

Wise Response Society Submission on the Productivity Commission's Draft Transition Plan to a Low Carbon Economy

Final for 8 June 2018

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1 Key Concern and Summary

1. First and foremost, the Wise Response Society (WR) sees this Report as an important, if long overdue, step in facilitating a nationwide discussion about how we can best respond to the serious threat global warming and climate destabilization poses for our economy and general welfare. We are encouraged that the Commission by this draft has shown itself willing to confront and look behind a wide range of issues related to shifting to a low carbon economy. It will be an important document to help the Climate Change Committee and future Commission scope the mission.
2. However, the Society still holds a number of serious concerns about the assessment so far, number one being that its most significant recommendation has not been addressed in any form i.e. the need for humans to plan to live within the capacity of the Earth to support human and other life. A precondition for such an outcome is acknowledging the direct contradiction between an economy dependent on continued material growth for its stability in a biosphere of finite resources.
3. As outlined in our earlier submission, the Limits to Growth (L2G) report published by the Club of Rome in 1972 describes a set of computer simulations of a future Earth. Its business-as-usual (BAU) projection predicts **overshoot and collapse** of the global economy, environment, and human population from about 2020 onwards. L2G's BAU projection has accurately tracked 40 years of subsequent statistical data collected by many international agencies and has yet to be taken seriously by decision makers¹.
4. We also drew attention to the diminishing return to energy investment and how it supports the limits to growth case, along with a range of other biophysical indicators and its profound implications for consumer behaviour and therefore economic productivity². Yet the basic assumption in the draft report is continuation of traditional economic growth.
5. Because a "no growth" scenario would literally reconfigure the "decision space" for a transition to a low carbon economy, it is extremely important that this possibility be included in any analysis. Indeed, based on the array of indicators, it is the Society's view that such an eventuality is inevitable and the sooner we start planning for this the better.
6. **The Society has no quarrel (indeed, would be delighted!) if the Commission can convincingly rebut our assertion that material limits, such as those expressed as diminishing returns to energy, need to be part of this enquiry, but we do have a problem if the proposition is simply ignored.**
7. The Terms of Reference for the enquiry include requests for the likes of "higher living standards", "higher productivity" and "growing incomes". But they also included requests for "increasing wellbeing ... including sustainability ...increasing

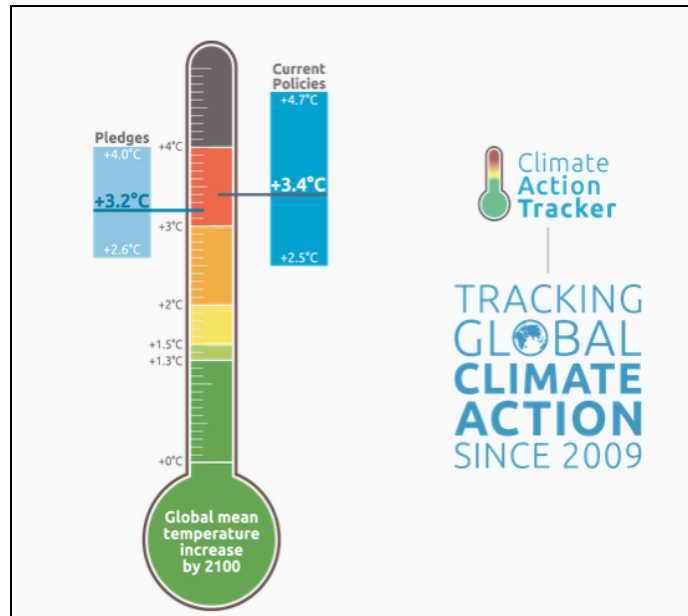
¹ Turner, G. (2014) 'Is Global Collapse Imminent?', MSSSI Research Paper No. 4, Melbourne Sustainable Society Institute, The University of Melbourne.

² http://www.feasta.org/wp-content/uploads/2012/10/Trade_Off_Korowicz.pdf

equality, social cohesion, and resilience to risk". Thus, ignoring the "no growth" scenario fails to satisfy the terms. The Minister for Climate Change James Shaw adds that "as a developed country, New Zealand will be expected to take a lead in reducing emissions sooner than others".

8. Thus, the Draft plan is, at least, not comprehensive and at worst, dangerously misleading and, in its current form, does not provide New Zealanders with an adequate plan for transitioning to a low carbon emissions economy. The main submission points are summarised below.
 - i. **Generally support:** WR supports an independent Climate Change Commission operating at "arm's length" from Central Government; removing subsidies for the fossil fuel industry; accelerating reforestation (with some reservations); dealing more effectively with waste; and developing a long-term, economy-wide, low-emissions strategy in response to the Climate Commission's recommended emissions budget (with some reservations).
 - ii. **Emissions control:** WR supports employing a carbon "Fee and Dividend" instrument beneath a scientifically-based national emissions cap as the primary mechanism to driver the low carbon transition and distribute obligation. A number of reasons are given for this preference over an ETS. We agree with the Commission that political consensus for the policy settings and institutional arrangements is vital. We recommend a very conservative budget that makes highest rates of emissions decline in the first years and does not rely on technical breakthroughs.
 - iii. **Resource limits:** WR is concerned about the exclusion of any reference to the threat posed by resource limits to economic activity, specifically diminishing returns to energy, (which was front and centre of our submission) and its profound implications for consumer behaviour and therefore economic productivity. In our view, the TOR could have created confusion and the concept needs to be included in the study.
 - iv. **Purpose of Commission:** WR proposes a revised purpose, which includes the concept of living within the earths material and energy limits, to be incorporated in the TOR of reference of this and other relevant Government studies as soon as possible.
 - v. **Urgency:** WR is concerned that there is insufficient urgency conveyed regarding the short window of opportunity within the next few years for making the widespread changes that are required to avoid very high risk of environmental collapse and the social and economic consequences that would follow. If all parties kept their pledges made in COP21 at Paris, the planet is still most likely to warm by 3.2 degrees C, above pre-industrial levels by 2100 - a level considered potentially disastrous by the IPCC (see figure below).
 - vi. **Air and sea travel:** We wish to see any GHG transition plan incorporate as "domestic emissions" embodied carbon, both the aviation and shipping industries and the future of the tourism industry
 - vii. **Landscape integration:** We propose that Councils are required to facilitate emissions mitigation and adaptation with catchment communities using

integrated landscape management principles to maximise resilience to climate change and minimise emissions. Notably the Report omits the potential role of enhanced soil carbon to assist in this process, maintain ecosystem services and thus help stabilize the economy.



- viii. **Forestry:** There is too much reliance placed on plantation forestry as a primary carbon offset, when its continuity is always at risk and is acknowledged as a temporary offset at best and at worst a potential GHG source in the future.
- ix. **Waste:** We consider that in order to make the much needed step change in waste and associated emissions reduction, the primary focus needs to shift from pricing waste to stewardship at the materials source.
- x. **Adaptation:** The Report creates an unhelpful and largely artificial separation between "mitigation" and "adaptation" when there is a need to both prepare for and reduce the risk of climate change as an integrated package.
- xi. **Population and investment:** The Report does not consider the impact of population growth and migration, nor the full options available for investment away from causing problems to helping provide solutions. We see the need for the adoption of ethical investment principles for all the agencies that Government is directly or indirectly responsible for.
- xii. **Technology and economic tools:** The Report puts too much reliance on economic tools and innovative technology for an effective transition, rather than directly driving behaviour change where it is already obviously necessary and inconsistent with our common deeply held values. To make this possible, we will need a new economy that is not at odds with underlying ecological/ biophysical principles.
- xiii. **Commercial influence:** There is insufficient recognition of the risk and inertia posed to transition by the capture of objective assessment and advice by commercial interests with more short-term economic objectives (e.g. Overseer,

Farm advisory services etc). And there is an absence of direction to shift our financial institutions (pension schemes, banks, investments generally) away from irresponsible behaviour.

- xiv. **Law:** There is a lack of recognition that our organisations and their legal structures and requirements are not yet fit for purpose (i.e. most relevant are the Resource Management Act 1991, Companies Act 1995 and the Zero Carbon Act (due 2019) as well as statutes concerning cooperatives, family businesses, state enterprises).
 - xv. **Trade and global economy:** The Report does not give adequate consideration to the risks and threats international trade and the economy will face because of encountering material and fossil energy limits. In particular, it omits emissions from air travel and shipping both nationally and internationally (omitted from COP21) nor with its potential effects on, for example, New Zealand's tourism industry.
 - xvi. **Participation:** There is a lack of recognition of the need to capture not just industry but all NZ citizens, and promote behaviour change for practical action. There are a raft of opportunities which, if adopted, would directly or indirectly have us better prepared for a low carbon future and related instability.
 - xvii. **Ethic:** There is insufficient acknowledgement of the need to develop an ethic other than exploitation of the Earth's resources for human utility as the dominant principle underlying our economic activity. Profound shifts in our values, culture and way of life that are required if we are to build and sustain the necessary impetus for change.
 - xviii. **Education:** It does not adequately recognise that there needs to be widespread discussion and education at all levels of the community of the threats, risks and opportunities for New Zealanders to both mitigate and adapt to the predicted turbulent future.
- 9. Thus, if the Productivity Commission is to play a significant part in dealing with the limitations identified above, WR recommends changing the Commission away from a **narrow economic focus** on productivity, with a new purpose, a name change and the use of a wider knowledge base.
 - 10. In particular, we are concerned that it is not recognised that economic models need to be in concert with **modern science**, and that economic tools to address externalities are not sufficient to bring about the necessary changes. This applies not only to the quantification of permissible emissions, but also to the quantification of available energy to build a picture of what is and is not possible in a lowering carbon economy.
 - 11. And, as there is an essential difference between price and value, (and ultimately we seek "sustainable and equitable wellbeing"), **values** cannot be ignored in this process.

2 Exclusions in Terms of Reference/Purpose of the Commission

12. To get the right answers, we must first ask the right questions. In our earlier submission, we expressed concerns about the Exclusions of the Terms of Reference given by the National Government Ministers.

Exclusions

This inquiry should not focus on the suitability of New Zealand's current, or any future emissions reduction target. In addition, the inquiry should not focus on the veracity of anthropogenic climate change, and should only consider the implications of a changing climate to inform consideration of different economic pathways along which the New Zealand economy could grow and develop.

13. First, we are bemused that it was thought sensible or possible to consider a transition to a low carbon economy without considering an emission reduction target.
14. It should be a requirement that interim targets are considered as this is a fundamental part of the Paris Agreement. The Agreement requires regular reviewing of emissions reduction capacity and goals. This in turn has a major influence on how an economy is managed to achieve such goals.
15. The above also fits with the modelling options described in Part Two of the draft Report, which requires assessing technological, business operation, and policy changes, interactions and effects on both what is required by science to keep average warming below 1.5°C and what is assessed as achievable by individual countries.

R1: WR recommends that the final report recognise that the Terms of Reference (TOR) were too restrictive, and limited the number of options that New Zealanders need to consider in developing a transition to a low emissions economy.

16. In addition to the limited Terms of Reference, we are concerned about the lack of attention to the severe threats and risks humankind faces from environmental degradation. The current legislative purpose of the Commission in the 2010 Act states:

The principal purpose of the Commission is to provide advice to the Government on improving productivity in a way that is directed to supporting the overall well-being of New Zealanders, having regard to a wide range of communities of interest and population groups in New Zealand society.

17. In the near future, the Government will receive advice from its Tax Working Group, the interim Climate Change Committee, and the Productivity Commission, amongst others. There will be overlap and gaps so they must be considered together. We are concerned that the Productivity Commission, as currently constituted, is not able to play as significant a role as it could because of its narrow economic focus on productivity (with a name change and the use of a wider knowledge base) and reference to the environment needs to be included. A suggested purpose is:

The principal purpose of the Commission is to provide advice to the Government on improving the overall well-being of New Zealanders, having

regard to a wide range of communities of interest and population groups in New Zealand society, the need to live within the material and energy limits of Earth's environmental systems essential for human and other life, and the future risks that we face that involve transition and mitigation.

R2: WR recommends that this revised purpose be incorporated in the Commission's TOR preferably before it produces its final report and certainly before any new work is undertaken on this subject. We also recommend that the same concept of limits and how they are to be managed, be included in the TOR of all other relevant Government studies.

Growth Economy and Thermodynamics

18. Second, we are dismayed that the Terms should consider only how a New Zealand economy should grow and develop. Today, humanity uses the equivalent of 1.7 Earths to provide the resources we use and to absorb our wastes. This means we use more ecological resources and services than nature can regenerate through over-fishing, overharvesting forests, and emitting more carbon dioxide into the atmosphere than forests and other vegetation can sequester ³.
19. This means that an economy based on unlimited growth (this means overall growth, not change within an upper limit) is contrary to modern science, including the entropy and the Second Law of Thermodynamics.
20. Because our earlier submission, particularly paragraphs 27-55, was not taken seriously on this issue, there are a number of options that are not included in the Draft Report. At least, this means that the advice the Commission gives to Government is incomplete and at worst, it is dangerously misleading.

Box 1 : Thermodynamics, Entropy and Economics

Entropy is a thermodynamic quantity representing the unavailability of a system's thermal energy for conversion into mechanical work. In 1865 Clausius first used the word entropy. He and others developed this concept when attempts were being made to try to make steam engines more efficient. They found that there was always some energy that was lost and not recoverable when converting heat energy into work. Simultaneously there is an increase in entropy or disorder in any such process.

Our use of fossil fuels to develop mechanical and electrical energy at ever increasing rates by an inherently inefficient process not only generates large amounts of greenhouse gas emissions but severely tests the ability of the biosphere to dispose of the resulting waste heat. A transition to the use of renewable forms of energy would not only reduce the emissions but in the case of solar, wind and hydro, increase the efficiency of conversion by avoiding the thermal conversion process.

A recent review by Heinberg and Fridley of assessments transitioning to a 100% renewable energy future, conclude that a variety of limiting factors support the assumption that available energy quantities will be lower, perhaps significantly lower, than BAU global energy demand projections⁴. We are consuming energy at rates far exceeding the ability of the biosphere to dispose of the resulting entropy.

³ Global Footprint Network. <https://www.footprintnetwork.org/our-work/ecological-footprint/>

⁴ Heinberg, R and Fridley, D. 2016. Our Renewable Future. Island Press.

Any economy that does not take into account the science of entropy or the Second Law of Thermodynamics, as it applies to the conversion of energy from one form to another, is doomed to failure. Unfortunately, when modern neoliberal economic theory was being developed, the Second Law of Thermodynamics was not taken into account.

Boulding, a proponent of an alternative economic theory, ecological economics, in a famous paper, compared the two economic theories (neoliberal economics and ecological economics) to a cowboy versus spaceship economies⁵. The former presupposes that there are no limits to growth, and that prices will always find alternatives to scarce resources. The latter is when modern science and limits to growth are taken into account. Wise Response has elaborated on these limitations in our recent submission to the Tax Working Group⁶.

While modern neoliberal economics can treat environmental degradation as an externality, the only branch of economics that incorporates the Second Law into its thinking as a core principle (a spaceship economy), is ecological or biophysical economics.⁷

21. A most obvious place where we can see that the Second Law of Thermodynamics is playing out is through the Energy Return on Energy Invested (EROEI or sometimes EROI). Raw primary energy sources require some energy to be utilised to process them into finished fuels. EROI is the ratio of energy usable in newly produced fuel, to the energy utilised in providing that fuel. Because the potential significance of this concept has been overlooked in the draft we offer a relevant quote:

"A thermodynamic analysis reveals that any organism can only afford to expend a small fraction of its current energy stores finding and processing new primary energy sources into fuel (assimilation) because there are many other essential energy-consuming (dissipation) tasks it must perform to survive; these include sustainment, repair, protection, maturing and increasing in complexity, and reproduction. Only if there is surplus energy after all of these demands are fully satisfied will the organism increase its mass (growth).

