

Identifying energy hardship at a utility scale



What's the problem?

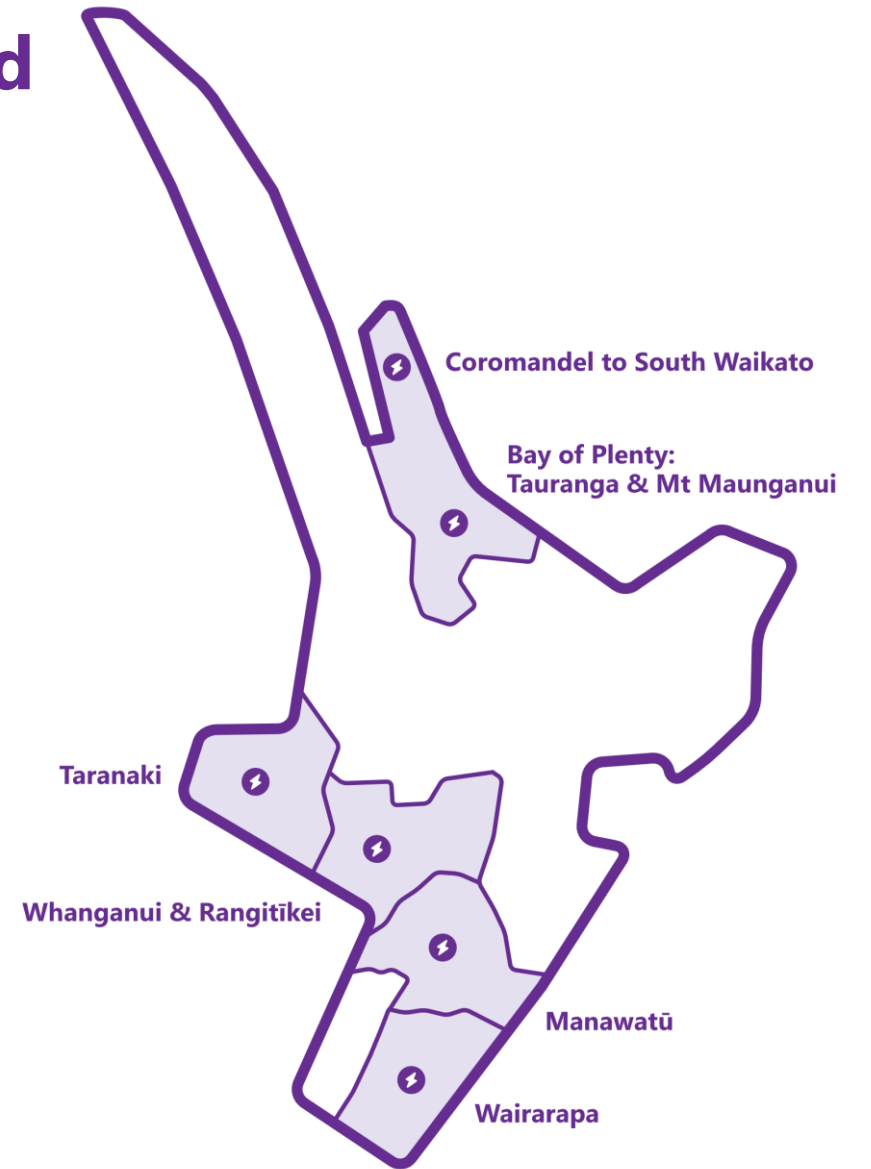
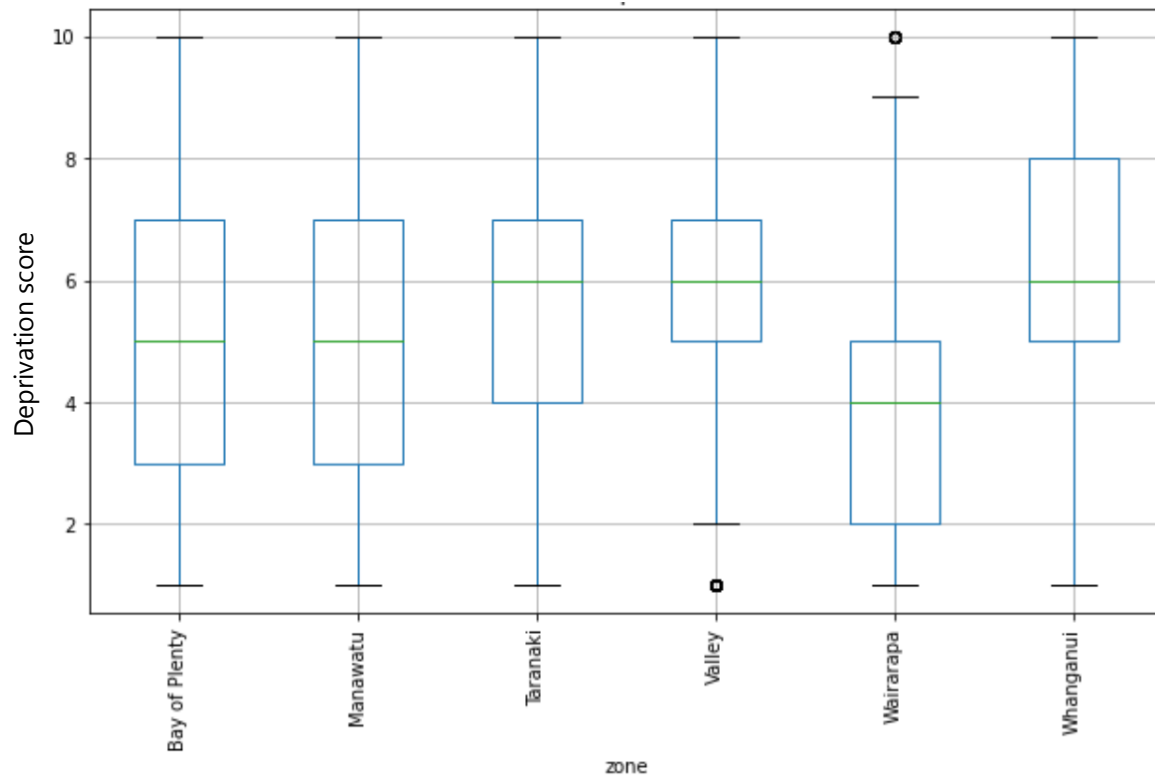
- MBIE's 2018/19 Energy Price Review (EPR) estimated there are 100,000 households in **energy hardship**.
- BCG report suggests the energy transition could increase distribution network spending in New Zealand by more than **20 billion every 10 years** for the next three decades
- Distribution networks have very little **information or connection to** their customers

