Institute for Energy Economics and Financial Analysis

Insights on the electrification transition

Seizing opportunities and managing risks

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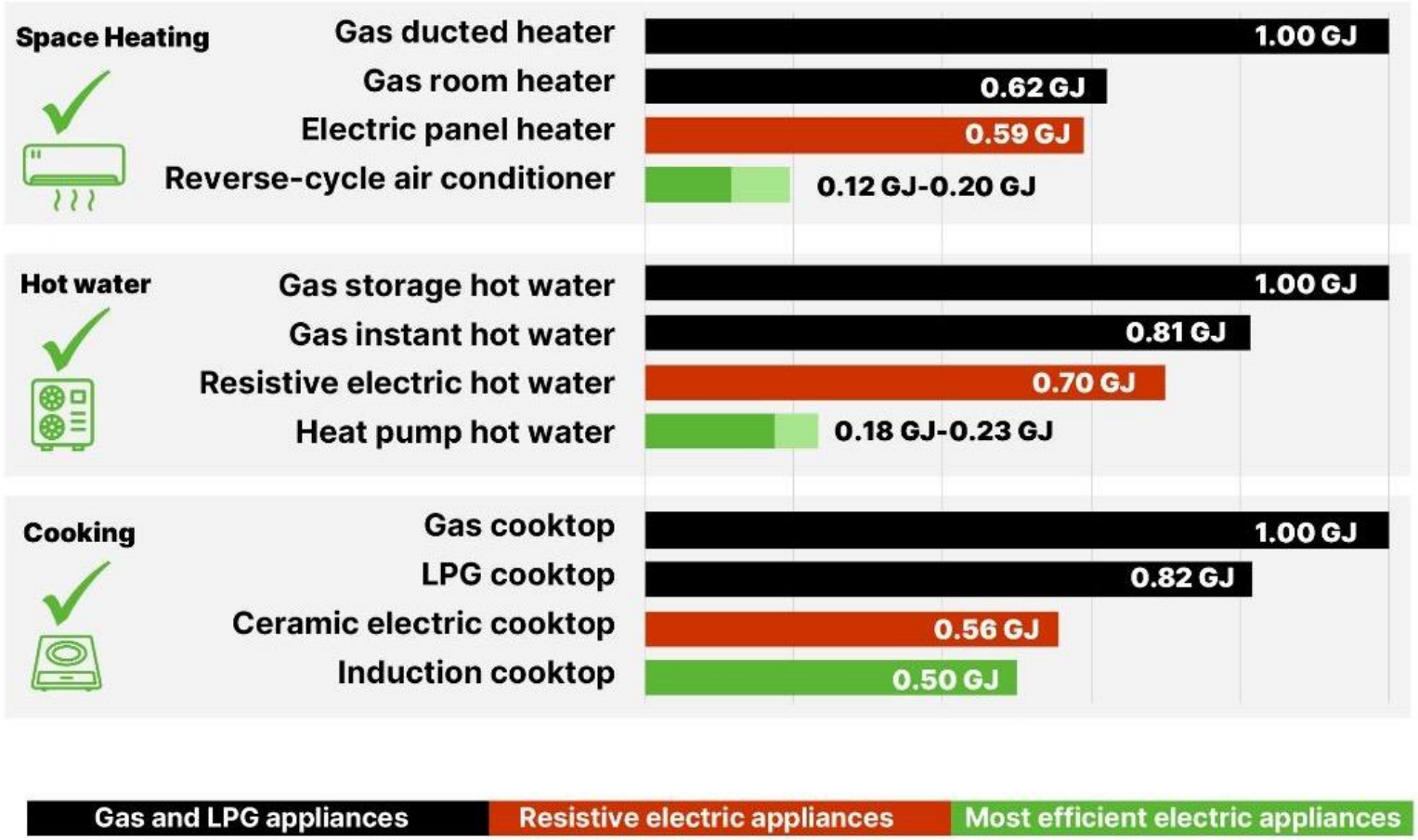
1 Size of the opportunity