To power all these activities, the organism needs food that is not just fractionally positive in net energy, but rather has an EROI many multiples greater than unity. A civilization is itself a high-order physical and biological organism that has tremendous overhead costs and can spare only a fraction of its energy to assimilate new energy.

One researcher exploring the linkage between physics and economics has found an historical linear relationship between global civilization's accumulated physical mass (i.e., net value of accumulated capital) and its appetite for

⁵ Boulding, K. 1966. The Economics of the Coming Spaceship Earth.

http://arachnid.biosci.utexas.edu/courses/THOC/Readings/Boulding_SpaceshipEarth.pdf

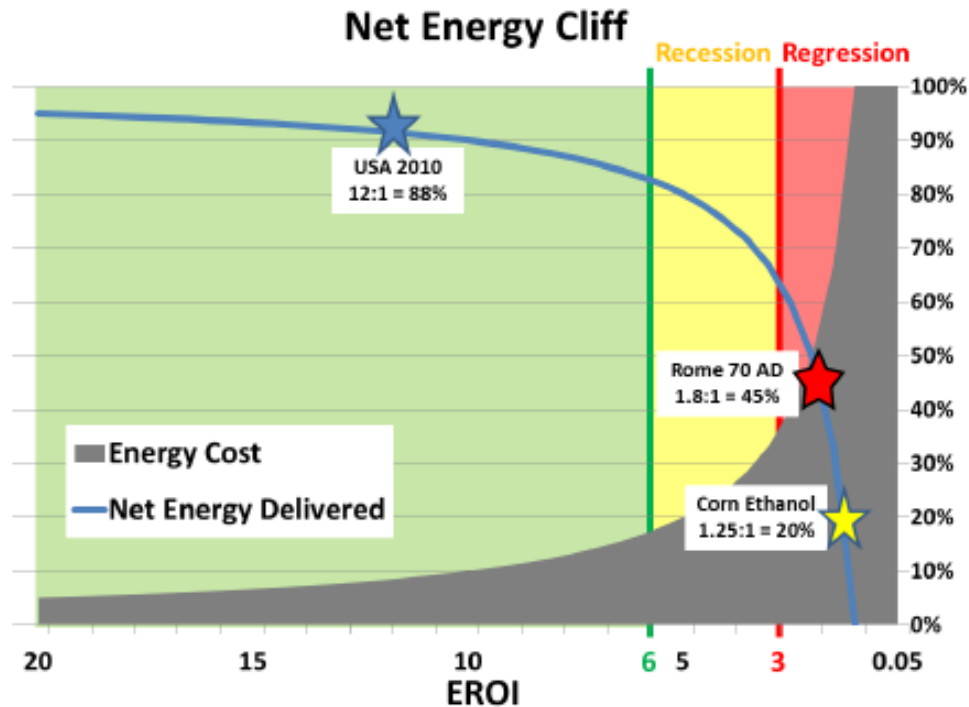
⁶ <http://wiserresponse.org.nz/wp-content/uploads/2018/05/Tax-Working-Group-Wise-Response-Submission-Final-300418.pdf>

⁷ Biophysical economics focuses on the central role of energy flows through the economic system and therefore the role that entropy and depletion play in its functioning and prospects. Biophysical economics is used by Charlie Halls, Ecological economics is used by Herman Daly, Kenneth Boulding and others.

<http://www.resilience.org/stories/2010-01-21/biophysical-economics-putting-energy-center/>

energy, with a value of 9.7 milliwatts per 1990 US dollar⁸. This same approach also revealed a similar linear relationship between civilization's wealth and the amount of CO₂ it exhales⁹".

22. While our original submission contains an energy cliff concept (p 14) the chart below illustrates both the net energy trend and its economic implications¹⁰.



Implications

23. The Commission appears to be relying on the GLOBE NZ Vivid Economics report. However, from the technical indexes, it assumes a 50% reduction in the energy intensity of GDP by 2050, as well as widespread 'decoupling' between energy and material, and emissions, a concept which has been comprehensively discredited¹¹.
24. In essence, the EROI trend is because the more readily extracted energy resources have been developed and with each new development, a greater proportion of the energy is required to secure it.
25. Moreover, solving issues with technological complexity also typically comes at significant cost in terms of energy consumption. As the net energy available to society (net of the energy cost of energy) declines, the level of complexity we can achieve and sustain declines too¹².

⁸ Timothy Garrett. "How Persistent Is Civilization Growth?" arXiv:1101.5635 (January 28, 2011). <http://arxiv.org/abs/1101.5635>.

⁹ Timothy Garrett, "No way out? The double-bind in seeking global prosperity alongside mitigated climate change," *Earth System Dynamics* 3, no. 1 (January 5, 2012): 1-17.

¹⁰ <http://wici.ca/new/wp-content/uploads/2013/04/Kiefer-Snake-Oil31.pdf>

¹¹ <https://damnthematrix.wordpress.com/2016/07/12/decoupling-the-issue-and-collected-evidence/>

¹² http://mahb.stanford.edu/wp-content/uploads/2014/03/energy-policy_Hall_Lambert_Balogh_2013.pdf

Wider context

26. In addition no mention is made of the geopolitical implications of this decline, and the likely disruption from efficient but brittle supply chains.¹³ An abrupt or even gradual diminishing of energy intensity will have significant impacts for the likes of employment, discretionary spending, business viability, tax take and therefore the capacity of government to sustain social services, government policy and perhaps even law and order.
27. In a world where clean safe produce is becoming an increasingly sought after commodity, there is another fundamental question, not addressed but which could significantly impact that feasibility of successful transition. That concerns the relative economic, social and environmental merit of being deeply embedded in a global economy through trade agreements, compared to positioning as an independent high quality primary producer, being able to command premium prices. i.e. marketing as genuinely "clean green". Strong support for innovation combined with the later option would appear complementary [F5.11, last bullet]¹⁴.
28. Likewise, is there any risk that trade agreements could prevent NZ requiring local emissions reduction by international businesses, if these threaten their profitability?

Economy now or planet later?

29. Because our earlier submission on biophysical limits, (particularly paras 27-55), was apparently not considered germane to this issue, there are a number of options that are not included in the Draft Report. This means that the advice that the Commission gives Government is at least incomplete and at worst, dangerously misleading.
30. The risk posed by diminishing EROI is that it would shift the critical limit from the effect of emission on climate to the reliable supply of energy. Both processes have the potential to put humanity's future in the balance, but based on current trends, an energy supply pinch would make the threat more imminent.
- 31. Essentially, if the threat posed by a diminishing EROI is real, it literally reconfigures the "decision space" for this enquiry as emissions would drop abruptly on their own accord.**
32. That is, our priority would shift from how to reduce GHG emissions to how to prepare our economy and living arrangements for another, but more serious, Global Financial Crash (GFC) caused by a sudden decline in the availability of fossil fuels (which currently provide over 80% of global energy needs).
33. And despite the optimistic note struck regarding our capacity to meet the climate challenge in the concluding paragraph of the Report¹⁵, on a dispassionate examination of the science, it's difficult to deny that the odds of the globe achieving that are starting to look rather long. Have we left it too late?

¹³ http://www.feasta.org/wp-content/uploads/2012/10/Trade_Off_Korowicz.pdf

¹⁴ Numbers in square brackets relate to Questions [Q], Findings [F] and Recommendations [R] to be found after p408 in the Commissioner's Report

¹⁵ Section 16.7, Finalising the Commission's advice

34. The 2008 GFC did result in a steep decline in GHG emissions. It is ironic then that another energy-driven economic crash may well give us the best chance of retaining a liveable planet. So if we are prepared to face up to that possibility and prepare accordingly then it may prove to be the better of two rather troubling scenarios.
35. On the basis of the evidence we have provided, not doing so might be most politely described as "wishful thinking". On this theme, Master Dick's expectation in the Wikipedia cartoon below seems particularly apt for a question about energy!



"Wishful thinking is the formation of beliefs and making decisions according to what might be pleasing to imagine instead of by appealing to evidence, rationality, or reality".

R3: WR recommends that the threat posed to economic activity by resource limits, specifically diminishing returns to energy, (which was front and centre of our original submission), and its profound implications for consumer behaviour, economic productivity and stability be addressed in the enquiry.

3. Review of Emission Market Mechanisms

ETS vs Fee

36. WR considers the imposition of a carbon fee as the most reliable mechanism to ensure we don't destroy the biosphere! We need a fair and transparent system to give each NZ citizen a direct connection to the carbon emissions associated with their lifestyle. In our original submission we proposed a fiscally neutral carbon fee (or levy), imposed at points of import and emission, with all dividends returned equally to citizens. This offsets the effect of higher energy cost on those who can least afford it. And those who use less benefit, which further incentivises emission reductions. We thus do not agree at all with the Commissions finding [F4.2] and

reconfirm our preference for a Fee and Dividend mechanism over an Emissions Trading Scheme (ETS). Our reasons for this are elaborated below.

37. It is not possible to "scientifically" or otherwise "price" the existence of our support system as an externality. We have a scientifically determined physical target -1.5 degrees C (or 2 deg C) - to prevent runaway climate change. We know what has to be done in terms of emissions reductions to keep below this target¹⁶. For 1.5 degrees, this amounts to permissible emissions of around 600 Gt CO₂ from the year 2010. For 2.0 degrees this amounts to emissions of around 900 Gt from 2010.
38. The basic process is the placement of an initial carbon price at a level that will incur those reductions which would need to amount is between 4 to 8% pa, depending on the temperature chosen and the start year. If the required reduction rate is not achieved in the initial years, then the carbon price must be raised. If we beat the target then the price can be relaxed. If the fee is not revenue neutral, funds might be used to progress alternative fuels and to incentivise further reductions [i.e. options in F4.4]. Any surplus should be returned back to those most vulnerable to increased energy prices.
39. Because of the magnitude of challenge that we are faced with in terms of emissions reductions (realising that the cost of failure is much higher), we are of the view that the best chance of actually making the necessary emissions reductions will be to use the 2050 limit as a benchmark and design compatible economic activity by "back-casting". Tweaking our existing economic activities is not sufficiently reliable.
40. Other key reasons we support a fee and dividend scheme rather than a trading scheme include:
 - The value and affordability of an emissions unit differs between participants. Thus, even with a maximum (and minimum) unit price, units will tend to gravitate to those actors who can most afford them. This outcome is most unlikely to be optimal for society as a whole.
 - As the rate of emissions permissible declines, it will become increasingly difficult to maintain access to units and eventually, for the market to function.
 - A fee regime maintains greatest control, minimises the opportunity for fraudulent practice, is simpler to enforce and can be structured to ensure that access for critical purposes is maintained.
 - If a new plantation forest is planted with the associated credits, it is increasingly vulnerable to fire, wind damage and disease as the globe warms, and is at best only effective for a limited time (e.g. 20 - 30 years for *Pinus radiata*).
 - Examples of less than satisfactory outcomes using a pricing system for resource access are the QMS and transferable water rights and rights to discharge nutrients.
 - With respect to carbon dioxide emissions, we consider a weakness is that an ETS aims to limit climate change indirectly by controlling emissions rather than

¹⁶ IPCC 5th Assessment Report with associated probabilities

directly by limiting fossil fuel use. This indirect approach undermines precision and introduces uncertainty and offers more scope to subvert the scheme. An example is the attempts to link freshwater outcomes with stocking rates and management systems through OVERSEER. Confusion over its reliability has delayed effective action for years.

- And with a market the business opportunity creates incentive to trade, not emissions reduction. The same direct principle of controlling inputs could be extended to cut back other gases e.g. methane controlled by stocking rates and nitrous oxide by fertilizer application rate.
41. An issue with both approaches is that they do not directly compel individual citizens to actively find ways they can support emissions reduction [10.11]. Even for people who are aware of the global warming, there is very frequently a deep rift between their everyday decisions (e.g. consumption and travel) and our collective emissions challenge [F4.13 refers]. One scheme that sets out to address this issue is the Tradable Energy Quotas scheme (see Appendix A)¹⁷. It would start to bridge the rift by forcing individuals to maintain a personal energy budget (within the frame of a national budget) and carefully allocate its use.
 42. If there is to be a market, then we think trading energy input rather than emissions output offers more certainty of complying with the emissions budget and target.
 43. Controlling inputs, while we understand may be politically more difficult, is the only way we see of guaranteeing that the targeted emission reductions will actually be achieved. The graph below indicates how far NZ are from tracking to comply with the Paris agreement and 2050 target, let alone taking responsibility for our own emissions¹⁸.
 44. In this context we disagree with the findings of the Commission that the deep uncertainty associated with the future presents a credible commitment problem for policy development [F7.1]. Nor do we see the need to spend potentially a lot of time seeking "broad agreement" on emissions targets (beyond political consensus for the Carbon Act) [R7.3]. The science is settled so we know what we need to do to avert disaster, and we have an internationally agreed target. The issue is simply mustering the political will to get on and meet it. Refinements can be made along the way [R7.4].
 45. In developing the budget, we should seek to diminish emissions at a maximum possible rate in the first years, as this is when greatest progress is likely to be possible. And we can not afford to rely on technical "breakthroughs" [F10.5] to reduce carbon, like widespread Carbon Capture and Storage (CCS) or methane vaccine. If they eventuate, then the reductions can be employed to further reduce risk. While a healthy economy during transition is desirable, given how pressing the climate threat is now, playing our part in (at a minimum) achieving the 2050 target has to be the priority. The best way we see to protect the economy is to become experts in transition.

