Institute for Energy Economics and Financial Analysis

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

IEEFA briefing slides

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Household appliances are long-term investments

- Consumers purchase appliances with the expectation they will last around 12-20 years.
- The decision of which appliance to purchase today impacts a household's energy bills for many years to follow
- The point of time at which an appliance wears out is also the most cost-effective time to upgrade

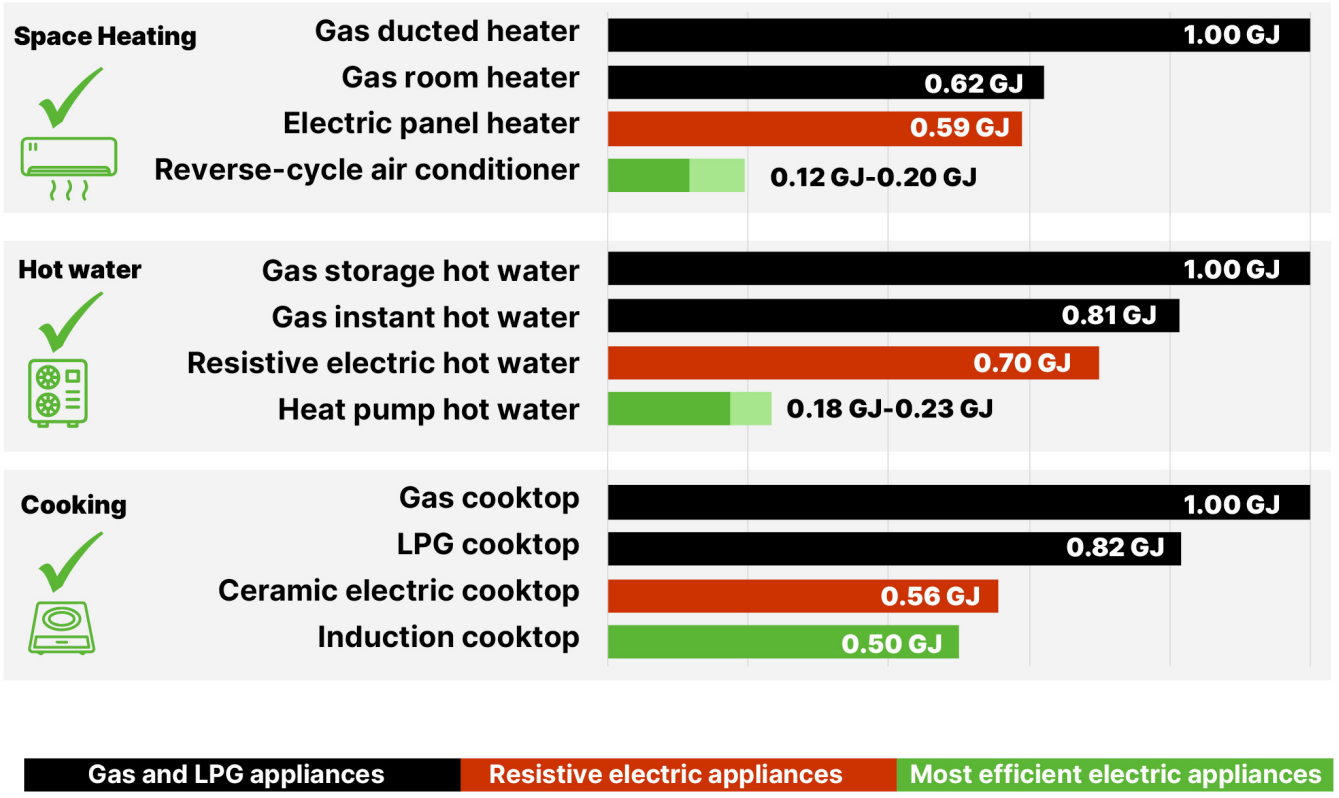
Appliance	Expected lifespan
Gas heater	20 years
Electric panel heater	15 years
Gas instant HWS	15 years
Gas cooktop	14 years
Induction cooktop	14 years
Gas storage HWS	13 years
Reverse-cycle air conditioner	12 years
Heat pump HWS	12 years
Electric storage HWS	12 years