An ad-hoc analysis was performed

- Study took scores from the Otago Deprivation Index, which takes a number of demographic factors from the New Zealand Census
- These scores were overlaid on to Powerco's Network using Census Area Unit polygons
- Information corresponding to residential distribution transformers was then interpreted according to area unit

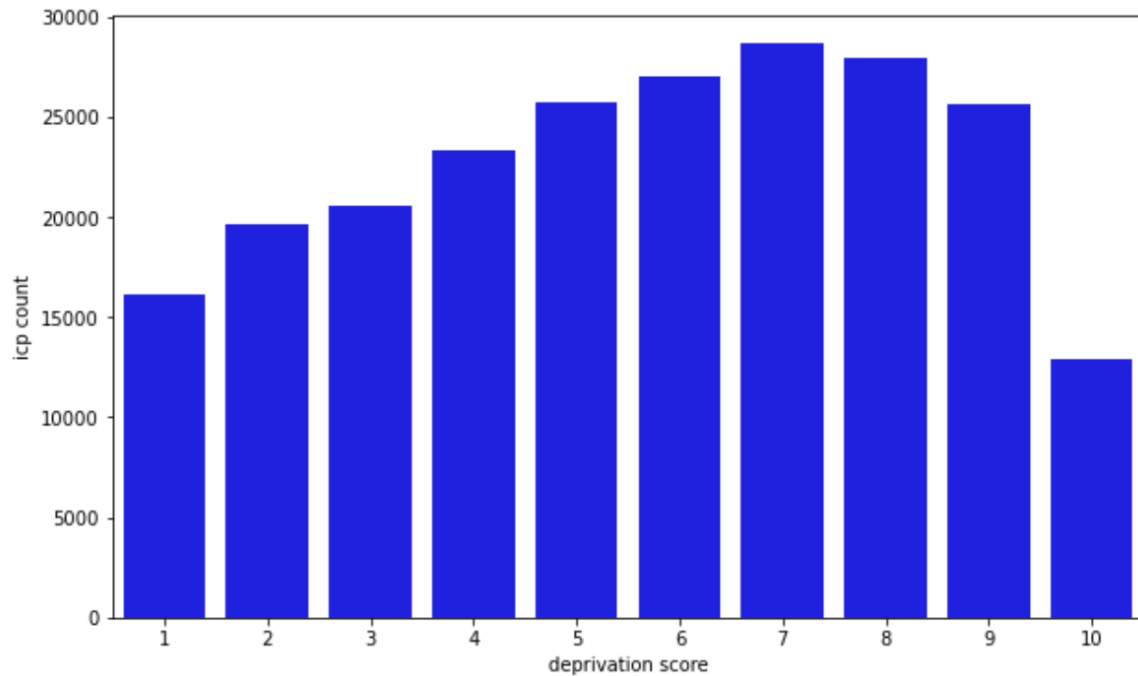
Areas of higher deprivation corresponded mostly with urban regions