¹⁷ <https://www.flemingpolicycentre.org.uk/EnergyAndTheCommonPurpose.pdf>

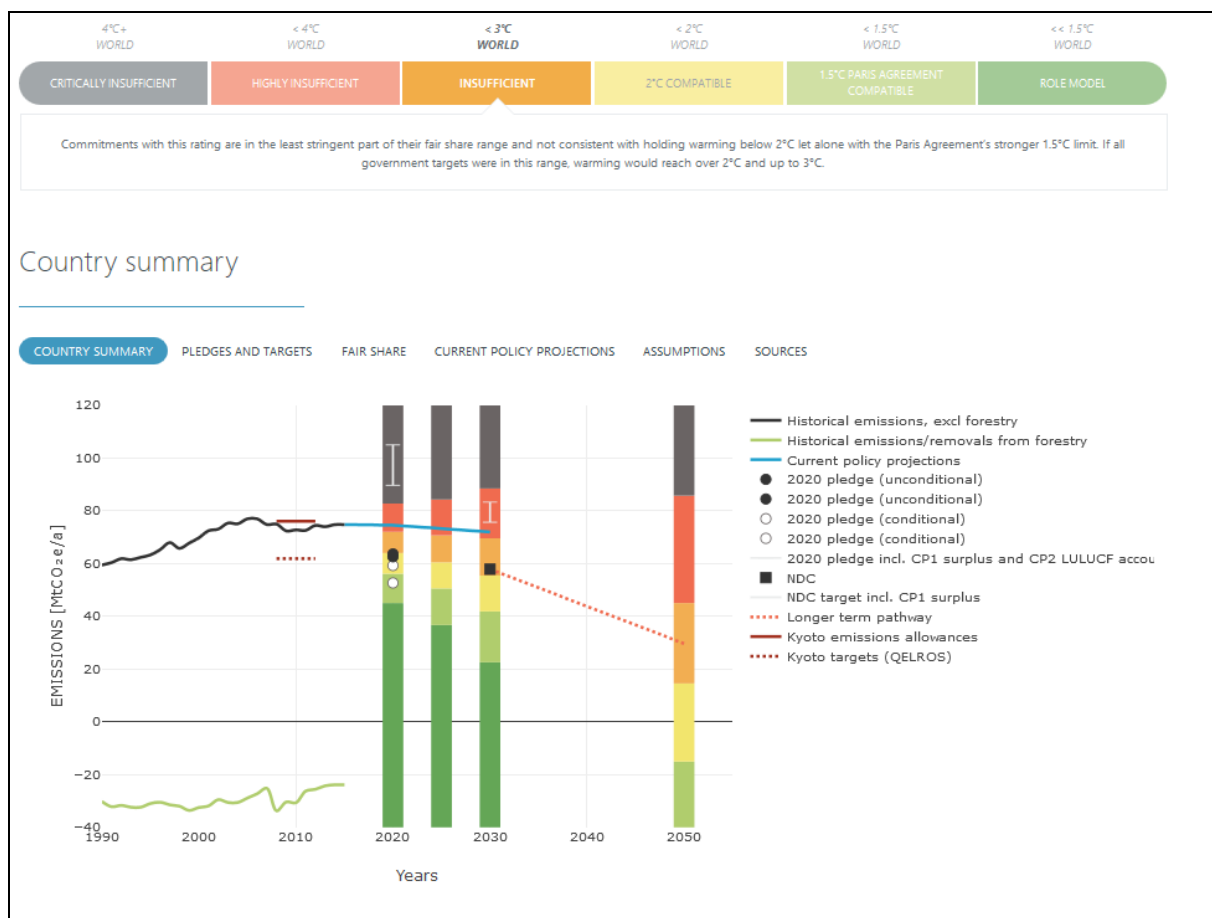
¹⁸ <https://climateactiontracker.org/countries/new-zealand/>

R4: WR recommends that a "Fee and Dividend" scheme be adopted as the primary mechanism to reduce NZ's domestic GHG emissions because it is more likely to equitably and reliably achieve the reduction target than a trading scheme such as the ETS and because humanity's future literally hangs in the balance.

R5: WR recommend that there may be useful elements of other schemes to add robustness to the Fee and Dividend approach. To promote universal participation by business and individual households, carbon budgeting by them needs to be an integral component of the Plan.

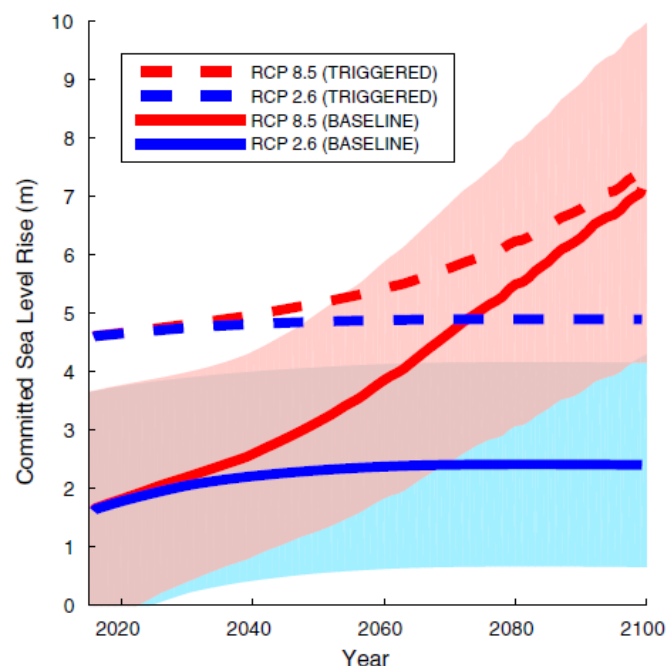
R6: WR strongly supports the Commission's finding that stability of policy settings and institutional arrangements for emissions pricing [F4.5] and the need for broad political consensus regarding the target and mechanisms [F7.8] are both vital.

R7: WR recommend that a very conservative national carbon budget is developed to achieve or better the 2050 Zero Net Carbon target, that makes maximum progress during the first periods (in case it becomes obvious steeper reductions are needed) and does not rely on new technical breakthroughs to achieve it.



4. Short Window of Opportunity to Act

46. As greenhouse gas emissions continue to rise, the window to limit global warming below 2°C is closing, let alone 1.5°C. Projections for sea-level rise are typically quoted in terms of 2100 and generally range near or below 1 m. However, paleontological and modelling evidence indicates long-term sea-level sensitivity to warming that is roughly an order of magnitude higher.
47. A key point that seems to be omitted from recent projections and models is that 2 degrees was originally put as a limit point, a temperature increase above pre industrial times after which further temperature rises may occur without any further increase in emissions (by various positive feedback processes).
48. The Figure below shows projections of committed global Sea Level Rise (SLR) under different emissions scenarios and assumptions about West Antarctica. The years shown relate to emissions and associated commitments, not to the timing of ensuing SLR. The 66% confidence intervals are shown for the baseline Antarctic case only (shading around solid trend lines).
49. Anthropogenic carbon emissions have locked in long-term sea-level rise that poses profound challenges to coastal communities. Analyses based on previously published relationships linking global warming and sea level rise indicate that unabated carbon emissions up to the year 2100 will commit an eventual global sea-level rise of 4.3–9.9 m.

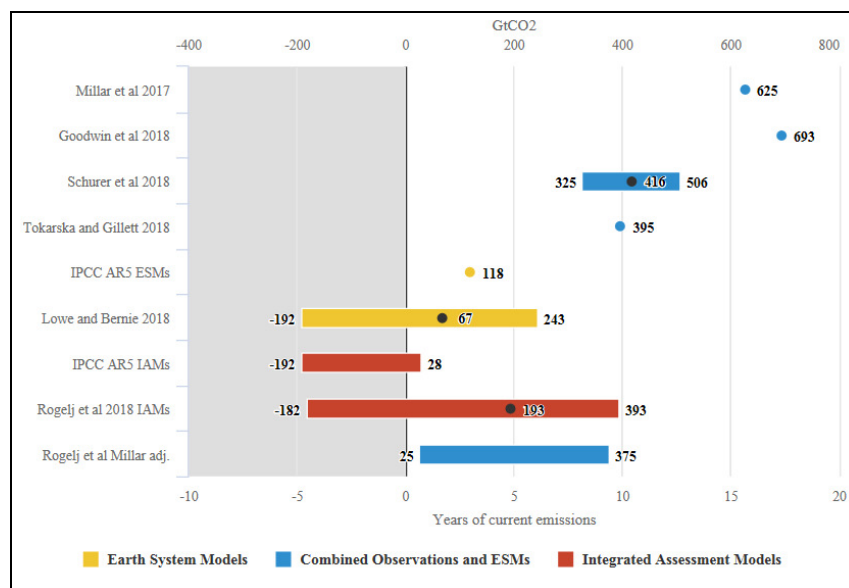


50. The point is that, although immediate sea level rise may appear manageable, it is now that a lack of action sets in motion long-term changes that will be unmanageable and therefore the long-term viability of thousands of coastal

municipalities and land currently inhabited by tens of millions of persons hang in the balance¹⁹.

51. If all parties kept their promises made in COP21 at Paris, the planet would warm by an estimated 3.5 degrees C, above pre-industrial levels²⁰. The COP21 agreement did not include the shipping and aviation industries. Shipping accounts for about 3 percent of global warming, and aviation accounts for 5 percent. In recent years their emissions have grown twice as fast as those of the global economy and they could make up 39% of world CO2 emissions in 2050, if left unregulated²¹.
52. Leading climate scientists have warned that the Earth is perilously close to breaking through the 1.5°C upper limit for global warming, only eight months after the target was set in 2015 (see Figure below). To limit warming to 1.5°C by 2025 all coal-fired power stations across the planet will have to have closed down. And by 2030 we will have to be rid of the combustion engine entirely. Clearly, such change is tremendously challenging. Even that decarbonisation will not guarantee restricting the rise to 1.5°C, but it will give humanity a chance.²².

Remaining carbon budget for a 66% chance of staying below 1.5deg C warming from reports released over the last 2 years



Source: Hausfather Z, Carbon Brief, 9 April 2018

53. Similarly, because nearly any plausible scenario would require a large amount of negative emissions later in the century, the carbon budget itself is not a hard cap on emissions. No matter what carbon budget is used, there is still less than 0.5C

¹⁹ <http://www.pnas.org/content/pnas/early/2015/10/07/1511186112.full.pdf>

²⁰ <https://www.nytimes.com/2015/12/14/opinion/falling-short-on-climate-in-paris.html>

²¹ <https://worldmaritimeneeds.com/archives/178732/cop21-paris-remains-silent-on-shipping-and-aviation/>

²² McKie, R. 6 August 2016. Scientists warn world will miss key climate target. Retrieved from https://www.theguardian.com/science/2016/aug/06/global-warming-target-miss-scientists-warn?utm_source=esp&utm_medium=Email&utm_campaign=GU+Today+AUS+v1+-+AUS+morning+mail+callout&utm_term=184996&subid=16872&CMP=ema_632

deg. additional warming to go before 1.5C deg. is passed and only a few decades before the world has to reach net-zero – and then net-negative – emissions²³.

54. At the international level, efforts to remove fossil fuel subsidies, cease the planning and building of new coal plants, and the exploration for fossil fuels, have yet to make significant headway. Changing physical infrastructure investment and social and cultural behavioural patterns typically takes time. Humanity does not have much time (some would add, if any²⁴), to make the necessary changes to transition to a low carbon economy.
55. This situation means that the response strategy needs to create a universal sense of "obligation" (or better, aspiration) at every level [Q10.1] [F10.11].

R8: WR recommends that the Commission's Report and the Government both acknowledge that there is only, at best, a very short window of opportunity for NZ to make the necessary changes to transition if it is to play its fair part in stabilising the climate.

5. Air and Sea Travel and Energy Trends

56. Transportation currently accounts for approximately 23% of total global energy-related CO₂ emissions and transport emissions are projected to double by 2050. Air travel produces a large and growing portion of the world's greenhouse gas emissions (Creutzig et al., 2015). Aviation has a disproportionately large impact on the climate system. It presently accounts for 4-9% of the total climate change impact of human activity²⁵.
57. Global passenger demand for air travel continues to grow at 5-6% per annum (Bows-Larkin et al., 2016), while efficiency gains have consistently failed to meet the 1.5% per annum target (2009-2020) set by ICAO. "Even under the most aggressive technology forecast scenarios, the anticipated gain in efficiency from technological and operational measures does not offset the expected growth in demand driven emissions" (ICAO, 2016:12; see also Peeters et al., 2016).
58. ICAO concedes that "...aviation emissions are expected to grow by up to 300% by 2050 unless action is taken" (EFTE, 2016:2). Public pressure is building for the air transportation sector to significantly reduce aviation greenhouse gas emissions (Sgouridis, Bonnefoy & Hansman, 2011).

²³ Carbon Brief. 9 April 2018. Analysis: How much 'carbon budget' is left to limit global warming to 1.5C? <https://www.carbonbrief.org/analysis-how-much-carbon-budget-is-left-to-limit-global-warming-to-1-5c>

²⁴ Example: Barkham, P. 26 April 2018. We're Doomed: Mayer Hillman on the climate reality no one else will dare mention. Guardian. <https://www.theguardian.com/environment/2018/apr/26/were-doomed-mayer-hillman-on-the-climate-reality-no-one-else-will-dare-mention>

²⁵ Suzuki, D. Air Travel and Climate Change. David Suzuki Foundation. Retrieved from <http://www.davidsuzuki.org/issues/climate-change/science/climate-change-basics/air-travel-and-climate-change/>

59. Unconstrained and accelerating emissions associated with air travel threaten everyone's wellbeing (IPCC, 2014b). However, transport is an expensive and difficult sector in which to reduce energy demand (Anable et al., 2012). Various command-and-control, market-based and soft policy measures are available to achieve reductions in transport emissions (Friman, Larhult & Gärling, 2013; Sterner, 2007). Yet there remains a significant implementation gap due to social lock-in in transport policy (Banister & Hickman, 2013).
60. High carbon transport use is entrenched and institutionalised (Randles & Mander, 2009). Deep cut emission reductions in aviation will require responses at the individual, business and policy levels:

Individual action

61. Ambitious reductions in all transport CO₂ emissions can be achieved by reducing total global demand for high carbon transportation. Consumers should be encouraged to reduce their own personal emissions profiles, but should not be held solely responsible for responding to the challenge of aviation emissions. This is why aviation fuel needs to be included in the Tax Scheme.
62. Consumers should be encouraged to consider and act upon energy intensity (fuel efficiency), carbon intensity (fuel shift), modal shifts (to lower emitting forms or modes of transport) and change in consumer travel behaviours (reduced frequency, distance and speed of travel) (Peeters & Dubois, 2010; Scott, Hall & Gössling, 2012).

Business responses

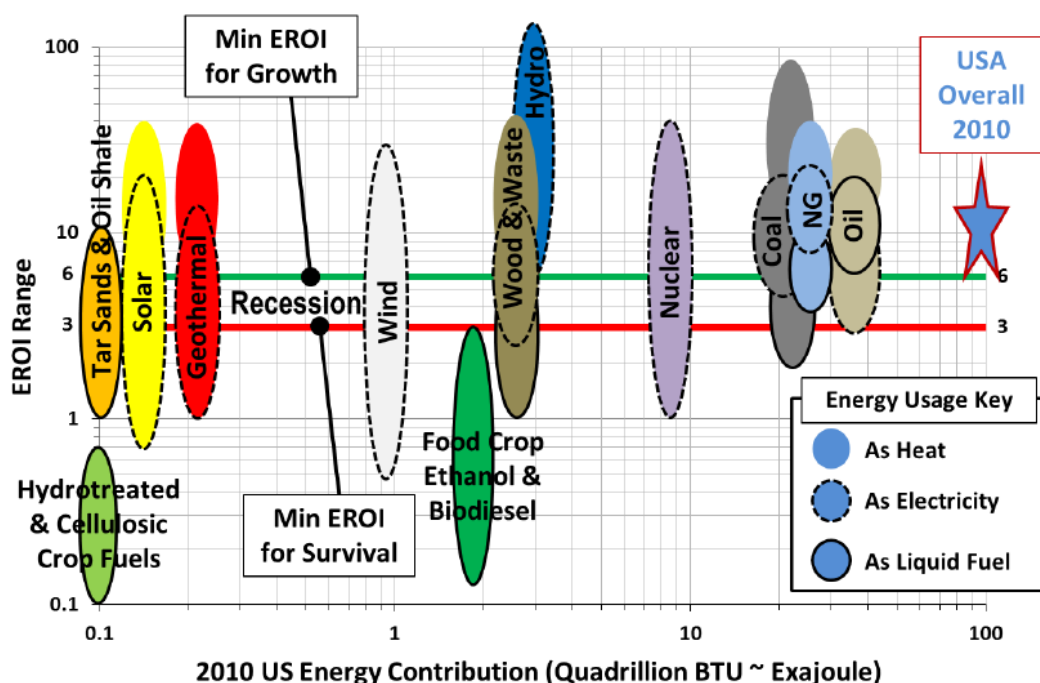
63. Air New Zealand has in recent years taken a number of worthy actions to begin to address its carbon impact, including the establishment of a Sustainability Advisory Panel. The Chair of that Panel, Sir Jonathon Porritt, stated²⁶ that the dilemma for anyone who cares passionately about addressing the multiple threats of climate change: either stop flying altogether, or fly as little and as discriminately and responsibly as possible.
64. Air New Zealand has also pioneered the testing of alternative biofuels, and entered into a corporate partnership with the Department of Conservation, which receives offset payments made by Air New Zealand passengers to invest in conservation programmes that capture and store carbon from the atmosphere.
65. However, physical evaluation of key characteristics of liquid transportation fuels has highlighted the deficiencies that preclude biomass from becoming a primary energy source and biofuels from replacing petroleum as a national-scale transportation fuel²⁷. The "Seven Deadly Sins of Biofuels" identified include:
 - i. crippling fossil fuel dependence,

²⁶ Air NZ Annual report

²⁷ <http://www.resilience.org/stories/2013-03-04/i-twenty-first-century-snake-oil-why-the-united-states-should-reject-biofuels-as-part-of-a-rational-national-energy-security-program-i-review/>

- ii. deficient EROI at scale, (e.g. Corn ethanol is barely positive at about 1.25:1 - see the figure below²⁸. Note that the minimum EROI for growth is 6 and at least 3 for survival)
 - iii. poor quality (energy density, power density, infrastructure and engine compatibility, need for hydrotreatment, etc.),
 - iv. huge environmental impact (land and water footprint, nitrate poisoning (eutrophication) and agrichemical runoff, irreversible conversion of and damage to biodiverse habitats),
 - v. higher lifecycle GHG emissions (when properly counting land use change and all N₂O, CH₄, and CO₂),
 - vi. increased global instability (food competition, "green grabbing" land confiscation, displacement of native populations, pseudo-slave labour),
 - vii. decreased energy security (higher cost, greater price volatility, annual production with no reserves, vulnerable to weather and crop failures, etc.).
66. The typical range of EROI for different energy sources and their relative contributions to the US economy are shown in the log-log Figure below. Note the barely positive ranges for crop fuels like ethanol and biodiesel. Note too, the vast majority of energy is currently derived from fossil fuels and (while there is a considerable range) that the average EROI has now declined to average around 12:1 when the first oil strikes could be as high as 100:1 (Refer to our original submission for further discussion on significance of EROI).