Efficient electric appliances consume a fraction of the energy of inefficient appliances



April 2024

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Appliance standards are key to driving the transition to efficient electric homes

- *The continued installation of gas and resistive electric appliances is locking Australian consumers into $3.4 billion in unnecessary costs each year.*
- *Improving minimum energy performance standards for space heating, hot water and cooking appliances via the Greenhouse and Energy Minimum Standards (GEMS) Act could mitigate these costs and help manage the electrification transition.*
- *Improved standards could be complemented by other policies that make efficient electric appliances even more accessible and profitable to consumers.*

Australians use a diverse mix of technologies to keep their homes comfortable, supply their hot water, and cook their meals.

For example, in regions like Victoria and the Australian Capital Territory (ACT), fossil gas has historically provided a cheap source of energy for winter heating, and it still features heavily in the energy mix.

Resistive electric appliances such as radiant heaters, electric storage water heaters and ceramic cooktops are also common in many states – particularly in Tasmania, which has had longstanding access to abundant hydroelectricity.

However, several fundamental shifts are occurring in the way we use energy in the household.

Southern states may be facing excess gas demand events due to Bass Strait gas production declining faster than demand. Gas no longer offers the cost advantage it once did prior to Australia's entry into the global LNG market. In recent years the consumer price index for gas and other household fuels has increased faster than for electricity.

Simultaneously, technologies have advanced to the point where modern electric appliances are widely available that use a fraction of the energy of either gas appliances or resistive electric appliances. The graph below shows the energy required by different appliances to replace one gigajoule (GJ) of energy consumed by the least efficient gas appliance in each category.

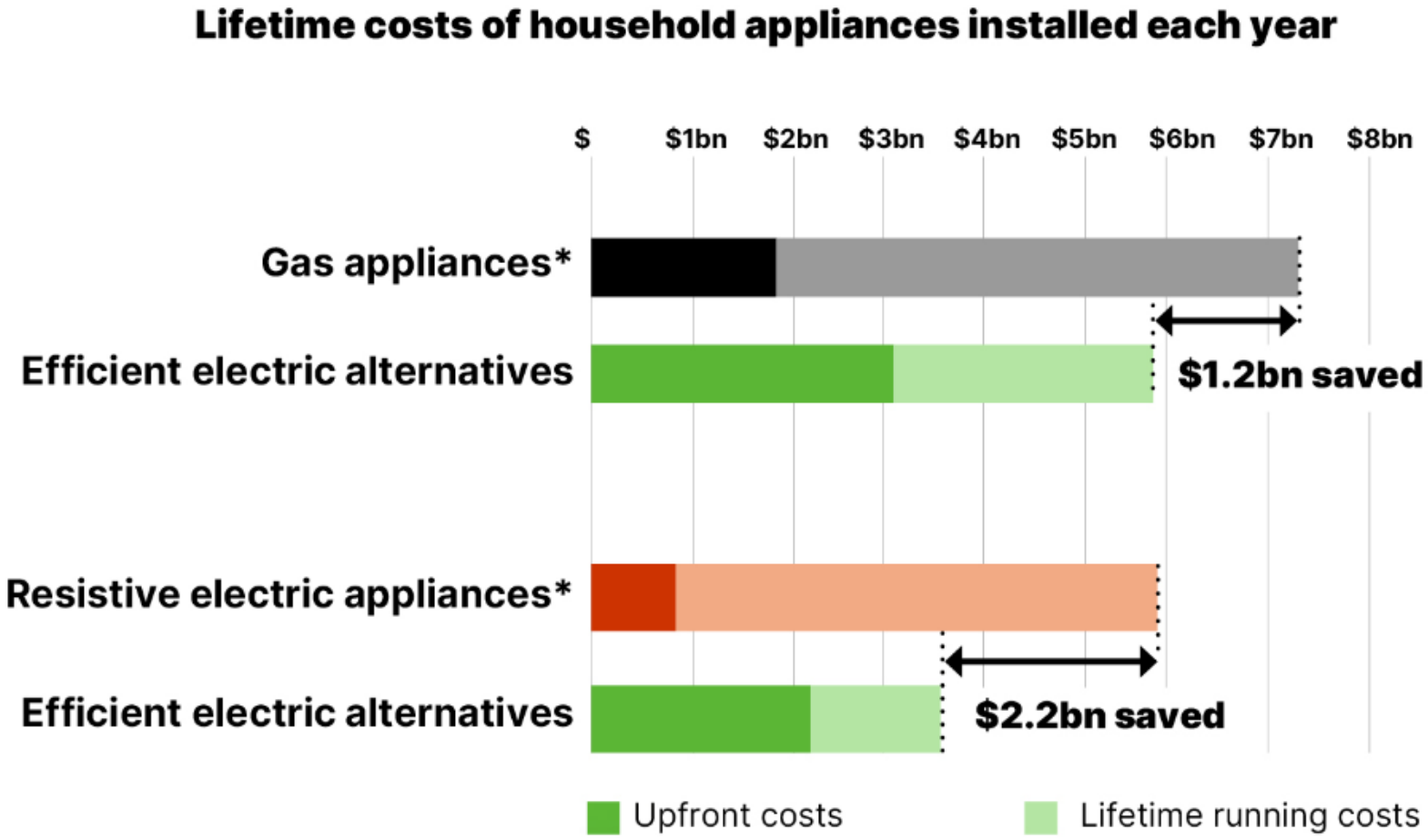
Appliance standards are key to driving the transition to efficient electric homes ieefa.org | 1

