DUNEDIN BIG EV DAY OUT

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INTRODUCTION

Is New Zealand doing enough to meet its Paris agreement goals and what do each of us need to do, to achieve these goals? The three big "C's" of climate change in New Zealand, can be summarised as coal, cows and cars.[1] Encouraging active transport is the gold standard, switching from motor vehicles (man's new best friend) to walking or cycling has obvious benefits for physical health, improving air quality and wider environmental benefits. Electric Vehicles (EVs) also need to be a part of our immediate transport and mobility solutions as a priority for mitigating carbon emissions. Driving an electric car produces 80 per cent fewer CO_2 emissions than a petrol-fuelled vehicle. Closer to home Dunedin has a high rate of car ownership and 40 per cent of Dunedin's carbon emission come from cars.[2] Even when you consider the embedded carbon from production there are 60 per cent fewer carbon emissions across the life cycle of the EV.[3] Cars are the low hanging fruit - getting them off the road where possible and the electrification of transport as fast as possible. Grassroots organisations around the world are taking up the challenge to promote EV options to the wider public with community education.

PARIS

On 4 October 2016, New Zealand ratified the Paris Agreement, a global agreement on climate change adopted under the United Nations Framework Convention on Climate Change (UNFCCC).[4] The Agreement commits all signatory countries to act on climate change, based on a growing body of international evidence of human-induced climate change.[5]

Three key numbers can summarise the goals of the climate talks in Paris in December: zero, two, and one trillion

> Two degrees Celsius is the maximum temperature increase that most global leaders have agreed is the upper limit of tolerable warming, beyond which the risks from extreme climate change are judged to be too high.
>
> One trillion tonnes is the maximum amount of carbon (a way of counting CO_2) that can be emitted before the planet will be pushed to more than 2°C of warming.
>
> Zero is the net amount of CO_2 and other greenhouse gases that humanity needs to be emitting by the second half of this century to have a reasonable chance of avoiding catastrophic climate change. [6]

This is what the science tells us, but it isn't only a scientific problem. IT IS A SOCIAL PROBLEM and one that needs a social response. It is evident we are in the middle of a global crisis and 'business as usual' is no longer an option. By omission, our inaction and failure to act with urgency on curbing greenhouse emissions is putting millions of people at risk from sea level rise and more severe weather systems.[7] The people who will bear the greatest physical impact from the effects of global climate change are the people who have produced the least carbon emissions, for example Pacific Island nations and countries with large delta coastlines such as Bangladesh, a country which is

Figure 1. Still from a government sponsored advertisement promoting electric vehicles.[12]

looking at a displacement of 30 million people alone. Associated social flow-ons are extreme pressure on food and water resources, shelter, heating, increased poverty, disease and famine with predicted mass migrations from such climate affected areas, at a scale which make the recent Syrian refugee "crisis" look like a trickle.[8] Whilst these "other" people are facing the very real mortal concerns of extreme deprivation and death, "our" (first-world) concerns are whether any changes we need to make to "our" lifestyle will cause us any *inconvenience*. Following on from the most famous power point of all time (*An Inconvenient Truth*),[9] the truth is we will be inconvenienced, in some way or other by climate change, the issue is to what degree (pun intended).

Closer to home a report released by the Royal Society of New Zealand highlighted local impacts if we fail to curb current climate change trajectories.[10] New Zealand's commitment at the Paris talks is to reduce its greenhouse gas emissions by 30 per cent from 2005 levels and 11 per cent from 1990 levels by 2030.[11] As part of that commitment the NZ government aims to have 64,000 electric vehicles operating in NZ by 2021.

We (each of us) need to be responsible for our individual contributions to global carbon emissions and we each need to be doing more now. To paraphrase Ralph Chapman, we are living in a period of "useful consciousness" – this is our (only) window in which life-saving action *is* possible.[13] What is needed is an immediate managed decline away from the fossil fuel industry and its supporting ICE manufacturing economy and investment in the transition to alternative carbon neutral technologies. Despairingly we've been here before. If we look back in time we are presented with a kind of groundhog-day scenario.[14]

GROUNDHOG DAY

At the turn of the twentieth century a major disruption occurred in transport technology which saw the horse (man's best friend) and cart supplanted by motorised transport options. Within the line-up of potential successors electric vehicles (EVs) were poised to take the lead from the steam car and close rival the internal combustion engine (ICE) aka the motor car. EVs were promoted in a climate of looming fuel shortages and at one point in the early 1900s, were the dominant mode of urban transport in cities such as New York, along with a sophisticated

network of charging infrastructure. [15] As we know EVs failed to take line honours in the technology race, at that time, and the motor car (car being an abbreviation of carburettor) became the dominant mode of transport for the remainder of the twentieth century. As many will know the Ford Motor Company played a key role in this piece of motoring history, but behind the story of Henry Ford's success is a little-known patent law suit, the court battle for which was backed by the Standard Oil Company.[16]

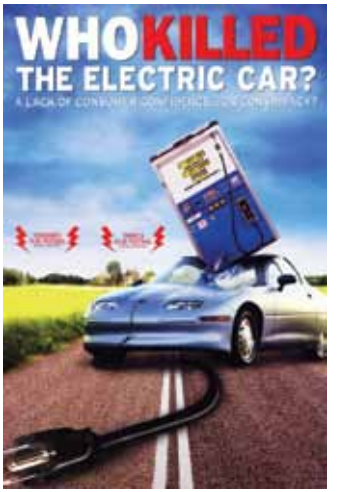
Fast forward to 1996;

> In 1996, GM rolled out the EV1, an innovative battery-powered car, in response to a 1990 California law requiring car makers to produce zero-emissions car. Relentless opposition and suits from automobile manufacturers, oil industry, orchestrated hype over a future hydrogen car, and finally the George W. Bush administration [saw the recall of the EV1].

