

Fire Research Report

Sustainability and Carbon Footprint Reduction

PricewaterhouseCoopers

September 2008

An estimate is made of a complete carbon footprint of greenhouse gas emissions arising from New Zealand Fire Service activities. Total emissions for the year ending 30 June 2007 are calculated as just under 10,000 tonnes of carbon dioxide equivalents. The tools and methodology are documented. Issues to be considered in establishing appropriate types of targets for reducing emissions are identified. The main drivers for the Commission in setting a green-house gas target should be to achieve cost savings and to demonstrate corporate responsibility. Recommendations are made on developing an action plan to achieve emissions targets based on the UK's Carbon Trust Standard.

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New Zealand Fire Service

Robust Carbon Management

June 2009

Table of Contents

1	Executive Summary	1
2	Aims and Objectives of this Project.....	4
3	New Zealand and International Approaches	5
4	Measurement of the Commission's GHG inventory	12
5	Adoption of Emission Reduction Targets	15
6	A framework for developing an action plan to achieve reductions.....	18
Appendix A	Review of the GHG Protocol's guidance on target setting.....	24
Appendix B	Bibliography.....	27

This report has been prepared by PricewaterhouseCoopers for the New Zealand Fire Service (NZFS). This report is issued pursuant to the terms and conditions set out in our Agreement dated 30 May 2008.

In preparing this report and forming our views, we have relied upon, and assumed the accuracy and completeness of all information available to us from persons with whom we have spoken in the course of consultation, or from public sources, or furnished to us by New Zealand Fire Service. We have evaluated that information through analysis, inquiry and review but have not sought to verify the accuracy or completeness of any such information. We have assumed the accuracy of the information provided to us by other entities. We have not sought to independently verify this data. Neither PricewaterhouseCoopers nor its partners, employees or agents, accept any responsibility or liability for any such information being inaccurate, incomplete, unreliable or not soundly based, or for any errors in the analysis, statements and opinions provided in this Report resulting directly or indirectly from any such circumstances, or from any assumptions upon which this Report is based proving unjustified. We will not accept responsibility to any other party other than to New Zealand Fire Service, to whom our report is addressed, unless specifically stated to the contrary by us in writing. We will accept no responsibility for any reliance that may be placed on our report should it be used for any purpose other than that for which it is prepared.

We reserve the right, but are under no obligation, to revise or amend our report if any additional information (particularly as regards the assumptions we have relied upon) which exists on the date of our report, but was not drawn to our attention during its preparation, subsequently comes to light.

1 Executive Summary

Introduction

This report sets out the findings and recommendations of the project carried out by PricewaterhouseCoopers under the New Zealand Fire Service Commission's contestable research fund on the measurement and management of greenhouse gas emissions arising from non-operational Fire Service activities.

The aims and objectives of the project were as follows:

- **Stage 1:** To measure and report a complete carbon footprint of the greenhouse gas (GHG) emissions arising from non-operational Fire Service activities.
- **Stage 2:** To provide recommendations on appropriate types of targets to be adopted for reducing the Fire Service's GHG emissions arising from non-operational activities.
- **Stage 3:** To prepare a framework for developing an action plan to achieve your GHG emission targets based on recognised international best practice.

The key findings and recommendations from each stage of the project were as follows.

Stage 1 Findings – Measurement of the Commission's GHG Inventory

- The objective of stage 1 of the review was to measure and report a complete carbon footprint of greenhouse gas emissions arising from Fire Service activities. We have completed and issued a separate greenhouse gas inventory report for the year ended 30 June 2007, with total emissions calculated as just under 10,000 tonnes of carbon dioxide equivalents. The findings of stage 1 are summarised in section 5.

Recommendations from Stage 1:

- The Commission's GHG inventory should continue to be measured in accordance with the GHG Protocol (WBCSD and WRI, 2004), ISO 14064-1 (International Organisation for Standards, 2006) and the MfE Voluntary Guidance (Ministry for the Environment, 2007), using the tools and methodology developed during this project.
- Procedures should be introduced to ensure that there are clear responsibilities for preparing, quality checking and documenting future GHG inventory calculations.
- A communication plan should be agreed, setting out how future GHG inventory reports are communicated to staff and external stakeholders.
- If the Commission decides to publish future GHG inventory reports, independent verification of the inventory should be obtained prior to publishing.
- Emissions data should be disaggregated where possible to individual fire station sites to maximise accountability for emissions reductions.

Stage 2 Findings – Adoption of emission reduction targets

- The objective of **stage 2** of the project was to provide recommendations on appropriate types of targets for reducing emissions. The conclusions and recommendations for this stage (summarised in section 6) are based on our research of international examples of target setting approaches, and an options appraisal meeting held with management.

Recommendations from Stage 2

- The main drivers for the Commission in setting a GHG target should be to achieve cost savings and to demonstrate corporate responsibility.
- Senior management and the Commission will need to approve and support the targets set.
- Targets should be set for the whole organisation (absolute target), and for significant emissions sources, such as fuel and electricity usage (intensity targets).
- Targets should be set initially for the 2011/12 year, based on reductions from the 2006/07 year. For the absolute target, reductions of 23% by 2011/12 is a reasonable benchmark (The Carbon Trust, 2008).
- For the intensity targets, using FTEs as the denominator will provide easier comparisons with other similar organisations (other fire service organisations use FTEs).
- Processes will need to be developed for monthly monitoring of progress against targets.
- Stakeholder groups need to be identified and consulted with before targets are finalised, to ensure target set are consistent with stakeholders' expectations.

Stage 3 Findings – A framework for developing an action plan to achieve reductions

- The objective of **stage 3** of the project was to prepare a framework for developing an action plan to achieve your emissions targets based on recognised international best practice. The framework we have developed is based on the UK's Carbon Trust Standard (The Carbon Trust, 2008), which has been successfully adopted by a number of UK public sector organisations, including the London Fire Service. This framework is set out in section 7, along with suggested actions identified at the options appraisal meeting held with management, and from our research of other similar entities.