Energy Return on Investment (EROI) of US Energy Sources (as an example)²⁹



²⁸ <http://wici.ca/new/wp-content/uploads/2013/04/Kiefer-Snake-Oil31.pdf>

²⁹ <http://wici.ca/new/wp-content/uploads/2013/04/Kiefer-Snake-Oil31.pdf>

67. We thus disagree with the Commissioner's faith in the potential of biofuels to deliver considerable emissions reductions [F11.13].

Collective action

68. High carbon transport use is a social convention that entrenches suboptimal social and environmental outcomes for everyone. Such conventions can only be ended by coordinated action, since any unilateral exit simply disadvantages those leaving without affecting the convention itself (Mackie 1996).
69. Participation in the high-carbon air travel regime is a social convention, and effective transition from social conventions requires policy-led coordination among players (Banister & Hickman, 2013; Schwanen, 2016), which in turn promotes our moral duty to seek collective action through urgent global or sub-global policy leadership.
70. At the global level, the UN International Civil Aviation Organization (ICAO) has taken some initiatives since COP21 to try and get industry agreement to plans to reduce their carbon emissions. This includes a global market-based measure (GMBM). However, the International Coalition for Sustainable Aviation (ICSA) states that while the agreement to establish a GMBM contains some good provisions and there are also a number of troubling elements that fall short of ICSA's longstanding recommendations to strengthen the GMBM ³⁰. The ICAO GMBMs are expressed in the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) (see Higham et al., 2018), but this is considered to fall well short of the deep-cut emissions reductions in aviation that are required under COP21 (Higham et al., 2018).
71. The failures of ICAO require that sub-global (national) policy responses are now urgently put in place. Wide-reaching regulation of air travel will be possible once vanguard countries step up to lead the way.
72. Countries that adopt air transport carbon charges that return to the maintenance (e.g., environmental conservation) and enhancement (e.g., deep cut emission reductions) of their tourism sectors will enjoy immediate short-run advantages over their competitors in the sector, as they will be replacing marginal and relatively invisible price advantages under the old regime with highly visible and marketable low-carbon advantages under the new one (Higham et al., 2018).

Tourism

73. This is of course a global issue, but given the inordinate distance tourists must travel to visit, and the concomitant carbon emissions, the NZ tourist industry faces a major challenge in re-orientating itself to offer low carbon travel and experiences. As the carbon budget tightens globally it will logically restrict international travel - both incoming and outgoing - so a higher proportion of tourists will be New Zealanders.
74. Anticipating and perhaps promoting this shift would be one way the industry could help future proof itself. There is a need to start thinking, not just of managing

³⁰ <http://icsa-aviation.org/global-aviation-co2-deal-adopted-with-mixed-results-just-as-paris-agreement-takes-off/>

growth but of limiting growth³¹. As carbon limits will ultimately mean that air travel is not an option as an everyday form of travel, another way the aviation industry can remain solvent would be to diversify into other forms of transport (like, for example, petroleum companies diversifying into renewable energy).

75. Currently, incentives for travel in NZ are such that it is much more convenient and cost effective to fly than travel by bus, rail or by sharing in a vehicle, even over short distances. Perverse incentives like this will need to be reversed if we are to stand any chance of meeting emission reduction targets here and agreements internationally. These are real contributions that NZ is making to climate disruption that cannot simply be left to the industry where business incentives are to increase passenger numbers.
76. We consider that adopting the principle that those who emit GHGs should sequester them and not pay others to do it for them is showing the kind of leadership and integrity that Hon James Shaw is intending for NZ (Letter to Commissioners). And while we support a the internalisation of a greater share of the real costs of the private vehicles, there are a range of ways to achieve this, including much lower speed limits in urban areas³² [F7.16].

R9: WR recommends that any GHG transition plan includes as "domestic emissions", budget for all GHG emissions that NZ's economy is logically directly or indirectly responsible for, including embodied carbon, both the aviation and shipping industries and the future of the tourism industry

R10: WR supports the Commission's recommendations [R11.6] to broaden the Governments Policy statement on Land Transport, but consider this must be extended into a single, fully-integrated transport package for land (including rail), sea and air, that conforms with the 2050 emissions reduction target and includes demand side management [F7.16] [F11.15] [F11.16].

R11: WR recommends Government emissions related policy such as procurement and travel lead by example to minimise emissions and use offsets wherever possible.

6. Offset and Mitigation Opportunity in Landuse, Forestry and Waste

Need for genuinely integrated landscape management

77. Acceptance of a global GHG budget at Paris was international acknowledgement that we must apply much closer attention to the ecological limits (in this case, GHG emissions) to all economic activity, including landuse.
78. The need for global decarbonisation by or before 2050 for more than a half chance of retaining a liveable climate is such an ambitious path that achieving it will dictate what kind of landuse and farming enterprises are possible for the foreseeable future.

³¹ <https://indd.adobe.com/view/ba876813-8fcc-4c0a-bff9-bd8dae07b0aa>

³² <https://www.nytimes.com/2018/05/15/opinion/there-are-better-ways-to-get-around-town.html>

79. The challenge for each landowner is to design a pathway for their operation that not only complies with the remaining emissions budget to stabilise the climate, but also remains economically viable. There is much landowners can do to future proof individual operations, but WR consider that to maximise benefit and minimise tradeoff and conflict between them, a framework at landscape level is needed.
80. This is most likely to be achieved where landuses are well matched to land capability and climate changes already in the pipeline. All rural and urban actors with responsibility for and interest in landuse and resource quality need to work together to achieve the most resilient outcome for communities as a whole.

Implementation

81. Thus, WR see "catchment-based learning hubs" with cross-community representation at all levels grappling with the climate threat and how best to respond as whole communities. These would provide a platform for understanding not just natural resources, ecosystems and business systems, but also social, economic, political and governance barriers to desired change, and how these might be mitigated or aligned with emissions targets.
82. A fundamental objective would be to develop practical and more integrated land management systems to function within predicted global and local ecological limits, and which would offer practical transition pathways for landusers. Information on the full cycle emissions impacts (including embedded) and energy requirements of different farming systems will be an early requirement. Guidelines for the process might include:
 - A core focus of overall community resilience and wellbeing (ie rural and urban)
 - Place the global problems honestly and openly in the lap of communities to develop own their own rational response strategies together
 - Participatory approach, possibly learning together via iterative model building
 - Include the role of conservation in an agroecological landscape
 - The necessary resource support in terms of finance, skills, decision support tools and backup
83. For this purpose we consider that the evolving concept of "integrated landscape management" (ILM), (which seeks multi-functional benefits at scale to achieve a diverse set of landscape objectives), offers a practical framework. This is achieved through the application of ecological/regenerative land management principles and a matching up of landuse activities with specific physiographic and climatic zones. The need to address with tree plantings the likes of erosion, water quality, shelter, corridors for wildlife etc. will provide opportunity for carbon offsets [Q10.2]
84. There are significant potential gains to individual property owners and the community at large from planning at such a level. Simply focusing on ways to enhance catchment water retention (in soils, aquifers, wetlands, rivers, etc.) and carbon (in soils, vegetation cover, wetlands, etc.) will automatically enhance biodiversity and ecosystem services for both the catchment and coastline.

85. Research into soil carbon dynamics in New Zealand's pastoral soils reveals that many soils are not in a "steady state" with respect to carbon, as had previously been believed. Studies have shown significant amounts of soil carbon were lost where dairy cattle grazed flat land. In contrast, carbon levels improved under drystock grazing on hill country, while no significant changes were observed under drystock on flat land or tussock grassland in the high country³³.
86. Between 10 and 40% of the applied N is taken up by plants. Much of the remaining 60 to 90% is returned to the atmosphere as ammonia or nitrous oxide – or leached to aquatic ecosystems as nitrate³⁴. There is thus major scope to reduce adverse impacts of commonly used farming practices.

R12: WR recommend that local government facilitates a collaborative process [F7.16] with catchment communities, so those with land management interests can design resilient economic pathways that comply with the remaining emissions budget in accordance with the Paris COP21 Agreement.

R13: WR recommend that carbon conservation and sequestration in biomass and soils be actively promoted throughout the landscape as part of this programme and planned for multifunctional benefits under a changing climate.

Forestry

87. On page 64 of the draft report under "Agriculture and forestry" it states that up to 2.8 million hectares are required: 1.9 million hectares of new plantation forest and 0.9 hectares of new native forest. Given the existing extent of plantation forestry is only some 1.7 million hectares, WR is concerned that more than doubling its current extent with new plantings is highly likely to involve areas with a high risk of promoting further land instability (as in the North Island's East Coast) or wilding tree invasion, particularly in the South Island high country where the problem is already recognised as nationally significant, and continuing to extend by some 5% annually. There must be a proviso that additional plantings must be confined to sites that can be contained and not further threaten an existing wilding problem.
88. The Report acknowledges that forestry is only cost-effective over a limited period and then becomes a liability because we start running out of land to plant, and old radiata pine trees stop absorbing much carbon. We submit that the Commission puts far too much faith in forestry as the biggest driver of our emissions reductions over the next 30 years³⁵. This is particularly in light of both the environmental imperative, the implied timetable, but more fundamentally, the energy supply constraints, particularly oil³⁶.
89. The Commission needs to do more work on how we can achieve two big transformations in forestry: ensuring we plant far more permanent and lightly

³³ Schipper, L. A., Parfitt, R. L., Ross, C., Baisden, W. T., Claydon, J. J. and Fraser, S. (2010). Gains and losses in C and N stocks of New Zealand pasture soils depend on land use. *Agriculture Ecosystems and Environment* 139: 611-617. doi: 0.1016/j.agee.2010.10.005

³⁴ <http://pureadvantage.org/news/2017/05/18/farming-profitably-within-environmental-limits/>

³⁵ Oram, R. 27 April 2018. So what happens if we fail? Newsroom.pro. <https://pro.newsroom.co.nz/articles/2695-rod-oram-so-what-happens-if-we-fail>

³⁶ Oil Shortages Ahead - research and articles archive bit.ly/oilshortage

harvestable native timbers (of utilitarian value) with far fewer exotics that have short growth cycles, (particularly monoculture radiata pine which has to be harvested on time or else it suffers extensively from wind damage); and using a higher proportion of our timber as biomaterials. Doing so would significantly reduce emissions while increasing the economic returns to forest owners.

90. A not entirely unrelated matter to a sustainable low carbon future is that New Zealand is currently in major breach of the Montreal protocol aimed at protecting the Earth's vital ozone layer through its reliance on methyl bromide as a fumigant for log exports. Under this protocol, the use of methyl bromide must be phased out by 2020, whereas in New Zealand its use has increased 10-fold since 2000. By comparison, the EU has banned its use altogether³⁷.

R14: WR recommend that as part of an integrated landscape management approach, additional tree plantings be carefully matched to land suitability. Tree species selection should reconcile the likes of the long-term negative emissions reduction profile, the risk of aggravating an existing wilding problem, soil conservation, water yield, ecosystem services and biodiversity.

Waste

91. We disagree with the Commissioner's faith in increasing the waste levy to reduce waste and emissions [R14.3]. The reason is, once again, that it is more effective and reliable to control the flow if it is directed at the input or source than to indirectly controlling it from the discharge. Addressing it that way is also once again an issue of political conviction that it is sufficiently important and urgent to make a step change. The essential need is to direct effort at product stewardship of the entire materials stream - requiring business and consumers to take back and reuse.
92. Opportunities for supporting materials stewardship might include:
 - Promoting the concept of "materials management" rather than "waste management".
 - Legislation for the likes of container-deposits on reusable items and replacing hazardous plastic bags etc with safe decomposable containers and wrapping.
 - Requiring green waste and food in landfills to be composed and returned to the land.
 - Requiring all Territorial Authorities to establish stores for reusable and recyclable materials and where possible, repurposing.
 - Requiring all materials for disposal to be formally examined for recycling before they can be landfilled.
 - Full lifecycle emissions and energy analysis and reporting of all materials and products for stewardship.

R15: WR recommend that the primary focus for reducing the waste stream and associated emissions be shifted to full cycle product stewardship through national legislation.

³⁷ *The Dominion Post*, Mon 4 June 2018, p 12-13, "The toxic gas we cannot quit"

7. Pressure from population movements

93. The press release, Climate Change Assistance for Pacific, from the Minister of Foreign Affairs and corresponding Cabinet papers such as Pacific Climate Change-related displacement and migration: a New Zealand action plan³⁸ indicates the Government's awareness of the threat of climate change to the Pacific. While this is to be supported, as the increasing threats of 2 degrees C warming become realised, there will be much greater pressure from other countries, such as Australia and Indonesia on New Zealand to taking climate refugees. This is entirely consistent with encountering limits to growth.
94. In preparation for these predictable population pressures, there needs to be much more discussion about what New Zealand can and should do by way of planning for these eventualities, and an overall population policy developed.
95. By way of example, we could choose to either prohibit or control high net worth individuals and communities. Controls could include a mandatory requirement for those purchasing land to build retreats in a way that that contributed to the resilience of the community surrounding them.
96. This could be done through development contributions and other local government levies that were earmarked for community resilience initiatives in line with the six foundations of community resilience³⁹: People; Systems thinking; Adaptability; Transformability; Sustainability; Courage. A liaison within Immigration NZ should be appointed to work with these people and the TLA's and Regional Councils affected to ensure that the process works for all concerned.

R16: WR recommends there needs to be much more discussion about what New Zealand can and should do by way of planning for these eventualities and the associated population increase and migration.

