

New Zealand Government - The Treasury (Ed.)

Working Paper

Proposals in Support of the Development of a Protocol to the Framework Convention on Climate Change (FCCC)

New Zealand Treasury Working Paper, No. 97/02

Provided in Cooperation with:

The Treasury, New Zealand Government

Suggested Citation: New Zealand Government - The Treasury (Ed.) (1997) : Proposals in Support of the Development of a Protocol to the Framework Convention on Climate Change (FCCC), New Zealand Treasury Working Paper, No. 97/02, New Zealand Government, The Treasury, Wellington

This Version is available at:

<https://hdl.handle.net/10419/205394>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>



**The Design of a Possible
Low-Level Carbon Charge
for New Zealand**

A Working Paper

**The Treasury
April 1997**

ISBN 0-478-10625-4

Comments

Comments on this working paper may be sent to:

Secretary to the Treasury
(Attention: Jim Hagan)
PO Box 3724
WELLINGTON

First Published in 1997
by the Treasury
PO Box 3724
Wellington

© Crown Copyright 1997

This document is subject to Crown copyright. This document or any part thereof may, however, be reproduced by any means for the purposes of private or public study, research, criticism or review, subject to acknowledgment of such Crown copyright.

Internet

This document is available on the New Zealand Treasury's Internet site.

The URL for this site is <http://www.treasury.govt.nz>

Ministerial Preface

This paper contributes to the debate on how New Zealand should meet commitments under the Framework Convention on Climate Change (FCCC) to mitigate greenhouse gas emissions. It is a technical paper, setting out how a carbon charge could be implemented, if the Government were to decide to do so. The release of the paper should not be read as a commitment by the Government to the introduction of a carbon charge as it has decided to defer until early 1998 a decision on whether a low-level carbon charge or some other method of reducing greenhouse gas emissions should be introduced. There are a number of options available to New Zealand to meet our climate change commitments. A carbon charge is only one of them. The Government remains committed to voluntary agreements by industry to reduce emissions in the meantime.

In 1994, the former Government took a series of forward-looking decisions on dealing with emissions of greenhouse gases. At the time, specific measures concentrated on the mitigation of carbon dioxide emissions. However, the previous Government also recognised that other greenhouse gases, such as methane, formed a significant part of New Zealand's emission profile, and forests constituted a substantial opportunity for absorbing carbon from the atmosphere. The 1994 policy provided for a decision, in June 1997, for the introduction of a low-level carbon charge, if New Zealand was not on track to achieve the target to which it had committed. However, during the intervening period the international context has shifted.

Since the beginning of the Berlin Mandate process in 1995, Parties to the FCCC have been meeting to discuss the extent and form of international action to mitigate greenhouse gas emissions post-2000. As part of this process, participating Annex 1 countries (essentially developed countries) agreed at the second meeting of the Conference of Parties in July 1996 to negotiate legally binding targets. This means that Annex 1 countries will be required to meet the commitments set out in the protocol, expected to be agreed in Kyoto, Japan in December 1997.

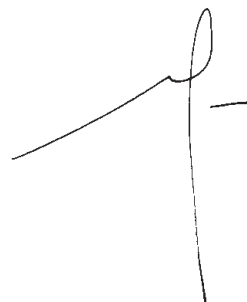
The former Government's commitments of 1994 (which included the possible introduction of a low-level carbon charge) are consistent with the international non-binding aim to stabilise anthropogenic emissions of greenhouse gases at 1990 levels by 2000. Emissions restraint targets have proved to be more difficult and costly to meet than previously anticipated. This experience makes it clear that, in considering how to meet any future commitments, it is important to make sure that the means employed are as efficient and least-cost as possible.

The timing of an agreement in Kyoto at the end of 1997 and the developments taking place in international negotiations make it sensible for New Zealand to defer making a decision on the introduction of a carbon charge until early in 1998. At that time the international context will be better known, along with the size and nature of future commitments. The Government will then be in a position to assess other possible measures such as tradeable carbon emission permits. In this light, the sections of the working paper on design principles, coverage and determining carbon content have a more general application to other instruments that might be implemented to meet New Zealand's future commitments.

It is expected that the Government will release a paper examining the technical issues associated with a permit trading regime during the year, as this is the other major instrument available to the Government to meet future commitments at least cost.



Hon Winston Peters
Deputy Prime Minister and
Treasurer



Hon Simon Upton
Minister for the
Environment

Contents

- Executive Summary 5
 - Introduction 5
 - Context and objectives 5
 - Design principles 6
 - Coverage 6
 - Administrative issues 7
 - Legislative issues 7

- Context and Objectives 9
 - Context 9
 - Objectives 10

- Design Principles 11
 - Summary 11
 - Carbon as a proxy for CO₂ emissions 11
 - Charging for emissions and paying for absorption? 12
 - Principles of tax policy 13
 - A uniform or differentiated charge? 13
 - Uniform* 14
 - Differentiated* 15
 - The Preferred Approach* 17

- Coverage 23
 - Summary 23
 - IPCC Classification 23
 - Fossil fuels 24
 - Carbon sources not associated with fossil fuels 25
 - Exclusions from a carbon charge 26
 - Exports and re-exports* 26
 - Non-emitting uses* 27
 - Carbon absorbed and released as part of a short-term natural cycle* 28
 - Activities excluded on cost-benefit grounds* 29
 - Conclusion 29

Administration	31
Summary	31
Determining carbon content, calorific values and emission factors	31
<i>Actual measurement</i>	33
<i>Other methodologies</i>	34
The point at which liability arises	34
<i>Imports</i>	34
<i>Coverage</i>	35
<i>Pricing</i>	35
<i>Administration</i>	35
<i>Product features</i>	36
Administrative and transitional issues	37
<i>Payment, refund and rebate arrangements</i>	37
<i>Auditing and enforcement</i>	38
<i>Compliance costs</i>	38
<i>Thresholds</i>	39
<i>Effect on existing contracts</i>	40
Legislation	43
Summary	43
Legislative design	43
<i>Existing Act or new legislation?</i>	43
<i>Legislation and regulation</i>	45
The content of the legislation	45
<i>Authority to impose a charge</i>	45
<i>Determining carbon content and setting the point at which liability arises</i>	46
<i>Authorising refunds or rebates</i>	46
<i>Administering a charge</i>	46
Interaction with other taxes	47
Conclusion	48

Executive Summary

Introduction

This Working Paper¹ describes a possible design for a low-level charge on the use of carbon leading to carbon dioxide CO₂ emissions in New Zealand.

It does **not** discuss whether or not New Zealand should introduce such a charge; what the rate of a carbon charge might be; or what the revenues from a carbon charge could be used for. These issues will be considered by the Government in early 1998. Instead, it addresses:

- the context and objective of a possible carbon charge;
- design principles;
- coverage;
- administrative issues; and
- legislative issues.

Context and objectives

A carbon charge is a policy option available to New Zealand to reduce national CO₂ emissions as part of an international response to climate change caused by greenhouse gases. The scope and nature of the international response to climate change will be clearer in early 1998 when the outcomes of the current negotiations on commitments beyond 2000 will be known.

The objective of a carbon charge would be to reduce CO₂ emissions in New Zealand by increasing the price of carbon, thereby changing people's behaviour. Unlike most taxes, its aim would not be to gather revenue. Rather, it would be an example of the kind of tax that aims to price environmental costs into activities or substances that have adverse environmental effects, so that the prices of these activities and substances more accurately reflect the costs they impose on society.

¹ This Working Paper has been developed by officials from the Treasury, Ministry of Commerce, Ministry for the Environment, Inland Revenue Department and New Zealand Customs Service.

