

TWO YEARS IN THE GODZONE



Some postcards
'home'

Ben Anderson
@dataknut

TWO YEARS??

- Marie Skłodowska-Curie Actions



- 2 years 'out'

Steal all your knowledge

- 1 year 'return'

Exploit it!



TYPES OF INDIVIDUAL FELLOWSHIPS

There are two types of Individual Fellowships:

- European Fellowships
- Global Fellowships



LINING
South



TWO YEARS??

BBC Sport  @BBCSport · Jul 15

What a moment.

England won the Cricket
ever see.

Read all about it: bbc.in/



50

13



BBC Sport  @BBCSport · Oct 26

England are into their first [@rugbyworldcup](#) since 2007 after a dominant win over reigning world champions New Zealand.

Report from [Viv Richards](#) via [@BBCSport](#)

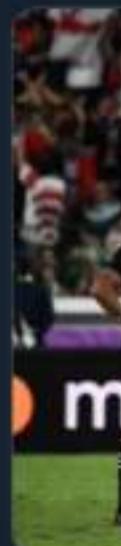


Cric Mindz [@CricMindz](#) · Nov 11

#RWC2015 England snatch T20I series in Super Over finish against New Zealand.

#ENGvsNZ #Cricket

Picture Courtesy: [@englandcricket](#)



15

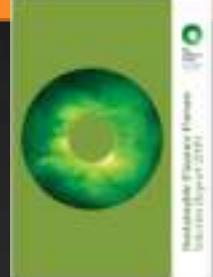


TWO YEARS??

Nov 2017

Nov 2018

Aotearoa New Zealand



TWO YEARS??

Nov 2017

Nov 2018

This is the Committee's annual report to Parliament, assessing progress in reducing UK emissions over the past year. It finds that UK action to curb greenhouse gas emissions is lagging behind what is needed to meet legally-binding emissions targets. Since June 2018, Government has delivered only 1 of 25 critical policies needed to get emissions reductions back on track.

Dis United Kingdom



Brexit

More Brexit

Some more Brexit

Nearly Brexit

Yet more Brexit

Brexit ad nauseam →



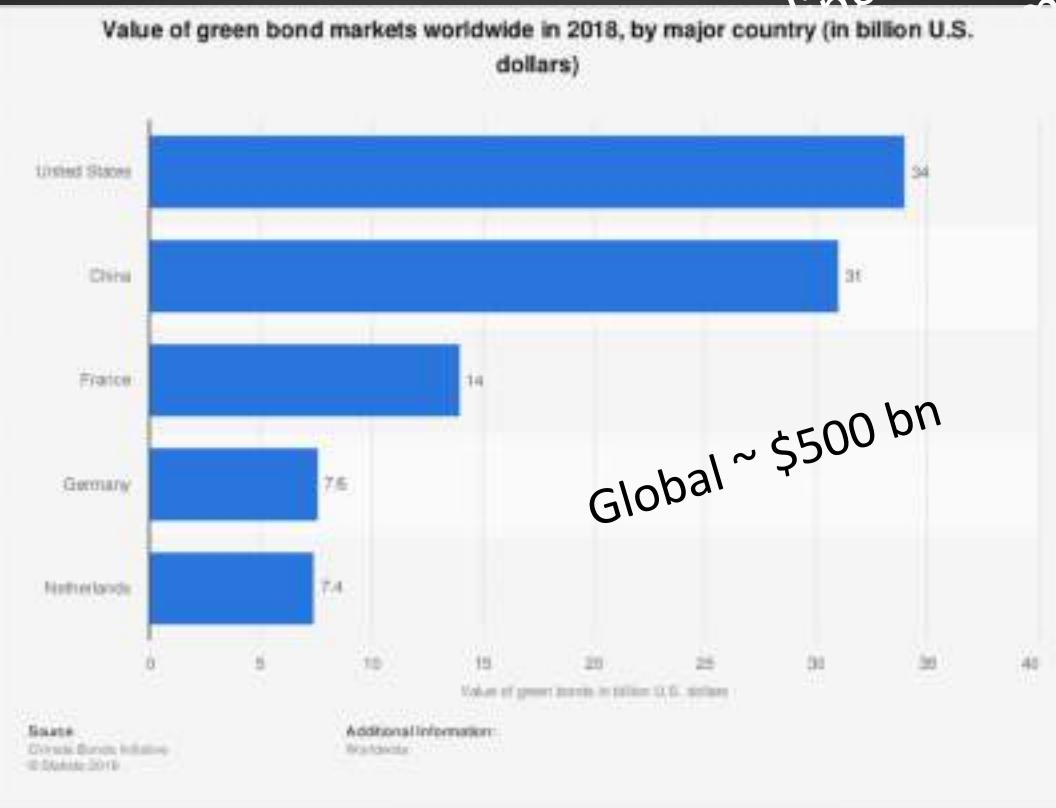
POLICIES ARE AT THE EDGE



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do otherwise could

E — LEGAL OPINION 2019 | 15

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Search

Help

News story

UK becomes first major economy to pass net zero emissions law

New target will require the UK to bring all greenhouse gas emissions to net zero by 2050.

Published 27 June 2019

POLICIES ARE AT THE EDGE



For professional investors - August 2019

WELLS, WIRES, AND WHEELS...

Dominique De Munck @Dominiq85633775 · Sep 27

'Oil needs a long-term breakeven price of USD 10 – 20/barrel to remain competitive in mobility.' Mark Lewis, Global Head Sustainability Research BNP Paribas - Wells, Wires, and Wheels – EROCI and the Tough Road Ahead for Oil investors-corner.bnpparibas-am.com/investment-the...

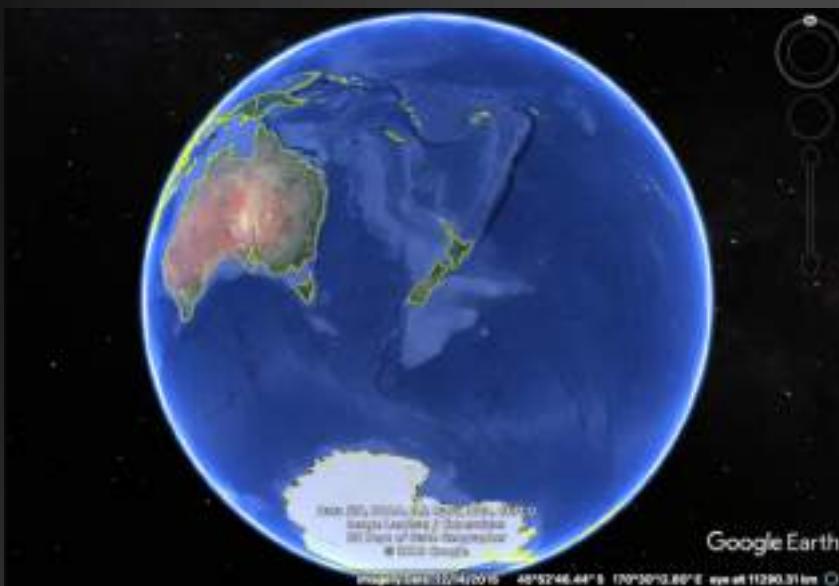


ON THE EDGE

- A long way from...

- Yeahnah

- Although...



ON THE EDGE

- 2nd in world:
 - Economy exposure to natural hazards
 - Yeahnah
 - Although...

Source: GNS Science



ON THE EDGE

- NZ does resilience



Nearly 200 kilometres of damaged road, 220 work sites and 190km of damaged rail line. And it only took 2 million work hours.



(To fix it)

Kaikoura earthquake 2016
Source: stuff

ON THE EDGE

- NZ does resilience

and innovation...



