Submission to Senate Select Committee on Climate Policy – Richard Corin

This submission is not confidential.

The Secretary
Senate Select Committee on Climate Policy
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8th April 2009

Dear Senators,

I believe the CPRS legislation is fundamentally ill-conceived and, if implemented, would severely handicap future efforts to address climate change. The CPRS legislation should be rejected and a whole new design created.

To this end I submit many of the relevant concepts, considerations and design features which I believe should be incorporated in a more appropriate response to the threat of climate change.

Amongst the mostly positive suggestions, are occasional criticisms of ideas embodied in the design of the CPRS.

Yours sincerely,

Richard Corin

Contents:

In brief - Features of a well designed carbon pricing mechanism

The price of carbon would be determined for the whole planet by a global mechanism, however, in the meantime, a national scheme should have the following features:-

- A target trajectory which is closely bound to a strategy for the transition to a zero carbon economy.
- A flexible emissions trajectory which can be changed in response to new science within 30 days, with strategic milestones rescheduled accordingly - and anticipated costs adjusted.
- Coverage of the whole economy.
- Employ scientifically sound and symmetrical accounting systems, so that positive or negative changes in biomass incur an equivalent debt or credit. Forest, biomass and ecosystem managers will pay for the loss of carbon from storage, but receive credits for regrowth.
- A carbon price that is always high enough to drive large-scale zero-emissions energy infrastructure investments.
- A carbon price which is stable, so the retail energy price reflects the mid-term price of large-scale zero emissions energy. (Specifically, to avoid the tendency for excessive prices during the years of waiting while sufficient clean energy from new infrastructure to come on line.)
- Carbon revenue itself should not be used to "ease" or reduce energy prices. That would subsidise high energy users and discourage efficiency improvements. However, public and private sectors are encouraged to invest heavily in zero carbon infrastructure.
- Carbon Dividends. 100% of net "carbon revenue" should be distributed equally to every citizen (half for children).
- A green energy investment scheme for individuals wishing to invest directly in zero carbon energy infrastructure and accelerate the transition. A personal option for Carbon Dividends to be invested automatically in "Green Bonds" if desired.
- Border Tax Adjustments to decouple the effects of unequal international carbon prices on the local economy.
- The current Australian carbon levy to apply to imports - equivalent to the emissions imposts for locally produced goods and services.
- No free permits! However, carbon expenses associated with products exported from Australia will be refunded, until a global scheme is implemented.
- Unconditionally reduces emissions due to *consumption* by Australian citizens to (near) zero by *2040*. (An offer "By 2030" has not yet been modelled and assumptions should be checked. I'm guessing it will work if emissions due to local consumption by Australian citizens, including imports, is less than half the national total CO2-e emissions. They may not be.)
- Conditionally reduces emissions due to Australian *exports* when our customers, pay a premium for commodities with low levels of associated emissions, or else a global carbon price with universal dividend is implemented.

No matter how much an ETS behaves like and Adjustable Carbon Tax, an ETS cannot be as good if it does not impose the carbon price on imports. Under an ETS, attempts to apply carbon charges to imports will look like import tariffs. But, a TAX applied equally to domestic and imported products will pass the WTO rules, as did the GST. This is vital if Australian products and those made with low emissions, are to compete fairly with products manufactured exploiting "free emissions" zones.

Please allow jobs in local production for local consumption to exist in Australia by rejecting any system which imposes costs that do not apply equally to international competitors.

Who owns the atmosphere?

Because it has always been free, the atmosphere has been used as a waste dump by anyone and everyone - some more than others. The atmosphere's ability to absorb carbon dioxide has become a scarce resource, and therefore very valuable. Our waste dump is running out. What remains will have to be rationed - and the usual method of rationing a scarce commodity is *by price*.

So why is it so complex to place a scarcity value on the atmosphere's CO2 absorption capacity?

This hitherto free service has been exploited and abused in order provide civilisation's cheapest source of concentrated energy. The atmosphere's apparently unlimited supply of oxygen and its abundant ability to "remove" gaseous wastes have meant that only fossil fuels have been the focus of economic scarcity and rationing by price. We prefer to overlook the fact that the ability to dispose of combustion wastes is a very valuable natural resource.

The solution to the problem of our atmospheric waste dump filling up, is indeed difficult and challenging, but it is not complex. It is the common and natural desire to keep receiving valuable things for free which lies at the root of why things get complicated. Human beings and their even greedier de-personalised institutions, have an ability to present distorted and unnecessarily complex frames which seem plausible on a superficial level, but tend to obfuscate assumptions and rorts, which benefit one interest group over another.

We cannot pretend that rationing CO2 emissions is not an issue of wealth distribution - it is - just as much as allocating the ownership of fossil fuels themselves. And, although there is a bit more to it, the ability to use and control energy is a very good measure of wealth.

One of the first questions to arise is - *Who owns the atmosphere?* - but the answer is rarely uttered. Who receives the proceeds of any rationing by price? And who misses out? At the heart of the climate solution is a deep and fundamental concept about cooperating for the common good and another concerning global governance of global issues such as the "health" of this rather unique living planet.

Thinking globally sometimes requires a bit of a stretch, but you don't need a brain the size of a planet to know that the air belongs to everyone. However, there are a lot of smart and cunning people who see a new opportunity to own natural wealth which is already the common property of every person. They want some aspects of the atmosphere privatised, simply because they now see it is a valuable resource – and they want it for free, if they can. Then they want to profit by selling your diminishing share of the atmosphere back to you, provided you are the highest bidder.

Four views of ownership

The ownership of the atmosphere is an issue that cannot be overlooked. Our policy preferences always imply one form of ownership or another. Whether stated, implied or unconsciously assumed, there are at least four views about the right to dump in the commons of the atmosphere. These attitudes are demonstrated by individuals, corporations, communities and nation states.

1. Historical justice. "The air belongs to everyone, equally. The wasteful have already used up more than their share of the dump. They have even used up what does not belong to them and must pay just compensation for their greed." There is only a problem because of the excesses of wealthy industrialised countries. People in less industrialised countries must have the right to the resources they need for development and well being, without having them appropriated. The remaining capacity belongs to those who have not yet used up their share. Since a just situation cannot be restored, the industrial countries must pay (very significant) compensation.

Third world debt would reverse its sign to become a credit, then industrialised nations would continue to pay dearly to obtain carbon rations from the rest of the world.

2. Fresh Start. “We must not blame or punish for past mistakes. Nobody imagined the atmosphere was finite, so this is a new situation. From now on, we're going to do things equitably.” The remaining dump capacity belongs equally to everybody. Those who continue to use more than their diminishing share will have to compensate those who use less. The dump capacity can be rationed through a world price, but the proceeds belong to the owners - everybody. Although a market mechanism is proposed, this view of ownership is consistent with "Contraction and Convergence".
3. First in first serve. "We all have to cut back equally. The dump belongs to those who filled it up, so we will formalise this right by issuing permits according to current emissions levels - then slowly cut them back." This view is the moral equivalent of claiming that the last piece of the cake belongs to those who already ate the most. "That's just too bad for those who missed out. It's a competitive world. Stop that whinging - you lost, fair and square." This attitude is most prevalent amongst developed nations with powerful fossil fuel industries. It is the rationale behind "cap and trade". If the world has to reduce total emissions by 60% then those who use almost nothing also have to cut by 60% so that big consumers can maintain their relative position at minimum cost. Despite claiming a belief in markets, they don't want *a price for carbon* built upon equitable ownership. They want a market in the ownership of “emissions rights” – they want the atmosphere privatised. First the asset, the “atmospheric real estate”, needs to be divided amongst nations according to historical emissions levels. Then, by getting their governments to hand over emissions rights to the big polluters, they take possession of the atmospheric resource – finally, selling the ever more valuable “dump capacity” back to the original owners – the citizens of the Earth.
4. Freeloader. "We will defend our freedom to the death - preferably yours!" This view accepts no restraint unless compelled by an overwhelming power. There is no concept of the public good except when it serves self interest. "Nobody owns the air, it is free and we love freedom. You can't put a fence around it, so you can't make us pay neither." Such a view is characterised by climate change denial and active opposition to and disruption of attempts at regulation. You'd have to be the most powerful nation on the planet to get away with this – or sucking up to one.

A just and moral basis for regulation

When some speak of fairness, in relation to the atmosphere it often relates to how much "reduction" effort a country should make. Metaphorically speaking – no matter if we be obese or starving, “fairness” says we must all cut our calories by the same proportion. But dividing the Earth’s presumed absorptive capacity for CO2 (mainly) amongst national governments according to how much they currently pollute also seems fair when you happen to be a beneficiary. Theft is “fair” if you have a bigger gun.

The idea of assigning "caps" to nations based on historic emissions involves an immediate and massive wealth transfer from *poor to rich* nations. This idea has little prospect of international consensus agreement. Will the USA and EU threaten India, China and Brazil with nuclear weapons to maintain their privileges of wealth and power? I hope this doesn't happen, but surely it is dystopian to believe that a massive robbery can save the world from disaster.

The Kyoto protocol experimentally endorsed the “first in first serve” model of dividing up the remaining assets roughly according to who was the biggest polluter in 1990. However several important nations only signed the agreement provided it said they had unlimited emissions rights!

This paradigm, which many of us in rich nations have been led to accept without question, almost caused the Kyoto talks to collapse. The Copenhagen talks in December 2009 can be expected to fail unless a new and equitable set of principles for a totally new protocol are adopted.

