

New Zealand as a Net Carbon Sink – truly doing our share *or* “The target, the pathway, the policies and the vision”

Introduction

Many people are aware of the dangers of climate change and wish to take action. But the reasons they don't are many. One is that the task seems so enormous that they don't know where to start; another is that the effects are only arriving gradually and it is easy to delay taking steps when they will affect our comfort and way of life. Another is the perception that hardly anyone else is doing anything so why should they.

My contention is that another major cause of inaction is a lack of a plan or pathway which would succeed in stopping global warming. Thus, if the size of the required reduction in greenhouse gas emissions could be calculated, then people could begin to understand the scale of the actions they must undertake and then form a plan to implement them. I have called my plan “The Target, the Pathway the Policy and the Vision”

This plan is revolutionary in six ways

1. It bluntly lays out what we have to do in New Zealand to defeat global warming, without considering whether New Zealanders would accept it or not.
2. It insists that New Zealand keep within its IPCC greenhouse gas emissions budget of 660 million tonnes of CO₂equivalent. This budget is based on NZ's percentage of the world population (0.066%) and the world emissions budget of 1000billion tonnes.
3. While it is calculated on New Zealand as a whole, it could equally be applied to an individual person, to a community or to a town/city.
4. It proposes that New Zealand rapidly becomes not just carbon neutral or carbon zero but a carbon sink with negative net emissions – sucking more greenhouse gases out of the atmosphere than it emits.
5. It envisions New Zealand as a model country for the world to follow to a post-carbon future.
6. It believes straight up that 100% of the reduction in NZ greenhouse gas emissions should be made by domestic reductions – none of the jiggery pokery of carbon trading.

The Target, the Pathway, the policy and the Vision.

1. The Target

Unfortunately you can't just start with a vision of a low-carbon society; you need to establish a target first. The question is “Just how much do we need to cut the world's emissions to stop global warming?” One target which seems credible is the IPCC world carbon budget of 1000 GTns CO₂e between 2011 and 2100.¹ This would give us a 66% chance of staying below 2 degrees temperature rise. The reason we have to have a budget and not a level of CO₂ by a given date, is that because CO₂ is so long-lived in the atmosphere, much of what we have already emitted is still there; in fact 1900 Gtn of the 2900 humanity has been allowed since the beginning of the industrial age is already in the atmosphere, therefore, we can now emit no more than 1000 Gtns more in the 83- year period

until 2100. The IPCC appears unclear how far out his budget extends. Some, like Mike Berners-Lee in his book *"The Burning Question"*, believe that CO2 is so long-lived that we can never ever emit above the budget. Unfortunately at our current rate of increase we will exhaust this budget by 2027.

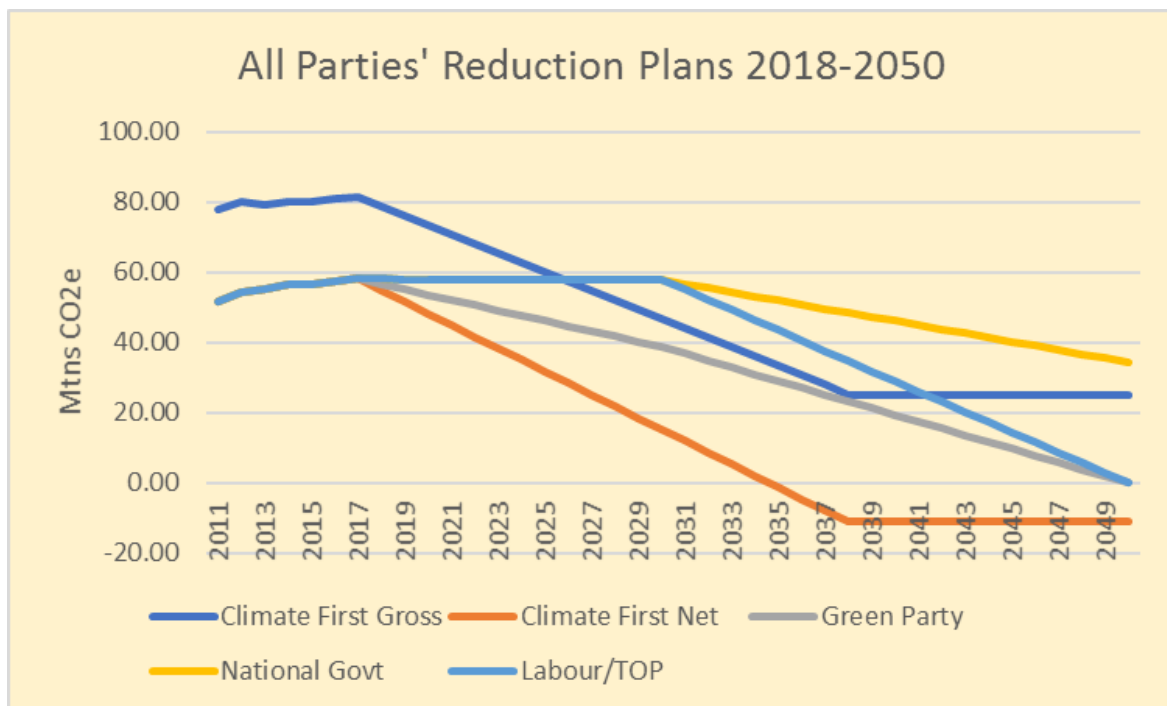
Therefore, our only hope is to reduce rapidly until the world reaches zero net emissions by 2050.

