

## Comments on the Commissions Draft Report “Low-emissions economy” dated April 2018

Andy Reisinger, 7 June 2018

My comments focus on Chapter 8, noting a few other more specific points in earlier chapters.

**Page 24 (framing):** “*Reducing CO<sub>2</sub> emissions to net zero is crucial*”: The report should recognize that given current global emission trends, it is becoming near certain that the world as a whole will need to achieve net negative CO<sub>2</sub> emissions during the second half of the 21<sup>st</sup> century if it wishes to achieve (or rather, recover to) the Paris Agreement’s temperature goal. Therefore, achieving net zero CO<sub>2</sub> emissions is not an end-point, but only a milestone in a journey towards global net CO<sub>2</sub> removals (meaning removals of CO<sub>2</sub> have to be greater than the sum of all gross emissions of long-lived GHGs). It would be helpful if the report recognized in its framing that net zero long-lived gases is only a milestone, not an end-goal – not least because this may have important consequences for investment, R&D and land-use change in the very long run if those net negative emissions are to be achieved via land-based sequestration options.

**Page 59: Table 3.3:** the entry under SD0 says that the carbon price in this scenario is not as high as in PD0, and yet the carbon price given for 2050 in SD0 is \$250 whereas for PD0 it is \$200, i.e. the price in SD0 is higher than in PD0. Is this a typo, or is there some other logical connection missing (including possibly on my side)?

**Page 64:** “*Differences in agricultural emissions between the 25 Mt of CO<sub>2</sub>e and net-zero targets are minor, with the tighter target driving only small changes in overall agricultural activity.*” It would be helpful to have a better explanation of this result, since the different scenarios imply significant changes in removals by forestry – how is this adding up in terms of a finite land resource? Is this because the additional trees are assumed to be planted mainly on low-producing sheep and beef land with a low emissions intensity per hectare?

**Page 68: Figure 3.13:** the Hotelling rule indicates that in a cost-minimising approach, carbon prices should rise with the discount rate. Yet in the paths shown in this figure, prices rise at very different rates. This suggests that the models as constructed are not following a cost-minimising approach relative to the end goal specified for each scenario. Please explain what this means for the total costs and inferred carbon prices under the different scenarios; is this because the models assume imperfect foresight about technological change? Or does Hotelling’s rule not apply for some reason?

**Page 73:** I assume it is too late since the additional modelling is already underway, but it would have seemed highly desirable to model the effect of different levels and types of international action, including non-climate actions that interact with New Zealand climate policy via terms of trade. Past modelling also used real gross national disposable income (RGNDI) as a metric of welfare, which seems more relevant than carbon prices or GDP (see past reports by Infometrics and NZIER). Can results in the final report be expressed in RGNDI?

### Comments on Chapter 8

**Overarching comment:** “*the short-term target is a stabilization level within a specified temperature limit*” (Page 199 and elsewhere): this formulation is unclear and yet this is a core conclusion of this chapter. The Commission should devote considerably more effort to clarify what this means, including how this would be applied practically in New Zealand – what is the appropriate stabilization level for methane, how should New Zealand determine this?

A global temperature target in itself gives very little guidance as to what level is appropriate for New Zealand’s methane emissions. The Commission should invest significantly more effort to set out

criteria it considers should be used to determine the appropriate level of New Zealand's methane emissions in 2050.<sup>1</sup> What measures and criteria should be employed to determine the appropriate level, noting that there is an interplay between the speed of reaching zero emissions of long-lived gases and the level of emissions of short-lived gases, and that it is the combination of both that determines New Zealand's actual contribution to future climate change (but it is in itself again a matter of judgement of what level of New Zealand's contribution to climate change is considered acceptable). As formulated now, this report gives no guidance on this important question.

In informal conversations and newspaper coverage I have seen this statement interpreted as meaning "do nothing about methane" (i.e. stabilization is interpreted commonly as "keep at today's levels"), but figure 8.8 suggests a rather dramatic reduction in methane.

How does the Commission think the actual methane target should be set?

**Page 200:** "*a very minor ongoing warming effect*": whether the ongoing warming effect from constant concentrations of any GHG is 'very minor' depends on historical emissions as well as the future state of the atmosphere. To illustrate and for comparison, if the concentrations of all GHGs had been fixed in the year 2000, the Earth would have been expected to still warm by about another 0.6°C by the year 2100 – compared to warming of about 0.75°C between 1900 and 2000 (see IPCC Fourth Assessment Report). This is certainly not a very minor amount. In other words, inertia of the climate system would have delivered almost the same amount of warming on top of the warming observed by the time that concentrations had stabilized. How much warming results after methane concentrations have stabilized depends on how quickly they rose up to that point, and how emissions from other sources are influencing the radiative efficacy of methane in future. The resulting continued increase in temperature from a constant rate of methane emissions is not necessarily minor. The notion that stable methane emissions result in stable temperature is a convenient short-hand but how true or wrong it is (and whether this matters in the big picture) depends on the specific situation and assumptions made.

