



Tax Working Group
Te Awheawhe Tāke

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This paper contains advice that has been prepared by the Tax Working Group Secretariat for consideration by the Tax Working Group.

The advice represents the preliminary views of the Secretariat and does not necessarily represent the views of the Group or the Government.

Coversheet: Tax and the environment – Paper I: Frameworks

*Background Paper for Session 8 of the Tax Working Group
April 2018*

Purpose of discussion

This paper:

- **introduces** potential frameworks for using taxes to address: (a) negative environmental externalities; and (b) resource rents;
- **identifies** specific types of taxes and tax issues that the Group may want further advice on to develop more detailed recommendations.

Key points for discussion

- **Frameworks:** Does the Group agree with the frameworks for taxing externalities and resource rents?
- **Level of recommendations:** In addition to providing recommendations on frameworks, does the Group wish to develop more specific recommendations?
- **Tax concessions and hypothecation:** Would the Group like further advice on these issues?

Recommended actions

We recommend that you:

- a **indicate** if you agree with the proposed frameworks for taxing externalities and resource rents;
- b **indicate** what level you would like to develop recommendations at:
 - i. Frameworks for taxing externalities and/or resource rents;
 - ii. High level assessment of selected pollutants/resources against the frameworks (e.g., conclude there is (or is not) *prima facie* a case for using tax instruments for a particular environmental issue, and identify issues for further consideration);
 - iii. Recommendations to implement specific taxes;
- c **note** option (iii) could require significantly more policy work and deliberation by the Group, requiring trade-offs against other items on the forward agenda, and the Secretariat therefore recommends either option (i) or (ii);

d **indicate** if there are particular resources you would like prioritised or excluded from further consideration:

Resource	Comment
Carbon / greenhouse gases	<ul style="list-style-type: none"> • Under active review elsewhere
Water abstraction	<ul style="list-style-type: none"> • Under active review elsewhere • Subject of ongoing processes between Māori and the Crown
Water pollution	<ul style="list-style-type: none"> • Under active review elsewhere • Subject of ongoing processes between Māori and the Crown
Transport / fuel / congestion	<ul style="list-style-type: none"> • Under active review elsewhere
Solid waste	
Petroleum / mineral royalties	<ul style="list-style-type: none"> • From resource rentals perspective, limited fiscal potential

e **indicate** if you would like further advice on tax concessions;

f **indicate** if you would like further advice on hypothecation;

g **indicate** if you would like to externally commission advice on a particular subject.

Tax and the environment – Paper I: Frameworks

Background Paper for Session 8 of the Tax Working Group

This paper contains advice that has been prepared by the Tax Working Group Secretariat for consideration by the Tax Working Group.

The advice represents the preliminary views of the Secretariat and does not necessarily represent the views of the Group or the Government.

The Tax Working Group will release its interim report containing its recommendations in September and the views of the Group will be informed by public submissions alongside Secretariat advice.

April 2018

Prepared by the Inland Revenue Department and the New Zealand Treasury, in consultation with the Ministry for the Environment, and the Ministry for Business, Innovation and Employment

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Executive summary

The Living Standards Framework identifies four capitals that contribute to wellbeing: social capital, human capital, physical/financial capital, and natural capital. This paper looks at natural capital, and the role of the tax system to manage and protect it over the long term.

The paper outlines four ways the tax system directly impacts on the use and protection of natural capital: negative externality taxes, resource taxes, tax concessions, and hypothecation. It is the first of two planned environmental papers. It introduces possible frameworks to guide policy making, and seeks guidance on where the Group wants to investigate further in the second environmental paper.

The tax system can also indirectly impact on environmental outcomes, for example, through the overall balance of different types of taxes. These broader impacts are not the main focus of this paper.

Tax is one of the potential instruments that the Government has, alongside other approaches such as banning, regulating and subsidising. In this paper, we attempt to identify both the advantages and disadvantages of using a tax approach, and in turn, introduce frameworks to help decide when to use taxes, and how to design them. This paper takes a broad view of “taxes”, including levies, charges, as well as auctions of emission or mining permits and other tax instruments which are revenue raising for the Government.

In Part A, we introduce a framework (a set of criteria and design principles) for taxing negative environmental externalities, such as pollution. Taxes are more likely to be feasible when the following criteria are met:

- *Measurability*: The damaging activity, or a reasonable proxy of it, is able to be measured
- *Risk tolerance*: There is sufficient time for a tax instrument to be developed and refined
- *Sufficient scale*: The environmental problem is sufficiently large-scale and persistent to justify administration and compliance costs

The relative benefits from a tax approach are potentially larger when:

- *Diversity of responses*: There is a range of low cost abatement responses
- *Revenue raising potential*: The revenues that could be raised from the tax are large, allowing for the reduction of more distortionary taxes (or spending on other government priorities)

The suggested design principles relate to:

- addressing Māori rights and interests;
- distributional impacts;
- pricing to the marginal external cost;
- the degree of localisation of tax instruments; and
- addressing industry competitiveness concerns.

In Part B, we introduce resource taxes for taxing rents. The rationale for taxing rents is different to taxing externalities, and we therefore introduce a different framework, specifically:

- *Ensuring a “fair” return to the resource owner.* The tax should seek to recover the resource rent, while ensuring adequate incentives for investors to develop resources;
- *Efficiency:* Deadweight losses should be minimised
- *Administrative complexity:* Tax instruments should aim to be simple and transparent;
- *Risk sharing between the Crown and industry:* Risk should be allocated to the party best able to manage it.

In Part C, the paper explores tax concessions to encourage positive environmental impacts, and suggests caution in their use noting their limitations relative to taxes on negative externalities. We identify three tax concessions that may be having negative environmental impacts (carparks, and special depreciation rules for petroleum mining and farming) and two tax concessions that could be having positive environmental impacts (forestry and environmental expenditure). These may warrant further review to establish if they are delivering sufficient benefits to justify the foregone revenue.

In Part D, the paper considers hypothecation and the use of tax revenue. We outline why hypothecation is generally avoided, and introduce reasons for its use: notably, compensation for harm, and public trust and acceptability.

Some issues are beyond the scope of this paper. This paper does not explicitly consider the use of subsidies or payments for environmental services such ecosystem services, as these fall beyond our working definition of “tax” (i.e., revenue raising economic instruments).

This paper also stops short of resource-specific assessments. We identify resources for possible further consideration by the Group, while seeking guidance on the level of detail the Group wishes to go. Some resources, especially carbon and water, are under active consideration elsewhere in Government.

Introduction

Purpose and scope

1. The Tax Working Group's Terms of Reference ask the Group to consider what role the taxation system can play in delivering positive environmental and ecological outcomes, especially over the longer term. This paper aims to:
 - Outline the different ways that the tax system can impact on New Zealand's natural capital;
 - Introduce potential frameworks for taxing negative externalities and resource rents, which could form the basis of a recommendation for the Group's report; and
 - Identify specific types of taxes and tax issues that the Group may want further advice on to develop more detailed recommendations.
2. This is the first of two planned papers for the Group on taxes and environment.

Different ways the tax system can impact on New Zealand's natural capital

3. This report is divided into four parts, outlining four distinct ways that the tax system can either protect or degrade New Zealand's natural capital:
 - *PART A: Taxing negative externalities* - Taxes on activities that pollute the environment or degrade natural capital, and where the polluter does not otherwise pay for that damage;
 - *PART B: Resource taxes (taxing resource rents)* - Taxes targeted at the extraction or use of natural resources;
 - *PART C: Tax concessions with environmental impacts* - Tax concessions that have either positive or negative environmental impacts;
 - *PART D: Hypothecation – using tax revenues* - Ring-fencing revenues raised from environmentally-related taxes for a specific use.

Frameworks

4. In Part A (Taxing negative externalities), we introduce a two-part framework:
 - Criteria for when a tax instrument is preferable to a regulatory approach; and
 - Design principles to guide creation of a tax instrument
5. In Part B (Taxing resource rents), we identify principles for taxing resource rents based on those used in recent reviews of New Zealand's royalties regime.
6. The Group may wish to consider recommending frameworks in its report.

