THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

BUSINESS SCHOOL
ENERGY CENTRE

Energy & society in ‘Zero Carbon’ New Zealand

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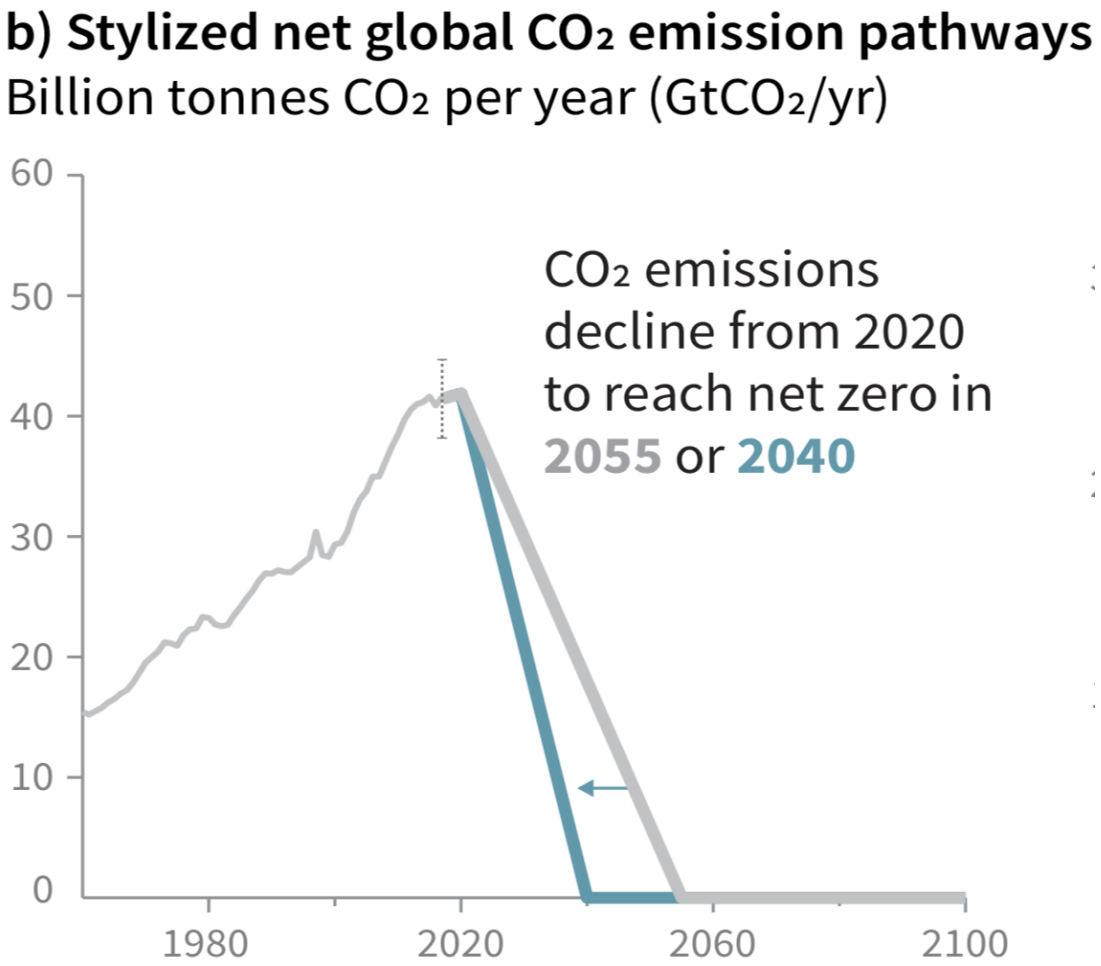
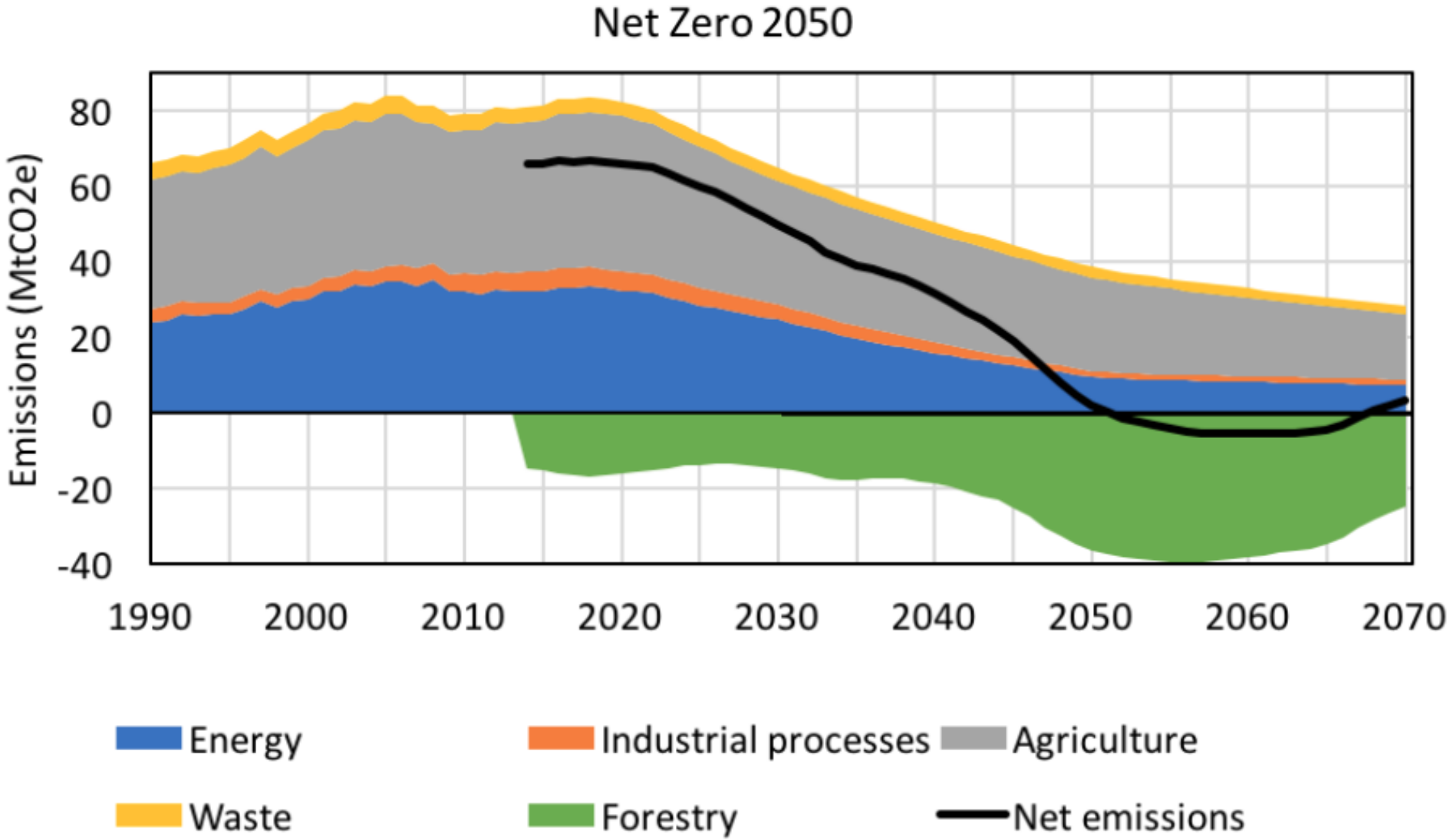
The challenge ahead