Recommendations from Stage 3

- The UK's Carbon Trust Standard provides a robust and credible basis for developing the Commission's framework for achieving reductions, but should be adapted to include a greater focus on objective setting (based on the GHG Protocol) and communications and stakeholder management (based on our experience of similar frameworks).

- In developing a plan to reduce emissions, the reduction opportunities identified at the options appraisal meeting should be incorporated.
- The Commission should also engage with the London Fire Brigade and Government agencies (MfE, EECA) to identify emission reduction opportunities.
- The Commission should adopt the framework detailed in section 6 to support the achievement of its emission reduction goals.

2 Aims and Objectives of this Project

The Agreed Aims and Objectives

Background to the project

Both the New Zealand Fire Service (the Fire Service) and the New Zealand Fire Service Commission (the Commission) are committed to supporting the Government's stated intention to improve energy efficiency and the uptake of renewable energy in the public service. The aim of the project was to provide Fire Service management with methodologies, techniques and skills they require to allow them to drive forward the measurement and management of greenhouse gas (GHG) emissions, improve energy efficiency and build resilience to future increased costs of carbon

Objectives of the project

The three objectives for this project are as set out in the Contestable Research Fund contract, and consist of the following:

- To measure and report a complete carbon footprint of the greenhouse gas (GHG) emissions arising from non-operational Fire Service activities (**stage 1**);
- To provide recommendations on appropriate types of targets to be adopted for reducing the Fire Service's GHG emissions arising from non-operational activities (**stage 2**); and
- To prepare a framework for developing an action plan to achieve your GHG emissions targets based on recognised international best practice (**stage 3**).

Relationship to your research objectives

This aims and objectives of this project are fully consistent with the Commission's objective of ensuring the Fire Service has "a baseline measure of its greenhouse gas emissions and develops targets and a plan to reduce emissions".

Contribution to knowledge

The approach we adopted to this project was to guide Fire Service management through each stage of the project to ensure there was a high level of "learning by doing". This has ensured Fire Service management has the skills and capabilities to review and revise the Commission's GHG inventory, targets and action plans in future years.

Structure of our report

A key element of the project was to identify national and international best practice approaches adopted at similar organisations to the Commission. Section 3 of this report details the findings of our research on these best practice approaches, and how we applied them to the three stages of the project.

Sections 4, 5 and 6 of the report go on to detail the findings from each of the three stages of the project are set out in the following sections of the report.

3 New Zealand and International Approaches

Introduction

This section examines national and international best practice approaches, covering:

- the measurement of GHG emissions (GHG accounting methodologies);
- the on-going management of GHG emissions and wider carbon risks and opportunities (approaches to carbon management);
- A case study of an overseas fire brigade demonstrating good practice carbon management and demonstrable emissions reductions (London Fire Brigade case study); and
- Examples of carbon reduction actions agreed by other overseas fire brigades (other fire department examples).

Assessment of GHG Accounting Methodologies

The four major GHG accounting methodologies

The four GHG methodologies we examined during our review are the most commonly applied by either New Zealand entities, or internationally by similar entities to the Fire Service. These methodologies consisted of the following:

- *The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard (2004) Revised*, issued by the World Business Council for Sustainable Development and the World Resources Institute (“the GHG Protocol”);
- ISO 14064-1: *Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals*, prepared by the International Organization for Standards (ISO) (“ISO 14064-1”);
- *Guidance for Voluntary, Corporate Greenhouse Gas Reporting – Data and Methods for the 2006 Calendar Year*, prepared by the Ministry for the Environment (“MfE Voluntary Guidance”); and
- The Ministry for the Environment’s *Carbon Neutral Public Service* initiative (“CNPS”) (Ministry for the Environment, 2008).

An overview of the key features of each of these methodologies follows, along with our assessment of their suitability to the Commission, and our recommendation on the most appropriate methodologies to apply.

The GHG Protocol

The GHG Protocol provides the guiding principles for comprehensive GHG accounting and reporting. The standard has been jointly developed by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI). It is widely used by government agencies and businesses both in New Zealand and internationally, and is the basis for most regulatory and voluntary GHG reporting programmes. The key features of the GHG Protocol are that it:

- Provides the guiding principles for organisations who are voluntarily accounting for and reporting GHG emissions;

- Is widely used and understood among GHG reporters, both in New Zealand and overseas;
- Is the standard on which other emerging GHG standards, such as ISO 14064-1, have been based and aligned to;
- Provides comprehensive guidance on complex issues, such as emissions from leased assets; and
- Provides a set of free on-line calculation tools, but also allows for other calculation tools to be used if required.

The principles that underpin the GHG Protocol ensure reporting is robust and credible, and information produced aid both internal and external decision making. These principles are compatible with, and consistent with, the Commission's objectives for measuring and managing its GHG emissions. These principles are that GHG reporting is relevant, complete, consistent, transparent and accurate.

The GHG Protocol provides standards and guidance to help entities develop accounting approaches for complex issues, such as boundary setting, restatements and reporting. It also provides guidance on other issues, including the setting of emissions targets.

ISO 14064-1

ISO 14064-1 is based on the GHG Protocol, and there has been extensive work done by ISO and the WBCSD/WRI to ensure the two documents are compatible. It was published in its final form in March 2006, and has been widely adopted by voluntary reporters over the last two years. For example, it is the standard that supports Landcare New Zealand's *carboNZero*TM programme (Landcare New Zealand Research Limited, 2008?).

ISO 14064-1 is much shorter than the GHG Protocol (20 pages compared to 113). The focus of ISO 14064-1 is to provide a clear set of requirements on 'what must be done', whereas the GHG Protocol provides a much more descriptive and user-friendly narrative and context on 'what, how and why to do this'. Where ISO 14064-1 lacks comprehensive discussion and guidance on various points it directs users to the GHG Protocol.