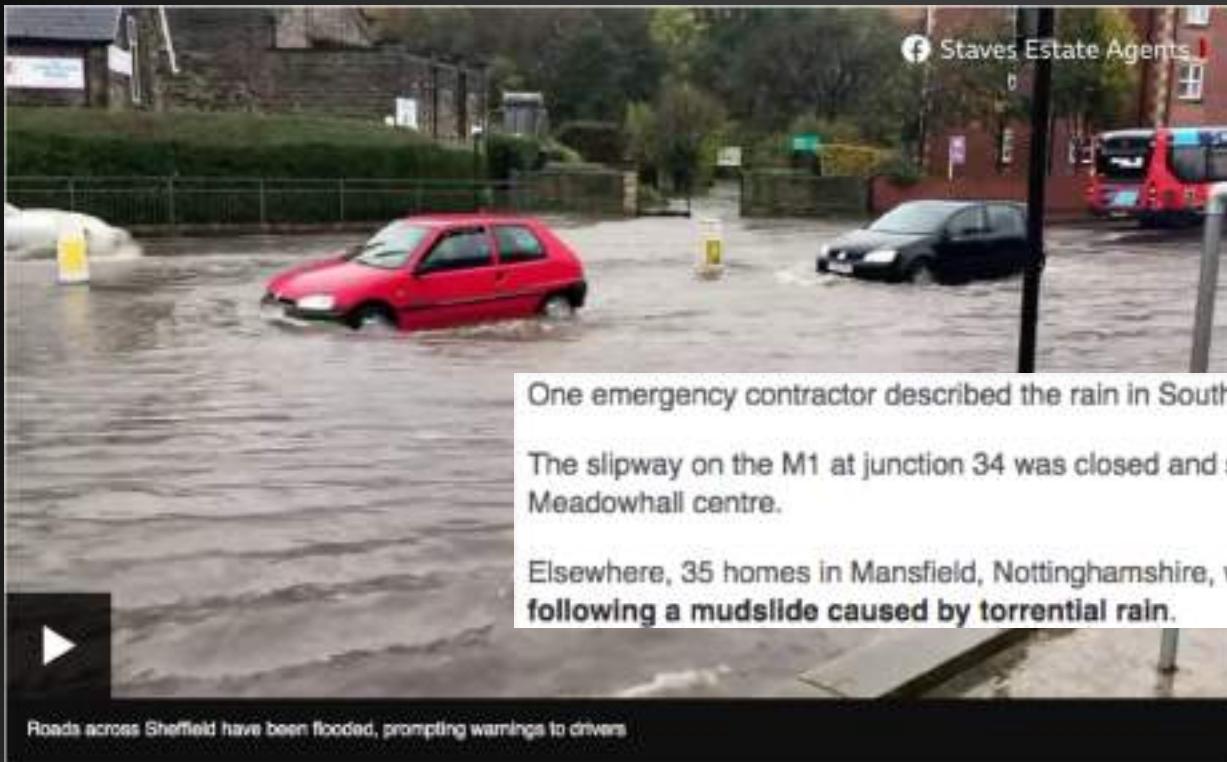
The bridge at Franz Josef, a vital link for the tourism-dependant West Coast, reopened on Saturday after a frantic 18-day effort by contractors, the Defence Force and NZ Transport Agency staff to rebuild it.



West Coast flooding 2019
Source: stuff

ON THE EDGE

- UK has floods too...



Sheffield flooding 2019
Source: stuff



ON THE EDGE

- So you're good at running hard and fast
- To stand still
- And this is good...



Stuff: 8 Sept 2019. Residents can't go back after beachfront homes at Port Waikato deemed unsafe



ON THE EDGE

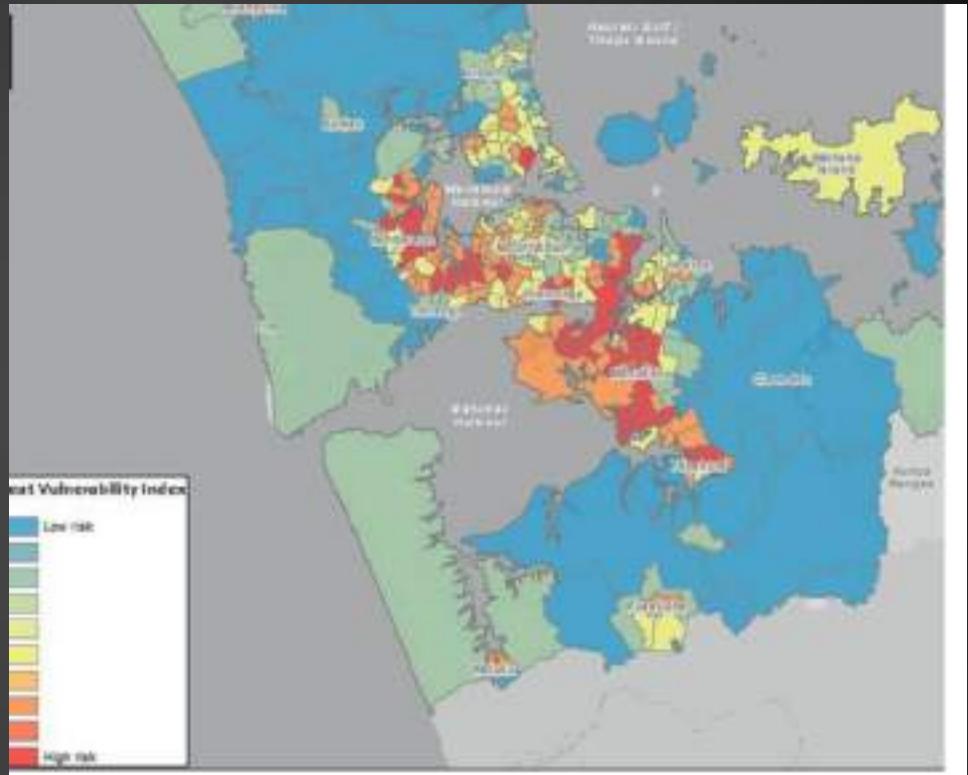
- So you're good at running hard and fast
- To stand still
- And this is good...



Stuff: 28 May 2016. Eating the shore (Oamaru).

ON THE EDGE

- So you're good at running hard and fast
- To stand still
- And this is good...



NZ Herald: 20 March 2019. Extreme heat, disease and rising seas: how climate change threatens Auckland

ON THE EDGE

- So you're good at running hard and fast
- To stand still
- And this is good...

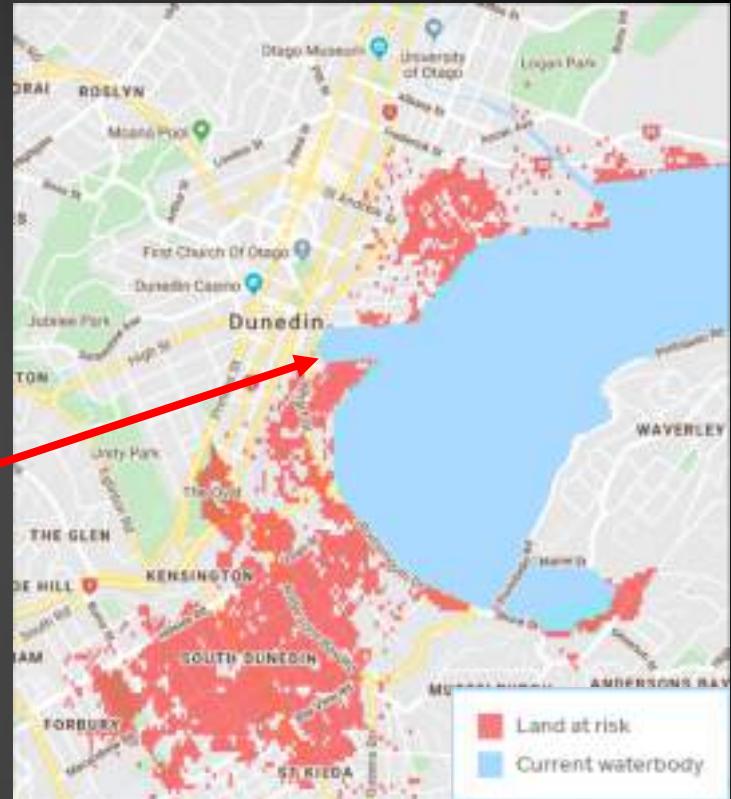


South Dunedin flood, June 2015

Photo: Stephen Jaquierey, Otago Daily Times, 16 Dec 2015

ON THE EDGE

- So you're good at running hard and fast
- To stand still
- And this is good...