IPCC (2018). Global Warming of 1.5 °C, www.ipcc.ch/report/sr15

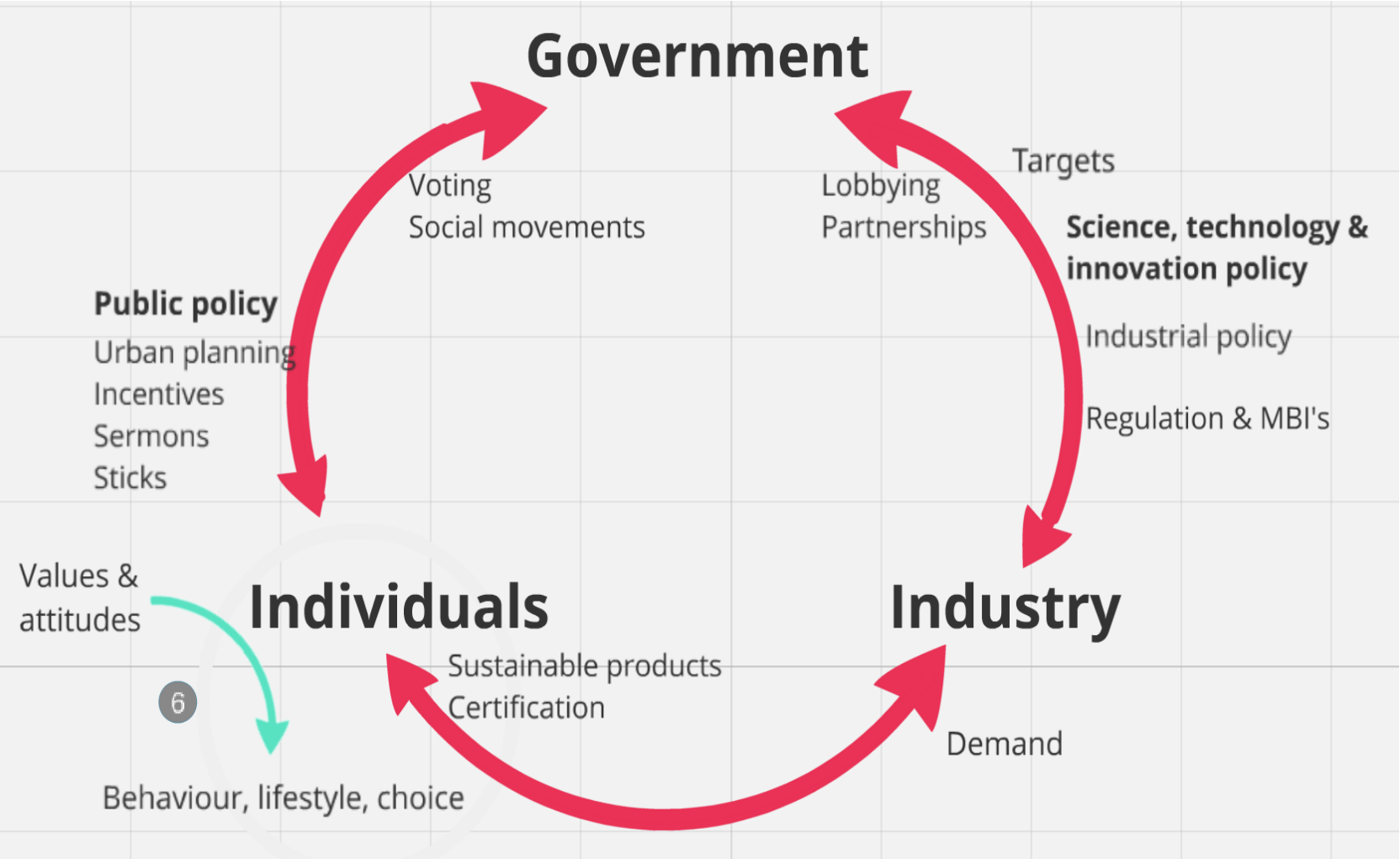
- BAU: 1.5℃ GW between 2030-2052
- 10-18 years to reduce CO_2 emissions to net zero to limit global warming to 1.5 ℃
- Including developing countries..
- For no or limited overshoot:
  - Lower energy demand
  - Decarbonise energy supply

The challenge ahead – New Zealand



Young (2017).

