no external assurance provided over this reported emissions data.

8. Contact Person

For further information please contact Annette Lusk, Sustainability Manager at [anet@hubbards.co.nz](mailto:anet@hubbards.co.nz)



***“We have identified energy efficiency opportunities that will lower our costs and reduce emissions. Our first priority is to reduce emissions by improving energy efficiency, then we will look at our whole greenhouse footprint”.***

***DICK HUBBARD, CHIEF EXECUTIVE HUBBARD FOODS.***

# Case Study

# Landcare Research

## THE BUSINESS CASE

Landcare Research has a vision<sup>7</sup>:

- *“To care for the environment (in our activities and through our influence)*
- *To demonstrate leadership (by ourselves and in partnership with others) in all we do”*

Compiling a GHG inventory is part of achieving the organisation’s vision.

Landcare Research has also established their GHG corporate inventory to provide leadership in emissions management and because you “manage what you measure”.

The organisation’s GHG emissions goals include:<sup>8</sup>

- reducing imputed CO<sub>2</sub> GHG emissions to 1,150t (2002 target)
- reducing domestic air travel by 5% (2002 target)
- making energy savings of 15% compared with 2001 (2001-2005 goal)

Other goals and reasons for compiling a GHG inventory include:

- Public reporting/participation in voluntary initiatives

To report emissions voluntarily and publicly through the Landcare Research Annual Report.

- Regulatory/Government reporting

To meet NZ’s potential Kyoto Protocol and other GHG obligations in a way that increases indigenous biodiversity.

7. Landcare Research Annual Report 2001 page 2

8. Landcare Research Annual Report 2001 page 43.

# Frontline Report

SUMMARY OF CO<sub>2</sub> EMISSIONS FOR THE PERIOD 1 JULY 2000 TO 30 JUNE 2001

 <b>1</b> DIRECT SCOPE		SOURCE OF EMISSION	DESCRIPTION	EMISSION FACTOR <sup>9</sup>	TONNES OF CO <sub>2</sub>
		Petrol	1,040,000 km	0.000244	254
					TOTAL

 <b>2</b> INDIRECT SCOPE		SOURCE OF EMISSION	DESCRIPTION	EMISSION FACTOR <sup>9</sup>	TONNES OF CO <sub>2</sub>
		Electricity Purchased	2,250,000 kWh	0.000450	1,013
					TOTAL

 <b>3</b> INDIRECT SCOPE		SOURCE OF EMISSION	DESCRIPTION	EMISSION FACTOR <sup>9</sup>	TONNES OF CO <sub>2</sub>
		Air Travel Domestic	1,424,000 km	0.000180	256
		Air Travel International	3,250,000 km	0.000110	358
				TOTAL	614 tCO <sub>2</sub>

				TOTAL DIRECT AND INDIRECT EMISSIONS	1,881 tCO <sub>2</sub>
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9. An emission factor is the number used to convert raw data into tonnes of CO<sub>2</sub> equivalent. For more information on the emissions factors used, please see Appendix 1

# Background Report

## DESCRIPTION OF THE ORGANISATION AND ITS BOUNDARIES

Manaaki Whenua Landcare Research (Landcare Research) operates predominately in one industry sector – the provision of scientific services focusing on the sustainable management of land based natural resources. The organisation’s accounting period runs 1 July to 30 June.

At 30 June 2001 there were 387 staff including part-timers (368 FTE).

## REPORTING BOUNDARIES CHOSEN

### Organisational Boundaries

Landcare Research is a Crown Research Institute. The consolidated financial statements are those of Landcare Research NZ Limited, including its fully owned subsidiaries, Sirtrack Limited (Sirtrack) and Landcare Research International Limited, which also have a balance date of 30 June.

## Discussion Point

### Question:

The emissions reported on page 42 of the Landcare Research Annual Report 2001 report do not include Sirtrack. Should Landcare Research include Sirtrack in their corporate emissions inventory?

### Discussion:

Sirtrack has been a 100 per cent subsidiary of Landcare Research since 1994. Although the company is located in Havelock North, and the activity of the company is separate to other activities of Landcare Research, Sirtrack emissions should form part of the Landcare Research emissions inventory.

### Conclusion:

Sirtrack is wholly owned by Landcare Research. Therefore all emissions should be 100 per cent accounted for.

### Question:

Landcare Research sublease several buildings to third parties. Should the electricity for premises leased to third parties be included in Landcare Research’s emissions inventory?

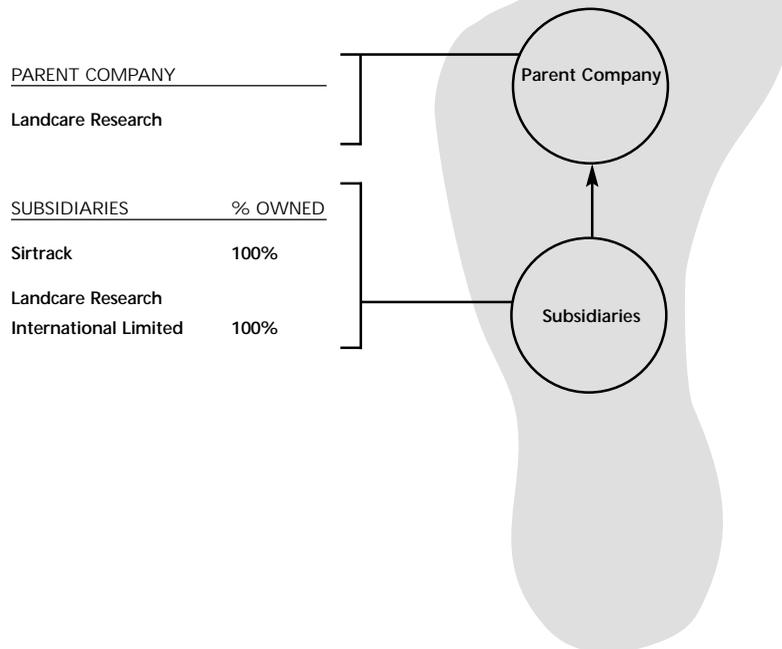
### Discussion:

The electricity is paid for by Landcare Research, and then the leasees are recharged for the electricity. To date the electricity emissions have been accounted for in the Landcare Research emissions inventory.

### Conclusion:

To ensure the principle of consistency between years, Landcare Research should continue to account for the emissions from premises they lease to third parties in their corporate emissions inventory, but put a note in the emissions accounts to clearly identify the amount.

