21st Century Energy System Planning

Australia's bright future starts now

Webinar 4 – The future of gas network planning

27 October 2023

with
Richard Lowes, Regulatory Assistance Project (RAP)
Claire Halbrook, Gridworks
Tony Wood, Grattan Institute

facilitated by

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Acknowledgement of Country

We acknowledge the Traditional Owners of the lands on which we meet, live and work today, and we pay our deepest respects to Elders past, present and emerging.

Key takeaways

1 The future of the gas grid is both a planning and regulatory challenge.

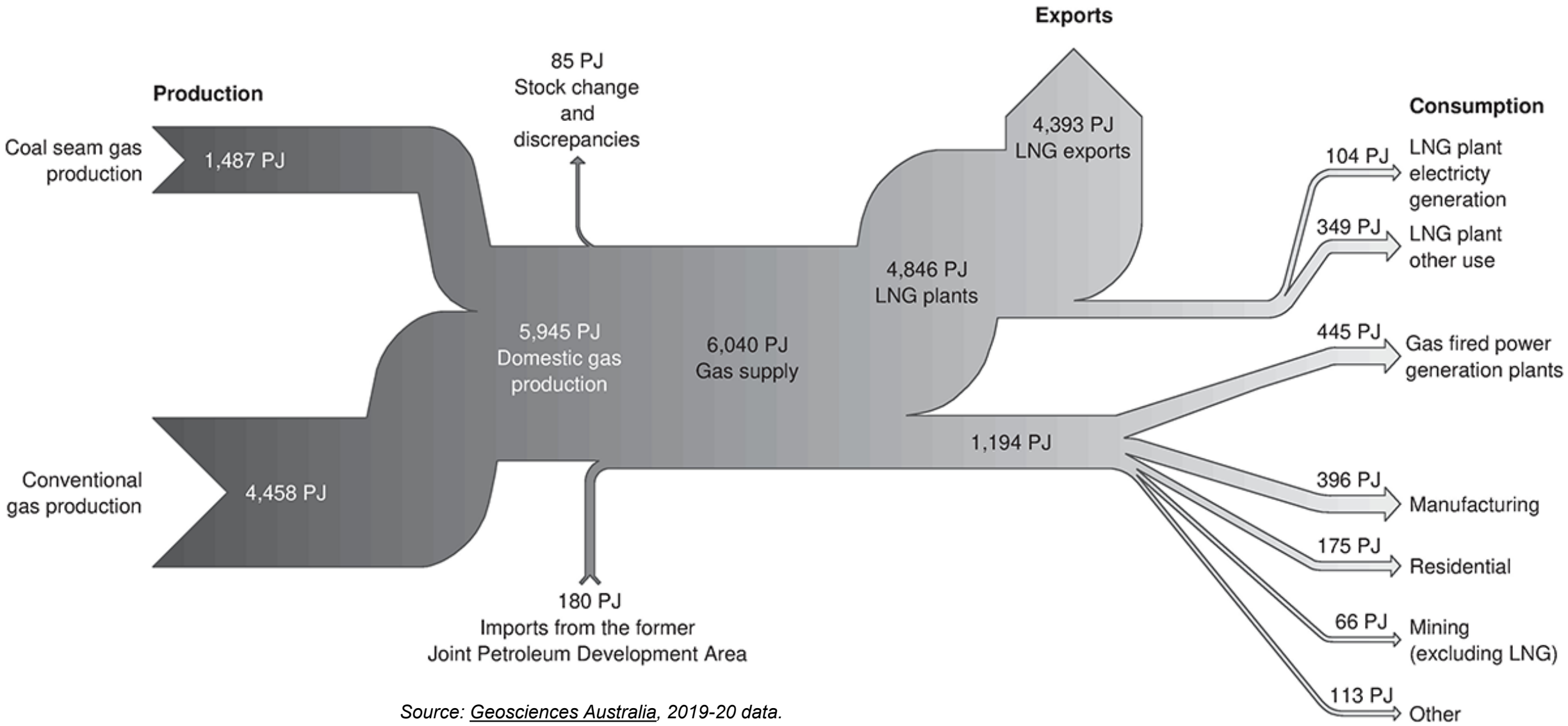
2 The gas transition must focus on consumer outcomes, especially on affordability.

3 Decarbonising is complex and difficult–but delaying action will only make it more so.

Agenda

Time	Topic
10 min	Overview and Framing *Brian Spak, Energy Consumers Australia*
45 min	Policy and regulatory options to manage the gas grid in the UK *Richard Lowes, RAP* California's best practices to consider and decide the future of its gas resources and delivery systems. *Claire Halbrook, Gridworks* Getting off gas: why, how, and who should pay? *Tony Wood, Grattan Institute*
15 min	Panel discussion with *Richard Lowes, Regulatory Assistance Project (RAP)* *Claire Halbrook, Gridworks* *Tony Wood, Grattan Institute* *Andrew Turley, Group Manager Forecasting at Australian Energy Market Operator (AEMO)* *Kirsty Rolls, A/g Manager, ISP Review Section – National Energy Transformation Division, DCCEEW*
15 min	Audience Q&A - *Please submit your questions via the Q&A feature in Zoom.*
5 min	Close

Australia's gas supply, demand, and exports

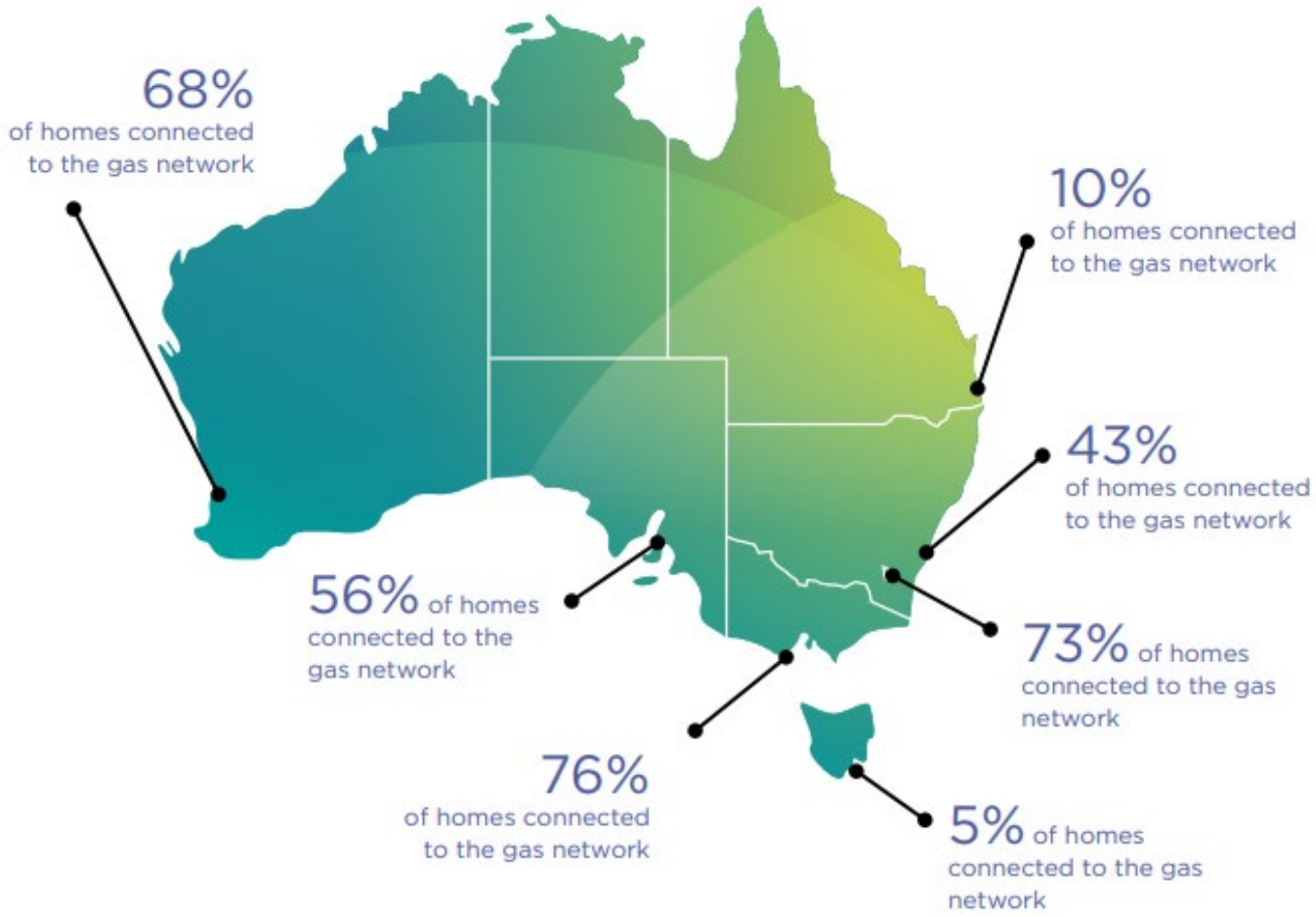


Source: Geosciences Australia, 2019-20 data.

Source: Australian Energy Statistics 2021.
Note: LNG = liquefied natural gas.

AECR 2.9

Almost 50% of Australian homes are connected to the gas network, but not all gas distribution networks are subject to price regulation.



Gas distribution network prices in ACT, NSW, VIC, and SA are regulated by the Australian Energy Regulator, and retail gas prices are regulated in WA by the Western Australian government.

Gas distribution networks in QLD and TAS are not subject to price regulation.

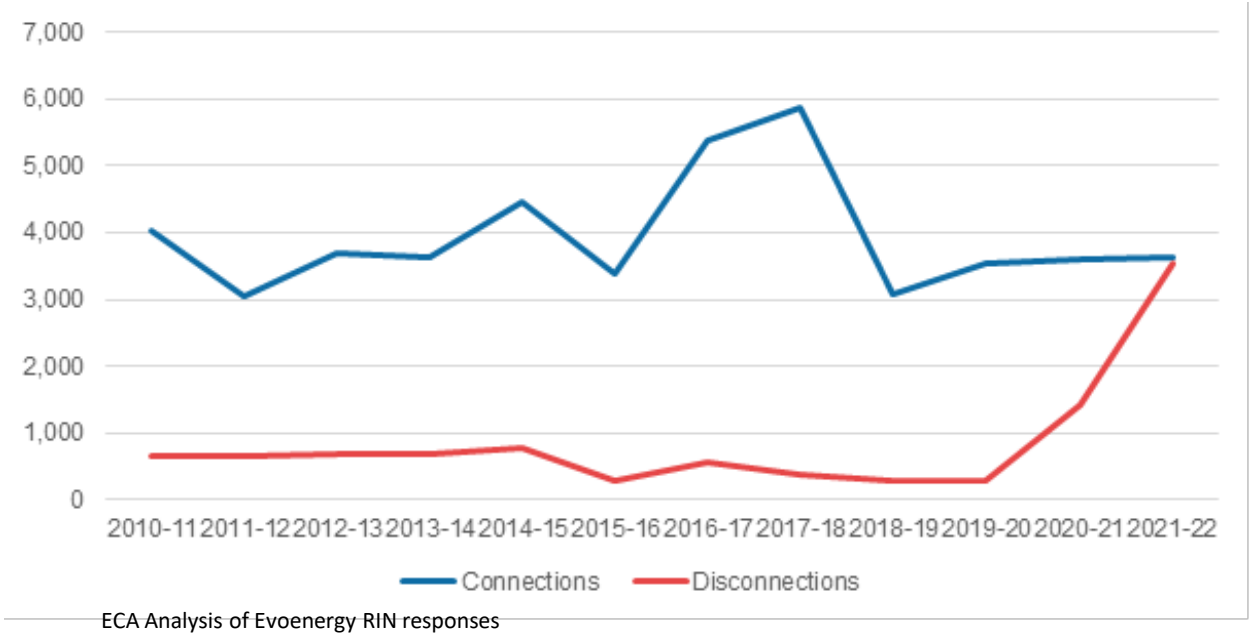
Source: Energy Networks Australia, Reliable and clean gas for Australian homes, July 2021

New gas connections have likely peaked, and disconnections will soon surpass new connections.