No person and therefore, no nation, (except those who have already consumed more than their fair share) has a moral obligation to accept a ration or cap which is less than anybody else's. People in developing nations should therefore offer to accept caps which are consistent with the per capita emissions of Australians or Americans. One partial solution to this problem is to assign every person a carbon ration corresponding with the global average – then the heavy emitters can purchase rations from those who have a surplus. Peter Singer advocates this is an essential ethical principle.

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http://commentisfree.guardian.co.uk/peter_singer/2007/06/reaching_a_compromise_.html
http://www.policyinnovations.org/ideas/commentary/data/per_capita_emissions

> But there is a solution that is both fair and practical:
>
> Establish the total amount of greenhouse gases that we can allow to be emitted without causing the earth's average temperature to rise more than two degrees Celsius (3.6 degrees Fahrenheit), the point beyond which climate change could become extremely dangerous.
>
> Divide that total by the world's population, thus calculating what each person's share of the total is.
>
> Allocate to each country a greenhouse gas emissions quota equal to the country's population, multiplied by the per person share.
>
> Finally, allow countries that need a higher quota to buy it from those that emit less than their quota.
>
> The fairness of giving every person on earth an equal share of the atmosphere's capacity to absorb our greenhouse gas emissions is difficult to deny. Why should anyone have a greater entitlement than others to use the earth's atmosphere?
>
> But, in addition to being fair, this scheme also has practical benefits. It would give developing nations a strong incentive to accept mandatory quotas, because if they can keep their per capita emissions low, they will have excess emissions rights to sell to the industrialized nations. The rich countries will benefit, too, because they will be able to choose their preferred mix of reducing emissions and buying up emissions rights from developing nations.

If economic development is to proceed in developing countries, then the fossil energy path must be by-passed and clean energy technologies implemented with the assistance of money from selling atmospheric resources to nations who grew fat on fossil energy. Otherwise, I believe, we are stuffed. An unjust climate agreement will produce hell on Earth, bloody revolutions and wars.

The following is an extract from *Environmental Principles and Policies: An Interdisciplinary Approach* - by Sharon Beder. Chapter 12, under “THE EQUITY PRINCIPLE”

Emission allowances and targets

By basing greenhouse emission reduction targets on the 1990 emission levels of each country, those that were emitting the most at that time were given a greater allowance under the Kyoto Protocol. This disadvantages countries whose lower levels of economic activity at the time meant they were not emitting much at all in 1990. The 1990 baseline freezes the status quo, consolidating ‘the historic overuse by Northern industry at the expense of the South', and is therefore inequitable (CEO 2001). This situation has been termed 'carbon colonialism'.

Larry Lohmann (1999) also claims that the Kyoto emission targets are inequitable:

> *Any measure requiring all countries to reduce emissions by similar percentages, for example, would allow the US to go on producing roughly one-quarter of the greenhouse gases released yearly, even though it has only four per cent of the world's population. Similarly, North-South*

'carbon trading' suggests that it is legitimate for rich countries or companies who already use more than their share of the world's carbon sinks and stocks to buy still more of them - using cash which has itself been accumulated partly through a history of overexploiting those sinks and stocks.

Lohmann (2004: 9-11) estimates that carbon pollution rights allocated to large industries in the United Kingdom, as part of the EU Emissions Trading Scheme, will give them the saleable rights to some 5 per cent of the world's estimated assimilative capacity for carbon. Yet he questions whether the United Kingdom has the moral right to grant such rights, given that assimilative capacity 'does not fall, geographically or otherwise, under UK legal jurisdiction, but is a capacity inherently spread around the world'. This is why he argues that the handing out of rights as part of emissions trading schemes is '**one of the largest, if not the largest, projects for creation and regressive distribution of property rights in human history**'. (bold added -RC)

A Fair Global Scheme

Any national question about a "a fair and equitable contribution to global emission reduction" becomes irrelevant once an equitable global system is established. There will be no national targets, only a planetary emissions trajectory with feedback for adjusting the carbon price obtained by measuring the CO2 concentration (seasonally adjusted). Every global citizen, rich and poor, will be treated the same. There will be one global carbon price for dumping into one global atmosphere, while the revenue will be distributed equally to every global citizen. This minimises the mess of trading, and ensures that any person generating average per-capita emissions, no matter where they live, is exactly compensated for increased expenses, while those who use more than the global average will pay extra to the benefit of those who use less. The rich can afford to reduce emissions first, but they need an incentive, while the poor cannot yet afford to avoid the fossil energy path to development, until they are compensated for the loss of this opportunity to exploit the natural atmospheric wealth previously available to all, but already used up by a few.

Note that this system remains very generous to developed nations. It ignores compensation for past appropriations and abuse of atmospheric resources. In my estimation, compensation for past errors may be limited to requiring the developed countries to provide insurance for climate disasters according to their historic accumulated emissions. Once responsibility is accepted, "punishment" or "revenge" for past ignorance or wilful denial does not help anyone.

An ethical carbon price mechanism

It has been our refusal to acknowledge these moral and ethical issues which has produced "the greatest market failure of all time". An ethical, fair and just market based rationing scheme would notionally allocate global per-capita emissions to each person and allow high emitters to purchase unused capacity from low emitters. The simplest practical implementation of such a principle, combined with the economic need to price carbon, is described below. It includes a notion of a birthright of human equality expressed as non-transferable shares.

- Carbon Levy. For economic, competitive trade reasons, there needs to be **one global carbon price** paid by everyone in the world. Otherwise, the smokestacks simply migrate to the cheapest locations on the planet - old smokestacks may get closed down but it is a major waste of resources whenever a new one gets built anywhere on the planet. The global carbon price makes fossil fuels and deforestation less competitive with clean energy and sustainable practices in forestry and agriculture.
- Carbon Dividend. A global carbon price on its own would severely disadvantage the poor and make whoever collects the money disgustingly powerful, so **everybody gets an equal share** of the proceeds. This means that persons at the current global average per capita emissions level receive exactly enough to compensate them for their increased expenses.

However, those who's consumption produces above average emissions will be out of pocket, and those who use less than the current average will be rewarded.

- Carbon Authority. To keep the planet on the emissions reduction target trajectory, the global carbon price will have to be adjusted regularly in manner that promotes reasonable certainty and relative price stability. The Carbon Authority will be **an international institution** like the IMF or WTO for example, charged with controlling the carbon price, and using strategy, technological transfers and expert knowledge of energy investment decisions all over the world to keep the global emissions heading in the right direction at the appropriate rate.

Although we don't need complicated negotiated national target trajectories, we do need the global one. This has the virtue that progress is measurable through direct testing of the air. There are important roles for national governments, but I don't want them to tax away the carbon dividend before people even see it. That would be highly regressive taxation which would undermine the equity and incentives which are essential for an optimum outcome.

Ignoring the fine print, I want governments of nation-states to agree to do four main things:

1. Fossil Fuels. Administer, enforce and collect the current carbon price or Global Carbon Levy (in currency per tonne) imposed on fossil fuels at the well head or mine gate;
2. Biomass. Administer, enforce and collect the current carbon price or Global Carbon Levy (in currency per tonne) for the depletion of stored biological carbon from forests and other ecosystems and pay out the same price for net increases in the mass of stored carbon.
3. Distribute the Global Carbon Dividend, to all adults in their jurisdiction (half for children).
4. Cooperate with and respect the authority of a UN Carbon Authority to collect and distribute payments, set the Carbon Levy and Carbon Dividend (according to an equal share for every person) and assist international inspectors for the purpose of ensuring compliance.

Getting countries to agree

A number of significant countries will continue to disagree about the unethical Kyoto arrangements which will be presented for endorsement at the Copenhagen meetings. On what basis will countries reach agreement? Do we all say "yes sir" to the biggest bully? Or will the governments eventually understand the will of the people of the Earth to have a simple, effective and elegant solution which is *transparently just and equitable*? When it comes to cooperating for the common good, seeking advantage on the basis of narrow, competitive self interest will cause great harm to all of us.

A mostly united world might join in solidarity to support trade sanctions against freeloaders, for example, provided we are united by a clear, just and equitable solution to this urgent problem.

Ultimately, if any deal is not seen as *just* by ethical people around the world, it is not sustainable and will not be enforced. A workable solution must serve the people of the Earth as much as it enables us to build new energy systems all over the planet. By paying a dividend, accompanied with an explanation of the global situation, most ordinary people will be willing to report cheating, and this will greatly assist enforcement.

International flows

There is some angst and much overestimation about large flows of wealth from high emitting countries to low emitting ones. This money represents new wealth from a new commodity. It will add to GDP and trade figures and be a real boon to the global economy, even as it improves the world and saves many times its “value” in climate related catastrophes averted. Indeed, even the Rudd government’s CPRS transfers huge amounts of wealth (as free permits) to subsidise the customers of corporations who export commodities from Australia. That wealth does indeed belong to people living in other nations so that they can pay for emissions associated with products exported from Australia. It is a matter of who receives the benefit of carbon revenue paid within

Australia. The CPRS prefers to pay exporters with “negotiated” handouts based on arbitrary thresholds rather than the rule of mathematically sound laws of accounting.

In a fair global scheme, the wealth represented by those subsidies, and the carbon revenue from every other nation, would be distributed equitably to every person on the planet irrespective of where they lived. Just as every person would pay the same carbon price included in the price of fuels and every product.

"Every kg of CO2 I emit into the atmosphere affects everyone else on Earth equally (not to mention animals and plants etc), so they should receive equal recompense. It does seem the fairest system, and as you say therefore the one most likely to stand the test of time." - Dr Martin Williams.