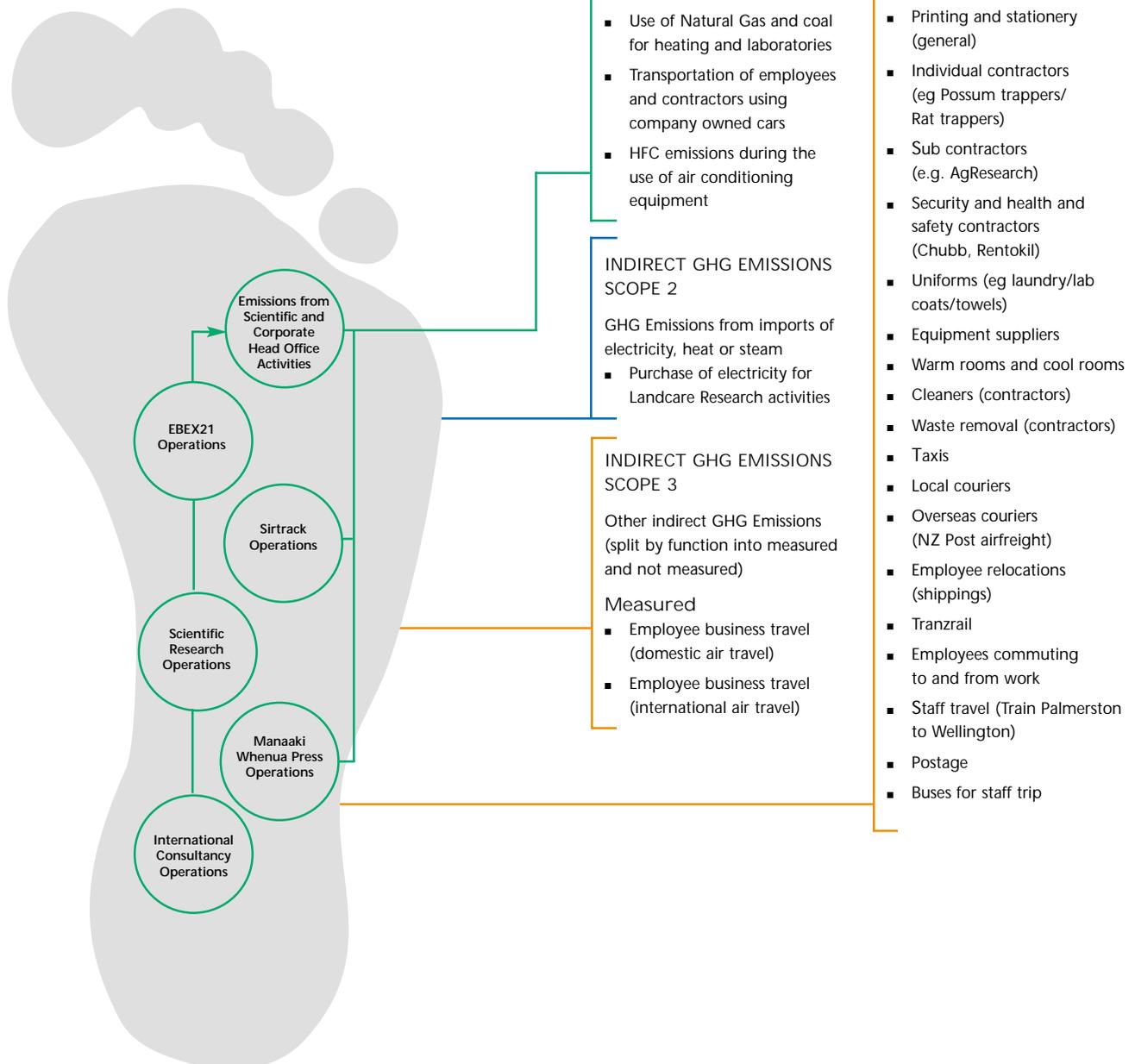
FIGURE 9 : LANDCARE RESEARCH ORGANISATIONAL BOUNDARIES



Operational Boundaries

The principal activity of Landcare Research is to conduct scientific research focusing on the sustainable management of land-based natural resources. Landcare Research has operations based in Auckland, Hamilton, Gisborne, Havelock North (Sirtrack Ltd), Palmerston North, Nelson, Lincoln, Alexandra and Dunedin.

FIGURE 10 : LANDCARE RESEARCH OPERATIONAL ACTIVITIES



Reporting Period Covered

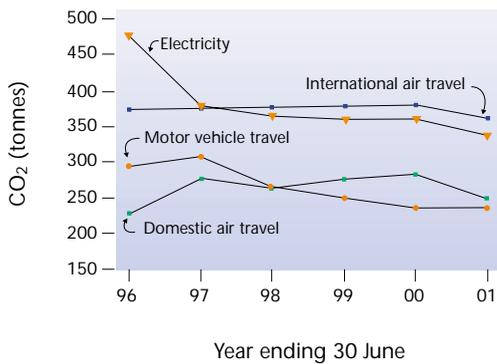
Landcare Research has a balance date of 30 June. This GHG emissions inventory covers the period 1 July 2000 to 30 June 2001.

Establishing The Base Year

Landcare Research has an accounting period 1 July to 30 June. To ensure consistency between the active participants of this project, the year ending 30 June 2001 has been chosen.

Performance over time

Imputed CO<sub>2</sub> emissions  
(Based on emission factors used in the Landcare Research Annual Report 2001)<sup>10</sup>



Landcare Research has a target of zero net emissions of greenhouse gases from their activities. Through a new project, the Emissions/Biodiversity EXchange (EBEX21<sup>®</sup>), Landcare Research has developed partnerships with the

10. Source: Landcare Research Annual Report 2001 page 42. Please refer to Note 1 "Methodology" on page 29 for further information on the differences between the Landcare Research Annual Report disclosures and this case study dialogue.

Queen Elizabeth II National Trust and the department of Conservation to invest in the regeneration of native forest on marginal hill farmland. A five-year strategy has been adopted by Landcare Research, combining a native forest restoration programme with the national energy conservation agreement with EECA to achieve zero net emissions.