Specific taxes and tax issues

7. This paper also identifies specific taxes and tax issues that the Group may want to consider further. There are a number of active reviews and engagement processes on the management of environmental issues occurring outside of the TWG – see Appendix D. The selection and design of specific tax instruments can be complex and may overlap with some of these reviews. There are options for what level the Group makes recommendations at, which could include:
 - Recommendations at the level of frameworks;
 - High level assessment of selected pollutants/resources against the frameworks;
 - Recommendations to implement specific types of tax instruments.
8. Potential issues for further analysis could include:
 - Taxing externalities: Carbon/greenhouse gases; water pollution/abstraction; solid waste; land transport/fuel/congestion
 - Taxing resource rents: Water abstraction; petroleum/minerals royalties
 - Tax concessions with potentially negative impacts: Carparks; petroleum mining (seven-year rule); farming
 - Tax concessions with potentially positive impacts: Forestry; environmental expenditure

Issues not considered in this paper

9. This paper does not explicitly consider the use of subsidies or payments for environmental services such ecosystem services, as these fall beyond our working definition of “tax” (i.e., revenue raising economic instruments).
10. This paper is focused on taxes directed at environmental externalities or resource rents. Broader tax settings will likely also impact environmental outcomes, however, these are not the main focus of this paper. For example, higher levels of income and wealth inequality are associated with worse environmental outcomes, such as biodiversity loss and generation of waste (Holland, 2009). Causal pathways are difficult to prove, but a recent UN working paper suggested progressive tax reform as a potential path to reducing inequality and improving environmental outcomes (Islam, 2015).

PART A: Taxing negative environmental externalities

11. This section looks at the use of taxes to address negative environmental externalities. This includes pollution, such as taxes on emissions to soil, air and water, and is sometimes broadened to include negative externalities such as noise and congestion.
12. A two-part framework is proposed consisting of criteria for determining when a tax instrument is preferable to a regulatory approach, and design principles to guide the creation of a tax instrument.
13. This paper takes a broad view of potential tax instruments, expanding the scope from previous reviews. The 2001 McLeod Review's consideration of environmental taxes focused on the use of nationally-uniform taxes and concluded they were ill-suited to most of New Zealand's environmental challenges in part because of local differences. This paper broadens the scope to include *economic instruments that can be potentially revenue raising for central or local government*. The intention is to more fully assess the potential role of taxes to improve environmental and ecological outcomes, as called for in the Terms of Reference. These tax instruments include:
 - Nationally-uniform taxes or levies
 - Locally-variable taxes or levies
 - Tradable emission permits, for both national and local markets, where the initial allocation of permits could be partially or fully auctioned or sold by the Government
14. See Appendix A for an overview of environmental taxes in New Zealand (including taxes on negative externalities), and how we compare internationally.

Rationale for taxing externalities

15. When people do not face the costs of their actions, we should be concerned that they might act in ways that are optimal for them, but not optimal for society. This phenomenon is described as a “negative externality” because there are negative impacts that are external to the parties of an activity.
16. Negative externalities are a common market failure that negatively impact on the environment. For example, my petrol-powered car emits CO₂ into the atmosphere. In the absence of a price on carbon, the damage caused by my CO₂ emissions is an externality – I am imposing costs on society by contributing to global warming, and I am not paying for those costs.
17. One of the policy solutions for negative externalities is a tax on the activity, also known as a Pigouvian tax. When the tax is set to reflect the external cost of the activity, people are disincentivised from engaging in activities where the private benefits are smaller than the “social costs” (i.e., the private costs plus the external costs). In this way, we can protect natural capital from being consumed in ways

that are not as valuable as maintaining the natural capital itself. See Appendix B for economic diagrams showing negative externalities and the impact of a corrective tax.

18. For example, suppose I am prepared to pay \$100 to drive to Hamilton. And suppose the private costs that I face are \$90 from fuel and car maintenance costs, but that the cost of my carbon emissions to society are a further \$20. In the absence of a carbon tax, it is worth my while to drive to Hamilton – the benefit to me is \$100, and cost is \$90. With a carbon tax, the outcome is different. I now face the full cost of my actions (\$110), and will be incentivised to choose another option, such as taking public transport, carpooling, or making fewer trips.
19. In a similar way, a tax on negative environmental externalities change the relative cost of choices. For example, if an electricity generator does not have to pay for damage caused by carbon emissions, fossil-fuel electricity generation might appear cheaper than renewables that do not emit carbon. If the cost of damage caused by carbon emissions is included, renewables might be revealed to be the choice that is best for society overall.
20. Externalities should be understood to encompass a broad range of costs and impacts that fall across the four capitals of the living standards framework. They can include, for example, congestion, noise, and the loss of natural capital where an activity is degrading the natural environment and is not subject to a resource tax. They can also include impacts on non-use values. For example, New Zealanders ascribe value to the preservation of certain landscapes, species and ecosystems, even if they never directly experience them.
21. Taxing externalities can also support a transition to a more ecologically sustainable “circular economy”.¹ Depletion of natural resources and the generation of waste and pollution can impose costs on society. Taxing these externalities could reduce resource use, waste and pollution.

Criteria for using negative externality taxes

22. Tax is one of the potential instruments the Government has. It needs to be compared against, or considered in combination with, other approaches such as banning, regulating and subsidising.
23. In this section, we outline some of the key advantages and disadvantages of taking a tax approach. These suggests criteria for their use.

¹ The circular economy is an industrial system that aims to design out waste.

Advantages of a tax approach

Lowest-cost response

24. Externality taxes have the potential to achieve an environmental outcome at a lower cost than regulations or subsidies (OECD, 2017; Mirrlees, et al., 2011). Regulations mandate a specific response to an environmental problem which risks imposing high costs on some people for little environmental benefit. For example, minimum fuel efficiency standards might be introduced for new cars to reduce carbon emissions. For someone who drives a lot, the cost of this regulation per tonne of CO₂ avoided might be quite low. However, for the occasional driver, the marginal cost of abatement will be much higher. A fuel or carbon tax allows for a diverse range of responses.
25. This suggests externality taxes are particularly well suited to situations where the lowest cost response varies between firms and individuals, and where the regulator does not have the necessary information to determine what these different responses are.

Improved allocative efficiency

26. Taxes and market-based pricing instruments can also improve market efficiency by allocating scarce environmental resources to their highest value use. The economic value of a resource is maximised when it is allocated to users who can derive the most benefit from being able to access it. A price helps achieve this by ensuring that only those deriving a benefit higher than that price will pay for it and access it.

Revenue-raising

27. Externality taxes also raise revenue. Regulations typically do not. Revenues raised can be used to reduce other more distortionary taxes (also known as “revenue recycling”), fund environmental initiatives, or pay for other government spending priorities.
28. The ability of externality taxes to reduce more distortionary taxes means they can support economic growth. The OECD reports that environmental taxes can be implemented “with potentially significant positive (or at least without negative) consequences for economic growth or overall employment” (OECD, 2017).
29. There are a range of examples of revenue recycling designed to reduce the distortionary effects of the tax system. When the Climate Change Levy was introduced in the UK in 2001, it was offset by a 0.3 percentage point reduction in employer National Insurance Contributions. This “switch” was designed to be revenue neutral for the average business (IFS, 2011). Similarly, when the carbon tax was introduced in British Columbia, the revenue was recycled into a mix of targeted and general reductions in corporate and personal income taxes.

Incentives to abate and innovate

30. Externality taxes can provide ongoing incentives to abate and innovate. Once a polluter meets a regulatory emissions standard, they can lack an incentive to abate further. Externality taxes can help maintain incentives for polluters and resource users to find further ways of reducing harmful activities. This continuous incentive to reduce harm and to do so flexibly can strengthen incentives to innovate.

Disadvantages of a tax approach

Measurement challenges

31. Externality taxes typically require an individual's environmental impact to be credibly measured or estimated (e.g., measurement of the volume of emissions). Regulation can be simpler to implement and monitor, although some regulatory approaches will also involve measurement challenges.

Risk tolerance

32. Tax instruments assume the optimal level of pollution or use of a resource is greater than zero. If this is not the case, a ban is likely to be preferable. Tax instruments can also take time to implement and may need several iterations before they function well. When resolution of an environmental problem is urgent and the cost of failure is high, a more decisive and certain regulatory approach may be preferable. For example, faced with an expanding hole in ozone layer, countries opted to ban ozone-depleting hydrocarbons in 1987 under the terms of the Montreal Protocol.

Administrative costs and complexity

33. Tax instruments can be relatively costly and complex to administer. Environmental problems that are temporary and have relatively low-cost externalities might not justify the costs of developing new tax instruments where there are simpler regulatory alternatives. Large scale and on-going environmental problems are likely to be better suited. National frameworks and template tools that can be locally adapted might help lower the costs and expand the scope for externality taxes.