Design principles

The design canvassed in this working paper involves taxing the sources of carbon rather than the emissions themselves. This is because the carbon content of the sources is a good indicator of the amount of CO₂ emitted, and the large number of emitters would make the direct taxation of emissions impractical.

For cost-efficiency reasons, this working paper suggests a low-level carbon charge that would be a 'one-sided', rather than a 'two-sided' instrument; that is, it would tax emissions but would not make payments for absorption.

Like alcohol and tobacco taxes, a charge would mean that the price of the substance would incorporate some part of the unpriced cost to society caused by its use. A charge would thus be consistent with the government's general principles of tax policy.

This working paper suggests that the preferred approach to designing a carbon charge would be to apply a charge at a uniform rate across all emitters in the economy. This would impose lower costs on New Zealand than it would if there were different rates for some emitters. This is because:

- emitters would have an equal incentive to find and apply the lowest-cost methods for reducing their emissions, so that these methods would be applied first throughout the economy; and
- all emitters would have the same incentives to use all potential methods of reducing emissions, encouraging a mix of voluntary, lowest-cost responses across industries.

A charge would be added to the price of the product, which would then be subject to GST, and would be a deductible expense in businesses' liability for income tax.

Coverage

This paper suggests that a charge would cover:

- the production and importation of fossil fuels; and

- CO₂ sources not associated with fossil fuels (that is, certain industrial processes and the extraction of steam from geothermal fields for electricity generation).

Where CO₂ is emitted outside New Zealand or is “fixed” in a non-emitting form, rebates² or refunds would apply.

Administrative issues

The administration of a carbon charge would, preferably, link into the operations of an existing agency. Administrative functions would include:

- determining the carbon content of products subject to a charge;
- setting the point at which liability for a charge and eligibility for refunds or rebates arises;
- the handling of payments, refunds and rebates; and
- auditing and enforcement, with a focus on encouraging compliance and minimising compliance costs.

Legislative issues

Legislation would be needed to enact a carbon charge. It would preferably take the form of a stand-alone Act, but would draw as far as possible on administrative provisions in existing tax law in matters such as auditing and enforcement. As a result, the legislation would be relatively compact.

The rate of a charge and the criteria for coverage would be set in legislation; the precise coverage and administrative details would be contained in regulations.

² Where the person exporting or “fixing” the carbon was also the carbon producer, a rebate would apply. The amount would be offset against payments made. In all other cases, a refund would apply.

Context and Objectives

Context

A carbon charge is one option available to New Zealand to reduce national CO₂ emissions, as part of an international response to climate change caused by greenhouse gases. Given the importance of the international negotiations and recent developments in this area, the Government has deferred a decision on whether to introduce a carbon charge until early 1998.

CO₂ emissions have been the main focus of attention in international negotiations because, worldwide, CO₂ is the main greenhouse gas. The emissions result primarily from the combustion of fossil fuels and from certain industrial processes.

The New Zealand Government is a signatory to the United Nations Framework Convention on Climate Change (FCCC), which aims to stabilise atmospheric concentrations of greenhouse gases at a level that avoids dangerous anthropogenic³ interference with the climate. There is not yet a consensus on what that level may be. One of the aims of the convention is for developed countries like New Zealand to return their emissions of CO₂ and other greenhouse gases to 1990 levels by the year 2000⁴. An international process is under way to develop legally-binding targets for emission reductions, and to make other commitments for the period beyond 2000, by December 1997.

New Zealand's actions are part of a global commitment to reduce emissions of CO₂ and other greenhouse gases. Co-ordinated international action on climate change will strongly influence our domestic actions. The Government is monitoring international developments - in particular, proposals for emissions trading. New Zealand is also contributing to the international debate on approaches to lowering the costs of achieving any given level of reductions in greenhouse gas emissions.

The sections of the working paper on design principles, coverage and determining carbon content have a more general application to other instruments that might be implemented to meet New Zealand's future commitments.

³ 'Anthropogenic' means resulting directly from human activities or from natural processes that have been affected by human activities.

⁴ At present, the convention does not set an emissions reduction target for developing countries.

Objectives

The objective of a carbon charge would be to reduce CO₂ emissions in New Zealand by increasing the price of the emissions. It would achieve this by increasing the price of the goods and services containing carbon released into the atmosphere. Effectively, the price of carbon would rise. Unlike most taxes, a charge on carbon would not be intended to gather revenue. Rather, it would be an example of the kind of tax that aims to price environmental costs into activities or substances that have adverse environmental effects, so that the prices of these activities and substances more accurately reflect the costs they impose on society.

Design Principles

Summary

Under the preferred approach, a carbon charge would be levied on carbon as a proxy for CO₂ emissions. Ideally, therefore, it would cover all sources of carbon that would be released as CO₂ in New Zealand. All other carbon sources would be exempt.

A charge would be a 'one-sided instrument', not a 'two-sided instrument'; that is, emissions would be taxed, but payments would not be made for absorption.

As with any tax, economic efficiency, simplicity, fairness and certainty are important principles in the design.

A uniform charge across all anthropogenic carbon sources that result in CO₂ emissions in New Zealand would minimise the cost involved in achieving a desired level of emission reductions in New Zealand.

Carbon as a proxy for CO₂ emissions

It could be argued that, because a charge would be aimed at reducing CO₂ emissions, it should be levied on the emissions themselves. The choice between taxing CO₂ emissions directly and taxing carbon-containing substances as a proxy for their CO₂ emissions depends on the cost and feasibility of monitoring CO₂ emissions, and on how good a proxy carbon content is for CO₂ emissions.

CO₂ emissions are from numerous and diverse sources; it would be impractical to impose a tax on emissions from every factory chimney and vehicle exhaust. Taxing the comparatively few sources of carbon would be considerably cheaper. However, doing this would be efficient only if there is a direct and stable link between the sources and the CO₂ emissions. In fact, there is, in general⁵, a stable proportional relationship between the carbon content of CO₂-emitting substances and the quantity of CO₂ emitted. Therefore, the carbon content of the substances is, in general, a good proxy for the emissions.⁶

⁵ Sources of CO₂ emissions that are not associated with fossil fuels are an exception (see "Exclusions from a carbon charge", page 26).

⁶ "Implementation Strategies for Environmental Taxes", 1996, OECD, page 11.

The relationship between the carbon content of a substance and the amount of CO₂ emitted per unit of energy generated from that substance is called the "emission factor". The emission factor

would be converted into a rate per unit of each CO₂-emitting substance, using whatever is the standard unit of measurement for each substance (for example, litres in the case of petrol or cubic metres in the case of gas).

Each type of fossil fuel contains different proportions of carbon, and therefore has a different emission factor. Coal emits about twice the amount of CO₂ per unit of energy released than natural gas does, with liquid fuels falling in between. This means that a uniform tax on carbon would translate to different amounts per unit of measurement for each major fuel type. The following table sets out the carbon content, in tonnes, per gigajoule of energy output.

Tonnes of carbon per GJ ⁷				
gas	coal	petrol	diesel	fuel oil
0.014	0.027	0.020	0.020	0.020

Charging for emissions and paying for absorption?

A carbon charge could be designed as a “one-sided instrument”, which would simply tax CO₂ emissions, or a “two-sided instrument”, which would also reward carbon absorption. Given the aim of reducing net CO₂ emissions, a two-sided instrument would, in theory, be better targeted. It could ensure that if an increase in absorption cost less than the same reduction in emissions, the absorption, not the reduction in emissions, would take place.