This story, retold in the documentary Who Killed the Electric Car, is a lament to the General Motors total recall of all EV1s ever made. The movie concludes with a poignant aerial shot of the crushed bodies wasting away in a remote field.[17]

Last year it was calculated that the last new gasoline-powered vehicles could be sold no later than 2035, if we were to keep the world on track to the most stringent goal set by world leaders last year in Paris, that is to 1.5 degrees of warming.[18] In response several countries have set dates to implement bans on all new internal combustion engine (ICE) vehicles. To name a few examples Norway – starting in 2025, all new passenger cars and vans sold must be zero-emission vehicles; France - no new sales of petrol or diesel cars starting in 2040; United Kingdom – no new sales of petrol or diesel cars starting in 2040. Austria, China, Denmark, Germany, Ireland, Japan, the Netherlands, Portugal, Korea and Spain have all set official targets for EV uptake.

At a time when the world is demanding clean renewable forms of energy and reduction in carbon emissions, climate change denial is still being funded by big corporates interests with substantial investment and profits at stake in the status quo. Such activity has been ongoing since the inception of the Global Climate Coalition in 1989. The group's name suggested that the group held the best interests of the planet at stake rather than the pockets of climate change denial lobbyists, some of which are now facing potential law suits over misleading the public.[19] (Closer to home we had the New Zealand Climate Science Coalition, which was until recently well-funded to reject



Figures 2-4 from left; McKinlay family phaeton, Lawrence 1891; DVD cover – "Who Killed the Electric Car," "last fuel stop" sign for Petrol vehicles, Portobello, Dunedin, 2017.

mainstream scientific information about man-made climate change.) This is no more obvious than recent news that President Trump will withdraw America withdraw from the Paris agreement and roll back other legislation in the United States of America which had aimed to reduce its green-house emissions. Despite all this we now appear to be living in a period of EV comeback and grassroots organisations and individuals are doing their part to advance change.

GRASSROOTS ADVOCACY

The Dunedin EV Owners Group was started in 2015. A core of committed and knowledgeable EV owners offer support and advice to new and prospective EV owners and promote the idea of Electric Vehicles to the wider public in Dunedin and the wider Dunedin area. For many buying an EV is "leap of faith". The technology is new and changing rapidly, the costs of purchase involved are high and people unfamiliar with the technology have fears around how to charge etc.[20] Events run by the Dunedin group are usually small-scale community showcases, talks or presentations and they also support other community events such as Vogel St Party and sustainability and research groups for example Otago Energy Research Centre. They work in close association with the Better NZ Trust for their annual Road Trip (Leading the Charge) see Figures 4 and 5 below, FlipTheFleet (a Curious Minds Citizen Science Project), hold public forums (ChargeUp Dunedin) to advocate for local rapid and other charging infrastructure and organize events as part of International Drive Electric Week.

Cape Reinga to Bluff is a long trip in anyone's book (3000km give or take a few km) but once a year a group of EV owners give up their time and travel the length of NZ in electric vehicles. The annual Leading the Charge Road Trip aims to highlight the advances in EV charging infrastructure, EV ownership, and public knowledge of the electrification of transport throughout in New Zealand. The fact that this group is driving the length of New Zealand demonstrates that it is possible for others to so also. As the Leading the Charge touring cars travel up the country they are supported at pit-stop events along the way by local EV owners' groups. This year they were joined by over 400 EV owners in towns and cities along the route, including in Dunedin, and tens of thousands of people attended events.

Figure 5 and 6. Screengrab of charging stations across NZ (as at Sep 10 2017) source http://www.revup.net.nz/PlugShare.aspx; Morgan Knoessen, a visiting EV owner from Wanaka, charges at the Filluel Street rapid charger in Dunedin, August, 2017.

Figure 7 and 8. EV Owner groups in North Island (left) and South Island (right) hold regular EV education events and support Leading the Charge outreach events such as Leading the Charge Road Trip.

INTERNATIONAL DRIVE ELECTRIC WEEK

International Drive Electric week is a week which focusses attention on EVs with a thunderclap of media attention across the country.