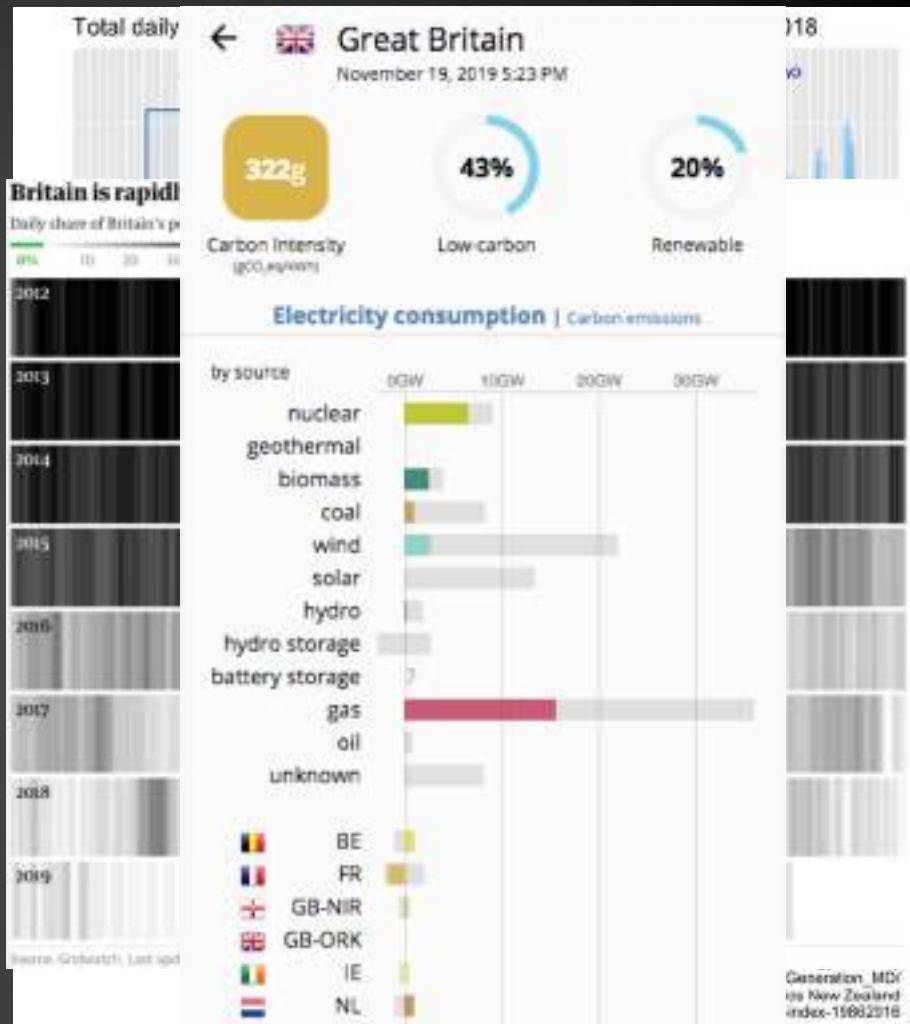
Source: DCC/youtube & Climate Central CoastalDEM



LEADING EDGE

- 14th in world:
 - % renewable electricity (excl nuclear)

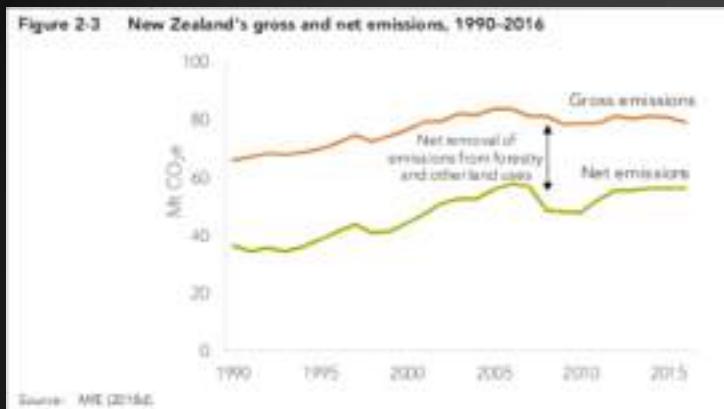
Source: IRENA 2018



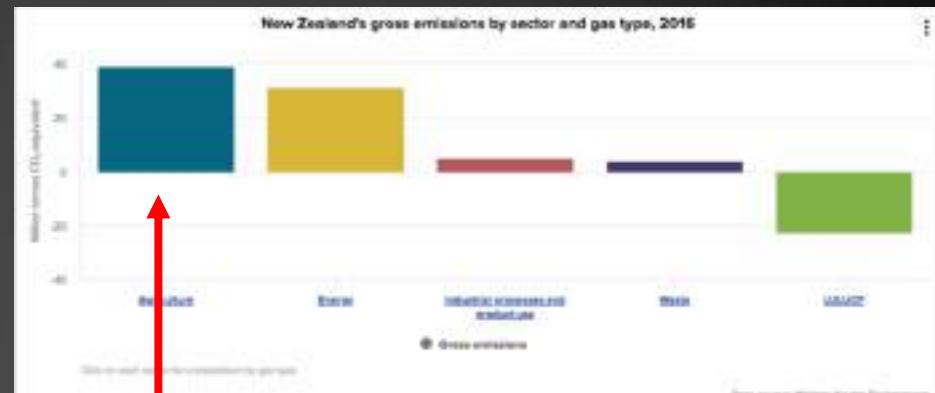
Source: <https://www.electricitymap.org/>

NOT SO LEADING EDGE

- But...



Source: Productivity Commission



Source: NZ Stats



NOT SO LEADING EDGE

There are large ruminants in the room

Since 1994, dairy cattle numbers have increased 70 percent nationally (from 3.8 million to 6.5 million), while beef cattle, sheep, and deer numbers have decreased.