Source: IEEFA

Sources for appliance efficiencies outlined in IEEFA – Managing the Transition to All-Electric Homes Technical Appendix (p.24).

IEEFA

Australian consumers lock in $3.4 billion each year they buy inefficient appliances

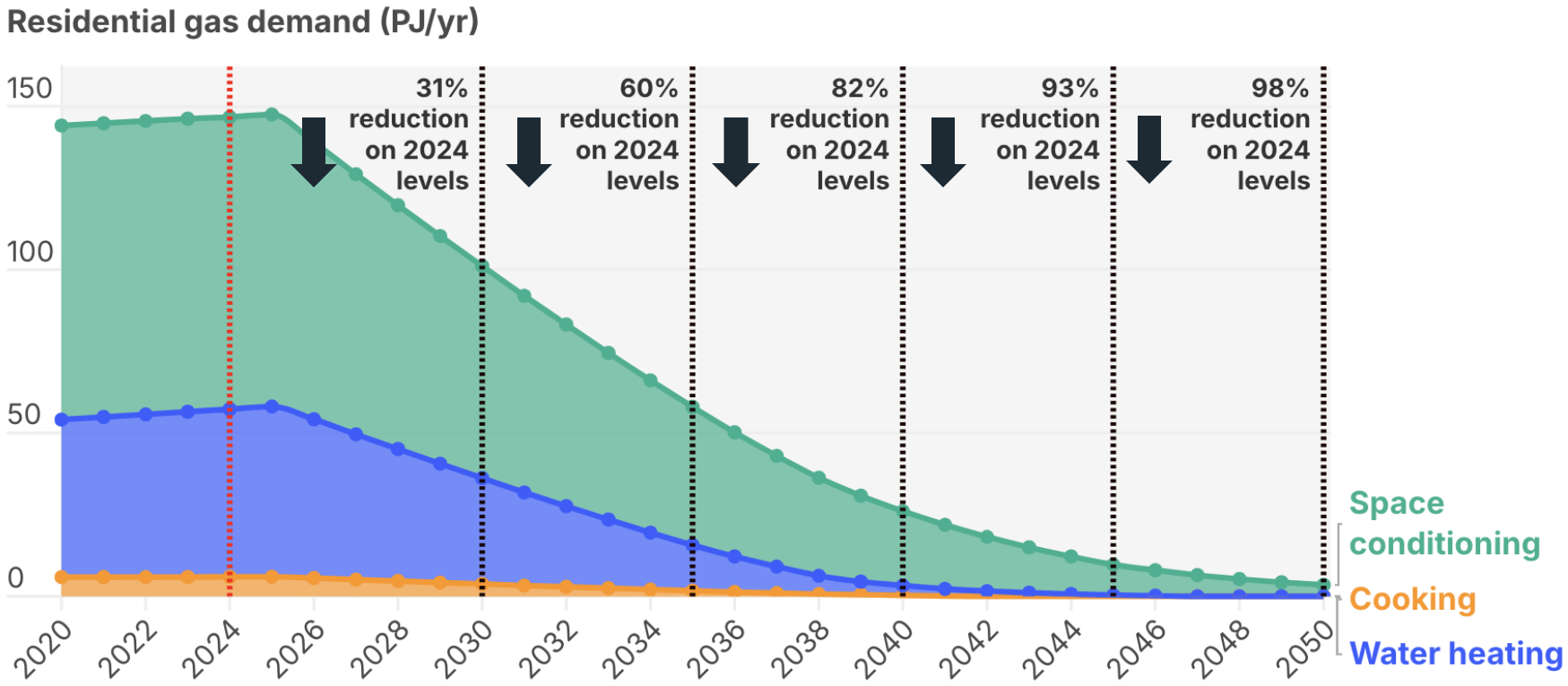


Source: IEEFA

*Gas appliances include gas space heaters, hot water systems and cooktops. Resistive electric appliances include resistive electric heaters and hot water systems