The five principles that underpin the GHG Protocol also apply to ISO 14064-1.

MfE's Guidance for Voluntary, Corporate Greenhouse Gas Reporting

MfE's Voluntary Guidance has been prepared to facilitate voluntary, corporate GHG reporting in New Zealand. It is intended to encourage best practice in GHG monitoring and reporting and to support voluntary GHG reporting initiatives. It endorses the use of the GHG Protocol and / or ISO 14064-1 as the reporting framework and also provides information (in the form of emission factors and methods) to enable organisation to apply these frameworks in New Zealand.

MfE's Voluntary Guidance will be regularly updated in order to maintain consistency with international best practice and the New Zealand Government's national GHG inventory reporting.

Carbon Neutral Public Service Programme

The CNPS programme is an initiative designed to lead core Government agencies on the path to carbon neutrality by 2012. As part of this initiative, all 34 core Government agencies have been required to submit annual GHG inventories since 2006/07. One of the objectives of the CNPS programme is to be consistent with international

standards for the measurement of GHG emissions. To meet this objective, the CNPS programme applies both the GHG Protocol and ISO 14064-1 in developing GHG emissions inventory reports. The Programme requires the inclusion of relevant indirect emissions sources to these inventories, and provides guidance on the indirect emissions sources that are expected to be included.

Overall assessment of the four methodologies

The GHG Protocol and ISO 14064-1 are the most widely recognised and credible frameworks for voluntary GHG emissions reporting, and are compatible as the ISO standard is closely based on the GHG Protocol. Both of these frameworks are supported by the Government for voluntary reporting, being the basis of the MfE's Voluntary Guidance and also the Government's CNPS programme.

In applying a GHG inventory reporting framework, the identification of appropriate information is an area of potential uncertainty due to the wide range of available emission factors and measurement methodologies. The MfE's Voluntary Guidance provides New Zealand entities with transparent, robust and credible emission factors and measurement methodologies, and the CNPS programme provides further guidance for Government.

Recommendation on GHG accounting methodologies

The Commission should measure its GHG inventory by applying the standards and guidance of the GHG Protocol and ISO 14064-1. Decisions on applying applicable emissions factors and scoping of indirect emissions sources should be consistent with the MfE's Voluntary Guidance and the CNPS

Assessment of Approaches to Carbon Management

Four approach to carbon management

The approach to carbon management we examined were:

- The guidance material included in the GHG Protocol;
- The Carbon Trust Standard Methodology, prepared by Carbon Trust in the UK;
- The Ministry for the Environment's Carbon Neutral Public Service initiative; and
- PricewaterhouseCoopers' own Robust Carbon Management Methodology (PricewaterhouseCoopers, 2007).

An overview of the key features of each of these approaches follows, along with our assessment of their suitability to the Commission, and our recommendation on the most appropriate approaches to apply.

The Greenhouse Gas Protocol

Although the GHG Protocol is primarily an accounting and reporting standard, it also contains guidance chapters on wider carbon management matters, including:

- Business goals and design (chapter 2); and
- Setting GHG targets (chapter 11).

These guidance chapters provide useful context for designing an approach to carbon management, and are commonly adapted by other carbon management methodologies and schemes.

Carbon Trust Standard

The Carbon Trust Standard is a certification scheme recently (June 2008) made available by the Carbon Trust in the UK. The Scheme's aims are to "*encourage and recognise good practice in carbon measurement, management and reduction by businesses and public sector organisations.*" (The Carbon Standard Rules v1.0 June 2008).

Applicants are awarded certification if they meet three sets of criteria relating to carbon measurement, carbon reduction and effectiveness in managing emissions.

The carbon measurement criteria are consistent with the ISO 14064-1 and the GHG Protocol's standards and guidance.

The carbon reduction criteria require organisations to report not only a figure for their annual absolute GHG emissions, but also two "footprint benchmarks" to measure the efficiency of the organisation:

- A scale of activity benchmark (either FTE or output based); and
- A turnover benchmark.

Reduction targets are required for both absolute emissions (i.e. a targeted reduction in total emissions) and for relative emissions (based on one of the "footprint benchmarks").

The qualitative assessment requires the applicant to provide evidence that it acting responsibly in the areas of governance, carbon accounting and carbon management.

Carbon Neutral Public Service programme

The CNPS initiative seeks to:

"reduce government department greenhouse gas emissions in a cost-effective way, to demonstrate leadership on sustainability and climate change and to reduce the environmental impact of government business." (2008 CNPS Emissions Inventory Preparation Guidance – Version 2.0)

The CNPS initiative requires a three step approach government department must follow to become carbon neutral:

- Measure all relevant GHG emissions through the completion of an emissions inventory report.
- Reduce "avoidable emissions" through the development of an emissions reduction plan, which should include a cost-benefit analysis of the reduction measures.
- Offset unavoidable emissions through the purchase of appropriate carbon credits.

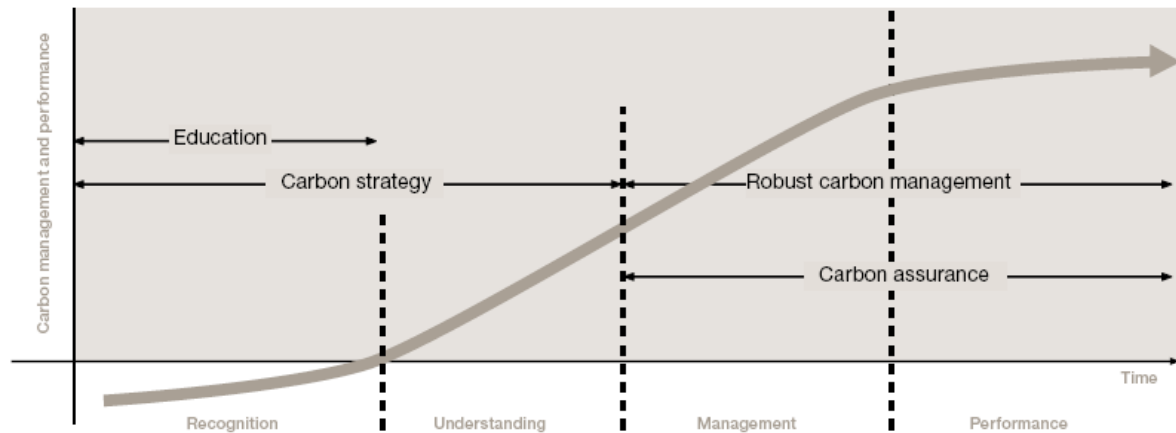
This three step approach is consistent with many other carbon neutral programmes, including Landcare New Zealand's *carboNZero*TM certification scheme.