Governing societal change

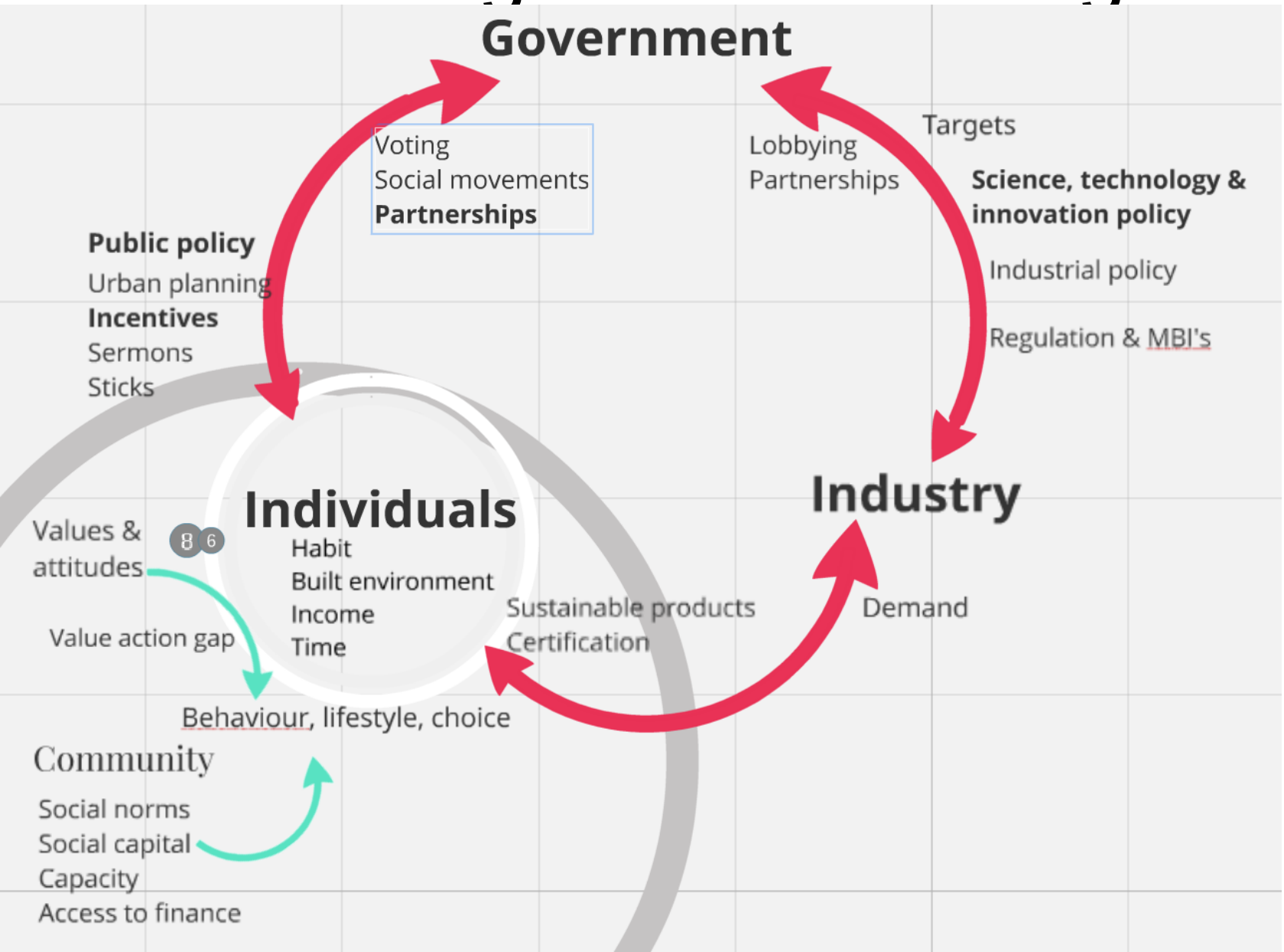


- From supply- push and individual choice…

Patrick:

"I'm worried about climate change but my family drives two cars, and you won't catch me on a bike. I eat meat daily. I love international travel. I use heaters when I could rug up"

Governing societal change



- ..to demand-side policies & local innovation experiments

Distributed energy in 2050

- Households and communities are central to a low energy demand scenario:
  - Local innovation experiments with end-user technologies
  - Integration ICT with energy using technologies & daily routines
  - Business models for ‘usership’

