

MAYBE WE CAN SAVE OUR PLANET BUT WE NEED TO ACT NOW!

I am reminded of a task I undertook a few years ago. The task was to rescue a bankrupt telephone company in a small African country. The situation was pretty dire. The Government was injecting cash on a monthly basis to keep the business going. Half of the staff had been on strike or locked out – depending on your point of view – for about nine months.

Before accepting the job, I asked if the government was prepared to act decisively and to make some difficult decisions. The answer was “yes”. So, I agreed to take on the job.

When I arrived and first met the senior managers, they produced a number of reports with fancy bindings that had been written by various consultants. They told me these reports said what ought to be done. I responded by telling them that I and my team were not there to write reports. We were there to get the job done! We never read those reports.

Within about 18 months we had that company back under control and in a positive cash flow situation. Our strategy to achieve this outcome was simple. Here are the steps we took.

1. Identify a small number of critical highly leveraged actions we could take that would make the greatest impact on the company's performance.
2. Pursue those actions vigorously.
3. Avoid distractions.

And that is what we did. We identified that the company needed to reclaim the millions of dollars owed by its customers and get its billing systems in order. Secondly, we identified that the company needed to down-size its staffing by around 50%. We vigorously pursued those actions. We managed to avoid distractions which included riots, anarchy, an attempted *coup-d'état* against the Government and a brief shooting war, and many temptations to address all kinds of minor flaws in the company. And so, the company was saved and our task was accomplished in good time.

As to global warming and management of emissions, we have a similar kind of situation – but this time on a global scale. The signatories to the Paris Accord acknowledge that the present country commitments are not sufficient to limit global warming to 1.5° C by the end of this century. And who is to say that our planet will still be liveable for our children and grandchildren at that threshold? The respected science commentator, Neil de Grasse Tyson¹ says it might already be too late to recover from climate change and others are saying that even with all the transitions to renewable energy that are now being accomplished, it already looks unlikely that our goal will be accomplished^{2 3 4}. We need to do better! The situation is dire and we need strong and effective action now! Just as in the rescue of the African telco, we need to move our focus from writing reports, to a programme for action, as individuals, as a country and as a global community.

The Productivity Commission has written an excellent report, highlighting both the opportunities and challenges ahead of us. And the Government produced an informative paper *New Zealand's Action on Climate Change* in September 2016.

The best part of the climate change paper is the subtitle on the cover page:

*“Climate change is the biggest environmental challenge of our time. How we respond **now** will affect generations to come.”*

...and the heading on back page:

¹ Neil DeGrasse Tyson on Climate Change ([CNN TV 17 September 2017](#))

² Climate change will almost certainly heat the world so much it can never recover, major study finds ([The Independent 31 July 2017](#))

³ Earth's oceans are warming 13% faster than thought, and accelerating ([The Guardian 10 March 2017](#))

⁴ The green revolution is stalling ([New Scientist 5 August 2017 p22-23](#))

“We need to do more”

The Productivity Commission warns us that:

“An effective transition to a low-emissions economy will mean that New Zealand will look very different in 2050, and even more transformed by 2100”

and that:

“...delaying action will result in a more abrupt transition (World Bank, 2015).”

We need to get on now with actions that will make a difference!

Following the lessons of the African company rescue, we need to ask ourselves the question. “What are the highly leveraged actions we can take right now?”

Here are my three for New Zealand:

1. Stop burning fossil fuels
2. Plant a lot more trees
3. Deal with agricultural emissions of methane and nitrous oxide

That’s it! Tackle these three effectively and we will have GHG neutrality⁵ or perhaps even a deficit which can help make up for other countries that are struggling. Reducing fossil fuel

⁵ GHG = greenhouse gases. GHG neutrality implies that any ongoing emission of GHGs into the atmosphere is offset by an equivalent removal of GHGs, for example by additional trees which will absorb carbon dioxide from the air.

and agricultural emissions to 35% of their 2017 levels and increasing the absorption by trees to 150% of 2017 levels would bring us to GHG neutrality⁶.

Given the urgency of acting as soon as we can, we must not wait until we have a complete solution for removing all sources of GHG emissions. It is vital that we start right now. We should start pursuing, as vigorously as we can, those solutions we already know to be technically feasible.

Simultaneously we should be making every effort to find viable solutions for those forms of emission that are more intractable (e.g. methane from livestock, fuels for shipping and aviation, and manufacturing processes such as making steel, plastics, cement and fertilisers).

