



Carbon pricing in New Zealand: implications for public health

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Abstract

The likely health effects of climate change make it one of the most pressing global public health issues of our time. Effects range from more intense and frequent cyclones, flooding, and heat waves through to changing infectious disease patterns, food and water insecurity, sea-level rise, and economic and social disruption. The governments of almost all developed nations are now focusing their attention on national policy responses to the threat of climate change. In New Zealand, it is currently unclear what path our current government will take to contribute to the global response and fulfil our Kyoto obligations.

In this paper we discuss the main carbon pricing options currently under consideration, and their implications for health and health inequities in New Zealand. We summarise the literature about the likely health and equity implications of different kinds of carbon pricing policy. A health sector voice in these significant policy decisions is vital to ensuring a policy that both addresses the threats to wellbeing of climate change, and maximises the potential health and equity win-wins of an adequate and well-designed response.

There is wide scientific agreement that the Earth's climate is changing and that these changes are very likely to be consequences of human activity.¹ There is also growing agreement that the health effects of climate change make it one of the most pressing global public health issues of our time.¹⁻³ Evidence suggests that the effects on health and wellbeing will be widespread and diverse.

Extreme weather events such as cyclones, flooding, and heat waves are predicted to increase in both intensity and frequency. As well as changes in infectious disease patterns and increasing foodborne illness, we need to consider the more widespread implications for health and wellbeing of food and water insecurity, sea-level rise, biodiversity loss, economic and social disruption.⁴ Variations in effects and abilities to adapt will exacerbate inequities both between and within countries. Our contribution to prevention and our ability to adapt will both be important for future quality of life in New Zealand.⁵

Several approaches are available to governments for mitigating and adapting to climate change. It is unclear at present what path New Zealand will take: the Emissions Trading Scheme proposed by the previous [Labour] Government is now under review. However, it is highly likely that this country will introduce carbon pricing, in some form, as a component of climate change policy.

We argue here that the complexity and scope of the effects on health, resulting from both climate change and societal responses to climate change, mean that public health should be central to the policy debate.

In this paper we consider the potential effects on health and wellbeing of one particular response to climate change—carbon pricing, by which we mean an environmental surcharge on the cost of carbon fuels.

We propose ways of thinking about the balance between short- and long-term risks, including the potential impacts of climate change; and explore ways of implementing carbon pricing to maximise the “win-wins” for health and environment.

Policy response options

This year is significant for New Zealand and the world in terms of climate change policy. In addition to New Zealand reviewing its Emissions Trading Scheme, the most important meeting of the parties of the UN Framework Convention on Climate Change (UNFCCC) since the Kyoto Protocol⁶ occurs in December 2009 in Copenhagen. At this meeting, states will agree on a replacement for the Kyoto protocol. It is unclear at this stage what emission reduction targets will result from the Copenhagen talks.

The National-led New Zealand Government have called for a 50% reduction in emissions compared with 1990 levels, by 2050.⁷ However, this may not be enough to avoid serious damage. For instance, it is estimated that a 50% reduction would mean there was still a roughly 1 in 2 chance of a billion people being short of water in 2050, with that number doubling by the end of the century as temperatures worldwide continued to rise due to committed global warming.⁸ The UK recently called for an 80% reduction by 2050 compared to 1990 levels.⁹ This reflects recent updates in climate science reporting that greater reductions in emissions are now indicated.

As we delay the implementation of global and domestic responses, the levels and timeframes for emissions reductions become more drastic in order to be tolerably certain that there will not be unacceptable social and ecological impacts.

How should a reduction of this order of magnitude be achieved, in an equitable fashion? The Global Commons Institute has proposed an approach known as Contraction and Convergence.¹⁰ This involves a reduction in total emissions (contraction) in which the heaviest polluters make the greatest changes, and the outcome by 2100 is the same level of emissions per capita in all countries (convergence).

For contraction and convergence to be successful, a globally agreed, unified approach is necessary, with all countries paying heed to per capita as well as total emissions. The Organisation for Economic Co-operation and Development (OECD) countries (including New Zealand) contribute 40% of the world's emissions.

Although New Zealand is a small contributor to overall emissions because of a small population, our per unit of GDP and per capita emissions are better indicators of performance on a global level. Of the 30 OECD countries, New Zealand produces the fourth highest greenhouse gas emissions per unit of GDP and the fifth highest emissions per capita.¹¹

As the pressure to act on climate change increases, governments around the world are weighing up strategies that will reduce carbon emissions with the minimum negative economic effect (Table 1).

Table 1 Carbon reduction strategies adapted from:¹²

Price-based mechanisms	Non-price-based mechanisms
Carbon tax	Regulatory control
Tradable quotas / permits	Information provision
Subsidies and incentives	Education to change public demand

Price instruments are likely to change behaviour more rapidly than information and education, whether this applies to household waste generation, energy, water, or transport use,⁶ and their effectiveness depends on the sensitivity of firms and consumers to changes in the cost of emissions.

