

Response to Zero Carbon Bill consultation document

The following are my personal views on the discussion document on the Zero Carbon Bill and related issues.

1. Introduction

First, I would like to introduce myself and my background. I am a building services engineer with over twenty years' experience in the building industry. Our focus as a profession has always been on making buildings more energy efficient and comfortable. We are therefore at the forefront of initiatives to protect the environment through energy efficient buildings. Although I have always worked in New Zealand, I have been a long-time member of a couple of the leading overseas professional engineering organisations in the field – Chartered Institution of Building Services Engineers (CIBSE) and American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). These organisations are at the leading edge of knowledge and technologies for the now and the future. As such I also keep an eye on what has gone on in the United Kingdom and the United States.

2. A few definitions

I think that a number of fundamental issues and definitions need to be discussed before delving into the detail.

2.1 Carbon

We need to be clear about the role of carbon and carbon dioxide in life on earth itself. The amount of carbon on Earth is a fixed quantity. It comes in many guises and forms the basis for life itself. You and I breathe out carbon dioxide and life only exists because of it, so if there is no carbon dioxide that means all life has stopped breathing. That is not a good target! The reality is that atmospheric carbon dioxide levels have risen above historical norms. What we want therefore is balance, not elimination.

My concern is that for many years the World has been told that carbon is an evil that needs to be expunged when nothing could be further from the truth. The term “zero carbon” is bandied about a lot in my business. Although many industry professionals like me know that it is simply shorthand for the real meaning, I have always been troubled by the term.

I am not convinced that the general public understand it that way. This is why I think we need to make that clear by renaming the bill to more accurately represent the goal that we need to focus on here, which is restoring balance. Perhaps call it the “carbon dioxide rebalance bill”.

2.1 Renewable energy

The second point I want to make is that the term “renewable energy” is also misleading. Two factors apply here. The Second Law of Thermodynamics states that all energy transfers towards an equilibrium state. Ultimately the whole universe is headed towards that equilibrium state, so nothing is truly infinite in that regard. Therefore nothing is truly “renewable” either. It is actually a relative term. If a resource is going to run out in a few years or decades, then it is not classed as renewable. If it is going to run out in a few thousand years then it possibly would be classed as “renewable”.

Obviously this is also an issue of supply and demand. Any resource would not be classed as renewable if demand outstripped supply.

3. Carbon dioxide is not the only environmental concern

Many environmentalists focus on climate change as though it is the single biggest problem we face. That is about as sensible as doctors only focussing on the health of people's lungs and ignoring heart attacks and the myriad of other health issues. Other enormous issues we

face include pollution of oceans and waterways, air pollution, scarcity of resources, destruction of habitats, etc, etc.

Everything we do and every option we take has some form of environmental impact. Some are more obvious than others. For example if you do away with natural gas then you need more electricity. That means more demand for resources such as copper. We cannot just focus on carbon dioxide. The reality is that some decisions may reduce carbon dioxide emissions but worsen environmental impact in other ways.

Pollution of air, water and soil are also major problems in New Zealand and around the World. These issues are very complex to deal with and it is more difficult to measure progress than simply targeting carbon dioxide. My concern is that by targeting carbon dioxide alone we would end up making poor choices and only make matters worse.

4. Energy sources

Fossil fuels are obviously a target of this Government. Natural gas is a very clean fuel with very low environmental impact other than the carbon dioxide emissions. A couple of the alternatives mentioned in the discussion document are biomass and biofuels.

4.1 Biofuels

Biofuels have been successfully produced and appear to work well. However they have proven to be a disaster in a number of ways. Enormous homogenous plantations of oil-palm in equatorial countries displace locals' ability to grow food, destroy bio-diversity and even replace areas of native rain forest. Biofuel production also accentuates the global divide of rich and poor nations. This is a prime example of attempts to replace fossil fuels creating even bigger problems. I think growing crops for fuel, even if it is accounted as producing carbon-neutral fuel, is a very poor use of land for a lot of reasons.

4.2 Biomass

There are a range of potential sources of biomass for fuel. These include off-gassing of waste and landfills, processing of sewerage and wood. Some of these have potential and are already used successfully. Using waste for fuel has got to be a win-win. However there will always be the supply-demand equation to consider.

Burning wood, in whatever form, will always be a very poor substitute for natural gas. It is a lot more polluting. It is much more problematic to deliver and handle solid fuel and waste. It is less controllable when in use. There are many applications for which natural gas is perfect that no other energy source can be used for. The ubiquitous continuous flow water heater is a prime example. Our one saves us hundreds of dollars a year. Backyard barbeques are another.

Wood has been offered as a "carbon-neutral" fuel. The argument is that the tree absorbs carbon dioxide as it grows, then releases it when it is burned. This is just voodoo accounting. If a tree takes 30-40 years to grow before it is harvested for fuel, and carbon dioxide in the atmosphere has a half-life of a similar period of time then it is highly debatable whether wood can be classed as carbon neutral. The reality is that burnt wood releases large amounts of carbon dioxide, particulates and other nasties into the environment, causing significant local air pollution. It would release none of that if it wasn't burnt.

