



Life
Course
Centre

Electrification, Local Energy and Resilience

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Energy Transitions and Resilient Cities

- Resilience for whom?
- Resilience at what scale?

Two research projects:

- Electrification and Low Income Households
- Microgrid Study in North West Victoria

Background

- A shift **to** renewables involves a shift **away** from gas
 - Gas transition knowledge gaps
- **Policy-driven** gas transitions
 - Victoria leading with **Gas Substitution Roadmap**
- **High gas dependence** amongst Victorian households
- Value of gas assets and risks of **stranding**

National Victoria Gas

This was published 9 months ago

New Victorian homes no longer required to have gas

Ashleigh McMillan

Updated July 2, 2022 – 4:39pm, first published at 2:09pm

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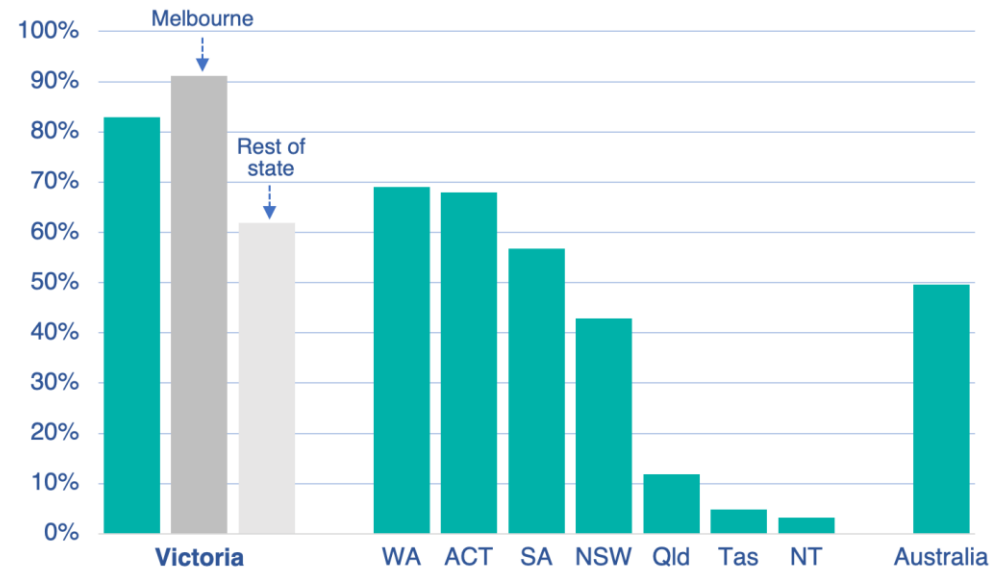
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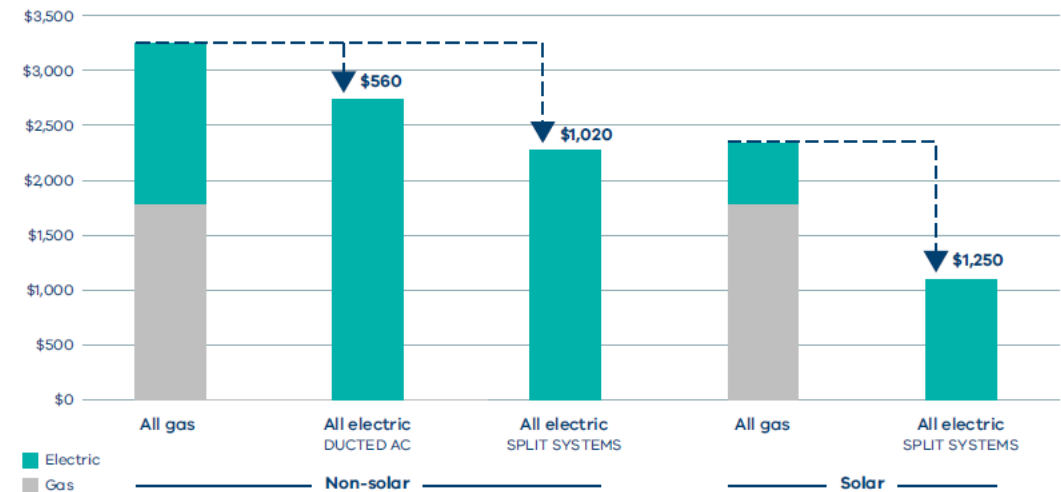
New homes built in Victoria will no longer have to be connected to gas, as the state government plans to halve carbon emissions by 2030 and drive down the cost of living.