However, a two-sided charge would be expensive to administer. It would require an administrative system that could estimate the changes in CO₂ absorption when land uses changed; for example, from agriculture to planted forestry. With a low-level charge, the additional administrative costs of a two-sided charge compared to a one-sided charge are likely to exceed the additional benefits. Therefore, the preferred approach is a one-sided charge.

⁷ *New Zealand Energy Information Handbook*, Baines, J. (1993).

Principles of tax policy

Economic efficiency, simplicity, fairness and certainty are important principles in the design of taxes. Tax reforms over the last decade have, in general, reflected these principles. Examples are the broadening of the tax base, the lowering of income-tax rates, and the lack of exemptions and special rates for GST.

However, a carbon charge, like a limited range of other taxes such as alcohol and tobacco excises, has a different purpose. While the principles of simplicity, fairness and certainty still apply, the economic efficiency issues for such taxes are not identical to those for taxes that aim to raise revenue. Revenue-raising taxes are aimed at minimising their impact on people's behaviour, while taxes such as a carbon charge are aimed at changing it. Their purpose is to 'correctly' price goods that, in their use, impose otherwise unpriced costs on society. They achieve this by incorporating the cost on society into the price of the good. In the case of carbon, the unpriced cost is human-induced climate change. A carbon charge equal to the unpriced cost of pollution would result in emission levels that were optimal from society's viewpoint.

A uniform or differentiated charge?

A charge could apply at a uniform rate to all carbon-containing substances that emit CO₂ when used, or there could be exemptions or different rates for different substances or uses. A uniform charge on all carbon that is introduced into the economy and released in it as CO₂ is the preferred approach. Uniformity would mean that all abatement opportunities would be treated equally across and within all sectors.

On the other hand, particular sources or uses of carbon could be exempted from a charge, or subject to a higher or lower rate. Examples of non-uniform approaches include:

- exempting carbon that contributes to existing emission levels (that is, 'grandparenting');

-
- placing a higher charge on those who can more readily reduce their emissions; and
 - taking account of emission reductions already in place under voluntary agreements.

The arguments for and against uniformity are set out below.

Uniform

A uniform charge would achieve a given reduction in CO₂ emissions at a lower economic cost than a non-uniform charge would. Therefore, it would usually be the preferred approach.⁸ This is because:

- emitters would have an equal incentive to find and apply the lowest-cost methods of reducing their emissions, so that lower-cost reductions (up to the level of the charge) are implemented rather than higher-cost ones;
- all emitters would have the same incentives to use all potential methods of reducing emissions, encouraging a mix of voluntary, lowest-cost responses across industries;
- a uniform approach provides fewer opportunities for lobbying or strategic behaviour than a non-uniform approach; and
- it does not discriminate against new entrants.

With a uniform rate, emitters face a common charge per tonne for emitting CO₂ and respond by reducing their emissions until the cost of reduction reaches that price. For example, with a \$10 per tonne charge, emitters would undertake all abatement measures costing less than \$10 per tonne. This would not lead to equal or proportional responses by all emitters, because some would be more price responsive than others. The incentive effect of a uniform rate would lead different firms to reduce pollution to different degrees - those with high reduction costs would reduce their use of carbon less than others and therefore obtain a smaller reduction in their carbon tax.

The advantage of uniformity would be that the introduction of more carbon into the economy would incur the same additional cost in all sectors. Everyone would then have to recover that

⁸ *The Theory of Environmental Policy*, Second Edition, 1988, Baumol, William and Oates, Wallace, Chapter 11. *Sustain-ability and Policy: Limits to Economics* (1995), Common, Michael, (page 161) comments that, given certain standard assumptions, "the least cost theorem says that abatement costs are minimised where [the Government] taxes emissions from all firms at a uniform rate per unit".

cost when pricing the goods produced using the carbon. All carbon uses that had a higher value than their cost, including the carbon charge, would be unaffected by a carbon charge. In other words, all high-value uses of carbon would be retained and low-value uses would be reduced. Thus, uniformity would minimise the cost to the economy as a whole of achieving a given reduction in CO₂ emissions.

A uniform carbon charge that does not differentiate between sources or emitters is a policy solution consistent with the nature of the underlying problem: that is, the failure of market prices to include the environmental costs of CO₂ emissions. A uniform charge would aim to partially incorporate the cost of the emissions directly into market prices, based on the carbon content of the goods. Producers and consumers would then be encouraged to adjust their behaviour accordingly. A non-uniform charge, on the other hand, would send different signals about the environmental costs to different emitters.

More generally, a uniform charge is a 'transparent' policy: the same rate applies to all sectors, without the complication of different rates and/or exemptions.

Differentiated

Arguments against uniformity normally focus on the specific circumstances of particular firms or industries. The advantages commonly presented of a non-uniform approach are given on the following page, with some suggested approaches under each heading.

Flexibility

1. Industries that are most able to reduce their emissions (whether due to the size of their emissions or their technical flexibility in using carbon) should face a higher charge, to encourage them to make maximum use of that ability.
2. Industries that are least able to reduce their emissions should face a higher charge, in line with the theory of 'Ramsey taxation' of commodities. This says that the economic costs

of collecting revenue can be minimised by setting the rate of the tax on each individual inversely to the extent that his or her behaviour changes in response to price changes. This minimises the behavioural response to the tax and the resulting distortions to the economy.

3. Industries that face technological limits on reducing their emissions should face a lower charge, since a higher charge would make little or no difference to their emission levels.
4. A charge should be higher on the largest CO₂ emitters or industries, to encourage them to reduce their emissions first.

Impacts

1. Firms or industries that would face a greater relative cost increase from a charge than others should face a lower charge.
2. Firms or industries that would reduce employment or investment following the imposition of a charge should face a lower charge.
3. Firms or industries that would be likely to relocate overseas, reducing emissions within New Zealand but possibly increasing them elsewhere, should face a lower charge.
4. Firms or industries in regions that may be particularly affected by a charge should face a lower charge.

Fairness

1. Existing levels of emission should be exempted under a 'grandparenting' provision. Some emitters may have already achieved some or all cost-effective reductions voluntarily before the introduction of a charge, and so should be exempt from it.⁹
2. If a uniform charge were implemented without comprehensive multilateral action, New Zealand firms would face a charge while some international competitors would not. Such firms should be exempted or a lower charge imposed on them, so that they can remain internationally competitive.

⁹ Twenty-one voluntary agreements are in place, including one facilitating agreement where an intermediary will arrange agreements with small firms within an industry. These agreements are not binding.

The Preferred Approach

A general response to the arguments against uniformity is that differentiating among emitters would not reduce emissions in New Zealand at the lowest cost to New Zealand.

As an example, assume that Emitter A is more easily able to reduce CO₂ emissions. Emitter A faces a carbon charge of \$200 per tonne and Emitter B faces a charge of \$100 per tonne. This gives Emitter A the incentive to spend up to \$200 per tonne to reduce emissions, while Emitter B has the incentive to spend up to only \$100 per tonne. A uniform, intermediate-level charge on both emitters would achieve the same reduction in emissions at a lower economic cost, because Emitter A would back off making reductions and Emitter B would increase them.¹⁰ This would happen regardless of the level of emissions or the size of the firm, or whether emissions have already been reduced voluntarily. The example below shows that the cost of reducing emissions is lower with a uniform charge than with charges aimed at achieving equal reductions by each firm, or charges from which some are exempt. It also shows that the distribution of winners and losers differs according to the type of charge used.