We need to avoid being distracted by the tough problems, while we make our best efforts to act on the solutions we can implement right now.

I have drawn up my list of recommended actions and these are presented in the following table. The recommended actions include electricity pricing reforms. I see these as a vital part of our response to the challenge of reducing our use of fossil fuels. Electric power is our best substitute for the energy we currently derive from fossil fuels, either as a direct replacement or as an ingredient in making other green fuels like hydrogen and synthetic hydrocarbons. We are going to need a great deal more electricity as we displace the fossil fuels and it is therefore important that we recognise and correct the failures in our present systems of electricity pricing so that we make the most efficient possible use of our electricity grid for the future. With the right pricing that grid can carry substantially more power than it does today, and it may even be possible to reduce our average price for electricity.

⁶ Calculations are based on data in Figure 10 of New Zealand Productivity Commission (2017) *Low-emissions economy: Issues paper*. Available from <http://www.productivity.govt.nz/>

Action to take now	Comment
Implement Norway-style incentives to promote EVs for cars and light commercial vehicles	<p>With 167,000 EVs today and a population similar to that of NZ, Norway is the world's most successful country in initiating a transition to EVs^{7 8}. Norway is also committed to completely banning the sale of fossil-fuelled cars by 2025⁹.</p> <p>A detailed study¹⁰ by the UBS reports that <i>consumer cost of ownership (TCO) parity vis-à-vis combustion engine (ICE) cars can be reached from 2018 (first in EU), creating an inflection point for demand.</i></p> <p>This is not an excuse for continuing to wait for market forces to drive the switch to EVs! Rather it is an affirmation that we are not going to crash our economy by tipping the scales to favour EVs before the tipping point arrives.</p>
Reverse the flawed KiwiRail decision to purchase new diesel locomotives for the North Island Main Trunk Railway ¹¹	There are less costly options and reversal would serve as a demonstration that government means business in promoting a transition to renewables
Initiate now the construction of new power stations using renewable energy to replace coal and gas-fired power stations as soon as possible	<p>Potential double benefit from eliminating fossil fuelled generation and enhancing the emissions reduction value of moving transport to EV solutions.</p> <p>We could do much better than the government's current target of 90% renewable electricity by 2025.</p> <p>Some of this investment can be financed as a consequence of the reduction in our present national fuel bill of around \$4 billion when land transportation is switched to EVs.</p>

⁷ Sigurd Magnusson, ([New Zealand Electric Car Guide, 4 August 2017](#))

⁸ Data on the Norway incentives for EVs can be found in [ICCT Policies – Europe May 2016](#)

⁹ Norway is Completely Banning Petrol Cars by 2025 ([Interesting Engineering 7 June 2016](#))

¹⁰ UBS Evidence Lab Electric Car Teardown – Disruption Ahead? ([UBS Global Research 18 May 2017](#))

¹¹ Roger Blakely et al, More on Kiwi Rail De-electrification ([Greater Auckland 19 September 2017](#))

Action to take now	Comment
<p>Rename EECA and repurpose the organisation to promote the conversion of all existing fossil-fuelled applications to renewable energy</p>	<p>Supporting the target of eliminating the burning of fossil fuels should be a much more important objective than EECA's current goal of minimising our use of electricity. In fact, we will need <i>more</i> electricity as this is our most suitable option for replacing fossil fuel burning in many existing applications.</p>
<p>Restructure retail electricity pricing to improve economic efficiency of transmission and distribution infrastructure. and incentivise individual investments in solar panels and batteries.</p>	<p>Transmission (TransPower) and distribution (lines companies) costs are a large part of part present retail prices for electricity, and yet their assets are very inefficiently utilised because of inadequate pricing signals to end users. Peak/off peak pricing¹² for transmission and distribution passed on to end users by electricity retailers, would encourage users to reduce their demand at peak times, spread the load on the power lines and allow significant additional total power to be distributed without the need for additional costly investment in lines.</p> <p>Carrying a significant load of additional power on the existing network should enable electricity price reductions without making anyone worse off.</p> <p>EV car owners would be strongly incentivised to charge their cars during off-peak periods.</p>

¹² Transmission and distribution line costs are determined by the peak demands they are designed to carry. The incremental cost of carrying additional power during off peak periods is effectively zero and this should be the price per unit charged by the lines companies. Their price for carrying power during the 8 hours or so of peak demand should be set to about 2½ times the present flat rates to give them adequate income. Retailers should be required to offer at least one plan choice to their customers which passes through this pricing structure. Optionally they might also include a peak/off peak component that reflects representative spot prices for the energy itself.