Source: EnergyConsult (largely in alignment with ATO guidelines for rental properties)

There are huge differences in energy consumption by appliance

- Running costs are not only a function of the unit cost of energy
- As heat pumps have become more available and efficient, the gap between the **least-efficient** and **most-efficient** appliances on the market has become very wide.

Relative energy consumption by type of appliance



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

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Our analysis looked at two categories of appliance upgrades:

Electrification of gas appliances:

From	To
Gas ducted heaters →	Reverse-cycle air conditioners
Gas room heaters →	
Gas instant hot water systems →	Heat pump hot water systems
Gas storage hot water systems →	
Gas cooktops →	Induction cooktops
Gas ovens →	Electric ovens

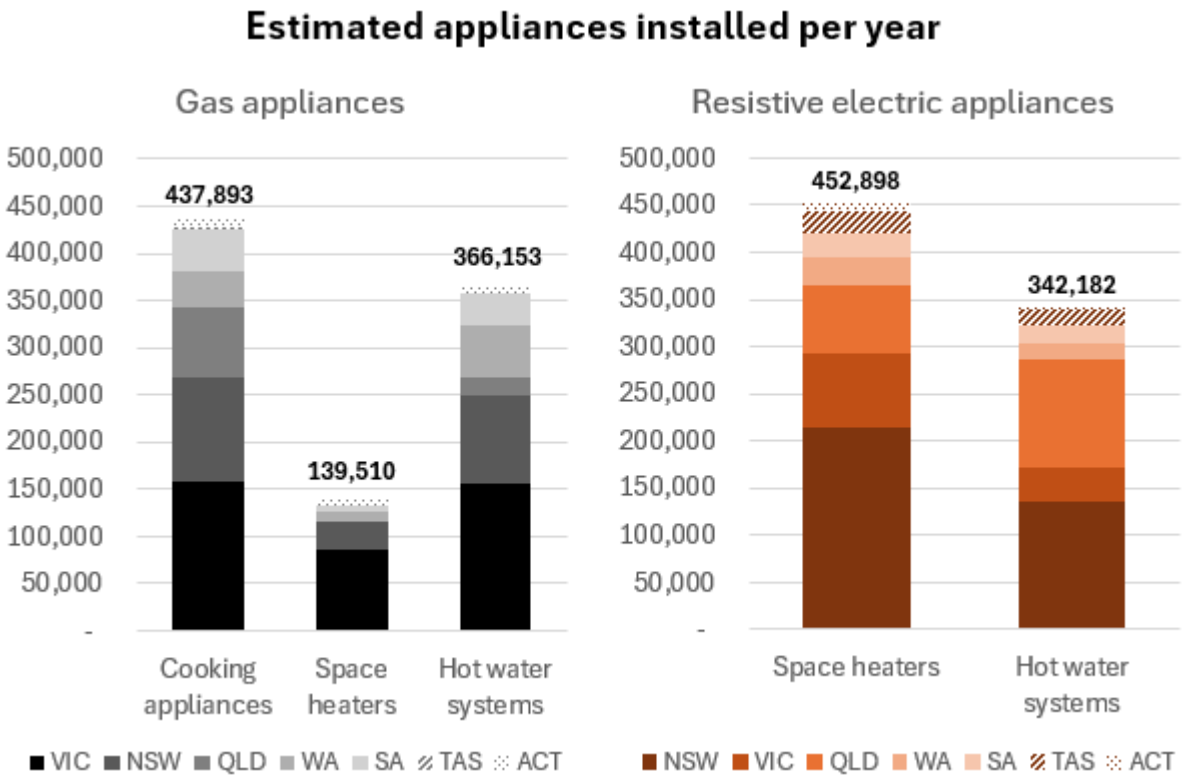
Upgrading resistive electric appliances:

From	To
Resistive electric space heaters →	Reverse-cycle air conditioners
Resistive electric water heaters →	Heat pump hot water systems

Upgrading ceramic cooktops to induction was excluded due to the relatively small impact on energy consumption; although this warrants further study.