PricewaterhouseCoopers' approach to carbon management

PricewaterhouseCoopers has successfully developed and applied a methodology to assist organisations in developing a robust approach to carbon management.

The methodology follows four phases of planning and mobilisation, carbon inventory, reduction and offset planning, and ongoing carbon management. There are clear objectives set for each phase, along with the key activities we recommend and the

desirable outcomes and deliverables. It is designed to provide a framework for entities to evolve their carbon management and performance from the initial recognition stage, through understanding, management and performance:



Underpinning this framework are ten key actions organisations need to start putting in place to develop robust carbon management, covering measurement, monitoring and reporting, target setting, managing abatement opportunities, resources and financing, developing new opportunities and continuous improvement.

Overall assessment of the four approaches

The Carbon Trust Standard provides a thorough and credible framework by entities can assess the extent to which they are acting effectively (and demonstrably) in response to climate change issues. The Carbon Trust is recognised globally as a leader in carbon measurement and management approaches, and a significant number of UK public and private sector entities have developed carbon management strategies based on the Carbon Trust’s methodologies. The Carbon Trust standard is consistent with the GHG Protocol, and the focus on measurement, management and governance is in line with PricewaterhouseCoopers’ robust carbon management methodology and the CNPS.

Recommendation

The Commission should develop an approach to carbon management that is consistent with the framework supporting the Carbon Trust Standard. In developing this approach, the Commission should also draw on guidance in the GHG Protocol, and good practice examples from other methodologies such as the CNPS and PricewaterhouseCoopers’ robust carbon management methodology.

London Fire Brigade and Other International Case Studies

London Fire Brigade case study

The London Fire Brigade (LFB) has achieved the Carbon Trust Standard, and was the winner of London’s Sustainable City Award in 2007 (The Carbon Trust, 2007). The targets and actions developed by LFB provide an appropriate reference for the Commission to consider in developing its own carbon management approach.

Key features of the LFB approach

The key features of LFB’s approach include:

- **Reduction target:** 20% absolute reduction in 1990 levels by 2015 (all operations)

- **Reductions achievement:** 17.4% reduction for all operations from 1990 levels by 07/08.
- **Funding:** Sustainability reserve set aside for energy projects. GBP 230,000 savings from GBP 1,500,000 invested by March 2008 (15% return)
- **Vehicles:** LFB's procurement department is working with its vehicles suppliers to replace all fire engines. New appliances meet the latest UK low emissions directives. Over the last five years, over 90% of the frontline operational fleet has been replaced.
- **Buildings:** Fire stations are being fitted out with on-site energy generation technology. To date, nine Photovoltaic, eight solar thermal, two wind turbines, 12 combines heat and power schemes, and 18 high efficiency lighting installations now in place. Improvements also being made to heating systems and sustainable wool loft insulation.
- **Staff based initiatives:** Initiatives to cut energy use and to recycle more (including recycling of disused fire hoses into clothing accessories and furniture).
- **Procurement practices:** working in partnership with suppliers to meet the highest environmental standards.

Other international fire department case studies

A number of other fire department / authorities are taking actions.

The table on the following page summarises these examples.

Department	Areas of focus	Agreed action
Essex Fire Authority (UK) (Essex County Fire and Rescue service, 2008)	Electricity	Building a new fire station which will have a wind turbine, solar panels, and a heat exchanger, which uses the earth as a heat source and the water supply for cooling, to reduce its impact on the environment.
Somerville Fire Department (US) (Marcell,K., 2008)	Fuel	Move, where possible, to more energy efficient vehicles as they make scheduled replacements in the fleet, to reduce their carbon footprint
Tokyo Fire Department (Fire and Rescue, 2008)	Fuel, electricity, Waste	Introducing hybrid vehicles into its emergency fleet. Working to try and turn vehicle engines off when possible in non-emergency situations. When designing new fire stations they adopt ideas for saving energy such as using renewable energy and preserving and creating greenery space on the building premises. Reduce waste and paper use and emphasizing the importance of saving energy among all its personnel.
Hong Kong Fire Department (Fire and Rescue, 2008)	Training, electricity	Live fire training is conducted using environmentally friendly fuel and conducted on an as needed basis. When designing new fire stations they use energy saving installations such as solar water heating and occupancy

Department	Areas of focus	Agreed action
		sensors for lighting. Setting the temperature of air conditioning systems to 25.5°C.
California Fire Department (San Rafael Fire Department, 2009)	Fuel	Uses solar panels to power their onboard engine battery which means that batteries are charged all the time without having to run the engine.
Norfolk County Council (UK) (Barsby,B., 2006)	Fuel	Fitted its fire engines with a special trap to filter out harmful emissions and black smoke.
Cheshire Fire Authority (UK) (Cheshire Fire and Rescue Service, 2008)	Energy, waste, transport, procurement	Promote energy efficiency and ensure that new buildings conform to the standards set by BREEAM (Building Research Establishment Energy Assessment Method). Monitor and reduce water consumption. Reduce waste and promote recycling. Reduce paper use through use of electronic ordering and invoicing. Promote “Green Travel” within the organisation. Review procurement policies and buy recycled or environmentally friendly products where possible.