Action to take now	Comment
Retail electricity pricing applied to individuals with solar panels and/or battery storage should be restructured to reflect economic principles and encourage behaviours that will support efficient operation of the grid.	<p>Technologies exist and are already being deployed^{13 14 15} that would allow battery owners or EV owners to feed power back into the electricity grid at peak times, thereby reducing the peaks and saving investment in transmission and distribution lines. Economically based pricing¹⁶ is required for electricity fed back into the grid to make this a practical and viable opportunity for the end-user.</p> <p>Sensible pricing as outlined will encourage private investment in solar panels and increase the nationally available supply of electricity. It will also ensure economic parity between home batteries and grid batteries such as Tesla is installing in South Australia¹⁷ to support peak loads, as an alternative to increased line and generating capacity. See also Andorka¹⁸</p>

¹³ Vehicle-to-Grid ([Wikipedia](#))

¹⁴ Nissan and Enel launch groundbreaking vehicle-to-grid project in the UK ([Nissan 10 May 2016](#))

¹⁵ New Zealand's first vehicle-to-grid charging system announced ... ([SEANZ](#))

¹⁶ As a possible example; assuming the pricing structure described in the preceding footnote is introduced, then during off-peak periods the retailer should pay the solar panel owner the spot price for the energy fed back into the grid because this is the amount it saves for that power. During peak periods the lines company should pay the retailer its peak rate (2½ times the present flat rate) and this payment plus the spot rate should be credited to the solar panel owner. The payment by the lines company is justified because the amount of peak power it has to carry on its main lines is diminished by the amount fed back into the grid (which is most likely delivered to one of the solar panel owner's near neighbours).

¹⁷ Tesla to build world's biggest lithium ion battery in South Australia ([The Guardian 6 July 2017](#))

¹⁸ Frank Andorka, Report: Grid-tied residential storage surpasses off-grid use ([PV Magazine 26 September 2017](#))

Action to take now	Comment
Devise incentives to encourage homeowners and commercial property owners to stop using all forms of fossil fuel including natural gas for space heating, water heating and cooking	We should promote and celebrate individual initiatives to radically reduce their carbon footprints ¹⁹
Set a more realistic <i>shadow price</i> for carbon emissions for government policy studies	<p>The Productivity Commission's paper²⁰ admits that so far, the current price of New Zealand Units in the scheme has been too low to influence behaviour. A low carbon price has contributed to many of the opportunities identified in this chapter not being actively pursued. We have to do better than this.</p> <p>In principle, the only meaningful cost of carbon would be established by entering into a contract with a company that committed to extracting CO₂ from the atmosphere and sequestering it. There aren't many companies able to do this yet, but Michael Barnard²¹ describes a process that might be used and cites a likely cost of USD \$120-\$140 per ton of CO₂ (equivalent to NZD \$171-\$200). A price of this magnitude, or even higher since no-one is able to contract to do it yet) should be used for policy studies and perhaps emissions trading.</p>

¹⁹ The impact of carbon footprint reduction decisions by individuals should not be underestimated. In the last 3 years our household has replaced a 30kW diesel boiler with 2 10kW electric heat pumps, installed a grid-tied 10kW solar array and purchased an electric car which is used for most of our local running. If every household in the country took similar steps we would be well on the way to achieving our national carbon reduction targets. Our next decisions will relate to batteries or some other form of energy storage – but before we take that step it would great to see rational power pricing introduced (as outlined elsewhere in this paper 😊)

²⁰ Productivity Commission, op cit, p 35.

²¹ Michael Barnard, Carbon Capture Is Expensive Because Physics ([Clean Technica 19 January 2016](#))

Action to take now	Comment
Initiate studies to find the best renewable solutions for heavy traffic, construction and farm vehicles and implement incentives accordingly	Likely solutions could be EVs ²² , biofuels or clean synthetic fuels such as hydrogen ²³ or synthesised hydrocarbons ²⁴ .
Investigate and monitor the new electric Denmark-Sweden sea ferries with view to similar deployment in NZ ^{25 26}	
Track the Iceland Deep Drilling Project ^{27 28} and consider the possibility of a New Zealand trial. This project holds the prospect of drawing abundant fossil-free and pollution-free energy from deep in the earth's crust.	<i>On Iceland's Reykjanes Peninsula, a short drive from the country's capital, a team of scientists and engineers is pursuing what they see as an energy source of the future. To unlock it, they have drilled down toward the center of the Earth, through layers of soil and rock, stopping just short of a chamber of molten magma more than 15,000 feet below the surface, a scalding pocket so hot that it would melt a lead pipe. They aim to use that heat to power the energy-hungry world — or at least part of it.</i>