Annual change in residential gas customer numbers in NSW, ACT, QLD and SA

ECA Analysis of AER retail performance reporting data; data unavailable for Victoria

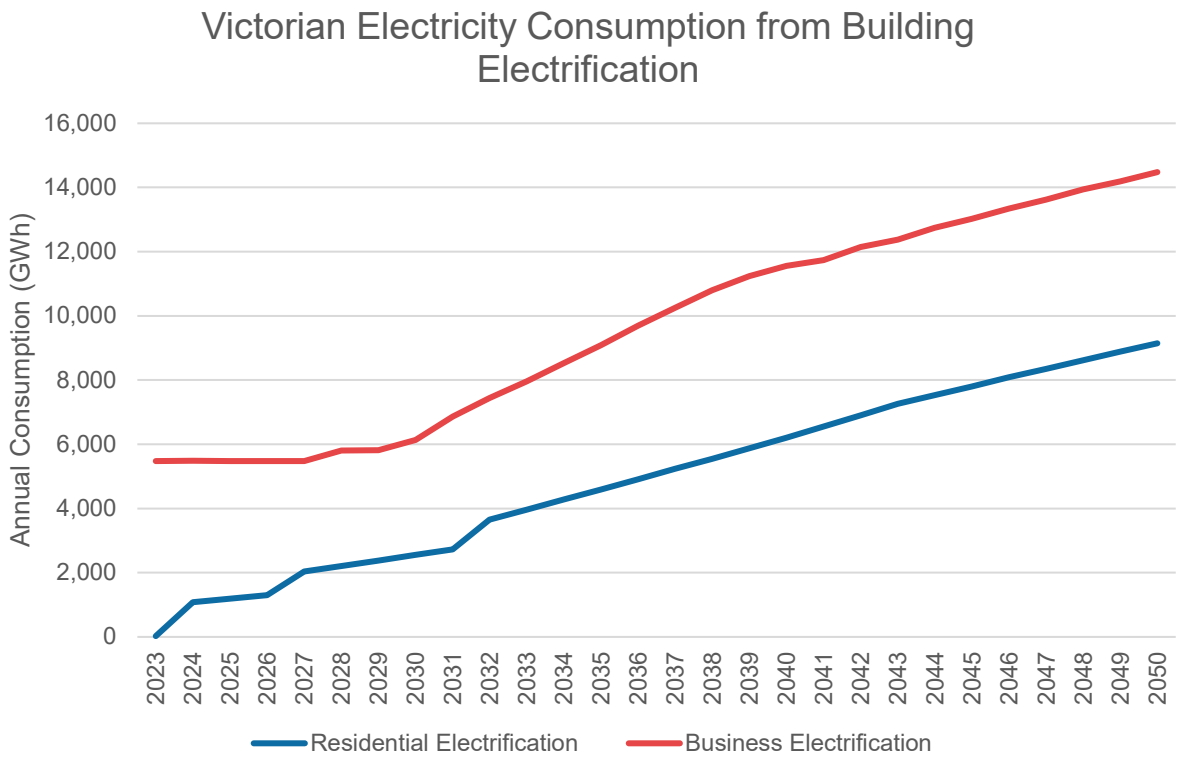
Evoenergy gas distribution network connections and disconnections per year



ECA Analysis of Evoenergy RIN responses

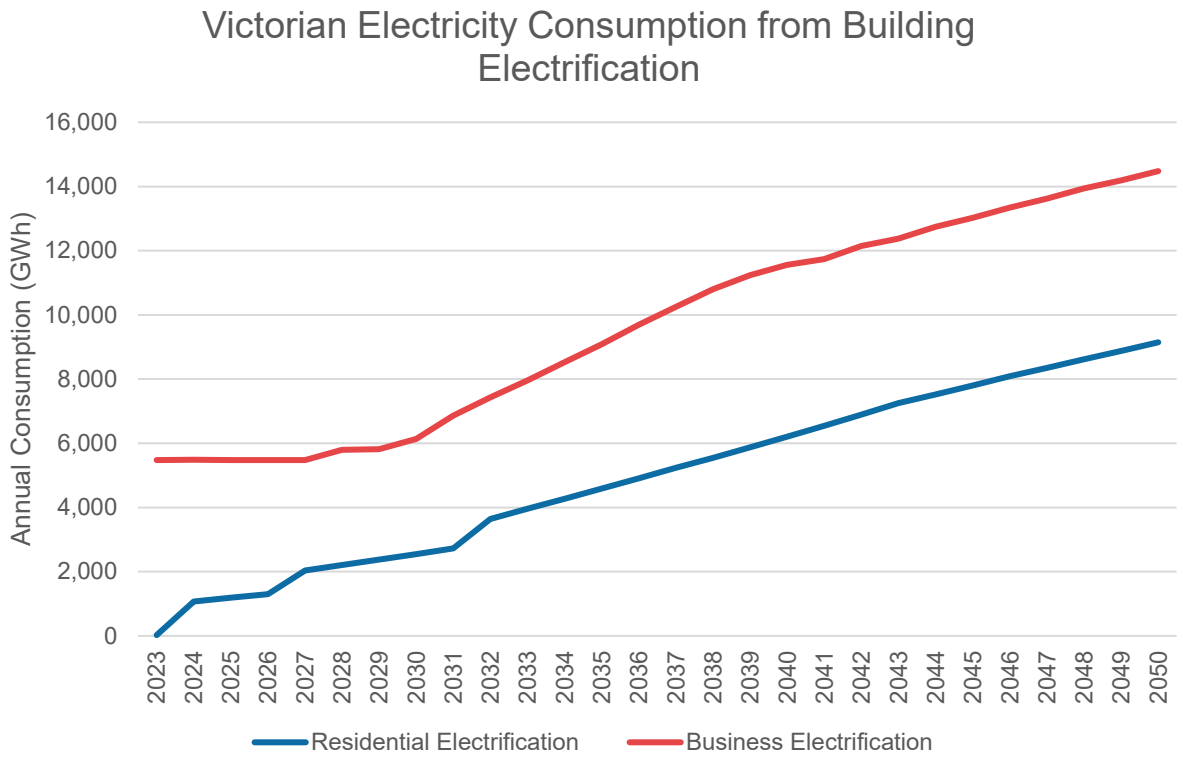
Read more here: Energy Consumers Australia, 2023. Are we reaching the peak in residential gas customer numbers? (by Ashley Bradshaw).

Greater electrification can lead to an unintended consequence:

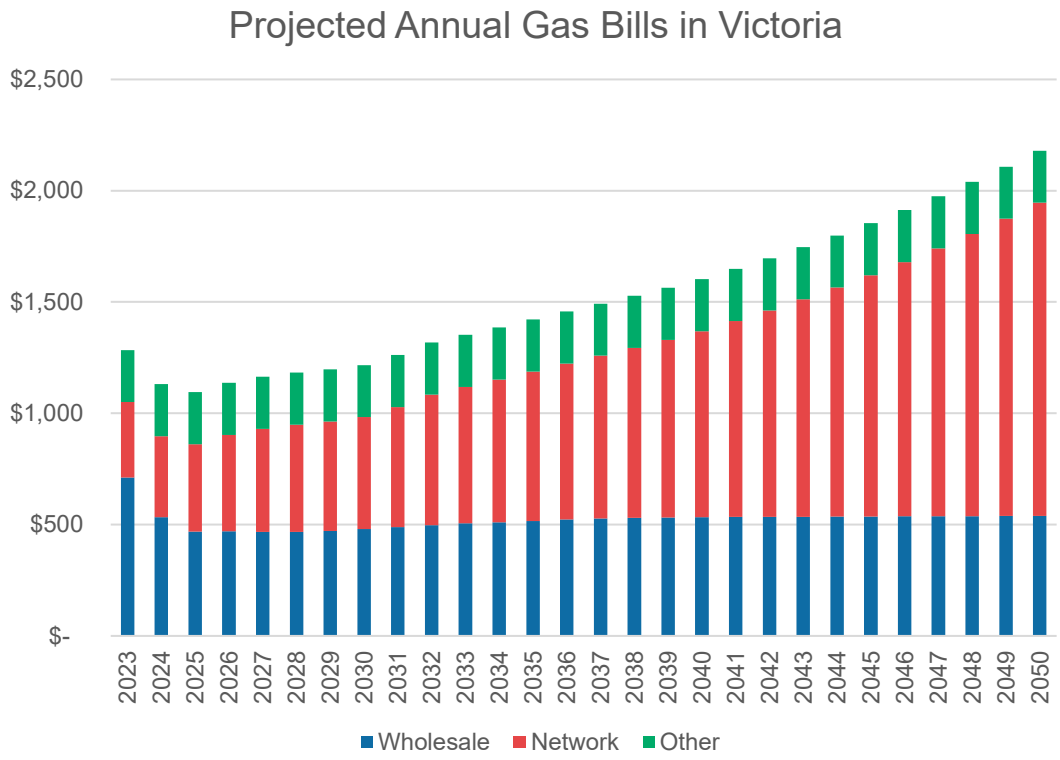


Data from 2022 ISP, Step Change Scenario (forecasting.aemo.com.au)

Greater electrification can lead to an unintended consequence: higher gas bills.



Data from 2022 ISP, Step Change Scenario (forecasting.aemo.com.au)

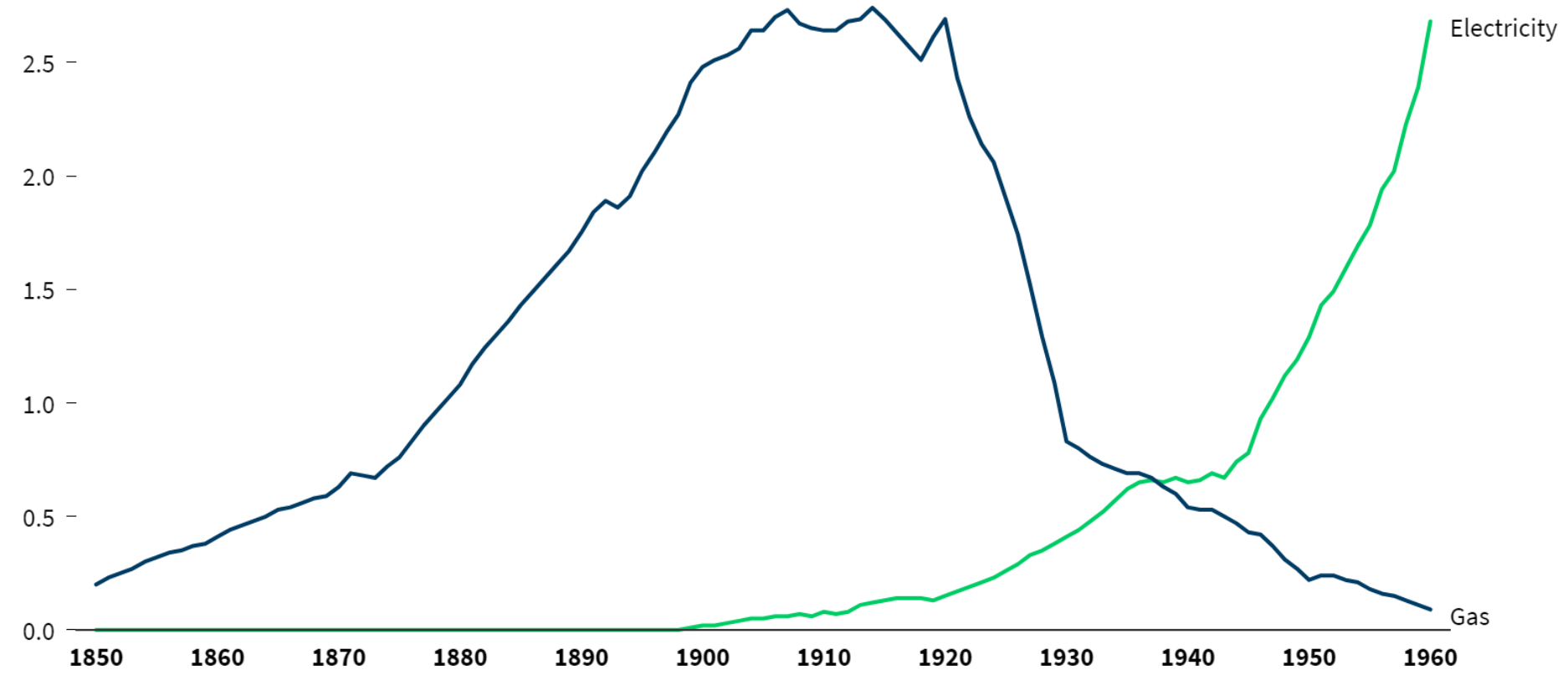


CSIRO data for Energy Consumers Australia, 2023

How do we ensure gas distribution networks continue to operate safely, reliably and affordably for the last Australian households and small businesses using gas?