4 Measurement of the Commission's GHG inventory

Introduction and Methodology Overview

Introduction

The objective of this stage of the project (**stage 1**) was to measure and report a complete inventory of the GHG emissions arising from the Commission's activities.

In the previous section, we recommend that the measurement of the Commission's GHG inventory be undertaken in accordance with ISO 14064-1 and the GHG Protocol, with decisions on applying applicable emissions factors and scoping of indirect emissions sources being guided by the MfE's Voluntary Guidance and the CNPS. This approach was agreed, and we therefore prepared, with the assistance of management and staff of the Fire Service, a GHG inventory report for the period 1 July to 30 June 2007.

We finalised and issued a detailed GHG inventory report in May 2008. This section summarises the findings of that separate report.

Overview of the methodology applied

The key activities undertaken in completing this stage of the project were as follows:

- **Planning and desk top research** of the Commission and of measurement approach followed by similar entities;
- Facilitation of a **scoping meeting** with selected Fire Service management and staff to explain the key principles and to discuss and agree actions;
- **Data collection**, working alongside Fire Service management and staff to collect all the required data;
- **Calculation** of the GHG emissions for each relevant activity;
- Preparation and agreement of the **GHG inventory report**; and
- Presentation of the GHG inventory report, and **discussion of the findings** with selected Fire Service management and staff.

Contribution to knowledge

One of the key features of our approach was to ensure we worked with the Fire Service team throughout each stage of the project to ensure there was a high level of "learning by doing". This has ensured that the Fire Service team now has the skills and capabilities to review and revise the GHG emissions inventory for future years.

In addition to the workshops and presentations, we have also provided management with a full set of our working papers, which explains the measurement methodologies applied for each area of activity, the data sources, and any assumptions applied.

This approach has also provided additional assurance that the GHG emissions inventory report is complete, relevant and accurate.

Workshop Findings

Workshop finding – agreement with the approach

The first stage of preparing the GHG inventory was to hold a workshop with management to obtain agreement on the approach (including assumptions and methodologies to be applied). Following this workshop, we issued a scoping document that detailed the agreed approach. Key points included the following:

- For the purposes of the GHG inventory, the Commission comprises the National Rural Fire Authority, the New Zealand Fire Service and the Commission itself;
- The period 1 July to 30 June 2007 comprises the base year for reporting and monitoring purposes;
- The financial control approach was adopted for consolidating emissions data, to ensure consistency with the approach adopted by the CNPS, and with the Commission's financial reporting – this means the inventory includes 100% of the emissions of the three entities;
- A number of possible emissions sources were excluded from the GHG inventory, comprising any direct emissions from emergencies incidents, other than fuel used by fire trucks for pumping water, and indirect emissions associated with activities of the United Fire Brigades Association of New Zealand, staff commuting to and from work outside of reimbursable mileage, shipping of significant purchases, the production of foam and other fire-fighting materials, the building new fire stations, air conditioning and waste.

Workshop finding – recommendations for the future

During the workshop, our recommendations for developing measurement processes in future years were also discussed. The recommendations discussed were as follows:

- The Commission's GHG inventory should continue to be measured in accordance with the GHG Protocol, ISO 14064-1 and the MfE Voluntary Guidance, using the tools and methodology developed during this project.
- Procedures should be introduced to ensure that there are clear responsibilities for preparing, quality checking and documenting future GHG inventory calculations.
- A communication plan should be agreed, setting out how future GHG inventory reports are communicated to staff and external stakeholders.
- If the Commission decides to publish future GHG inventory reports, independent verification of the inventory should be obtained prior to publishing.
- Emissions data should be disaggregated where possible to individual fire station sites to maximise accountability for emissions reductions.

Summary of the Commission's GHG emissions

Greenhouse gas emissions in tonnes of CO ₂ equivalents (t CO ₂ e) for the year ended 30 June 2007	
Direct emissions (Scope 1)	
- Transport emissions (diesel and petrol)	5,273
- Generation of electricity, heat or steam (diesel, gas)	897
- Other (LPG consumed by the training facility)	287
	6,457
Indirect energy emissions (Scope 2)	2,196
- Purchased electricity	2,196
Indirect other emissions (Scope 3)	516
- Transport related (air travel)	381
- Transport related (other business travel)	327
- Energy related (electricity and gas line losses)	1,224
Total Emissions	9,877

The emissions profile of the Commission was discussed and appraised at the options appraisal meeting held as part of stage 3 of the project – refer to section 6 for reduction opportunities identified.

5 Adoption of Emission Reduction Targets

Introduction and Methodology Overview

Introduction

The objective of the next stage of the project (**stage 2**) was to provide recommendations on appropriate types of targets to be adopted for reducing the Commission's avoidable GHG emissions. To achieve this objective we identified and appraised options for the types of targets the Commission can set for reducing avoidable emissions.

There were three particularly important considerations given in identifying these options:

- Recommended approaches from international best practice standards;
- Practical examples of what other similar entities are doing when setting their GHG targets; and
- Understanding stakeholder expectations.

Overview and methodology applied

The key activities undertaken in completing this stage of the project were as follows:

- **Research** on target types adopted and actual targets set by similar organisations in New Zealand, the UK and Australia; and
- Facilitation of an **options appraisal meeting** with selected Fire Service management and staff to discuss and agree the appropriate types of targets to be adopted based on our research and on an understanding to the expectations of the Commission's stakeholders.

Research

Research – overview of findings

From our research of international best practice examples, we assessed the following two sources as providing the most relevant, credible and comprehensive approaches to setting emissions reduction targets:

- The Guidance material included in chapter 11 of the *Greenhouse Gas Protocol*; and
- *The Carbon Trust Standard Rules v1.0*, prepared by Carbon Trust in the UK.

We also identified target setting approaches that have been applied by other similar organisations within New Zealand and from overseas.

The findings of our research are summarised in this section.