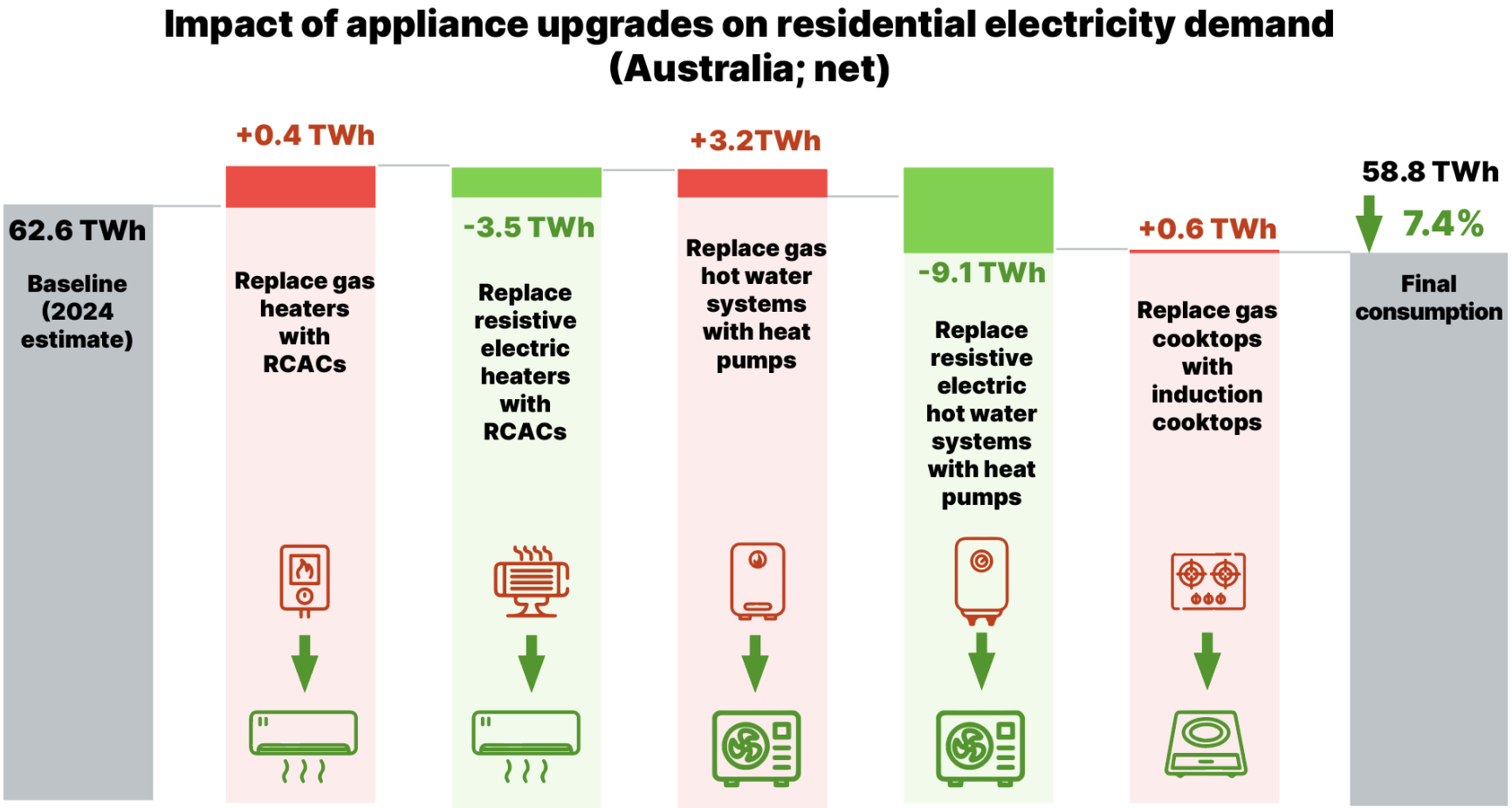
If all new appliances were electric…

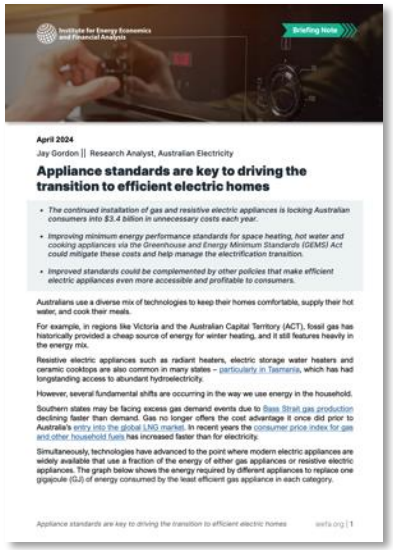
Residential gas demand in Australia if appliances are electrified at end-of-life