The pace of the transition from gas to electricity is unclear and could be much faster than anticipated.

Exhibit 3: Gas light to electric light transition in the UK. Demand for energy, mtoe



Source: Fouquet, Heat, Power and Light

Source: RMI, Peaking: A Brief History of Select Energy Transitions, 2022: https://rmi.org/insight/how-past-energy-transitions-foretell-a-quicker-shift-away-from-fossil-fuels-today/

There are more planning processes for electricity than gas.

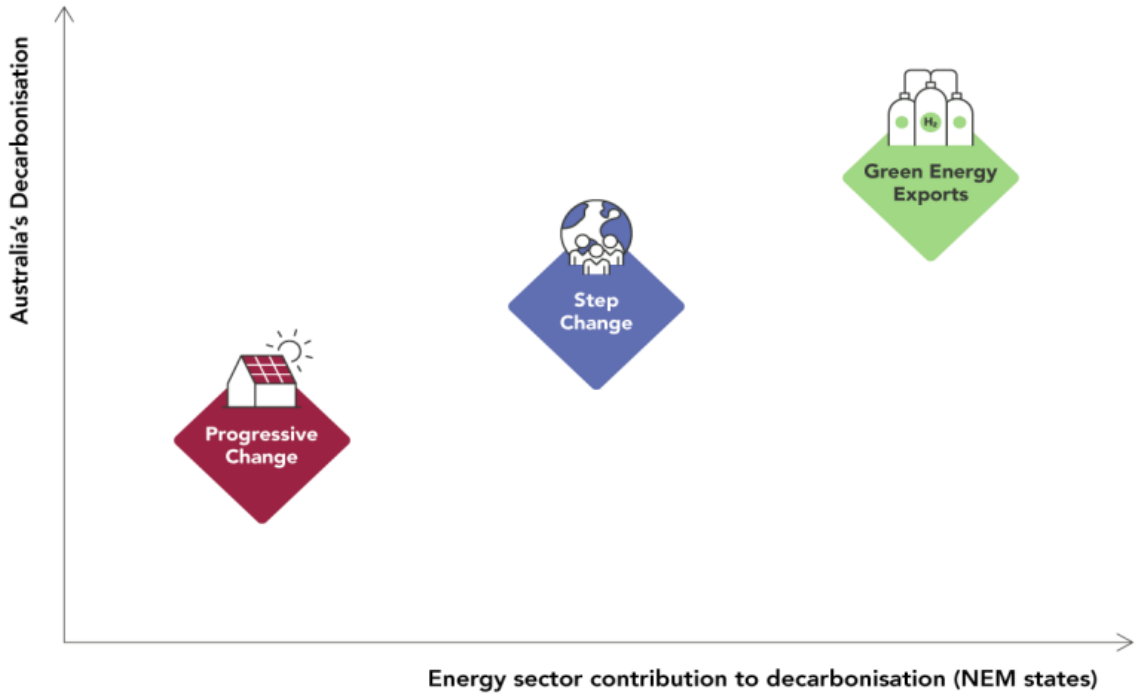
	Electricity Planning	Gas Planning
AEMO	Integrated System Plan	
	System Security Planning	
	Electricity Statement of Opportunities	Gas Statement of Opportunities
Networks	Distribution Annual Planning Reviews	
	Transmission Annual Planning Reviews	
	Regulatory Investment Test	
	AER Expenditure Reviews	AER Expenditure Reviews

Source: Energy Consumers Australia review of the National Electricity Rules and the National Gas Rules

Using different inputs, assumptions, and scenarios across electricity and gas could lead to consumers paying for two contradictory energy transitions.

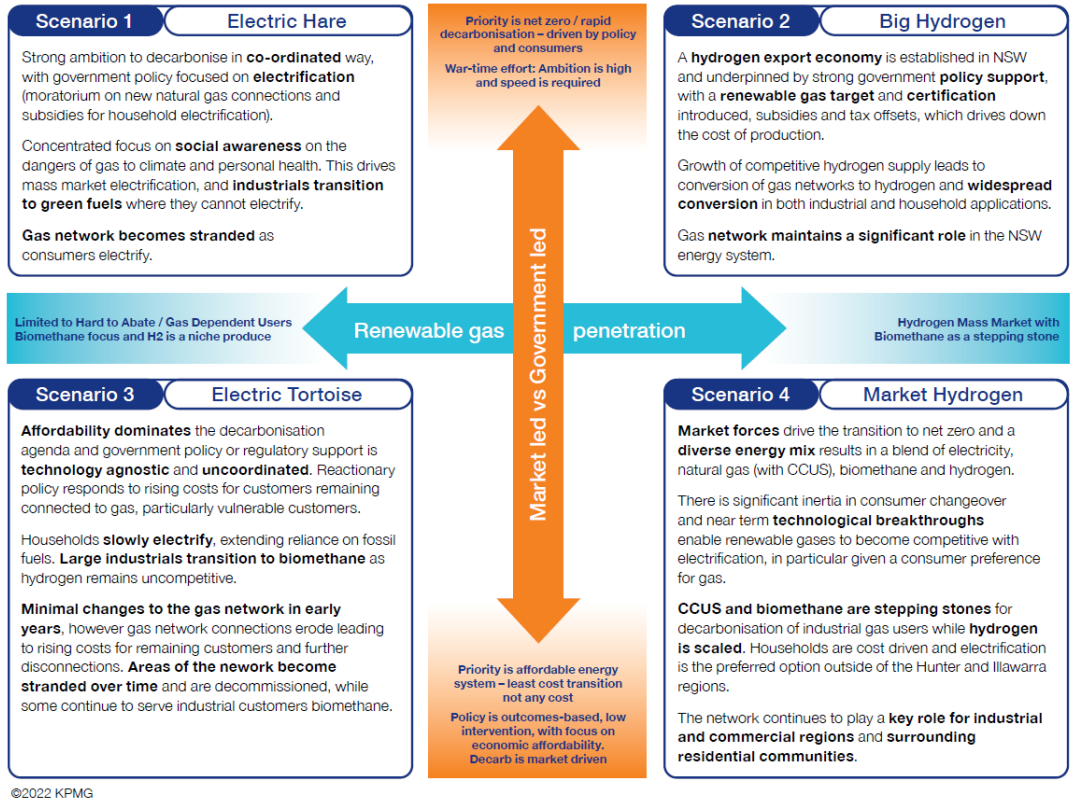
2024 ISP Scenarios used by AEMO for NEM transmission network planning

Figure 1 2023-24 scenarios



AEMO, 2023 Inputs, Assumptions and Scenarios Report

Scenarios used by Jemena for NSW gas network planning



Jemena, Gas Networks 2050, Consumer Forum 1, 12 November 2022

26/10/23

Decompression: Policy and regulatory options to manage the gas grid in a decarbonising UK

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About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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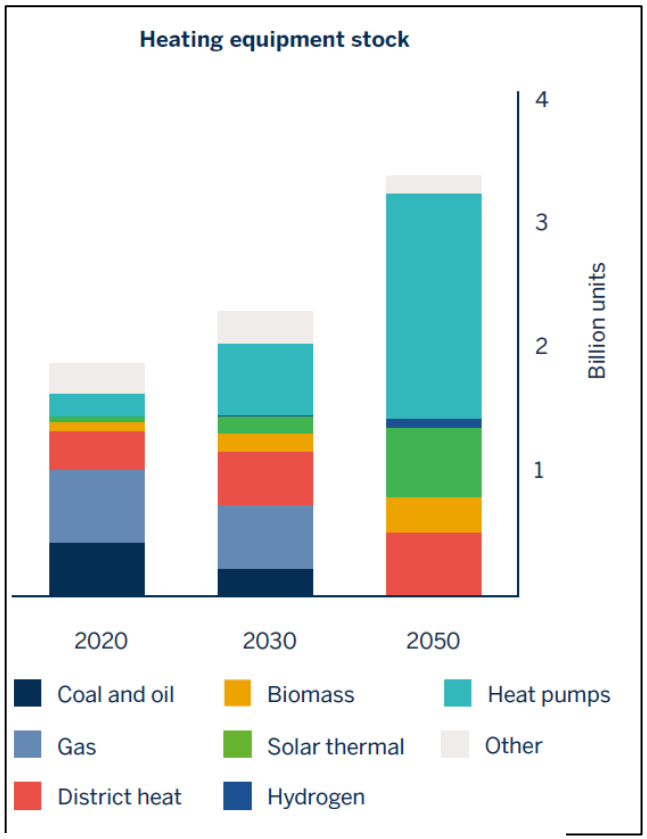
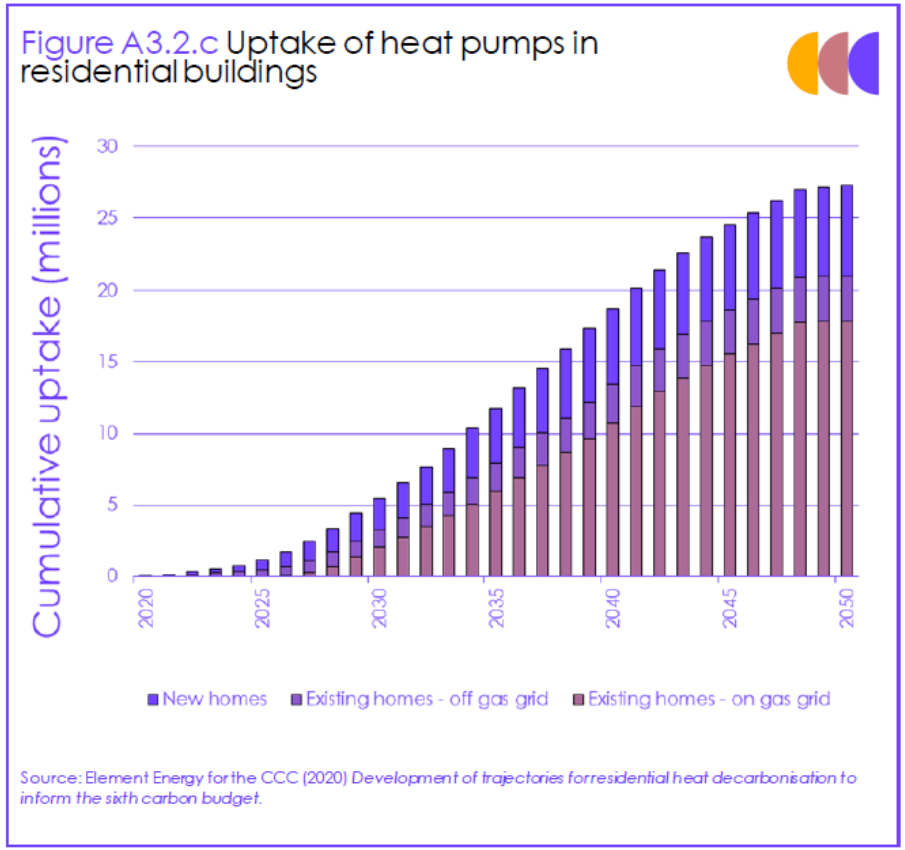
UK context

- 85% of homes connected to gas grid.
- Half of fossil gas imported and imports expected to grow.
- Energy policy is bounded by Climate Change Act (2008).
  - Need for net zero GHG emissions by 2050.
- Sat scale scope for clean gas options is very limited.

The transition needs to happen fast



Source: IEA. (2021, May). *Net Zero by 2050: A Roadmap for the Global Energy Sector*.