> International Drive Electric Week is a worldwide celebration to heighten awareness of today's widespread availability of plug-in vehicles and highlight the benefits of all-electric and plug-in hybrid-electric vehicles. Started in 2011 as National Plug in Day in the United States, with the simple idea to hold simultaneous events across the country on the same day, by popular demand it was expanded to an entire week of grassroots events.[21]

In 2015, Drive Electric Week (America) became an international event with invitations to EV groups in other countries to participate. "International" Drive Electric week now more accurately represents its coverage and importance. New Zealand participated in 2015 with one or two events. The following year, events were held in twenty New Zealand locations. Each Drive Electric week event is led by local EV owners' group and typically includes some combination of EV showcase, ride-and-drives, informational booths, talks and more. In Dunedin alone this year the local EV owners Group organized sixteen events and activities over the course of the week to promote EV awareness.

The Dunedin Big EV Day Out was the major event for the Dunedin EV Group in 2017. A record attempt for the most EVs in one place at the same time, was held on Sunday 10th September, at Forsyth Barr Stadium. The wider aim of the EV park-up was to visually demonstrate Dunedin's EV population. As an artist, I wanted to make a document of the attempt – a kind of big Dunedin EV-extended-family photo to record this milestone of early EV adoption in Dunedin's EV history and made as sequel to a short film made last year.[22] I was inspired by a photo in the Christhcurch Star Weekender of a large number of 1920s EV s assembled for a photo in Bealy Ave,[23] and also wanted to reference the abandoned EV1s rusting away in some distant dusty field.

The Dunedin Big EV Day Out gave members of the public a one of a kind opportunity to meet a large number of local EV owners, from all walks of life, and talk to them about their experience of EV ownership and driving in Dunedin and the wider Dunedin area. Word of mouth and test rides and drives are the best way to demystify electric cars (and e-bikes) and win over hearts and minds. People are free to ask any questions, without any pressure or spin they might feel if asking a car dealer. Nine models of (off-the-shelf) Electric Vehicles (new and second-hand) and a range of e-bikes were also on display and available for test drives. The event received multiple pre-event and follow-up news coverage and the dramatic visual documetation of the *Big EV Day Out* photo has been in demand ever since. [24]

Figure 9. EV park up of Dunedin EV Owners at Dunedin's Big EV Day Out, Forsyth Barr Stadium, 10 Sep 2017.

The event planning which began in March, blossomed to become a family friendly EV gala day. Wrapped around the EV guest-experts, technical booths and charging demonstrations etc were science demonstrations, local sustainability project stalls, live music and child friendly entertainment such as face painting as well as food vendors and more. Special interest EVs were on display including NZ's oldest electric car still in use, a 1904 Baker Electric, a built from scratch electric racing vehicle and several local home-conversions. Elsewhere in the country the Motor Trade Association (MTA) were celebrating 100 years of MTA in NZ, in response we had a feature exhibition of "100 years (plus) of EVs in NZ."

Over 2000 people came through the venue doors and visited the showcase and indoor activities on the day. Participating owners reported a non-stop series of conversations with interested members of the public and forty-five people went for test rides and test drives in EVs and forty on e-bikes, in the public session of the event between 12 and 2pm. Dealers reported strong interest on the day and an upsurge in interest and sales in the following weeks. And that 'record' attempt? At the 12noon cut off point we had 135 EVs in one place, just twenty-five short of Auckland (who had set the new record on the previous day at 159). This was an impressive outcome for Dunedin, given our size and lack of public charging infrastructure. The *Big EV Day Out* photo was in circulation by 9am Monday morning and was key to discussions at the ChargeUp Dunedin meeting later in the week at which the Dunedin City Council made a joint announcement with Charge.net NZ for three additional rapid chargers to be installed in Dunedin and other support for future EV initiatives in the city.

Figures 10-11. Montage of photos from the event.

CONCLUSION

"Think global, act local" has become the new mantra as we scramble against the clock to find ways to stall the trajectory of climate change. We can all make a difference as ordinary people by making small, ordinary actions, made necessary by the time we are born into. To quote Thomas Berry,

> This is a work not chosen by us; indeed, it was chosen for us, by the fact of our being born into this time of crisis when the very structure of the Earth is threatened and the extinction of species continues unimpeded.[25]

Changes are not happening at a fast-enough rate. Regarding transport, it may appear that the age of EV is inevitable, but there are many behavioural barriers to overcome before EVs become the norm. The science is in. What is needed is a social and active response, to complement existing and ongoing research. Efforts by early EV adopters and grassroots groups aim to help accelerate EV uptake by educating the public by busting myths and demonstrating the benefits of EV and in general raising EV awareness. This is done by word of mouth and community based education events.

"There are no rules for living on this planet, only consequences."[26] Every km travelled in a petrol-fuelled car is a cost to the environment. We need to stop pretending - time's up for that road trip.

Figure 12. Zero Emission – side panel of Nissan LEAF from event in Octagon, April 2017.

Pam McKinlay works in the Research Office and Dunedin School of Art at Otago Polytechnic and is a member of the Otago Polytechnic Staff Sustainability Group. Her art practice aims to engage the public in looking at the impacts of climate change locally and seeking ways in which these can be mitigated by encouraging change at a personal level. She is is Co-convenor of the Dunedin Electric Vehicle Group, Chairwoman for Otago EV Inc. Soc. and a member of the Otago Chamber of Commerce Energy Committee in the above capacity.

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