Source: IEEFA

Upgrading other inefficient appliances can complement electrification





Source: IEEFA

2 Managing the risks

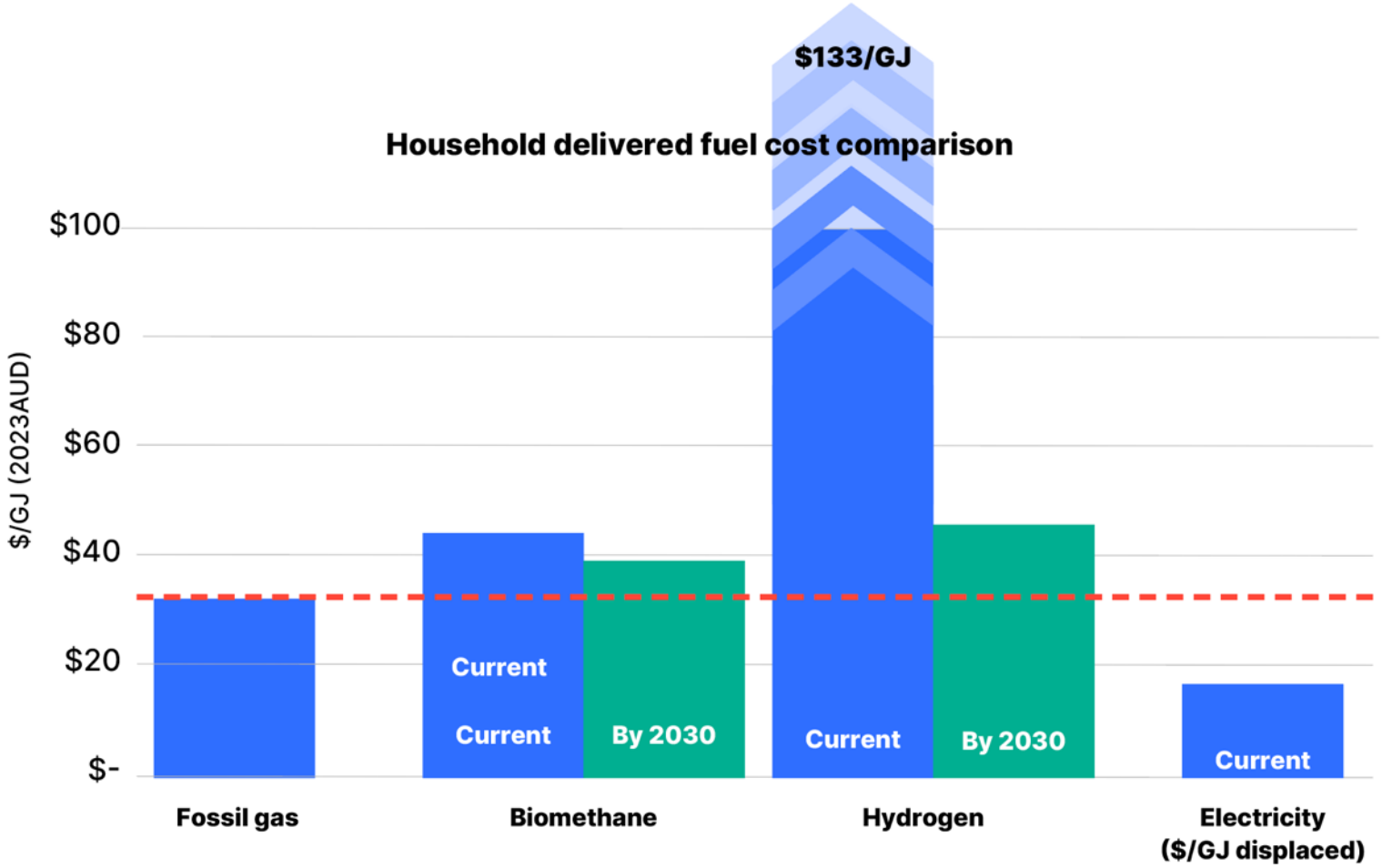
‘Renewable gas’ is not a viable option for households

Green hydrogen:

- ✓ Cost-effective for **iron**, **ammonia** production
- ✗ Expensive and difficult for **buildings**