Criteria for using externality taxes

34. Externality taxes have the potential to raise revenue, improve allocative efficiency, provide incentives to innovate, and can ensure the lowest-cost abatement options. This suggests a general preference for externality taxes over regulation, where the following criteria are met
 - *Measurability*: The damaging activity, or a reasonable proxy of it, is able to be measured

- *Risk tolerance*: There is sufficient time for the a tax instrument to be developed and refined
 - *Sufficient scale*: The environmental problem is sufficiently large-scale and persistent to justify administration and compliance costs
35. Additionally, there are situations where the relative benefits from a tax approach are potentially larger:
- *Diversity of responses*: There is a range of low cost abatement responses, such that regulating a particular response could impose high costs
 - *Revenue raising potential*: The revenues that could be raised from the tax are large, allowing for the reduction of more distortionary taxes (or spending on other government priorities)
36. In the 2001 McLeod Review, two further criteria were suggested for using externality taxes: that the cost of the externality is estimable²; and the cost of the externality is nationally uniform (McLeod et al., 2001). These are additional criteria that the Group may want to consider.
37. Being able to estimate the cost of the externality is useful for guiding decisions on the level of the tax, and we identify it as a guiding design principle in the following section. However, costing externalities is also important for regulating. In both situations, policy makers need to balance costs and benefits. It might, therefore, not be a necessary criteria for deciding when to use a tax or regulation.
38. We have excluded the nationally uniform costs criteria because of the more expansive view of tax instruments taken in this paper. The McLeod Review was focused on the use of nationally uniform taxes. At the beginning of this section above, we outlined a broader definition of taxes, allowing for local variation in tax settings. See localisation principles below further discussion of local pricing.

Principles for designing externality taxes

39. The previous section identified general criteria for when externality taxes could be preferable to regulation. Externality tax proposals, however, should still be assessed against the general tax frameworks – specifically, the living standards framework and the tax principles framework – to identify specific impacts and trade-offs.

² This is distinct from the measurability criterion. Measurability refers to the ability to measure the volume or extent of an environmentally damaging activity. Estimability refers to the ability to estimate the cost of the damage.

40. A high level assessment of externality taxes against these frameworks raises a number of typical concerns. In this section, we outline these concerns, and where relevant, suggest some guiding principles to either mitigate or manage them.

Addressing Māori rights and interests

41. Māori rights and interests should be acknowledged and addressed in the development and design of potential environmental tax instruments. If the tax is based on assumptions that could impact Māori rights and interests, or if Māori rights and interests cannot be adequately addressed through environmental tax instruments, the Crown should consider whether additional complementary measures could address Māori rights and interests, or whether other approaches might be preferable. The term “Māori rights and interests” may encompass a wide range of interests (including non-proprietary interests or claims). The development of detailed proposals that impact significantly on Māori rights and interests may require consideration of issues about the particular resource or tax instrument concerned.

Distributional impacts

42. Proposed tax instruments should be assessed for distributional impacts, and adverse impacts should be mitigated where possible. Environmentally-related taxes are sometimes found to be more regressive than other types of taxes, such as personal income tax. Because they may be levied on widely used essential goods, or the incidence of the tax may ultimately fall on such goods, lower income people might spend proportionately more of their income on the tax than higher income people. Taxes could also result in only higher income people being able to engage in an environmentally harmful activity. However, the distributional impacts will depend greatly on the specific tax (Kosonen, 2012).
43. Distributional concerns can be mitigated through recycling the revenue. For example, when a carbon tax was introduced in Australia, there was an accompanying set of compensation measures for low-income households. Targeted exemptions and differential rates have also been used although these risk undermining the integrity of the tax.³

Pricing to marginal external cost

44. Following the negative externalities rationale, the price of the tax instrument should be set at the marginal external cost. Marginal external costs can be difficult to estimate, but a lack of precision in damage estimates should not preclude the use of externality taxes. As noted in an IMF working paper, “... a tax that is 50 percent above or 50 percent below true marginal damages may still perform fairly

³ In the UK, households can be exempted from the Climate Change Levy. In Italy, there are reduced rates of duties on natural gas in the south.

reasonably in terms of expected welfare gains” (Parry, Norregaard, & Heine, 2012).

45. We note that the general pricing problem with externality taxes is that they are priced well below the estimated externality (OECD, 2017). Pricing above the externality is not the norm.
46. In practice, tax instruments may be designed around volumes. This is one method to try and price to the marginal external cost when costs are challenging to directly estimate. For example, there can be particular thresholds where the cost of pollution may suddenly rise, and this can establish the volume of emission permits in a market. Alternatively, a community might decide on a minimum environmental standard for a resource, implicitly weighing up the costs and benefits, and tax instruments can be used to manage pollution within that standard.

Localisation

47. Where the environmental costs of an activity vary by time and place, the level of the tax should vary to match. A single uniform tax rate can deliver sub-optimal and potentially negative environmental or economic outcomes where the environmental damage caused by a marginal unit of pollution varies significantly by time or place.
48. Local and temporal variation in environmental externalities are arguments for having local and variable pricing. It does not necessarily follow, though, that these are local taxation issues. It is important to distinguish between the different dimensions of potential devolution, namely pricing, allocation of revenue, and governance and administration. Devolution on one of these dimensions does not necessarily mean devolution on all dimensions. For example, congestion charging could be based on hyper-local pricing, but be administered on a national or regional level.

Uniform vs. differentiated pricing

49. Pricing should be locally variable where:
 - *Local variation in impacts:* Where there is significant local variation in the environmental or economic impacts of a marginal unit of damaging activity, local variation in pricing is likely to better achieve the objectives of the tax instrument.
 - *Technically feasible to estimate local variations:* There is a potential trade-off with administrative costs and complexities in determining whether pricing is done at a local or national level. Localised pricing might be theoretically preferable, but be technically impractical to implement.

Centrally allocated vs. locally allocated revenue

50. There are several potential principles for guiding where revenue from externality taxes should be allocated (see *Part D: Hypothecation – using tax revenue* for further discussion):
- *Compensation for harm:* Where a tax instrument is linked to an environmental externality, the community most negatively impacted by that externality might have a stronger claim to compensation. This points towards local recycling of revenue from local environmental problems.
 - *Compensation to owners:* Where a tax instrument aims to capture rents of a natural resource, there is a case for revenue going to those with the strongest ownership claims on the resource.
 - *Efficiency of revenue use:* Revenue can be directed to its highest value use, be it improving environmental outcomes or funding broader government priorities, if it is not hypothecated and instead collected by central government. Efficient revenue recycling also requires central collection – central government cannot reduce more distortionary taxes if they are not collecting the offsetting revenue from externality taxes.

Centrally administered vs. locally administered

51. The principle of subsidiarity suggests the level of Government that should administer an externality tax should be based on information availability and alignment of incentives. Sometimes, this is understood as local administration for local environmental challenges. But this is not necessarily the case. Central government may be better positioned to manage costly or complex information and monitoring systems, or to provide systems for local government to use. Equally, there may be instances where incentives are also better aligned at a central government level where there is a risk of a regional “race to the bottom” or problems with local capture.

Industry competitiveness

52. Taxes should take account of international linkages and impacts on industry. Levied unilaterally by a country, externality taxes may increase costs for domestic industry, reducing global competitiveness. They could also encourage globally mobile businesses to shift operations to lower-taxed jurisdictions.
53. If the externality is local to New Zealand, however, it will be in our interests if the industry moves or shuts down in response to the tax, as the activity was costing New Zealand (including environmental costs) more than it was providing in benefits.
54. If the externality is global, the situation becomes more complicated, as the industry may move and there may be no reduction in the negative externality globally. Because of this, global agreements to coordinate policy responses are

vital. As such, local taxes to combat negative externalities will be very important to meet international obligations.

Box 1: Framework for externality taxes

Criteria for use of externality taxes

- *Measurability*: The damaging activity, or a reasonable proxy of it, is able to be measured
- *Risk tolerance*: There is sufficient time for the a tax instrument to be developed and refined
- *Sufficient scale*: The environmental problem is sufficiently large-scale and persistent to justify administration and compliance costs

Additional criteria for when the relative benefits from a tax approach are potentially larger:

- *Diversity of responses*: There is a range of low cost abatement responses, such that regulating a particular response could impose high costs
- *Revenue raising potential*: The revenues that could be raised from the tax are large, allowing for the reduction of more distortionary taxes (or spending on other government priorities)

Principles for designing externality taxes

- *Māori rights and interests* should be acknowledged and addressed
- *Distributional impacts* should be assessed and mitigated
- *Marginal external cost* should be the price of the tax
- *Localisation principles*:
 - The price should vary locally where there is local variation in impacts
 - Revenue allocation should consider harm, ownership and efficient use
 - The level of administration should be based on information availability and alignment of incentives
- *Impacts on industry*, through international linkages, should be considered

Potential areas for further consideration

55. There are several potential directions that the Group may want to consider with regards to externality taxes. There are a number of active reviews in the environmental space which the Group may want to consider – see Appendix D.