However, carbon revenue from exports would not be all that is distributed internationally. Although the per-capita emissions due to consumption by Australian citizens (including imports) is not as severe as when the emissions associated with exports are included, they do remain well above the global average. Until we modify our choices and replace brown coal with zero carbon energy sources, we will remain above average and there will be a net flow of wealth from Australia’s high emitting citizens, to low emitting persons somewhere on the planet. We already buy oil and so much else from overseas, so it should come as no surprise that we are not self sufficient in carbon emissions allowances either. There is no harm in paying to make up our shortfall and great benefits will come out of it.

As an aside. It might prove expensive if rich people bought carbon quotas from poor people at a free market price – but, perhaps the rich could cheat a little through having a global regulated carbon price with universal dividend. If it starts with a low regulated world carbon price, it might still produce spectacular results *before* international money flows become "unacceptable" to the rich nations. Sit back and watch how quickly rich nations slash emissions in order to beat the price rise! This is undoubtedly the method that produces *the maximum abatement at the lowest possible cost*! Nothing strikes fear into the hearts of the rich like having to pay the poor. This paragraph was meant to be a joke, but it could turn out to be the most persuasive argument for having global dividends and a regulated carbon price. Cut your emissions or else “pay a loser”.

Example: to stop clearing tropical rainforest

There are counties who would have below average per-capita emissions if it were not for large scale clearing and burning of rainforest. The citizens and economies of such nations would benefit by subscribing to the Global Untax on carbon. By doing so, (at least) two things would happen. First every citizen will begin to receive the carbon dividend which will inject international purchasing power into local villages and remove the necessity or motivation to support the destruction of forests. Secondly, both logging and burning will incur costs according to the carbon price. It will become too expensive to clear or burn, although sustainable logging of high value timbers should pay well enough to justify removing carbon from natural storage for use in the human economy.

If local policing remains inadequate, despite paying the population to report offences against the Earth, then satellite monitoring can provide enough information to subtract the carbon cost of burning and land clearing from that nation’s gross dividends. This method of encouraging enforcement could be just as effective for nations which have above average per-capita emissions and therefore are, in effect, net importers of carbon allowances, so long as such (usually developed) nations remain in the scheme. Countries like Australia and the USA would join the scheme for reasons that, fortunately, the rich can afford – it is their citizens high emissions technologies and lifestyles which generated the global threat of climate change in the first place – so it is primarily our duty to fix up the mess of our mistake and ensure that others are able to take an ecologically sustainable path of development.

The world's high population level has to a large extent been made possible through access to fossil fuels. Much greater flows of sustainable energy will be required from benign sources. Fortunately, only an insignificantly tiny fraction of the daily dose of energy delivered by sunlight will ever be needed by human beings.

One world, multiple jurisdictions

I do not believe the current system of negotiated emissions caps is going to produce anything like an effective international agreement. Governments have simply lined up to claim atmospheric real estate, before a fair or viable system can be established. (Remember MDB irrigation licences.) The most arrogant nations have held out for even greater privileges because their unbelief gives them no reason to cooperate, while low per capita emissions countries continue to be vilified for justly refusing to cut back their small consumption. Will the rich beat the poor into submission? That looks to be what many must be hoping for in Copenhagen.

Any system built upon an injustice will simply become unenforceable and collapse. I don't believe we can afford the time to wait for an obviously bad system to fail.

I submit that our best option for the successful global management of anthropogenic greenhouse gas emissions, is to recognise that cooperation on a global scale requires the consent and support of the vast majority of human beings. For that to be possible, *the proposed management principles and implementation must be transparently just and equitable*. To be successful, the design principles and practical implementation must be ethically robust, otherwise people of good will may fail to overcome the inevitable cheats and freeloaders.

This is not only an arena for governments and the self interest of nation states. This issue will inevitably spill out into the real world and become a matter of cooperation-for-survival that is vital to everyone. To be successful, we'll need a bigger involvement than an annual bureaucratic orgy of spin regurgitating the advice of every nation's fossil energy sector.

If the vast majority of governments really can not agree to a single global carbon price with equitable distribution before the end of the Kyoto period in 2012, then the system described above can be implemented by individual countries or trading zones. However, without a global carbon price, trade between jurisdictions is complicated by the valid necessity to protect local industry from products made with "free to air" emissions.

A fair & equitable contribution to the global effort

The mechanism is quite simple. First determine what amount of global emissions are ethically allocated to the Australian population according to equal per-capita shares. This will be a share of the scientifically determined global anthropogenic emissions budget or world cap (which will be subject to change according to new findings). The share for the Australian population will be the global budget multiplied by our share of world population. It will not be very much compared with what we are used to according to gross per-capita figures.

However, all emissions due to exports from Australia will be excluded from the national allocation, as they will be the responsibility of our customers who will effectively import foreign emissions. Emissions associated with our imports will be included in the national total because these are due to consumption by Australian citizens.

No nation needs to offer to reduce any of the emissions due to exports. Until there is a global scheme, it is the responsibility of importers to impose a carbon levy or reject products associated with emissions. Our exporters will reduce their emissions when the market demands it. And the market will demand it as soon as nations understand they are importing emissions.

Beyond their individual share of the global allocation, Australian citizens should effectively pay the current world price for carbon emissions, which will ultimately come from those who use less than their share of atmospheric resources. A fair amount is however much we are willing to pay for, at the current price, beyond our equal per-capita global allocation Indeed, without a global price, there is no incentive to reduce emissions at all. Talk about "reduction effort" is like asking how much should bank robbers give back. The correct view asks how much are they ethically entitled to keep?

Environmentally effective targets

Is the CPRS environmentally effective? Are the 2020 & 2050 targets adequate?

Not at all. The government is looking to lock in targets which assume an over optimistic and outdated global goal to achieve an atmospheric concentration of CO2 around 550ppm. The CPRS aligns itself with the interests of the coal industry and the government has clearly not understood that the days of coal are numbered. A new era has arrived with new challenges and opportunities for those with the vision to look towards the future instead of facing backwards dragging their feet. Our response to the challenge of climate change needs to be based on a global target concentration of 350ppm – and we are already at 385ppm.

A different approach to targets

What our emissions might be in 2020 does not determine what they will be in 2040 or 2050. All targets are meaningless unless they relate directly to a realistic strategy, but even then, the number which counts is the total accumulated emissions to 2100 (or 2050, after we decide to go for zero fossil energy and very low emissions before then). The final limit which is the total accumulated emissions can be in gigatonnes of CO2, but it represents our last tank of fossil energy which we ought to use as wisely as possible.

The assumed strategy of simply reducing the "flow" linearly or according to an exponential decay curve, and hoping for everything to sort itself out because of our great faith in the gods of the market is, quite frankly, childish and irresponsible. There is no substitute for carbon energy until we build replacements for it. Construction programs have project managers, not markets to get the job done in an efficient and timely manner. Markets are good at what they can do, but they cannot be expected to substitute for intelligence, planning, design, skill and responsibility.

The target emissions trajectory should be determined in conjunction with practical milestones from a project strategy, rather than basing targets for particular years on inappropriate assumptions borrowed without comprehension from academic papers. Any target trajectory which does not also describe how it will be achieved, is merely an aspiration. Although it has some effect, the shape of the trajectory is less important than the total accumulated giga-tonnes of CO2-equivalents released into the atmosphere. The total emissions are proportional to the area under the curve of the trajectory – the total sum of emissions from each year.

I have done simple modelling which indicates that zero emissions from fossil fuels can be achieved before 2040. This did not model the biological sector. However, the model indicated that the alternative energy infrastructure industries may still be growing rapidly in 2018 and re-investing much of the renewable energy output into growing ever larger capacity. Once the critical scale has been achieved, the job of replacing fossil energy sources over the next 20 years can begin. This scale is sustainable, in the sense that the task is completed just as the first generation of infrastructure needs replacing.

With something like a war effort, I think the job could be done by 2030, but we would end up with double the "sustainable" scale of energy infrastructure manufacturing capacity, with nothing to replace for another decade. We would have to export energy infrastructure, or build a lot of excess energy capacity in Australia, or else mothball the industry for a decade. Beyond solar aluminium, we could use our clean energy glut to export hydrogen fuel or any other energy intensive commodity.

Maintaining and stimulating economic activity and green collar jobs

E) Will the CPRS encourage green jobs, R&D, manufacturing and service industries, taking into account permit allocation, leakage, compensation mechanisms and additionality issues;

As mentioned above, the CPRS does not impose the carbon price on imports. Therefore, if the carbon price ever gets high enough to do any good against emissions, it will harm import competing businesses. Like the very low maximum carbon price, this may be another feature designed to stop or delay an effective carbon price coming out of the government's emissions trading system.

The carbon price must apply to all imports. Australia's GST is applied to all imported goods, yet imports cannot be captured by the CPRS. Because the CPRS is not a tax, there can be no equalising tax on imports to reduce the competitive disadvantage to Australian products. Attempts to address this serious flaw will be deemed to resemble an import tariff. But a **carbon tax** on the greenhouse gas emissions associated with the entire production and delivery chain, could be applied to both imported and local products. The GST is allowed by WTO rules because it applies equally to both local production and imports. This is one **very major flaw of the CPRS.** The fact that imports escape the CPRS, creates an intolerable situation for Australian business that will persist as long as a world price for carbon remains a mere aspiration.

Given that exporters are effectively exempted and some are unjustly compensated, but imports are not included, Australian products for local consumption may be exported and re-imported to avoid CPRS expenses. Any business which cannot do this will carry an unfair burden and jobs will be lost because of muddled thinking.