Establishing Internal Data Collection Systems

Collating data for the 30 June 2001 Annual Report was a complex and manual exercise. Some internal emissions data is starting to be collated monthly (e.g. air travel). However the emissions calculation is only performed once annually. For the purposes of this project, we have used the data that was collated for the June 2001 exercise. Several gaps in the internal data collection system were identified as a result of applying the GHG Protocol. Landcare Research are interested in capturing this information including:

Emissions from:

- Use of Natural Gas and Coal
- Sirtrack (potentially direct emissions)
- Travel to Antarctica (Indirect Scope 3 emission)
- Buses for staff trips (Indirect Scope 3 emission)

Assumptions, Exclusions and Justifications

- The GHG Protocol methodology has been used to calculate the emissions inventory prepared for this case study.
- To ensure consistency between the active participants of this project, the year ended 30 June 2001 has been chosen.
- Emissions from Sirtrack have been excluded as this data has not been measured to date.
- Emissions from the use of coal and gas has not been included as the quantity has not previously been measured. These GHG emissions will be included in future reports.
- HFC emissions during the use of refrigeration and air-conditioning equipment are not currently measured or reported.

SUPPORTING INFORMATION

1 Methodology

Landcare Research have used their own emissions methodology to calculate their 2001 emissions inventory that was reported in their 2001 Annual Report.

This methodology (including the emissions factors) form the basis of the EBEX21® product. This guide has used the same activity data used in the Annual Report disclosures, but applied the emissions factors detailed in Appendix 1, to ensure consistency between the project participants.

2 Changes

The sustainable development report for the period ending 30 June 1999 covers emissions from 1 July 1995 to 30 June 1999 and reports emissions based on carbon tonnes. There was no sustainable development report published in June 2000. In June 2001, the Landcare Research emissions inventory for the period 1996 to 2001 were recalculated and restated to incorporate better information that had subsequently become available. This exercise resulted in restating the original calculations reported in the 1999 report, and to report the emissions in tonnes of CO<sub>2</sub> equivalent. The assumptions and reasons behind the restatements are disclosed at [www.landcareresearch.co.nz](http://www.landcareresearch.co.nz)

3 Emissions reductions

There were no emissions reductions credits purchased, sold or banked in the period.

4 Other Emissions

There were no emissions from biologically sequestered carbon or emissions attributable to the generation of exported electricity and steam.

5 GHG Strategies

Landcare Research has a target of zero net emissions of greenhouses gases from their activities. To achieve this target Landcare Research have:

- Conducted energy audits
- Appointed an energy manager
- Signed an external agreement with EECA to reduce electricity use
- Set internal targets to reduce air travel
- Made managers accountable for their air travel targets
- Invested in the regeneration of native forest on marginal hill farmland

6 Other GHG emissions

There were no other emissions accounted for from GHG's not covered by the Kyoto Protocol.

7 Verification

The data in the Landcare Research 2001 Annual Report was verified by Tonkin and Taylor.

8 Contact Person

For further information please contact Annie Lloyd-Jones at [Lloyd-JonesA@landcareresearch.co.nz](mailto:Lloyd-JonesA@landcareresearch.co.nz)



*“Many New Zealand businesses have low-cost options to reduce their greenhouse gas emissions, often reducing costs at the same time. Tools to measure and manage emissions are now available, adapted for New Zealand conditions. My recent visit to London has shown that major industries, banking, investing and insurance organisations have an increasingly strong focus on the sustainable development performance of businesses. Reducing greenhouse gas emissions is a key element of that performance. London is setting itself to be the global centre for emissions and credits trading, and there is strong interest in credits from New Zealand.”*

ANDY PEARCE, CEO  
MANAAKI WHENUA LANDCARE RESEARCH

# Appendices

## Appendix 1 – Emission Factors Table

Activity	Note no.	Activity units	Suggested Emission Factors as at August 2002 (Note 1)
Petrol	2	Litres used	0.00228 tonnes of CO <sub>2</sub> per litre
Petrol	2	Km's travelled	0.000244 tonnes of CO <sub>2</sub> per km
Diesel	2	Litres used	0.00260 tonnes of CO <sub>2</sub> per litre
LPG	2	Litres used	0.00162 tonnes of CO <sub>2</sub> per litre
LPG	2	Tonnes used	3.00 tonnes of CO <sub>2</sub> per tonne of LPG
LPG	2	GJ used	0.0604 tonnes of CO <sub>2</sub> per GJ
Gas – kWh	3	kWh (with high heating value)	0.000188 tonnes of CO <sub>2</sub> per kWh
Gas – kg/GJ	3	GJ (with high heating value)	0.0521 tonnes of CO <sub>2</sub> per GJ
Coal	4	GJ (Sub-bituminous with high heating value)	0.0912 tonnes of CO <sub>2</sub> per GJ
Electricity	5	kWh	0.000450 tonnes of CO <sub>2</sub> per kWh
Air Travel – domestic	6	Passenger land km (short haul)	0.000180 tonnes CO <sub>2</sub> per km
– domestic	6	Passenger land km (medium haul)	0.000126 tonnes CO <sub>2</sub> per km
– international	6	Passenger land km (long haul)	0.000110 tonnes CO <sub>2</sub> per km

**NOTE 1 – INTERNATIONAL VS NZ EMISSION FACTORS**

Emissions factors are published by a variety of sources and cover a wide range of activities. We have listed the factors that are likely to be most useful to most organisations. However this is not a definitive list. For emission factors for other sources of fuels, please refer to the Ministry of Economic Development or see the GHG Protocol initiative calculation tools. In all cases, clearly disclose your assumptions in your GHG emissions inventory report.

The GHG Protocol Initiative calculation tools use international emission factors which have been peer reviewed and represent a solid basis to calculate your emissions inventory. We have a high level of confidence over the international emission factors, but these may not be the best choice for NZ organisations. NZ has unique characteristics, such as our high proportion of electricity generation using renewable hydro resources. We have therefore included some New Zealand specific emission factors used, for example by the Ministry of Economic Development to calculate NZ's national emissions inventory. Where-ever possible we recommend checking with the Ministry of Economic Development to ensure NZ specific emissions factors are used as these have been adjusted to take into account NZ's unique characteristics. In particular research and debate continues over the electricity emissions factor. This number is being further refined by organisations such as EECA and Landcare Research, and organisations with significant electricity usage should carefully consider what emissions factor they choose (see note 5 for further discussion on the electricity emissions factor).

When preparing your emissions inventory, you must choose an emissions factor that you believe is defensible, verifiable and you have a high level of confidence in.