~ 3.6m



~ 6.6m



~ 27.5m

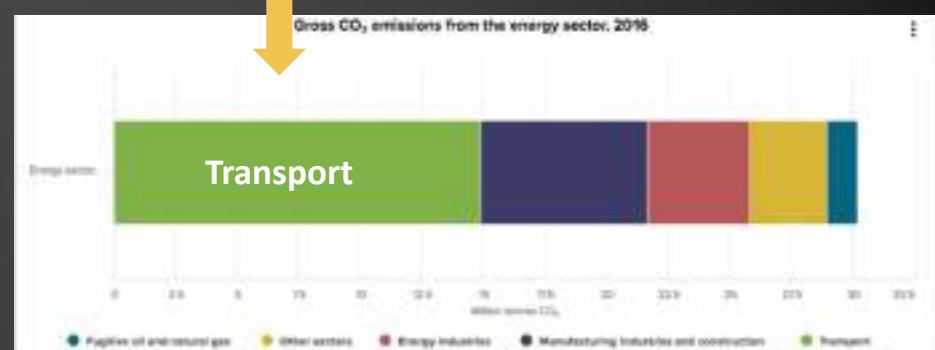
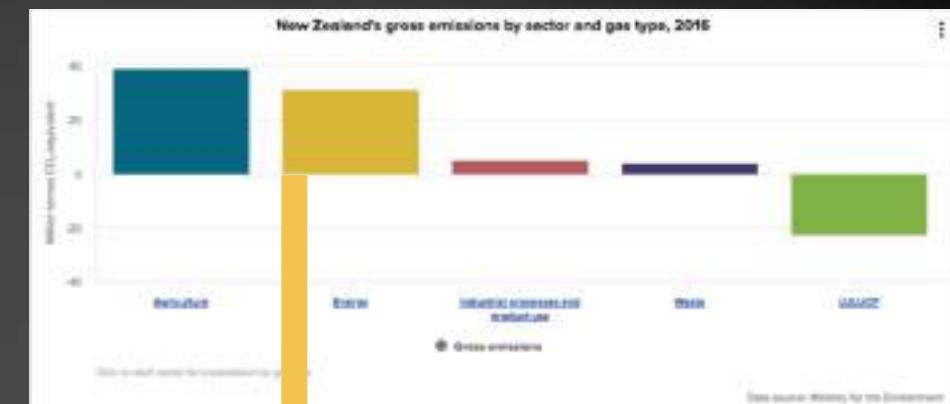
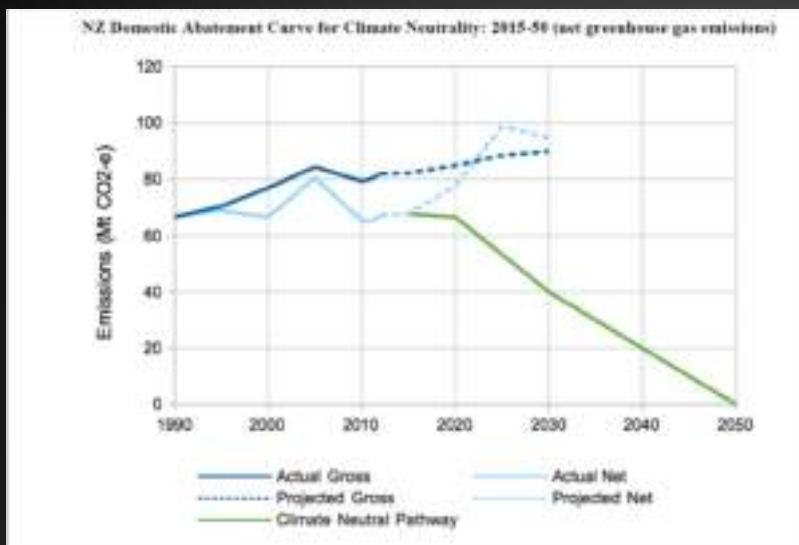


Source: NZ Stats
Images: NZ Beef & Lamb, RNZ, Stuff



NOT SO LEADING EDGE

- Although...



NOT SO LEADING EDGE

There are large trucks in the room
too

Transport

Transport is New Zealand's second largest source of GHG emissions (and about one third of long-lived GHG emissions). It is dominated by private road transport. Compared to other developed countries, New Zealand's transport use is low, and the vehicle fleet is old with poor fuel economy. Rapid population growth and a decline in prices for fossil-fuel vehicles have caused the vehicle fleet to grow rapidly. Road transport emissions have risen more than any other emissions source.

And that doesn't include
international aviation



Source: NZ Productivity Commission

NETWORKS AT THE EDGE

- But the low emissions economy thing...
- Requires electrification of
 - Transport
 - Heat
- Demand will increase
- Especially at peaks