We estimated the number of appliances installed per year

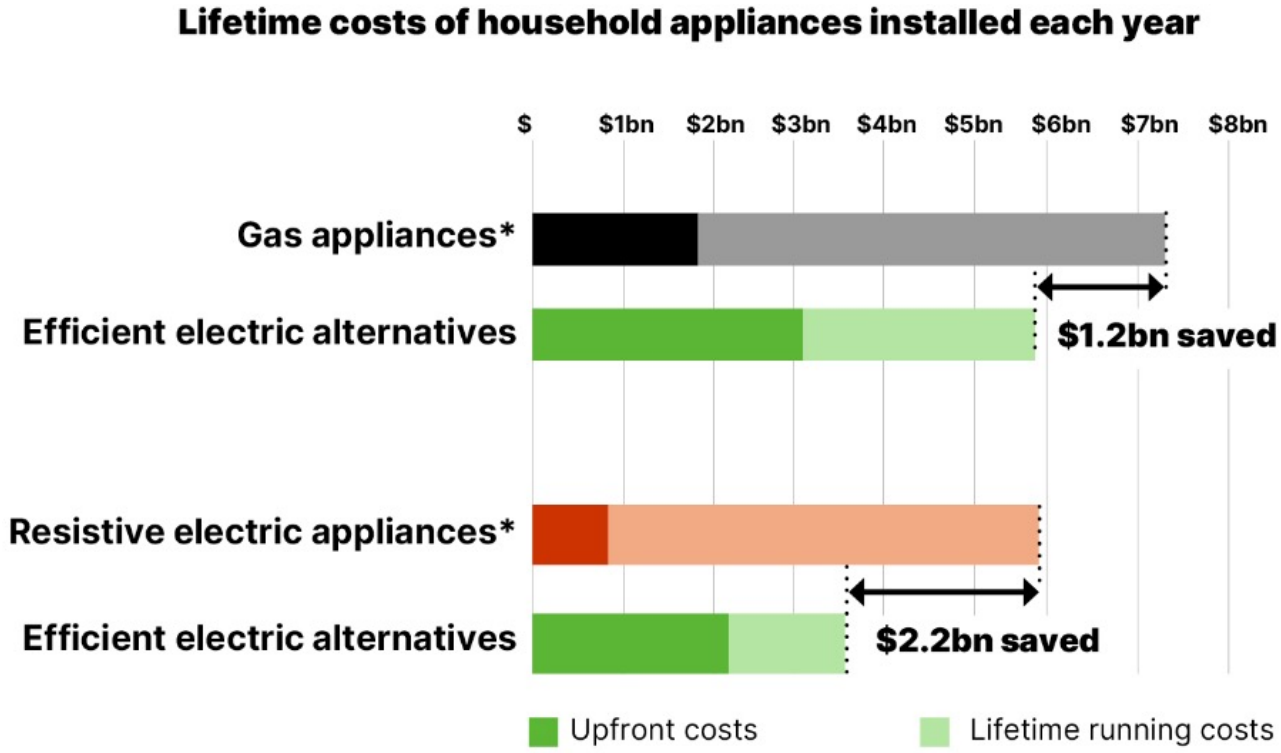
- Estimation based on source data and stock numbers from Residential Baseline Study
- **~940,000 gas appliances** per year
- **~800,000 resistive electric appliances** per year



Source: IEEFA analysis of sources from EnergyConsult 2021. NT excluded due to poor data.