Electrification and Resilience

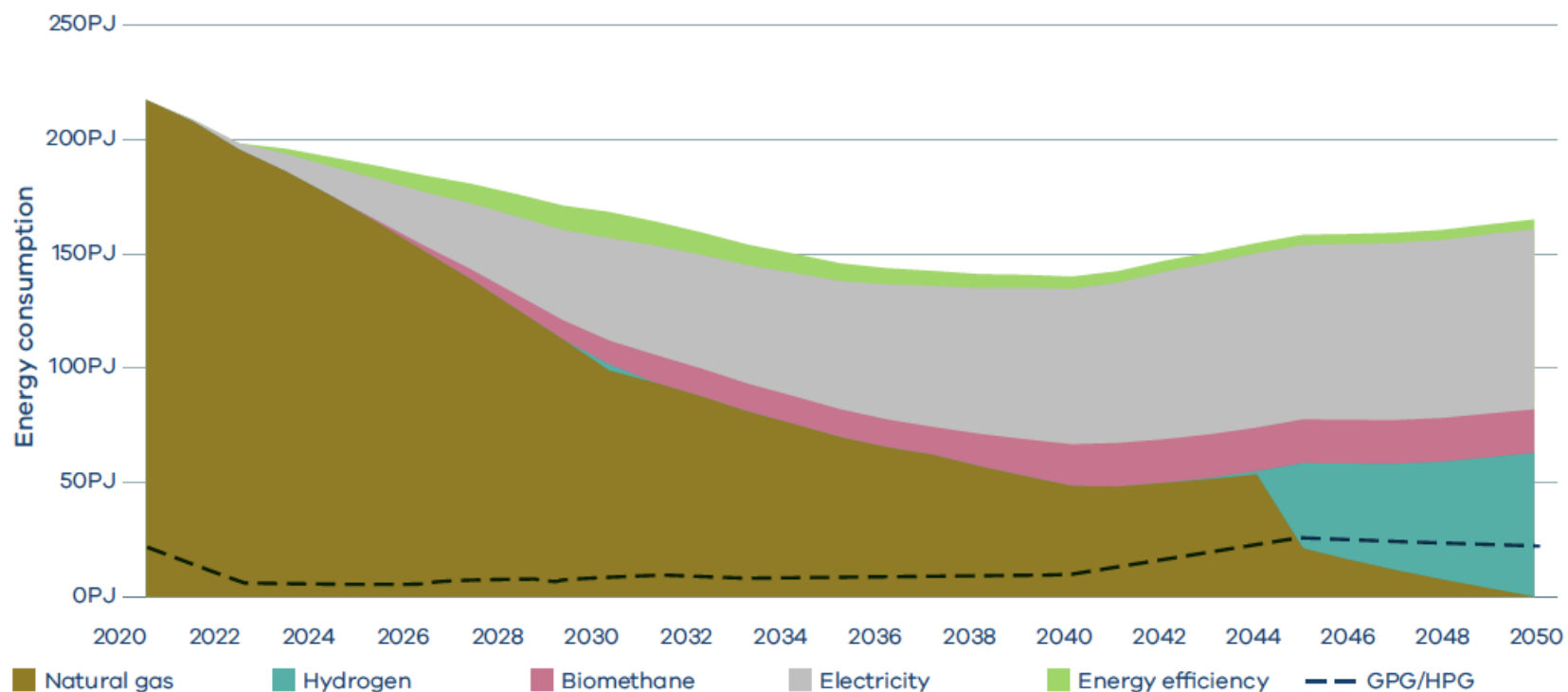


Percentage of households using mains gas, by state.
(Source: Own figure, developed from ABS, 2014)