In the example, there are three firms, whose emission reduction costs per tonne vary. Three methods of reduction are used:

1. **Uniform charge.** With this charge, each emitter undertakes all reduction measures that cost less than \$20.
2. **Differentiated charge aimed at equal reductions by each firm.** With this charge, each emitter undertakes equal reductions in absolute terms.
3. **Charge with exemption.** With this charge, one emitter is exempt, and all the others undertake equal reductions in absolute terms.

To illustrate the effects of these methods, we assume an objective of reducing CO₂ emissions by 300 tonnes overall.

¹⁰ This example is discussed in "Timing, Distribution and Impacts of Carbon Taxes", NZIER report to Ministry of Commerce, S Gale, May 1995, page 13. It is not a technically precise example, but illustrates the effect of uniformity versus non-uniformity.

Reductions of CO₂ emissions achieved (in tonnes) at given costs per tonne

	\$10	\$20	\$50	\$75
Firm A	100	150	200	250
Firm B	10	50	100	150
Firm C	50	100	200	300

Method One - uniform charge

	Marginal cost	Total cost	Reduction
Firm A	\$20	\$3000	150t
Firm B	\$20	\$1000	50t
Firm C	\$20	\$2000	100t
Total			300t

Average cost: \$20.00/tonne of CO₂ reduction

Method Two - uniform quantity

	Marginal cost	Total cost	Reduction
Firm A	\$10	\$1000	100t
Firm B	\$50	\$5000	100t
Firm C	\$20	\$2000	100t
Total			300t

Average Cost: \$26.27/tonne of CO₂ reduction

Method Three - exemption

	Marginal cost	Total cost	Reduction
Firm A	\$20	\$3000	150t
Firm B	\$75	\$11250	150t
Firm C	\$0	\$0	0t
Total			300t

Average cost: \$47.50/tonne of CO₂ reduction

Exemptions or lower charges would also create a longer-term problem of “lock-in”. Once preferential arrangements were in place they would become difficult to change, and the firms concerned would have no incentive for technological innovation

that might remove the original reason for the preference. Further, favouring existing firms or sectors would, in effect, raise barriers for new entrants or more efficient users of carbon, thus reducing competition and efficiency. In the longer run, this would increase a charge's economic costs to New Zealand.

Flexibility

There is an intuitive appeal to the idea of imposing a higher charge on those with the most potential to achieve reductions, so that they are encouraged to do so. However, this does not necessarily work in practice.

With a uniform charge, everyone faces the same incentives. A uniform charge would usually result in the most flexible firms making the greatest reductions, but would not prejudge which firms or sectors are most flexible. Adjusting a charge on a case-by-case basis to reflect each individual firm's or sector's ability to adjust its carbon use would require detailed information that the government would not have, and encourage firms and sectors to claim inflexibility in order to qualify for a lower charge.

Ramsey taxation, as noted above, aims to raise revenue but cause minimal behavioural change. This approach is inappropriate for a charge that is intended to change behaviour rather than to raise revenue.

Impacts

A uniform charge would directly increase the price of carbon and, therefore, the cost of CO₂ emissions. Increasing the relative price of carbon would have an economic cost in GDP terms, and would reduce CO₂ emissions, which would not be accounted for in GDP. The production and consumption mix of the economy would change, creating both 'winners' and 'losers' among firms. There may also be a competitive disadvantage for some New Zealand firms in relation to overseas firms.

Part of the response to a carbon charge would include a reduction in the output of some firms and possibly the closure of some marginal firms. However, exempting firms from a

carbon charge would simply shift the burden onto others. The wider the exemption, the greater the additional costs would be. The general principle is that, to achieve a given level of reduction in emissions, any reduction of cost for one emitter would mean an increased cost for others¹¹. These costs may not be apparent if they are dispersed, but the exemptions would still increase the economic cost to New Zealand as a whole¹² because they would represent a departure from uniformity.

If New Zealand imposed a carbon charge unilaterally, this would reduce the international competitiveness of some firms. Some emitting activities may relocate overseas, leading to increased emissions overseas. Thus global CO₂ emissions would be reduced to a lesser extent than the reduction of emissions in New Zealand (or not at all) as a result of unilateral action by New Zealand. However, this working paper is considering the design of a carbon charge which would reduce New Zealand's *national* emissions at least cost. The issue of unilateral versus multilateral action by a range of countries to reduce CO₂ emissions is being considered in international negotiations on climate change. In these negotiations New Zealand is advocating a least-cost flexible approach involving multilateral mechanisms.

Fairness

Differentiation in charges would raise issues of fairness. Any non-uniform approach benefits particular firms or sectors on grounds other than national benefit. Arguably, this is unfair, since, as noted above, others would bear a greater burden to achieve any given reduction. The same could be said about applying the carbon charge only to additional emissions; that is, grandparenting existing emissions.

A variation on the grandparenting argument is that it should apply to firms that have already reduced emissions under voluntary agreements. However, as well as creating a distorting effect on competition (by exempting established firms), this would cause problems, such as high compliance and administrative costs, in establishing which emissions are

¹¹ Strictly speaking, this is correct only if firms reduce emissions as a result of the charge. There may be some firms for whom, in the short term, a carbon charge would not lead to emission reductions, due to technological limitations. However, over time, there is always some opportunity for technological change that could reduce emission levels for a given level of output, or for some measure of substitution between the carbon-containing inputs and/or outputs of the firm or sector in question, and the inputs and/or outputs of other firms or sectors.

¹² See the previous footnote.

genuinely additional. Such grandparenting arrangements can distort markets for a long time, with pricing decisions largely driven by previous, government-set prices.

It would be impossible for the government to obtain reliable information on the impact of voluntary agreements; for example:

- whether firms would have undertaken emission reduction measures in the absence of a carbon charge;
- the degree to which emission reduction measures have been brought forward to help achieve climate change objectives; and
- the extent to which firms have exhausted the potential for achieving emission reductions.

It is worth noting that measures firms have undertaken under voluntary agreements have already reduced their potential liability from a carbon charge, since their lower emission levels would incur a lower charge.

The issue of the imposition of a charge on New Zealand firms, while some overseas competitors may not be taxed, raises the broader question of the international co-ordination of policy responses to climate change, as noted in the preceding section. This Working Paper does not consider this broader question. However, whether or not overseas competitors face some form of carbon tax, a uniform carbon charge would reduce CO₂ emissions in New Zealand at less cost than a non-uniform approach.

Administration

Most varieties of non-uniformity, if feasible at all, would need complex and costly administrative arrangements. Varying the rate of a charge on the basis of technical flexibility would require information on every source's methods of reducing emissions, both in general terms and at every level of output. This information would need to be continually updated to reflect technological changes, but would be difficult or impossible for the government to ascertain accurately. Since the rate of a

uniform charge on given products varies only in proportion to their carbon content, uniformity would allow a charge to be imposed at the point of production or importation of the products. This minimises administrative costs for the government, and compliance costs for the introducers and users of carbon.

Another advantage of a uniform charge over a non-uniform charge is that it reduces the incentives for carbon-using firms or sectors to lobby on the basis of their own interests. A uniform charge would be a transparent instrument of environmental policy; transparency is an important means to reduce special treatment for particular firms or sectors.

Coverage

Summary

The suggested coverage for a carbon charge is all anthropogenic carbon introduced into (that is, produced in or imported into) the New Zealand economy and then released in New Zealand in the form of CO₂. This carbon includes:

- fossil fuels (including the flaring of gas and the use of imported petroleum coke and pitch for carbon anodes used in aluminium smelting); and
- CO₂ sources not associated with fossil fuels (for example, the manufacture of cement and the extraction of geothermal steam for electricity generation).