Having said the above I do appreciate that my specialty is not atmospheric chemistry, and I realise that is a complex field. Nevertheless I would strongly question any statement that suggests wood is carbon-neutral.

4.3 Natural gas

I believe that natural gas is such a brilliant fuel that we need to keep it as part of our energy mix as long as we can. Changing from it would cost many many billions of dollars. I also believe it has far less environmental impact than many of the alternatives being touted.

5. A fossil fuel-free future

A future without fossil fuels also means a future without air travel and orbiting satellites. Even sea travel is likely to be significantly affected in terms of size and speed of vessels. How will that affect our society and the World at all sorts of levels? Trade, social, political and even military impacts and more need to be thought about. I think that the impact of eliminating air travel will hit New Zealand a lot harder than most countries because we are so physically remote from most of the rest of the World.

6. Economic analysis

Whatever economic analysis figures you have come up with are completely meaningless rubbish. They appear to be based on some sort of emissions trading scheme and the “cost of carbon”. What that means is increasing penalties imposed upon people for using carbon. That makes it increasingly difficult for them to fork out the money required to change their usage. The accounting system does not include any cost to actually make that change.

For example if a person or company needs to spend \$1m to change over to a carbon neutral alternative technology then they will be hit by increasing penalties until they manage to save up that one million dollars to make the change. Your accounting only measures the penalties, not the actual cost of change.

These costs will be very unevenly spread and in many cases will be enormous. As a country the cost will run into many hundreds of billions of dollars. There is no way our economy will grow when faced with costs like that. These costs do not appear to have been modelled in your economic analysis. That means effectively that you are trying to sell a lie to the people of New Zealand by hiding the real cost of change. You suggest that the lower socio-economic groups will be hit the hardest. Absolute rubbish. The costs will be borne by businesses and property owners.

6.1 Emissions trading scheme

The emissions trading scheme is not explained in the discussion document. It appears to be some sort of tax on carbon dioxide which increases over time. If so this seems to be some sort of musical chairs where those who take the longest to react, possibly because they can't afford to, are hit the hardest. This could be a vicious spiral that actually prevents people and businesses from making the required changes.

7. The problem with public opinion, politics and democracy

One of the problems with public opinion is that it often does not understand or reflect the true concerns or impact around particular issues. This is especially so with regard to complex technical issues, including all of the issues and potential impacts around climate change and environmental policy. Public opinion tends to drive democracy, and that in turn tends to drive politics.

8. Climate change commission

I worry a lot about what changes may occur with environmental regulations in the future. We absolutely should be acting, but there are a million ways to get this horribly wrong and do a lot more harm than good. The Government's recent move against oil and gas exploration is a prime example of a move that was so shockingly ignorant and damaging that I still can't believe it months later.

A climate change commission could be an important part of this transition, but only if it is set up and operates on the right basis.

Things it absolutely must not be swayed by are:

- Political influences
- Cultural influences
- Public opinion
- Ideologies
- Individual technologies

Things it needs to consider include:

- Effects on business and the economy
- Effects on individuals
- Real costs of change and how those costs are distributed
- Encouraging holistic solutions
- Encouraging options, creativity and innovation. One solution will never fit all circumstances
- Quality science and engineering

I don't believe a small group of people, no matter how experienced they are, will have enough wisdom or knowledge to make these sorts of decisions on their own. Whoever is on the commission will need a strong supporting structure behind them.

By supporting structure I mean ties with people and organisations working in the real world. I have seen quite a bit of work produced by so-called policy analysts and the like who work for the Government. To be quite honest most of what I have seen is appallingly out of touch and ignorant of the real world.

9. [Bringing everyone with us](#)

In the message from James Shaw at the beginning of the discussion document is the phrase "we need to make sure we bring everyone with us". I am not quite sure what he meant by that comment. It may have all sorts of meanings put on it, possibly economic, possibly technology, possibly ideology.

The reality is that every person will respond to this challenge in different ways based on their backgrounds, their resources, their viewpoints, their age and health and the challenges they face in their lives. Consequently there will be a wide range of levels of engagement and acceptance. I would like to hope that the term has a connotation more of support and encouragement rather than the opposite.

I certainly do agree that everyone needs to be brought along on this ride and we need to ensure everyone is catered for. However we must not be steered by public opinion or ideologies. The only way this might possibly work is with wise leadership from very well informed and supported people.

10. [Timeframe](#)

Don't be fooled into thinking a thirty year timeframe is a long time. That is actually a very short period of time for the changes that are being talked about here. Comparing these changes with those brought by the internet over the last thirty years is ridiculous. This time we are talking about physical and structural changes.

Most of our building stock is well over thirty years old, and most of the buildings that will exist in 2050 have already been built. Similarly most of our cars and vehicles are also a decent age, and only a small portion of us would ever consider buying new. It can take many years to approve, design and build significant buildings and infrastructure. Technologies that don't exist yet are likely to take decades to start to make a significant impact.