The IPCC AR5 publication is ambiguous as to whether our budget extends from 2011 to 2050 or from 2011 to 2100. However, Climate First has chosen 2050, remembering that we are given only a 66% chance of staying below 2° of warming, and it would be better to achieve this budget earlier.

We here in NZ cannot do much about global emissions, but we could in theory, given a government with the right policies, reduce our national emissions in order to stay within our proportion of the global carbon budget. NZ with 4.6 million people represents 0.066% of the world population of 7 billion, therefore our national carbon budget would be 660 Mtns CO2e (0.066% of 1000Gtn) between 2011 and 2050. The problem is that it is now 2016 and we have already used up 330 Mtns or half our allocation in the first 6 years and we still have 32 years to go!

When could we begin? No sooner than 2018 which is after the next election. Therefore, assuming a new government is elected which is prepared to genuinely tackle climate change, what would be the required reduction?

Fig 1. Four emission reduction targets (table for chart appendix 1)



The chart, Fig 1, shows several proposed emission reduction scenarios for NZ: the Government, the Greens, TOP/Labour and Climate First.

Explanation of Fig.1.

Because neither Labour, nor TOP have included a 2030 target in their Climate Change policy releases, we assume that they are happy with the current Government one for Paris of "30% below 2005 gross". This creates a problem in that to reach zero after 2030 will require really steep reductions because the 2030 figure is so high. The Greens are better off with their own much

stronger 2030 target of 40% below 1990 gross. Only Climate First has both a gross (light blue line) and a net orange line because we have specified annual reduction targets for both.² Of all these scenarios, only Climate First's will keep NZ within its budget of 660 Mtns by 2050. As the table shows,² The Greens will be more than double the budget, National will be more than three times, and Labour/TOP more than 2 ½ times.

You might ask what use is it for NZ to reduce its emissions when we are only less than 0.2% of total global emissions. There are four answers: Firstly, global emissions are only an aggregation of the emissions of every person in the world, and if everyone made a sufficient reduction we would have climate change beaten. Secondly, NZ's emissions increase (68% since 1990) is one of the worst of all OECD countries (behind only Turkey), therefore we have a duty to lead the world on correcting this. Thirdly, at 12.6 Tonnes net per person, our emissions are more than twice the world average of 5.7 T/pp Net, therefore, we need to reduce rapidly to do our fair share in fighting climate change. Fourthly we should not underestimate the power of an example. New Zealand, with its large forest sink, low population and plentiful food supply is in the perfect position to change to a post-carbon society.

Next, we ask what reduction pathway we need to follow in order to stay within our carbon budget of 660 Mtns before 2050. Only Climate First will achieve this, in the following way:

To stay within budget, we must both reduce our gross emissions and increase our forest sink. In what proportion should this occur? The answer is to increase our forest sink from 23 Mtns up to 36 Mtns rather than allowing it to diminish further. This means that we must reduce our gross emissions from 81.39 in 2017 down to 46.75 Mtns in 2030 and continue in a straight line down to 24.81 Mtns in 2038. At 24.81 Mtns gross and subtracting 36 Mtn for the sink gives us then negative net emissions of 11.19 Mtns. All we would have to do is continue at that level for the remaining 12 years until 2050, slowly pegging back our budget overshoot which would have occurred in 2024. In 2050 then, we would have emitted exactly our IPCC budget allowance of 660 Mtns CO₂e.