Emissions factors are likely to change. These numbers are current as at August 2002. If you are preparing a corporate emissions inventory, it is best to check these numbers, to ensure you are using the most up to date data. We strongly advise users of this guide to check with the Ministry of Economic Development or EECA for the latest NZ emissions factors before making any decisions based on information that incorporates information based on emission factors. There is on-going work with many of these factors, and it is essential users have the most up-to-date information available.

International emission factors have been sourced from the calculation tools of the WBCSD/WRI Greenhouse Gas Protocol Initiative (see [www.ghgprotocol.org](http://www.ghgprotocol.org)). These factors have been sourced from the IPCC - either the :

- IPCC 1997. Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual or
- IPCC 1999 Volume 2 Section 1

The NZ specific emission factors are referenced in the individual notes.

To aid understanding, we have also included a conversion table in Appendix 2.

**NOTE 2 – PETROL, DIESEL AND LPG**

Two calculation approaches are available in the GHG protocol worksheets. The first calculates emissions based on amount of fuel consumed. The second calculates emissions based on distance travelled or equipment activity, i.e. truck kilometers travelled. Companies should use the approach or approaches which make best use of available data. When fuel use data is available, it is usually more reliable than distance data. If fuel use data and distance data are of equal quality, the fuel use data should be used (fuel composition varies less than vehicle efficiency). If distance data and fuel economy factors are known, use the calculator provided on the 'fuel use' worksheet to calculate fuel consumption. Note that the default emissions per distance factor used above was developed in the United States and Europe, and is based on the assumption that the car is a medium sized automatic. Different factors are available for different types and sizes of vehicles at [www.ghgprotocol.org](http://www.ghgprotocol.org)

The "litres used" emissions factor for petrol shown in the emissions factor table is sourced from the New Zealand Energy Greenhouse Gas Emissions Inventory 1990 – 1999 and the New Zealand Government Energy Data File, January 2002. The "km's travelled" emissions factor is sourced from the calculation tools of the WBCSD/WRI Greenhouse Gas Protocol Initiative (see [www.ghgprotocol.org](http://www.ghgprotocol.org)).

**NOTE 3 – GAS (NEW ZEALAND SPECIFIC EMISSION FACTOR)**

Gas is usually expressed in joules.

In New Zealand, there are a number of different gas streams, including Maui and Kapuni. The emission factors table includes emissions factors for the average New Zealand gas stream, with gas usage expressed as kWh and GJ. (Source: the New Zealand Energy Greenhouse Gas Emissions Inventory 1990 – 1999)

Many gas retailers show kWh used on their gas bills. When preparing your emissions inventory please carefully check what units your Gas company has used to bill you.

**NOTE 4 - COAL**

The NZ coal emission factor for sub-bituminous coal with high heating value is 0.0912 tonnes of CO<sub>2</sub> per GJ (Source: NZ Government Energy Greenhouse Gas Emission 1990 – 1999 Annex A, page 115, sourced from the New Zealand Energy Information Handbook)

**NOTE 5 – ELECTRICITY**

New Zealand has a unique electricity generation profile. The electricity emissions factor is currently being worked on by different groups and agencies. The Ministry of Economic Development have recommended a New Zealand electricity emissions factor of 0.000450 tonnes of CO<sub>2</sub> per kWh. (source: New Zealand Ministry of Economic Development, 2002). Please note this number has no official status and official electricity emissions factors are still under development for Government policy mechanisms such as Projects and NGAs. This electricity emissions factor estimates the emissions intensity of the expected mix of new generation in New Zealand over the next 5 years. This number represents a grid factor and does not reflect physical (or contractual) supply in all cases. If your organisation can point to and substantiate a different emission factor for electricity, you should use it. The factor that you use should reflect your source of supply. If you can not stipulate supply side mix, then you should use the grid emission factor of 0.000450 tonnes of CO<sub>2</sub> per kWh.

**NOTE 6 – AIR TRAVEL**

For most organisations, air travel represents an Indirect Scope 3 emission. For the case studies in this guide, we have used the international emissions factors, taking into account the length of the flight:

Short haul	= 452 kms per trip	0.000180 tonnes of CO <sub>2</sub> per passenger land km
Medium haul	= 1600 kms per trip	0.000126 tonnes of CO <sub>2</sub> per passenger land km
Long haul	= 6,342 kms per trip	0.0001100 tonnes of CO <sub>2</sub> per passenger land km

(Source: WBCSD/WRI GHG Protocol Initiative Mobile combustion workbook, Emissions based on distance Worksheet – available from [www.ghgprotocol.org](http://www.ghgprotocol.org))

When deciding which emissions factor to use, consider where the majority of your flights are to and from.

## Appendix 2 – Conversion Table

This table has been sourced from the WBCSD/WRI Calculation tool for Stationary combustion. For further information, please see the full calculation sheet and associated guidance material available free from <http://www.ghg-protocol.org/standard/tools.htm>

### MASS

1 pound (lb)	453.6 grams (g)	0.4536 kilograms (kg)	0.0004536 metric tons (tonne)
1 kilogram (kg)	2.205 pounds (lb)		
1 short tonne (tonne)	2,000 pounds (lb)	907.2 kilograms (kg)	
1 metric tonne	2,205 pounds (lb)	1,000 kilograms (kg)	1.1205 short tonnes (tonnes)

### VOLUME

1 cubic foot (ft <sup>3</sup> )	7.4805 gallons (gal)	0.1781 barrel (bbl)	
1 cubic foot (ft <sup>3</sup> )	28.32 litres (L)	0.02832 cubic meters (m <sup>3</sup> )	
1 gallon (gal)	0.0238 barrel (bbl)	3.785 litres (L)	0.003785 cubic meters (m <sup>3</sup> )
1 barrel (bbl)	42 gallons (gal)	158.99 litres (L)	0.1589 cubic meters (m <sup>3</sup> )
1 litre (L)	0.001 cubic meters (m <sup>3</sup> )	0.2642 gallons (gal)	
1 cubic meter (m <sup>3</sup> )	6.2897 barrels (bbl)	264.2 gallons (gal)	1,000 litres (L)

### ENERGY

1 kilowatt hour (kWh)	3412 Btu (btu)	3,600 kilojoules (KJ)	
1 megajoule (MJ)	0.001 gigajoules (GJ)		
1 gigajoule (GJ)	0.9478 million btu (million btu)	277.8 kilowatt hours (kWh)	
1 Btu (btu)	1,055 joules (J)		
1 million Btu (million btu)	1,055 gigajoules (GJ)	293 kilowatt hours (kWh)	
1 therm (therm)	100,000 btu	0.1055 gigajoules (GJ)	29.3 kilowatt hours (kWh)