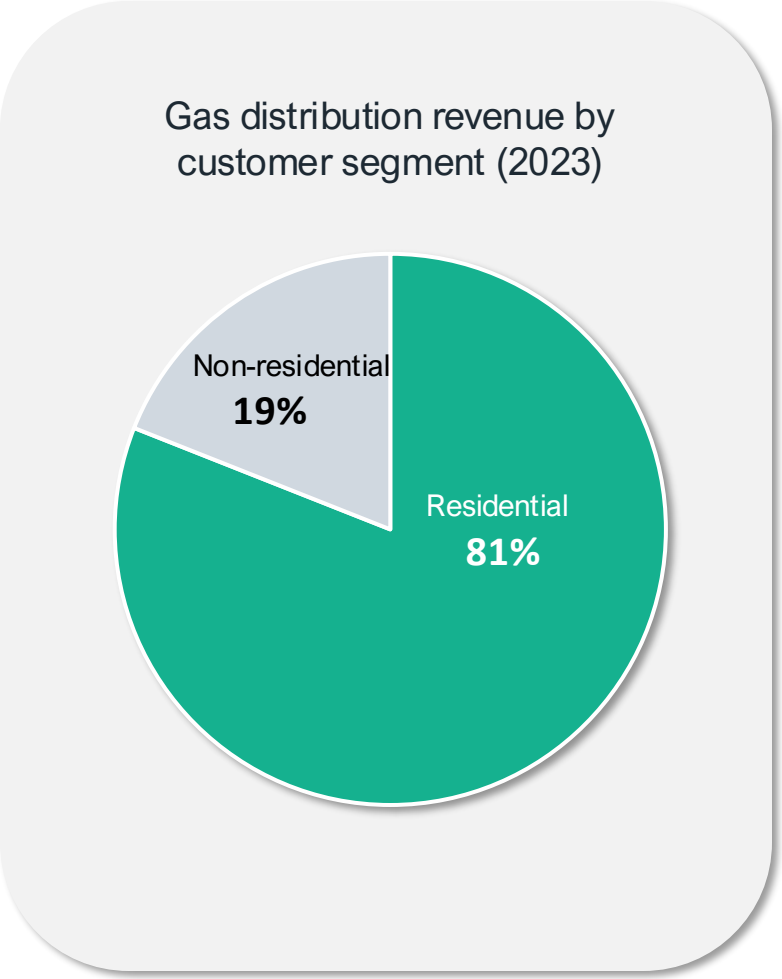
Biomethane:

- ✓ Useful in ‘**hard to abate**’ cases
- ✗ Very **supply constrained**

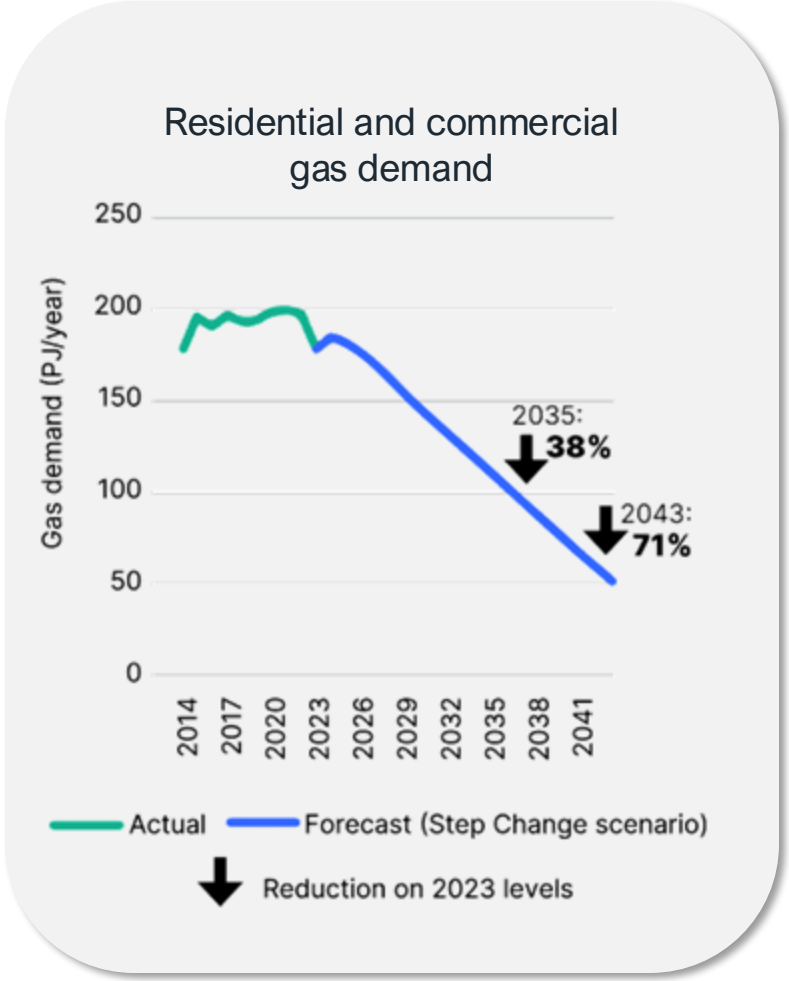


Source: IEEFA analysis based on St Vincent de Paul; retail energy plans; AER; Future Fuels CRC and DCCEEW. Based on original Victorian analysis and extended to represent all states/territories except NT.