Comparison of combined electricity and gas bills for an existing detached home with different appliance choices, based on government modelling
(Source: Victorian State Government, 2022)

Background



SOURCE Roadmap scenario modelling

GPG Gas powered generation HPG Hydrogen powered generation

Predicted energy consumption under a rapid transition scenario
(Victorian Gas Substitution Roadmap)

Incentives



Victorian Energy Upgrades

Discounts for energy-efficient products



Solar Homes

Rebates for hot water, solar PVs and batteries



7 Star Homes Program

Improving construction supply chains

Policy and regulatory change



Victoria Planning Provisions to be changed to remove gas connection requirements for new residential subdivisions



Planning Scheme changes are underway through the Environmentally Sustainable Development Roadmap to strengthen support for energy efficiency and renewables



Plumbing Regulations will be aligned with changes to the National Construction Code 2022

Resilience for whom?

- Blindspot to date on differentiated impacts:
Who is particularly vulnerable and what is the nature of vulnerability in the gas transition?



Resilience for whom?

- Partnership between **Life Course Centre** and **Brotherhood of St Laurence**
 - Institutional trust
 - Recruitment from existing database
 - Follow-up support

Mixed methods study

- **Online survey**
220 responses included in analysis
(of 236 completed surveys)
- **Focus group discussions**
34 participants, including:
26 at 4 in-person groups
8 at 2 online groups

How will a transition away from gas affect households already experiencing socioeconomic disadvantage?

How can these households be supported to transition away from gas use in their homes?

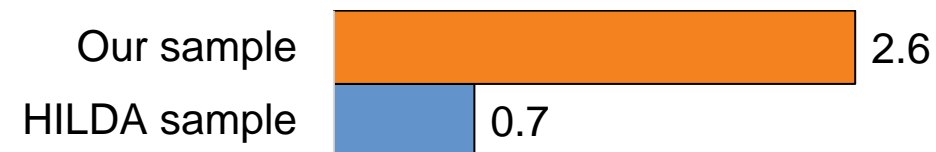
Our study participants

Profile of survey respondents ($n = 220$)

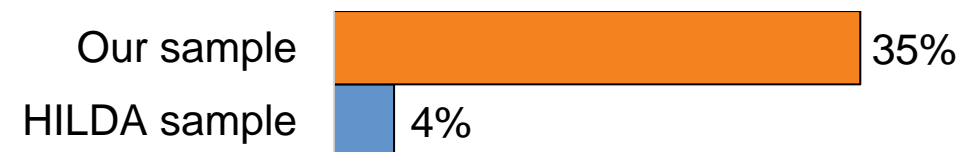
Over 60 years of age	49%
Female	68%
Live with children	35%
Born outside Australia	38%
Speak language other than English at home	25%
Annual household income, equivalised	
<\$20,000	31%
<\$40,000	85%
Income support, household-level	87%
Housing tenure	
Social housing	14%
Private rental	35%
Own with mortgage	17%
Own outright	31%
Care responsibilities as main activity	29%
Employment (under 60 years)	
Full-time	9%
Part-time	11%

Financial stress

57% survey households in financial stress
(≥ 2 indicators of 7, past year)



Unable to heat home due to shortage of money



Household, Income and Labour Dynamics in Australia Survey
(nationally representative, ~10,000 households)

Energy use and hardship

Gas use

88% survey respondents currently use mains gas
Higher use in Greater Melbourne and by owner-occupiers

Extent of limiting energy use

Extremely aware of limiting energy use



More common in households without children (33% vs 15%)

Unaware of limiting energy use



IV sample – Infrastructure Victoria's *Gas Infrastructure Community Sentiment* survey, July 2021

Indicators of energy hardship?