56. Possible directions include:

- a. Staying at the level of frameworks (e.g., testing and improving the criteria and design principles);
- b. High level assessment of selected pollutants/resources against the frameworks (e.g., conclude there is (or is not) *prima facie* a case for using tax instruments for a particular environmental issue, and identify issues for further consideration based on the design principles);
- c. Recommendations to implement specific taxes;

57. Potential resources for consideration include:

Resource	Comment
Carbon / greenhouse gases	<ul style="list-style-type: none"> • Under active review elsewhere
Water abstraction	<ul style="list-style-type: none"> • See Part B for discussion of resource rental issues • Under active review elsewhere • Subject of ongoing processes between Māori and the Crown
Water pollution	<ul style="list-style-type: none"> • Under active review elsewhere • Subject of ongoing processes between Māori and the Crown
Transport / fuel / congestion	<ul style="list-style-type: none"> • Under active review elsewhere
Solid waste	
Petroleum / mineral royalties	<ul style="list-style-type: none"> • See Part B for discussion of resource rental issues • From resource rentals perspective, limited fiscal potential

58. An alternative area for interest could be a high level estimate of the fiscal potential of environmental taxes to fund a “green shift” in the tax base (i.e., what is the total potential revenue that could be raised from environmentally-related taxes)

PART B: Resource taxes (taxing rents)

59. Part A of this paper looked at the use of taxes to address environmental externalities. In Part B, we look at the use of taxes levied on natural resources for the very different purpose of capturing value (or rents) to compensate the resource owner (e.g., the Crown) and/or to efficiently raise revenue. These are potentially complementary taxes – there could be a case for applying both a resource rent tax and an environmental externality tax on the same resource.
60. Resource taxes can be levied on the extraction or use of both non-renewable and renewable natural resource. Similar to Part A, we take a broad view of tax instruments, encompassing revenue raising economic instruments. These include:
- Ad Valorem Royalty – A percentage of revenues
 - Accounting Profits Royalty – A percentage of accounting profits
 - Resource Rent Tax – A percentage of the estimated “rents” (see discussion below)
 - An auction of extraction rights (sometimes referred to as cash bonus bidding)
61. Land taxes can also be considered a type of resource tax, but are being considered separately by the Group.

Resource taxes in New Zealand

62. Resource taxes are not a major source of revenue for the Government. In recent years, royalties have averaged approximately \$200 million (including energy resource levies). No revenue has been gathered through the allocation of petroleum or mineral exploration permits via cash bonus bidding (i.e., auctions).⁴ Total revenues from the sector, including income tax, are approximately \$500 million per annum – approximately 0.6 percent of core Crown revenue. In the absence of any new discoveries, revenues are forecast to decline in the coming years, reflecting declining petroleum production volumes, and the decision not to grant further exploration permits for offshore petroleum mining.
63. The relatively small contribution is primarily because of the small size of the industry. For petroleum permits issued after 1991, MBIE estimates that petroleum permit holders will pay up to 42 percent of profits to the Crown through royalties and taxes. This suggests there is limited fiscal potential from further review of resource taxes applied to petroleum and minerals.
64. New Zealand’s resources industry is dominated by petroleum. Petroleum (oil and gas) account for approximately 95 percent of royalties, with 80 percent of these royalties coming from offshore operations. New Zealand has a relatively small

⁴ This form of allocation is provided for in legislation but has not been favoured in New Zealand given the relatively low levels of competitive interest and geological prospectivity.

mineral extractives industry – volumes are low and it accounts for less than 6 percent of royalty revenues.

Rationale for resource taxes

Compensation to the resource owner

65. Resource taxes can serve a compensatory function. In New Zealand, the Crown automatically owns all petroleum, gold, silver and uranium and has a significant ownership interest in many other minerals.⁵ Resource taxes can compensate the Crown (or other owner) for the right to take ownership of its property. The “economic rent” (see below) is a measure of the value of the resource which resource taxes attempt to recover, in part or in full, for the owner.
66. This compensatory function can more broadly be understood as an equity or fairness objective. The Crown (or other owner) should aim to get the best return possible when its assets are used for private benefit, mindful of other objectives the Crown might also have.⁶ Otherwise, property rights will be being transferred in ways which provide windfall gains to some individuals or entities at a cost to other New Zealanders.

Efficiently raise revenue (taxing economic rents)

67. Resources taxes are sometimes advocated as a means of efficiently raising revenue because they can be non-distortionary when they tax only the economic rent. Economic rent is the income generated by a resource over and above what is needed to keep it in its current use. It is sometimes referred to as “surplus profit” – see Box 2 below (Land, 2008).
68. Generally, taxes are distortionary – they change behaviours in a way that creates deadweight losses for society. A tax that can be successfully applied to economic rent is non-distortionary and can, therefore, theoretically raise tax revenue with no deadweight losses.

⁵ The Crown also owns about half of the in-ground coal, metallic and non-metallic minerals, industrial rocks and building stones in New Zealand – either by right or because they are in Crown-owned land.

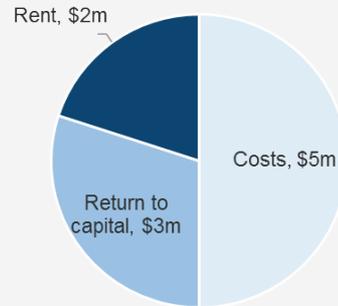
⁶ In practice in New Zealand, the Crown aims to achieve a “fair” financial return. A fair financial return is interpreted as balancing the interests of the Crown (as owner of the resource for the benefit of New Zealand) and those of explorers and miners. A further component of “fair” is that the Crown (for the benefit of New Zealand) should always receive a return on the production of Crown owned minerals and petroleum, including from the start of production.

Box 2: Economic rents

Economic rent is the excess earnings generated from a resource, over and above what is required to keep the resource in its current use.

Take, for example, a mine. Annual revenues are \$10 million. Costs are \$5 million. The owner also has a minimum required return on capital of \$3 million. This implies a surplus profit (or rent) of \$2 million. These are earnings over-and-above what is required for the miner to invest in and operate the mine.

Resource rents from a mine
Revenues = \$10m



69. Take, for example, the mine in Box 2 above, which generates rents of \$2 million. The Government could impose a tax on the mine of up to \$2 million while avoiding any change in behaviour (e.g., the mine shutting down) and corresponding deadweight losses.
70. Rents can be especially large in natural resource markets because of restrictions on competition. If firms are earning surplus profits, other firms are incentivised to enter the market, driving down the price. However, this is not always possible with natural resources – a firm might have exclusive access to a scarce resource, and there may be high barriers to entry.
71. A common example of resources with rents are mineral deposits, but other resources can also attract rents. For example, telecom operators can generate returns from using radio spectrum in excess of their operating and capital costs. Competition is prevented from entering and competing away the rent because there is a finite supply of spectrum. The Government therefore auctions the supply of radio spectrum, capturing part of that rent for the State. Fresh water is another resource that can generate rents in specific contexts.

Other rationales

72. In Part B of this paper, we focus on the use of resource taxes to compensate resource owners and/or efficiently tax rents. They can, however, serve other purposes.
73. If a resource is allocated on a first-in-first-served basis, and there is no “use it or lose it” provision or a functioning market to trade or otherwise reallocate access to that resource, the resource can be locked up in relatively low-value, inefficient uses. A tax (levied on access rights to a resource) can create incentives for users to surrender access rights that they are not making good use of.
74. Allocative efficiency is unlikely to be a significant concern in the petroleum or mineral mining space, where mining projects can be bought and sold, and where

there are “use-it-or-lose-it” provisions for exploration and mining permits. However, it may be a concern for water “sleeper permits”. Water permits can have a duration of up to 35 years. The permit holder may not have good use for their full allocation, perhaps due to land use changes. A tax applied to permitted volumes would encourage them to surrender their excess permits, allowing them to be reallocated to higher value uses.

Auctions vs taxes

75. As noted at the beginning of this section, we take a broad view of tax instruments which includes auctions (or cash bonus bidding). Auctions, resource rental taxes, and royalties are common instruments used, each with their own strengths and weaknesses.
76. Auctions of exploration and mining permits can, in theory, obtain the full value of a resource for the resource owner, reflecting the expected value of a resource given the information about that resource at the time of the auction (Fane & Smith, 1986). The introduction of additional taxes (announced in advance of the auction) would result in a correspondingly lower auction price.
77. There are, however, potential practical defects with auctions that can limit their use. There may be an insufficient number of firms to ensure a competitive process, or firms may attempt to collude or bid strategically. Auctions can also suffer from a sovereign risk problem – if firms believe there is a risk that the Government will levy additional taxes in the future, they will lower their bid accordingly. Auctions may also be undesirable because they value the resource at an early stage in the development process when there is very limited information. In other words, they transfer all of the risk to the bidders. Bidders will discount their estimates accordingly, and the price received at auction may diverge significant (either above or below) the realised value.
78. Resource rental taxes attempt to define a level of rent, measure actual income against that measure, and tax a percentage of it. In theory, they can capture the full value of a resource for the owner if set at 100 percent of the rent (Fane & Smith, 1986). In practice, resource rent taxes are likely to capture a much smaller share – Australia’s Minerals Resource Rent Tax was set at 30 percent of the calculated super profits.
79. Resource rental taxes have an advantage of flexibility, not cutting in too low (such as an ad valorem tax) and preventing some less profitable investments from happening, but also having no upper limit and allowing a larger total amount of tax to be collected.
80. There are several practical defects with resource rent taxes. For tax purposes, firms are incentivised to understate their revenues and overstate their costs, and it can be costly for the government to ensure accurate accounting and reporting by firms (although this is also the case for any income tax). Resource rent taxes also

share risk in a way that might not be acceptable for government. A field could be developed, but never reach the threshold rate to trigger the resource rental tax, meaning the government never receives any rent on its resource. A well-designed resource rental tax may be able to mitigate some of these challenges.