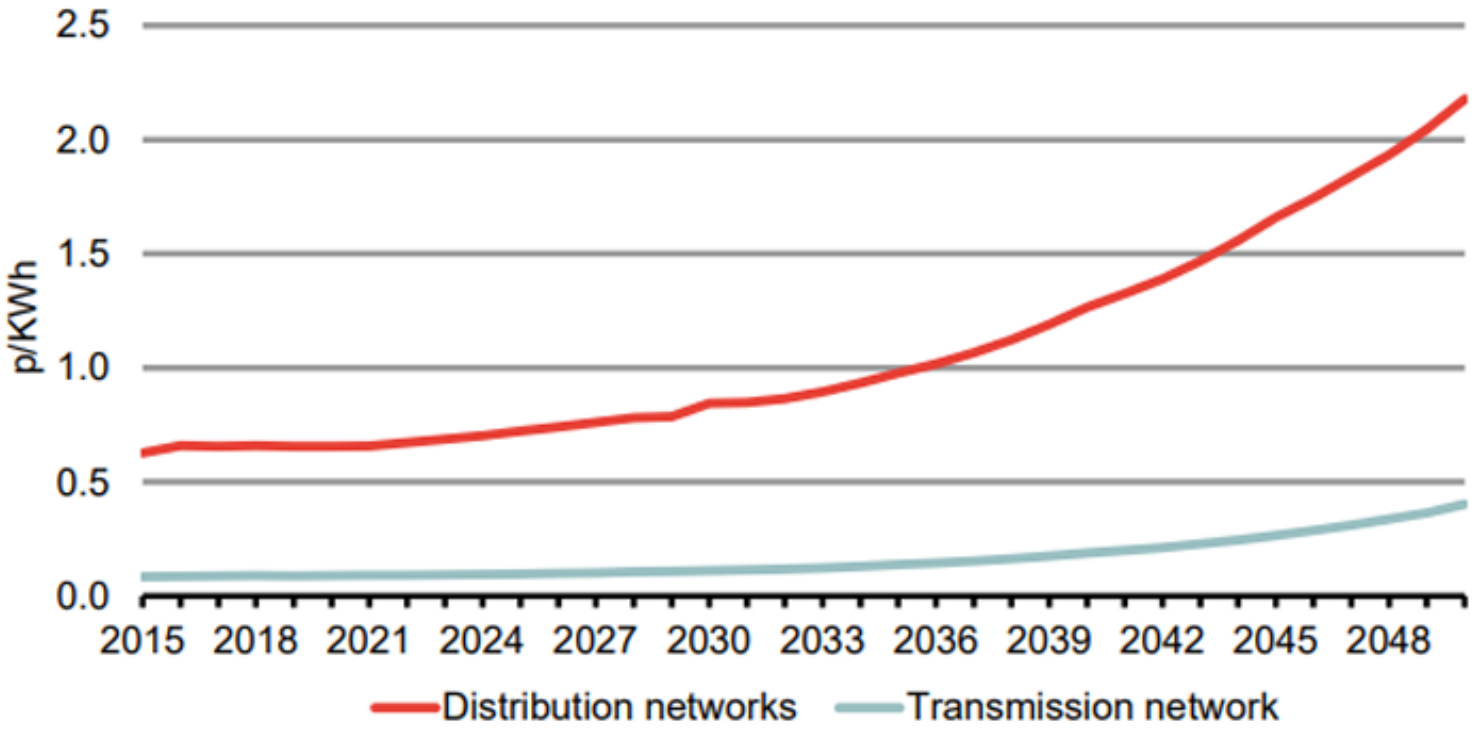


The future of the gas grid is a major regulatory issue

1. As people switch or are switched away from gas, the charges to fund the gas grid will sit across an ever-decreasing number of customers, putting up their bills.
2. Based on the current regulatory model and assuming no further capital investment beyond the current price control period ending in 2026, the gas network would be valued from a regulatory perspective at around £4 billion in 2050, even though it may have very few customers.
3. Thirdly, there will be significant costs associated with the physical decommissioning of the grid, to make it safe.

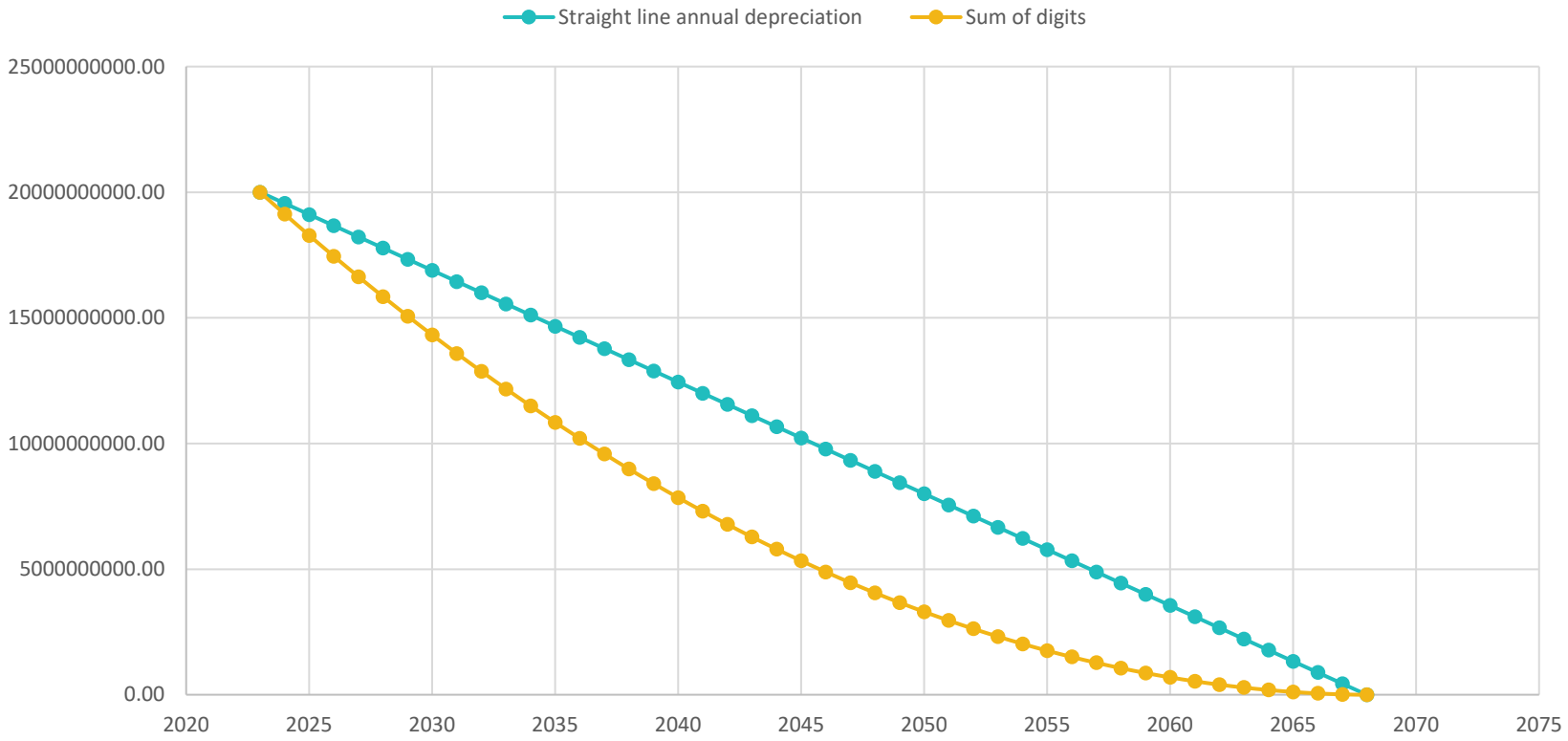
It is also a major climate, consumer and energy security issue

Figure 2. Distribution and transmission tariffs (low gas)



Source: Climate Change Committee. (2016, October). Future Regulation of the Gas Grid (Frontier Economics).

Is 45 year depreciation appropriate?



Does private ownerhip work during an active/regulatory led wind-down?

Decomissioning costs may be significant

- Ranging from £8 to £136 billion
  - A higher number is better for the network operators, making decommissioning look harder and all other options for heating look more expensive.
  - This will become a lobbying line.
- A great innovation/research project would

3 options seem possible

1. Business-as-usual wind-down with accelerated depreciation
2. Evolutionary regulation
3. Nationalisation and planned wind-down

Policy recommendations

1. Take steps to gain a thorough understanding of the required process and costs of decommissioning the gas grid in order for this risk to be properly considered.
2. Ofgem and the UK Department for Energy Security and Net Zero should work together with other parties to develop a plan which equitably allocates the multi-billion-pound risks associated with stranded gas assets and decommissioning, considering the value of accelerated depreciation, evolutionary regulation and renationalisation.
3. Consider whether the Iron Mains Risk Reduction Programme continues to offer consumers value for money as a major capital investment programme — and if not, intervene as soon as is practicable.
4. Ensure that approaches to heat and local area energy planning, and wider clean heating policy, are coordinated with the issue of gas grid decommissioning and that consumer protection is central.

Conclusions

- UK gas grid decommissioning is an inevitability.
  - Stranded asset risk
  - Decommissioning cost risk
- Fundamentally it's an issue about equity and sharing costs appropriately.
- I forsee initially accelerated depreciation and if things move quickly re-nationalisation but not clear this will happen in my lifetime.

The Future of Gas Network Planning

California's Approach to Long-term Gas System Planning

GRIDWORKS

October 2023

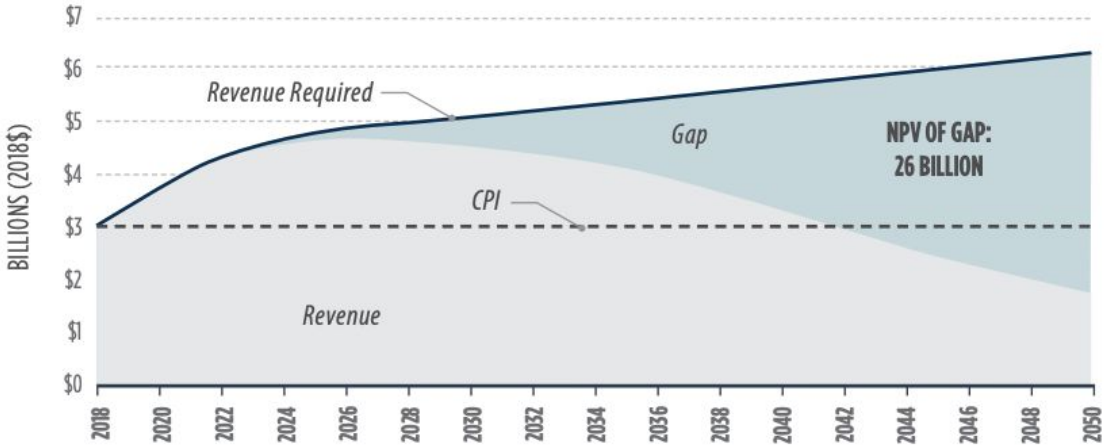
Decarbonization of our economy is within reach, and more important than ever.

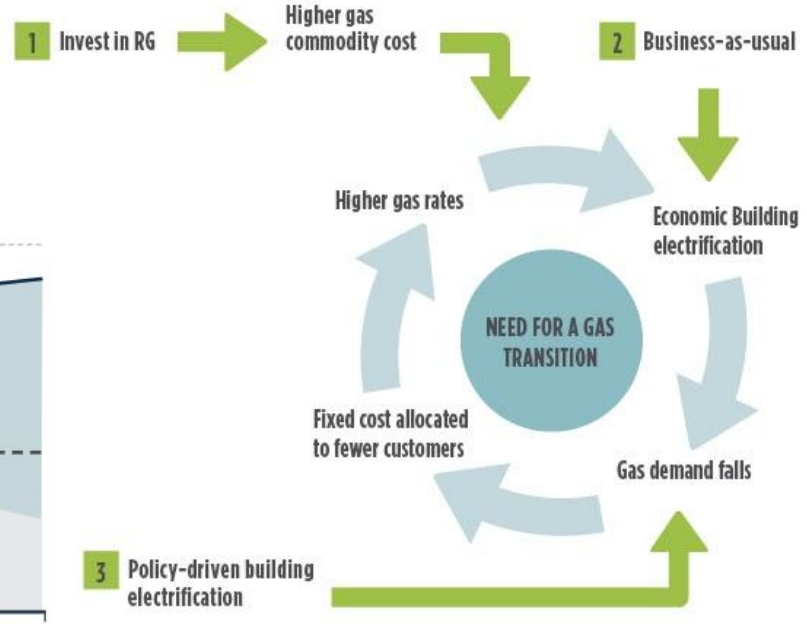
We are a non-profit that convenes, educates, and empowers stakeholders working to decarbonize our economy.