8. Recognition that successful adaptation and mitigation are both necessary for a viable low carbon economy

97. We note the Commission's interpretation of its TOR is to largely omit "adaptation".
98. However we consider the Commission needs to address how to both prepare for and reduce the risk of climate disruption as a package (as does the Climate Commission Committee and presumably, the Commission) as part of an integrated approach if the future wellbeing criteria also in the TOR are to be satisfied.
99. For example, adaptation and integration may be similarly integrated when sequestering carbon in the land as it improves water holding capacity which means farms are better adapted for global warming.

³⁸ <https://www.mfat.govt.nz/assets/Uploads/Redacted-Cabinet-Paper-Pacific-climate-migration-2-May-2018.pdf>

³⁹ Six foundations of community resilience: <http://bit.ly/1U8RIBc>

100. This kind of thinking can only be done if the various departments and ministries have a mandate to co-ordinate in this way and initiatives are place, rather than discipline driven.
101. Wise Response considers that to achieve a viable low carbon economy, components of both adaptation and mitigation will be required. Arguably mitigation is taken care of if the pathway to Zero net carbon by 2050 is complied with. Moreover, they are so intertwined that it is fake and unhelpful to attempt to separate the two when planning for the future.

R17: WR recommend that a process be developed to identify potential synergies and minimise contradictory actions in adaptation and mitigation. The "sustainability" theme that underpins the RMA has specific provisions for integrated resource management, so the fundamentals are there for such an approach. This legislation would however benefit from a review of the way various agencies are structured and mandated, as well as the 2004 Amendment which prevents consideration of the effects on climate change of a specific development proposal.

9. Excessive reliance on economic pricing tools and technological fixes

102. The Draft Report's recommendation that **the tax and welfare system** be used to offset adverse impacts of such increases on the real incomes of vulnerable households is an indication of an excessive reliance on economic pricing tools. Similar statements were made when GST was introduced, but the impact was an increase in the number of poor people in New Zealand and a significant increase between rich and poor⁴⁰. There is much more that needs to be done to help all New Zealanders in the transition (see Section 14 below).
103. WR is concerned about the reliance in the Report **on innovation and technological solutions**. This is not to say that New Zealand should not support innovation and technology. There is no question that technology will bring changes to the way we care for the planet. There are many technological advances that have yet to be brought to full production that will contribute to issues such as energy, water, and food. However, while some technology has the potential to solve some of the problems of environmental impact, it does not mean that it will. The hybrid engine was developed in 1916. The average fuel efficiency of the US vehicle fleet has risen by just 3 miles per gallon since the days of the Ford Model T, and has barely shifted at all since 1991⁴¹.
104. The successful introduction of new technology is conditional on a variety of factors including government regulatory and tax regimes. An example is illustrated with carbon capture and sequestration plants in the USA. American Electric Power

⁴⁰ <http://wiserresponse.org.nz/wp-content/uploads/2018/05/Tax-Working-Group-Wise-Response-Submission-Final-300418.pdf>

⁴¹ Glaskin, M (2009) US vehicle efficiency hardly changed since Model T. New Scientist. Retrieved from <http://www.newscientist.com/article/dn17506-us-vehicle-efficiency-hardly-changed-since-model-t.html>

announced in 2011 that it was not going to proceed with plans to build a full-scale carbon-capture plant at Mountaineer, a 31-year-old coal-fired plant in West Virginia, where the company has successfully captured and buried carbon dioxide in a small pilot program for two years. The company would not continue with the larger, \$668 million project because they did not believe state regulators would let the company recover its costs by charging customers, thus leaving it no compelling regulatory or business reason to continue the programme⁴².

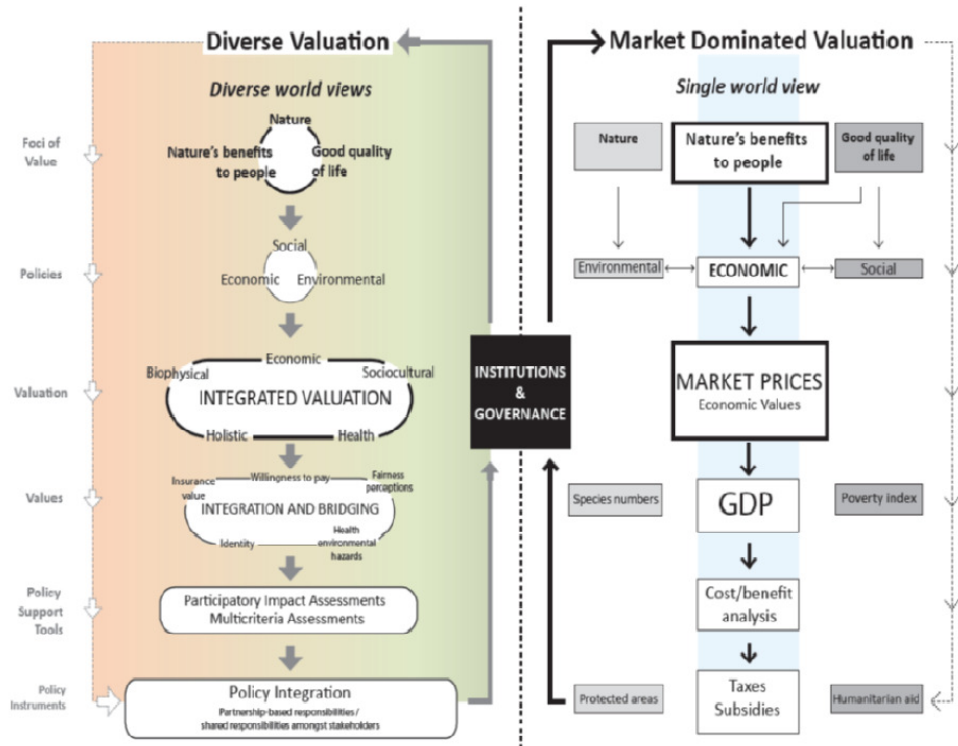
"No technology can solve the climate problem on its own. Even in combination, today's remedies – renewables, nuclear and energy efficiency – hardly seem up to the job. To have a reasonable chance of keeping down the rise in temperature to less than 2 °C, industrial economies need to reduce emissions by 80% by 2050. The true scale of this challenge is not widely understood. A thorough study of options for such cuts in California, long a leader in energy efficiency, concluded that with today's technology and plausible extrapolations of it, 60% was the best that could be done. If California can't do better than that, says Jane Long, of Laurence Livermore National Laboratory, who led the study, 'neither can anyone else'"⁴³.

105. As leading transition thinker Ted Trainer asks, "if technology is going to help us reduce gross emissions, when's it going to start?". This question highlights the issue of "Jevon's paradox", where relative decoupling of GDP and energy is more than countered by increases in production and profit taking. This is enabled by the very energy efficiency improvements that were supposed to reduce the amount of energy consumed.
106. Similarly, the dependence of modern technology on rare earths assumes reliable future supply. This assumption is not justified (see Appendix B).
107. The difference in key features of a heavily price-dependent resource allocation system, and one based on a more diverse but integrated approach, are shown in the Figure below. We consider that the latter approach is more suited to finding a solution to the emissions challenge and that it should be supported by an ecological or biophysical economic system grounded in the principles in Box 1: Thermodynamics, Entropy and Economics. It appears that this however requires a further review outside the scope of the current Productivity Commissions brief.

R18: WR recommends that it is made clearer that carbon pricing and technology alone will not bring about the changes necessary for caring for the Earth by maintaining biodiversity as well as ecosystem function and services. To achieve this will require a parallel shift in both our economy from BAU to an economy based on ecological and biophysical principles, and in the values and beliefs that underpin our human-earth and human-human relationships.

⁴² Kanter, J. 31 July 2011. Obstacles to Capturing Gas. NY Times. Retrieved from www.nytimes.com/2011/08/01/business/global/obstacles-to-capturing-carbon-gas.html?pagewanted=all

⁴³ Morton, O. 2012. The Dream that Failed. Special Report on Nuclear Energy. Economist March 10 p 15



10. Changing Investment Patterns

108. The section addresses the Draft Report's recommendations [R6.1], [R6.2], [R6.3], [R6.4].

Responsible Investment

109. These recommendations are limited and timid in part because of the superficial understanding conveyed in the Report about Responsible Investment (RI). The large majority of RI standards are conceptually muddled, and are often used to claim respectability while investing in companies that are behaving in contradiction to codes such as the Universal Declaration of Human Rights, or environmental codes or standards codes that are based on robust science. Examples include the NZ Superannuation Fund and ACC. This is elaborated on in Appendix C.

R19: WR recommends that the Government adopt ethical investment principles or a charter along the lines in BOX C1 for all its agencies that it is directly or indirectly responsible for.

R20: WR recommends that the Government exercises its role in regard to its own investments, where it provides grants and subsidies, its contracting of goods and services, and its responsibility to appoint members to boards or funds or subsidises in some way or other. These include the New Zealand Superannuation Fund, the Accident Compensation Corporation, civil servants pensions, Kiwisaver pensions, universities, local government, insurance companies and banks, and the appointment of people to non-profit boards including Foundation North and TSB Community Trust (which owns TSB Bank).

R21: WR recommends that the group within the NZ Superfund, that carries out evaluations of the ethical nature of companies that it does or could invest in, and the engagement with those companies to change behaviour, be separated out

into an independent agency along the lines of the Norwegian and Swedish models for their sovereign wealth funds, so that it can provide assistance to the many agencies mentioned above.

110. We support the recommendations R6.2 and R6.3. However, the movement towards using that information by many overseas companies to improve behaviour, is often small and slow, and restricted by inferior and weak industry and sector codes of conduct and standards for acceptable behaviour. This includes the UN Principles for Responsible Investment (UNPRI). There needs to be a much more active part played by investors in encouraging investment to move into a set of responsible behaviours that care for people and the planet, rather than exploiting and destroying humans and degrading the Earth.
111. The Draft Report ignores the substantial number of government and institutional investors internationally who have divested from fossil fuel companies. It ignores the role of engagement that investors do and can play in changing unacceptable company behaviour. It also ignores the active role that Government can play through its own investments and procurements, directly and indirectly.

Green Investment Fund

112. In theory, there should be no need for a Green Fund, if existing financial institutions and agencies are doing their job according to proper RI principles. In practice, this is not the case, and the move towards that situation is not likely to happen with the speed and urgency required.

R22: WR supports the establishment of a Green Fund. We do not support the cautious approach in [R6.1] but supports recommendations [R6.2] and [R6.3].

11. Laws and Institutions are Not Fit for Purpose

113. This section considers Chapter 7, Laws and Institutions, in the Draft Report. WR submits that this chapter omits consideration of the adequacy of our current laws and institutions because the wrong questions were asked.
114. First, in reply to Question 12.1, we consider the present RMA unduly constrains investment decisions. Together with the present Local Government Act it hinders the ability of regional and local councils to act quickly and effectively to reduce emissions and places an excessive reliance on the ETS to achieve emission reductions. There is widespread international evidence that multi-level governance approaches will be needed to combat climate change⁴⁴.
115. Second, if it is accepted that humankind needs to live within the capacity of the Earth's resources to support human and other life, but is our current law fit for purpose for authorising, regulating, directing, constraining and penalising

⁴⁴ Multi-level governance and climate change mitigation in New Zealand: lost opportunities Julia Harker, Prue Taylor & Stephen Knight-Lenihan
Climate Policy 17 (2017), 485-500. <https://doi.org/10.1080/14693062.2015.1122567>

companies and organisations and their actors whose actions are contrary to this acceptance? How accountable are owners and/or board directors and/or senior management when their companies or organisations destroy or damage the basis of our health and survival? What penalties do they face (including personal penalties)? Companies are not the only organisational forms that should be considered: cooperatives and family businesses should be included.

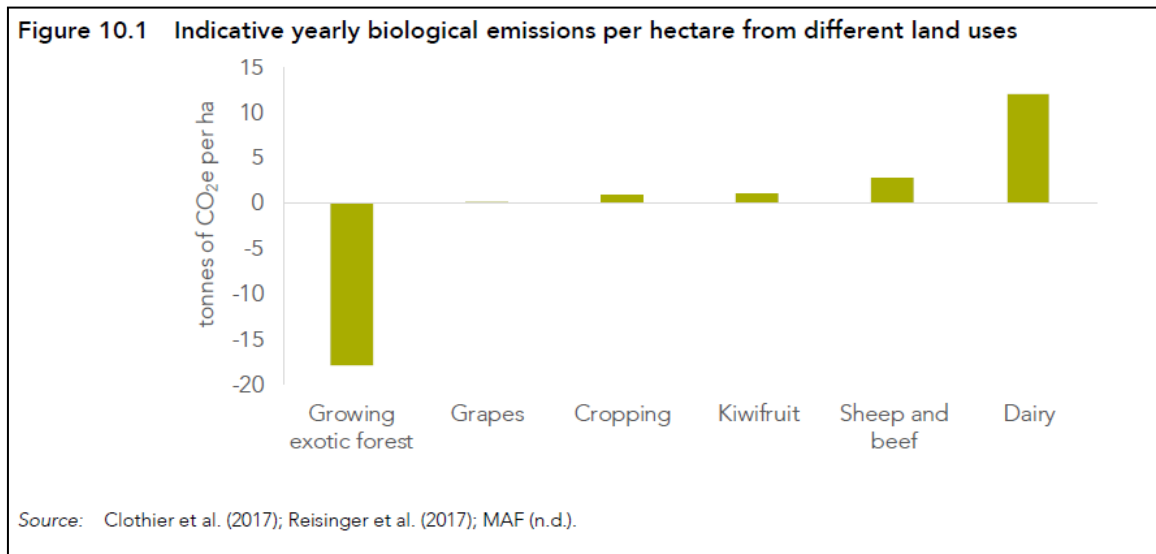
116. When these questions are considered, companies, family firms, and cooperatives are not fit for purpose in meeting societal needs to care for the Earth, rather than exploit it.
117. Adopting legislation based on requirements for mandatory consideration of stakeholders would place the judiciary in a very awkward position choosing between stakeholders: instead it requires Parliament to pass laws and regulations that place obligations on directors and senior managers to observe stakeholders' essential needs.
118. The examples of Pike River Mine, Tiwai Point Aluminium Smelter, Clear Ridge Station Ltd and Beejay Stud Ltd, demonstrate that existing laws are inadequate in bringing the failures of board directors and managers to account. The law should be changed so that appropriate criminal and financial penalties can be applied to both company and personally for directors and senior management.
119. The example of Tui and Martha Mines raises questions about the adequacy of bonds for rehabilitation. More generally, the use of bonds for protecting society against risky actions that could seriously damage parts of our environment, is worth extending to include such activities as fossil fuel explorations and harmful toxin and chemical production. Bonds should not just be for companies, but a requirement for directors and senior management personnel.
120. While these steps would reduce the likelihood of significant abuse of our environment, it does not necessarily address the more fundamental and difficult issue of humans living within the capacity of Earth's life support systems. There are other initiatives necessary for this accomplishment, but establishing proper laws for full accountability at the organisational level is an important step.
121. More detailed discussion is contained in Appendix D.

R23: WR recommends that laws should be changed so that appropriate criminal and financial penalties can be applied to both company and personally to directors and senior management when serious social and environmental abuses occur. This should be extended to include cooperatives and family firms.

R24: WR recommends that the use of bonds for protecting society against risky actions that could seriously damage parts of our environment, is worth extending to include such activities as fossil fuel explorations and harmful toxin and chemical production. Bonds should not just be for companies, but a requirement for directors and senior management personnel.