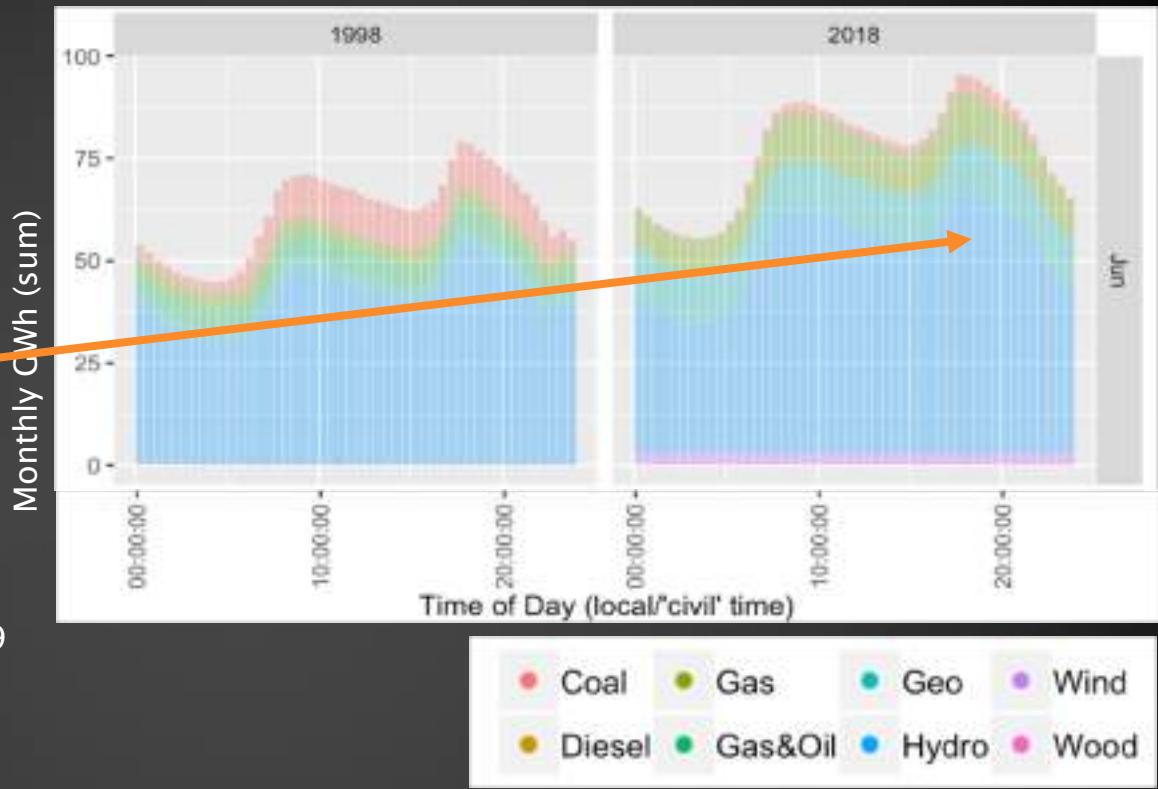
Source: <https://www.nzonscreen.com/>



LISTENING TO THE EDGE

- Yes, you have peaks

But they are (currently) low
carbon peaks



Khan et al 10.1016/j.jclepro.2018.02.309

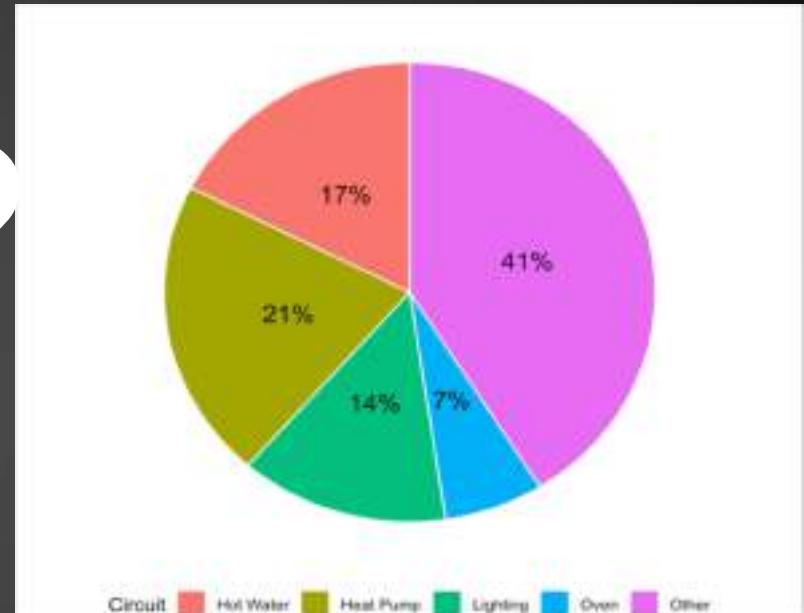
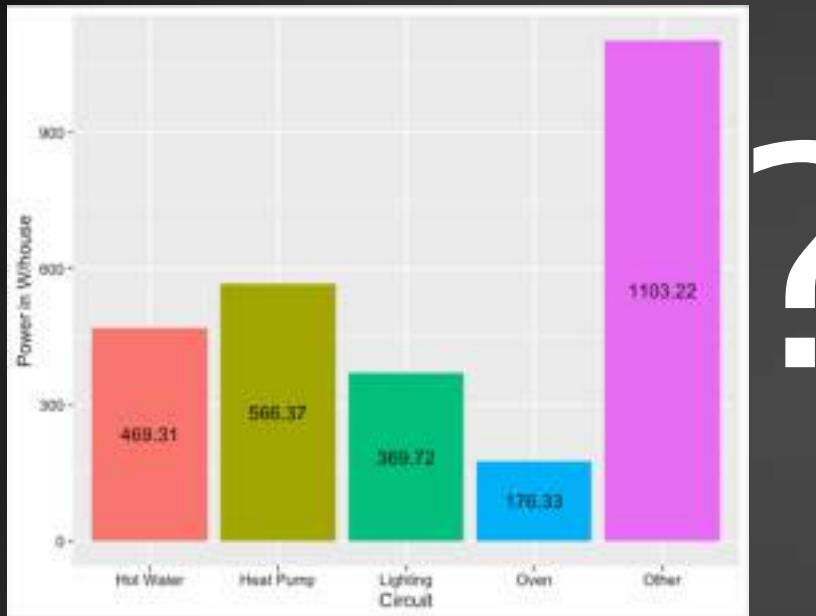


Total NZ electricity demand per half hour (June)

Source: Electricity Authority

LISTENING TO THE EDGE

- What are the components of residential peak demand in NZ?



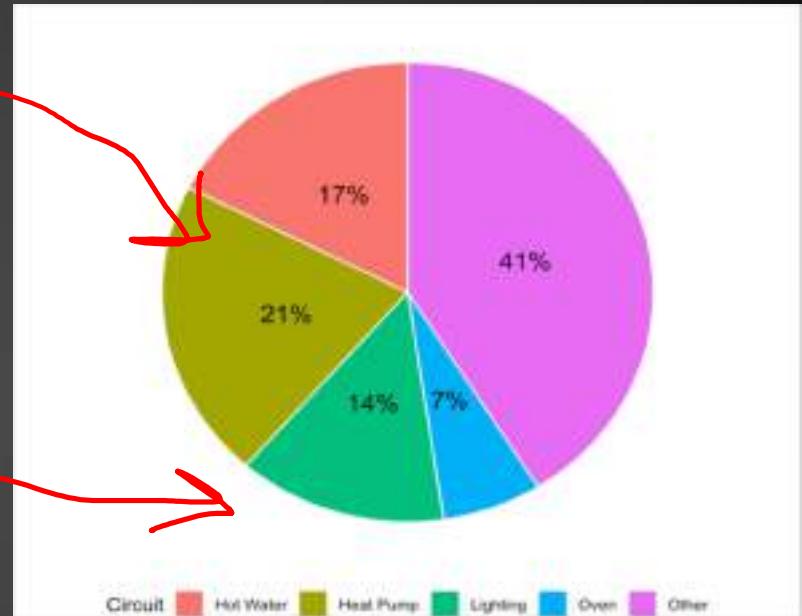
Mean load contribution at 'peak' (17:00-21:00) by circuit in winter 2015
Source: GREEN Grid Household Demand data, <https://dx.doi.org/10.5255/UKDA-SN-853334>
~ 40 households

LISTENING TO THE EDGE

- And how might we reduce them?

Negawatts

1. Taking the heat out
2. Lightening the load



LISTENING TO THE EDGE

"Energy poverty is a price issue"



Homes as energy sinks?

- The good news:
 - Dwellings are generally more thermally efficient
 - Heating is more energy efficient
- The bad news:
 - We have bought into a raft of narratives:
 - Performance vs affordability
 - Energy costs are about energy pricing
 - Big houses are better investments than small houses
 - Resale
 - Per square metre
 - The edge is cheaper
 - Falling rates of home ownership
 - Rentals poor condition and poorly maintained
 - Moral hazard problem
 - The dung heap syndrome



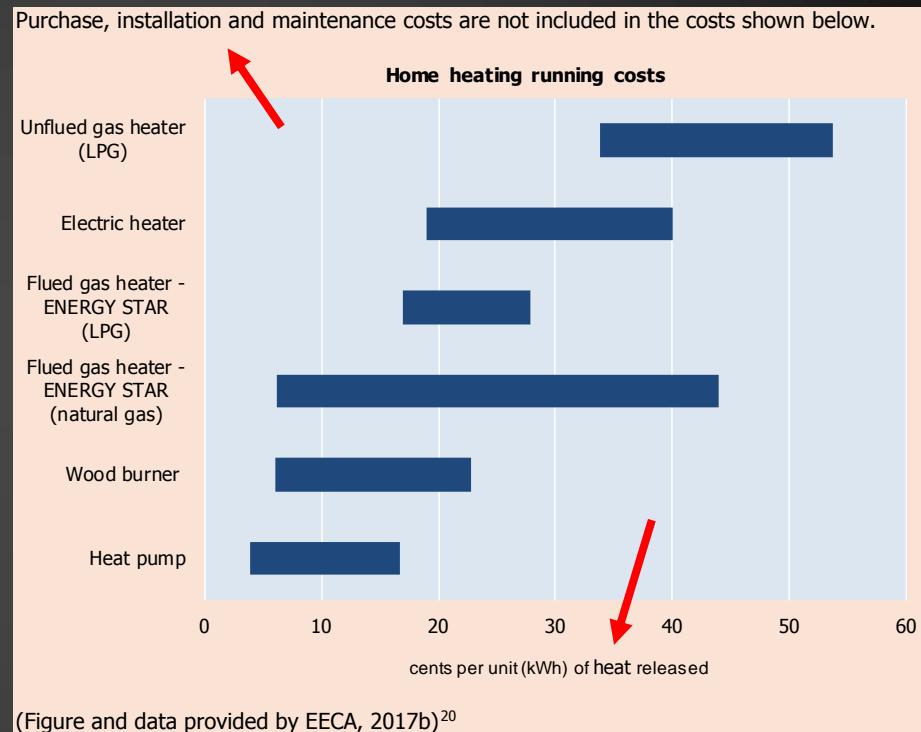
Source: Saville-Smith 2018

LISTENING TO THE EDGE

One response:



“Man the heat pumps!”