## Appendix 2 - Conversions Table

### OTHER

kilo	1,000		
mega	1,000,000		
giga	1,000,000,000		
tera	1,000,000,000,000		
1 psi	14.5037 bar		
1 kgf/cm <sup>3</sup> (tech atm)	1.0197 bar		
1 atmosphere (atm)	0.9869 bar	101.325 kilo pascals	14.696 pounds per square inch (psia)
1 mile (statue)	1.609 kilometers		
1 tonne CH <sub>4</sub>	21 tonnes CO <sub>2</sub> equivalent <sup>11</sup>		
1 tonne N <sub>2</sub> O	310 tonnes CO <sub>2</sub> equivalent <sup>11</sup>		
1 tonne carbon	3.664 tonnes CO <sub>2</sub>		

11. These equivalences are based on IPCC calculations for effects over 100 years.

## Appendix 3 - Background to this report

This industry guide is part of a climate change project, convened by the New Zealand Business Council for Sustainable Development and the Ministry of Economic Development to "Lead New Zealand businesses to:

- Explore the business opportunities arising from a carbon constrained economy
- Understand and minimise their greenhouse gas emissions".

THIS PROJECT DEFINES "BUSINESS OPPORTUNITIES" AS:

- Opportunities to generate new revenue as a result of a carbon constrained economy (e.g. new technologies/practices, research, consultation services, generation of carbon credits etc.)
- Opportunities to reduce costs through eco-efficiency initiatives (e.g. energy efficiency)

The NZ government is particularly interested in the outcomes of this project because it will assist them in the development of domestic climate change policy. The project forms part of the Government's Foundation policies of Innovation and Business Opportunities.<sup>12</sup>

Because of the current uncertainty around agricultural emissions this project will primarily focus on industrial, commercial and transport emissions.

The Greenhouse Gas Protocol is a corporate GHG accounting and reporting standard jointly developed by the WBCSD and the World Resources Institute. Its mission is to "develop and promote internationally accepted GHG accounting and reporting standards through an open and inclusive process".<sup>13</sup> The corporate inventory module was developed through extensive stakeholder dialogue road testing by more than 30 companies in 10 countries including several small and medium enterprises and extensive peer review. Increasingly, international organisations are adopting the Greenhouse Gas Protocol as their tool for GHG accounting and reporting.

This project has applied the corporate inventory module of the Greenhouse Gas Protocol to six NZBCSD members. These case studies show "why" and "how" New Zealand organisations can calculate and report their GHG emissions.



*"The next step businesses must take, is to take their first step."*

ANDY BRITTON, PARTNER,  
PRICEWATERHOUSECOOPERS

12. For further information, please see "Climate Change The Government's Preferred Policy Package, A Discussion Document", April 2002 page 8 at [www.climatechange.govt.nz](http://www.climatechange.govt.nz)

13. For further information, please see "The Greenhouse Gas Protocol, a corporate accounting and reporting standard" at [www.ghgprotocol.org](http://www.ghgprotocol.org)

# Glossary

There is a lot of terminology associated with climate change and greenhouse gas emissions. This glossary is intended as a guide to the jargon, it is sourced from The GHG Protocol, Danish Energy Authority Manual for Project Developers, May 2002 and New Zealand Government Proposed Policy Package on Climate change, April 2002.

TERM	DESCRIPTION
AA	Assigned Amount - the amount of GHG emission that an Annex B country may emit in the Commitment Period 2008-2012.
AAU	Assigned Amount Unit - tradable units of the Assigned Amount of an Annex B country as issued pursuant to the rules of article 17 of the Kyoto Protocol, expressed as one metric ton of CO <sub>2</sub> equivalent.
Accounting	Covers the company internal compilation of GHG data.
Additionality	Refers to a situation where a project results in emissions reductions additional to those that would have taken place in the absence of the project activity.
AJ, Activities Implemented Jointly	In the first Conference of the Parties (COP 1) to the UNFCCC held in 1995 in Berlin a project pilot phase was created, during which bilateral GHG mitigation projects were called Activities Implemented Jointly (AIJ). During the AIJ Pilot Phase, projects were conducted with the objective of establishing experience, but without allowing carbon credit transfer between countries.
Annex I countries	These are the industrialised countries and economies in transition listed in Annex I of the UNFCCC as follows: Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, USA.
Annex B countries	These are the emissions-capped industrialised countries and economies in transition listed in Annex B of the Kyoto Protocol. Legally-binding emission reduction obligations for Annex B countries range from an 8% decrease (e.g. EC) to 10% increase (Iceland) of 1990 levels by the first commitment period of the Protocol, 2008 – 2012.
Annex I or Annex B?	In practice, Annex I of the Convention and Annex B of the Protocol are used almost interchangeably. However, strictly speaking, it is the Annex I countries, which can invest in JI/CDM projects as well as host JI projects, and non-Annex I countries, which can host CDM projects, even though it is the Annex B countries, which have the emission reduction obligations under the Protocol. Note that Belarus and Turkey are listed in Annex I but not Annex B; and that Croatia, Liechtenstein, Monaco and Slovenia are listed in Annex B but not Annex I.
Anthropogenic	Caused by human beings.
Article 3.3	An article in the Kyoto protocol which allows for sink credits to be earned over 2008-2012 for a limited set of sink activities (establishing new forests) that have occurred since 1 January 1990. Any loss of carbon over 2008-2012 from forests that are converted to a different land use after 1 January 1990 results in a loss of a country's emissions units.
Article 3.4	An article in the Kyoto Protocol that provides a basis for claiming further emissions units from additional sink activities associated with management of pre 1990 forests, crop land management, grazing land management and revegetation if New Zealand chooses to do so for the first commitment period 2008-2012.
Base year	A historic baseline year (a specific year) for comparing emissions over time.
Base year emissions	GHG emissions in the base year.
Baseline	A reference point for what emissions would have been without the intervention of the GHG reduction project.
Baseline Study	A study including the construction of a baseline scenario, an emission baseline, an assessment of project emissions and a calculation of emission reductions.
BAT	Best Available Technology.
Biofuels	Fuels made from plant material, e.g. wood, straw and ethanol from plant matter.
Boundaries	The definition of the area or activity you are calculating. Your organisation may have different business units, operations, geographical locations, subsidiaries or investments. The boundaries you apply to measure your organisation's GHG emissions should be consistent with the boundaries drawn up for financial accounting purposes and should reflect the economic reality of your business operations, not just its legal form.
Calculation tools	A number of cross-sector and sector-specific tools that calculate GHG emissions on the basis of activity data and emissions factors.
Cap and trade system	A system that sets an overall emissions limit, allocates emissions allowances to participants, and allows them to trade emissions credits with each other.