12. Implications of a deterioration of the international economy and engaging with all NZ citizens

122. The Draft Report does not take into account the likely influence of the world's economy, as the effects of climate change impact on it. It is very difficult to accurately predict what economic circumstances will be like in 30 years and onwards. But there is absolutely no doubt that climate warming and destabilisation will have an adverse effect on the international economy and the reliability of food supplies.
123. This will be further aggravated by the converging influence of degradation in the quality of many other environmental elements. We cannot assume a BAU model (perhaps with some tweaks for certain externalities), will be the likely scenario.
124. Indeed, based on the mainstream scientific analyses provided in our original Submission to the Commission, it is far less probable that BAU can continue for much longer. This fact has not received the attention it demands in the report.
125. A limitation of relying primarily on the ETS to shift emissions is that it does not necessarily engage all citizens in any direct way. Yet we understand the importance of "team spirit" to success in sport, business, politics and many other aspects of life.
126. We also know that it is hard for individuals to commit to change, no matter how worthy when it requires a community-wide commitment. Indeed, this argument has been proffered as the reason for tiny NZ not to act in its own right against climate change for the last decade.
127. So while an emissions cap for NZ provides a cumulative target for a safe climate, it does not necessarily create an obligation or an incentive for each individual to support the process or, as some may wish, do more than their fair share [F10.11].
128. Judging by the record to date of addressing global warming at an international level, the Society has a lot more faith in a widely based, bottom-up response. With the right support, there are many things that we can all start to do. Examples include setting up equipment sharing schemes, installing solar hotwater systems to reduce electricity demand and its emissions, improving public rail and road transport and facilities and changing our diet.
129. Figure 10.1 below from the Commissioner's report shows clearly that major reductions in GHG from agriculture could be achieved simply with a shift from meat to a more plant-based diet. USA Biotech company, "Perfect Day" claims its synthetic protein reduces GHG by 84%, landuse by 91%, energy by 65% and water consumption by 95% which if correct could greatly contribute to a transition economy.



130. Given the challenge of supporting growing technical complexity in a resource-constrained economy, diminishing material and energy stocks, environmental degradation and loss of natural ecosystem services, in the face of growing population and demands, and the logical conclusion is to deliberately simplify technology.
131. In this context, a vision of shifting from an economy based on "yesterdays fossil energy" to one based on "today's solar energy" (or renewables) offers a more positive and marketable vision for educational purposes than one of "low emissions".

R25: WR recommends that the Commission's report specifically acknowledges and addresses the evidence for a deterioration in the global economy (caused by global warming and associated climate disruption and other threats such as freshwater availability and ocean acidification) or another, but more persistent GFC and their potential to disrupt normal commerce, production and food supply chains.

R26: WR recommends that any plans for New Zealand to move to a low carbon economy should include dialogue with all levels of the community, of the threats, risks and opportunities for New Zealanders to mitigate and adapt. Economic tools are not sufficient, and informed consultation and education initiatives should be set up to empower all New Zealanders to respond and contribute to the necessary transition.

13. Need for profound shifts in values and culture.

132. If we as a species are to survive, we need to live within the capacity of the Earth's life support systems. We are currently not doing this, in part because of an outdated economic model (BOX 1; Thermodynamics, Entropy and Economics, p10). Another, just as important factor, is the ethical principles and philosophies that are dominant. The current economic model relies on Utilitarianism, and the right to use the Earth's resources for human utility. That needs to change.
133. While traditional ethics, including Aristotelian, Social Contract, Utilitarian or Consequentialist, has primarily dealt with human-human relationships, there have

always been people throughout history who have included human-Earth relations in their ethic. These include people from many indigenous cultures, Francis of Assisi, Blake, Wordsworth, John Muir (Sierra Club), Gandhi, Rousseau and Schweitzer. German foresters influenced in part by Rousseau, and the movement promoting wilderness, included a human-Earth perspective, into their thinking⁴⁵. But it was twentieth century scientists such as Rachel Carson⁴⁶ and Aldo Leopold⁴⁷ who led the modern development in environmental ethics. While religions have at times supported dominance over the Earth, The Forum on Religion and Ecology at Yale⁴⁸ documents the widespread principle throughout religions that have a concern for what Pope Francis calls Care for our Common Home⁴⁹.

134. Ethical issues were also recognised by scientists working with climate change. The Intergovernmental Panel on Climate Change (IPCC) was set up to advise the United Nations Framework Convention on Climate Change (UNFCCC) on the issues of climate change. The First IPCC assessment Report dealt mainly with the science. But subsequent Reports and the literature debate around these Reports, picked up the issues related to the Articles and Principles of the UNFCCC, namely, equity, cost effectiveness and economic analysis, sustainable development, and (to a lesser extent) governance. One of the writers on the IPCC Working Party Group III in the early 1990's, Grubb, recognised a number of the ethical issues⁵⁰. He identified the issues of fairness (equity) between countries and generations. He picked up a third issue put forward by Shue, namely the process of representation and effective participation. Grubb reported on the economic calculations by such economists as Nordhaus, which rests on a utilitarian philosophy and obscures the important differences in climate change effect between countries and generations, and the valuing of life.
135. Despite these developments, we have not yet been able to translate these values into the way we live and use Earth's resources. Environmental ethics has been most concerned with the moral grounds for protecting the welfare of non-human animals, the moral foundations for laws protecting endangered species, and the ethical basis for preserving and restoring degraded environments. There are a number of ethical concepts and principles on which to base a human-human and human-Earth ethic. These include respect for nature, care for the earth, intrinsic

⁴⁵ a) Grove, R. 1995. *Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism, 1600-1860*. Cambridge: Cambridge University Press.

b) Guha, R. 2000. *Environmentalism A Global History*. NY: Longman.

⁴⁶ a) Carson, R. 1963. *Silent Spring*. London: Hamish Hamilton.

b) Carsen, Rachel <http://www.rachelcarson.org/>;

⁴⁷ a) Leopold, A. 2003. *The Land Ethic*. In: Light, A and Rolston III, H (Eds) *Environmental Ethics An Anthology*. Oxford: Blackwell Publishing. 38-46;

b) Leopold, A. 1949. *A Sand County Almanac*, Oxford University Press

c) Leopold, A <http://www.aldoleopold.org/AldoLeopold/LandEthic.pdf>

⁴⁸ <http://fore.yale.edu/about-us/>

⁴⁹ http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

⁵⁰ a) Grubb, Michael, 1995, Seeking Fair Weather: Ethics and the International Debate on Climate Change, *International Affairs*, 71,3, 463-496.

b) Grubb, Michael, 2006, The economics of climate damages and stabilization after the Stern Review, *Climate Policy*, 6, 505-508.

value. The Earth Charter uses a number of concepts including respect, ecological integrity, care, equity, justice⁵¹. Until we adopt and use such concepts as equity and respect for nature or similar concepts, enabling us to live within the capacity of the Earth's life support systems, we will be denying any desirable kind of life to future generations⁵².

136. Another indicator of overshoot and collapse is the increasing global divide between the rich and poor demonstrated by global increasing homelessness. This divide is growing faster in New Zealand than in any other developed country. In his book *Capital in the Twenty-First Century*, economist Thomas Piketty (2013) argues that this divide will continue to widen as long as political decision-makers continue to tax income rather than wealth derived from capital gains. Best use of diminishing resources in a lower carbon economy will be achieved if this is more equitably distributed.

137. The statement in the Terms "how to maximise NZ's comparative advantages in a carbon constrained world" illustrates an outdated economic approach as the priority now is to conserve and share the increasingly limited resources we will have.

R27: WR recommends that government, business and civil society's Codes of Conduct or ethical standards include a human-human ethic based on the fairness, and a human-Earth component that recognises the value of the natural world. We must develop an ethic other than exploitation of the Earth's resources for human utility as the dominant principle. The Earth Charter is one example of developing ways of caring for the Earth so as to live within the capacity of the Earth to support human and other life in sustainable ecosystems, both natural and managed.

⁵¹ Earth Charter. Retrieved from <http://www.earthcharterinaction.org/content/pages/History.html>

⁵² Elijah R. Cetas and Ma'ī Yasu'e, A systematic review of motivational values and conservation success in and around protected areas

14 List of contributors to his submission

This submission has been shared and developed with a Wise Response discussion list of 50 persons, many having academic expertise in different areas. Creating a coherent message from such a range is not easy which goes some way to explain its length!

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Thankyou for the opportunity to submit. The Society wishes to be heard on this issue if the opportunity is provided.

Appendix A

Tradable Energy Quotas in Brief⁵³

1. Tradable Energy Quotas" (TEQs) is a system to enable nations to reduce their emissions of greenhouse gases along with their use of oil, gas and coal, and to ensure fair access to energy for all.
2. There are two reasons why energy-rationing may be needed: i) Climate change: to reduce the greenhouse gases released into the air when oil, gas and coal are used. ii) Energy supply: to maintain a fair distribution of oil, gas and electric power during shortages.
3. TEQs are measured in units.
4. Every adult is given an equal free Entitlement of TEQs units. Industry and Government bid for their units at a weekly Tender.
5. At the start of the scheme, a full year's supply of units is placed on the market. Then, every week, the number of units in the market is topped up with a week's supply.
6. If you use less than your Entitlement of units, you can sell your surplus. If you need more, you can buy them.
7. All fuels (and electricity) carry a "rating" in units; one unit represents one kilogram of carbon dioxide, or the equivalent in other greenhouse gases, released when the fuel is used.
8. When you buy energy, such as petrol for your car or electricity for your household, units corresponding to the amount of energy you have bought are deducted from your TEQs account, in addition to your money payment. TEQs transactions are automatic, using credit-card or (more usually) direct-debit technology.
9. The number of units available on the market is set out in the TEQs Budget, which looks 20 years ahead. The size of the Budget goes down year-by-year – step-by-step, like a staircase.
10. The Budget is set by the Energy Policy Committee, which is independent of the Government.
11. The Government is itself bound by the scheme; its role is to find ways of living within it, and to help the rest of us to do so.
12. TEQs are a national scheme, enabling nations to keep their promises, guaranteeing their carbon reduction commitments within whatever international framework applies at the time.

Appendix B

Rare Earths

There is a question about the reliance of modern technology on rare earths and its supply in the amount required to have enough impact. China controls about 40% of all rare metals, and is the leading global producer of 28 advanced metals. But instead of exporting rare earths to help create jobs in Japan and elsewhere, China wants to build

⁵³ <https://www.flemingpolicycentre.org.uk/EnergyAndTheCommonPurpose.pdf>

high-tech plants in China and employ Chinese. Already every major wind turbine manufacturer has moved operations to China. Historically the United States supplied all the cerium and neodymium for General Electric's light bulbs, but all that is now done in China.

It is the greater use of rare metals in modern technology that makes rare earth metals so important. Rare metals make the products such as computers, iphones, tablets, smaller, faster and more powerful. They make permanent magnets that are found in automobile, medical and military products. They are at the core of a lot of green technology, such as electric cars, solar and wind power. They are used in a variety of goods, such as toothbrushes. An electric toothbrush needs circuit boards dotted with materials of tantalum in a capacitor to store energy; neodymium, dysprosium, boron, and iron magnet to provide the power to spin brushes at 31,000 strokes per minute; batteries made from nickel and cadmium or lithium. The 35 metals needed come from 6 continents.

Cobalt is used in the manufacture of permanent magnets. In the 1970's 40% of cobalt came from Zaire. Soviet backed rebels fought Mobutu and the price increased and supply became unreliable. Arising from that period efforts were made to reduce dependence on cobalt. Sagawa in Japan did create a permanent magnet without cobalt, using dysprosium. This is mainly found in China. In 2010 when China was in dispute with Japan over East China Sea islands, the supply of neodymium and dysprosium was halted until China's demands were met. China lost two WTO cases over its export quotas, but the general strategy of better control and local value added production will not change.

China has been able to produce many of its rare metals due to lower labour costs and environmental standards. Their inadequate environmental standards have led to significant degradation, particularly around the mines. According to Beijing officials, 2000 kilograms of tailings are created to produce every kilogram of rare earths, and some officials believe that they have sacrificed the country's environment for little profit. From a Chinese perspective countries have outsourced their pollution to it. A good deal of the rare metal that China produces could not be done elsewhere (such as Japan) because of environmental regulation. To deal with the environmental degradation worldwide, costs will rise across the whole cycle.

But the biggest concern for rare metal supply lines, according to Abraham from the Technology, Rare and Electronics Materials Center, may be that our new energy saving gadgets work too well and that green tech will quickly become the best tech. With the demand to avoid the impact of climate warming, technology will become dependent on rare earth metals in quantities that are unlikely to be available. Costs will rise and political conflict is likely⁵⁴.

The recent report about how China is involved in rare earth developments in Greenland, does nothing to allay these concerns⁵⁵.

⁵⁴ Abraham, D. 2015. The Elements of Power. Yale University Press.

⁵⁵ Throwing off the Danish Yoke. Economist. May 5 2018. P44.

Appendix C

Responsible Investment ⁵⁶

In the USA, the forum for sustainable and responsible investment is US SIF. They use the term 'responsible investing' to mean 'community investing,' 'ethical investing,' 'green investing,' 'impact investing,' 'mission-related investing,' 'responsible investing,' 'socially responsible investing,' 'sustainable investing' and 'values-based investing,' among others ⁵⁷.

In Europe, EUROSIF is the European association for the promotion of sustainable and responsible investment. EUROSIF states that there is no consensus on a unified definition of responsible investment. Their scope includes "any type of investment process that combines investors' financial objectives with their concerns about environmental, social and governance (ESG) issues." They include sustainability themed investment; best-in-class investment selection; exclusion of holdings from the investment universe; norms-based screening; integration of ESG factors in financial analysis; engagement and voting on sustainability matters; impact investing⁵⁸.

The Global Sustainable Investment Alliance, the international body that draws on the work of the regional bodies such as EUROSIF and US SIF, states in its 2014 Report that globally the proportion of RI relative to total managed assets was 30.2%. The corresponding figure for Australia and New Zealand was 16.6%⁵⁹. This is despite the USA having at least 9 definitions of RI, and the Europeans stating that there is no consensus but identifying at least 7 definitions.

The difficulty with this problem of definition is that it hides the fact that if the goal posts or the tent (choose your metaphor) are so wide or big, then choosing a genuinely responsible company is very difficult. Take the notion of best-in-class investment. This involves selecting the best companies in sectors. But there are some categories where investment is not morally justified. How does one select the best tobacco company? By choosing those that grow their tobacco organically, or dry the tobacco using renewable energy? Investment in the best performing coal companies cannot be justified when using coal contributes significantly to climate warming and the sector needs to be closed down. If you exclude tobacco only and hence qualify as a responsible investor via the category of exclusion of holdings from investment universe, does this make you an ethical investor when you invest in all the other immoral companies?

The problem with ESG definitions is that these are not moral terms and measures. What social behaviour is morally right or wrong? What environmental impact is moral or immoral? What governance standards are acceptable or unacceptable? The ESG framework is lacking in this moral dimension, and standards and codes such as the United Nations Principles of Responsible Investment, and the Investor Group on Climate Change which are based on ESG are not valid.

Validity is where a measure or standard actually measures what it is intended to measure. There are two steps to establish whether this is the case: content and construct validity. To be a valid measure, both tests need to be passed. Content validity requires consideration at a conceptual level: does the measure make sense?

⁵⁶ This draws upon Howell, R. 2017. Investing in People and the Planet. ISBN 978-0-473-38418-0. Distributed by Quaker Books: quaker.books@quaker.org.nz

⁵⁷ USSIF <http://www.ussif.org/>

⁵⁸ EUROSIF <http://www.eurosif.org/>

⁵⁹ Global Sustainable Investment Alliance. Retrieved from http://www.gsi-alliance.org/wp-content/uploads/2015/02/GSIA_Review_download.pdf

Example: if a measure of health was defined simply as absence of injury, it would not be valid because health is understood to include other forms of ill health such as illness. Construct validity requires empirical considerations: is the application of the measure consistent with other empirical evidence?