Gross reductions (from Agriculture, Energy, Transport, Industrial Processes and Waste) need to be enough to disrupt the current economic status quo. I contend that a year on year reduction of 2.67 Mtn would do that. This disruption is required because any pretence that the reduction required to defeat climate change can be achieved within the economic status quo, by switching to renewable energy for example, will induce people to believe that things are not really that serious and with a few tweaks they can carry on more or less as usual. Reductions in gross emissions have to be severe enough to encourage sacrifice and major change in outlook and economic focus.

Now you might ask why would other countries follow our model when we will not have completed our goal until 2050? My answer - a model doesn't have to have been completed to be effective. All we would have to do is show that we had a target and a pathway by which to reach it and that in the first few years we had met our annual targets. Then the world would believe that we intended to achieve, and were actually on course to reach, the target we had set.

2. The Pathway

The next step, having decided on a target (40% below 1990 net by 2030), is to calculate the yearly reductions required starting from the beginning of 2018.(Table 1 above) We find that a year on year

reduction of 2.8 Mtms in gross emissions and a gradual increase in the sink would get us to 23 Mtms net in 2030. This would represent a 3.3 Mtms year on year reduction in Net emissions. In percentage terms the cut in net would be 4.9% in 2018, rising to 12% in 2030, rising to 79% (because the base is so small) in 2038, the year NZ becomes a carbon sink instead of an emitter.

Following this, then, having decided a credible target and calculated a pathway, we need to describe this pathway in more detail before moving on to government policies which would enable it to happen. The overriding principle here is that of “fairness”, which means that the effort to make reductions must be allocated in a way that people see as fair. No one will make the sacrifices needed if they think others are getting a free ride. I believe this means that each sector (Agriculture, Energy, Transport, Industrial processes and Waste) must make reductions in proportion to their share of national emissions. For example, historical and projected emissions were:

Table 2. NZ sector emissions and percentages

Sector	1990		2013		2015	
	emissions	%	emissions	%	emissions	%
Agriculture	34.3 Mtms	51.5	39.2 Mtms	48.4	38.4	47.9
Energy	15.2	22.8	18.81	22.7	17.68	22
Transport	8.8	13.2	13.86	16.1	14.76	18.4
Ind Process	3.3	4.9	5	6.2	5.3	6.6
Waste	5	7.5	5	6.2	4	5
Total	66.7	100	81	100	80.14	100

Therefore, emissions limits for each sector based on the 2015 inventory figures would be:

Table 3. Annual emissions allowed by each sector.

Sector emission proportions

	Total RERP	Ag 47.90%	Energy 22%	Transp 18.40%	IPPU 6.60%	Waste 5%
		red 1.28 Mtn/yr	red 0.59 Mtn/yr	red 0.49 Mtn/yr	red 0.17 Mtn/yr	red 0.13 Mtn/yr
2015	80.15	38.39	17.63	14.75	5.29	4.01
2016	80.77	38.69	17.77	14.86	5.33	4.04
2017	81.39	38.99	17.91	14.98	5.37	4.07
2018	78.73	37.71	17.32	14.49	5.20	3.94
2019	76.06	36.43	16.73	14.00	5.02	3.80
2020	73.40	35.16	16.15	13.51	4.84	3.67
2021	70.74	33.88	15.56	13.02	4.67	3.54
2022	68.07	32.61	14.98	12.53	4.49	3.40
2023	65.41	31.33	14.39	12.04	4.32	3.27
2024	62.74	30.05	13.80	11.54	4.14	3.14
2025	60.08	28.78	13.22	11.05	3.97	3.00
2026	57.42	27.50	12.63	10.56	3.79	2.87
2027	54.75	26.23	12.05	10.07	3.61	2.74
2028	52.09	24.95	11.46	9.58	3.44	2.60
2029	49.42	23.67	10.87	9.09	3.26	2.47
2030	46.76	22.40	10.29	8.60	3.09	2.34
2031	44.10	21.12	9.70	8.11	2.91	2.20
2032	41.43	19.85	9.12	7.62	2.73	2.07
2033	38.77	18.57	8.53	7.13	2.56	1.94
2034	36.10	17.29	7.94	6.64	2.38	1.81
2035	33.44	16.02	7.36	6.15	2.21	1.67
2036	30.78	14.74	6.77	5.66	2.03	1.54
2037	28.11	13.47	6.18	5.17	1.86	1.41
2038	24.81	11.89	5.46	4.57	1.64	1.24
2039	24.81	11.88	5.46	4.57	1.64	1.24
2040	24.81	11.88	5.46	4.57	1.64	1.24
2041	24.81	11.88	5.46	4.57	1.64	1.24
2042	24.81	11.88	5.46	4.57	1.64	1.24
2043	24.81	11.88	5.46	4.57	1.64	1.24
2044	24.81	11.88	5.46	4.57	1.64	1.24
2045	24.81	11.88	5.46	4.57	1.64	1.24
2046	24.81	11.88	5.46	4.57	1.64	1.24
2047	24.81	11.88	5.46	4.57	1.64	1.24
2048	24.81	11.88	5.46	4.57	1.64	1.24
2049	24.81	11.88	5.46	4.57	1.64	1.24
2050	24.81	11.88	5.46	4.57	1.64	1.24