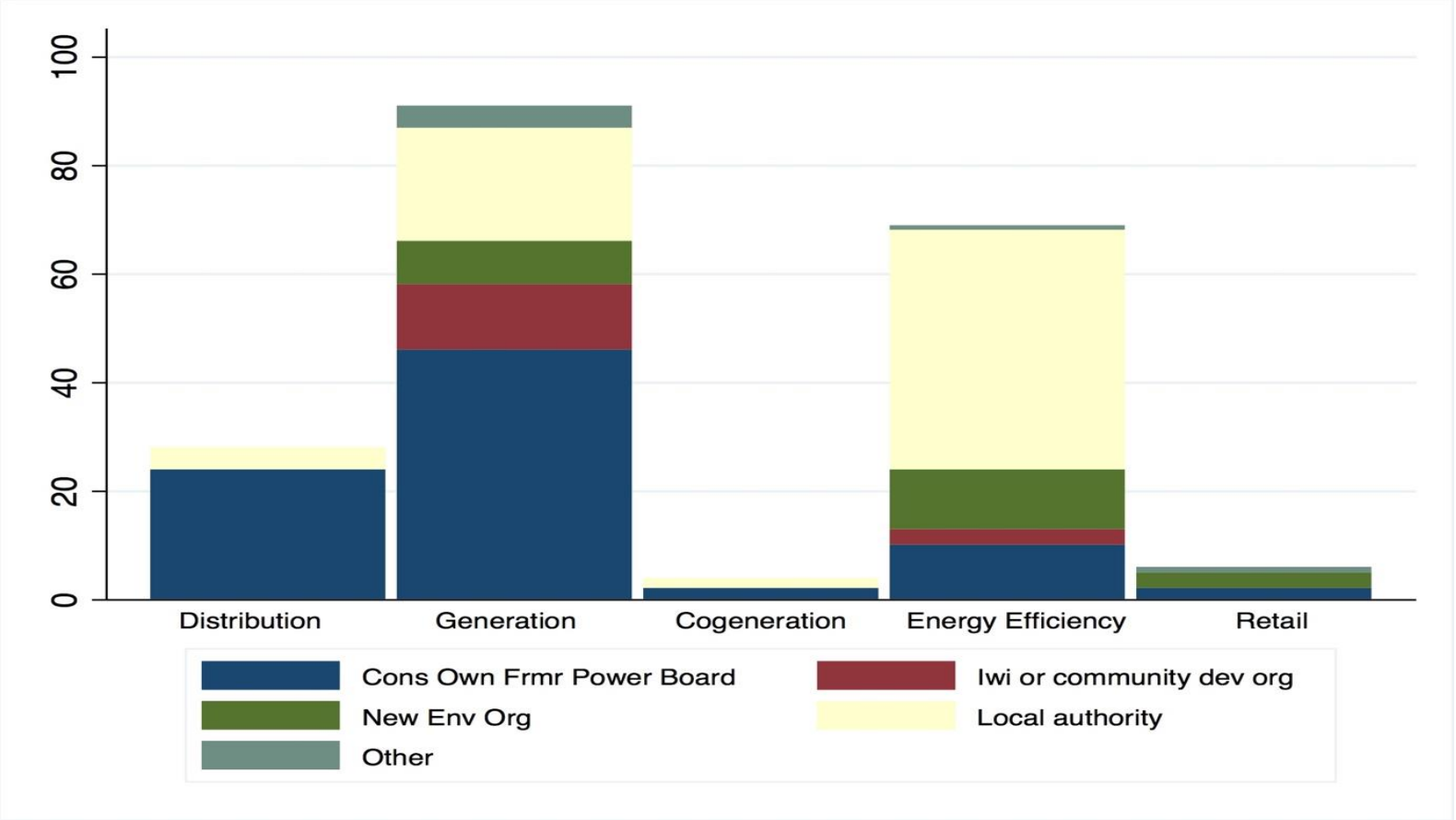
Grubler et al (2018).

- Where might citizens, communities, iwi, local authorities fit in?