GRIDWORKS

Where We Began

Problem Statement: Growing spending coupled with declining usage increase gas rates for customers and increase stranded asset risk for shareholders





Source: California's Gas System in Transition (link)

CPUC Long-Term Gas Planning Rulemaking (link)

Track 2 - Long-Term System Planning

Jan. 2022	Spring 2022	Summer 2022	Dec. 2022	Jan. 2023	Aug. 2023	Sept. 2023
Track 2 Scoping Memo	**Public Workshops** (link and link)	**Parties submitted comments**	**Decision adopted**	**Staff released proposal**	**Phase 2 Scoping Memo released**	**Decision adopted**
Established overarching question for the proceeding: How should the Commission determine the **appropriate gas infrastructure portfolio** for utilities **given the state's GHG reduction laws and the utilities' statutory obligation to serve** customers within their territories?	Subject-matter experts and utility reps presented on: utility pilots, R&D efforts, equity considerations, role of natural gas and related infrastructure in a largely decarbonized future, continued need for gas storage, long-term gas system planning, obligation to serve.	Questions posed to parties focused on: criteria and processes for **repair, replacement, derating, and/or decommissioning of transmission and/or distribution lines**; role of existing **gas storage facilities**; **obligation to serve**; how to consider **industrial** and **hard-to-electrify sectors**; and **zonal electrification.**	Requires gas utilities to file a special application prior to constructing gas infrastructure projects in excess of **$75 million and/or are within proximity of sensitive areas**; Requires gas corporations to **file a "Report of Planned Gas Investments" annually**	Asks what factors should be considered to determine whether **gas distribution infrastructure should be maintained or retired.** Divides all areas served by gas distribution infrastructure into **five tranches to prioritize communities for pipeline decommissioning or maintenance** of existing pipelines.	**Opened new phase related to gas transmission and storage.** Deferred questions related to **distribution pipelines, cost control and cost allocation issues, data needs, & long-term gas planning** to April 2024 or later.	Adopts review criteria for gas utility applications proposing to **repair or replace transmission pipelines;** Adopts criteria to determine when declining demand can enable **transmission pipelines** to be **derated or decommissioned**;

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The Current Hypothesis: A Multi-pronged Solution Set

Limit Gas System Expansion

All-electric new construction

State and Local Governments

- California building code now considers heat pump to be “baseline” technology
- Local gov’s passed “reach” codes

All-Electric Upon Burnout

Only electric appliances available for purchase

Air Quality Management Districts

- Water heaters and furnaces sold in Bay Area cannot emit NOx as of 2027 and 2029 respectively

Avoid Major Replacement Projects

Electrification, thermal energy, and de-rating

Regulatory Commission and Utilities

- California Energy Commission Research Project
- Small-scale pilots from PG&E
- Recent CPUC Decision

Fund Early Retirement

Financial strategies to pay for remaining assets

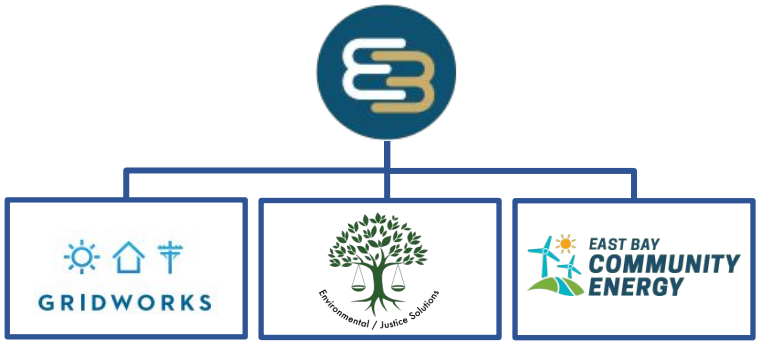
Legislature and Regulatory Commision

- Theoretical consideration of: securitization, accelerated depreciation, deduced return on equity, and disallowing recovery

California Energy Commission Research Project (link)

Key Question: How can targeted building electrification paired with tactical gas decommissioning provide net gas system savings while promoting equity and meeting the needs of local communities?

Project Team

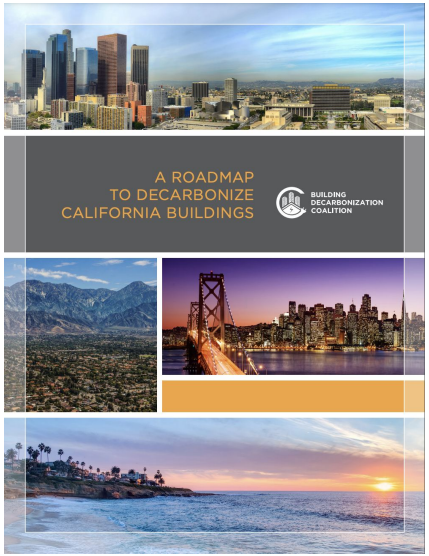


Project Partner: PG&E*

*PG&E has been a major leader in this space. Click here for summary of some of their recent work.

Project Objective	Status
Develop a replicable framework to identify sites where targeted building electrification combined with tactical gas decommissioning could support gas system cost savings	**Complete**
Using that framework, **identify three proposed pilot sites**, including at least one within a disadvantaged community	**Complete**
Engage local communities in sharing their perspectives and priorities	**Nearing Completion**
Produce deployment plans for the recommended pilot sites	**In Progress**
Analyze cost-effectiveness of gas decommissioning	**Nearing Completion**

Gridworks' Contributions to Building Decarbonization and Gas Planning in CA



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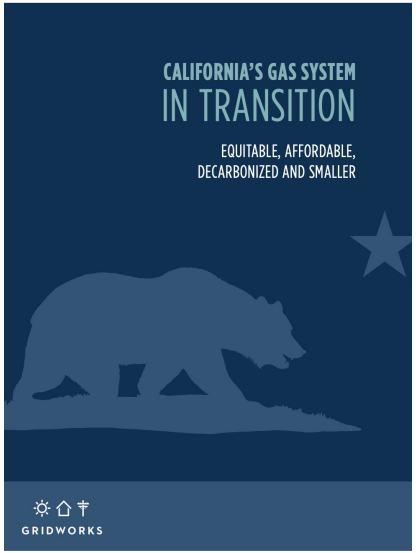

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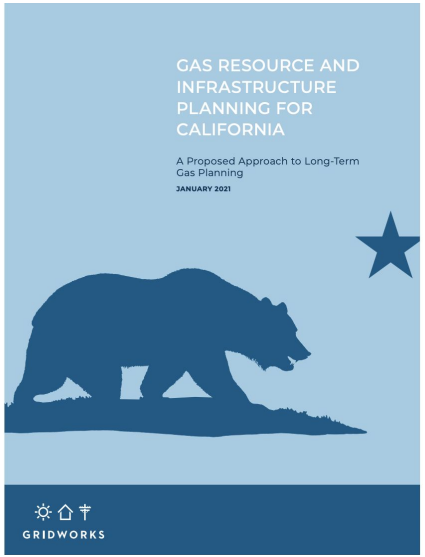

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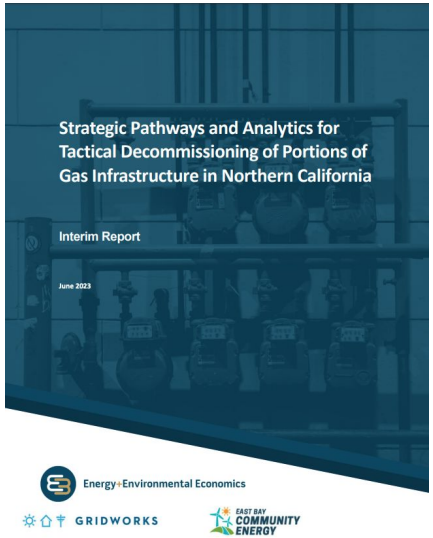
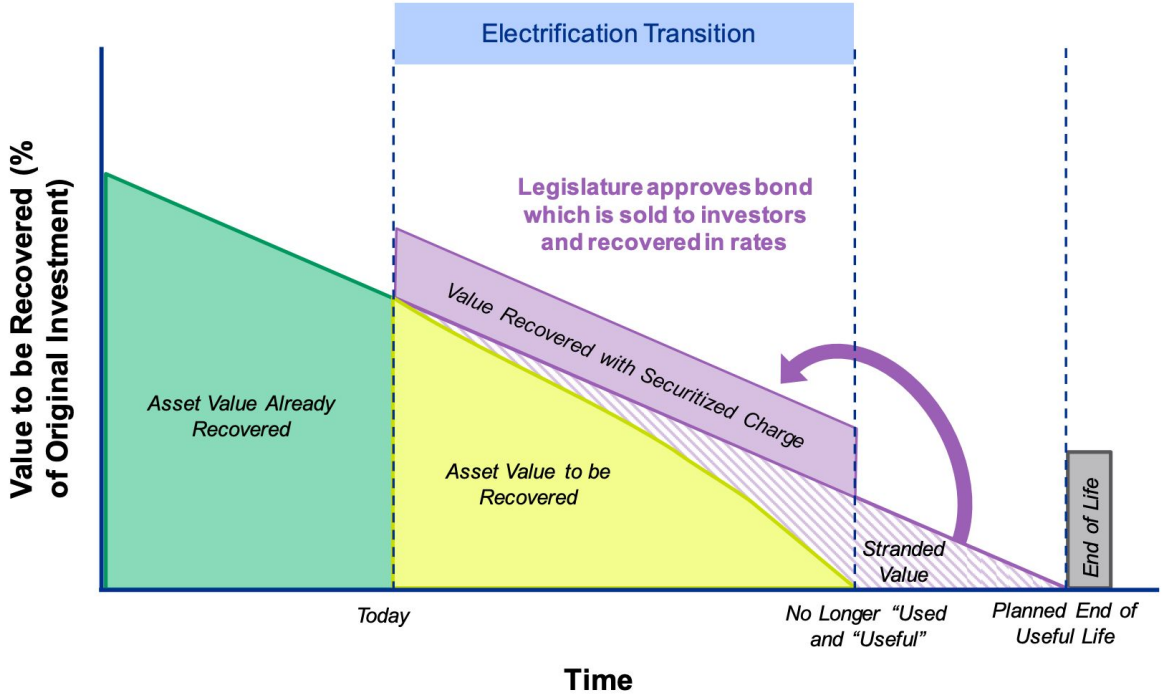