Well I have now outlined and given some detail on an emissions reduction schedule which would ensure that New Zealand did its true fair share towards the required world reductions. This plan works in four important ways:

1. It is radical enough to produce real changes in attitudes and actions.
2. It means New Zealand can be a role model for the rest of the world.
3. It means that our per capita emissions will reduce from more than twice the world average down to the world average of 5.7 and then progressively reduce further as the world average reduces towards zero emissions.
4. Within NZ it is fair, with all sectors contributing proportionally according to their percentage of emissions.

That is the plan. Now the big question. What policies would our government need to introduce? And secondly would anyone vote for it? To answer the second question first. The existing major parties have an established voter base that they don't want to alienate with policies that are too radical. This leads them to ask the question "What can we propose to begin to address climate change that our voters would accept?" The question that needs to be asked however is "What policies will actually achieve the pathway outlined above and defeat global warming?" If no one votes for effective policies that's their problem – they will just have to accept that they will suffer the unbearable heat, droughts, storms, starvation leading to mass migration and wars that follow. It's a question of acting now to save tomorrow.

3. The Policies

The most important policies to Climate First are:

1. Agriculture
2. Transport
3. Housing
4. Energy
5. Immigration
6. Tourism

The following analyses are the beginning of applying the plan to those 6 policy areas.

1. Agriculture.

Because agriculture is the biggest emitter it is appropriate to start there. According to the plan, the Agriculture sector needs to reduce its emissions by 1.28 MT in 2018. This would be incentivised by a realistic carbon tax applied uniformly and fairly across all sectors. By afforestation, the agricultural sector could offset the cost of that by gaining carbon payments. When a dairy farmer, therefore, converts 1 hectare of pasture into forest the cost in lost production would be partly compensated for by payment for carbon sequestered. Unfortunately, the current Government plan is to go on increasing the number of livestock for ever, so that that growth in livestock numbers would have to be reversed if we are to meet our target. It is commonly believed that agriculture is a really important sector in our country, yet it makes up only 8% of our GDP.

The target of 1.28 Mtns year on year could be met in three ways: by reducing livestock numbers, farming less intensively or using low-emission-bred animals or planting trees to sequester CO₂. A case study, [The Afforested Dairy Farm](#), has been done on a typical dairy farm alone. Preliminary calculations show that dairy is responsible for 24% of all agricultural emissions. This means it would

have to carry 24% of the 1.27 Mtn agriculture reduction from 37.71 Mtn down to 36.43 Mtn in the 2018 year. In other words, a 0.3 Mtns reduction.

2. Transport

The case study "[The nz light passenger fleet meets its pathway](#)" shines a light on the large reductions which would be required of passenger cars if this subsector were to meet its share of emission reductions.

4. The Vision

Following the pathway described above will have huge repercussions on our way of life in NZ and will result in a post-carbon society in 2038. The vision of what this society will look like is only partly formed, however three major changes would appear to be:

1. An economic system dependent on continually increasing growth in economic throughput would be replaced by a sustainable or steady-state economy.
2. Society would be more equal
3. The current consumerist-materialist, individualistic competitive, globalised mindset would give way to a more local and co-operative one based on the well-being of citizens.