Deprivation levels **varied** across planning areas

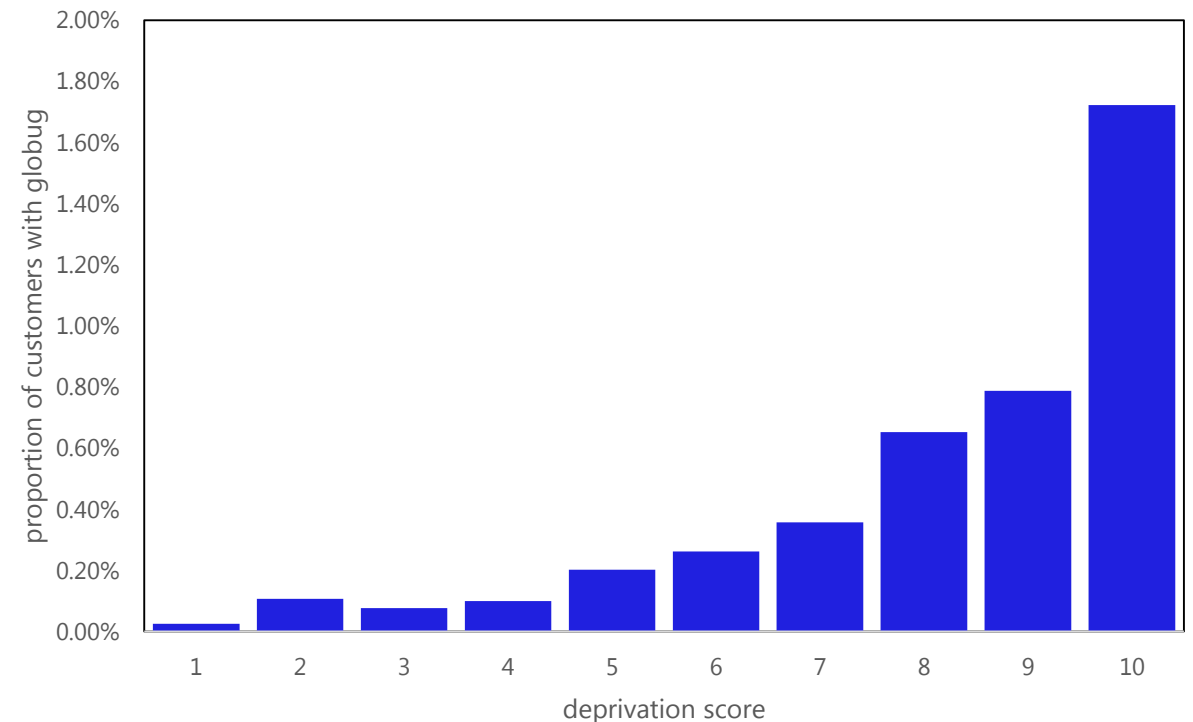


Approximately 14 thousand households could be experiencing energy hardship

Residential customers were skewed to areas of **higher vulnerability**

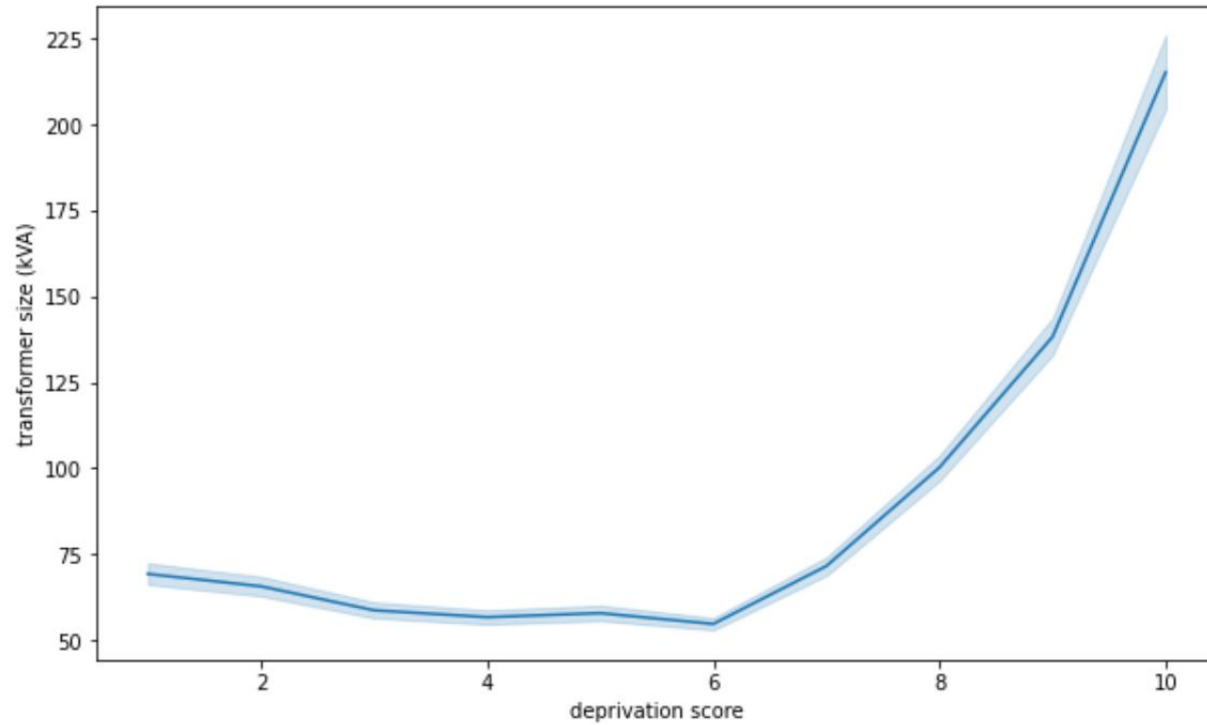


Vulnerable customers were **more likely to seek pre-pay** power options

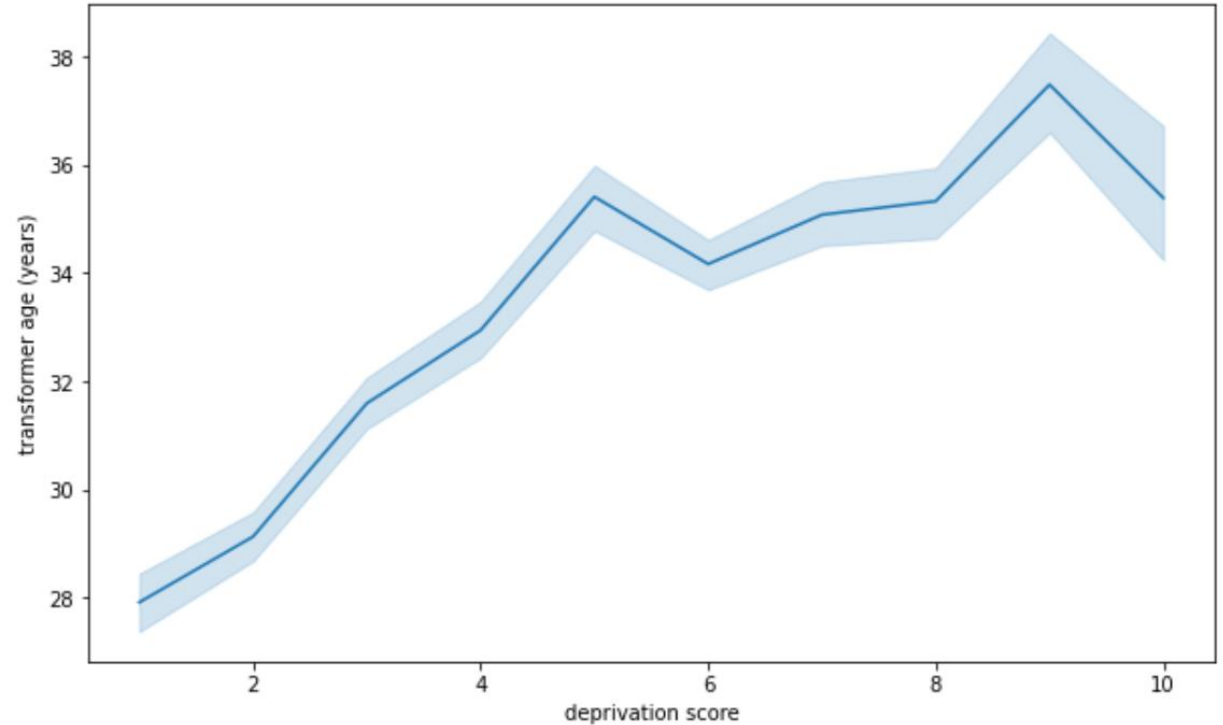