Reduced peak seasonal lighting & heating loads	EE and self-consumption
ST flexibility and ancillary services	Hydro (2-10TWh), demand response
20-50 TWh additional generation	Local / shared ownership in geothermal (8TWh), wind (12-30TWh), solar (1-5TWh).
Renewable dispatchable alternatives to gas	Small-scale biomass CHP

Distributed energy today

- 83MW solar (83% residential)
- 131 local authority / community energy organisations, 294MW generation capacity, 11 billion NZD in diverse locally owned assets:



Distributed energy today - barriers

- **Systemic market barriers beyond microgeneration**
  - Mostly partnerships
  - Weak bargaining position ito finance, risk distribution and return, high failure rates

- **No unified strategy for DE**
  - Lack of regulatory streamlining (Health & Safety, Anti-Money laundering, district & regional plans)
  - Lack of public support & awareness of the benefits / opportunities; local opposition

- **Local government legally and financially constrained**

- **Ad hoc lifelines**: MBIE grants, university projects, council grants, state energy efficiency programmes

Distributed energy today

Emerging models try to work around barriers

- **Integrated generation/retail projects** - *ShareEnergy, CoastalEnergy and EnergyDemocracy*
  - Overcome wholesale market risk exposure
  - Protracted feasibility stages.
- **Off-grid microgrids and community facilities -** *Parihaka Resistance to Climate Change, Omaio, EnergiseOtaki*
  - Iwi/island/rural LC
  - Self-sufficiency / community development, energy access, alleviating constraints on remote uneconomic power lines

Distributed energy today

Emerging models try to work around barriers

- **Peer-to-peer trading** - *P2Power, OurEnergy and CleanP2P*
  - Power sharing, gifting and DSR
  - Matching local consumption with local generation in real time, contributing to reduced peak loads and short term demand flexibility
  - Feasibility/ pilots.
- **Virtual power plants** - *Contact, Genesis, Vector*
  - Utility-led remotely controlled community-owned grid-tied generation/storage assets
  - Alleviating grid constraints