There could be exclusions from a carbon charge where:

- the carbon is exported or re-exported;
- no CO₂ is emitted when the carbon is used;
- the carbon is absorbed and released as part of a natural cycle; or
- the transaction costs (for example, administration and compliance costs) of imposing a charge would be great enough to outweigh the benefits of including the activity within the regime.

It would be important to have a clear division, based on transparent criteria, between sources of carbon that are subject to the regime and those that are exempt.

IPCC Classification

Ideally, a uniform charge on carbon would cover all carbon introduced into, and then released within, the New Zealand economy. The Intergovernmental Panel on Climate Change has issued a set of Guidelines for National Greenhouse Gas Inventories that classifies all sources and sinks of greenhouse gases. National inventories of flows of greenhouse gases include all emissions and removals taking place within national territories and offshore areas over which national jurisdiction applies.

It currently excludes bunker fuel sold to ships or aircraft engaged in international transport, although these emissions are reported.

The categories used are:

- energy;
- industrial processes;
- solvents and other products containing volatile organic compounds;
- agriculture;
- land use change and forestry;
- waste; and
- other (non-specified) sources.

Fossil fuels

This working paper suggests that all fossil fuels in New Zealand would be subject to a carbon charge.

Fossil fuels are the major sources of CO₂ emissions. In 1995, they represented 96.5 percent of New Zealand’s gross anthropogenic emissions of CO₂. The breakdown by fuel is as follows:

Oil:	50 percent
Combustion	48 percent
Use of electrodes for iron and steel manufacture, and of carbon anodes (made from petroleum coke and liquid pitch) in the Tiwai Point Smelter ¹³	2 percent
Gas:	29.5 percent
Combustion ¹⁴	28 percent
Flaring at wellheads ¹⁵ , and CO ₂ stripping at the Kapuni Gas Treatment Plant (with some subsequent reuse)	1 percent
Production of hydrogen at the Marsden Point refinery	0.5 percent

¹³ The smelting process also uses pure carbon cathodes. These are imported and do not result in emissions, so the regime would exclude them. The steel-making process at BHP New Zealand Steel also results in CO₂ emissions from the consumption of carbon-based electrodes in two electrically powered melters and in the arc furnace used to melt scrap. Pacific Steel Ltd also uses an electric arc furnace to melt steel scrap, with carbon in the charge combined with oxygen to produce steel with a required carbon content.

¹⁴ Including production and combustion of methanol and liquid fuels produced from gas.

¹⁵ Such as for well testing, or where low-quality gas is extracted as a by-product.

Coal:	15 percent
Combustion	11 percent
Use of coal to remove oxygen from iron-sand at the Glenbrook steel mill	6 percent

A charge would cover all these fuels when they are first introduced into the New Zealand economy.

A charge would not apply to fuels manufactured in New Zealand, since it would already have been levied at an earlier stage. Such fuels include synthetic petrol or methanol (manufactured by Methanex at Motonui), hydrogen peroxide (manufactured by DuPont at Morrinsville) and hydrogen (manufactured at Marsden Point). In all these cases, the feedstock is gas or oil that would already have been taxed at production or importation.

However, if the fuels were manufactured overseas and imported into New Zealand, a charge would apply to the refined product on importation. Apart from transport fuels, refined products that could be imported include bitumen, carbon black, lubricating oils, petroleum coke and pitch. Any such products manufactured in New Zealand would incur a charge on the basis of their raw materials, so imports should also be subject to a charge, to ensure total coverage. Conversely, if domestic production would receive a refund or rebate of a charge, the corresponding imports should be exempted from it. See "Non-emitting uses", pages 27-28, "Activities excluded on cost-benefit grounds", page 29, and "Payment, refund and rebate arrangements", page 37.

Carbon sources not associated with fossil fuels

Non-fossil fuel sources of carbon would also be subject to a charge.

Such sources accounted for 3.5 percent of gross emissions in 1995. They would require a different charging mechanism to that used for other carbon introducers, because they are solely domestically produced and not all uses convert all the carbon input into CO₂ emissions. A charge would apply not to

production, but to certain uses only; for example, to the calcination of limestone to make cement, but not to the construction of a road with limestone.

The only significant examples of CO₂-emitting uses that are not associated with fossil fuels are:

The calcination of limestone in the process of manufacturing cement ¹⁶	1.8 percent
The calcination of limestone in the process of manufacturing lime ¹⁷	0.3 percent
The use of limestone in steel production ¹⁸	0.1 percent
The release of CO ₂ as part of steam extracted from geothermal fields for electricity generation ¹⁹	1.3 percent

¹⁶ Carbon dioxide is produced during the production of clinker and intermediate products from which cement is made. Calcium carbonate (CaCO₃) from limestone is heated to form calcium oxide (CaO, or lime) and carbon dioxide (CO₂). This process is called calcination. Limestone often also includes magnesium carbonate (MgCO₃), which has similar emissions. Cement can also include a small proportion of limestone filler that is not calcinated.

¹⁷ Lime is produced in a similar manner to cement clinker.

¹⁸ In BHP New Zealand Steel's multiple hearth furnaces at Glenbrook. The estimate is indicative only.

¹⁹ Extraction of steam from bores, not underground heat exchange within bores, or natural geothermal effects. The CO₂ content of gas emissions is measured from samples taken at the wellhead.

Note: There may be other CO₂-emitting industrial processes that have not yet been identified.

Exclusions from a carbon charge

Exports and re-exports

Exports and re-exports of fossil fuels would be exempt from a carbon charge.

The target of a charge would be CO₂ emissions within the New Zealand economy. This implies that a charge on the export or re-export of fossil fuels would be refunded or rebated. On the other hand, if the production of the fuel involved the emission of carbon, the refund would not be payable because the emissions would have occurred in New Zealand.

The treatment of international aviation and marine bunker fuels is currently being considered by the parties to the UN Framework Convention on Climate Change on a multilateral basis. In the meantime, by international agreement, these fuels, as exports, would not incur a carbon charge. However, bunker fuel unloaded from ships would incur a charge as an import because it emits CO₂, either directly or as waste fuel oil, which can be burned in kilns.

Non-emitting uses

A refund or rebate would apply to non-emitting uses of carbon; that is, where the CO₂ is 'fixed' in such a form that it is not normally released during the product's life. This mainly applies to the embedding of refined petroleum products in end-products.²⁰

Examples of non-emitting uses are:

- sparging; that is, the injection of CO₂ (previously stripped from natural gas) with calcium oxide to form a limestone lining on wastewater pipes; and
- the re-injection of gas into wells. If the re-injection takes place before the point where the tax is collected, no charge would be levied. If the re-injection occurs after the point where the tax is collected, a rebate should be made.

There are some uses of carbon-containing substances that cannot be simply classified as emitters or non-emitters. These uses may:

- emit some but not all of the embodied carbon as CO₂;
- emit embodied carbon as CO₂ but only over a long period of time; or
- emit CO₂ only in some circumstances.

Whether such uses should incur a charge will need to be considered on a case-by-case basis, taking into account the significance of CO₂ emissions and the administrative and compliance costs of including or excluding the uses concerned.

Examples of these uses are:

Tyres About 25 to 35 percent of a tyre is made from carbon black, which is made from the oxidation of natural gas or from the residual hydrocarbons from oil refining. The small proportion of tyre material that is deposited on roads oxidises, thereby releasing CO₂. Common disposal methods such as landfills also release CO₂, but only over a very long period. Further investigation would be needed to consider whether

²⁰ See "Refunds and rebates", page 37.

the long-term release of CO₂ from disposed tyres is significant enough to justify their inclusion in the carbon charge regime.