Network characteristics differed by deprivation level

Residential transformers in vulnerable areas were **larger**

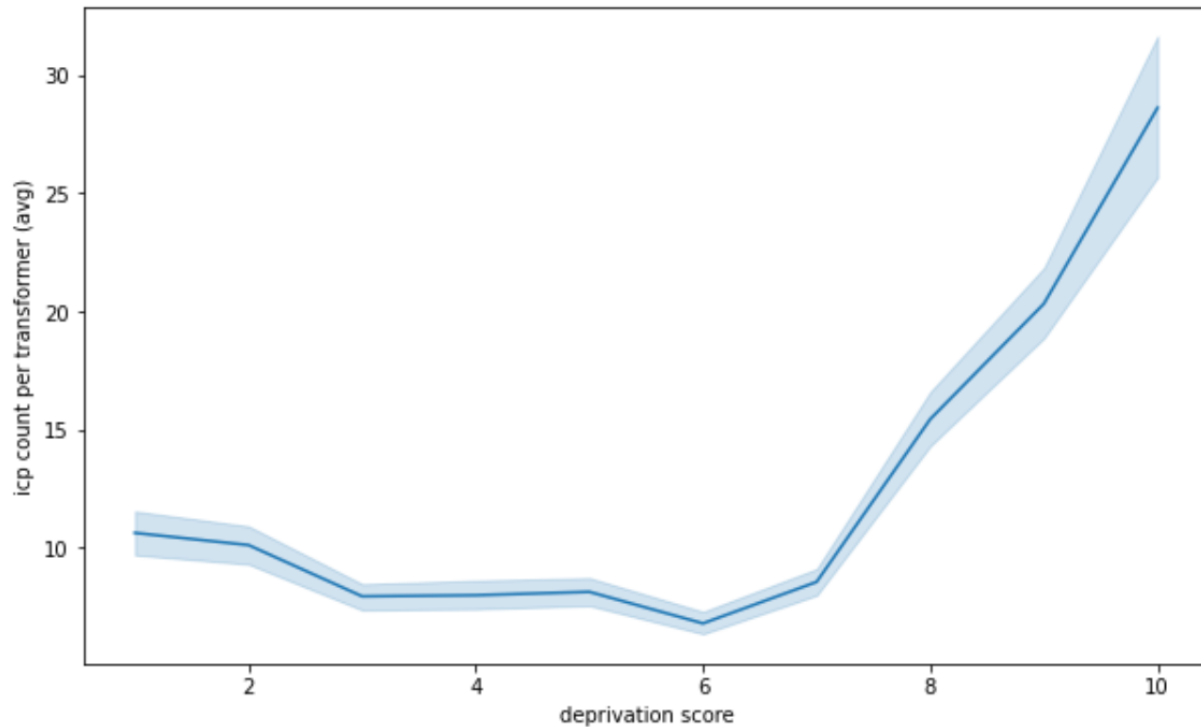


Residential transformers in vulnerable areas were **older**

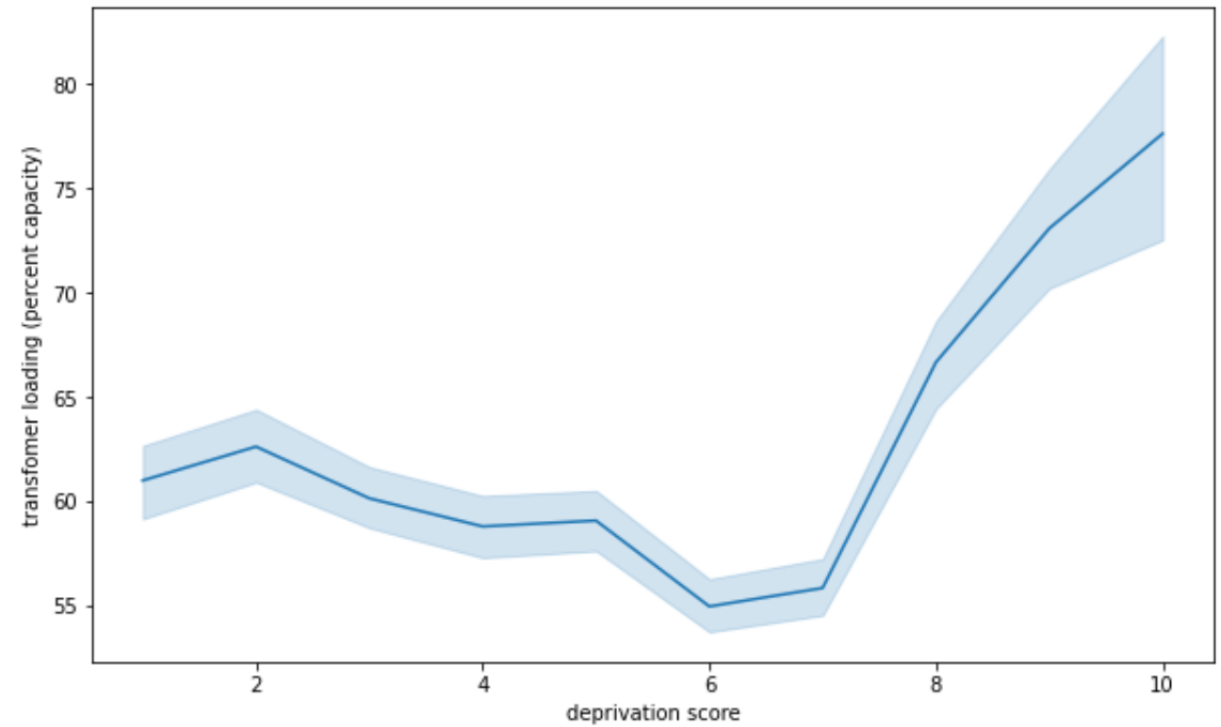


Network loading differed by deprivation level

Residential transformers in vulnerable areas had **more customers connected**

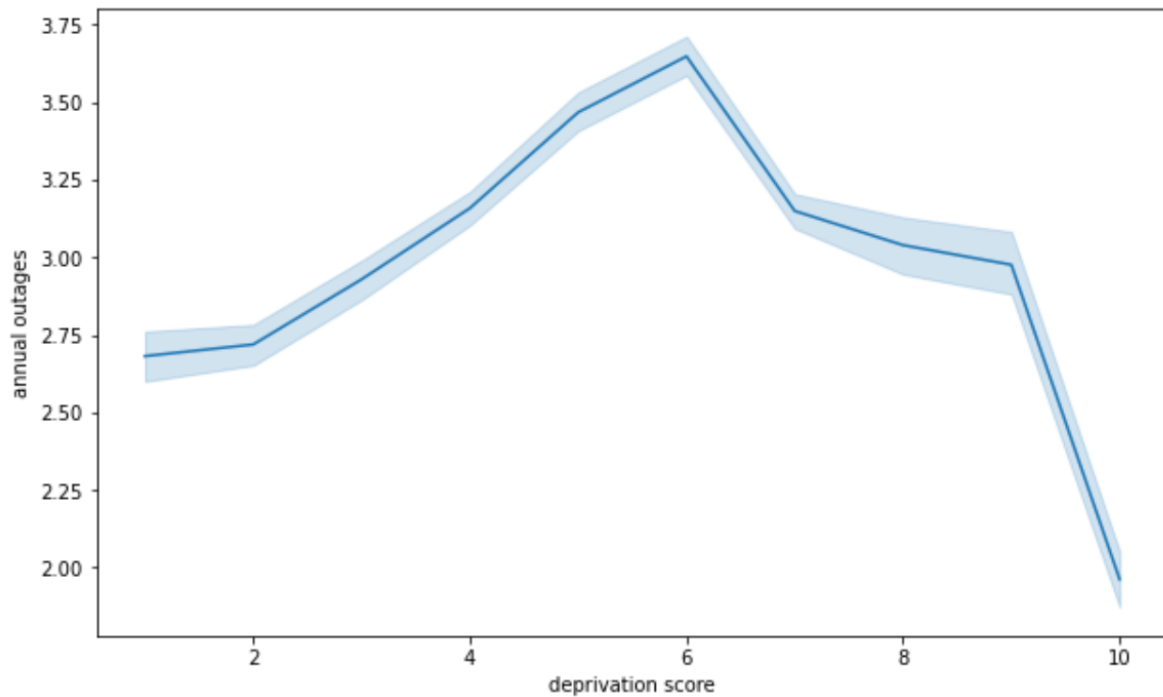