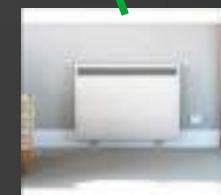
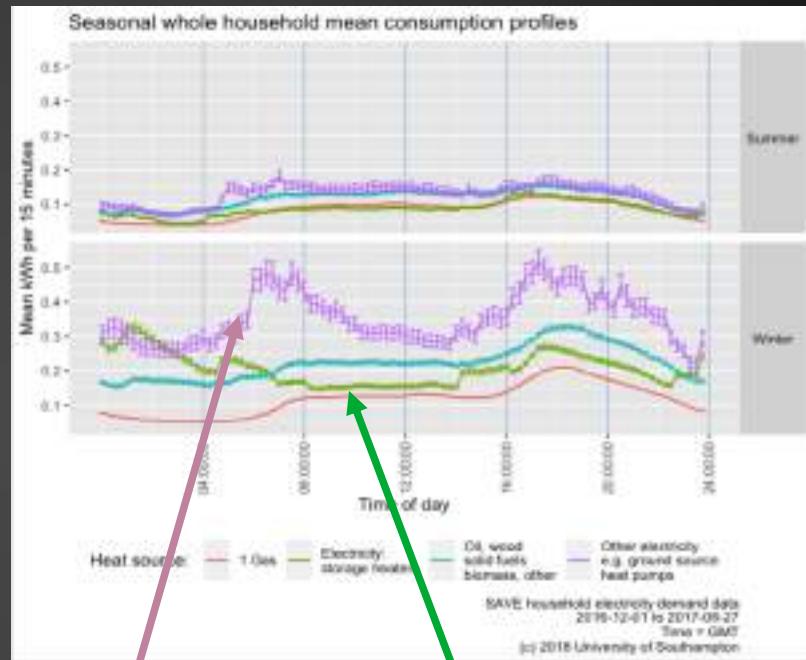
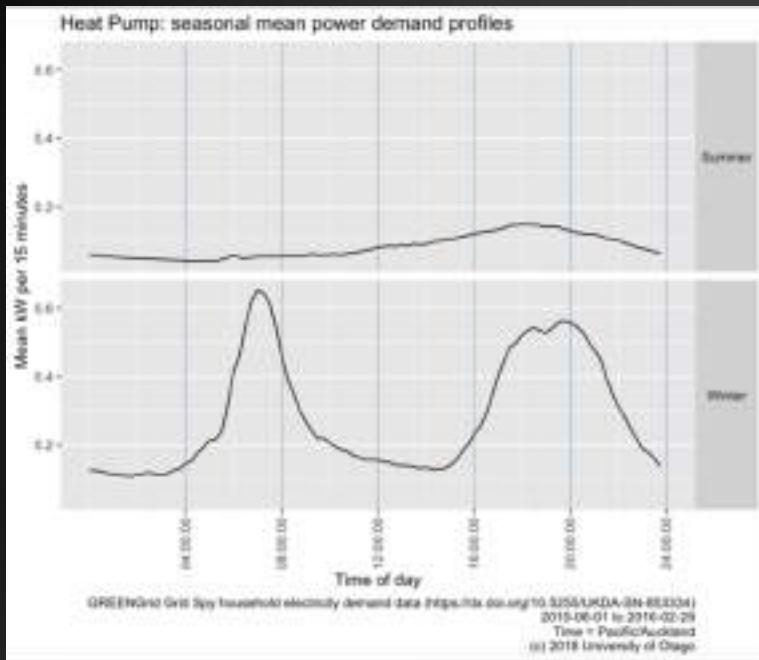


Source: BRANZ HCS 2015

LISTENING TO THE EDGE

But

'Efficiency' is in the eye of the beholder



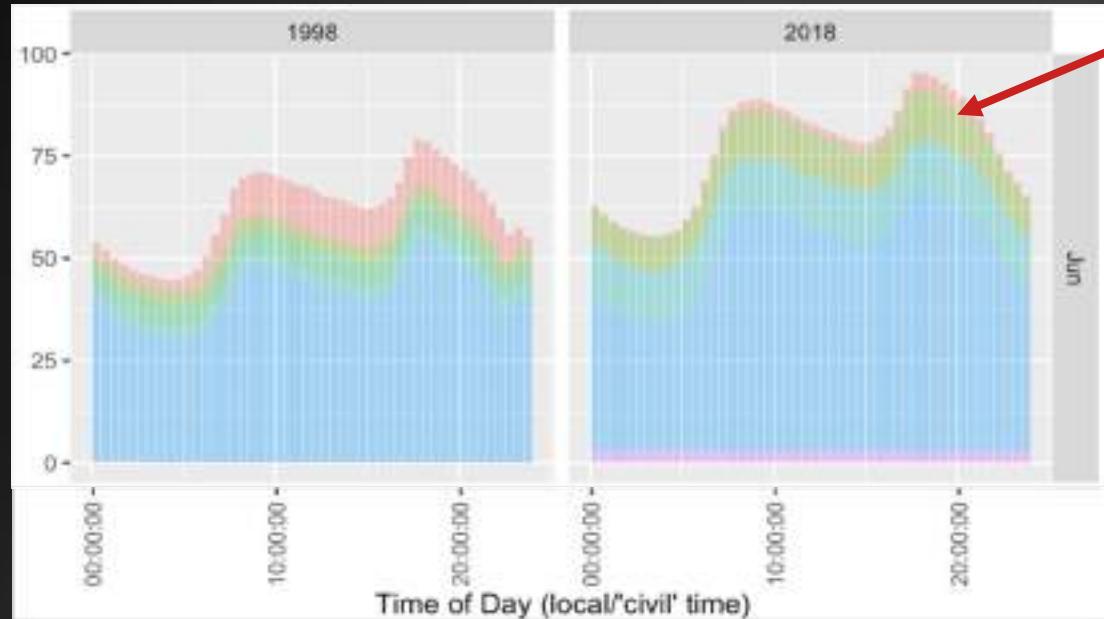
LISTENING TO THE EDGE

'Bxxxxr'

Might just replace
radiant heaters?

Or add demand?

Monthly GWh (sum)



Comfort-taking

Total NZ electricity demand per half hour (June)

Source: Electricity Authority

LISTENING TO THE EDGE

But we've forgotten something:
Negawatts?



ACTION AT THE EDGE

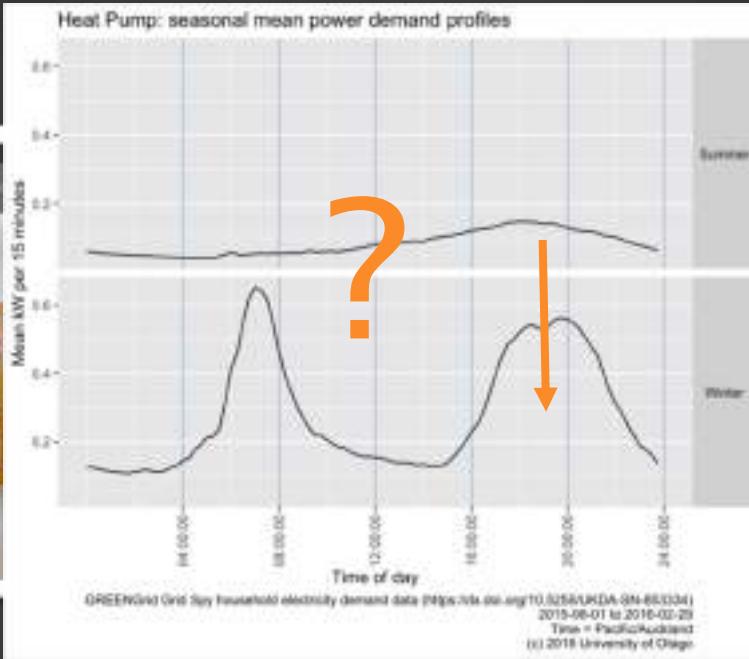
Taking the heat out of peak



Pt Chevalier zero energy house
<https://ourauckland.aucklandcouncil.govt.nz/articles/news/2015/12/admin-case-study-pt-chev/>

RESEARCH NEEDED

Taking the heat out of peak



Pt Chevalier zero energy house
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RESEARCH NEEDED

"Energy poverty is a price issue"



Homes as energy sinks?

