The group Extinction Rebellion has called for New Zealand's emissions to be reduced to zero in 2025 in the face of the world climate change emergency. This figure came from the UK Extinction Rebellion group, but it is not appropriate for New Zealand.

Our second demand should be changed from zero in 2025 to zero in 2030. The reason for this is that NZ and UK are different countries. As chart 1. below shows, UK net emissions have fallen

Char**t 1 Comparing UK and NZ**

Comparison NZ and UK emissions 1990- 2016							
	1990 net emissions Mtns	1990 population mil	1990 perperson Mtns	2016 net emissions Mtns	2016 pop. mil.	2016 perperson Mtns	Diff. %
UK	797.8	57.11	13.96	471.7	65.11	7.2	-41
NZ	36.28	3.397	10.68	56	4.565	12.26	54

41% between 1990 and 2016, but NZ's have risen 54%. This means that the UK has been on the path to zero emissions and with a bit more effort it could possibly reach net zero by 2025. For example, per person emissions have fallen from 13.96 tonnes per person down to 7.2. NZ, on the other hand, has had per person emissions rise from 10.6 tonnes per person up to 12.6. This makes it almost impossible without the collapse of our society and economy to reach net zero by 2025.

As chart 2 shows, the UK reaching net zero by 2025 would involve every person reducing their emissions by 1.02 tonnes each year. NZers would have to reduce by 1.7 tonnes per person each year. However, if we extended our time frame to 2030, then Kiwis would need to make about the same reductions per person as the UK (1.02 tonnes per person per year). (the 3 shaded cells)

Chart 2. Per person reduction scenarios for 2025 and 2030

		UK		NZ				
	red	reduct	red.	red.	reduct.	red	annual %	annual %
	67.285/yr	1.0285 pp	8/yr	1.7514 pp	4,66/yr	1.0216 pp	reduct.	reduct.
							for 2025	for 2030
2018	471	7.2	56	12.26	56	12.26	both countries	
2019	403.71	6.17	48	10.51	51.3	11.24	14.29	8.33
2020	336.43	5.14	40	8.76	46.7	10.22	16.67	9.09
2021	269.14	4.11	32	7.01	42.0	9.20	20.00	10.00
2022	201.86	3.09	24	5.25	37.3	8.17	25.00	11.11
2023	134.57	2.06	16	3.50	32.7	7.15	33.33	12.50
2024	67.29	1.03	8	1.75	28.0	6.13	50.00	14.28
2025	0.00	0.00	0	0.00	23.3	5.11	100.00	16.66
2026					18.7	4.09		19.99
2027					14.0	3.07		24.99
2028					9.3	2.04		33.31
2029					4.7	1.02		49.96
2030					0.0	0.00		99.83

Explanation of Chart 2.

The first 2 columns apply to the UK only.

Column 1 shows what year by year emissions would be each year as the UK reduced from 471 Mtns in 2018 down to zero in 2025 (i.e. Reducing 67.28 Million tonnes a year).

Column 2 shows how an individual's emissions would reduce. In order to compare UK with NZ we have to work with per person emissions only

Column 3 shows how NZ emissions would reduce by 8 Mtns each year to zero by 2025.

Column 4 shows how NZ per person emissions would reduce to reach zero in seven years.

Column 6 shows NZ per person emissions reducing to zero over 12 years

Columns 7 and 8 show the annual percentage reduction required over 7 years and 12 years. As the proposed reduction is a straight line, the percentage reduction rises year by year until in the final year is must be 100%.

The second reason for choosing 2030 is that NZ is fortunate in having a large forest sink, capable of sequestering as much as half of all our emissions; UK does not have this potential. But trees capture very little carbon in their first few years, However, given an emergency tree-planting programme, by 2030 our forest sink could be the decisive factor in NZ reaching its goal.

The third reason to choose 2030 is that NZ's forest sink of 22.8 Mtns in 2016 is expected to reduce sharply from 2021 through to 2028. This is because the huge planting just after 1990 will be maturing and ready for harvesting during those years. In 1990 our sink was 30 Mtns but now it is 22.8 and it could go under 10 Mtns after 2021. The repercussion of this is serious; it means that nearly all of the reductions would have to come from our gross emissions, currently at 78.7 Mtns.

If our sink was only 10 Mtns, then we would have to go from 78.7-10 = 68.7 down to zero in 7 years, an annual reduction of 9.8 Mtns a year in NZ or 2 Tonnes per person per year, twice that of the UK.

I have contacted some XR people in the UK and they have indicated that they would not have a problem with countries getting to zero emissions in a time frame relevant to them.

There are three other issues that could be considered:

1.Under-reporting of methane emissions. By international standards, NZ has a high proportion of methane emissions, 43% of our total emissions compared to the UK's 15%. Now the standard measure of methane's warming effect, called GWP100, measures the effect of methane on the atmosphere over a period of 100 years (it is 28 times as powerful as CO2 over this period). However, XR is only talking about a 5- or 10-year period, over which methane's warming effect is more than 100 times that of CO2. If we use this latter measure, because of our high methane emissions, New Zealand's total emissions rise from 78.7 Mts to more than 139 Mtns and our gross per person emissions to 29 Tns per person, the highest in the whole world.

2. Non-counting of international air-travel emissions. The tourist industry in NZ has become our largest export earner. This means that NZ's actual emissions are even higher still.

3.The UK has managed to reduce its emissions by offshoring them. By shifting food production and manufacturing to other countries such as New Zealand and China, and earning overseas income from such low-carbon activities as intellectual property and financial services, the UK has gained an unfair advantage. Accounting for this is quite complex, but I believe it can and should be done. Similarly, within NZ, the emissions burden of producing a litre of milk for example should not be shouldered entirely by the dairy farmer who does the emitting. Half of it should be borne by the consumer who drinks the milk.

What would need to happen in New Zealand to make reductions of the magnitude that XR is talking about?

Starting with chart 2 column 3 above, it can be seen that NZ would have to reduce 8 Mtns a year. Here is an example of what would be required by the dairy sector.

Dairy farming

Dairy farms emit 22% of NZ's emissions. Fairness requires that they therefore make 22% of the reductions. If we reduce from the current 56 Mtns net down to zero in 7 years, then 22% of 56 is 14 Mtns spread over 7 year which is 2 Mtns per year reduction required of all the dairy farms in NZ. Now if each cow emits 3.4 Tonnes per year then 2,000,000 tonnes divided by 3.4 tonnes gives 588,000 cows fewer each year. These would have to be slaughtered. **After 7 years our current herd of 5 million cows would be reduced to 88,353 cows**. In 2015 we had 11,970 dairy farms with an average of 419 cows per farm. By the end of 2025 there would only be 210 farms left out of 11,970!!

However, there could be many more farms if the pasture vacated by the reduced cow herd was planted in forest.

What about the transport sector?

Well, transport made up 16. 72% of NZ emissions in 2016 or 13.16 Mtns. 64% of these were light vehicles such as cars and vans making 8.42 Mtns of emissions from about 3.5 million vehicles which is 2.4 tonnes per vehicle average.

Now again, being fair, these vehicles, making up 10.7 % of our emissions should make 10.7% of the cuts.

So 10.7% of 56 Mtns is 5.99 Mtns, divided by 7 years gives an annual reduction of .856 Mtns per year for the light vehicle sector. At 2.4 Tonnes per vehicle that means a reduction every year of **357,000 cars taken off the road.** When you consider that over the last 5 years, an average of more than 80,000 extra cars has been added to the fleet every year, you can begin to see the magnitude of our problem.

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