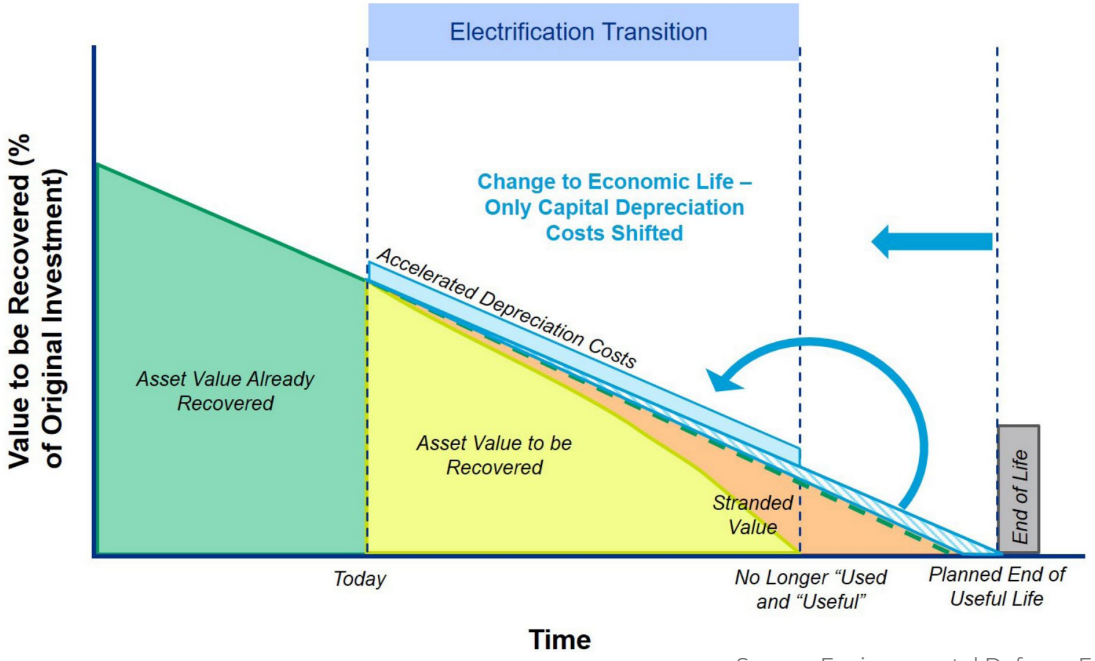
Report Link

Financial Strategies: Securitization



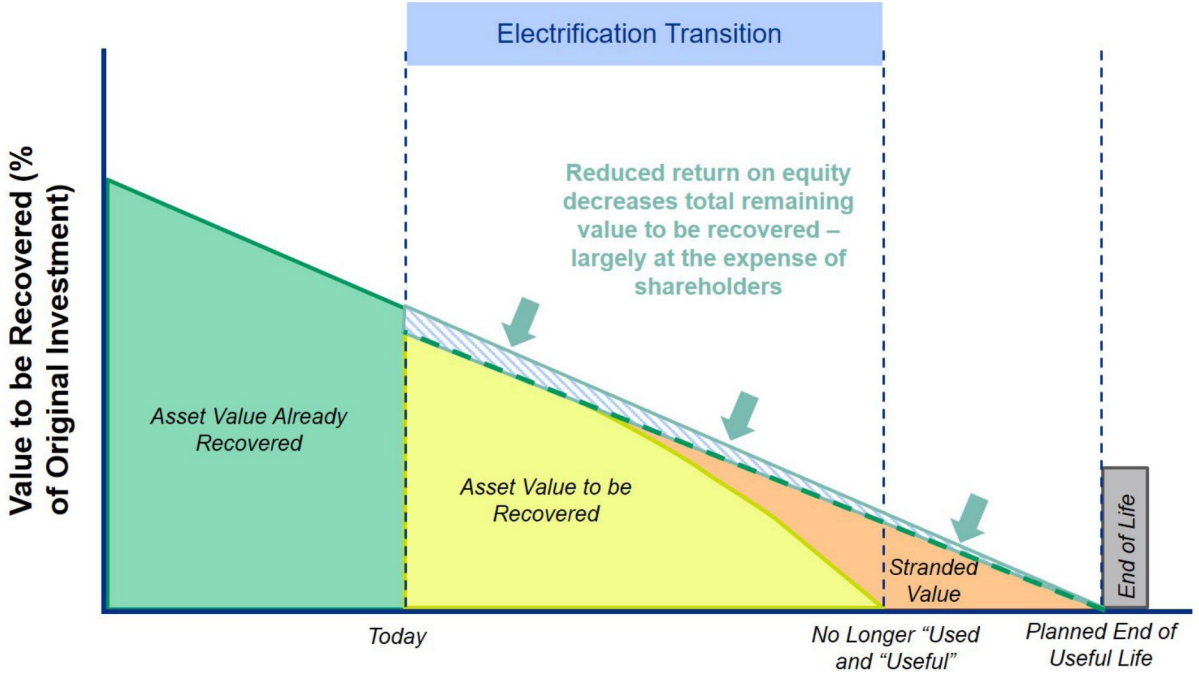
Source: Environmental Defense Fund: Managing the Transition (link)

Financial Strategies: Accelerated Depreciation



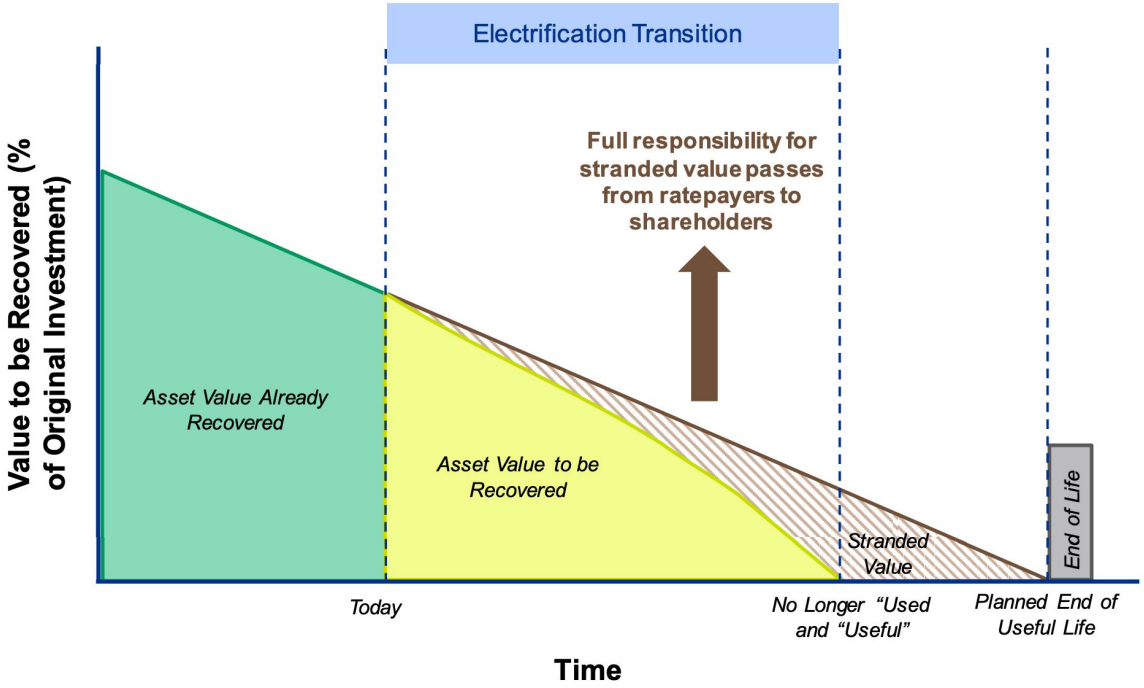
Source: Environmental Defense Fund: Managing the Transition (link)

Financial Strategies: Reduced Return on Equity



Source: Environmental Defense Fund: Managing the Transition (link)

Financial Strategies: Disallow Recovery



Source: Environmental Defense Fund: Managing the Transition (link)

HOW CAN WE HELP?

CLAIRE HALBROOK

chalbrook@gridworks.org

www.gridworks.org

GRIDWORKS

Getting off gas: Why, how and who should pay

ECA Webinar, The future of gas network planning

Tony Wood

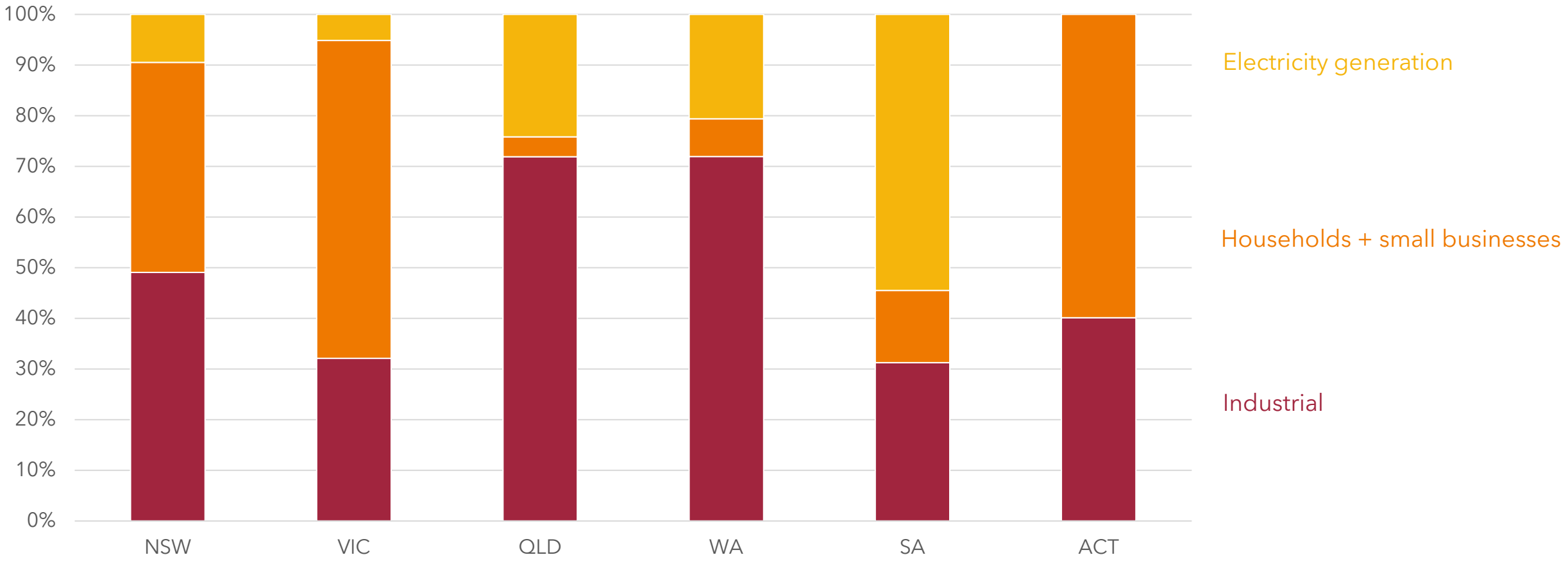
Program Director

Date: 27 October 2023

GRATTAN Institute

Different priorities for different states

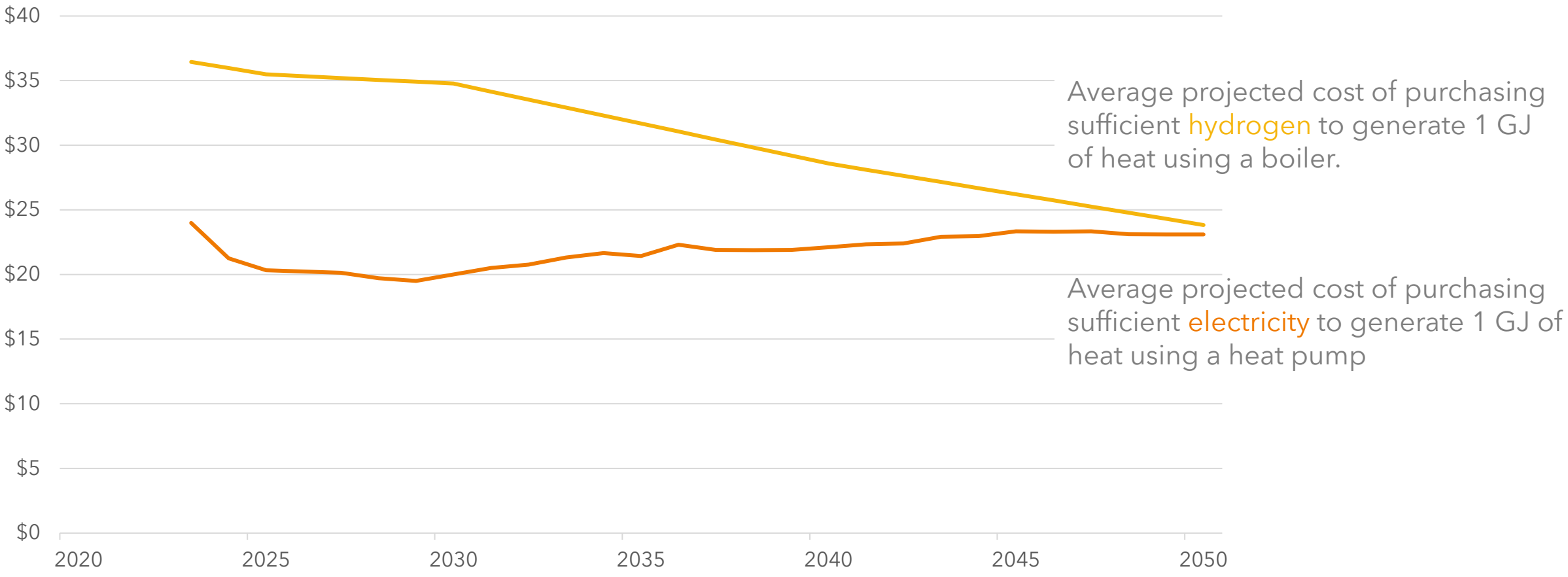
Proportion of gas use in 2021



Notes: Excluding LPG. No comparable data are available for NT use. `Industrial' includes mining and mineral processing.

Sources: AER, AEMO, ACT Government.