11. Buildings and building code

Our building code is an embarrassment. We are decades behind probably all of the developed world and even much of the developing world in what we demand of our buildings. We need to catch up, but we need to tread carefully and make sure we get it right.

We need to make sure the new codes encourage options and innovations. We need to ensure particular technologies are not mandated. Solar panels for example are a great technology, but they are not suited to all locations and building types and they are obviously not suited to all conditions. Many sites are shaded by topography and other buildings. Solar panels also have much more limited benefit to multi-storey buildings. No single solution works everywhere.

We need to improve the energy efficiency of our homes and buildings, but in doing so we need to recognise the very wide range of building types and also the wide range of climates and altitudes we have to deal with in New Zealand. We need to use performance metrics that make sense across a wide variety of building types and locations.

As noted above, improving the building code is good, but we also need to deal with the existing buildings as they will make up the vast majority of buildings that will be around in 2050. In most cases it won't be possible to upgrade an older home to the highest standards, but they certainly can be improved. We are going to have to be realistic in what can be achieved with existing buildings and balance cost against reward. For example it would be better to upgrade our existing home than knock it down and build a high spec home.

There are an increasing number of building rating systems available including LEED, BREEAM, Greenstar, Living Buildings and others. Even within each of these there are a wide range of types and editions. These are good in their way and all have their place in marketing the skills of the designers and in marketing to tenants. However they are not necessary to achieve outstanding performance. The direct and indirect cost of certification can often be redirected to further improving building performance. Ultimately it is how the building performs rather than its rating that will determine success.

We also need to study what has happened overseas, what has worked and what hasn't and why. The Green Deal was a UK Government policy that was implemented with the greatest of intentions and hope to improve existing homes but turned out to be an abject failure and ended up being scrapped. Also in the UK plans for mandating "zero carbon homes" have come and gone. It will be very important for us to study both the successes and failures from overseas and get an understanding of the reasons behind those results. Hopefully that way we will be able to get a feel for what is realistically possible and then implement policies that work well in New Zealand.

12. What's the right target?

A number of other countries are not targeting zero net carbon dioxide emissions, but something less than that. For example the UK and Europe are targeting an 80% reduction by 2050 rather than 100%. Note that these nations are already decades ahead of New Zealand in working towards these goals and have been responsible for huge technological and strategic steps in doing so. These are steps that New Zealand can benefit from. It says a lot that these countries, with all their experience, know that net zero emissions is too difficult. We should therefore not be aiming for a much more stringent target in half the timeframe.

A large proportion of atmospheric carbon dioxide is absorbed by the oceans rather than on land. Given those two factors I would question whether aiming for zero net carbon dioxide emissions in New Zealand is even the right or most appropriate goal. If two thirds or so of the atmospheric carbon dioxide is being absorbed by the oceans, then should our target be something less stringent than net zero?

I would also suggest that we should be using a different metric than measuring our emissions against some arbitrary mark in the past, like 1990. Our population has grown over 40% since then. Instead we should be measuring on a per capita basis.

13. World leadership

I get annoyed at all of these aspirations of world leadership that James Shaw keeps going on about. The fact is that New Zealand are very late on the scene with any climate or environmental legal framework and are just about the last country in the World who could possibly be in a position to claim some sort of global leadership on the topic.

The only possible explanation I can think of is the ludicrous oil and gas exploration decision by the Government. If that is what passes for global leadership then please stop immediately. The absolute last thing we need in dealing with these issues is ignorant rubbish like that.

It's also disrespectful to all the countries and people who have worked so hard for decades to come up with all sorts of solutions (that we can now benefit from). The fact of the matter is that in the building industry at least, the technology is already available to achieve net zero carbon dioxide emissions if money, space, resources and effort were no barrier. In the real world however there are limitations on all of these and our efforts will require a lot of trade-offs, balancing objectives and compromises. Even then we are likely to fall well short.

14. Conclusion

In conclusion I would say that we definitely have to start pulling our weight on the issue of environmental impact. We are a long way behind the rest of the World, so we need to humbly catch up. Please scrub any grandiose notions of World leadership on the issue.

We need to consider broader environmental impact, not just carbon dioxide levels. I believe that pollution should be targeted. In this way we would be better able to aim for more balanced targets. Given the role of the oceans in the carbon dioxide cycle and that most other countries are targeting less than 100% reductions, I would suggest that the target not be set as stringent as zero net carbon dioxide emissions. Instead it should be based on a per capita figure.

I believe that an emissions trading scheme is likely to be a hindrance rather than an encouragement to reduce environmental impact.

A climate change commission could be a good thing, but only if it is completely independent of political interference and public opinion. It is also essential that it is backed by sound science, engineering and economics so that it can be in a position to provide the best possible advice.

We should be targeting a sensible high quality energy mix covering a range of different sources. One of those sources should be natural gas and we should be keeping that going as long as possible.

We certainly need to upgrade our building code to be more in line with other developed countries. At the same time we need to work on upgrading our existing building stock.

Finally we need a better handle on what the actual costs of all this change are likely to be and who is likely to bear most of that cost.