TERM	DESCRIPTION
Carbon Credit	Generic term for the claimed carbon benefits arising from project-level activities. One credit is equal to one ton of CO <sub>2</sub> equivalent.
Carbon Footprint	Your carbon imprint on the earth. The total emissions your organisation has generated, including the carbon emitted as the result of you demanding others goods and services (e.g. employees travelling on scheduled flights, emissions in the product use phase).
Carbon Offset	Term used in a variety of contexts, most commonly either to mean the output of carbon sequestration projects in the forestry sector, or more generally to refer to the output of any climate change mitigation project.
Carbon Purchasing Agreement	Agreement between buyer and seller of emission reductions in which the conditions of the sale of carbon credits are defined.
CDM	Clean Development Mechanism - a mechanism introduced by the Kyoto Protocol governing project-level carbon credit transactions between Annex I and non-Annex I countries.
CER	Certified Emission Reductions: the terminology for emission reductions generated under the CDM Certification. The written assurance by an OE that during a specific time period a CDM project activity achieved the GHG emission reductions as verified.
Climate-friendly	A general term for technology, actions or attitudes that do not contribute or contribute less than the norm, to the risks of climate change (e.g. carbon free or low carbon intensive means for generating energy).
COP/ MOP	Conference of the Parties to the Framework Convention on Climate Change, or Meeting of the Parties once the Kyoto Protocol has been ratified.
Commitment period	A range of years within which Parties to the Kyoto Protocol are required to meet their greenhouse gas emissions reduction target, which is averaged over the years of the commitment period. The first commitment period is 2008-2012.
Co-generation unit/ combined heat and power (CHP)	A facility producing electricity and steam/heat using the waste heat from electricity generation.
Competitiveness -at-risk group	A term used by the NZ Government. This group is comprised of sectors of the economy and particular industries that would find adjustment difficult if expected to make the transition to a direct price on emissions in the first commitment period. For these companies, it may be a choice of closing, changing location to a country with no controls on emissions ('carbon leakage'), or reducing staff or production in the short-term to compensate for the increased costs.
Control	The ability of a company to direct the operating policies of another company or organisation.
CO <sub>2</sub> equivalent	The quantity of a given GHG multiplied by its global warming potential. This is the standard unit for comparing the degree of harm which can be caused by emissions of different GHGs.
Crediting period	The fixed and approved period over which emission reductions in a specific project can be generated and during which no adjustments to the baseline will take place.
Cross-sector	A GHG calculation tool that addresses GHG sources common to various sectors, e.g. emissions from stationary or mobile calculation tool combustion.
DERSA	Danish Emission Reduction System Administration.
Determination	The process of evaluation by an IE as to whether a JI project and the ensuing GHG emission reductions meet the relevant requirements of JI.
Developed Countries	Typically described as (core) OECD countries but also used to describe countries listed in Annex 1 of the UNFCCC which also includes countries in eastern Europe and the former Soviet Union (referred to as having 'economies transition').
Direct GHG emissions	Emissions from sources that are owned or controlled by the reporting organisation.
Direct monitoring	Direct monitoring of exhaust stream contents in the form of continuous emissions monitoring (CEM) or periodic sampling.
EIA	Environmental Impact Assessment, which is an assessment of the impact that the project will have on the environment.
EBEX21®	A web-based CO <sub>2</sub> calculator designed to store information and report on participants CO <sub>2</sub> emissions. EBEX21® was developed and is administered by Manaaki Whenua Landcare Research. See the Landcare Research case study in this guide for further information.
EECA	The Energy Efficiency and Conservation Authority.
Emission baseline	The GHG emissions occurring in the baseline scenario.
Emissions	The intentional and unintentional release of GHGs into the atmosphere.
Emissions charge	A tax applied to every tonne of CO <sub>2</sub> equivalent.

## Glossary

TERM	DESCRIPTION
Emissions credit	A commodity giving its holder the right to emit a certain quantity of GHGs. Emissions credits will, in the future, be tradable between countries and other legal entities.
Emissions factor	A factor relating activity data (e.g. tonnes of fuel consumed, tonnes of product produced) and absolute GHG emissions.
Emissions trading	A mechanism to allow firms to take on and manage an emission obligation and their price exposure directly, with the potential to reduce their costs or add value through trading emissions units, either domestically or internationally.
Emissions units	A unit representing one tonne of CO <sub>2</sub> equivalent. For a country to be in compliance with its Kyoto Protocol commitment, it must have and retire units equal in number to its emissions over the commitment period. A country is initially assigned a number of units equal to its target (in New Zealand's case, five times its 1990 level of emissions).
Enter into force	When enough countries ratify the Kyoto Protocol, it will enter into force which means that it will start operating and will be legally binding on countries that have ratified it.
Environmental	The requirements that project emission reductions have to be additional to what otherwise would have occurred in absence of additionality the project.
Equity share	The percentage of economic interest in/benefit derived from an operation.
ERU	Emission Reduction Unit – the technical term for the GHG emission reduction output of JI projects.
Eru-PT	The Emission Reduction Unit Procurement Tender for JI projects from the Dutch government. Since the first Eru-PT tender launched in 2000, the Dutch government has set up a programme called carbon credits.nl under which new procurement tenders have been launched for JI and CDM.
Externalities	Project impacts that are caused by the implementation of the project and are outside the boundaries of the project GHG Methane (CH <sub>4</sub> ), Nitrous Oxide (N <sub>2</sub> O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphurhexafluoride (SF <sub>6</sub> ).
Forest sinks	See Sinks.
Foundation policies	Actions that the NZ Government is already taking, or has already approved, regardless of Kyoto. These will go ahead whether or not sufficient countries ratify to bring the Protocol into effect. They are important for New Zealand and New Zealanders, whether or not their impact on emissions is their primary purpose.
Fugitive emissions	Intentional and unintentional releases of GHGs from joints, seals, packing, gaskets, etc.
Functional market	Criteria for determining whether an emissions trading system will provide an efficient price are: <ul style="list-style-type: none"> <li>• the international emissions trading market is a well-functioning market where transaction costs are low and prices are determined competitively</li> <li>• the situation regarding the participation in the international market of possible and likely major buyers, including the US, Japan and EU, is clear</li> <li>• Russia and the Ukraine are able to use the Kyoto mechanisms (that is, they can sell their excess emissions units)</li> <li>• second commitment period targets have been negotiated and likely second commitment period participants identified</li> <li>• analysis of economic, social and competitiveness impacts has been undertaken and any outstanding concerns can be addressed.</li> </ul>
General Energy Users group	Most New Zealanders are in the General Energy Users group. This includes the energy and transport sectors, industrial and business processes, operations and households, though not big energy users; in effect, all businesses, organisations, institutions and households for which energy (electricity, gas, coal or transport fuels) is a cost, but may not be the major cost in their operations. As a group, it represents about one quarter of New Zealand's greenhouse gas emissions but about two-thirds of its CO <sub>2</sub> emissions.
GHG accounting principles	General accounting principles to underpin GHG accounting and reporting.
GHG Protocol Initiative and GHG Protocol	A multi-stakeholder collaboration convened by the World Resources Institute and the World Business Council for Sustainable Development to design, develop and promote the use of an international standard for calculating and reporting business GHGs. Please refer to <a href="http://www.ghgprotocol.org">www.ghgprotocol.org</a> .
Global warming potential (GWP)	A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO <sub>2</sub> .
Green power	Includes renewable energy sources and specific clean energy technologies that reduce GHG emissions relative to other sources of energy that supply the electric grid. Includes solar photovoltaic panels, geothermal energy, landfill gas, and wind turbines.