Of the price-based mechanisms, carbon taxes have the broadest range, applying to all fossil fuels and all sectors, therefore supporting almost all forms of energy conservation and providing, potentially, a wide range of additional benefits.¹³ This is in contrast to tradable permits, which affect more directly large industrial emitters, and reach consumers by “trickle-down” price rises.¹³

A combination of responses is most common internationally, but it is useful to bear in mind there are a number of important differences between taxing and trading carbon.¹⁴:

Emissions trading—The *quantity* of emissions is fixed (a “cap”) and the right to emit becomes a commodity to be traded on the domestic and international market. The cap is broken up into units or permits, and these are allocated (either sold, or assigned) to participating industries. To comply without cost, industries must emit less than the number of permits they hold. However, further permits or units can be bought. In theory, this means reductions in carbon emissions occur globally where the cuts are least costly. Depending on how the trading scheme is organised, costs and revenues may be largely contained in the private sector.

Carbon taxation—The *marginal cost* of carbon emissions is fixed, and this cost is paid at the point of consumption. This means the external costs of greenhouse gas emissions are paid directly. The cost of carbon is set by government and revenues return to central government as with any other tax.

Depending on the number of permits in circulation, an emissions trading scheme ties the market closely to the environmental target. In addition the cost of emissions adjusts automatically to the international economic climate, avoiding the “stickiness” of a tax, which takes time to review in the light of fluctuating economic markets. However, carbon taxes tend to be broader in scope, and they can more easily reach individual consumers as well as industries. This can result in a greater range of wellbeing co-benefits. In addition, it may be easier to moderate inequitable effects of carbon taxes: revenue flows directly to central government, and may (if government wishes) be utilised to reduce adverse impacts on vulnerable groups such as low-income households.

The previous New Zealand Government led by Helen Clark proposed tradable permits in the form of an Emissions Trading Scheme (ETS), as part of a suite of policies including direct regulation, improved education, and research.¹⁵ The scheme would

require permits for any greenhouse gas emissions, which would be compulsorily relinquished to central government. The government would use some permits to fulfil its international obligations under the Kyoto Protocol, and the rest could be used in a number of different ways. Permits might be given back to industries that were unable to make rapid changes in their processes, or could not pass on costs to consumers.

Other permits could be auctioned to domestic industry or sold on the international market. The money raised in this way could be invested in low carbon technologies, adaptation to climate change, or whatever is required to ameliorate the social effects of the scheme. Australia is considering a similar kind of emissions trading scheme as recommended by the Garnaut Climate Change Review¹⁶ and discussed in a recent Commonwealth Green Paper.¹⁷

The present New Zealand Government, led by John Key, has announced that it will review the ETS, as well as other carbon-reduction strategies such as taxes on fuel, congestion, and agricultural methane. Such taxes most directly affect the energy, transport, and agriculture sectors, with further flow-on effects for the cost of food and commodities.

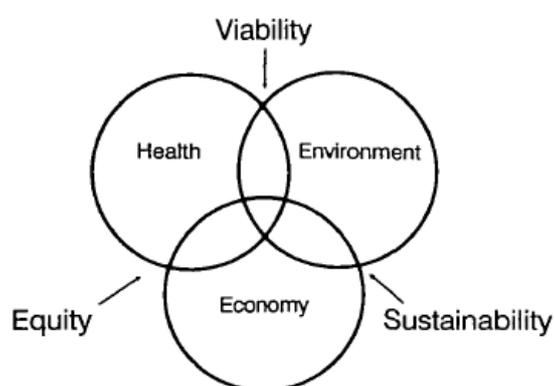
Whatever combination of policies is chosen, there will be far-reaching consequences. In the following discussion we focus on the ways in which health and health inequities may be affected by moving to a system in which the full environmental costs are reflected more accurately in the price of carbon.

Implications for human wellbeing

The strategies outlined in Table 1 are currently being evaluated with a focus on economic effects. Measuring economic impacts captures some of the upstream "drivers" effects on health, but a more explicit examination of the health effects of these options is warranted. As part of the policy machinery for tackling climate change, a relevant model of health that reflects the links between economy, environment and wellbeing is crucial.

Trevor Hancock's model of human development¹⁸ demonstrates the inter-relationship between health (and social factors), environment, and the economy, and implies that economic activity serves not only to preserve the environment but also improve wellbeing (see Figure 1).

Figure 1. Model of health and human development¹⁸



The Intergovernmental Panel on Climate Change (IPCC) Summary for Policy Makers recommends evaluating policies using a framework that mirrors this model (equity, environmental effectiveness, cost effectiveness) and adds institutional feasibility.¹²

Considering these aspects in relation to climate change mitigation, our first priority is to viability—thus ensuring a long-term level of carbon in the atmosphere that is consistent with human and ecosystem survival. Environmental and economic sustainability are closely intertwined.