Experiences of past twelve months:

- Unable to pay energy or phone bills on time
- Unable to heat home
- Went without meals

64%

- Unable to heat home
- Went without meals

42%

Attitudes and preferences

Opinion on a transition away from gas

69% support (49% strongly support)

- More likely with higher levels of **education**
- Less likely with a preference for **gas**
- No association with tenure, location, age or financial stress

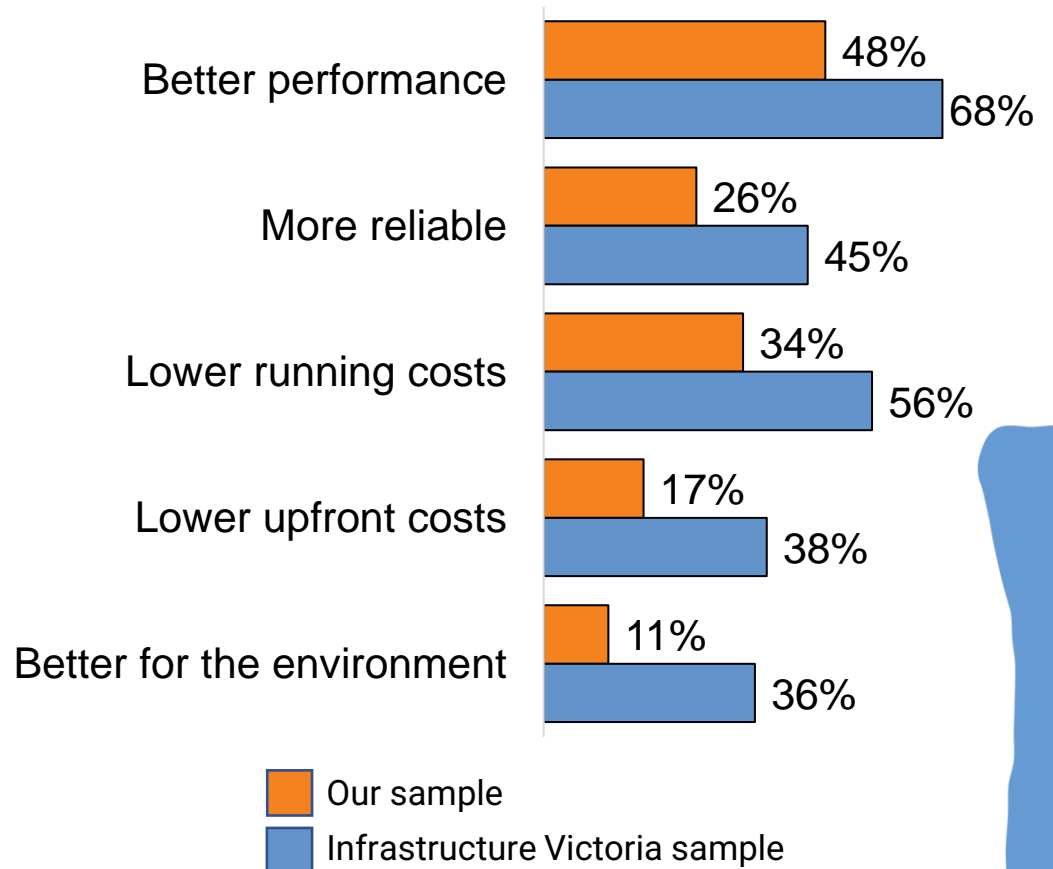
Electricity or gas?