81. New Zealand’s current system of resource taxation is a mix of ad valorem royalties and accounting profit taxes. Like resource rent taxes, these are likely to only be capturing a limited share of the total value of the resource. While simpler, more transparent, and guaranteeing the government will receive revenue from its resource, these royalties can have the effect of discouraging marginal investments where a resource rent tax would not.

Framework for evaluating resource taxes

82. Many of the design principles and concerns identified in externality taxes will broadly apply to resource taxes – see *Principles for designing externality taxes*. In particular, the need to address Māori rights and interests, distributional impacts, and localisation principles.
83. The following principles in Box 3 below are based on those used in recent reviews of New Zealand’s royalties policy.

Box 3: Principles for taxing resource rents

- *Ensuring a “fair” return to the resource owner.* The tax should seek to recover the resource rent, while ensuring adequate incentives for investors to develop resources.
- *Efficiency:* Deadweight losses should be minimised. In theory, a tax levied on pure rent will be non-distorting. In practice, it is difficult to tax pure rent and resource tax instruments will introduce distortions and deadweight losses.
- *Administrative complexity:* Tax instruments should aim to be simple and transparent. There is often a trade-off between the theoretical efficiency of a resource tax, and its administrative complexities and costs.
- *Risk sharing between the Crown and industry:* Risk should be allocated to the party best able to manage or tolerate it. Different tax instruments split risk differently between the Crown and industry, especially commercial risk and price risk.

84. Where the objectives are to address environmental externalities, the criteria and design principles outlined in Part A will be more appropriate.

Potential areas for further consideration

85. There are several areas relating to resource taxation in New Zealand which the Group may want to consider further.

Expansion of resource tax bases

86. Royalties in New Zealand are restricted to Crown-owned minerals and petroleum resources. The Group may want to consider whether resource taxes or charges be extended to other resources, such as fresh water, where private users might be getting windfall gains.
87. Some policy commitments on fresh water have already been made – the Labour-New Zealand First coalition agreement includes a commitment to introduce a royalty on exports of bottled water. There are also a number of processes underway regarding Māori rights and interests in freshwater, including an active Waitangi Tribunal case. There is an expectation that policy development concerning Maori rights and interest in freshwater, including allocation of rights to freshwater, will continue. (See *Addressing Māori rights and interests* in Part A for further discussion of general design principles.)
88. There are several high level issues the Group may wish to consider:
- Is there evidence of rents accruing to users of fresh water in New Zealand, or to other renewable resources?
 - Is there evidence of allocative inefficiency in fresh water, or other renewable resources?
 - There are different potential objectives of a water charge. What types of tax instruments best align with these different objectives?

Changes to existing resource taxes

89. In 2012, the Government carried out reviews of both the minerals and the petroleum royalty regimes. For petroleum, no changes to the royalty rates were recommended, and some minor changes to the rules for calculating royalties were introduced at this time. For minerals, the review resulted in the effective doubling of royalty rates to apply to new high-value mineral permits. As noted above, there is likely to be limited fiscal potential from further review of resource taxes applied to petroleum and minerals.

Royalty rates for future developments

90. Consideration could be given to changing royalty rates on future projects. New Zealand has relatively low petroleum royalty rates. The 2012 review found that New Zealand had one of the most competitive fiscal regimes in the world (see Appendix C) and that further decreases would be unlikely to significantly incentivise additional investment. Ultimately, the review did not recommend rate

changes, concluding that current rates were appropriate given the country's geological and commercial risk profile.⁷

91. The fiscal significance of any changes is likely to be low. Given the Government's recent decision not to grant any further offshore petroleum permits, any changes to royalty rates would only apply to minerals and onshore petroleum exploration. In 2017, existing producing minerals and onshore petroleum permits paid less than \$40 million in 2017. Most of the industry's prospective commercial potential is in offshore fields.

Royalty rates for legacy fields

92. Consideration could be given to changing legacy royalty provisions. Previous petroleum royalty regimes are significantly more concessionary than the current regime.⁸
93. There is precedent for changing the fiscal obligations of natural resource projects. New Zealand introduced the energy resources levy in the mid-1970s. The levy is similar to an additional royalty and applies to open-cast coal and natural gas produced from discoveries made before 1 January 1986. More generally, governments regularly revise company and income tax rates.
94. However, for the past 40 years New Zealand has not changed legacy royalty provisions and there could be long term costs to doing so. Changing legacy provisions could undermine the predictability of regulatory settings in settings in New Zealand. This increases New Zealand's sovereign risk, driving up the cost of capital for investment and potentially reducing the value of future investments.
95. A change in legacy royalty provisions could also be seen as running counter to recent policy decisions – when deciding not to grant more offshore exploration permits, the Government also agreed that this decision did not affect the rights of current permit holders. We understand that preservation of legacy royalty rates is included in these rights.

⁷ The terms of reference also had a fiscal neutrality objective.

⁸ Under the current royalty regime, royalty rates are 5 percent ad valorem royalty (AVR), or 20 percent accounting profit royalty (APR), whichever is higher. Seven petroleum mining licences granted under the 1937 Petroleum Act are still in force. For fields developed under these licences, the rates are: 5 percent AVR for licences issued before 1975 (e.g. Kapuni and Maui); 10 percent (e.g. McKee) and 12.5 percent AVR for licences issued between 1975 and 1985; and 12.5 percent AVR for licences issued between 1986 and 1995 (e.g. Kupe). Revenues are calculated at the wellhead (as opposed to the point of sale) and subject to a number of deductions.

PART C: Tax concessions with environmental impacts

96. Tax concessions can be used to encourage positive environmental outcomes. For example, recycled goods could be exempted from GST, electric cars can be exempt from fringe benefit tax, or accelerated depreciation rates can be applied to investment in green investments. There are also tax concessions with other objectives that can encourage negative environmental outcomes.
97. In this section, we review the rationale for tax concessions; outline limitations with their use; suggest alternative approaches; and identify existing tax concessions in New Zealand that the Group may wish to receive further advice on.

Rationale of tax concessions

98. The underlying rationale for using tax incentives is similar to that of negative externality taxes. They can correct for market failure from externalities, but in this case, they are positive externalities. However, there are significant practical issues arising from the use of tax incentives that typically don't arise when using negative externality taxes (OECD, 2017). This suggests a more cautious approach.

Potential limitations and concerns with tax concessions

99. Tax incentives can struggle to encourage a diversity of cost effective actions. They often involve subsidising a particular type of mitigation measure, disadvantaging other potentially more cost effective alternatives. An exemption of fringe benefit tax for electric vehicles, for example, does not provide an incentive for commuters to consider other types of low-carbon transport. A fuel or carbon tax avoids this problem.
100. Tax incentives can also indirectly increase environmentally damaging behaviour by lowering the cost. A subsidy for hybrid electric vehicles, for example, could encourage people to drive more. Again, a fuel or carbon tax avoids this problem.
101. Tax incentives are often poorly targeted. The OECD reports that “tax incentives are frequently found to provide subsidies to actions that would have been taken in their absence while resulting in limited additional investment” (OECD, 2017). It is difficult to limit an electric vehicle tax exemption to only those households that would have not bought it without the subsidy. Tax incentives can also suffer from pricing problems. The tax benefit provided by exempting electric cars from fringe benefit tax is unlikely to align with the value of the positive externalities, or be at a tipping point for encouraging electric car purchases.
102. Like negative externality taxes, tax incentives can also raise distributional concerns. The OECD finds that tax incentives often accrue disproportionately to more affluent households.
103. International experience with tax concessions suggests they can be vulnerable to lobbying, potentially undermining the coherence of the tax system. Tax

concessions can potentially be directed towards causes with the loudest voice, as opposed to causes with the greatest positive environmental externality.

104. Finally, unlike negative externality taxes, tax incentives do not raise revenue. Instead, tax incentives are a form of government spending.

Alternatives to tax concessions

105. This is not to say the Government shouldn't incentivise positive environmental behaviours. However, tax incentives may be a relatively blunt and expensive way to do it.
106. Direct payments for environmental services is one alternative approach – for example, payments for ecosystem services. There is also scope for some tax instruments to operate as both taxes and incentives – for example, foresters can claim carbon credits through the emissions trading scheme for engaging in abatement activity.