The IPCC suggests that responding to climate change will have a net benefit to GDP for many countries, particularly those who develop and rapidly adopt new technology, creating vibrant low carbon economies, while avoiding the costs of negative climate change impacts. In addition a well-functioning Emissions Trading Scheme will reduce the economic impact of meeting Kyoto obligations. This leaves us with two more elements in Figure 1—health and equity.

Effects of mitigation on health and equity (co-benefits and regressiveness)

A well-designed carbon taxation scheme—or a combination of carbon taxation and emissions trading scheme—could achieve health co-benefits or “win-wins” for health. For example, a reduction in the burning of carbon will improve air quality. It has been estimated that air pollution from road vehicles and homes heating result in almost 1000 adult deaths per year in New Zealand urban settings.¹⁹

Other positive health effects will depend on the availability of alternatives to fossil fuels, and the availability of affordable improvements to energy efficiency (influencing the sensitivity of consumer choices to price). For instance, where public transport, walking and cycling are convenient, safe, and affordable, transition to these modes as a result of increasing motor vehicle fuel prices will increase levels of physical activity, reduce road traffic injury, and improve opportunities for social connections.^{20–25}

Improvements in household energy efficiency, and clean heating technologies, could prevent excess winter mortality, and respiratory hospitalisations.^{26,27}

Depending on how it is implemented, carbon pricing may be regressive (i.e. a greater burden on the poor than wealthy people) or progressive in nature (a lesser burden on lower income people). For instance, there will be heavier economic demands on households as the increased cost of carbon is passed on through rising prices of products and services.²⁸ This is regressive if costs bear most heavily on those with low incomes, and in these circumstances inequalities in health and wealth would be made worse.

In New Zealand, low-income households already spend a higher proportion of their income than high-income households on non-discretionary carbon-related expenses such as household fuel and power. Households in the lowest income quintile now spend 9.7% of their income on household fuel and power compared to 7.1% in 2004.²⁹

Even without an Emissions Trading Scheme or carbon taxation, the pressures on low-income households will continue if the price of energy rises. Fuel poverty—defined as households spending more than 10% of their income on fuel use to heat the home to an adequate standard of warmth—already affects between 10 and 15% of all households in New Zealand.³⁰

Of all fossil fuels, the price of petrol is likely to increase most sharply as a result of a carbon charge.³¹ If people are unable to switch to more carbon-efficient modes of private or public transport due to lack of infrastructure, access, or affordability, then their ability to access employment, health facilities, and social and recreational activities is sharply impaired.

Those on low incomes are more vulnerable for many reasons. For instance, in some areas there is an inverse relationship between access to public transport and neighbourhood deprivation in New Zealand.³² To compensate, people on low incomes may respond to the rising costs of travel by reducing spending on essentials such as nutritious food, household heating, electricity, and water—with predictable adverse consequences for health.

There are already significant pressures on food supplies in many parts of the world; for example, the world food price index rose by 40% in 2007 (compared with an increase of 7% the year before).³³ Climate-related increases in fuel and agricultural costs, conversion of agriculture land to biofuel generation, and extreme weather events will exacerbate threats to food security.

In New Zealand, low-income households spend a greater proportion of their household expenditure on food than those on higher incomes.¹⁹ If carbon prices rose steeply, the flow-on effects on food costs would therefore cause a disproportionate burden on those already most vulnerable. The effect of a systemic carbon price rise will also increase inflation in New Zealand, exacerbating fuel and food inequities through a “welfare effect”.³⁴

Modelling conducted by Suzi Kerr and Brian Easton on the proposed Emissions Trading Scheme indicates that a carbon price of \$50 per tonne would contribute to job losses, but these would be less drastic than those associated with the market shocks of the 1980s and 1990s; and price rises would be less than the increases in oil and electricity prices in 2006–2008.³⁵ These analyses were limited to examining average effects across society and did not focus on any potential differential impacts.

Whether the carbon price will go beyond \$50 per tonne is the major uncertainty—according to the IPCC, a price of up to \$100 per tonne may be needed to reduce global emissions to the levels required to avoid damaging climate change. Social effects may depend also on the rate of change: rapid increases in prices (which of course are more likely the longer interventions are delayed) are tolerated less well than gradual changes. Research to date has not examined the possible effects on lower-income households of rapid adjustments of the price of carbon.

In summary, carbon pricing could bring important co-benefits, especially if alternative strategies to fossil fuel use for household energy and transport are convenient and affordable. However, health inequities could be made worse through the regressive nature of the scheme. Enhancing potential co-benefits and reducing the costs for low-income households should be central to the design and implementation of the ETS or

any other carbon pricing strategy. Experience with carbon pricing interventions elsewhere indicates these goals are achievable.