²² Electric bus travels 1100 miles on one charge ([Arstechnica, September 2017](#))

²³ ITM Power develops rapid response electrolyser for production of green hydrogen ([Renewable Energy Magazine 25 September 2017](#))

²⁴ Solar-to-Fuel System Recycles CO2 to Make Ethanol and Ethylene ([Berkeley Lab News Center 18 September 2017](#))

²⁵ Electrification of Denmark's ferry fleet ([Siemens October 2016](#))

²⁶ Two massive ferries are about to become the biggest all-electric ships in the world ([Elektrek 24 August 2017](#))

²⁷ Justin Worland, A Solution to Our Clean Energy Problem May Lie Right Beneath Our Feet ([Time Magazine 25 July 2017](#))

²⁸ Guðmundur Ó. Friðleifsson and Wilfred A. Elders, The Iceland Deep Drilling Project geothermal well at Reykjanes successfully reaches its supercritical target ([Geothermal Resource Council March/April 2017](#))

Action to take now	Comment
Plant “a billion” trees	This was announced as a Green Party policy by leader James Shaw during the recent election campaign. Regardless of politics and the outcome of the election it would be a great policy initiative for New Zealand’s programme to reduce GHGs in our atmosphere.
Monitor existing research programmes for devising means to combat both methane and NOx emissions from New Zealand livestock, and provide additional resources as needed for both research and implementation.	Several promising leads have already been announced from these research projects and we need to make sure that these are adequately resourced.

Conclusion - a call for action

There are many promising opportunities for New Zealand to reduce its net greenhouse gas emissions. What we need to do now is to identify the most effective interventions and get on with the job.

Sometimes it feels as if global warming and air pollution have us all on a runaway train that is going faster and faster, while the train crew are discussing what to do and writing reports. We need to stand up and start putting on the brakes!!

Postscript – Article from New Scientist 9 September 2017

This article is quoted directly and in full below. Its message is the same as that for my submission, though it focusses on the first of my three action steps: namely *stop burning fossil fuels*. The message again is

MAYBE WE CAN SAVE OUR PLANET BUT WE NEED TO ACT NOW!

Here is the article:

An achievable dream

We really could run the world purely on clean, renewable energy, says Mark Jacobson

“Shifting all forms of energy for all uses to electricity is possible, supplied only by wind, water and solar”

PEOPLE often ask me if I think there is any hope that the world can transition to clean, renewable energy fast enough to avoid the deadly and damaging impacts of a rapidly warming planet. I say yes.

That’s despite a popular belief that we are doomed because a lot of politicians are wedded to fossil fuels. There are also those who question the practicalities: for example, how to keep a supply grid stable with 100 per cent, as opposed to 80 per cent, clean, renewable energy. Plenty of studies show it is possible.

Despite the naysaying, I remain optimistic that a complete transition can happen globally. In the first issue of sustainable energy journal *Joule*, our team at Stanford University and the University of California, Berkeley, set out road maps to achieve 100 per cent clean, renewable energy in 139 countries, responsible for more than 99 per cent of all emissions.

These show how a transition of all forms of energy for all uses to electricity is possible, supplied by 80 per cent wind, water and solar power (WWS) by 2030 and 100 per cent by 2050.

The study found not only that it is possible, but also that this would bring big gains, including averting most of the millions of annual deaths attributed to air pollution. It would also stabilise energy prices and create in excess of 24 million more permanent, full-time jobs than are lost.

Access to power for billions of people in energy poverty would improve, and demand would be reduced by about 43 per cent – due chiefly to the greater efficiency of electricity over combustion and the elimination of energy use for producing and moving fossil fuels.

Importantly, moving to renewables would eliminate nearly all emissions associated with global warming, helping us avoid reaching 1.5°C of warming this century, the Paris climate agreement’s most ambitious goal for avoiding climate disaster.

*“I am confident that the transition is technically and economically possible, **but it requires a massive increase (by a factor of between 10 to 100) in public and private action around the world.** All of us can play a part in this.”*

Mark Jacobson is a professor of civil and environmental engineering at Stanford University and co-founded the Solutions Project, a clean energy campaign

End of quote

The full published article can be found [here](#).

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