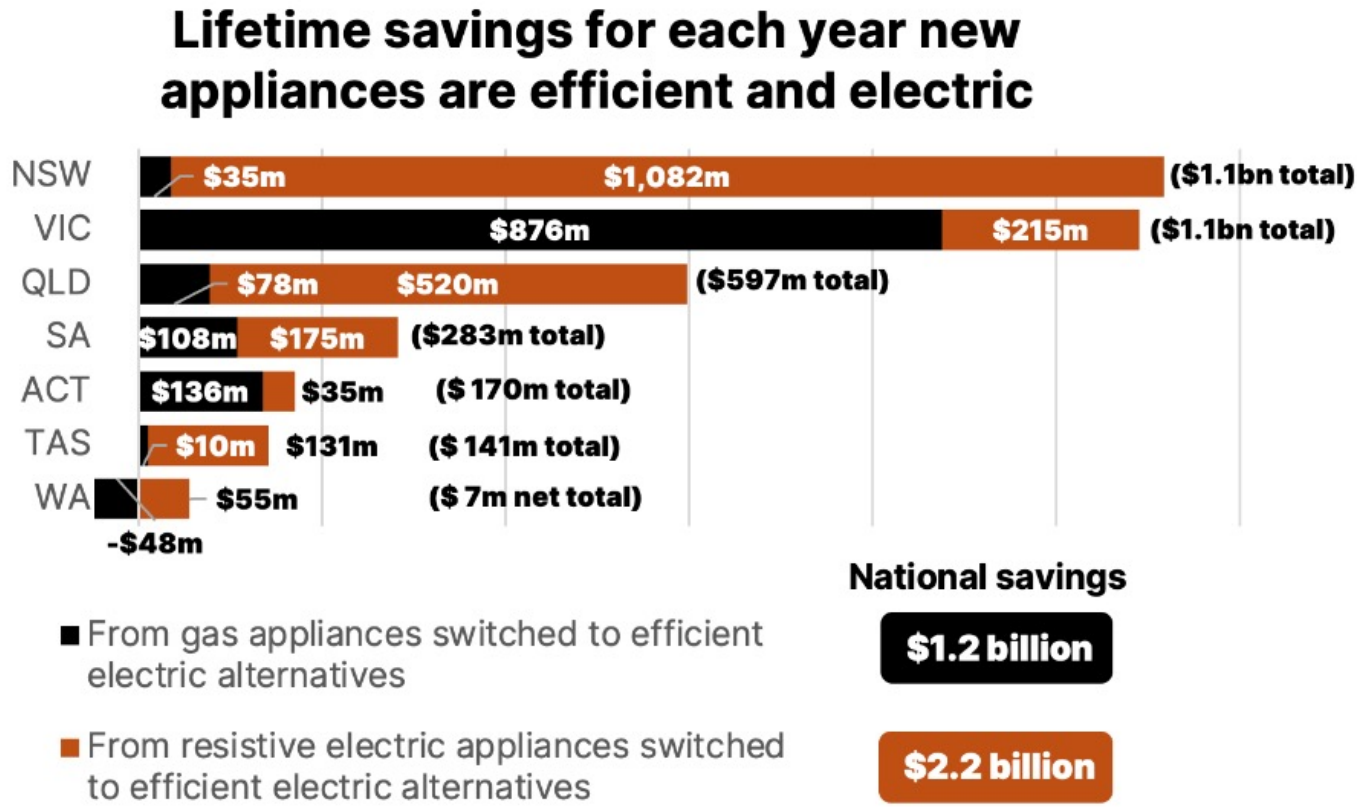
Collectively, installing these appliances locks consumers into $3.4bn per year

- Our calculation compares both the **upfront** cost, and **lifetime running cost** of these appliances compared to the efficient electric alternative.
- Energy costs are fixed to **current retail prices** by state
- Any **difference in expected appliance lifetime** is accounted for