TERM	DESCRIPTION
Greenhouse gases (GHGs)	For the purposes of this standard/guidance, GHGs are the six gases listed in the Kyoto Protocol: carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF <sub>6</sub> ).
Heating value	The amount of energy released when a fuel is burned completely. Care must be taken not to confuse higher heating values (HHVs), used in the US and Canada, and lower heating values, used in all other countries (for further details refer to the calculation tool for stationary combustion available at <a href="http://www.ghg_protocol.org">www.ghg_protocol.org</a> ).
Host country	Country in which the JI or CDM project is implemented.
Hydrofluorocarbons (HFCs)	A group of greenhouse gases used in a range of industrial applications.
Independent Entity (IE)	A legal entity that has been accredited by the JI Supervisory Board to perform all necessary functions relevant to the determination and verification of ERUs generated by JI projects.
Indirect GHG	Emissions that are a consequence of the activities of the reporting company, but occur from sources owned or controlled by emissions from another company.
Intergovernmental Panel on Climate Change	International body of climate change scientists. The role of the IPCC is to assess the scientific, technical and socio-economic information relevant to the understanding of the risk of human-induced climate change ( <a href="http://www.ipcc.ch">www.ipcc.ch</a> ).
Inventory	A list of an organisation's GHG emissions and sources.
Inventory quality	The extent to which an inventory provides accurate information.
JI	Joint Implementation, as referred to in Article 6 of the Kyoto Protocol. JI refers to climate change mitigation projects implemented between two Annex I countries. JI allows for the creation, acquisition and transfer of ERUs.
Kyoto forest	A forest planted since 1 January 1990 on land that was previously non-forest.
Kyoto Protocol	A protocol to the International Convention on Climate Change – once entered into force it will require countries listed in its Annex B (developed nations) to meet reduction targets of GHG emissions relative to their 1990 levels during the period 2008-12.
Leakage	The effect when an industry facing increased costs at home due to an emissions price, chooses to reduce production, close or relocate production to a country with no controls on emissions and therefore the industry's emissions take place outside the overall Kyoto limits. This situation could lead to increased emissions world-wide.
Marrakech Accords (MA)	Legal text elaborating on the Kyoto Protocol, representing the decisions and actions adopted by the COP at its seventh session (COP.7). See <a href="http://www.unfccc.int">www.unfccc.int</a>
Methane	A greenhouse gas with emissions coming from ruminant livestock, landfills, coal mining and their sources.
MOU	Memorandum of Understanding.
Mobile combustion	Burning of fuels by transportation devices such as cars, trucks, trains, aeroplanes, ships etc.
Monitoring plan	Plan describing how monitoring of emission reductions will be realised. The monitoring plan forms a part of the PDD.
National Interest Analysis	An analysis which by constitutional convention must be tabled in New Zealand's Parliament and subject to consideration by Parliamentary Select Committee; examines the implications of ratification of the Kyoto Protocol as an international treaty binding on New Zealand.
Negotiated Greenhouse Agreements (NGAs)	A contractual agreement between the NZ Government and a Competitiveness-at-risk firm or sector to reduce greenhouse gas emissions in return for partial or full exemption from a price instrument, such as a levy or emissions charge. The agreed emissions path would be consistent with each firm's individual circumstances and have the overall objective of achieving world best practice on emissions per unit of production. Criteria, including meeting a positive net benefit test, would be applied to determine eligibility for an NGA. A more detailed description of NGAs is provided in the working paper: Competitiveness-at-risk Firms and Negotiated Greenhouse Agreements.
NEECS	The NZ National Energy Efficiency and Conservation Strategy (NEECS) developed by EECA and the NZ Ministry for the Environment to encourage energy efficiency and a target for renewable energy.
Non-Annex 1 countries	Defined in the International Convention on Climate Change as those countries not taking on emissions reduction obligations.
Offset	An emissions reduction achieved by undertaking a GHG reduction project.