Bitumen This is produced by distillation of the lowest fraction of crude oil. Some proportion of the carbon embodied in bitumen is released in the form of carbon monoxide (CO) or methane (CH₄). Since some carbon is fixed in the bitumen and no CO₂ is released, a carbon charge rebate would seem justified.

Plastic Plastics are manufactured from resin that contains a small proportion of carbon. The manufacture, use, recycling and disposal of plastics does not, in general, involve the emission of CO₂, suggesting that a charge should not be levied on resin. However, plastics may be combusted, which does involve the emission of CO₂. Combustion is not a significant method of disposing of plastics at present but, if it were to become more common, consideration would need to be given to a charge on resin.

Carbon absorbed and released as part of a short-term natural cycle

A charge would not apply to carbon that is released as part of short-term natural cycles such as the harvesting and replanting of forests, because the CO₂ emitted is offset by carbon absorption.

Carbon is released in this way when, for example:

- trees are harvested and burned;
- plant matter decomposes;
- methane from landfills is burnt; and
- sugar is fermented in beer production.

A 'one-sided' regime (that is, one that taxed carbon release but made no payments for carbon absorption) would generate perverse incentives in this area. Taxing the CO₂ released in such

circumstances without giving a credit for the initial carbon absorption (for example, when trees are planted) would discourage that initial absorption phase, which is undesirable.

Activities excluded on cost-benefit grounds

The regime would not cover sources of carbon where the administration and compliance costs of imposing a charge would be likely to exceed the benefits. If a charge were set at a higher-level, such exclusions might be reviewed.

One-off land-use changes fall into this category, as may the emission of carbon from tyres, bitumen and plastics. See “Non-emitting uses”, page 27-28.

Conclusion

A charge would apply to all carbon that is introduced into the economy from:

Fossil fuels, whether produced here or imported (including flaring of gas at wells).

Other sources - industrial processes that result in CO₂ emissions, such as the calcination of limestone and the extraction of steam from geothermal fields.

A charge would **not** apply:

- where carbon is introduced into, but not released within, the economy; for example, in the case of:
 - exports, and international aviation and marine bunker fuels
 - non-emitting (that is, ‘carbon fixing’) uses;
- where carbon is absorbed and released within a natural cycle. This applies to:
 - renewable sources (biomass)
 - landfill gas generation; or
- to activities currently excluded on cost-benefit grounds. These include minor emitters of carbon, such as plastics.

Administration

Summary

This section discusses implementation of a carbon charge, if the Government decided to implement such a charge. The aim would be to minimise the total costs associated with the introduction and ongoing operation of an effectively administered carbon charge. These costs include payers' compliance costs and the government's administrative costs.

The main issues are:

- how to determine the carbon content, amount of CO₂ emitted per unit of energy generated (calorific value), and emission factors of the products subject to a charge. The preferred approach would be to measure the carbon content rather than estimate it, wherever possible;
- where to set the point at which liability for a charge arises; and
- administrative and transitional issues such as:
 - payment, refund or rebate arrangements for exports and carbon-fixing activities;
 - auditing and enforcement;
 - compliance costs;
 - the use of thresholds; and
 - the effect on existing contracts.

Determining carbon content, calorific values and emission factors

Imposing a carbon charge on a product requires knowledge of its carbon content and calorific value, so that an emission factor can be calculated for it.

Agreed methodologies would be established for obtaining this information. The preferred methodology would be to actually measure the carbon content and calorific values, with estimation of these where measurement is not feasible or cost-effective. The key factors in deciding on other, second-best, methodologies

would be cost, the accuracy of the proposed methodology, and the variability of carbon content and calorific value in the product.

Both of these approaches - actually measuring carbon content and calorific value, and using other methodologies - would require striking a balance between the level of compliance costs and the effectiveness of the regime.

Once an agreed methodology for determining the carbon content and calorific values and for calculating the emission factors was in place, ongoing monitoring of production would be comparatively simple, with payers of a charge calculating their liability by multiplying the emission factor per unit of the product by the quantity produced or imported.

The following table sets out the carbon contents, calorific values and emission factors of the main fossil fuels.

		Carbon content	CO ₂ emissions per unit of energy*	CO ₂ emissions per standard unit of measurement
Gas	natural gas	69%	52.6	2.1 kg /m ³
Oil	petrol	86%	66.6	2.3 kg /l
	diesel	86%	68.7	2.6 kg /l
	aviation fuel	87%	68.7	2.5 kg /l
	fuel oil	88%	73.7	3.0 kg /l
	LPG	82%	60.4	1.6 kg /l
Coal	bituminous	78%	88.8	2.9 t /t
	sub-bituminous	56%	91.2	2.1 t /t
	lignite	39%	95.2	1.4 t /t
	average	62%	90.4	2.3 t /t

* Output in kilotonnes per petajoule.

The most appropriate categories for determining the carbon content of the different products would probably be:

- For fossil fuels:
 - each oil and gas field;
 - each standard grade of coal (narrower grades would probably be required than are presently used);
 - each category of crude oil; and
 - each type of refined petroleum product, including non-fuel petroleum products (for example, lubricating oil, petroleum coke, pitch and carbon black)²¹.
- For other carbon sources:
 - each limestone quarry or cement works; and
 - each geothermal field.

Actual measurement

Actual measurement of carbon content and calorific values is the preferred approach, wherever it would be cost-effective.

For domestic production of petroleum, the carbon contents and calorific values of the various oil, gas and condensate streams could be measured at or near the wellhead.

Major producers of coal already regularly measure the characteristics of production, and these tests could cover carbon content and calorific value also. Smaller producers may be subject to less rigorous requirements. CO₂ is already measured at major geothermal energy sites through sampling of gas emitted.

For imports and exports, it may be necessary to measure the actual carbon content and calorific value of each cargo. This is unlikely to be a significant issue for gas, given the low level of external trade and the uniform carbon content of traded gas. However, it may be a significant issue for exports and imports of coal or oil. In the case of oil, exports and imports are both in standard grades. If the grades are sufficiently accurate,

²¹ Where any of these products had any full or partial non-emitting uses, imports would be taxed, and refunds or rebates would apply at the appropriate point.

certification of the carbon content by exporters or importers may be the most cost-efficient approach. For coal, each cargo may have to be sampled.

Other methodologies

Estimation methodologies would be used where measurement of the actual carbon content or calorific value was not cost-effective. This could apply to products as a whole or to specific sources only, such as small coal mines, bunker waste and small imports of petroleum products.

The point at which liability arises

To administer a carbon charge, it would be important to establish a legally-binding point at which the carbon content of the product and the level of production could be determined, and at which it would be clear who would be liable for a carbon charge. The preferred approach would be that a charge would apply to domestic sources of carbon at the production, not the consumption, stage, and to imports in the same way as current tariffs and excises.

The main decision is whether to levy a charge when the product is produced or imported, or when it is consumed. When making the decision, the effects on the following areas should be taken into account:

Imports

If a consumption-based approach were adopted, no separate regime for imports would be required.

Under a production-based approach, imports could be handled quite simply by levying a charge when the product leaves the point of entry (a “customs-controlled area” under the Customs and Excise Act 1996).

Coverage

A consumption-based charge would not cover transformation losses, such as from crude oil refining at Marsden Point or from the production of methanol.

A production-based charge would be an incentive to modify processes to minimise transformation losses. Such an approach (together with charging for domestically produced oil at the production stage) would ensure that transformation losses (such as petroleum products used at Marsden Point itself) were subject to a charge.