Current tax concessions with environmental impacts

107. A review of tax expenditures has identified several tax concessions in New Zealand that are likely to have negative environmental impacts:
- Carparks – fringe benefit tax exemption for carparks provided to employees on the employer's premises
 - Petroleum mining – seven-year depreciation rule
 - Farming – accelerated depreciation and immediate write-offs for some types of expenditure
108. We have also identified some tax expenditures which could be having positive environmental impacts, but may be subject to some of the concerns outlined above:
- Forestry – accelerated depreciation (expenditure related to the planting and maintenance of forest trees are immediately deductible)
 - Environmental expenditure – there are special deduction rates for environmental clean-up expenditure
109. Further review may be warranted to establish if the benefits of these tax exemptions are justified by the foregone revenue and efficiency costs of potential overinvestment in certain activities.

PART D: Hypothecation – using tax revenues

110. An advantage of environmental taxes (both externality taxes and resource taxes) as a policy tool is that they raise revenue. One of the ways governments can use this revenue is “revenue recycling” to reduce other more distortionary taxes. See *Advantages of externality taxes* in Part A.
111. Alternatively, revenues can be earmarked for funding specific projects or area of government spending – a process known as hypothecation. This section defines what hypothecation is, explains why it is generally not done, and the reasons why it could be.

What is hypothecation?

112. Hypothecation of tax is the dedication or earmarking of revenue raised from a specific tax for a particular programme or service.
113. Hypothecated taxes can be strong or weak (LeGrand, 2013). They are strong when the revenues from the tax concerned are only used to fund a particular programme or service, and there is no other source of tax funding for that programme. Hypothecation is weak when either or both of the above conditions are not fulfilled.

Why tax revenues are generally not hypothecated

114. Hypothecation can result in under or over funding of an expenditure item, relative to what might be judged optimal through the budget’s prioritisation process.
115. A key objective of the budget process is to ensure that government spending is directed to its highest and best value use. Disparate revenues are collected centrally, and then spending is allocated to disparate votes through a prioritisation process. It links spending not to actual requirements of the service, but to a potentially unrelated variable.

Reasons for hypothecation

116. Hypothecation is generally inconsistent with the objective of directing the Government’s revenue towards its highest value use. However, it might still be preferred as a means of achieving other objectives.

Compensation for harm

117. Where a tax is used to price a negative externality, the community that suffers from that externality might have a special interest in the revenues. For example, if a tax is applied to air pollution in a city (e.g., the emission of particulates), the people living in that city and being harmed by the emissions might have a special claim to the revenues raised. Similarly, revenues raised from resource taxes might be hypothecated to compensate those with a special ownership interest in that resource - see localisation principles in Part A.

Public trust and acceptability

118. Hypothecation can be used as a means of building public trust and acceptance of new tax measures, especially in the externality tax space. It communicates that the tax is being introduced for environmental reasons, and not raise money for general government expenditure. In New Zealand, the waste disposal levy is hypothecated to waste minimisation projects. In Ireland, the plastic bag environmental levy is hypothecated to support waste management, litter and other environmental initiatives (CIB, 2017). In the UK, revenues raised by the plastic bag levy is given to charity, clearly demonstrating that the levy is not a revenue collection exercise for government (DEFRA, 2018).

Beneficiary pays principle

119. Hypothecation can be used as a means of achieving efficiency (matching costs and benefits) where the tax is paid by those who benefit from the service (Carling, 2007). The ‘beneficiary pays’ approach may be an efficient way to overcome the externalities and incentives issues in the land use planning at a local government level. For example, the Government is examining ways to fund infrastructure investments through the use of targeted taxes (e.g. value capture mechanisms) on the property owners who will benefit the most from that investment.

Reliability of funding

120. Hypothecation is sometimes proposed as a way of securing a steady and reliable funding source for particular programmes. It is unclear that hypothecation is an especially useful or successful tool for earmarking funding over the long term. Nor is it clear that hypothecation achieves stability of revenue, as it results in funding for a programme fluctuating with revenue from a source initiative. However, there might be instances where changes do match up to changes in need. For example, the waste disposal levy is successful in reducing waste volumes, thereby reducing funds raised, potentially there is less need for waste minimization projects being funded by the levy (although part of the reduction might be being achieved by highly successful waste reduction programmes that have their funding cut).

Hypothecation in New Zealand

121. The most notable examples of hypothecation in New Zealand are ACC levies, EQC levies, road user charges, and fuel excise. In each case, there is clear link to a beneficiary pays principle. For example, revenue raised from road user charges are used to pay for the maintenance and construction of the roads. Heavier vehicles pay higher road user charges, reflecting the greater cost they impose on the roads.
122. The Waste Levy is an example of a hypothecated environmental tax in New Zealand. Part of the levy is used to fund waste minimisation projects. As noted above, there may be public trust and acceptability reasons for hypothecating in this instance.

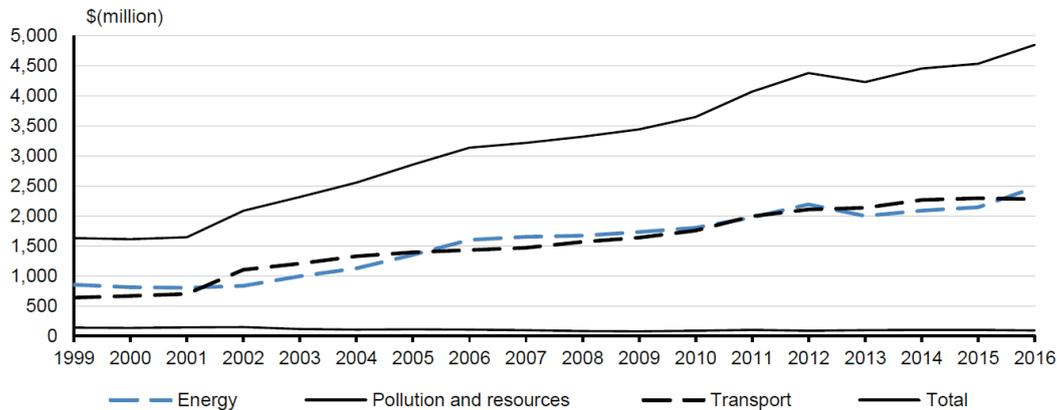
123. The coalition agreement between the Labour Party and New Zealand First includes a provision for hypothecation of any revenues from the potential inclusion of agriculture in the ETS, stating: “If the Climate Commission determines that agriculture is to be included in the ETS, then upon entry, the free allocation to agriculture will be 95 percent but with all revenues from this source recycled back into agriculture in order to encourage agricultural innovation, mitigation and additional planting of forestry.”

APPENDIX A: Environmental taxes in New Zealand

124. Statistics New Zealand estimates that in 2016, the total amount of environmental taxes collected was \$4.9 billion. This was 6.2 percent of government revenue, up from 4.8 percent in 1999 (Stats NZ, 2018, updated April 2018).
125. For environmental accounting purposes, the System of Environmental-Economic Accounting (SEEA) classifies environmental taxes into four categories (UN, 2014):⁹
- *Energy taxes* on energy production and on energy products used for both transport and stationary purposes (e.g., taxes on petrol or diesel, electricity consumption and production, and emissions of greenhouse gases).
 - *Transport taxes* related to the ownership and use of motor vehicles (e.g., motor vehicle import or sales, registration of motor vehicles, road user charges, congestion charges, flights and flight tickets).
 - *Pollution taxes* on the management of waste and other pollutants (e.g., emissions to water or air, excluding carbon dioxide, solid waste disposal, and noise)
 - *Resource taxes* on raw materials (e.g., taxes on water abstraction, and extraction of minerals, oil and gas)
126. In New Zealand and in the OECD, energy and transport taxes make up most of the total (98 percent in New Zealand and 97 percent in the OECD).
127. Most environmental tax revenue is directly or indirectly related to transport. In New Zealand, 51 percent of environmental taxes are classified as transport taxes, such as road user charges and vehicle registration fees. A further 47 percent of environmental tax revenue are classified as energy taxes, and this is largely made up of transport fuel taxes, such as petrol excise duty.

⁹ This is a statistical definition of environmental taxes. As the SEEA notes (Paragraph 4.154): “The approach taken to the definition of environmental taxes in the SEEA differs from the approach commonly found in the economics literature, where environmental taxes are defined with reference to taxing negative externalities, i.e., Pigouvian taxes. These types of taxes are based on an assessment of the motive for setting rates of tax, i.e., the extent to which a particular tax rate will reduce the negative externality. Pigouvian taxes do not include taxes collected for fiscally motivated reasons. Since determining the precise motivation for taxation involves a difficult measurement issue, the approach in the SEEA is to consider the underlying tax base.”