Manufacturing clean energy systems will need to be a very big industry and, after the Howard years and the failure to extend the MRET, we have not got much of a base. The proposed CPRS will delay the implementation of zero carbon energy systems. It will do this by keeping the carbon price, too low or too uncertain to encourage investment in renewable energy and energy storage technologies. The proof is the maximum ETS price is limited to $40 / t CO2-e. That is less than 7c/L on petrol and not enough to produce a restructuring of the energy industries.

Training for green jobs and looking after fossil industry workers

Significant moves to expand Australia's technical and workforce training sectors should be undertaken now. The financial barriers and disincentives to seeking qualifications and skills training should be examined and removed. Study is a job. Many who would like to undertake courses for qualifications or for skills retraining are deterred because their families simply could not afford to live.

Scrambling economic incentives

Any scheme which ignores the principle of "polluter pays, so the polluter's customer pays", is a scheme designed to fail. When rewards and penalties do not accrue to those responsible for the right or wrong decisions, the whole purpose of a price for carbon emissions is lost. People will not change their behaviour because "nothing has any effect". This is what the fossil industries want.

A lot of the GHG emissions resulting from consumption by Australian citizens are released from Chinese chimneys. While most, so called, Australian emissions, go into commodities, goods and services exported to the rest of the world. This is why the assumptions behind Kyoto are scandalously screwed – because they scramble the responsibility, the liabilities and the incentives, until you have to pay no matter how you change your behaviour or purchasing decisions - and no matter what you do about your emissions, you still have to pay. And everybody pays for everybody else. The incentives are scrambled, the targets are misallocated and most "Australian" emissions produce commodities for people who live overseas.

Decoupling the local economy from jurisdictions with a different or a zero carbon price is about more than just "leakage". Flaws in how the Kyoto national targets were allocated will have to be fixed or somehow adjusted. National accounting and targets should focus on the emissions due to the consumption by *citizens* of that jurisdiction. Emissions associated with imports must be counted and paid for, while exports should be exempted from national carbon budgets and have their emissions costs refunded (subject to future international negotiations). Emissions which are associated with exported goods and services should be counted on the accounts of the importing nation, business or consumer, who ultimately pays for the privilege or else chooses a product made and delivered without the expense of GHG emissions.

Under the current paradigm, Australia will replace fossil energy only when overseas customers demand and pay the premium for products made with renewable energy. *That will require customer nations with the good sense to place carbon taxes on their imports* - something which the Rudd government has not done because it wants its CPRS instead of a carbon tax.

If reason prevailed, while we work towards a simple and just global emissions scheme:-

- national quotas would be proportional to population and the difference purchased or sold;
- we would count the emissions associated with imported goods and services, as well as locally consumed production;
- and exclude emissions associated with exports, because they belong on the customer's account.

In an effort to reduce their imported carbon liability, in dollar terms, importers would automatically seek out products associated with the least emissions. Thus, world exporters will face global competitive pressures to minimise emissions, without being financially handicapped in a world market, by an impost which their competitors don't have.

A failure to implement the above principles, will have the effect of scrambling the incentives which are supposed to be the whole point of paying for carbon emissions. Under the CPRS, we pay for others, while others pay for our imported virtual emissions, so nothing we do has any effect on what we have to pay, nor to our national emissions. It is a folly to make ourselves responsible for the

choices and behaviour of others, but doubly so when we also avoid responsibility for our own actions.

It is worth noting the absurdity of refunding exports while exempting imports at the same time. It will be a boon to world trade and boost emissions from shipping because local products for local production will be the only products effected by the CPRS. The solution for Australian business is to export everything then re-import what they would like to sell in Australia, otherwise we will have no jobs except those blessed by export exemptions and the "non trade exposed" parasitic sectors like lawyers and bureaucrats. Ordinary citizens and workers will be dumped with the entire burden of reducing Australia's emissions through their involuntary poverty.

When I read Ross Garnaut's thoughts on what I have described as "Border Tax Adjustments", I thought that he and I were in agreement. (pp43-45 describe Garnaut's solution)

Supplementary Draft Report - Targets and trajectories - 5 September 2008 (PDF, 1.76MB)

"It is important that we stop thinking in terms of payments to Australian firms in order to compensate them for the effects of the domestic emissions trading scheme. There is no basis for compensation arising from the loss of profits as a result of this new policy. The reason for payments to trade-exposed, emissions-intensive industries is different and sound. It is to avoid the economic and environmental costs of having firms in these industries contracting more than, and failing to expand as much as, they would in *a world in which all countries were applying carbon constraints involving similar costs to our own*."

A carbon price mechanism is not enough

A) Emissions trading as central policy

If there had always been a GHG price signal, we would not be in the trouble we are in. If we had set up an international pricing system to restrain the rate of emissions at least one, but probably two decades ago, there would be time for feedback signals to work and for markets to stabilise. But attempting to prevent the consequences of "the greatest market failure of all time" at this late stage is closing the gate after the horse has bolted. There remains an important role for the market and voluntary responses to a real price for emissions, but the situation has become so urgent and the required scale of the response so immense that sitting back and letting things work themselves out without strong direction and purpose will be a recipe for disaster. Some "intelligent design" and competent project management is in order to do what clearly needs to be done.

The central policy must be a strategy

For reasons of urgency, or at least in preparation for the likelihood that urgency will become recognised, the method for pricing greenhouse gas emissions needs to be a component of a larger flexible strategy capable of bringing about the rapid transition to a zero carbon economy. That strategy itself should be the *central policy.* The complete replacement or transformation of Australia's energy systems, including transportation technology, is a very big project which will require competent project management. Putting an economic value on GHG emissions, via a carbon price on fuels or by monitoring exhaust pipes and chimneys, is but one aspect of a well designed strategy to bring about the success of this extremely major project.

In the context of strategy, I can mention targets. The only target that really matters is the total accumulated emissions to 2100 (or 2050, after we decide to go for zero fossil energy before then). The shape of the trajectory is less important than the total accumulated giga-tonnes of CO2-equivalents released into the atmosphere. An important observation which is often overlooked, is that any target trajectory which does not also describe how it will be achieved, is merely an

aspiration. The setting of an ultimate goal or target, especially one which is likely to change as new information becomes available, should not pre-empt strategy by specifying details based on shaky assumptions. For example, lead times between establishing a sufficient and reliable energy price to justify building large factories that make renewable energy infrastructure, and the date and rate that clean energy becomes available on the grid are almost never taken into account.

We would be quite foolish to attempt to rely on foreign sources to supply Australia's energy infrastructure needs. There are likely be long delays for such items on international markets and the huge payments will rapidly become unaffordable. Like trams and wind turbines, global prices and waiting times are blowing out. We'll have to make our own. We cannot afford not to.

No matter what emissions may be relative to a current target, it will always a good investment to expend energy on building energy infrastructure that will provide carbon free energy - even at the cost of higher emissions in the short term. Modelling reveals that emissions will increase during the early phase of growing an Australian zero-carbon energy infrastructure industry, while it strives to achieve the necessary huge scale. However the mid and long term emissions will be very much reduced by doing exactly this. It is the total accumulated emissions before we stop that matters.

The pricing policy for carbon must serve strategic goals rather than hoping a price mechanism alone will spontaneously produce an optimum, organised energy system in a timely manner. "Chaotic accretions", organised by market feedback may eventually evolve and self organise, through much trial and error, into a more or less working system - but this requires decades more time than we have available. (I'm reminded of India's electricity system and 20th century government buyouts of private electricity firms to reintroduce some consistent standards and reliability for customers.)

Generally speaking, cost effective and efficiently functioning systems tend to be designed by skilled human beings rather than by pricing mechanisms. Pricing mechanisms have an important role to play, but that role is not the project manager nor systems designer.

Even if the urgency of our situation is not yet fully appreciated, the design of the legislation and the policies which we must depend on, need to be flexible enough to deal with the more rapid responses demanded by the current science. An ETS does not fulfil these essential requirements, however, a regulated carbon price, or an adjustable carbon tax, does.

In this country, at least, the Australian Carbon Authority will have to be more than a kind of RBA board – it will also need to act as a responsive Project Manager for implementing Australia's transition to a truly low carbon economy.

The Carbon Dividend

Assuming there is sound and reliable strategy to replace fossil energy with zero-carbon energy systems, the next highest priority associated pricing GHG emissions or "carbon", is to ensure equity and justice are respected and maintained. I believe ***it is better to be able to afford efficiency than to freeze in the dark***. I submit it is self evident that every person has an equal right to the benefits of access to the atmosphere, including the now scarce absorptive capacity for combusted carbon.

However it is collected, the net carbon revenue should be paid to the natural "shareholders" of the atmosphere. These Carbon Dividends should be paid to every person equally (half for children).

Apart from equity considerations, there are additional reasons for ***not*** relying on carbon revenue for funding other worthwhile purposes.