Gas distribution networks are exposed to stranded asset risks



Source: Analysis of RIN responses for fully-regulated gas networks



Source: 2024 GSOO data from AEMO forecasting portal (excludes WA)

> *we can see the potential for **more competition in the future** (as renewable energy becomes less expensive.)"*
> AGN (SA)

> ***significant stranding risks** could emerge by 2040"*
> AusNet

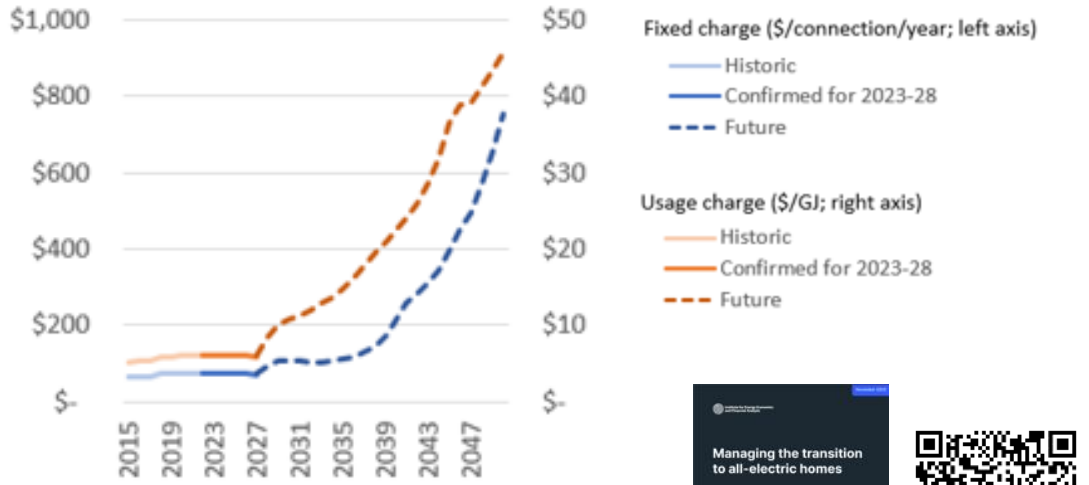
> *the end result of a death spiral demand reduction is the loss of whatever assets have not been recovered; referred to as **economic asset stranding**"*
> AGN (Albury/Victoria)

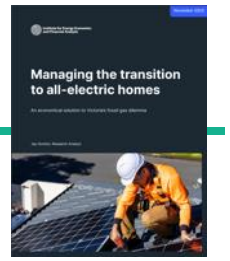
> *Future demand for gas networks is expected to decline due to changing consumer behaviours, and as a direct result of government policy […] This **may lead to our network becoming stranded**"* Jemena

Who pays for stranded assets?

- Increasingly, stranded asset risks are being transferred to **consumers**.
- It is unsustainable for a shrinking consumer base to continue paying down the network

Example – modelling of prices in a Victorian gas network





Source: IEEFA

However regulated gas networks have consistently **over-recovered revenue** – contributing to profits that are nearly double the regulator's allowance.

Source: IEEFA

3 Key Takeaways

Governments can support consumers by…

Supporting better appliance choices

- Ending sales of gas appliances
- Updated appliance standards
- Updated appliance labelling
- Well-designed financing schemes

Combining electrification with efficiency upgrades

- Encourage a shift from resistive electric to efficient appliances
- Prioritise thermal efficiency upgrades alongside electrification

Managing gas stranded asset risks

- Capping future growth of gas networks
- Gas network phase-down plan to mitigate consumer risks
- Better consumer protections around ‘renewable gas’ campaigns

Thank you

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