Research – the GHG Protocol

Chapter 11 of the GHG Protocol provides guidance on the process of setting and reporting on a corporate GHG target. The focus of the guidance is on the steps involved, the choices to be made, and the implications of these choices. A detailed review of the GHG Protocol's guidance is set out in the Appendix to this report. The key conclusions from our review, and from the discussions held with management at the options appraisal meeting are as follows:

- The main drivers for the Commission in setting a GHG target should be to achieve cost savings and to demonstrate corporate responsibility.
- Senior management and the Commission will need to approve and support the targets set.
- Targets are to be set for the whole organisation (absolute target), and for significant emissions sources, such as fuel and electricity usage (intensity targets).
- Targets will be set initially for the 2011/12 year, based on reductions from the 2006/07 year. For the absolute target, reductions should be at least 23% by 2011/12.
- Processes will need to be developed for monthly monitoring of progress against targets.

Research – the Carbon Trust Standard

The Carbon Trust Standard requires organisations to demonstrate an absolute and/or a relative (intensity) reduction across the scope of emissions. The standard also requires organisations to produce two “footprint benchmarks” to measure the efficiency:

- A “scale of activity” benchmark (either by FTE or an output metric); and
- A “turnover benchmark”, being emissions / budgeted revenue

An appropriate scale of activity benchmark might be the number of incidents attended during the year. However, applying the FTE benchmark will make it easier to draw comparison with other organisations.

The standard sets as a benchmark a reduction of 2.5% per annum for relative reductions for activity measures, based on an analysis of economic growth in OECD countries. For turnover measures, this is inflation adjusted to 4.5%.

Options Appraisal Meeting

Scope

At the options appraisal meeting held in June 2008, the following matters were considered:

- The findings of our research on target setting approaches;
- Your objectives in measuring and managing emissions, with reference to your stakeholders, your reputation drivers, and your wider organisational and/or sustainability objectives;
- Your reasons for establishing a reduction target, with reference to leadership, planning, performance tracking and/or cost savings;
- Your base year for tracking emissions; and
- The target types should you select (absolute or intensity, internal or external), with reference to what other organisations are doing.

The agreements reached at the meeting are summarised in the following section.

Agreement reached

The following points were agreed at the options appraisal meeting:

- Initial decisions were reached for each of the 10 steps recommended by the GHG Protocol in setting emissions targets (refer to the Appendix to this report);
- Further work is required to identify and agree the Commission's key stakeholders. The three key stakeholder groups identified were users of services (general public, civil defence, other emergency services, iwi, other community groups), Government (MED, MfE, DIA, Treasury) and staff;
- Once stakeholder groups have been identified, initial decisions on targets should be discussed with to ensure they are consistent with their expectations, particularly when carbon reduction objectives may not align with other objectives (e.g. users of services are likely to consider fire response times more important than emission reductions); and

For non-emergency activities (training, education, fire prevention), more ambitious targets should be set than for emergency activities, to align with the Commission's wider objectives.

6 A framework for developing an action plan to achieve reductions

Introduction and Methodology Overview

Introduction

The objective of the final stage of the project (**stage 3**) was to prepare a framework for developing an action plan to achieve your GHG emission targets based on recognised international best practice.

In section 2, we recommend the use of the Carbon Trust Standard as an appropriate approach to develop the Commission's framework, with consideration given to other approaches, including the GHG Protocol. The framework recommended in this section has been developed on the basis of this recommendation.

Overview of the methodology applied

The key activities undertaken in completing this stage of the project were as follows:

- **Research** into, and assessment of international best practice examples of carbon management approaches;
- Facilitation of an **options appraisal meeting** with selected Fire Service management and staff to explain framework options, discuss and agree key decisions, and develop practical actions to include in the action plan; and
- Development of an appropriate **action planning framework**, based on the decisions reached at the options appraisal meeting.

Research and Options Appraisal Meeting

Research - development of the recommended framework

From our research into approaches to carbon management (refer to Section 3), we concluded that the Carbon Trust Standard provides a robust and credible basis for developing the Commission's framework for achieving reductions.

The carbon management aspects of the approach focus on:

- Governance arrangements (policy, responsibility and reporting);
- Accounting processes; and
- Carbon management processes (monitoring, targets, reduction programmes, investment, training and products/services).

The framework we have developed incorporates the features of the Carbon Trust Standard, which we have adapted to reflect additional aspects we identified as important from other carbon management projects. These include a focus on understanding and clearer articulating the goals and objectives of your carbon policy before developing the rest of the framework. This approach is supported by the GHG Protocol's guidance (chapter 2). It also includes a focus on communications and stakeholder management, which we consider to be key in ensuring the support and involvement of Fire Service staff, and your other external stakeholders.

The framework we have developed is detailed at the end of this section.

Options appraisal meeting – scope

At the options appraisal meeting held in June 2008.

The following matters were considered at the meeting:

- The options available for developing a framework, based on our research;
- The findings of stage 1 of the project, and the opportunities for reducing emissions levels;
- The current governance and carbon management arrangements in place, both formal and informal; and
- Practical matters to be considered in developing an action plan.

The agreements reached at the meeting are summarised in this section.

Options Appraisal Meeting

Options appraisal meeting – reduction opportunities

The findings of stage 1 of the project were discussed, and the following reduction opportunities were identified:

Transport related emissions

- Research should be conducted into sourcing more fire efficient operational and non-operational vehicles – in conducting this research, the London Fire Brigade should be contacted to obtain information on their fleet replacement strategy and other measures they have introduced to reduce transport related emissions.
- Undertake a review to establish the opportunities for a more rational use of the vehicle fleet by, for example, sending smaller trucks to smaller fires/incidents, and avoiding using fire trucks for non operational activities.
- Analyse fuel usage of each vehicle within the fleet to identify high and low usage vehicles, and establish the reasons for the variances to ensure good practice behaviours are shared across all sites.
- Introduce driver training for non-incident related travel to maximise responsible driving behaviours.
- Review maintenance levels for all vehicles to identify where increasing planned maintenance and servicing will result in reduced fuel usage.
- Review PDAs where more than one fire truck is sent, to establish whether there is an opportunity send one truck unless the alarm is followed up by a second call.
- Focus actions on non-operational transport (e.g. training, education and fire prevention).