Conclusion

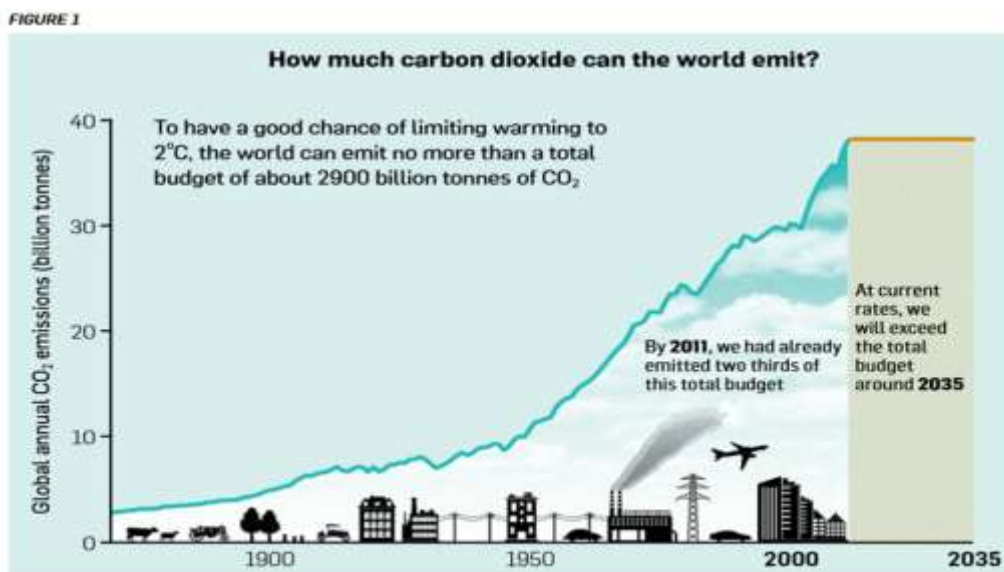
I have been able to come this far on the journey by myself by reading, discussing and pondering. To fill out the vision of the post-carbon society, I am now asking others to come on board this project to develop policies that New Zealanders will embrace, and which will enable us to reach negative greenhouse gas emissions by 2036 and thereby become a model country in the fight to defeat global warming.

Les Jones

14/9/2017

References

1.



Source: Information is sourced from the IPCC's Fifth Assessment Report, Working Group I (emissions data, Figure 6.8; carbon budget, SPM E.8)

2.

three reduction scenarios					
	CF	net CF	Greens	Nat	Lab/TOP
	gross	red 3.3		Govt	
		path2			
2011	77.94	51.79	51.79	51.79	51.79
2012	79.93	54.45	54.45	54.45	54.45
2013	79.39	55.24	55.24	55.24	55.24
2014	80.26	56.47	56.47	56.47	56.47
2015	80.15	56.37	56.37	56.37	56.37
2016	80.77	57.24	57.24	57.24	57.24
2017	81.39	58.11	58.11	58.11	58.11
2018	78.73	54.81	56.62	58.10	58.10
2019	76.06	51.51	55.13	58.08	58.08
2020	73.40	48.21	53.63	58.06	58.06
2021	70.74	44.91	52.14	58.05	58.05
2022	68.07	41.61	50.65	58.03	58.03
2023	65.41	38.31	49.15	58.02	58.02
2024	62.74	35.01	47.66	58.00	58.00
2025	60.08	31.71	46.17	57.98	57.98
2026	57.42	28.41	44.68	57.97	57.97
2027	54.75	25.11	43.18	57.95	57.95
2028	52.09	21.81	41.69	57.94	57.94
2029	49.42	18.51	40.20	57.92	57.92
2030	46.76	15.21	38.7	57.9	57.9
2031	44.10	11.91	36.77	56.72	55.01
2032	41.43	8.61	34.83	55.54	52.11
2033	38.77	5.31	32.90	54.36	49.22
2034	36.10	2.01	30.96	53.18	46.32
2035	33.44	-1.29	29.03	52.00	43.43
2036	30.78	-4.59	27.09	50.82	40.53
2037	28.11	-7.89	25.16	49.64	37.64
2038	24.81	-11.19	23.22	48.46	34.74
2039	24.81	-11.19	21.29	47.28	31.85
2040	24.81	-11.19	19.35	46.10	28.95
2041	24.81	-11.19	17.42	44.92	26.06
2042	24.81	-11.19	15.48	43.74	23.16
2043	24.81	-11.19	13.55	42.56	20.27
2044	24.81	-11.19	11.61	41.38	17.37
2045	24.81	-11.19	9.68	40.20	14.48
2046	24.81	-11.19	7.74	39.02	11.58
2047	24.81	-11.19	5.81	37.84	8.68
2048	24.81	-11.19	3.87	36.66	5.79
2049	24.81	-11.19	1.94	35.48	2.89
2050	24.81	-11.19	0	34.3	0
		661.67	1325.13	2002.08	1641.93