Regarding content validity, ESG definitions need to go beyond a superficial level, and define what social or environmental impacts are responsible or not, and as such the ESG approach is conceptually deficient because the conceptual work needs to occur beyond this superficial level ⁶⁰.

Regarding construct validity (does the application of the measure conform with other empirical evidence), one of the Co-Chairs of the Expert Group that drafted the United Nations Principles of Responsible Investment, has stated that the Responsible Investment community has not been more responsible than the investment community generally.

“(T)he trillions of dollars controlled by RI asset owners, managers and consultants are not deployed consistent with long term investment strategies that would conduct our economies in a direction consistent with sustainable development, environmental protection, and greater economic justice – which would imply radical departures from what the market feels comfortable with and the valuation it puts on the large cap listed shares that dominate most global portfolios” ⁶¹.

Simply adopting the UNPRI does not therefore imply responsible behaviour, and is a very inadequate moral compass.

Norwegian Sovereign Wealth Fund Model

The Norwegian Government’s approach is a good model to start with. The Graver Committee was set up in 2002 to recommend ethical guidelines to the Storting (parliament). The Storting adopted these, and the Ministry of Finance made them effective from December 2004. The Council on Ethics was established by Royal Decree at the same time. The Act relating to the *Government Pension Fund – Global* gives the Ministry of Finance responsibility for management of the Fund. The Ministry of Finance has delegated operational management of the Fund’s capital to Norges Bank. The Council of Ethics evaluates whether potential investments in financial instruments are inconsistent with the ethical guidelines.

A possible Ethical Investment Principle or Charter using the Norwegian approach is contained in Box C1.

BOX C1 : Possible Ethical Investment Principle / Charter

The two general principles for investment shall be based on fairness for people and care of the Earth. The latter notion shall entail living within the capacity of the Earth to support human life. It shall include the concept of kaitiakitanga.

⁶⁰ Howell, R. 2013. United Nations Principles of Responsible Investment (UNPRI) and the Four Australian Banks. Retrieved from <http://a-resilient-world.blogspot.co.nz/2016/08/united-nations-principles-of-responsible.html>

⁶¹ Joly, C. 2012. Reality and Potential of Responsible Investment, in Responsible Investment in Times of Turmoil. Ed Vandekerckove, W et al. Dordrecht: Springer

In applying these principles the Fund shall avoid unacceptable risks contributing to unethical acts or omissions, such as violations of fundamental humanitarian principles, serious violations of human rights, gross corruption or severe environmental damage. The Fund shall screen out companies that either themselves, or through entities they control, produce weapons that in their normal use may violate fundamental humanitarian principles. They also exclude companies considered to pose an unacceptable risk of contributing to serious or systematic human rights violations, such as murder, torture, deprivation of liberty, forced labour, child labour and other child exploitation; serious violations of individuals' rights in situations of war or conflict; severe environmental damage; gross corruption; and other particularly serious violations of fundamental ethical norms.

The only exception shall be when the Fund wishes to engage with a company in an attempt to persuade it to change its policies and behaviour. The Fund shall regularly report on how the companies, entities and their subsidiaries that it invests in meet these principles, and the effects of any engagement that it undertakes.

Negative screens or exclusions will include organisations involved in industries like:

- armaments and weapons systems;
- nuclear power;
- gambling;
- tobacco;
- animal exploitation and experimentation;
- significant environment abuses;
- high carbon emissions;
- gas, oil and coal extraction and production companies.

NB This draws on the Norwegian Government's ethical guidelines for investment.

If we compare the Norwegian Sovereign Wealth Fund's exclusions and see if the NZ Superfund is invested in these companies that the Norwegians exclude, then some examples show that the NZ Superfund is unethical because it invests in companies that breach serious violations of human rights; severe environmental damage; gross corruption; and other serious violations of fundamental ethical norms.

BOX C2 : Examples of Norwegian Fund Exclusions (NZSF Inclusions)

- Serious violations of Human Rights:
Walmart (human and labour rights)
- Severe Environmental Damage :
Bharat Heavy Electricals (building coal plant near forests in Bangladesh)
Duke Energy (discharges from coal-fired plants)
IJM Corp (palm oil plantations)
- Gross Corruption
ZTE Corp (bribery and corruption in 18 countries)
- Other Serious Violations of Fundamental Ethical Norms
Potash Corp Saskatchewan (phosphate from Sahara)

The full analysis of these breaches is available on the Norwegian Council of Ethics website.

Engagement

The most widely quoted engagement is that against apartheid, but more recent examples deal with GE, Nucor, mining lobbies, and fossil fuel divestment.

General Electric

It is widely accepted that the most successful shareholder advocates are the Interfaith Center for Corporate Responsibility (ICCR, 2016), founded in 1971 in the USA by Catholic, Protestant and Jewish investors. With others, a coalition of Catholic nuns from ICCR, petitioned General Electric (GE) to report on greenhouse gas emissions and the steps the GE Board could take to promote energy efficiency and deal with climate change. Twenty three per cent of GE's investors gave support (Davis, et al, 2006). The management then investigated and found that they could increase profits by over \$10 billion in five years by adopting energy efficient goods and services. In 2005 it announced its project called 'ecomagination' to do just that. Over eleven years to the end of 2015, GE had invested \$17 billion in clean tech research and development through Ecomagination while making \$232 billion in revenue from its products ⁶². (Questions need to be asked about strategic business models when one of the world's mightiest corporations, General Electric, needs a coalition of Catholic nuns to draw its attention to the business opportunities of energy efficiency!).

Nucor

Another example concerns the production of pig iron in Brazil, which for many years was produced through slave labour. The charcoal produced at camps in the Amazon was used to make pig iron, which is ultimately sold to international buyers including Nucor, the largest steel producer in the United States. Domini Social Investments and the ICCR on behalf of 11 USA based Funds, submitted three shareholder proposals to Nucor in 2008, 2009 and 2010, seeking the protection of fundamental human rights in its global operations and supply chain, and a public report to shareholders. Eventually Nucor signed the National Pact for the Eradication of Slave Labor, and worked with Citizens Charcoal Institute, an association of Brazilian iron and steel companies formed to combat slavery in their supply chains and agreed to comply with its requirements ⁶³.

Mining Advocates

Another recent successful engagement, closer to home deals with mining companies support for mining advocacy groups. Michael Slezak reported that the voice of Australia's coal lobby is under renewed threat as the country's second biggest miner, Rio Tinto, faced a shareholder revolt over its membership of lobby groups including the Minerals Council of Australia and the role it plays in Australia's climate and energy debate. Global investors worth \$84bn joined together to file a shareholder motion calling on Rio Tinto to rethink its membership of the MCA, NSW Minerals Council (NSWMC) and the Queensland Resources Council (QRC). It demands Rio Tinto reveal all membership fees paid since 2012, review the consistency of the MCA's lobbying positions with those held by Rio Tinto, and disclose what it would take for Rio to quit its membership of the MCA. The resolution was submitted by the Australian Local Government Super, the Church of England Pensions Board and the Seventh Swedish National Pension Fund (AP7).

⁶² Heimer, M. Aug 21 2016. Here's How 5 World Changing Companies are Helping the Environment. Fortune. Retrieved from <http://fortune.com/2016/08/21/change-world-company-environment/>

⁶³ Kanzer, A. 2011. Building Sustainable Communities through Multi-Party Collaboration. Retrieved from www.iccr.org/publications/2011SSRG.pdf.

The action was coordinated by the Australian Centre for Corporate Responsibility (ACCR), which successfully forcing the country's biggest miner, BHP, to agree to similar demands. When ACCR coordinated a similar motion filed at BHP's annual general meeting, despite it not winning a vote, BHP agreed to conduct a review of industry associations. That review announced plans to leave the World Coal Association, and declared BHP would quit the MCA if it did not change the way it lobbied for coal ⁶⁴.

Fossil Fuel Divestment

As at May 2018, the approximate value of institutional divestment was \$6.09 trillion ⁶⁵. Notable institutions included Rockefeller Brothers Fund, Norwegian Sovereign Wealth Fund, New York City. New York City is also suing the fossil fuel companies ⁶⁶.

Government's Role

The Government has a role in regard to its own investments, its influence where it provides grants and subsidies, its contracting of goods and services, and its responsibility to appoint members to boards. The investing bodies that the Government is responsible for (including its responsibilities as an employer), or funds or subsidises in some way or other, include the New Zealand Superannuation Fund, the Accident Compensation Corporation, civil servants pensions, Kiwisaver pensions, universities, local government, insurance companies and banks. The Government also appoints people to non-profit Boards including Foundation North and TSB Community Trust (which owns TSB Bank). There is currently a hodgepotch approach with no consistency. The NZ Superfund recognises the need to deal with fossil fuel investments (on long term economic grounds, not moral reasons), but the ACC does not. A comprehensive approach is needed.

Currently the New Zealand Superannuation Fund has a unit that carries out evaluation and engagement. It is understood that information is available informally to a limited number of other Government Funds such as ACC. The work required for evaluation and engagement is not cheap, and it is silly to expect this work to be done for a limited number of agencies, and duplicated by the many others. That is a waste of taxpayers money. Also joining with other engagement groups overseas improves its efficacy.

Because the taxpayer finances the Fund, its advice should be made available to all New Zealand Government agencies dealing with investment. That is best done by separating out that operation into a separate independent unit, such as the Norwegians and Swedes have done. It could be attached to the NZ Super Fund for administrative support but governed and managed independently. The advantage of this separation is that it can then act provide evaluation and engagement services to all the other government and government related agencies. But it is best done when all these agencies have the same or similar charter. The Government and all its agencies uses banks and insurance. The Australian-owned banks that operate in New Zealand invest in fossil fuels. Major overseas insurance companies are often no better. When the Government contracts out for banking and insurance services, it should factor into its decision-making criteria how responsible they are, and what plans they have to use their investments responsibly.

⁶⁴ Slezak, M. @ March 2018. Rio Tinto faces \$84bn shareholder revolt over membership of Minerals Council. Guardian. <https://www.theguardian.com/business/2018/mar/02/rio-tinto-faces-84bn-shareholder-revolt-over-membership-of-minerals-council>

⁶⁵ Fossil Free Divestment. <https://gofossilfree.org/divestment/commitments/>

⁶⁶ Milman, O 10 Jan 2018. Guardian. <https://www.theguardian.com/us-news/2018/jan/10/new-york-city-plans-to-divest-5bn-from-fossil-fuels-and-sue-oil-companies>

Appendix D ⁶⁷

Organisational Fit for Purpose

Introduction and Summary

If it is accepted that humankind needs to live within the capacity of the Earth to support human life, is our current law fit for purpose for authorising, regulating, directing, constraining and penalising companies and organisations and their actors whose actions are contrary to this acceptance? How accountable are owners and/or board directors and/or senior management when their companies or organisations destroy or damage the basis of our health and survival? What penalties do they face (including personal penalties)? Companies are not the only organisational forms that should be considered: cooperatives and family businesses should be included.

It is argued here that companies, family firms, and cooperatives are not fit for purpose in meeting societal needs to care for the Earth, rather than exploit it. Adopting legislation based on requirements for mandatory consideration of stakeholders (which includes the environment as a stakeholder) would place the judiciary in a very awkward position choosing between stakeholders: instead it requires Parliament to pass laws and regulations that place obligations on directors and senior managers to observe stakeholders' essential needs.

The examples of Pike River Mine, Tiwai Point Aluminium Smelter, and Clear Ridge Station Ltd and Beejay Stud Ltd, demonstrate that existing laws are inadequate in bringing the failures of board directors and managers to account. The law should be changed so that appropriate criminal and financial penalties can be applied to both company and personally for directors and senior management.

The example of Tui and Martha Mines raises questions about the adequacy of bonds for rehabilitation. More generally, the use of bonds for protecting society against risky actions that could seriously damage parts of our environment, is worth extending to include such activities as fossil fuel explorations and harmful toxin and chemical production. Bonds should not just be for companies, but a requirement for directors and senior management personally.

While these steps would reduce the likelihood of significant abuse of our environment, it does not necessarily address the more fundamental and difficult issue of humans living within the capacity of the Earth to support human life. There are other initiatives necessary for this accomplishment, but establishing proper laws for full accountability at the organisational level is an important step.

Companies

The Primary Duty

The primary duty of company directors is to act in the best interest of the company. The current laws originated in Britain with the concept of a limited liability company in the Companies Act 1862. Directors of a company should have principal regard to the interests of shareholders and the shareholders or owners are legally separate from the corporation itself so cannot be liable for all the debts of that entity.

Directors need to consider the interest of their shareholders within the rules of their legal constitutions, and the laws in regard to some stakeholders such as workers and the environment. The areas for workers include their wage levels (minimum wage) and

⁶⁷ This material is also available at <http://a-resilient-world.blogspot.co.nz/>

health and safety matters. Companies need to follow laws in regard to such matters as building codes and pollution.

The most obvious example of company interest being in conflict with society's interests is the oil companies. From the late 1950's and 1960's Humble Oil which became Exxon Mobil knew about the threat of climate warming and the significant contribution of that threat by fossil fuels⁶⁸. Between 1979 and 1983 The American Petroleum Institute together with the USA's largest oil companies ran a task force to monitor and share climate research between 1979 and 1983, indicating that the oil industry, not just Exxon alone, was aware of its possible impact on the world's climate far earlier than previously acknowledged. The group's members included senior scientists and engineers from nearly every major U.S. and multinational oil and gas company, including Exxon, Mobil, Amoco, Phillips, Texaco, Shell, Sunoco, Sohio as well as Standard Oil of California and Gulf Oil, the predecessors to Chevron, according to internal documents obtained by InsideClimate News and interviews with the task force's former director⁶⁹.

In New Zealand when the fifth Labour Government (1999-2008) talked about introducing a carbon tax, business groups commissioned a report that estimated it would cost about \$1 billion or 1% of GDP. Business leaders such as Liddell from Carter Holt Harvey, Norgate from Fonterra and McDonald from Tiwai Point Smelter, campaigned to persuade public opinion against a tax⁷⁰.

This behaviour has certainly impeded an ordered transition to a world that is free of the threats from climate warming at the very least, and at worst has brought about a future world without the human species⁷¹. Climate warming is not the only threat: there are a number of other threats including human overpopulation, poor and declining water supplies, atmospheric and water-borne toxins, species loss, and an unscientific and unethical economic system⁷².

Stakeholders

Is it possible to make it compulsory for companies to consider all their stakeholders? Stakeholders have been defined as individuals and entities who may be affected by business, and who may, in turn, bring influence to bear upon it. Important direct stakeholders include investors, employees, customers, suppliers, and the local community where the firm is based and trades⁷³. There is no legal obligation in the company's legislation in New Zealand to observe the interest of stakeholders.

In the UK's (172 companies act 2006) there is an attempt to maintain shareholder primacy at the same time as requiring directors to consider stakeholder interests. The law there states:

A director of a company must act in the way he considers, in good faith, would be most likely to promote the success of the company for the benefit of its members as a whole, in doing so have regard (amongst other matters) to –

⁶⁸ <https://www.greenpeace.org/usa/global-warming/exxon-and-the-oil-industry-knew-about-climate-change/exxons-climate-denial-history-a-timeline/>

⁶⁹ <https://insideclimatenews.org/content/Exxon-The-Road-Not-Taken>

⁷⁰ Hot Air. Film Documentary. Available at <https://www.nzonscreen.com/title/hot-air-2014>

⁷¹ Hamilton, C. 2010. Requiem for a species. EarthScan

⁷² a) SANZ. 2009. Strong Sustainability for New Zealand. Principles and Scenarios.

b) Howell, R. How are we to live?