Pricing

In competitive markets, the point at which a charge would be applied does not alter the distribution of those who bear the cost. The point chosen, therefore, should be the one that would most effectively achieve the policy objectives and minimise administrative costs.

Administration

There are far fewer producers and importers than consumers. Targeting the point of production or importation means there are fewer collection points, lower administrative costs and risks of evasion, and possibly lower compliance costs if existing revenue and monitoring points are used.

A production-based charge would require a regime for refunding or rebating a charge for non-emitting uses, and for exports and bunker fuels. The implications for contractual arrangements between different firms in the production process may also have to be considered.

A charge at the consumption stage would avoid the need for refunds or rebates.

Product features

Electricity is generated from coal, gas, and geothermal and hydro sources; motor fuels are derived from gas and oil. Under current industry structures and technologies, it is not feasible to levy separate charges at the consumer level for electricity and motor fuels on the basis of the feedstock. Therefore, a tax on electricity or motor fuels as the final products of CO₂-emitting energy sources would give no price incentive to consume electricity or to derive motor fuels from a source that emits less CO₂ per unit of energy produced. This suggests that the tax should apply to the energy feedstock, not the final energy form.

In the light of these considerations, the preferred approach, in general, would be to apply a carbon charge at the production or importation stage; that is:

- for imports, at the border. A charge would operate in the same manner as existing excises and tariffs; and
- for the domestic production of fossil fuels, at the well or mine. In order to ensure the effectiveness of the regime, a charge would apply to fossil fuels either leaving the mine or wellhead, or used on site. This would ensure that stockpiles were covered, minimising the transition period and preventing stockpiling in anticipation of a carbon charge. In the case of gas, separate measurement points might be required for the different components of output such as condensate and gas, and for flaring.

An exception would apply in the case of limestone, which has a number of uses. Of these uses, only the manufacture of steel and the production of lime cause CO₂ emissions. This suggests that a charge should be levied where the limestone enters the steel and lime production processes.

Administrative and transitional issues

Payment, refund and rebate arrangements

The handling of payments, refunds and rebates is a technical issue. Using existing procedures would minimise costs to the government and firms.

Payments

Wherever feasible, it would be desirable to use the same payment arrangements as for existing tariffs and excises. Payment frequencies may vary according to the size of the expected liability, as they do for GST and excises.

Refunds and rebates

The regime would contain provisions for refunding or rebating a charge where any product that has directly incurred a charge is exported or applied to a non-emitting use.

As noted in the section on coverage, some **sources** of carbon would be exempt from a carbon charge. This simply means that the regime does not need to cover them. However, there would also be exempt **uses** of carbon - exports and re-exports, international aviation and marine bunker fuels, and non-emitting uses.²² These exempt uses would be likely to draw on non-exempt sources of carbon.

In these cases, arrangements would be required to reverse payments made as a result of a carbon charge. In theory, there are two ways to accomplish this:

²² Non-emitting uses would need to satisfy the following criteria:

- the use is verifiable as a final fixing of carbon into a non-emitting form (with monitoring rules to ensure no refund or rebate was given unless a charge had been applied); and
- the benefits of bringing the activity into the refund or rebate regime are greater than the administrative costs.

- rebating payments at production; or
- refunding payments at export of the product, or at the point where the carbon is fixed.

Where it is the producer who puts the carbon source to a non-emitting use, the first approach would be taken. However, it could be difficult to know at the production stage what the final use of the carbon-containing product would be. In this case,

only the second approach is feasible. The New Zealand Customs Service uses both approaches, both rebate and refund, in administering excises on tobacco, alcohol and petrol.

The rebate or refund approach is fully consistent with the objective of a carbon charge, since it would make uses that do not involve emissions of CO₂ in New Zealand cheaper than uses that do. It could be perceived as unfair that refunds would often be made to parties that did not make the original payment (this would not happen with rebates, which go to the person originally making payments). However, large purchasers may come to an agreement with sellers to share the burden of a charge and benefit of a refund, or the agreed price for the good might incorporate the cost of a charge. Indeed, if sellers fully incorporated a charge in their price and the refund were paid to purchasers, the net effect on both parties would be nil.

Auditing and enforcement

It would be desirable to use existing types of audit arrangements wherever feasible. The precise arrangements would depend on the administrative structure of a charge and its compatibility with existing audit arrangements.

It would also be desirable to draw on existing legislation and administrative procedures for audit and enforcement. This would include the definition of offences, the setting of penalties comparable to those applying to similar tariffs and excises, and disputes resolution. The objective would be to encourage compliance through a co-operative approach.

Whether new, specific provisions are required in these areas would depend on which agency would administer a charge, and the extent to which existing provisions could be used.

Compliance costs

Compliance costs are the costs to businesses and individuals of meeting an obligation to government. They are distinct from the direct costs of the requirement, such as the carbon charge payable.

A carbon charge would impose additional compliance costs on those who are potentially liable for a charge. The significance of these costs would differ according to the industry and the size of firm. The administrative arrangements may therefore require some tailoring.

The design proposed seeks to use existing procedures to minimise compliance costs, while retaining a robust regime. This inevitably involves trade-offs between compliance costs and effectiveness.

Thresholds

The regime should contain provisions for applying thresholds, in value terms, below which a charge and refunds would not apply. Whether such provisions are used in practice would depend on the particular circumstances.

Applying thresholds for the application of a charge and refunds would reduce compliance costs. Setting them would involve a trade-off between effectiveness and practicality, which could change as the level of a charge changed. If a standard threshold (in value terms) were used, administrative and compliance costs, which are likely to be broadly similar across industries, would be minimised.

Thresholds would probably be irrelevant for oil and gas production or imports, because these are usually carried out on a large scale and accurate measurement of quantities is standard. They may be relevant for:

- some coal mines. However, although many mines are small, coal has a high carbon content, so that even a low dollar threshold would exclude very few mines;
- small imports of petroleum products; and
- minor flaring at wellheads.

Thresholds would be appropriate for refunds or rebates, given the cost to the government of verifying the nature and size of the carbon-fixing activities. Alternatively, refunds or rebates

could be available to anyone willing to go to the expense of self-verification. This may depend on the likely costs of approving and monitoring such activities.

If thresholds were used, careful attention would need to be given to balancing compliance costs with the potential for evasion and the effectiveness of the regime. Where a domestic carbon source is exempted on the basis of compliance costs, there would have to be measures to protect the integrity of the rebate/refund system. Without such measures, firms could, for example, receive a refund or rebate on a product that had not borne any charge to begin with.

Effect on existing contracts

The preferred approach would be for the Government not to include in carbon-charge legislation provisions to override fixed-price contracts to ensure that a charge would be passed on.

Some contracts for the supply of goods subject to a charge would be long-term and would have fixed-price provisions. Such provisions could temporarily (for the duration of the contract) prevent the carbon charge from being passed on to the users, delaying its effect on emissions. If it chose to do so, the government could legislate to ensure that a charge was passed on regardless.

Long-term contracts are a mechanism by which commercial parties share the risks associated with unforeseen events. A major aspect of long-term contracts is the allocation of risks associated with price changes. Some contracts allocate the risk of a new tax to the buyer, by including a provision stating that the buyer will pay the cost associated with any new tax. Fixed-price contracts, on the other hand, allocate this risk to the seller. These different risk allocations are part of the efficient operation of markets over time.