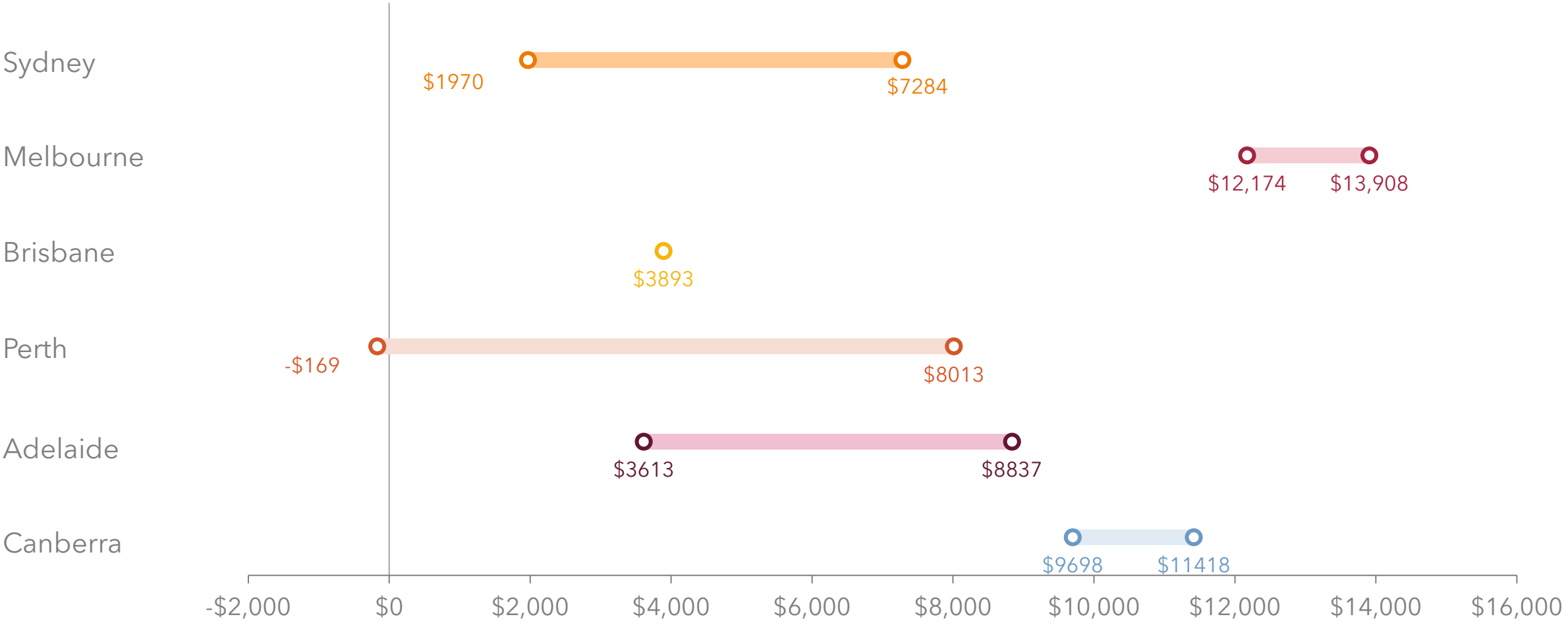
Electricity is cheaper than hydrogen for the same job



Source: Grattan Analysis. See Appendix B.

Switching will save early movers money on energy bills

Estimated household savings range from all-electric homes ($ over 10 years)

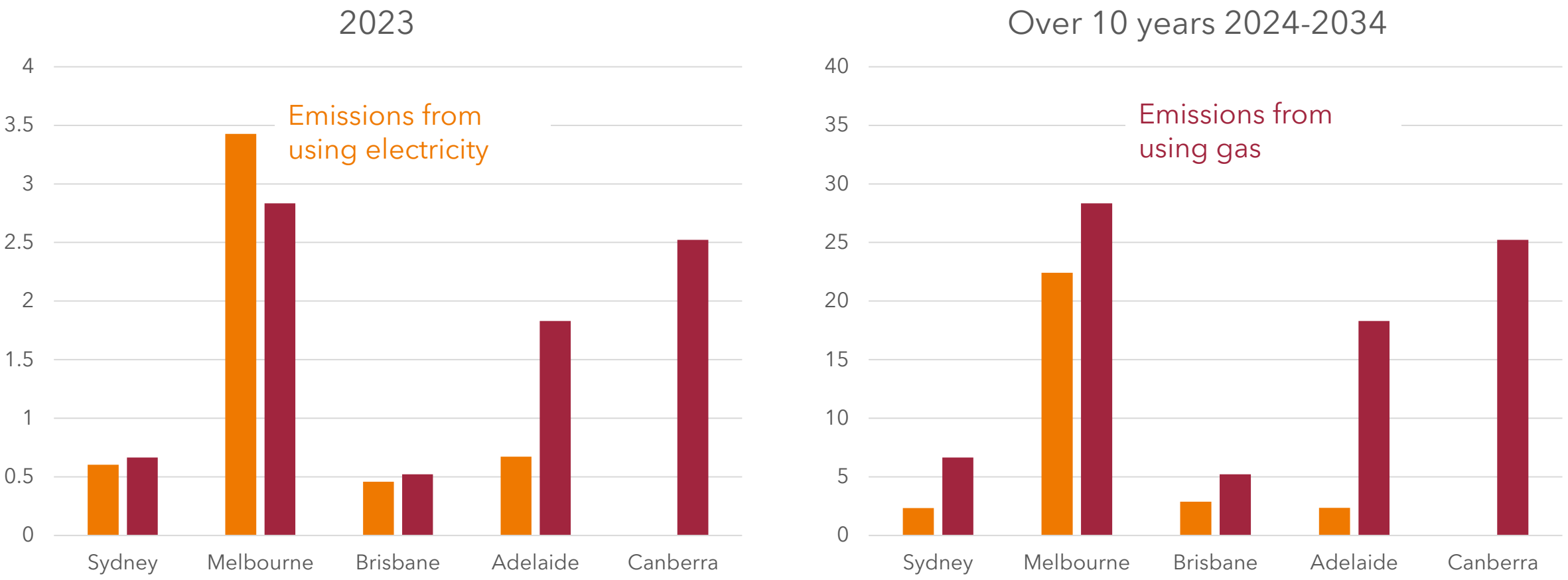


Source: Grattan analysis. See Appendix B

Greenhouse gas emissions from heating, cooking, and hot water are higher in dual-fuel homes than all-electric homes

GRATTAN Institute

Emissions per household (tonnes of carbon-dioxide-equivalent)

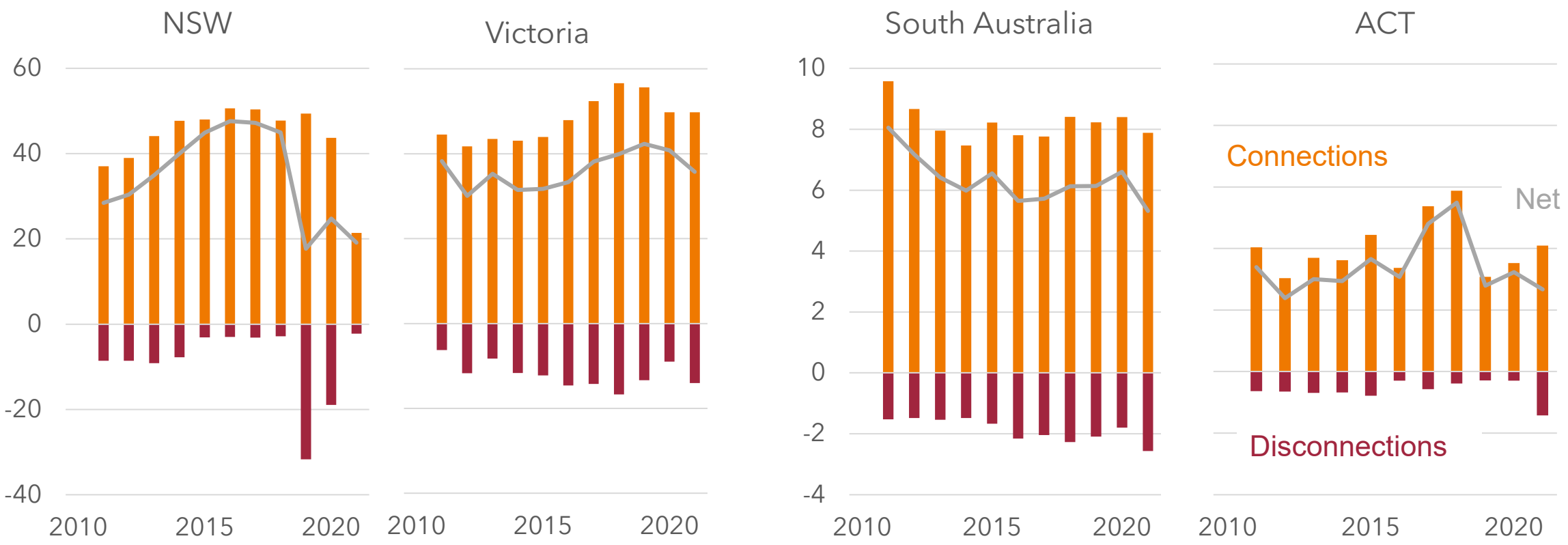


Notes: Dual-fuel homes have gas water heaters and cook-tops. All-electric homes have heat-pump water heaters and induction cooking. Sydney homes assumed to have no heating. Melbourne and Canberra dual-fuel homes assumed to have ducted gas heating, all-electric homes to use reverse-cycle air-conditioning for heating. Adelaide dual-fuel homes have gas furnace heating, electric homes have reverse-cycle air-conditioning.
Source: Grattan calculations using Australia's emissions Projections (DCCEEW 2022) and Australian emissions factors (DCCEEW 2023).

Stop digging

GRATTAN Institute

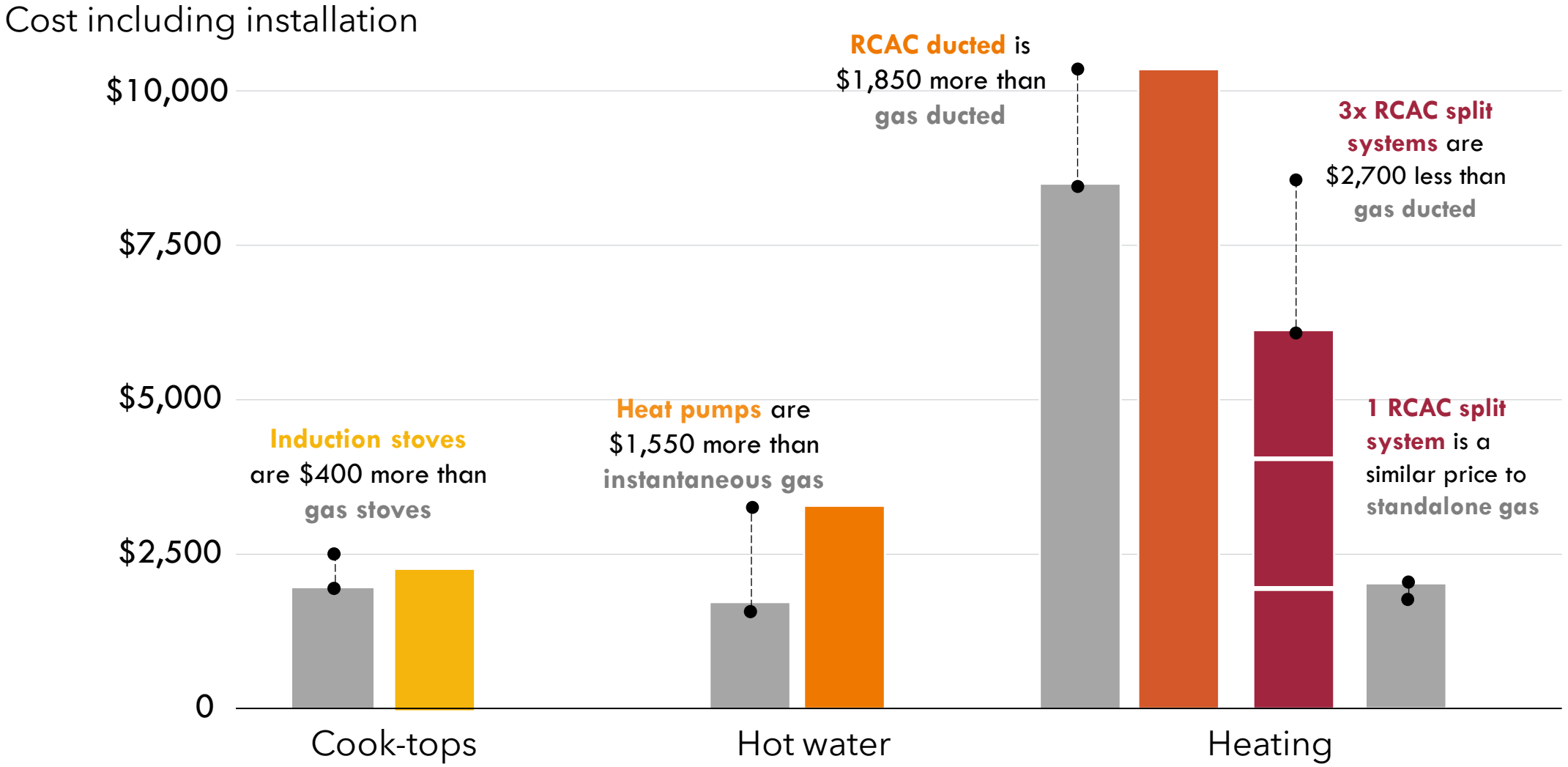
Residential gas connections ('000s)



Notes: Connections in Albury NSW are included in the Victorian totals. Methodology used to collect data in NSW changed in 2019.