<https://drive.google.com/file/d/0B95bmHyVng3KS1dIMVNIWXRGOwC/view>

<https://drive.google.com/file/d/0B95bmHyVng3KZzJxb0R1WXF1ejA/view>

⁷³ Wheeler, D & Sillanpää. 1997. The Stakeholder Corporation. Pitman

- a) the likely consequences of any decision in the long term,
- b) the interests of the company's employees,
- c) the need to foster the company's business relationships with suppliers, customers, and others,
- d) the impact of the company's operations on the community and the environment,
- e) the desirability of the company maintaining a reputation for high standards of business conduct, and
- f) the need to act fairly as between members of the company.

There is no compulsion required. The legal opinion of Watts, Campbell and Hare in their book *Company Law in NZ* ⁷⁴, is that to make this mandatory would put the judiciary in an impossible position of choosing between the relevant stakeholders. They do not elaborate to much on this, but if one considers the wide range of stakeholders that are involved in a business operation, and the numerous value judgements entailed, it would not be an envious position to be a mediator between contentious parties.

Accountability of Directors

In a limited company, shareholders are not normally liable for payment beyond their invested capital. Are there any circumstances where there is legal redress? What requirements are there to require persons connected with the company to pay compensation to the company? Under s 301(1) of the Companies Act, the court has the power to enforce payment when it appears that a person has misapplied, retained, or become liable or accountable for money or property of the company, or has been guilty of any negligence, default or breach of duty or trust in relation to the company ⁷⁵. This power arises on liquidation. However, this does not appear to have been very widely applied.

Two recent examples in New Zealand illustrate the inadequate legal responses for the failure of Directors and senior management to govern responsibly, and the third example concerns the adequacy of bonds required for rehabilitation. The first involves Pike River Mine; the second deals with waste from the Tiwai Point Aluminium Smelter; and the third involves Tui and Martha Mines.

Pike River Mine

After the Royal Commission the in-seam drilling contractor Valley Longwall International pleaded guilty and was fined just under \$50,000; Whittall, the General Manager of Pike River Mine pleaded not guilty; and the company, then in receivership, did not even make an appearance to plead. District Court Judge Farish found against the company, citing "a systematic failure of the company to implement and audit its own (inadequate) safety plans and procedures". She ordered the company pay \$3.4 million in reparation to the victims' families, and imposed a fine of \$760,000 for multiple breaches of the law – well aware that any punishment she handed down to the company would be all but meaningless, given the company's limited funds and that it owed a number of creditors ⁷⁶.

The only person considered for prosecution was Peter Whittall. The Ministry of Business, Innovation and Employment announced that it had dropped all 12 charges

⁷⁴ Watts, P, Campbell N, Hare C. 2016 *Company Law in NZ* 2nd edition LexisNexis NZ

⁷⁵ Schenone, S and I Drinkovic. 2016. *Duties and responsibilities of directors and company secretaries in New Zealand*. Wolters Kluwer, CCH New Zealand. Edition 5.

⁷⁶ White, D. May 2014. No consequence after Pike River. <http://thewireless.co.nz/articles/no-consequence-at-pike-river>

against him. Details emerged that one of the factors that had led to MBIE dropping the charges was a deal by which the \$3.4 million in compensation owed to the families would be paid by the directors' insurance. MBIE says that Whittall's offer was a relatively minor factor in their decision to withdraw the charges. Macfie says MBIE was advised that there was sufficient evidence to possibly get a conviction, but that it failed to meet the "public interest" test, which factors in the severity of the sentence if a guilty verdict is reached. In this case, the most likely outcome would have been a relatively light financial fine and no custodial sentence. The fact that relatively minor charges carrying a light sentence had been laid against Whittall became a perverse justification for dropping the changes.

Since then, there are now requirements for directors and officers to show due diligence for health and safety requirements. The Institute of Directors and Worksafe New Zealand state

- directors and other officers will be personally liable if they breach their due diligence duty;
- the maximum penalty for a serious breach of the due diligence duty is imprisonment for up to 5 years and/or a fine of up to \$600,000.
- insurance cannot be used to pay fines under HSWA6 ⁷⁷.

While this is an improvement in accountability for health and safety matters, it does not extend to the health and care of the environment.

Tiwai Point Aluminium Smelter

Taha Asia Pacific, owned from Bahrain, had a contract with New Zealand Aluminium Smelters to take dross siphoned off from the main smelting operation. In August 2018 it went into liquidation. A deal was made to share the \$4 million cost of cleaning up the waste: the smelter and the government will pay three quarters of the cost, and the four Southland councils and four landowners will cover the rest. Environment Minister Hon David Parker said the government decided to pay a share of the clean up cost rather than spend it on legal fees. "I'd have to say this should never be able to happen again and if it ever did arise again I would be expecting the Crown to be suing those responsible rather than contributing to the cost of removal of this substance ⁷⁸. The primary responsibility for the waste should rest with the smelter, Mr Parker said.

Tui and Martha Mines

The Waihi Gold Mines are required to fund a bond for rehabilitation. There is some \$43.535 million dollars held associated with the rehabilitation aspect of the Waihi Gold mines. The bonds are all held in favour of the Waikato Regional Council and Hauraki District Council and are reviewed on an annual basis. This review process is undertaken in conjunction with the Hauraki District Council. The bond process is determined by the consent conditions and in simple terms the process is that the Company provides a rehabilitation report each year detailing the works that have occurred over the past year and those that are proposed for the next year and the works required to rehabilitate the site. The report is reviewed by the independent peer

⁷⁷ Institute of Directors and Worksafe New Zealand. 2016. Health and Safety Guide: Good Governance for Directors.
https://www.iod.org.nz/Portals/0/Governance%20resources/Health%20and%20Safety%20Guide_Good%20Governance%20for%20Directors.pdf

⁷⁸ Heron, M. March 20 2018. Govt issues warning to smelters over toxic waste.
<https://www.radionz.co.nz/news/political/352885/govt-issues-warning-to-smelters-over-toxic-waste>

reviewers associated with the site and any other experts deemed necessary by the Councils depending on the nature of the forthcoming works ⁷⁹.

Yet there is significant doubt about whether the amount is sufficient. In 2007, 5000 kg of heavy metals – zinc, iron, manganese and 100 kg of arsenic, cadmium, and lead was released from the Tui mine. The Tui and Tunakohia streams which flow into the Waihou River, and from there into the Firth of Thames, are totally devoid of fish and invertebrate life and are unsafe for humans. This annual dose of contamination is likely to have been occurring at similar levels since the Tui mine closed in 1973. Heavy metals are continuously released into the waterways from approximately 135,000 tonnes of mine waste (tailings) and two small mining tunnels.

The alarming extent of the mining pollution is revealed in a March 2010 Assessment of Environmental Effects. Plans are being prepared to clean up the Tui Mine contamination at a cost to taxpayers of approximately \$17.5 million, stated Coromandel Watchdog spokesperson Denis Tegg. It is NZ's most contaminated site. When you compare Tui's 135,000 tonnes of tailings to the current 40 million tonnes of tailings at Waihi's Martha Mine, the potential threat to waterways is a very frightening scenario," Mr Tegg said.

Newmont Waihi Gold's Martha Mine has generated tailings approximately 300 times larger than those at the Tui mine. Using the Tui mine costings as a benchmark, if just 10% of the Martha mine tailings required similar remedial work in the future the cost to taxpayers would be approximately \$500 million ⁸⁰.

In 2016, the Coromandel Watchdog has also questioned the safety of the tailing dams in the case of an earthquake ⁸¹. The Minister of Energy evaded a response, saying that it was a matter for the Waikato Regional Council.

If there was a legal requirement that held directors and senior managers truly accountable (and not just the company), the governors and managers of Waihi Gold Mines would very likely, not be so ready to continue their operations, certainly in their current form.

Clear Ridge Station Ltd and Beejay Stud Ltd

These companies with David and Frances Webster as directors, had two farms in the Far North. They were charged by the Northland Regional Council in 2016 and entered guilty. The companies were fined \$225,000 but there has been no payment. In 2018, Environment Court Judge Craig Thompson said that they were the worst case of prolonged non-compliance he had ever seen. The offending involving huge amounts of untreated dairy effluent was described as blatant, ongoing and serious, with one of the farms awash with dairy effluent, resulting in gross contamination ⁸².

⁷⁹ Sheryl Roa Principal Advisor - Consents | Resource Use. Waikato_Regional_Council | Te Kaunihera ā Rohe o Waikato. Email response 5 April 2018.

⁸⁰ CoromandelWatchdog. The toxic legacy of a mine. <https://watchdog.org.nz/older-news/multimedia/true-extent-of-toxic-legacy-from-coromandel-mine/>

⁸¹ Tegg, D. Nov 2016. How earthquake safe are the mine tailings dams at Waihi? <https://teggtalk.wordpress.com/2016/11/30/how-earthquake-safe-are-the-mine-tailings-dams-at-waihi/>

⁸² Sharpe, M. May 15 2018. Stuff. <https://www.stuff.co.nz/environment/103892720/fine-of-225000-for-dirty-dairying-will-go-unpaid-because-companies-are-broke>

The Clear Ridge farm was sold for \$4.5 million in January 2016. The Beejay Stud property was sold but no records of when and for how much. Emma Smith, the Websters' lawyer said that the Council had been told that the farms had been sold, and that the companies had no assets to pay the fines. It was reported that the accountant said that if there were any funds, they were likely to be in other companies or trusts relayed to the Websters, and access to these funds would be very unlikely.

Leaving aside the legal niceties about whether the money can be recovered, at the very least this case indicates that the current law is not providing any clear message that illegal behaviour is unacceptable and that directors will not escape personal responsibilities and liabilities. Nor does it indicate that prompt action will be taken to change the behaviour of directors of companies acting against the wider interests and society and the environment.

All these examples illustrate the need for a revision of existing law in New Zealand to adequately hold the governors and senior managers personally accountable. They also raise questions about the adequate assessment of risk. There is inadequate legislation authorising, regulating, directing, constraining and penalising companies and organisations and their actors whose actions are contrary to their duties towards employees and the environment. The legislation should include adequate ways of enforcing payment when companies do not have enough funds to meet payments imposed. This would send a clear message so that such behaviour would not occur in the future.

Family firms

It might be thought that the family firm structure might be a more useful organisational form than publicly owned companies. The Boston Consulting Group calculates that family companies represent 33% of American companies and 40% of French and German companies with revenues of more than \$1 billion a year. In Asia and Brazil they are even more prevalent ⁸³. But often this form is a means of controlling a number of shares in other companies. Randall Morck, of the University of Alberta, points out that the Wallenberg family controls companies that represent up to half the market capitalisation of the Swedish stockmarket, including global giants such as Ericsson. The Agnelli family controls 10.4% of the Italian stockmarket. In Hong Kong the top 15 families control assets worth 84% of GDP, in Malaysia 76%, in Singapore 48% and in the Philippines 47%.

The majority of the world's most successful medium-sized companies are also family firms. Hermann Simon, chairman of Simon-Kucher & Partners, a consultancy, calculates that they account for two-thirds of Germany's mighty *Mittelstand*, including world leaders in doors (Dorma), balancing machines (Schenck) and industrial mixers (Ekato). Italy has a large number of family-owned global champions in taste-conscious niches: Ferrari in cars, Versace in fashion, Ferrero Rocher in chocolates.

The worst thing about family companies is succession. Family businesses that restrict their choice of heirs to their children can be left with dunces. Moreover, wealth corrupts, a principle so well-established that many languages have a phrase for it. In English it is "clogs to clogs in three generations"; in Italian "from stables to stars to stables"; in Japanese "the third generation ruins the house"; and in Chinese "wealth does not survive three generations". According to the Family Business Institute, an American consultancy, only 30% of family businesses survive into the second

⁸³ Economist April 18th 2015. To have and to hold. We draw on this article for this section.

generation and 12% into the third. A mere 3% make it into the fourth and beyond. So, expecting family firms to bring a long-term perspective and bypassing some of the problems of publicly owned companies, is over-optimistic.

Cooperatives

A report for United Nation's Secretariat Department of Economic and Social Affairs⁸⁴ states that cooperatives world-wide generated US\$2.98 trillion in annual revenue. Combined the global cooperative economy is larger than France's economy and behind Germany's economy as the 5th largest economic unit if it were a united country. At a national level the cooperative economy comprises over 10% of the Gross Domestic Product in 4 countries in the world (New Zealand (20%), Netherlands (18%), France (18%) and Finland (14%).

There are a number of examples of cooperatives being very interesting and inspiring models. The Mondragon coops in Spain has many admirable features⁸⁵. But we know from our experience in New Zealand, with Fonterra using coal during its dairying operations, and problems with animal waste polluting waterways, that a cooperative organisational form does not necessarily improve the clash between shareholder's interests, and wider societal interest.

Discussion

Current company law in New Zealand does not fairly and adequately authorise, regulate, direct, constrain and penalise companies and organisations and their actors whose actions are contrary to the benefit of society generally, and in particular to the wellbeing of New Zealanders and the protection of the elements of our environment that provide the means for human life on Earth. Adopting legislation based on requirements for mandatory consideration of stakeholders would place the judiciary in a very awkward position: instead it requires Parliament to pass laws and regulations that place obligations on directors and senior managers to observe stakeholders' essential needs in specific areas such as minimum wages and environmental protection.

The examples of Pike River Mine and Tiwai Point Aluminium Smelter demonstrate that existing laws are inadequate in bringing the failures of board directors and managers to account. Changes have been made for health and safety matters but not for other aspects. The laws should be changed so that appropriate criminal and financial penalties can be applied. One of the benefits of such action would be to deter companies from taking such risky initiatives. The legal changes should include directors and senior managers being personally liable even when a company goes bankrupt and is liquidated.

The example of Tui and Martha Mines raises questions about the adequacy of bonds for rehabilitation. It appears that the bond does not fully ascertain the risks. More generally, the use of bonds for protecting society against risky actions that could seriously damage parts of our environment, is worth extending to include such activities as fossil fuel explorations and harmful toxin and chemical production. Bonds should not just be for companies, but a requirement for directors and senior management personally. This could particularly apply for overseas directors who may not be so easy to pursue in comparison to New Zealanders living in New Zealand.

⁸⁴ Grace and Associates. 2014. Measuring the Size and Scope of the Cooperative Economy: Results of the 2014 Global Census on Co-operatives. <http://www.un.org/esa/socdev/documents/2014/coopsegm/grace.pdf>

⁸⁵ <https://www.mondragon-corporation.com/en/about-us/>

These legal changes should apply to privately and publicly owned, family and cooperative enterprises.

While these steps would reduce the likelihood of significant abuse of our environment, it does not necessarily address the more fundamental and difficult issue of humans living within the capacity of the Earth to support human life. Today humanity uses the equivalent of 1.7 Earths to provide the natural resources we use and absorb our waste. The ecological footprint measures the ecological assets that a given population requires to produce the natural resources it consumes (including plant-based food and fiber products, livestock and fish products, timber and other forest products, space for urban infrastructure) and to absorb its waste, especially carbon emissions. This means it now takes the Earth one year and six months to regenerate what we use in a year. We use more ecological resources and services than nature can regenerate through overfishing, overharvesting forests, and emitting more carbon dioxide into the atmosphere than forests can sequester⁸⁶. This moves the issue from individual organisations to sectors, requiring a national and international effort to reduce output in those sectors significantly contributing to overreach, and major reform of all sectors. Critical to that exercise, however, are the legal requirements to authorise, regulate, direct, constrain and penalise companies and organisations and their actors so that we care for the environment rather than exploit it.

Appendix E

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