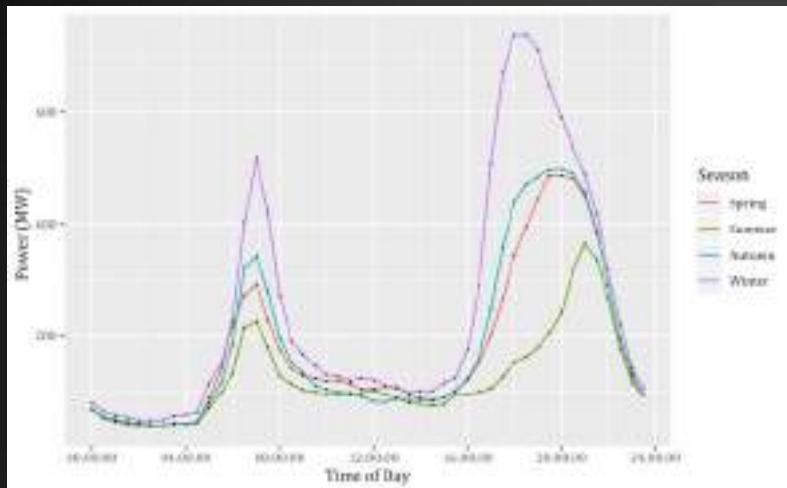
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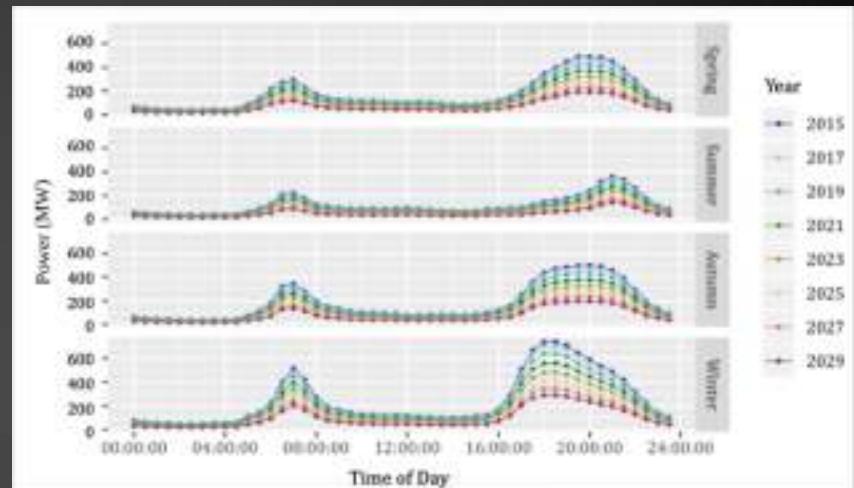
Source: Saville-Smith 2018

RESEARCHING THE EDGE

Lightening the load...



Simple LED uptake model I



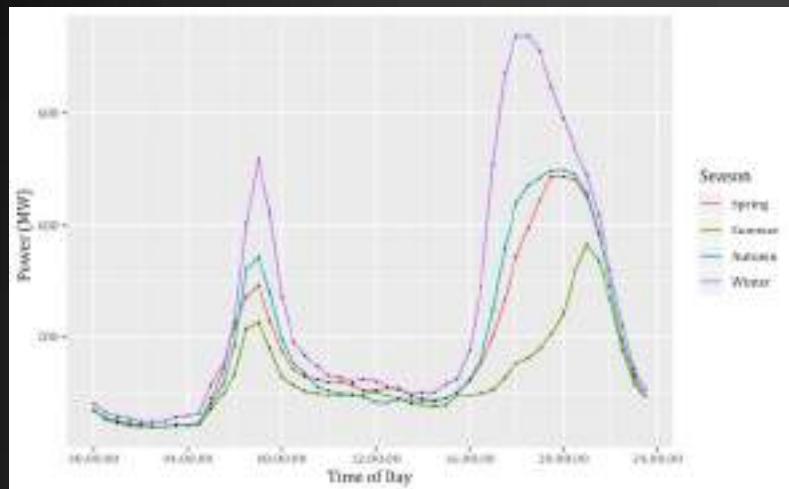
More efficient residential lighting could reduce New Zealand's total annual demand by 1 TWh and reduce the highest winter evening peaks (at 17:00) **by at least 500 MW (9%) by 2029.**



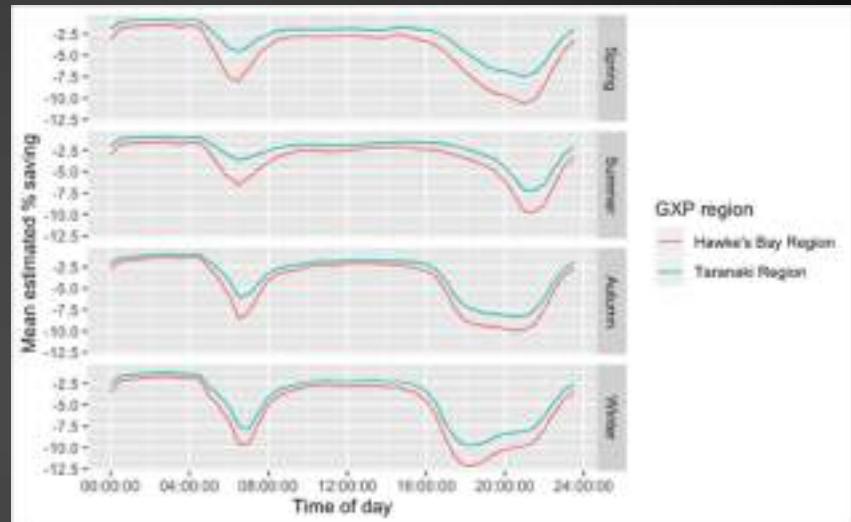
Source: Dortans et al (in submission)
GREEN Grid Household Demand data, <https://dx.doi.org/10.5255/UKDA-SN-853334>
~ 40 households

RESEARCHING THE EDGE

Lightening the load...



Simple LED uptake model II

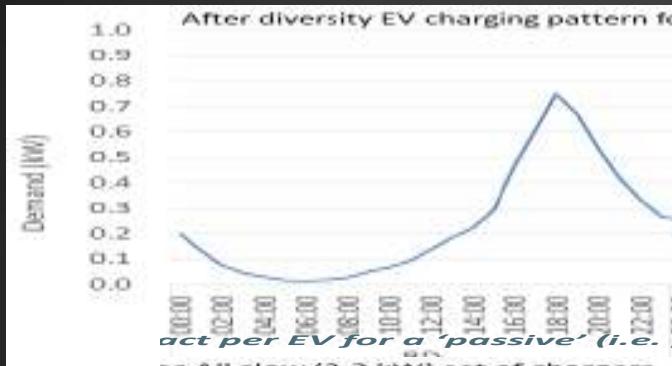


Source: Anderson et al (in submission)
GREEN Grid Household Demand data, <https://dx.doi.org/10.5255/UKDA-SN-853334>
~ 40 households
Upscaled to ~ 110,000 using NZ Census 2013

EDGE THREATS

Avoiding an EV peak

Figure 30: After-diversity EV demand impact



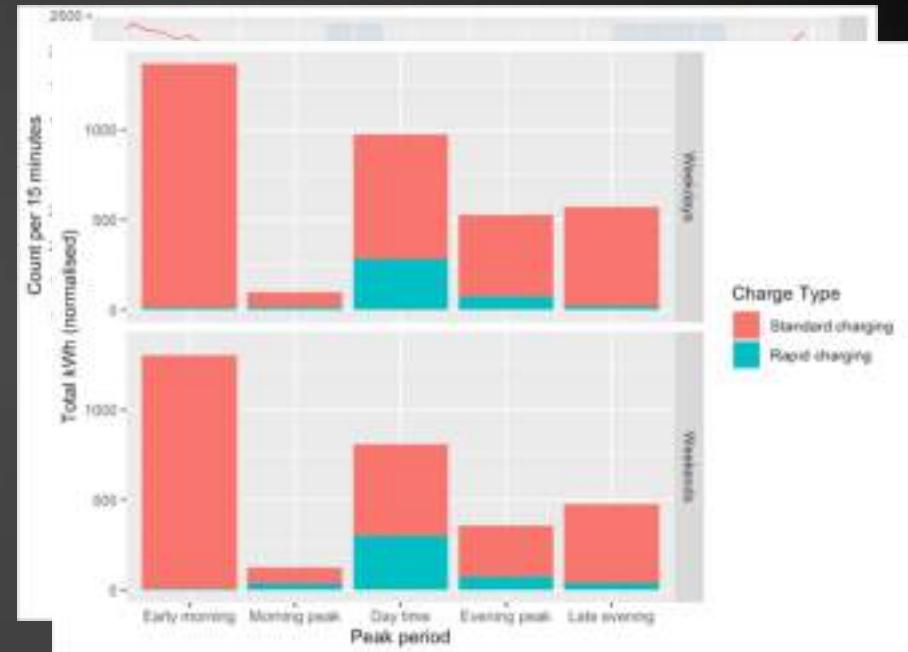
Source: Concept Consulting (2018) Driving Change



