

**BEFORE THE OTAGO REGIONAL COUNCIL  
AT DUNEDIN**

**Under the**

Resource Management Act 1991

**In the Matter of**

Proposed Otago Regional Council's  
Draft Regional Policy Statement

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**STATEMENT OF EVIDENCE OF CHRISTOPHER (BOB) LLOYD TO ACCOMPANY  
SUBMISSIONS BY THE WISE RESPONSE SOCIETY INC.**

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26 November 2015

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**BACKGROUND**

1. My full name is Christopher (Bob) Lloyd of 49 Raynbird St Dunedin
2. I am a professional consultant.
3. I have professional experience over 40 years in the field of renewable energy, teaching at universities and climate change.
4. I have published over 30 peer reviewed papers in professional journals and over 100 consultancy reports.
5. I am familiar with the aims and main submission to these hearings from Wise Response.
6. I have read the Code of Conduct for Expert Witnesses, and agree to comply with it.
7. I confirm that the issues addressed in this brief of evidence are within my area of expertise.

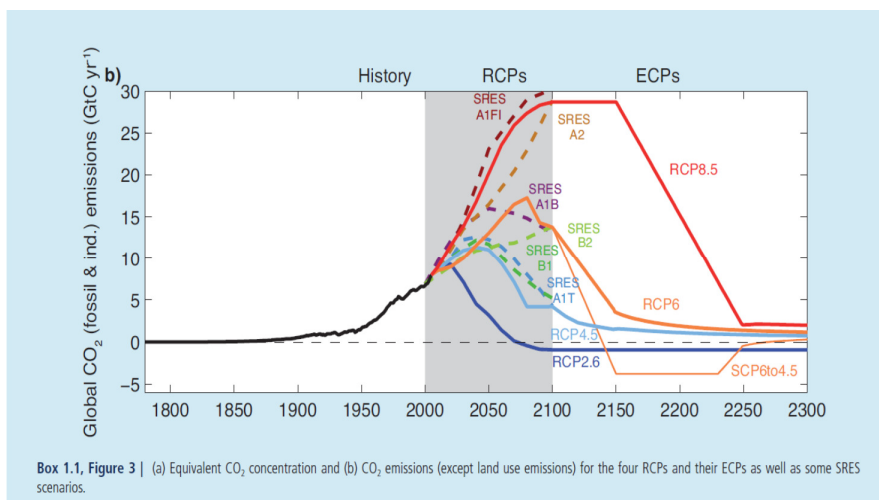
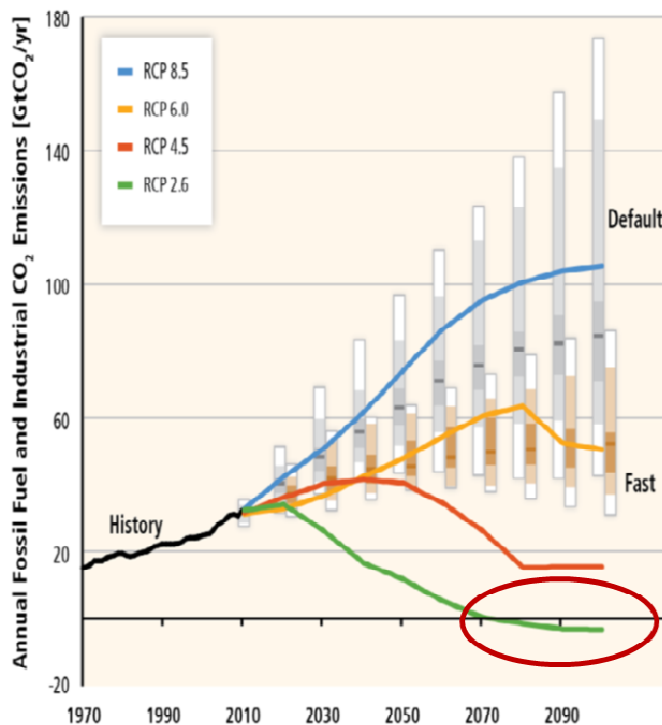
**SCOPE OF EVIDENCE**

8. The evidence given here is directly taken from the IPCC 2014 AR5 reports, 2015 INDC announcements and professional judgement.