Strong preference for gas for

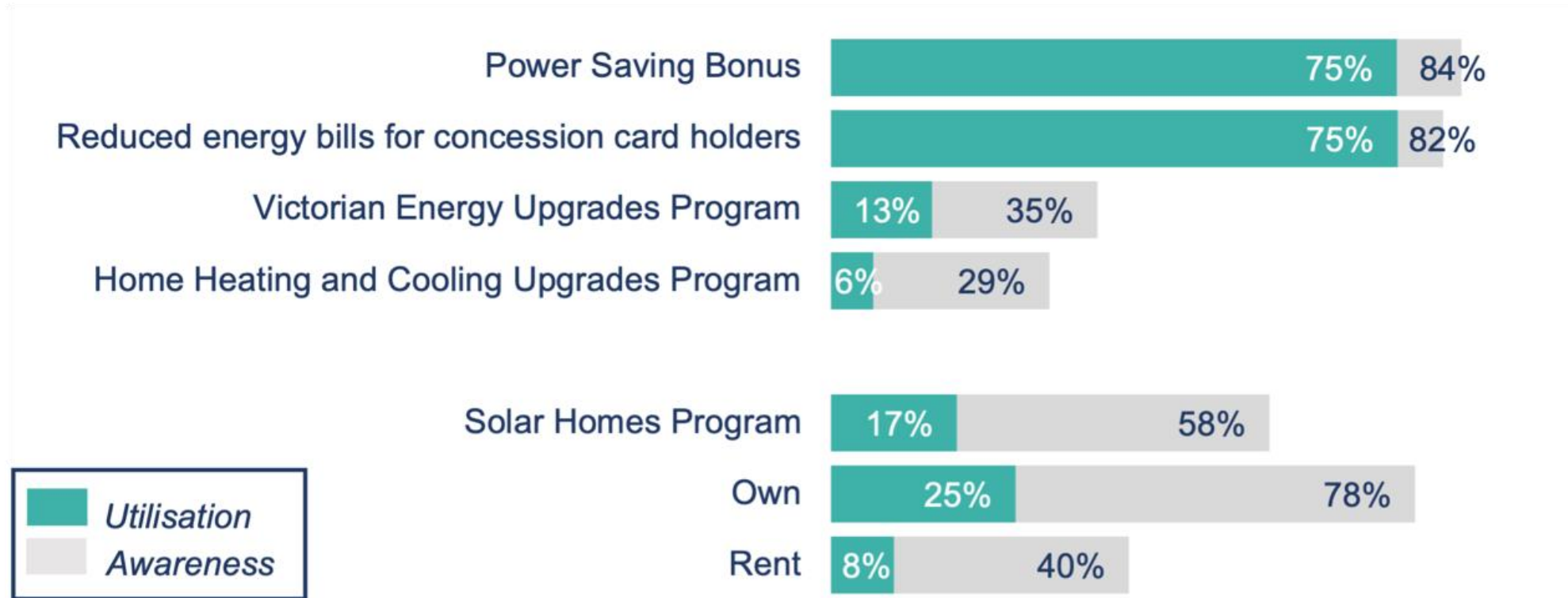
- Stovetop cooking (62 vs. 24%)
- Hot water (45 vs. 24%)

For all categories of energy use, expressed **preferences** are significantly associated with **current energy use**