- It can be shown that paying the Dividend to individuals is clearly more effective at reducing emissions than subsidising renewable energy. It is far better to maintain a high price for energy and solve the affordability issue through distributing the Carbon Dividend. In brief, subsidising

zero carbon energy lowers both the price of energy and the carbon price. Subsidised energy delivers the biggest subsidy to the biggest energy consumers while depressed prices discourage efficiency measures and new investments in alternative energy infrastructure. (appendix 2)

- Targeted subsidies or picked winners will distort decisions. Throwing money at particular products or industries may not deliver the most cost effective emissions reductions. e.g. spending on insulation may be more effective than subsidising solar electricity to run air conditioners.
- Politics. If the public perceive the Carbon Levy as "just another tax", it will be easy for competing political parties to bribe the electorate with promises of free emissions. By effectively rewarding below average consumption of fossil energy, the Carbon Dividend creates a large constituency of supporters.
- The flow of carbon revenue is temporary and self limiting. It will decline along with CO2 emissions. Success reducing GHG emissions will reduce the funds available for general revenue. A perverse incentive, or conflict of interest, exists when Governments come to depend on revenue from sources they purport to discourage. By far, the best use for the carbon revenue is "lubricating" the transition to a zero carbon economy through Carbon Dividends.

My opposition to using Carbon Revenue for anything other than border tax adjustments and the Carbon Dividend, should not be taken to imply opposition to government finance. I welcome government investment in infrastructure and any loan finance schemes which can facilitate private investments in cost effective energy saving measures.

The Great Recession

You may ask, if we don't use carbon revenue to subsidise new energy infrastructure how do we get it built?

Clean energy infrastructure would be funded by government loans, (loans *from* the government) which are recorded as *assets* so there is no "deficit". The clean energy infrastructure loans will be repaid through sales of energy to customers. This is the model that built this country and served us well until the Freidmanites insisted private ownership was always more efficient, no matter what the cost to society and the economy.

The government is perfectly entitled to act as a bank and make loans of any size and on any terms it thinks will advance national goals. The only caveat is a risk of inflation if private banks are also churning out loans at a high rate at the same time. Bank lending has been disastrously low since the GFC, so there is no risk of inflation and a desperate need for government investment such as the Zero Carbon Transition.

I would try to maintain a "level playing field" between government and private enterprises so that both may contribute to building the new energy systems with both public and private investment.

I prefer that we do not miss out on attracting private money and creative effort – but I also see that the current state of the financial system will basically leave everything up to government finance anyway. However, it would be a great way for super funds to invest in a better future for their compulsory contributors, just like they were supposed to do.

Dealing with climate change is the solution for economic recovery! Investment in infrastructure provides deficit free stimulus. We could not find the human resources during an economic boom to do what needs to be done, and the additional stimulus would risk inflation. The Great Recession is the best thing that could happen to enable the world to implement the necessary response to climate change. There's no excuse for not doing something real and of huge benefit – to stimulate the economy in the direction of a positive clean energy future.

ETS vs TAX

No doubt there have been many submissions criticising an ETS, but especially the proposed CPRS, and I endorse the following criticisms in particular. The Cap is a Floor below which emissions cannot fall. This makes personal efforts to reduce emissions futile, leading to the collapse in the motivation to do so. The so called "environmental certainty" of fixed caps, sacrifices flexibility and locks us into inadequate targets which are expensive to change as new scientific realities become known. Clever tweaks or amendments might appear to address these fundamental design issues, but I have even more fundamental objections regarding the suitability for purpose.

The purpose of a carbon price is threefold:-

1) Close the price gap between fossil energy and clean energy. To break civilisation's historical dependence on fossil fuels, a carbon price must high enough to initiate, justify and maintain massive levels of investment in zero emissions energy technologies and infrastructure.
2) Maintain relative price stability. The carbon price signal must have benign dynamics. If the carbon price is unstable or too low, urgently needed projects for zero emissions infrastructure will be delayed. If it is too high, unnecessary hardship will be inflicted on families and the economy. The economic harm could resemble the stagflation which followed the 70's oil shocks, but, this time all energy sources will cost more until further notice.
3) Reduce waste and promote efficiency. This is almost a side effect of an adequate price. When energy costs more, consumers and businesses will appreciate its value and seek to reduce their energy bills. They will invest in energy saving technologies and modify behaviour to reduce consumption, provided they have access to appropriate finance and reliable, accurate advice.

The main stumbling block for an ETS is the unavoidable time delay between the price signal and the most effective response, which is bringing large quantities of zero emissions energy on line to displace smokestack energy sources. While the market waits for the eventual culmination of the initial response, depending upon the weather, prices from an ETS will be volatile. A low or falling carbon price could easily cause new energy projects to be abandoned, yet excessive prices will cause economic harm for no benefit, since they cannot accelerate the delivery of clean energy.

The oil shocks of the 70's did eventually produce a reduction in the rate of oil consumption, but not before producing economic harm to families and stagflation – high inflation together with rising unemployment. High fuel prices could hardly accelerate the rate of technological change. It took time for the car fleets of the world to change over from gas guzzlers to more fuel efficient vehicles. It took about six years to make some adjustment to the '73 shock, then there was another in '79. Despite the unfortunate and probably unnecessary economic damage, a higher oil price did eventually reduce underlying demand. By the mid '80s, the gas guzzler was all but dead – but low oil prices in the '90s heralded its return in the form of the urban 4WD.

We need a stable and correct carbon price. As mentioned above, we could do far worse than think of the appropriate carbon price as the gap between the old fossil energy price and the new price for clean energy. I hope to convince you that is best delivered through an Adjustable Carbon Tax.

Who should hold the tiller that sets the carbon price? Despite the great faith many of us have in their powers of divination and wisdom, markets provide a rather simple feedback mechanism between buyers and sellers. Although they have their part to play, I would not leave the fate of humanity up to a one dimensional chaotic system driven by short term greed, coupled to slow responding dynamics and oblivious to long term consequences.

The carbon price signal should be intelligently controlled like the price of money, with a view to influencing the supply of clean energy in five years time. Reject the CPRS and any ETS proposal in favour of a regulated price for carbon, that is an Untax, or Carbon Tax with 100% Dividend.

i) Reduce carbon pollution at the lowest economic cost

Neither an ETS nor a Carbon Tax changes the cost to society of changing a light bulb, insulating a house or commissioning a concentrating solar thermal power station. If almost every cent spent on emissions permits or a carbon tax is returned to society through a Carbon Dividend, a carbon price set by any method has an insignificant effect on the cost to society of implementing the list of things which have to be done to eliminate GHG emissions. The carbon price will have a powerful influence on what is not done and how long meaningful action can be delayed.

Depending upon how it is defined, the short term "economic cost", will mainly be determined by the necessary rate of progress. Least cost may be defined as "do nothing", so the phrase could be taken to mean "appear to be reducing emissions while doing almost nothing". That may be what the coal industry hopes that it means, but moving too slowly will result in the greatest economic cost.

During the economic boom, there was a real risk that starting the zero carbon transition would overheat the economy and lead to inflation. That would have been an economic cost. Now that the supply of credit has drastically slowed and unemployment is rising, massive investments in our future energy security can begin in earnest. Failure to seize this opportunity, will incur a very long lasting economic cost. Government can provide funds as loans or to purchase valuable assets and create no budget deficit, because the debt or the asset is a positive that will also pay for itself. At times when banks are failing to supply the economy with adequate expansion of credit, it is the duty of government to act like banks and make loans to construct national assets. This is not "spending" - it is the best investment in this nation's future that could be made. It will not be paid for by tax payers, but by the commercial sale of energy.

Even if we ignore the costs of climate change itself, moving too slowly will increase the cost to society by adding duplication and unnecessary items to the list of things that need to be done – things such as temporary half measures which only put off what has to be done anyway. For example, public investment in CCS will be wasted resources if the process cannot eliminate 99% of emissions from burning brown coal, or if the insurance costs make CCS uneconomic in most potential locations. If renewable energy power systems eventually have to be built anyway, it would be cheaper to do the right thing from the start. Having said that, it is valuable to invest in research in order to test ideas, so long as all promising options are explored, in order to avoid expensive mistakes – not to invest so much in one "picked winner" that other solutions are seen as a threat to the investment.

There is a significant difference of economic efficiency in favour of a carbon tax:- it is simpler administratively, it does not require a huge parasitic industry of lawyers, brokers and speculators, sucking the life out of what people pay on the street and another army of skilled public employees to investigate the frauds and dodgy deals perpetrated by those expecting to profit from the world's need to ration carbon emissions. Looking at a carbon tax:- transaction charges are nominally zero, although some administrative effort is involved - the cost is insignificant for the collection of tax revenue from fossil fuels and distributing dividends. We must acknowledge that costs for verifying and policing the biological carbon sectors are potentially substantial under any system.

ii) Provide incentives to invest

There is an optimum rate of transition to a zero carbon energy economy and therefore an optimum carbon price to facilitate this process. It occurs as the price of fossil energy approaches a competitive price point for large scale zero carbon energy systems. It occurs at the price point where sufficiently large investments build the industries which will manufacture the infrastructure to replace the old fossil energy technologies over the period of one average service life of the new plant. This is not merely the price of intermittent wind power at convenient locations, but enough to pay for balanced, reliable power systems including transmission lines to currently unavailable wind, geothermal and solar locations, as well as energy storage and load levelling technologies.

An examination of the EU-ETS demonstrates that ETS markets are subject to severe price volatility, while a Carbon Authority would be in a position to publish an anticipated minimum carbon price five years in advance, enabling major planning decisions to be made based on that future price. If sufficient major infrastructure decisions are not made to meet required targets, a Carbon Authority may revise the future price upwards until appropriate infrastructure approvals are brought forward.

A board or trust of persons capable of understanding the system they are adjusting, is the best way to provide relatively stable and predictable pricing. On the other hand, a fixed monthly allocation to a market will be inherently volatile due to demand fluctuations caused by the chaotic variations of weather. We cannot afford to waste time waiting for markets to reach a threshold price for long enough to convince people it might be permanent, before giving the green light to projects with long lead times that should have been started five years ago, if only we had known it would be economic by now.