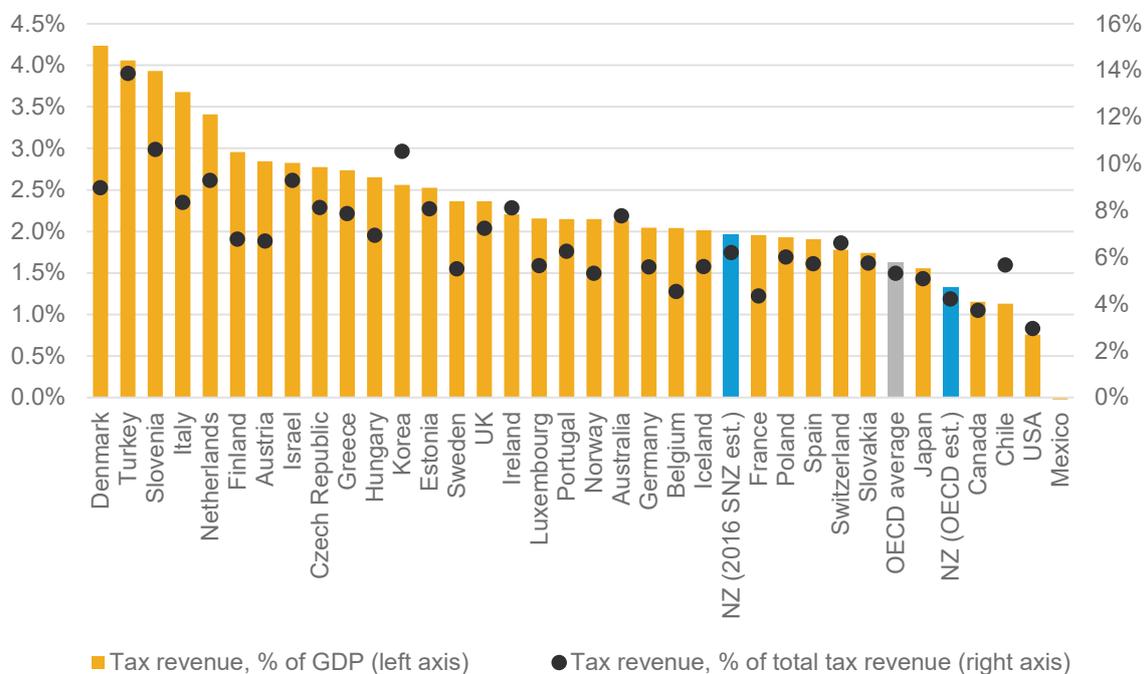
Environmental taxes by tax base 1999–2016



Source: Stats NZ

128. There are differing estimates of how we compare internationally. The OECD reports New Zealand to be one of the lowest users of environmental taxes, with environmental tax revenue making up 4.2 percent of total tax revenue. Stats NZ’s estimate, based on more recent and more complete data, is 6.2 percent (Stats NZ, 2018, updated April 2018).

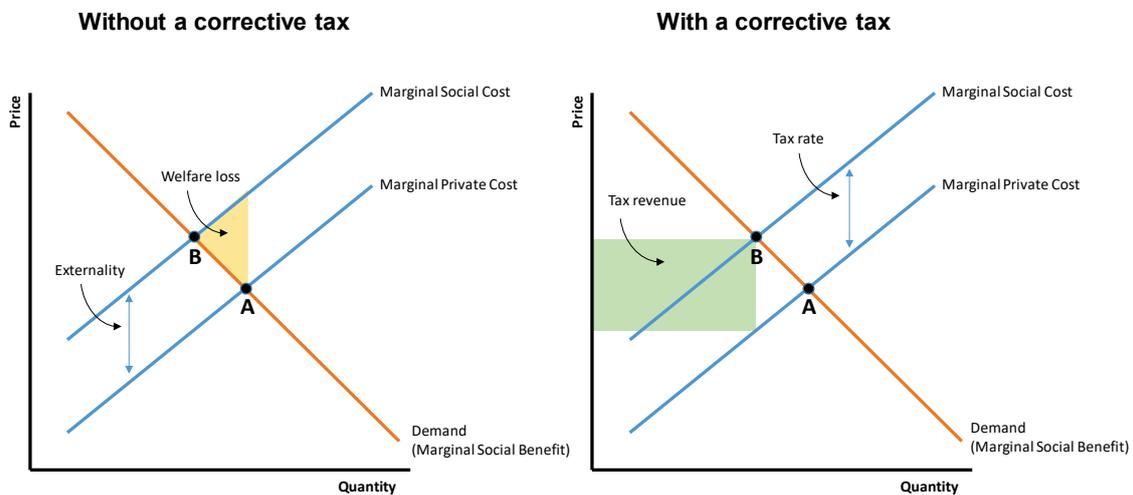
Environmental tax revenue across OECD countries (2013)



Source: OECD (2015) *Environmental taxation*. Retrieved from: <http://www.oecd.org/env/tools-evaluation/environmentaltaxation.htm>

APPENDIX B: Economic diagrams

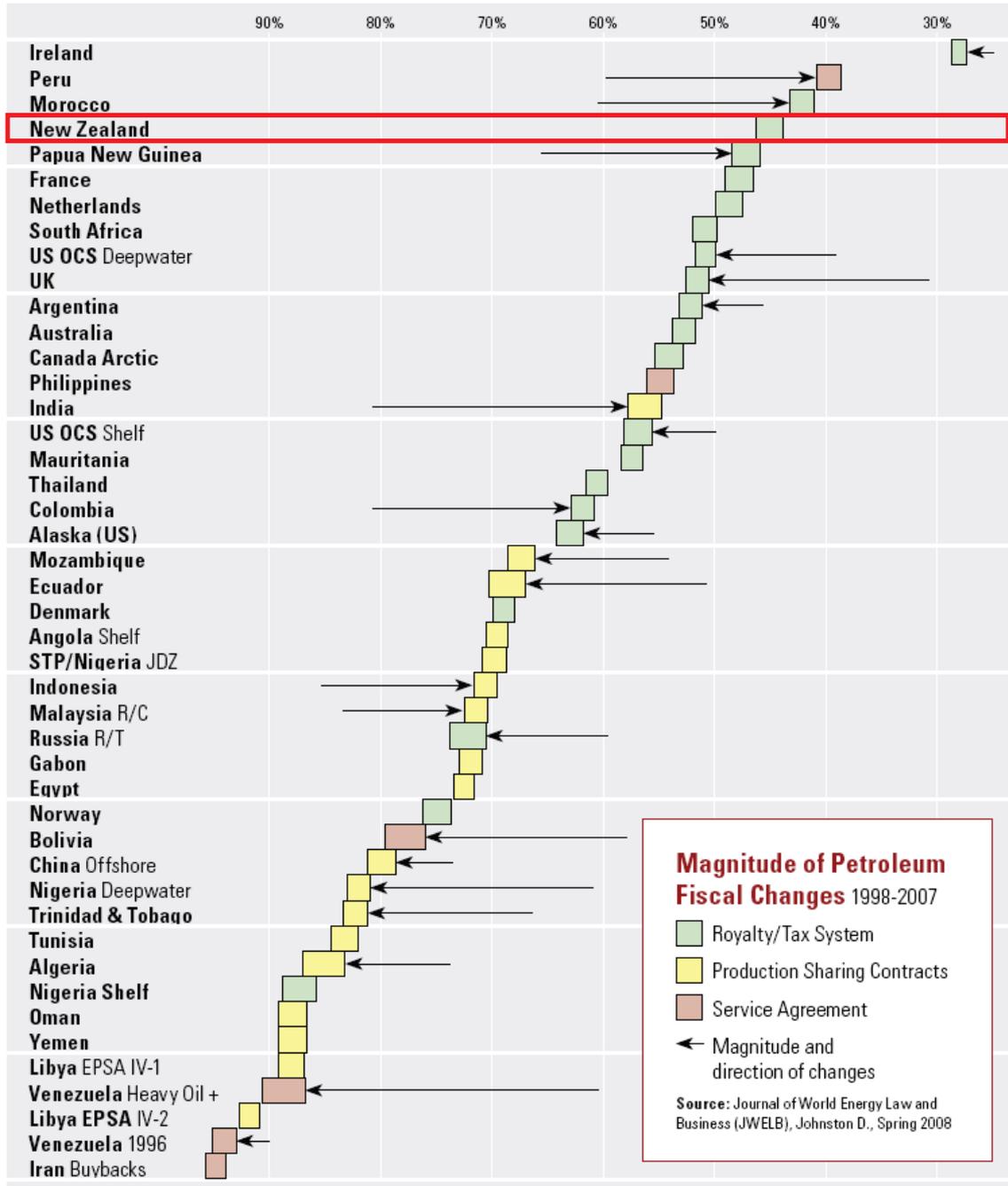
129. A negative externality results in the “social” cost of an activity (i.e., the cost to society) being higher than the “private” cost (i.e., the cost to the individual or firm undertaking the activity). The market will settle at Point A on the diagram below, where the marginal private cost is equal to the marginal social benefit. This results in a welfare loss (the yellow triangle) where the cost to society of the activity exceeds the benefit to society.
130. When a corrective tax is applied, and the tax rate is equal to the externality, the market will shift from Point A to Point B. The welfare loss is eliminated. The Government will also raise revenue (the green rectangle), where that revenue is equal to the tax rate multiplied by the quantity.