**REMAINING CARBON BUDGET AND CLIMATE CHANGE**

9. Last year, the scientists of the world, in the IPCC AR5 documents have spoken. They delivered a set of analyses of the physics, chemistry and biology of the planet that suggest various scenarios for the future. The only scenario (RCP2.6) for the future that they came up with that keeps us below the two degrees centigrade limit agreed at the Copenhagen COP is very onerous indeed.
10. Why? Because it involves committing generations of the future to sequestering CO<sub>2</sub>, taking it out of the atmosphere and storing it somewhere, from 2070 out to the year 2300. If we do not agree to this stupendous task then we have to cut all emissions of CO<sub>2</sub> to zero by before 2050 and even that will only give us a two in three chance of staying below the two degree limit.
11. Critical information regarding mitigation scenario RCP2.6 from the IPCC 2014 reports is below. As can be seen from the second graph the CCS (negative

emissions) extends to 2300.



Box 1.1, Figure 3 | (a) Equivalent CO<sub>2</sub> concentration and (b) CO<sub>2</sub> emissions (except land use emissions) for the four RCPs and their ECPs as well as some SRES scenarios.

12. After exceeding two degrees, feedback effects are highly likely to make the situation irretrievable that is the temperature will just keep on going up.
13. The allowable CO<sub>2</sub> emissions for this scenario are 900 GT from the end of 2010 onwards. Or 250 billion tonnes of C. How much carbon have we got in existing reserves? Around 750 billion tonnes C (BP Stats, 2014) so we can only burn around 1/3 of known reserves. IPCC 2014 says only 1/5 can be burnt.

14. The 900 GT is around 120 tonnes CO<sub>2</sub> per person. The world is emitting a little over 5 tonnes per capita per annum which gives us 24 years at present rates of emission (NZ 8, China 7, US 19, Kuwait 30, TT 36, India 1.5, Nepal 0.1)
15. Historical increases will put us over the line in 2031 with the IPCC range being between 2024 and 2036. BPs estimate extends the crossover by one year to 2032. If we managed to keep emissions from all fuels at 2014 levels the crossover extends by 3 years to 2034
16. To keep below 2 degrees we would need to reduce all emissions from the end of this year by 5% pa. If we wait until 2020 the reduction will need to be 7% pa. Fatih Birol, Chief Economist for the International Energy Agency says 8% pa.
17. With these scenarios, the total emissions in 2050 would need to be only 5GT per annum i.e. the total reduction from 2014 would need to be 87%, close to what some people in Germany are proposing.
18. But even this is not enough for rich countries, as the poor countries (think Nepal, Pacific Islands) still want development and to increase emissions. The rich countries will need to reduce emissions even faster and at the same time transfer funding to the poor countries to assist their development.
19. If we decide to mitigate we have to meet the scientific targets, which are already too low and have pretty dodgy statistics i.e. would we build a bridge with a 33% chance of failing. Comparison with catching a plane. There is no point in trying to do our best if we cannot meet the targets.

#### **Intended Nationally Determined Contributions (INDCs)**

20. The announcements of the present INDCs to be presented to the Paris meeting at the end of the month suggest a complete disconnect between what the scientists are telling us and what Governments of the world are prepared to tolerate. By the end of 2030, the commitment period for the present INDCs, the world will have almost entirely expended the budget of CO<sub>2</sub> emissions allowed under the AR5 scenario to stay below two degrees. One cannot call such action just not acceptable to the people of the world, it is plainly insane.
21. The basic problem is that the economic system adopted by the world is one that needs economic growth to function. There are no inherent limits to this growth, whereas there are limits to the physical problems caused by that growth, including CO<sub>2</sub> emissions causing global warming.
22. At present the wealth accumulating from this economic growth is very unevenly distributed with the rich nations getting the majority share and the rich in the rich nations getting most of that share. The poorer nations need some economic growth to satisfy the hunger of their constituent populations. The rich nations need economic growth so that their politicians can get re-elected. Until there is a reassessment of this impasse there will be no respite

from the inevitable global temperature rise and the meeting in Paris will suffer the same fate as previous COPs.

### **Is there hope?**

23. Technical solutions are available in terms of a massive transition to renewable energy but this transition will necessitate a commitment on behalf of the rich countries including NZ that they are not yet willing to take.

- It would involve introducing a carbon tax sufficiently high to actually deter use of fossil fuels.
- It will take a commitment to not look for any further sources of fossil fuels.
- It will take a commitment to stop economic growth and consumption growth forever.
- It will involve shutting down the fossil fuel industry and ramping up solar, wind, biomass and other alternatives.
- The remaining fossil fuels allowed under the AR5 mitigation scenarios should be used predominantly to make the renewable energy devices and for other essential services.
- It will involve a massive transfer of wealth from the rich countries to the poor countries to enable the latter to mitigate and transition to renewable energy.

24. Finally it will require the world to focus on the problem at hand and not be distracted by waging senseless wars and producing technical advances that will increase growth and not decrease world average temperatures.

25. The ORC needs to be part of this effort and not be distracted by other seemingly important issues.

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Bob Lloyd

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