Evidence for policy implementation to maximise progressiveness

Internationally the best evidence on the effects of carbon taxation policies and emissions trading schemes comes from the European Union (EU). In the EU, carbon pricing has had regressive social effects, but there are also signs that the negative impacts can be softened, avoided altogether, or even reversed by revenue recycling. For instance, schemes that directed additional revenues specifically to improving energy efficiency and subsidising fossil fuel alternatives had a more progressive effect than those in which carbon revenues are used to reduce other taxes (such as income tax).³⁶⁻⁴⁴

The European experience shows that progressive allocations are possible, but it is not certain that additional revenue gained from a carbon tax would be spent in this way. Tax hypothecation, on the other hand, might be a way of earmarking new money for schemes that will reduce inequalities. For instance, revenue generated by carbon-charging might be legislatively directed to public transport and housing insulation for those in higher deprivation levels.

The potential for progressive outcomes across the income spectrum has been demonstrated in Italy.⁴⁴ The introduction of a carbon tax in Italy resulted in significant rises in transport fuel costs, as well as rising household energy costs. However, the revenue from carbon taxation has been explicitly targeted to reductions in social security contributions; reducing taxation on heating fuels for the poorest and coldest areas; and improving the environmental efficiency of energy use.

International experience also indicates that regressive outcomes depend on balance of taxation between transport fuels and household energy, and the availability of alternatives. In New Zealand, demand for transport fuel is relatively inelastic due to the lack of convenient alternatives and therefore adding to the cost of carbon will be particularly regressive without some form of revenue recycling into (for example) better public transport in low-income areas.

Similarly, low-income households are already finding it difficult to respond to rising electricity costs, particularly in cold weather, due to poorly insulated houses and a lack of affordable, healthy heating alternatives. In response, revenues might be tied to subsidised insulation retrofits and other measures that improve household energy efficiency. This was the purpose of the Household Energy Fund proposed in October 2008, and now under review.

A version of tax hypothecation directed towards reducing inequalities has been recently accepted in New Zealand as part of the Auckland Regional Fuel Tax.⁴⁵ The cost of fuel in the Auckland region will progressively increase by up to 5 cents per litre and the revenue will be reinvested into public transport projects. Prioritisation of low-income areas for improvements in public transport initiatives has been included in the scheme. Such direction has the potential to reduce economic inequalities by preferentially benefiting households in poverty.

Conclusions

In conclusion, if climate change is not controlled through timely central government means then health losses will occur worldwide. However, worldwide there is also the potential for a “triple dividend” for health if we get our policy response right.

An emissions trading scheme that establishes the right market price for carbon to achieve internationally agreed carbon targets could prevent the negative effects of climate change on environmental, economic, and physical wellbeing. However, a carbon taxation scheme that hypothecates revenues could also have significant wellbeing co-benefits and reduce socioeconomic inequalities—by improving the affordability and convenience of fossil fuel alternatives for low-income groups. Revenue recycling in this form also has the potential to reduce wellbeing inequalities.

Finally, by creating convenient, affordable fossil fuel alternatives in the transport and housing sectors, we make behaviour change towards healthier homes and transport easier to achieve long term. A carbon pricing scheme that reflects the key tax-shifting principles of broad coverage, predictable implementation, revenue neutrality, and protection of low-income households⁴⁶ could create a favourable environment for addressing our climate change obligations while improving wellbeing and equity.

However, there is a risk that New Zealand's response to climate change will fall between two stools—making an insufficient dent in our obligations to mitigate the climate change impacts on wellbeing, while introducing a regressive policy that in itself is likely to increase health inequities.

The health sector remains one of the most respected sections of society. Health professionals must play their role in advocating for the “healthiest” kind of policy response to climate change—a policy that is predictable, structured to assist low-income communities, with revenues returned in ways that further benefit low-income households. As the global climate change rhetoric becomes more urgent, the organised actions of society to protect public health become more crucial.

Examples of activities for health professionals include: education and discussion with peer networks; encouraging health agencies to contribute to the public debate; and stressing that protection and improvement to human wellbeing is a strong justification for taking appropriate action on climate change.

In particular, submissions can be made by individuals and groups to the review of the Emissions Trading Scheme by Friday 27 February 2009 (late submissions are likely to be accepted by arrangement). Information about making a submission to the Parliamentary Review Committee can be found at <http://www.parliament.nz/en-NZ/SC/SubmCalled/4/8/d/49SCETSreviewets200902131-Review-of-the-Emissions-Trading-Scheme-and.htm>

There are opportunities to join in action with other health professionals globally in preparation for the next United Nations climate change conference in Copenhagen in December 2009. Contact the authors for more information.

Competing interests: None known.

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