Residential transformers in vulnerable areas were **modelled to be loaded more heavily**

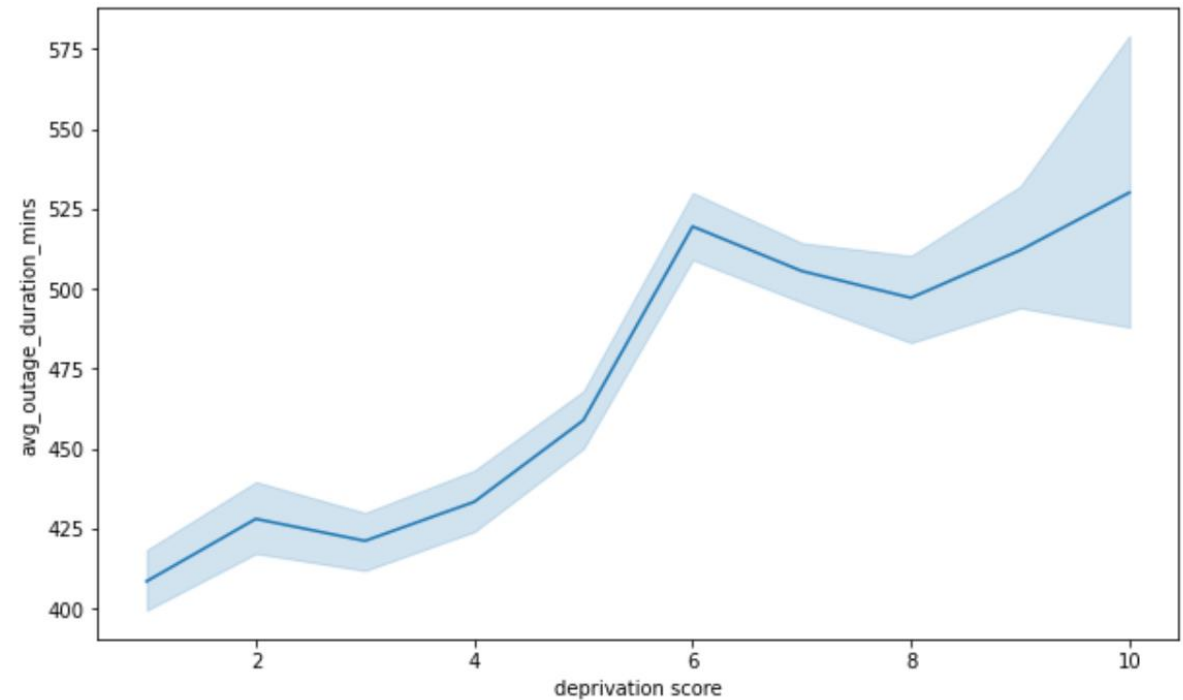


Network performance may also be impacted

Residential transformers in vulnerable areas appeared to experience **a similar or lower** number of outages



Residential transformers in vulnerable areas appeared to observe **slightly more outage minutes on average**



Where to from here?

1. Energy hardship is a challenge for the whole energy sector and government to address
2. The energy transition will increase energy costs, at least in the short term which could exacerbate the already challenging circumstances of vulnerable customers
3. More work needs to be done to validate initial findings at a national level to:
 - a. Create useful geographical measures/tools to identify hardship
 - b. Assess potential impacts and opportunities arising from network architecture
 - a. Could we address non-network alternatives differently when considering network upgrades?
 - b. Could community energy sharing and storage programmes be more beneficial in areas of energy hardship?
 - c. Could flexibility programmes offer more value?
 - d. Could the value of lost load measure be improved?