APPENDIX C: International comparison of petroleum fiscal regimes

Comparison of petroleum fiscal regimes

Government take (i.e., percent share of profits going to government)



Source: Johnson D., (2008) *Journal of World Energy Law and Business (JWELB)*

APPENDIX D: Other reviews relating to the environment

Carbon / greenhouse gases	<ul style="list-style-type: none"> • Completed government review of the emissions trading scheme (2015–17) • Productivity Commission is preparing a report on transition to a low-emission economy – draft report released on 27 April 2018 • Interim Climate Change Committee is considering role of agriculture and transition to 100 percent renewable electricity • Ongoing work to implement of recommendations from the Emissions Trading Scheme review – investigating limits on international units, auctioning systems, price ceilings, free allocations
Water abstraction	<ul style="list-style-type: none"> • Active three Waters Review considering drinking/storm/waste water management by councils • Ongoing deliberations by Land and Water Forum • Policy work on royalties for exports of bottled water • Ongoing Waitangi Tribunal case
Water pollution	<ul style="list-style-type: none"> • Active three Waters Review considering drinking/storm/waste water management by councils • Land and Water Forum reporting in May on consensus view on allocation of nutrient and sediment loads
Solid waste	<ul style="list-style-type: none"> • 2017 Waste Levy review
Transport/fuel/congestion	<ul style="list-style-type: none"> • Ongoing work led by Ministry of Transport on transportation funding models and congestion pricing. Part of Government’s broader Urban Growth Agenda
Petroleum / minerals royalties	<ul style="list-style-type: none"> • 2012 review of petroleum and minerals royalty regimes
Other	<ul style="list-style-type: none"> • Upcoming local government funding review – terms of reference yet to be announced

Glossary

Accounting Profits Royalty (APR). A charge that is levied as a percentage of accounting profits. An APR is only due if a profit is generated.

Ad Valorem Royalty (AVR). A charge that is levied as a percentage of sales revenues. An AVR must be paid whether or not a profit is generated.

Circular economy. An industrial system that aims to design out waste.

Corrective tax. A tax designed to make markets more efficient by exposing producers and consumers to prices that reflect the costs that they impose on others (such as pollution).

Deadweight loss. The loss of economic efficiency that can occur when equilibrium for a good or service is not achieved – that is, when marginal social costs are not equal to marginal social benefits.

Deduction. Losses or outgoings incurred in producing income or running a business that can be used to reduce taxable income.

Depreciation (economic). The decline in the market value of an asset over its life.

Depreciation (tax). The decline in the value of an asset for taxation purposes, which may differ from economic depreciation.

Distortion. Any action or thing that reduces economic efficiency. Distortions generally arise when private action (such as price-fixing by a cartel), or public action (such as a tax imposed by government), changes an individual's or firm's behaviour.

Ecosystem services. The benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services such as nutrient cycling.

Environmental tax. A tax levied on activities which are considered to be harmful to the environment and is intended to promote environmentally friendly activities via economic incentives.

Externalities (negative) / external cost. A cost that affects a party who did not choose to incur that cost.

Externalities (positive). A benefit that affects a party who did not choose to incur that benefit.

Fiscal regime. The fiscal regime of a country is a set of laws, regulations and agreements which governs the economic benefits derived from exploration and production of a resource, especially for petroleum and mineral mining.

Hypothecation. The earmarking of revenue raised from a specific tax for a particular programme or service.

Marginal cost / marginal damages. The cost added by producing one additional unit of a product or service.

Pigouvian tax. A tax on an activity that generates negative externalities.

Rents (economic). An economic rent is the excess of the return to a factor of production above the amount that is required to sustain the current use of the factor (or to entice the use of the factor). For example, if a worker is paid \$100,000 but would still be willing to work at the same job if they were paid \$75,000, their economic rent would be \$25,000.

Resource rent tax. A tax that applies to the super normal profits, or economic rent of a resource project.

Revenue recycling. Using revenue from the introduction of a tax to reduce other taxes.

Royalties. Payments made for the use of an asset.

Social costs. The total costs of an activity. This includes the private cost as well as the spillover or external cost imposed on people who are not directly involved in the activity.

Tax instruments. In this paper, tax instruments is broadly defined to include any potentially revenue raising economic instrument. This includes nationally-uniform taxes or levies, locally-variable taxes or levies, royalties, and auctions of tradable emission permits or exploration rights.

Windfall gains. Large, unexpected gains resulting from fortuitous circumstances.

Bibliography

- ATO. (2016, February 25). *Minerals resource rent tax*. Retrieved from <https://www.ato.gov.au/Business/Minerals-resource-rent-tax/>
- Carling, R. (2007). *Tax Earmarking – Is it Good Practice?* The Centre for Independent Studies. Retrieved from <http://www.cis.org.au/app/uploads/2015/07/pm75.pdf>
- CIB. (2017, November 14). *Plastic Bag Environment Levy*. Retrieved from http://www.citizensinformation.ie/en/environment/waste_management_and_recycling/plastic_bag_environmental_levy.html
- DEFRA. (2018, January 11). *Carrier bags: why there's a charge*. Retrieved from <https://www.gov.uk/government/publications/single-use-plastic-carrier-bags-why-were-introducing-the-charge/carrier-bags-why-theres-a-5p-charge>
- Fane, G., & Smith, F. (1986). Resource rent tax. In C. (. Trengove, *Australian energy policies in the 80's*.
- Holland, T. G. (2009). A Cross-National Analysis of How Economic Inequality Predicts Biodiversity Loss. *Conservation Biology*, 23: 1304-1313.
- IFS. (2011, July 7). *Hyping hypothecation: should green tax revenues be earmarked?* Retrieved from <https://www.ifs.org.uk/publications/5622>
- Islam, S. N. (2015). *Inequality and environmental sustainability*. UN DESA working paper.
- Kosonen, K. (2012). *Regressivity of environmental taxation: myth or reality*. European Commission Taxation Papers.
- Land, B. C. (2008). *Resource rent taxation - theory and experience*. IMF. Retrieved from <https://www.imf.org/external/np/seminars/eng/2008/taxnatural/pdf/land.pdf>
- LeGrand, J. (2013). *Motivation, Agency and Public Policy: Of Knights and Knaves*,. Oxford University Press.
- MBIE. (2012). *Review of the royalty regime for petroleum*.
- MBIE. (2017, January 17). *New Zealand's mineral estate*. Retrieved from <https://www.nzpam.govt.nz/our-industry/mineral-estate/>
- McLeod, R., Patterson, D., Jones, S., Chatterjee, S., & Sieper, E. (2001). *Final Report - Tax Review 2001*. Retrieved from <https://treasury.govt.nz/publications/information-release/tax-review-2001>
- Mirrlees, J., Adam, S., Besley, T., Blundell, R., Bond, S., Chote, R., . . . Poterba, J. (2011). *Tax by design*. Oxford University Press. Retrieved from <https://www.ifs.org.uk/publications/5353>
- OECD. (2015). *Environmental taxation*. Retrieved from <http://www.oecd.org/env/tools-evaluation/environmentaltaxation.htm>
- OECD. (2017). *Environmental Fiscal Reform: Progress, Prospects and Pitfalls*. Retrieved from <http://www.oecd.org/tax/environmental-fiscal-reform-progress-prospects-and-pitfalls.htm>
- OECD. (2017). *OECD Environmental Performance Reviews: New Zealand 2017*. Paris: OECD Publishing.
- OECD. (2017). *The macroeconomics of the circular economy transition*. OECD. Retrieved from

- [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/WPRPW/WPIEEP\(2017\)1/FINAL&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/WPRPW/WPIEEP(2017)1/FINAL&docLanguage=En)
- OECD. (2018). *Taxing Energy Use 2018: Companion to the Taxing Energy Use Database*. Paris: OECD Publishing. Retrieved from <http://dx.doi.org/10.1787/9789264289635-en>
- Parry, I. W., Norregaard, J., & Heine, D. (2012). *Environmental Tax Reform : Principles from Theory and Practice to Date*. IMF. Retrieved from <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Environmental-Tax-Reform-Principles-from-Theory-and-Practice-to-Date-26049>
- Stats NZ. (2018, updated April 2018). *Environmental-economic accounts: 2018 (corrected)*.
- UN. (2014). *System of Environmental-Economic Accounting 2012 - Central Framework*.
- Withana, S., ten Brink, P., Kretschmer, B., Mazza, L., & Hjerp, P. (2013). *Evaluation of environmental tax reforms: international experiances*. IEEP.