Positive attitudes about gas appliances

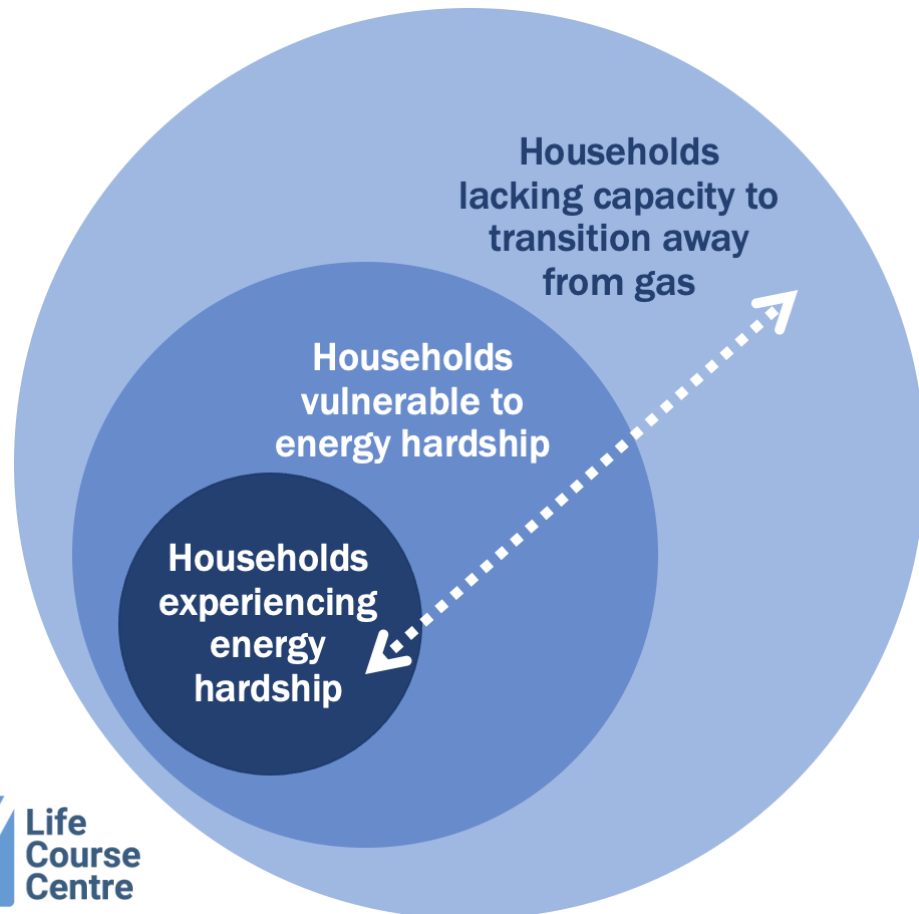


Policies and programs: awareness and uptake



Heterogeneity of barriers to electrification

- High support for electrification and a planned transition away from gas
- Differing experiences of electrification and hardship



Energy hardship

- Limiting energy use, coping measures
- Low thermal quality housing, insecure tenure
- Constrained ability to navigate the transition

Energy vulnerability

- e.g. Commonly in rental accommodation
- e.g. Live with disability or chronic illness

Lacking capacity to transition

- e.g. English as a second language
- e.g. Significant care responsibilities, time-poor



In summary

- **Research report** to be released in May
- **Support for electrification is high but awareness of supports is low**
- **A plan for the future of the residential gas network will reduce uncertainty**
- **Home ownership** defining driver for electrification – renters left behind
- **Addressing capital barriers is key to electrification**
- More sophisticated **tailoring** of policy, programs and interventions and appropriate **delivery channels**
 - Need to focus on **journeys** not just outcomes

Donald and Tarnagulla Microgrid Feasibility Study

Project 11 Recommendations to Regulators



Setting the scene | DEFINING MICROGRIDS

Key characteristics:

- a **distinct interconnected local energy system** that can
- **Actively balance and optimise** its own energy storage and generation with the grid
- In order to benefit the microgrid's community



Why a microgrid? | COMMUNITY ASPIRATIONS

Community aspirations

- emissions reduction
- improved reliability and resilience
- managing energy costs
- sharing local renewable generation
- local ownership of or control over decision-making for energy resources.

Reliability and resilience

- Meeting energy needs during grid outages
- Providing energy while islanded from rest of grid
- Rationing electricity during outages to serve those most in need



Enhanced resilience constrained by Regulation

- increased *resilience* to natural hazard events is not well accounted for in the returns allowed for networks
 - Proactive investment in resilience cannot be valued, but ex post costs of restoring supply after a black out is valued



Key findings

- The energy transition is on – centralisation to decentralisation
- There are opportunities to enhance resilience and reduce emissions at the local scale
- Regulation and planning is playing catch up with tech developments and community aspirations
- Regulatory reforms for distribution networks needed to properly value what microgrids can offer
- Better understand the value of local benefits from local coordination of energy resources
- How do we get from today to a more decentralised future in a fair and just way?

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