Markets are a component of a system which should be designed for a purpose, not left up to chance. Successive Australian governments agree that the price of money is too important for politicians to decide and, also, too important to leave up to a free market - so they have a Reserve Bank Board, selected for their experience observing the economy and financial system, who undertake to manage a well defined responsibility. They make periodic adjustments to interest rates with the intention of meeting inflation targets. Thus it should be for the carbon price. There will certainly be a target trajectory, attached to a national strategy, politically accepted and endorsed – but it is the long term emissions total which matters, not the rigidity of daily, monthly or annual allowances, nor the trading of speculators upon market noise.

An ETS, and particularly this CPRS is most likely to delay and retard investments in alternative energy systems and green collar jobs until the coal industry decides it is ready to implement CCS. On the other hands, the Australian Carbon Authority (by any name) could announce a minimum carbon price for five years hence within the first week of operation. With such an announcement, large investments could be initiated in good confidence with better certainty than any ETS.

There can still be a futures market where people speculate and hedge bets on what the official carbon price will be, just as there is currently speculation about official interest rates – but such trading would not be a parasite on the actual process of running the carbon tax system. The existence of such a futures market may assist the Carbon Authority, but it would not be bound by it.

iii) Contribute to a Global Solution

See also: A Fair Global Scheme

Australia can encourage constructive international action through a combination of unconditional and conditional undertakings. The key is to think less about smokestacks and where they are located, but to focus on consumption by Australian consumers. Governments should be representing a population of citizens rather than lobby full of fossil industrialists.

It is the domestic consumption of citizens that we can modify through market measures. However, a nation state has much less say over what people in other jurisdictions want to buy from them in a competitive world market. Make it clear to other nations that a significant portion of Australia's emissions reductions will depend upon international cooperation and particularly the policies of our customer nations. For example, Australian industries will be happy to use more expensive low carbon energy sources (when this energy becomes available), if our customers choose to pay the premium.

If we place a carbon penalty on our exports when our competitors do not, we will rapidly lose sales. The reduction of Australian emissions associated with exported commodities will mostly depend on international cooperation. But make no mistake, local consumption by our citizens is up to us.

The emissions due to the goods and services we choose to consume are entirely the responsibility of the Australian community, our policies and political choices. Reducing emissions associated with end use consumption can have no adverse effect on the nation's "international competitiveness". Deciding to eliminate our need for imported oil, would be a good start, and greatly increase Australia's economic security. Such a strategy will require compressed air and electric vehicles, rapid transit systems as well as even more zero carbon electricity production.

The contribution of complementary measures

Feed-in laws

Feed-in tariffs are temporary substitutes for an adequate Carbon Price. A PV feed-in tariff becomes redundant when the retail price of electricity rises to be the same as the feed-in tariff itself. This is exactly what an adequate Carbon Price would do. Even at a retail price of around 40c per kWH, energy will remain affordable, so long as 100% of the net Carbon Revenue is returned equally to citizens. A Carbon Levy with 100% Dividend replaces feed-in tariffs. It will encourage and help to pay for any and every measure that reduces carbon emissions, not just PV grid connect systems. Over the years of the transition, the Dividend will slowly decline to finally expose consumers to the full price of zero carbon energy. By that time, a mature industry will have lower real prices.

How much demand reduction and efficiency?

This is an economic question which will be answered empirically by consumers and suppliers in the marketplace. Very often, efficiency measures save far more than they cost. Be assured that the higher the marginal price of energy, the greater will be the contribution of efficiency measures. The ultimate answer depends upon the relative costs of additional energy versus the equivalent saved energy in terms of both money and convenience to the customer. As mentioned elsewhere, the price of energy should rise to approach the mid term price of energy from large scale, zero carbon energy systems. That will set the appropriate level of incentive for efficiency and energy substitution measures such as solar hot water installations.

I will hazard a guess. By the end of the transition, if an amount of energy costing $300 today has gone up to $500, I think efficiency measures will have reduced that $500 energy bill down to $350. My guess is that over the period of the transition, efficiency measures will reduce per capita energy usage by around 30% . On the other hand, desalination and intensive waste recycling systems could easily put the per-capita energy consumption back to today's levels.

Utility loan schemes and expert advice

Energy itself is usually an on-going recurrent expense while efficiency comes in the form of infrequent capital expenditures. Special purpose loan schemes, especially for rented housing and offices, and accurate, reliable information, perhaps via independent, publicly paid consultants, will remove some barriers which inhibit the optimum take-up of money saving energy options. It also helps when people can compare monthly energy expenses with monthly payments for efficiency measures and conveniently structure payments that way. The higher the marginal cost of energy, the more efficiency measures will be economically viable, so the more businesses and consumers will be prepared to invest in saving energy. Other forms of demand reduction involve only behaviour change and much less financial expenditure. One extremely low cost form of demand reduction practised by the poor is called freezing in the dark, but it is rarely a preferred option.

Investing in efficiency should be facilitated by finance and advice, but not subsidised. There is a point where the most cost effective method to reduce emissions is simply to get on with providing clean energy. So long as the real price of clean energy is reflected in the retail energy prices, the contributions of energy efficiency, substitution and behaviour change will find their own levels. Accept a higher price of energy, but make it affordable through the Carbon Dividend.

Efficiency standards and regulations

Businesses tend to respond to market forces rather than anticipate them. When the price of energy rises to the point where the market cares far more about efficiency than price, most manufacturers will be caught asleep at the wheel. I cite Australia's auto industry which would have done much better with mandatory efficiency or fuel consumption standards. Regulated standards that anticipate the market forces unleashed by other necessary interventions, can be a very good thing. Big changes are required, faster than the usual market response times, so setting minimum standards for appliances, particularly for invisible and difficult-to-measure factors like energy consumption are highly recommended. However, deliberately try to avoid propagating greenwash – be advised by independent engineers and scientists, not sales and marketing people or industry lobbyists. (It is no wonder the public are bamboozled.)

Protecting and developing carbon stores

By putting a price on coal, we must also put a price on biomass, otherwise our forests will be mined as fuel to burn. The one difference is that biomass can grow back – but only slowly. When biomass such as plantation timber is harvested, the carbon price should be paid, although half of the amount may be recorded as a debt to be repaid through subsequent regrowth. As a plantation re-grows, periodical carbon audits will generate payments to forest managers at the current carbon price. Previous carbon debts will be paid down and funds paid to forest managers, depending upon the mass of new growth. At maturity the forest managers will have saved enough to pay at least half the carbon price for harvesting. Although the same principles would apply for the management of carbon in old growth forests and natural ecosystems, be mindful that forest ecosystems have values beyond their role in carbon storage which are protected by other laws and regulations.

The UNTAX - a Carbon Tax with 100% Dividend

Simultaneously introduce a Carbon Levy, Carbon Dividend and independent Carbon Authority.

- Establish a Carbon Levy for CO2 emissions from fossil fuel combustion. This adjustable carbon price creates incentives for energy efficiency and the transition to low carbon energy sources.
- All revenue from the carbon charge will be distributed as a Carbon Dividend equally to all citizens (half for children) through the tax and welfare systems. The Carbon Dividend recognises the right to an equal share of the carbon emissions budget. It will compensate consumers for price rises and reward reduced consumption of fossil energy.
- The Carbon Authority will be an independent trust, empowered to set the carbon price for the purpose of controlling demand to meet emissions targets. It will monitor CO2 emissions, infrastructure developments and all aspects of the carbon economy to inform a mid and long term view about the appropriate carbon price.

The concept is to use the carbon price to reduce demand for fossil fuels in order to meet the supply target. The target trajectory is to be "soft" in the sense that errors are allowed, but the future carbon price will be adjusted to compensate for accumulated errors. Adjusting the Carbon Levy is all about finding the right price to keep emissions reductions on track to meet a long term target. It is analogous to the Reserve Bank setting interest rates to achieve inflation targets.

How it works

Following the introduction of the Carbon Levy, the price of energy derived from fossil carbon and energy intensive products will rise. Through the *Carbon Dividend*, the "average" consumer of fossil energy and products will receive an amount of money equal to their cost increases. High consumers of carbon energy (and products) will end up paying more, while the efficient, frugal and users of clean energy will be rewarded. As the price of fossil energy approaches that of "Green Power", more consumers will demand clean energy. A higher price for fossil energy will stimulate investment in renewable sources, and underpin a secure, minimum price for renewable energy. The higher price of energy generally provides an incentive for efficiency savings. The economics of solar hot water, solar PV, passive thermal management and efficient appliances, are a lot more attractive when they provide greater monetary savings though the reduced consumption of "expensive" energy.

Equity requires that people can afford these increased expenses. It is essential that carbon revenues are returned to people's pockets so they have the option of using it to save energy, switch to green power and low carbon products or continuing to pay their increased expenses. (We don't want people on low or fixed incomes living in darkness, nor disruptive anomalies like everybody wanting to convert vehicles to LPG at the same time.)

Down the track

Over time, as the economy moves to higher efficiency and green energy becomes the norm, revenues from the Carbon Levy will decline. Consequently, the average consumer will be compensated for a lower level of carbon consumption. The "average" consumer is encouraged to keep up with the community or accept paying more. This pressure comes automatically from changing community choices – through a declining Carbon Dividend – not directly from the government.