## Glossary

TERM	DESCRIPTION
Operational Entity (OE)	A legal entity that has been accredited by the CDM Executive Board to perform validation, verification and certification functions for CDM projects.
Organic growth/decline	Increases or decreases in GHG emissions as a result of changes in production output, product mix, plant closures and the opening of new plants.
'Others' group	This group includes sectors where factors such as a lack of cost-effective abatement options and/or emission measurement difficulties affect their ability to cope with a full cost on emissions in the short term. It includes the waste and synthetic gases sectors.
Outsourcing	The contracting out of activities to other businesses.
Party	Party to the Kyoto Protocol, which are the countries that have ratified the Kyoto Protocol.
Permit	A marketable instrument giving its holder the right to emit a certain quantity of GHGs.
PCF	Prototype Carbon Fund of the World Bank.
PDD	Project Design Document, which refers to all documents to be submitted to an Operational Entity for validation or to an Independent Entity for determination.
Perfluorocarbons (PFCs)	A group of greenhouse gases which are used in a range of industrial applications and are produced during aluminium smelting.
PIN	Project Idea Note, a project information form that needs to be filled out for submitting projects to the Prototype Carbon Fund from the World Bank. Also used in this manual for the voluntary project information form to be submitted to DERSA.
Process emissions	Emissions generated from manufacturing processes, such as cement or ammonia production.
Programmes	Policies, measures and activities that will have an impact on greenhouse gas emissions or will address climate change issues, but where results generally cannot be accurately determined in advance. Programmes often involve building knowledge and experience, identifying and overcoming barriers and facilitating market transformation.
Project boundary	The notional boundaries set around the project within which the impacts and effects of the project on GHG emissions should be considered and quantified.
Project Developer	The term Project Developer in this manual refers to the organisation developing a JI or CDM project. This is not necessarily the same organisation that is developing the physical project.
Project reduction module	An additional module of the GHG Protocol covering GHG emissions accounting for GHG reduction projects. This is work in progress. More information is available at <a href="http://www.ghgprotocol.org">www.ghgprotocol.org</a> .
Projects	A specific activity aimed at delivering defined reductions in greenhouse gas emissions. These could be from new technologies and practices, or enhancement of sinks, in return for provision by the NZ Government of an incentive, such as funds or emissions units. An activity could not be a project unless it would be uneconomic without payment of an incentive.
Ratio indicator	Indicators providing information on relative performance, e.g. GHG emissions per production volume.
Registration	Formal acceptance of a validated JI or CDM project by the appropriate authorities.
Renewable energy	Energy taken from sources that are inexhaustible, e.g. wind, solar and geothermal energy, and biofuels.
Renewables	Energy sources that are constantly renewed by natural processes. These include non carbon technologies such as solar energy, hydro power and wind as well as technologies based on biomass.
Reporting	Presenting data to internal management and external users such as regulators, shareholders, the general public or specific stakeholder groups.
Reporting for control	An approach for setting organisational boundaries. This requires reporting 100 percent of GHG emissions from controlled entities/facilities.
Reporting for equity	An approach for setting organisational boundaries. This requires reporting the equity share equivalent of GHG emissions from share entities/facilities under control and significant influence.
Revenue recycling	The return to the economy of revenue derived from an emissions charge or from the selling of emissions units or sink credits. In the NZ Governments Preferred Policy package on climate change, revenue recycling refers to using the balance of net revenue, after funding policies such as Projects, NGAs and NEECS, for recycling back into the economy, for example through the tax system.

TERM	DESCRIPTION
RMU	Removal Unit – a new carbon unit created at COP7 in Marrakech, relating to credits generated from sequestration activities, where one unit is equal to one tonne of CO <sub>2</sub> equivalent. Please note that RMUs are only related to Annex I countries.
Scope	Defines the operational boundaries in relation to indirect and direct GHG emissions.
Scope 1 inventory	A reporting organisation's direct GHG emissions.
Scope 2 inventory	A reporting organisation's emissions from imports of electricity, heat, or steam.
Scope 3 Inventory	A reporting organisation's indirect emissions other than those covered in scope 2.
Secretariat	The Secretariat of the UNFCCC (sometimes also referred to as the Secretariat of the Parties), located in Bonn, Germany. Its primary role is to provide administrative support to the UNFCCC process and the JI Supervisory Committee and the CDM Executive Board.
Sector specific calculation tools	A GHG calculation tool that addresses GHG sources that are unique to certain sectors, e.g. process emissions from aluminium production.
Sequestration	The uptake and storage of CO <sub>2</sub> . CO <sub>2</sub> can be sequestered by plants and in underground/deep sea reservoirs.
Significant influence	For definition, refer to Chapter 3: Setting organisational boundaries.
Significant threshold	A qualitative or quantitative criteria used to define a significant structural change. It is the responsibility of the company/verifier to determine the 'significant threshold' for considering base year emissions adjustment. In most cases the 'significant threshold' depends on the use of the information, the characteristics of the company, and the features of structural changes.
Sinks	Any natural or man-made system that absorbs and stores greenhouse gases, including carbon dioxide, from the atmosphere. To be considered a sink, a system must be absorbing more CO <sub>2</sub> than it is releasing so that the store of carbon is expanding.
Sink credits	A unit representing one tonne of carbon dioxide equivalent absorbed after 1 January 2008. Sink credits would be equivalent to emissions units and could be used to meet emission obligations under the emissions trading system.
Source combustion	Any process or activity, which releases GHGs into the atmosphere.
Structural change	A significant change in the size or kind of operation of a business.
Sulphur Hexafluoride (SF <sub>6</sub> )	A greenhouse gas used in electrical switch gear and their industrial applications.
Supplementarity	Eligibility criterion for JI and CDM projects, use of the flexible mechanisms by Annex I countries. It means that projects must be supplemental to domestic mitigation action by Annex I countries.
TCO <sub>2</sub> , tonnes of carbon dioxide equivalent	Units for carbon dioxide equivalent calculations. One tonne of CO <sub>2</sub> equivalent is equal to one ERU or CER.
Uncertainty	The likely difference between a reported value and a real value.
UNFCCC	United Nations Framework Convention on Climate Change negotiated by the world 's nations in 1992. It aims to stabilise greenhouse gas concentrations at a level that avoids dangerous human interference with the climate system.
Validation	The process of independent evaluation of a project activity by an OE against the requirements of CDM.
Value chain module	An additional module of the GHG Protocol covering GHG emissions accounting for activities happening upstream and downstream from a business. This is work in progress. More information available at <a href="http://www.ghgprotocol.org">www.ghgprotocol.org</a>
Verification	Verification is the objective and independent assessment of whether the reported GHG inventory properly reflects the GHG impact of the company in conformance with the pre-established GHG accounting and reporting standards.



New Zealand Business Council  
for Sustainable Development

Level 16  
ASB Bank Centre  
135 Albert St, Auckland

Tel: 64 9 363 3308  
Fax: 64 9 358 7102

Email: [office@nzbcSD.org.nz](mailto:office@nzbcSD.org.nz)  
Web: [www.nzbcSD.org.nz](http://www.nzbcSD.org.nz)