Further, changing contracts through legislation would suggest that the government is willing to override the provisions of privately-agreed commercial arrangements. This would damage New Zealand's reputation as a country to do business in and

make long-term contracts a less reliable vehicle for commercial relationships. It would also add to the uncertainty already created by the imposition of a new charge. All this would make commercial parties less willing to enter into efficiency-enhancing long-term contracts.

These considerations suggest that the government should be wary about overriding the provisions of contracts that commercial parties have voluntarily entered into. Accordingly, the preferred approach would be for the Government not to legislate to override the price provisions of fixed-price contracts.

Legislation

Summary

A carbon charge would need to be enacted by a stand-alone piece of legislation. Standard practice would be used to divide the necessary provisions between legislation and regulations.

The legislation would provide for, or authorise regulations to provide for:

- the imposition of a charge on products containing carbon, and the setting of the rate;
- procedures for determining carbon content, and setting the point at which a charge applies;
- the circumstances in which refunds or rebates can apply; and
- administrative arrangements (for example, provision for data collection, audit, offences, penalties and dispute resolution) where provisions in existing legislation do not apply.

A carbon charge would be added to the price of products before GST was charged and would be tax deductible for businesses.

Legislative design

The preferred approach would be to use a stand-alone piece of legislation to establish any charge, with references to existing legislation for administrative and enforcement provisions, and with regulations detailing coverage and measurement procedures.

Existing Act or new legislation?

The regime could be implemented by a stand-alone Act or by the use of similar, existing legislation.

The legislative options are to:

- incorporate it into existing legislation for revenue collection. This would recognise the fact that a charge is a tax;
- incorporate it into the Resource Management Act. This would recognise that a charge has an environmental purpose; or

- create a new, stand-alone piece of legislation. This would recognise a charge's special nature as an environmental charge, and the possibility that other measures with the same target, such as alternative economic instruments, may be set in the future.

The major categories of Acts currently in place that impose taxes or duties (excluding user charges and local body rates) are:

- Taxes on goods and services: the Goods and Services Tax Act 1985, the Customs and Excise Act 1996 (petrol, alcohol and tobacco excises), and the Tariff Act 1988;
- Energy and resource levies: the Energy Resources Levy Act 1976 (on coal and gas) and the Ministry of Energy Abolition Act 1989 (Petroleum Fuels Monitoring Levy and other levies on mining and energy activities);
- Duties: the Stamp and Cheque Duties Act 1971, the Estate and Gift Duties Act 1968 and the Gaming Duties Act 1971; and
- Income tax: the Income Tax Act 1994; the Tax Administration Act 1994, and the Taxation Review Authorities Act 1994.

The following Acts regulate emissions of pollutants:

- The Resource Management Act 1991; and
- The Ozone Layer Protection Act 1996.

The simplest approach would seem to be to create a stand-alone Act that covers issues specific to the carbon charge, but draws on other legislation for administrative powers. This would avoid the need to draft duplicate administrative and enforcement procedures.

Further, a stand-alone Act would allow a separate purpose clause that would reflect the reasons for introducing a charge and create a legislative framework for implementing any future environmental instruments such as other charges or emission permits. A stand-alone Act would also separate out the complex measurement procedures, which are not relevant to other legislation.

Legislation and regulation

It would follow New Zealand's constitutional practice to set the rate of a carbon charge and criteria for coverage in legislation.

New Zealand constitutional practice requires taxes to be imposed by legislation, but provides a power to make regulations about administrative procedures. Standard principles for legislation and regulations are that:

- tax rates are specified in legislation;
- legislative provisions that give regulation-making powers must specify precisely what is covered;
- regulations do not amend or override legislation;
- there must be full and proper consultation on draft regulations; and
- there must be a right of appeal on regulations that affect rights or liberties.

Regulations would specify the precise coverage of a charge and administrative issues such as the point where liability for it arises, assessment of the carbon content of products, and the movement of particular categories of exports or non-emitting uses in or out of a refunds or rebates regime.

The content of the legislation

The legislation would need to provide for:

- legal authority to impose a charge;
- determining carbon content and setting the point at which liability arises;
- authorising refunds or rebates; and
- administering a charge.

Authority to impose a charge

The legislation must provide the authority to collect a charge. This authority would represent Parliament's basic authority to impose taxes.

The authority would need to cover the rate of a charge, and criteria for bringing products within its coverage. The actual coverage would be set in regulations, providing the flexibility to adjust the regime as required.

A charge would be set in terms of emission factors, and then related back to the prevailing unit of measurement in each product. Regulations would set standard conversion factors.

Determining carbon content and setting the point at which liability arises

The legislation would need to give the authority for regulations to specify administrative procedures for determining the carbon content of products to which a charge applies.

These procedures would need to be flexible.

Setting the point at which liability arises would be a technical question, involving specific issues such as the need to include flaring of gas, and measuring coal after screening.

Authorising refunds or rebates

The legislation would need to specify criteria for exempting products from a charge, with the actual exemptions set in regulations. This would provide the flexibility to adjust the regime as required.

The criteria would focus on verifying carbon fixing or exporting, and on whether the benefits of exemptions exceed their costs.

The provisions would need to cover a range of circumstances, from the standard exemption for exports of fossil fuels to procedures for determining whether a carbon-fixing activity receives a refund or rebate.

Administering a charge

In this area, the preferred approach would be to refer to existing legislative provisions as far as possible.

Administrative arrangements would need to cover payment methods, auditing, and enforcement, including offences, penalties and disputes resolution.

The Ministry of Commerce and the New Zealand Customs Service already hold much information on the production and importation of carbon-containing substances. However, it is likely that additional information would be needed, for the initial determination of carbon content and the ongoing monitoring of production.

Collecting, auditing and enforcing a charge are unlikely to raise issues that are any different from those involved in existing tax systems. This suggests that, whatever form the main legislation may take, it could draw heavily on existing provisions for these purposes. Standardising procedures in such areas also reduces the room for confusion.

Interaction with other taxes

The carbon charge would interact with GST and the company tax regime. A charge would be added to the price of the product, which would then be subject to GST. This is consistent with the treatment of existing excises.

A charge would be a deductible expense in businesses' liability for income tax.

Conclusion

The following table summarises the provisions in legislation and regulation that would be needed to establish a charge.

	Legislation	Regulations
1 Purpose	To achieve least-cost reductions of CO ₂ emissions from New Zealand, consistent with our international obligations.	
2 Imposition of charge	Charge imposed on carbon-containing products at \$X related to emission factors, and converted into \$Y per tonne of carbon content. Covering only products that contain: <ul style="list-style-type: none"> – anthropogenic carbon introduced into (produced in or imported into) the New Zealand economy; or – other anthropogenic CO₂ sources where CO ₂ is released within New Zealand and is not part of a short-term natural cycle.	Detailing precise coverage - defining carbon-containing products. Setting standard conversion factors from emission factors back to standard units of measurement for each product.
3 Refund or rebate of charge	Available where: <ul style="list-style-type: none"> – the emissions occur outside New Zealand; or – the use is non-emitting and verifiable, and involves more than a minimum level of carbon. 	Detailing products and/or circumstances. These include: <ul style="list-style-type: none"> – exports of fossil fuels, and international aviation and marine bunker fuels; and – non-emitting uses.
4 Measuring carbon content	Hierarchy of methods: <ul style="list-style-type: none"> – measurement of actual carbon content where feasible and cost-effective; – estimated content otherwise. 	Detailing products and/or circumstances for use of each method.
5 Point at which liability arises	The closest feasible point to production or import. More than one point if this is necessary to measure different components of the product.	Delegating authority to the service provider to set the appropriate point in each case.
6 Administration	Reference to existing legislation governing the administering agency.	Where required.