Under this system, carbon revenues are effectively and equitably recycled. Low-carbon energy and demand-reduction become affordable through subsidising the customer. The technological, cultural and economic transformations become cost effective alternatives to the slowly rising price of fossil energy. The Carbon Untax finances the transition to a low carbon economy by removing the subsidy which previously allowed the cost of CO2 emissions to be "externalised". Simultaneously, consumers are empowered to demand more effective energy services. Civilisation's dependence on fossil fuels means we cannot make this transition instantly, but it must happen quickly enough.

Inflation?

Higher prices with more spending power looks like inflation. However, the Untax is revenue neutral – it is not real inflation. As with the introduction of the GST, apparent inflationary effects can be safely ignored. Although the cost of carbon emissions will show up in prices, there will be no wages pressure for cost of living increases because the revenue is immediately distributed to the shareholders of the atmosphere - everyone.[1] As carbon emissions decline, so will the Carbon Dividend, and real energy prices will approach that of green energy. By that time, large scale and mature technology will provide carbon neutral energy services much cheaper than today.

The real price of energy will slowly rise over decades to be equal to that of tomorrow's green energy. This small economic cost will be swamped by the effects of climate change itself, such as

[1] "Cap and Trade" *does* create hardship for the poor and pressure for higher wages, because price rises due to carbon trading are *not* returned to the people. The same is true for carbon taxes without a universal dividend. Both equity and sensible economics require an inalienable right to an equal share of the emissions budget.

water and food shortages, storm damage and disease, compounded by competition for diminishing resources such as oil. Our failure to act soon enough will result in chronic "stagflation".

International Trade

Within the national economy, industries and businesses will pass their higher energy costs on to their customers who will have the Carbon Dividend money to pay for it. However, imported goods will be relatively cheaper if they have been made with "free to air" fossil energy, and energy intensive exports will be less competitive against those which have been made with subsidised emissions. Without a single world carbon price, "Border Tax Adjustments" will be needed.

If there is a world carbon price, regulated through one global entity, no adjustment measures would be needed for international trade. However, for trade between jurisdictions with different carbon charges, the following principles are necessary to avoid a competitive race for the lowest carbon price. The following principles must form part of any successful international protocol that allows differential pricing of carbon emissions.

- Carbon charges shall be imposed on imported goods & services, but refunded for exports.
- The information provided in claiming export refunds shall be made available to importing jurisdictions for the purposes of carbon accounting.
- Accurate carbon accounting information must accompany all imported products. If reliable emissions information is not available, a higher amount of emissions will be deemed for calculating carbon charges.
- Emissions associated with exported products become the liability of the importing nation.
- ***Focus on consumption!*** It follows that national targets must be calculated and specified to include only emissions generated in the provision of goods and services consumed by the citizens of that jurisdiction. Imports must be included and exports excluded from national emissions targets and assessments.

This is a major modification to Kyoto style national targets which focus on the location of smokestacks rather than the consumption by citizens. Kyoto does little more than rearrange the smokestacks on the Titanic - from where emissions are expensive to wherever they are cheap. Global emissions will only keep increasing until there is an adequate worldwide price on *all* carbon emissions, implemented through a "carbon levy" on fossil fuels. The logical consequence of "polluter pays" is that the polluter's customer pays. And equity measures follow naturally from enacting every individual's inalienable, non-transferable right to access an equal share of allowable CO2 emissions. Every person will receive a dividend from rationing the atmosphere.

If the government set a target consistent with zero emissions from fossil fuels by 2040, and I was a commissioner on the Carbon Authority which manages the Carbon Levy and acts a project manager for the transition to a zero carbon economy, I would want to make the energy transition as quickly and smoothly as possible in the knowledge that reducing emissions will inevitably improve the balance of payments of Australia. I would propose that we start (in 2010) with a carbon price around $30 /t Co2-e, rising smoothly (monthly or quarterly) to around $180 /t CO2-e in five years.

It is the publicly announced future price which will provide the greatest incentives for action. Until there is an effective global scheme, the carbon expenses for exports will be refunded and the rest will be distributed to the citizens, so affordability will not be a significant problem.

The bigger picture

Climate Change is a resource depletion issue, just as much as it is a global management issue, and there are many more resource depletion challenges looming as the era of rapid growth comes to an end. I believe we are entering a new era of rationed resources which marks the end of the growth economies of the last two centuries. Our global civilisation has already exceeded the limits of sustainable consumption of natural resources, and this natural wealth will inevitably attain scarcity values unimagined during the era when the Earth seemed full of resources and empty of people. (Any form of shortage or rationing creates a scarcity value, even if it arises in a black market.)

In pricing nature to manage consumption, I prefer non-renewable resources to be taxed or levied with sufficient royalties to encourage high levels of recycling and substitution, while harvesting ecological resources may be capped at the sustainable yield and auctioned. (Yes, there is a place for cap and trade, but it is best suited to systems with a periodic sustainable yield or ecological surplus.)

Many agree about the need to ration and price scarce natural resources, but my position also presumes an equal entitlement to the free gifts of nature, so *the proceeds from the scarcity value of natural resources belong directly to each person*. (This is the equivalent of providing tradable quotas or coupons.)

To save something for the future, we will need to regulate the exploitation of resources, with the unavoidable consequence that shortages will become *more severe* in the short term! Unless revenue from rationing is used to create a more equitable society based on sustainable and ethical principles, people who advocate responsible management will be despised for further depriving those who cannot profit from the private ownership of natural wealth.

Although distributing a dividend from the rationing of natural resources does not pay for the labour involved in it's "delivery", it does allow all individuals to afford their ration of what may be scarce items of natural wealth which can no longer be supplied at cost. In the case of dumping CO2 emissions, the cost of "delivering the service" is zero, so the carbon price entirely represents the scarcity value arising from rationing the resource. In the case of water, there is usually a delivery cost involved - whether it be installing tanks, digging a well, walking to a stream with a bucket, or paying for reservoirs, pumping and reticulation systems - but as soon as the shared resource can be identified as being limited, the supply should be rationed for the common good and managed to maintain that source of natural wealth sustainably for current and future generations.

In my accounting, the failure to distribute dividends from rationing resources is in effect the same as imposing a regressive poll tax. Dividends are necessary to distribute the scarcity value of the rationed "free gifts of nature" which, historically, have remained unpriced and overexploited, or else converted into private profit via private ownership. (As an aside: land is also a natural resource, but, due to the evolved territorial nature of human beings, I would place land reform at the end of a prioritised list which places the management of GHGs in the atmosphere urgently at the top.)

The atmosphere is not privately owned, and is the prime example of a global commons, so getting people to pay for what has always been free is the crucial issue. Paying them for their personal share makes the important connection and helps to make paying acceptable. The renewable resources of forests would be next, followed by the bounty of the "open seas". Non renewable mineral resources will have to be recycled and the rate of extraction rationed too.

It is desirable that these management systems should be implemented before the inevitable consequences of exceeding natural limits are unleashed, or, in other cases, before the extortionate

prices associated with scarcity become windfall profits for private owners to the detriment of society.

You will appreciate the need for such management policies if you contemplate a rapidly rising scarcity value of natural resources overtaking a falling price of labour on an overpopulated planet. Such a situation would rapidly degenerate into slavery for those who struggle to live, simply because they do not profit from the sale of natural resources which have become scarce necessities.

All this rationing for sustainability will mean less for each person, greater scarcity and therefore even higher prices. Whether population continues to grow, is stable or declines will make a difference too. Voluntary reductions in fertility rates do occur without coercion where social policies provide security to individuals, combined with education, careers, choice and control to women. Thus, I hope oppressive methods of population control can be avoided everywhere.

In the context of all this, humanity will have to choose whether we believe that "all men are created equal" with equal rights to access what has been given for free by nature, or whether we want some to live in guilty luxury hoping the deprived poor will die off and leave more resources for the rich. I would rather my children shared natural resources in a world where population slowly declined through voluntarily reduced fertility. Whatever problems they will face, people will need energy to deal with them. The key to a decent lifestyle will be a plentiful supply of renewable energy.

Questions about a fair distribution of the tax burden to fund government bureaucracy should be considered as if taxes were to be applied *after* the distribution of dividends from common resources. (Note that a *flat rate* of tax can automatically become progressive taxation when there is also a significant rebate or a basic income for every person, independent of other income.)

Dividends, Subsidies and Incentives

The money raised from a carbon price should not be spent by the government on clean energy infrastructure! After dealing with “border tax adjustments”, the carbon revenue should be returned to the people on a per capita basis (half for children), to help them pay for clean energy and voluntary efficiency measures. The best way to pay for clean energy infrastructure is by selling the energy produced by that infrastructure. Government can loan money and private funds can invest, but the capital expense will be an asset, so it is appropriate for capital financing to build these systems and sales revenue to pay them off.

The main reason for having a Carbon Price is to increase the price of fossil energy up to the price of clean energy, so that clean energy can compete. I hope to show that it is not appropriate to subsidise clean energy because it lowers the price of all energy – cheaper clean energy means a lower carbon tax to fill the price gap. Rather than subsidising energy, it is better to maintain a steeper price incentive to reduce energy use, but recycle the carbon revenue equally to the citizens.

After putting a price on emissions, all energy will be more expensive, but people will not have any extra money to pay for it unless we recycle the carbon revenue back to them. The carbon revenue should be recycled to every individual as a 100% dividend after "border tax adjustments" have been taken care of.

The Carbon Tax must be imposed on imports just as it is on companies who buy fossil energy in Australia – and local carbon taxes should be refunded for exported goods. Clear, logical rules are far less likely to produce corruption than vague negotiated "compensation" deals between ministers and industry lobbyists. Border tax adjustments are not the current topic, but my views on this are quite close to Garnaut who opposed "compensation schemes" to businesses to protect their profits.