**Page 202: Figure 8.2:** this figure and the accompanying discussion of carbon budgets gives the misleading impression that the carbon budget for a given temperature limit is a fairly precisely known and robust number. This needs to be revised significantly, given the increasing evidence that various assumptions and different definitions have a significant impact on the carbon budget. See for example the useful summary in Carbon Brief: <https://www.carbonbrief.org/analysis-how-much-carbon-budget-is-left-to-limit-global-warming-to-1-5c>, and the commentary in Nature Geoscience (Peters, G. (2018): Beyond carbon budgets, <https://www.nature.com/articles/s41561-018-0142-4>.

**Page 203 and F8.2:** "*Stabilisation of short-lived gases*": my overarching comment on chapter 8, that the Commission needs to provide better guidance and set out criteria to help decide at what level New Zealand should seek to stabilize methane emissions, applies here. A related comment is that this section gives the misleading impression that the level at which short-lived gases have to stabilize is uncertain (it is stated that the allowable stock of short-lived gases is a function of the stock of long-lived gases). However, there is almost a 1-1 relationship between the carbon budget and the level of warming that short-lived gases can contribute; every 0.1°C of warming from short-lived gases reduces the available carbon budget by about 220 Gt CO<sub>2</sub> (based on the transient climate sensitivity). This means that one could equally state that the allowable stock of long-lived gases is a

---

<sup>1</sup> taking 2050 as the "long term", but noting that since both the global climate and global emissions will continue to change, it seems folly to expect settling on a firm "stabilization" level that would then be maintained in perpetuity; just like net zero emissions of long-lived GHGs is only a milestone in a longer journey

function of the stock of short-lived gases. The two uncertainties or dependencies are symmetrical. Of course one could argue that globally, CO<sub>2</sub> is the dominant greenhouse gas and hence it dominates choices for other gases, but I don't feel this reasoning applies unchanged to New Zealand. So one could equally state that the time when long-lived gases have to reach zero emissions is uncertain as it depends on the level at which we stabilize methane emissions.

**Page 205:** The GWP in the 1990 IPCC report was not only mentioned to illustrate the difficulties inherent in the concept. The report also states that "However, because of the importance of greenhouse warming potentials, a preliminary evaluation is made." I.e. I don't think it would be correct to give the impression that GWPs were only introduced to show how not to use them.

**Page 214:** consistent with my comment on page 203, I feel it is incorrect and misleading to refer under Option 1 to the "*uncertain nature of the short-lived gas budget*" – the allowable budget for long-lived gases is equally as uncertain, and the two are mutually interdependent. The far more relevant uncertainty that a target for short-lived gases has to deal with in my view is that of technological and market change (for New Zealand's livestock products), which could significantly alter both baseline emissions of methane in New Zealand and the cost and potential of reducing those emissions.

**Page 214:** as per my overarching comment on this chapter, the phrase "*stabilization within a temperature limit*" provides too little guidance what level of methane emissions the Commission considers appropriate, or the criteria by which the Commission considers such a level ought to be determined. The bullet points on the top of page 215 make a useful start at offering some criteria, but I believe they can and should be elaborated a lot more, including how the different criteria interact, their weighting, and they could be operationalised – this would be a highly valuable outcome and contribution from this report to future work and policy decisions in New Zealand.

**Page 216:** "*the precision of the long-lived gas target*": this statement flies in the face of the uncertainty of the global carbon budget (see comment on page 202, figure 8.2). Again, as per my comment on page 203, this paragraph suggests that the allowable stock of short-lived gases is uncertain whereas the budget of long-lived gases is not – and yet the two are entirely interdependent and for an individual small country, both are open to subjective choices. The timing when we (want/need to) reach net zero long-lived GHG emissions is exactly as uncertain as the allowable level of emissions of short-lived gases, both (collectively) within a given temperature limit.

**Page 218: Recommendation R8.1:** as per my overarching comment on this chapter, the phrase "*stabilization within a temperature limit*" provides too little guidance on what level of methane emissions the Commission considers appropriate, or the criteria by which the Commission considers such a level ought to be determined. The Commission should at least develop a clear set of criteria and demonstrate how it would expect those criteria to be applied to determine a target, and under what conditions the target should be revised (e.g. should the target for short-lived gases be subject to more frequent revision than the target for long-lived gases, and under what conditions should such a revision occur?)