Property related emissions

- Analyse energy-related emissions by fire station in conjunction with the recent energy audit findings to target outliers for the easiest efficiency savings.
- Complete a review of the energy efficiencies achieved as a result of the energy efficiency measures introduced at the new Paraparaumu station to establish how these savings can be replicated elsewhere.
- Conduct research into improving the design and efficiency of existing buildings (e.g. insulation, sensor lighting).
- Focus actions on full-time rather than part time stations.

Recommended Framework – Governance Features

Good practice feature	What you need to have in place	Deliverable
<p>Policy:</p> <p>The Commission should have in place a carbon policy document.</p>	<p>A carbon policy is in place with evidence of clear objectives and an action plan. The objectives are aligned to the Commission’s overall strategic objectives, with reputation drivers (e.g. responding to fires is the primary reputation driver, not sustainability) and with the expectations/sustainability objectives of the Commission’s key stakeholders.</p> <p>The policy is signed off and is available to stakeholders.</p> <p>The policy is regularly reviewed and updated.</p>	<p>A copy of the signed-off policy is available on the Commission’s website.</p>
<p>Communication:</p> <p>The Commission should prepare a communications and stakeholder management plan.</p>	<p>A communications and stakeholder management plan has been prepared for both internal and external communications.</p> <p>The plan includes the agreed approach to reporting emissions levels, targets and reductions internally and publicly.</p> <p>The plan also identifies the key stakeholder group (including staff), and the agreed approach to engaging with these groups to consult on the Commission’s carbon policy, objectives and targets.</p>	<p>An approved communications and stakeholder management plan is available and re reviewed and updated regularly.</p>
<p>Responsibility:</p> <p>The Commission should</p>	<p>An executive body has overall</p>	<p>Standing item on executive body</p>

Good practice feature	What you need to have in place	Deliverable
have overall responsibility for climate change matters, with clear responsibility for day-to-day management.	<p>responsibility for climate change matters.</p> <p>Senior management regularly review carbon/energy performance.</p> <p>There is a management structure in place for day-to-day management, including a responsible person at each fire station site.</p> <p>An individual has responsibility for project management, and a detailed project plan to ensure the on-going achievement of each area of the carbon management framework.</p>	<p>agenda to review performance.</p> <p>Clear chart showing management and staff responsibility.</p>
<p>Reporting:</p> <p>Emissions and reduction performance should be regularly communicated to stakeholders.</p>	<p>Emissions and reduction performance is communicated to relevant stakeholders. This communication may take the form of, for example, a section in the annual report, as part of a separate CSR report, or information on the website.</p>	<p>The communications and stakeholder management plan including the medium for communicating performance to stakeholders.</p>

Recommended Framework – Carbon Management Features

Good practice feature	What you need to have in place	Deliverable
<p>Monitoring:</p> <p>The Commission should have in place systematic monitoring procedures.</p>	<p>Systematic procedures are in place for actively monitoring and controlling energy and fuel consumption throughout the year. Where data is available, this is disaggregated to a fire station site level for significant emission sources, including fuel and electricity usage, and is monitored on a monthly basis against budget and the performance of the other sites. For property related emission sources, the results of the energy audit are used to drive performance monitoring and controlling of energy use.</p> <p>A verification strategy has been agreed over the quality of the emissions and reduction data.</p> <p>An assessment of the adequacy of the systems available for maintaining emissions data has been completed, and actions have been agreed to address any areas of weakness.</p>	<p>Summary monthly monitoring reports are produced and communicated to senior management and the persons responsible for energy and fuel use at each site.</p>

Good practice feature	What you need to have in place	Deliverable
<p>Targets:</p> <p>The Commission should have carbon/energy reduction targets.</p>	<p>Carbon/energy reduction targets have been set for the organisation.</p> <p>Carbon energy targets have been set for particular sites.</p> <p>Performance between sites is compared and organisation performance is compared to external benchmarks.</p>	<p>Summary monthly monitoring of key emission sources is compared to the intensity targets set.</p> <p>Regular reporting to the Commission of overall emission against the absolute target.</p>
<p>Reduction programme:</p> <p>The Commission should have in place programmes or quality control mechanisms to ensure that operating procedures minimise the carbon impact.</p>	<p>Programmes or quality control mechanisms are in place to ensure operating procedures of all sites, vehicles and equipment minimise the carbon impact.</p> <p>A reduction plan has been developed and agreed, and includes a three-year action plan with clear responsibilities, timeframes, costings and expected savings (in both dollars and tonnes of carbon).</p> <p>The reduction plan has been developed from the reduction opportunities identified during the options appraisal workshop and from consultation with other agencies (including good practice organisations such as LFB, and Government agencies such as MfE and EECA), and also from consultation with responsible staff throughout the organisation.</p> <p>The reduction plan focuses on the areas highest emission/cost impact (fuel and electricity usage), and the areas of highest visibility to staff (e.g. recycling and energy reduction initiatives). A cost/benefit analysis (including the possible use of a marginal abatement cost curve) has been completed in setting priorities.</p> <p>The reduction plan covers areas such as changes to make to operating instructions, maintenance programmes, fleet management, procurement processes and staff training.</p>	<p>A reduction programme, including an action plan, is prepared and is available to all relevant staff.</p> <p>Regular reporting of achievements against the action plan are made to the Commission.</p> <p>The reduction plan is monitored regularly, and is reviewed and updated annually.</p>
<p>Investments:</p> <p>Capital investment plans should be in place to</p>	<p>Capital investments are underway to reduce the carbon impact (e.g.</p>	<p>The action plan contained in the reduction programme includes</p>