A low carbon price is a bad thing. The carbon price has to raise the cost of fossil energy high enough to see all carbon burning energy systems replaced. A carbon tax with 100% dividend rewards personal behaviours to reduce emissions. The higher carbon price together with the dividend, provide maximum incentives for voluntary action on climate change. Those who most cheaply avoid energy and products incurring greenhouse gas emissions, may invest their "profits" into shares for clean energy infrastructure. Rewards for effective action can be multiplied!

Let me give an example near the start of the scheme, when 90% of energy is from fossil sources.

100% Dividend (simplified – electricity only, and ignoring business)

Suppose an average quarterly electricity bill for an average family was $300 but zero carbon energy would cost them $500, then tax & dividend would need **$200** worth of carbon tax to equalise the two prices. The effect would be that customers would see the price of electricity rise by 66% and this provides a powerful incentive to change light bulbs & fridges, install solar hot water, insulate the house better and learn about thermal management using curtains and shades. Since this is an average household, let’s call them the **Grey** family, they would get an average family carbon dividend of **$180** to help them pay their $500 energy bill, or to help to pay for measures to cut their energy usage.

The average dividend is $180 rather than the full $200, because 9 out of 10 customers pay the $200 carbon tax for using fossil energy - but 10 out of 10 must share in that revenue. (Once we include transport fuel and goods & services, the dividend would be more than this $180 derived only from electricity sales.) Because of the $180 dividend, our average household pays $320 net for their energy bill, which is a 6.66% increase on $300.

In reality, if there is only enough clean energy available to supply 10% of electricity then the retail price for clean energy will still be higher than fossil energy to discourage excessive demand for this still scarce commodity.

No matter what their consumption, every average family of two adults and 2 children will get this hypothetical $180 dividend per quarter. ($60 per adult plus $30 for children.) So if they can cut their electricity consumption by 4%, from $500 to $480, then, after subtracting the $180 dividend, they'll only pay the same $300 that they used to.

Before we consider using the carbon revenue as a subsidy for clean energy, I want to look at two other households under this dividend scheme. One family that cuts its electricity consumption by half and one that used to consume twice the average – and still does.

a) The average family that uses *half* the average electricity consumption is the Green family. The Greens will receive a quarterly electricity bill of $250, which, with the $180 dividend, leaves them with a net payment of only $70. Under the previous regime, before the carbon dividend, their bill would have been about $150, so this family seems to be making money from the carbon tax. I believe this $80 per quarter is helping them to pay for their solar hot water and high efficiency fridge. This family is most likely to invest any spare money in further energy savings and may even invest in clean energy power stations if this option is promoted. Such families are the heroes of the Zero Carbon Transition – the dividend system makes them winners and everyone wants to be like them. And so they should.

b) The average family that uses *twice* the average electricity is the Brown family. The Browns will receive a bill of $1000 which with the $180 dividend means they pay $820. Before the carbon tax their bill was maybe $600, so they will want to find ways to reduce the extra $220 of energy they are consuming.

Not only is *Tax and Dividend* the ethically based method of distributing carbon revenue, it also rewards those who do the right thing, rather than rewarding polluters.

Clean energy subsidy (simplified –electricity only, ignoring business)

If the carbon revenue is directed to subsidising clean energy, then the carbon price would only add $20 to the existing $300 bill for the average family. The increase due to the carbon price will only be **$20**, because every nine houses paying $20 extra raises the $180 required to subsidise the one house who is using expensive clean energy. $500 - $180 = $320. The net energy bill for families with average consumption increases by 6.66% and this is the same as the above example. However, the lower carbon price provides little incentive and no rewards for voluntary reductions, because it is the same for every unit of electricity - it is merely a 6.66% price rise.

Let's look at the other two other households. The Greens who cut their electricity consumption to half and the Browns who used to use twice the average and still do!

a) The Green family which uses *half* the average electricity consumption will receive a quarterly electricity bill of $160, which, is $10 more than if they made the same effort under the old regime. There is no reward for spending money to reduce emissions. Before the carbon price was added, their bill would have been about $150, so this family is worse off under a system which subsidises clean energy, than when there was no carbon price.

b) The Brown family which uses *twice* the average electricity will receive a bill of $640 which is only $40 more than under the old regime. Before the carbon price their bill was $600, so an extra $40 is hardly worth doing anything about.

Because the difference in price between clean and fossil energy is small in both cases, the demand for clean energy will soar, but the supply is limited by the speed at which we can build the factories that will manufacture the required annual production of clean energy infrastructure. This is a whole new topic, but I mention it only to remind you that it will take time to grow the industry that makes the stuff that replaces the fossil energy system.

When the new industries have matured and the rate of expansion slows down, I expect the price of clean energy to fall, but probably not until near the end of the transition process.

When *half* the fossil power stations have been closed down, the price of the equivalent quarterly clean energy bill without efficiency measures will probably remain around the same $500 hypothetical price used previously. Assuming the Carbon Price closes the price gap between fossil and clean energy, the Carbon Dividend will now only be half the **$200** contribution from the carbon tax, rather than 90% as it used to be. With only half the population using fossil energy and paying the carbon tax, the dividend for each of these average families in this simplified model will be $100, so they will pay $400 for the same kWHs of electricity that they used to pay $300 for. If those average families want to keep their bills down to $300, they will have to reduce their consumption by 25% compared with the start of the transition. If they do, they will get an electricity bill for $400 but receive a $100 from the carbon dividend – to end up with no net change.

In the case where carbon revenue is used to subsidise clean energy instead of producing dividends to individuals, the contribution to the average family's bill from the carbon price will be $100. These average families will all receive electricity bills around $400. Because half the customers are still using fossil energy, $100 from each of the carbon energy customers will subsidise $100 for each of the clean energy customers.

The result for the extremely average Grey family is the same - but with the dividend system, we have had a high and stable carbon price to encourage efficiency right from the start. The subsidy method has a low and slowly rising carbon price that does not send strong signals for change. At the end of the transition process, both systems leave customers paying the full price for clean energy, but the dividend method improves efficiency and changes behaviour by starting with a real carbon price. This is no trick. The people are the shareholders of the atmosphere so they receive dividends from rationing the scarcity of this shared resource. They are free to spend it on what works best for them.

Subsidising clean energy is highly interventionist with potential for misallocation and corruption. Empower the customers to buy clean energy at the appropriate market price and charge properly for carbon emissions!

There is no "cost to the economy" if carbon revenue is recycled, and the real cost of clean energy will be the same in any case. A recycled carbon tax can be very high with negligible negative effects on the economy.

For the same average cost to consumers, the subsidy path does not encourage or reward voluntary actions, but the 100% dividend does. By recycling the carbon revenue we multiply the value extracted from the customer's dollar. The same carbon tax dollars are recycled again and again until they end up in the hands of a clean energy supplier. This is exactly what needs to happen. Please consider these great advantages of the Carbon Dividend. Once people understand, they are usually won over to this superior solution, but it is sometimes difficult to help people understand something new, which they have not seen before.

Even if it does stimulate green infrastructure, I am concerned that handing the revenue to taxpayers won't result in lowering emissions. It might go to plasma TVs, new cars and whitegoods.

I have already compared the scenario of using carbon revenue to subsidise clean energy with distributing a personal dividend. So which of the three similar families might indulge in extra emissions generating consumption under the different regimes?

You may recall the absolutely average in every way family is called the Grey family. The tribe which reduces its emissions to half of average consumption shall be known as the Green family, and the mob with double the average emissions is called the Brown family.

The Grey family found themselves with exactly the same disposable income under both scenarios. Under the carbon dividend regime, the Green family paid a net energy bill that was $90 less than when the price was subsidised. But the Brown family had to pay out $180 more under the dividend system than with the clean energy subsidy.

It seems to me, that the Green family is the one most likely to spend their $90 “bonus” on reducing emissions further, or investing in clean energy infrastructure. I strongly suspect their emissions are low because they already invested in energy saving technology and they would not have done so without knowing they could pay for it from savings generated by avoiding the consumption of expensive electricity. On the other hand, the Browns were much happier under the energy subsidy, because cheaper energy means they can afford to waste it. With the $180 extra disposable income they have under the price subsidy scheme, they are the ones most likely to spend it on emission generating purchases. Don’t subsidise energy prices – pay people for their share of the atmosphere.

I too am concerned about customers spending money on high energy products, that is why it is best to encourage everyone to value energy by charging the full price. If they are already paying the full price of renewable energy, they will treat energy with the same respect as they would if every CO2 belching power generator had already been closed down. The price they pay is the price they need to pay to make that happen. By recycling the carbon revenue back to customers, we provide a mechanism to smooth the transition from today's low fossil energy prices to tomorrow's clean energy prices. Tomorrow’s clean energy prices will not be quite so high after the industry matures and the frantic rate of construction fades.

I hope the mental light bulbs have come on and you have been won over, at last. If you are doubtful about the simplifications and assumptions in these models, you will have to justify an alternative. I think the clean energy price subsidy is a very good proxy for any effective subsidy program which relieves the consumer from paying the full price of clean energy. Any price subsidy, by whatever method, can only increase emissions because people will be less motivated to save energy. The carbon dividend will appear in your bank account just like a small income boost. It is not a rebate on your electricity bill, in fact it will be big enough to help you afford the carbon levy on everything you purchase. When you make decisions about energy choices, you will compare prices and benefits with little thought of how the money gets into your bank account.

regards,
Richard Corin