Source: Australian Energy Regulator data

Higher upfront costs requires financial products



Notes: RCAC is a reverse-cycle air-conditioner.
Sources: Grattan analysis of retail data, ACIL Allen (2020)

Widespread electrification means fewer users

GRATTAN Institute

How should networks be paid for as user numbers decline?

Option 1:

- Users don't pay more

Potential outcomes:

- Financial difficulties for network businesses
- Unsafe network operations

Worst case scenario:

- Bankrupt network business asking to be bailed out

Option 2:

- Users pay more

Potential outcomes:

- Price-sensitive users switch to electric
- Remaining users pay more

Worst case scenario:

- Network death spiral

Accelerated depreciation is a temporary solution

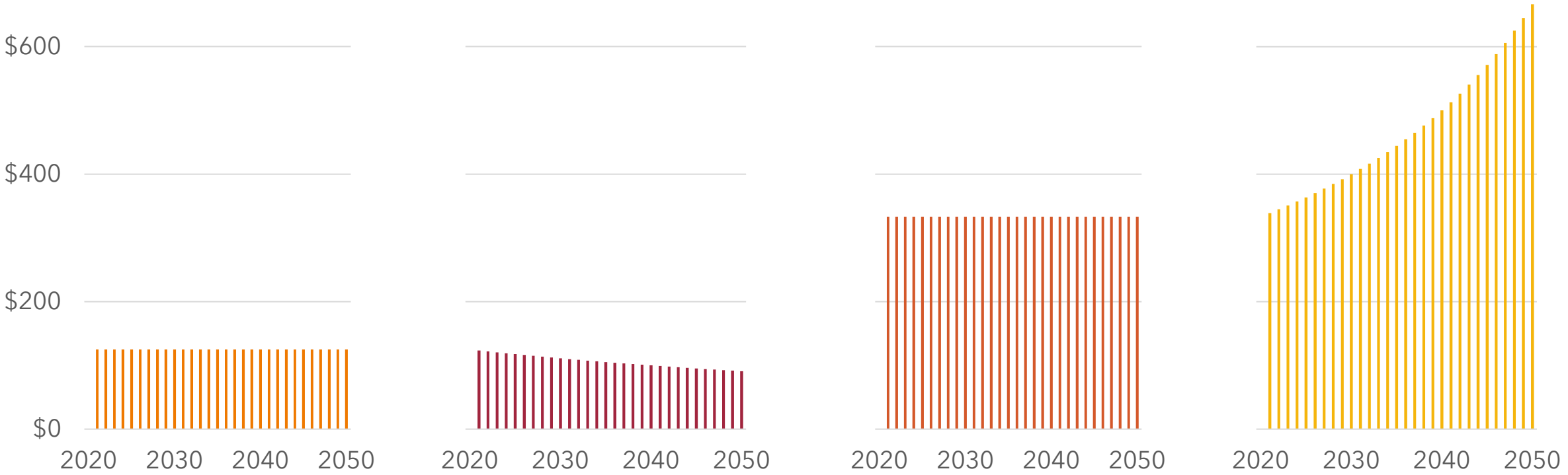
GRATTAN Institute

(A) Full depreciation, static customer base
2020: $125/yr
2050: $125/yr

(B) Full depreciation, growing customer base
2020: $123/yr
2050: $91/yr

(C) Accelerated depreciation, static customer base
2020: $333/yr
2050: $333/yr

(D) Accelerated depreciation, shrinking customer base
2020: $339/yr
2050: $667yr



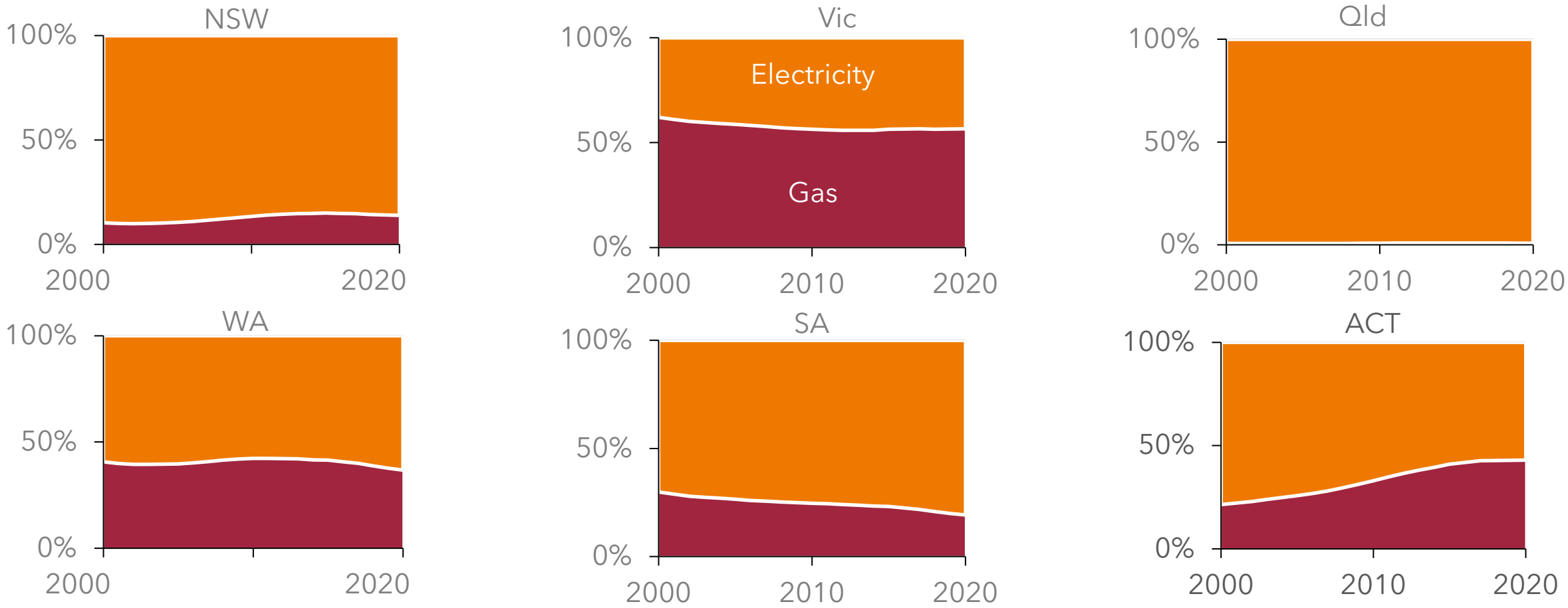
Illustrative example of how depreciation of a $1 million asset can be turned into an annualised cost for varying customer bases and asset lifespans
(a) Depreciation over 80 years, fixed customer base of 100 customers
(b) Depreciation over 80 years, growing customer base (100 customers grows to 200 customers over 80 years)
(c) Depreciation over 30 years, fixed customer base of 100 customers
(d) Depreciation over 30 years, shrinking customer base (100 customers shrinks to 50 across 30 years)

Key/contentious issues

- Electrification is more expensive for consumers.
- Emissions from homes and small businesses should not be a priority.
- Switching will not reduce emissions.
- It's too early to make a call on electricity versus hydrogen or biomethane.
- A second energy supply provides greater comfort.
- The gas network will have value for energy storage.
- Transition issues
  - Better regulate disconnections and abolishments
  - Who pays for the stranded risk?
  - Require networks to plan for a safe shrinking network
  - Manage peak electricity demand to reduce electricity network costs
  - Blueprint for market reform
- Communications and consumer engagement will be critical.

Electric heating is more popular than gas in most states

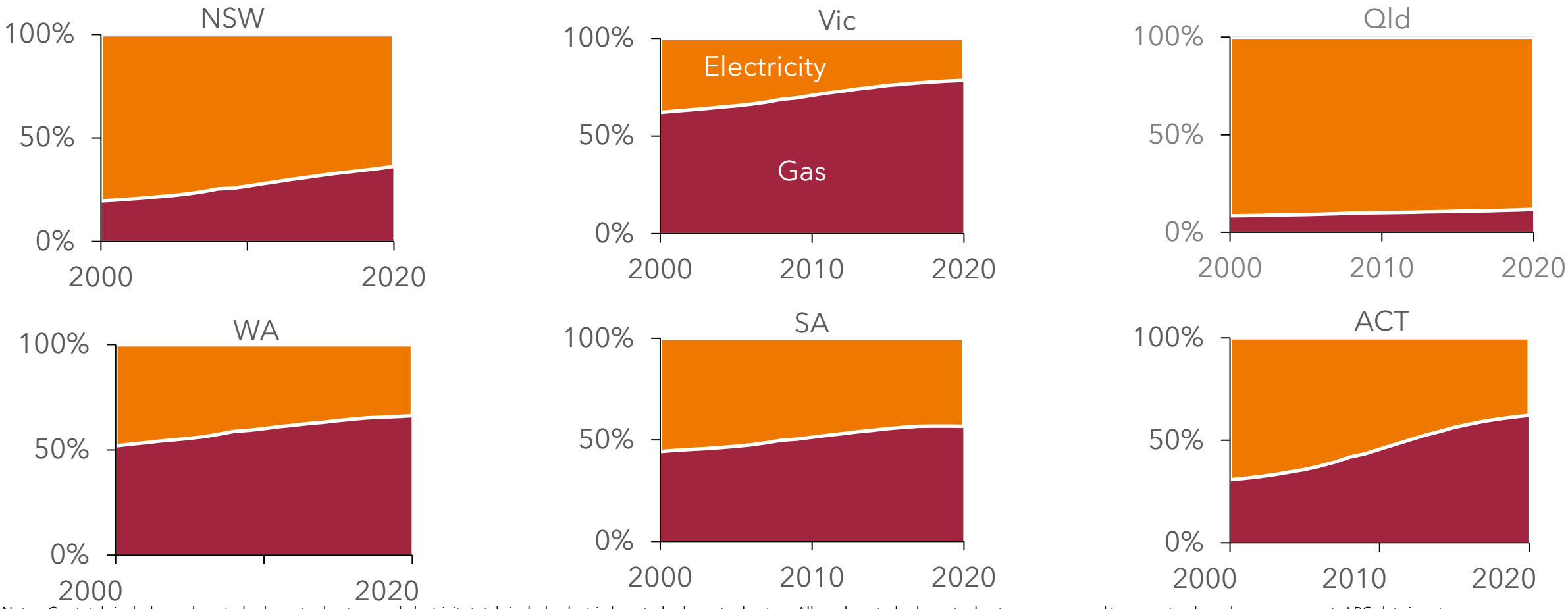
Proportion of households using gas and electricity for space heating



Source: Grattan analysis of Energy Consult (2021).

Gas water heating has become more popular since 2000

Proportion of households using gas and electricity for water heating



Notes: Gas totals include gas-boosted solar water-heaters, and electricity totals include electric-boosted solar water-heaters. All gas-boosted solar water heaters are assumed to use natural gas, because separate LPG data is not available. In Queensland and WA, the number of solar water heaters boosted by LPG may be significant, and a larger number of households use LPG for water-heating.

Source: Grattan analysis of Energy Consult (2021).

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