Good practice feature	What you need to have in place	Deliverable
<p>reduce the carbon impact.</p>	<p>lighting controls, purchasing fuel efficient vehicles) as part of the approved reduction programme.</p> <p>For each capital investment included in the reduction programme, details are provided on the timeframes, capital cost, and the expected life-cycle savings (dollar and tonnes of carbon).</p> <p>For investment made for other purposes, there is evidence that the carbon/energy efficiency impacts have been considered as part of the assessment process.</p>	<p>capital investment initiatives.</p> <p>Carbon/energy efficiency impacts are one of the criteria applied in making any capital decisions.</p>
<p>Training:</p> <p>Appropriate training and awareness programmes should be in place.</p>	<p>Awareness programmes are in place for all staff, covering the Commission's carbon policy, objectives, responsible staff, targets, monitoring arrangement, key actions and how staff can contribute.</p> <p>Appropriate training provisions are in place for those with responsibilities for carbon emissions.</p>	<p>Programme of communication to all staff, and a formal training programme for those with direct responsibility for carbon emissions, included in the communications and stakeholder management plan.</p>
<p>Products and services:</p> <p>Programmes should be in place to influence suppliers and other stakeholders.</p>	<p>Programmes are in place to reduce the life-cycle carbon impacts of services (e.g. through procurement processes).</p> <p>The communication strategy includes how the Commission will actively influence others (e.g. key stakeholder groups).</p>	<p>Included in the communications and stakeholder management plan.</p>

Appendix A Review of the GHG Protocol's guidance on target setting

Common Drivers for Setting a GHG Target

As with any other robust business strategy, setting targets is an essential element of tracking performance over time. The GHG Protocol identifies five common drivers for setting a GHG target.

1. Minimising and managing GHG Risk	A GHG target is used to help drive GHG reduction strategies and increase awareness of the risks and opportunities presented by climate change.
2. Achieving cost savings and stimulating innovation	Implementing a GHG target can result in cost savings and can also drive spend in research and development which can stimulate innovation.
3. Preparing for future regulations	Implementing internal GHG targets can allow companies to respond more effectively to future GHG regulations.
4. Demonstration leadership and corporate responsibility	A commitment such as setting corporate GHG targets demonstrated leadership and corporate responsibility. It enhances relationships with customers, employees, investors, business partners and the public.
5. Participating in voluntary programmes	Voluntary GHG programs encourage and assist companies in setting, implementing and tracking progress against GHG targets.

At the options appraisal meeting held with Fire Service management, it was agreed that the main drivers for the Commission in setting a GHG target should be to achieve cost savings and to demonstrate corporate responsibility. Minimising and managing should also be considered is a less important driver, but future regulation and participating in voluntary programmes are not key drivers at this stage (this may change if the Fire Service comes under the CNPS programme at some later stage).

Types of GHG Targets: Absolute or Intensity

There are two types of GHG targets which companies can use in an effective carbon management policy. Absolute targets reduce emissions over a set period of time to an absolute figure. Intensity targets reduce the ratio of emissions over a set period of time relative to another business metric. Another option to consider when setting GHG targets is to incorporate both an absolute and intensity target. The GHG Protocol lists the advantages of each type:

Advantage	Absolute	Intensity
Environmentally robust, ensuring total emissions reduced	Yes	
Reflects improvements independent of growth or decline		Yes
No need to identify an appropriate common denominator	Yes	
Ease of communication and understanding by third parties	Yes	
Ease of comparison with entities in the same sector		Possible

At the options appraisal meeting held with Fire Service management, it was agreed that an absolute target would be appropriate for the Commission as a whole, consistent with other Government agencies. It was also agreed that intensity targets should be set for individually significant emissions sources (fuel and electricity usage) as this will assist the Fire Service in managing its future exposure to the costs of carbon (for example, through increased fuel prices resulting from the expected emissions trading scheme).

Recommended 10 Steps to Setting a Target

The GHG Protocol recommends 10 steps in setting a GHG target which are shown in the table below, along with the Commission's approach agreed by Fire Service management at the options appraisal meeting:

Step	Agreement reached at the options appraisal meeting
1. Obtain senior management commitment	Support at the senior management/executive level will be essential in achieving a successful GHG reduction programme. Once an emission target, or targets, has been agreed, these will be approved by the Commission.
2. Decide on the target type	An absolute target should be set for the Commission, and one or more intensity targets should be set for the most significant emissions sources (likely to be fuel usage and electricity usage).
3. Decide on the target type boundary	For the absolute target, all emissions should be included. For the intensity targets, only emissions from non emergency activities should be included.
4. Choose the target base year	2006/07 should be the base year as this is the first year for which accurate emissions data is available.
5. Define the target completion date	2011/12 should be the initial target completion date, as this aligns with the Government's CNPS period, and provides the Commission with five years to achieve emissions reductions to allow for

Step	Agreement reached at the options appraisal meeting
	investment in new capital.
6. Define the length of the target period	An initial five year period, as above.
7. Decide on the use of offsets or credits	No planned use of offset or credits, as there is no intention at this stage to claim carbon neutrality.
8. Establish a target double counting policy	No double counting arises within the organisational boundary.
9. Decide on the target level	<p>For intensity targets, a decision should be made once the absolute target has been set, and further research has been completed into reduction opportunities. In setting intensity targets, consideration should be given to the Carbon Trust Standard's benchmark of 2.5% per annum for OECD countries. This equates to a 23% reduction on 2006/07 emissions by 2011/12.</p> <p>For the absolute target, an initial decision on the target levels needs to be reached and then communicated to key stakeholders before being finalised. As there is unlikely to be significant growth in fire service activities (based on a consistent national population), a reduction target of 23%, consistent with the above, may be appropriate.</p>
10. Track and report progress	Processes need to be established to measure and report progress monthly by fire station for emissions subject to an intensity target.

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