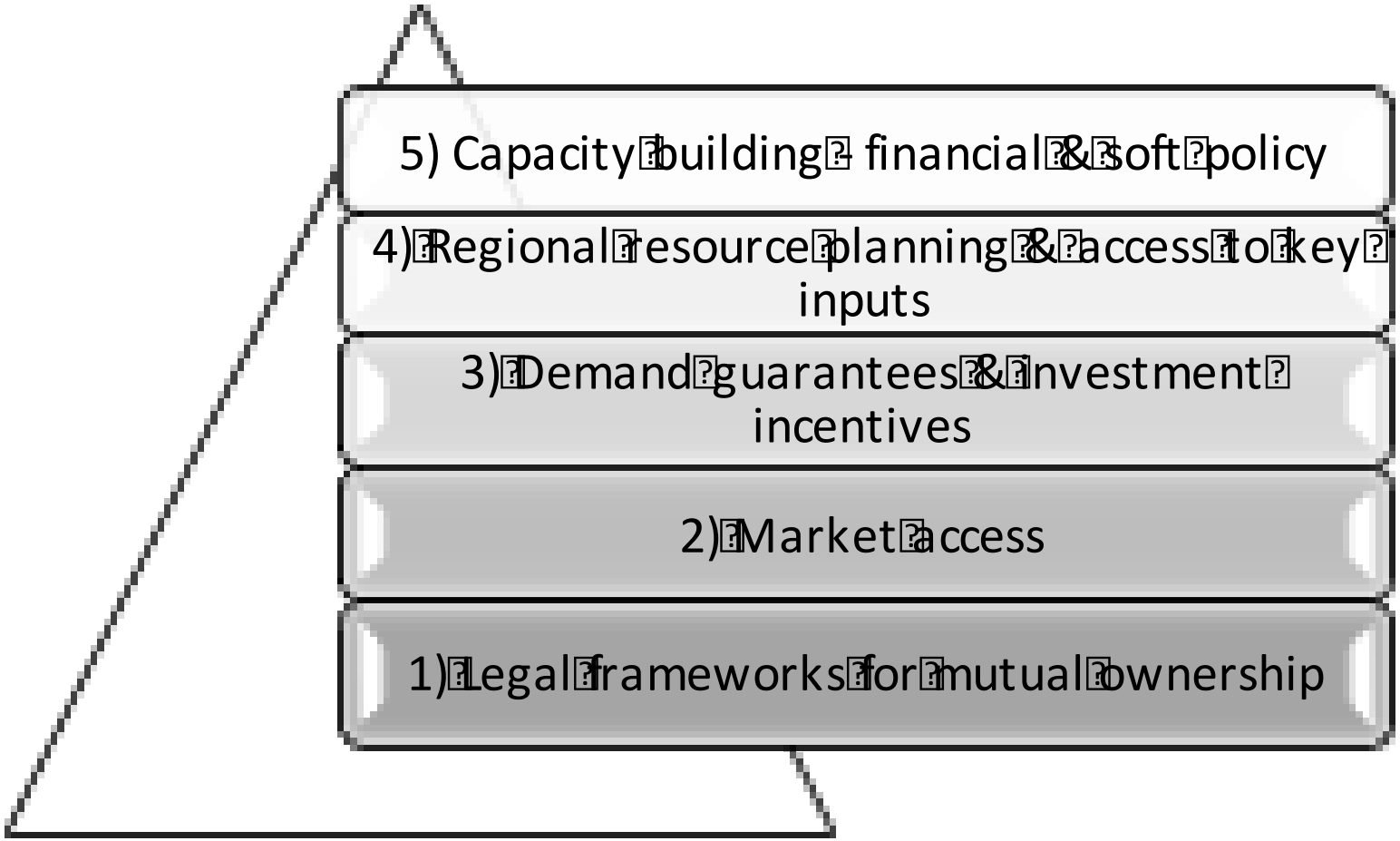
Distributed energy today - risks

- Social justice
  - Low income hh spend a higher % of income on energy, food and transport
  - Low income hh less likely to adopt EV's, DE, and smart-home tech
  - Who bears the burden of network infrastructure and service costs?

- Adoption of smart home technology ≠ energy savings
  - Competing trends around home convenience, comfort & time saving
  - Can not assume interest in saving energy

Strengers & Nichols, (2017).

Programmatic support for local energy innovation



Programmatic support for local energy innovation

Low cost	- Voluntary/ mandatory guidelines for shared ownership - Centralised strategy with targets - Concerted effort for regulatory streamlining - Regulated power purchase obligations and prices - One-stop-shop providing information, network and tendering services - Regional energy planning - Set aside public land for local energy projects - Public procurement programmes
High cost	- Seed funding / revolving funds / low interest public loans - Capacity market with special provisions

Conclusions

- ‘Civic energy’ is sizeable but distinct from European counterparts
  - Dominated by residential solar, consumer-owned trusts in distribution & Māori organisations in large-scale geothermal generation.
- An absence of low risk mechanisms for market integration prevents inclusiveness and diversity.
- Lack of unified strategy and regulatory streamlining for DE
- From ad-hoc to programmatic local innovation experiments in energy?
- Range of policy options exist that would enable more diversity and inclusivity across organisational types and socio-economic income categories

Conclusions

- Climate leviathan or entrepreneurial state?

> “*New Zealanders didn't need to be told what to do by a Government increasingly looking like it thinks it knows best.”*
>
> - Simon Bridges

Mann & Wainwright (2018), Mazzucato (2013)

Thank you!

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References:

- IPCC (2018). Global Warming of 1.5 °C, www.ipcc.ch/report/sr15
- Grubler A. et al (2018). A low energy demand scenario for meeting the 1.5 °C target and sustainable development goals without negative emission technologies, Nature Energy doi.org/10.1038/s41560-018-0172-6
- Transpower (2018) Te Mauri Hiko Energy Futures. Retrieved 21.11.18 https://www.transpower.co.nz/sites/default/files/publications/resources/TP%20Energy%20Futures%20-%20Te%20Mauri%20Hiko%20%2021%20May%2718%20-%20web.pdf.
- Young (2017). 2050 Pathway for New Zealand – GLOBE Discussion Report.
- Mazzucato (2013). The entrepreneurial state. Anthem Press, ISBN 0857282514.
- Herrero, Nicholls and Strengers (2018). Smart home technologies in everyday life: do they address key challenges in households? Current Opinion In Env. Sustainability, 31: 65-70.
- Strengers & Nicholls (2017). Convenience and energy consumption in the smart home of the future: industry visions from Australia and beyond, Energy Research and Social Science 32: 86-93.
- Berka, MacArthur, Poletti, Matthewman and Bargh (2018). Policy strategies for inclusive renewable energy in Aotearoa. Policy Brief, Public Policy Institute.