87% off-peak



Source: Hugobento

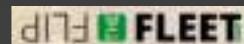
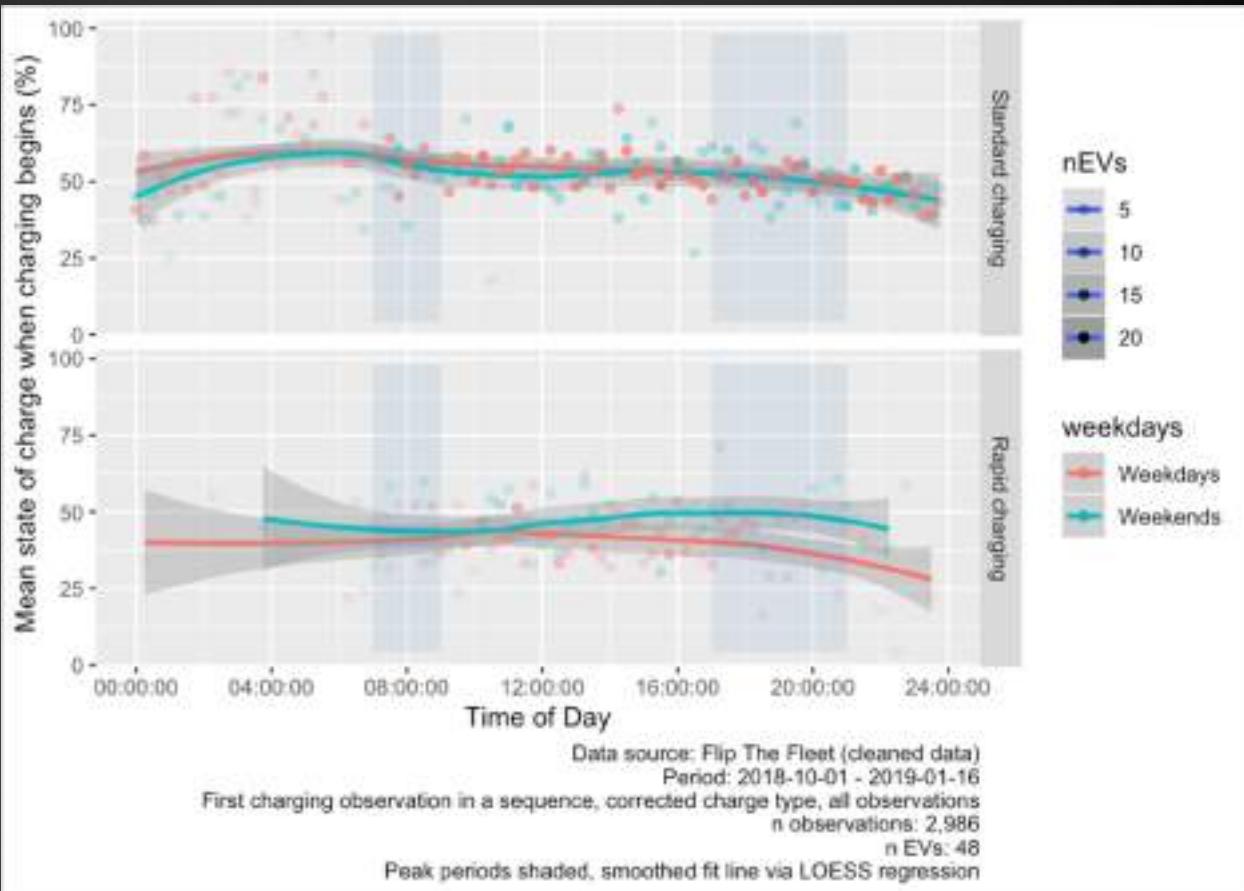


Source: Anderson et al (2020) Will Flipping The Fleet F**k The Grid? 7th IAEE Asia-Oceania Conference 2020



EDGY BENEFITS

Turn on..
Feed in..
Peak shave



Southeast Asia Energy Storage 2020 Wall
Flipping The Fleet F**k The Grid? 7th
IAEE Asia-Oceania Conference 2020

EDGY CHALLENGES

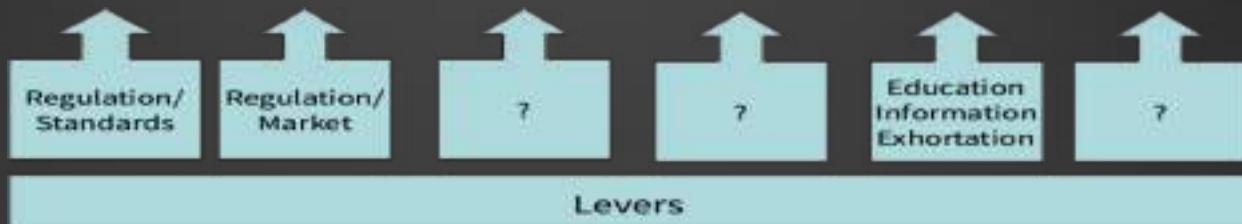
- Not technical
- Not social
- But socio-technical

~ 44% of variation
(Huebner et al, 2015)

Why people don't do what they
'should' (Jim Skea)

$$\text{Energy use} = f(\text{materials} + \text{attitudes} + \text{demographics})$$

Well-known
inelasticity



EDGY CHALLENGES

- Not technical
- Not social
- But socio-technical

~ 44% of variation
(Huebner et al, 2015)

Energy use = $f(\text{materials} + \text{attitudes} + \text{demographics})$

Well-known
inelasticity

+ price
+ norms + practices) + 'error'

Why people don't do what they
'should' (Jim Skea)



We need some new normals

RE-NEWING THE NORMALS

PURPOSE OF THE STRATEGY

To create Ngāi Tahu responses to the risks and opportunities presented by climate change, referencing the entire tribal structure, so that iwi, hapū and whānau aspirations can be met in a changing world

Mō tātou, ā, mō kā uri ā muri ake nei – For us and our children after us.

But how do we do this?

Our Values

Whanaungatanga

Family

We will respect, foster and maintain important relationships within the organisation, within the iwi and within the community.

Manakitanga

Looking after our people

We will pay respect to each other, to iwi members and to all others in accordance with our tikanga (customs).

Te tangata

Expertise

We will prioritise knowledge and ideas that will strengthen and grow Ngāi Tahu and our community.

Kaitiakitanga

Stewardship

We will work actively to protect the people, environment, knowledge, culture, language and resources important to Ngāi Tahu for future generations.

Hauora

Approach

We will strive to ensure that the tikanga of Ngāi Tahu is actioned and acknowledged in all of our outcomes.

Rangatiratanga

Leadership

We will strive to maintain a high degree of personal integrity and ethical behaviour in all actions and decisions we undertake.

Sources: <https://ngaitahu.iwi.nz/environment/policy/climate-change-strategy/>
<https://ngaitahu.iwi.nz/investment/ngai-tahu-annual-reports/ngai-tahu-outcomes-framework/>
Oratia Media

HE RAUTAKI MŌ TE HURINGA O TE ĀHUARANGI CLIMATE CHANGE STRATEGY

Final draft – August 2018



The growth of Maori
community entrepreneurship
“We do not inherit the land from our ancestors,
we borrow it from our children.”
Chief Seattle (purportedly)
MERATA KAWHARU and PAUL TAPSELL



WAYS OF WORKING AT THE EDGE

No **one** of us has the solution

We have to listen to the **edges**

We have to radically **co-create**

Mō tātou, ā, mō kāuri ā muruake nei.

For us and our children after us.



THANK YOU FOR HAVING US



@dataknut