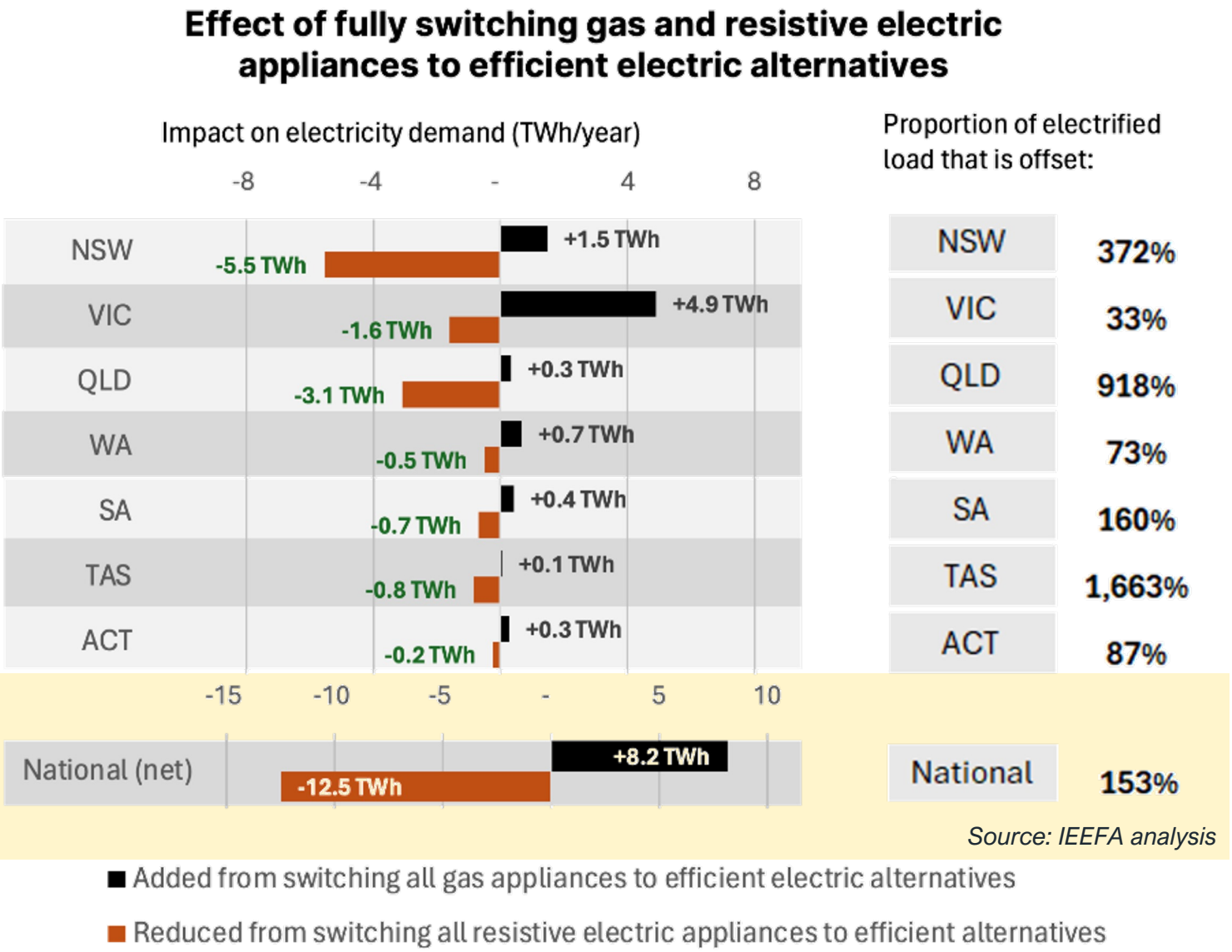
Source: IEEFA analysis

Cost savings would be shared across states and territories



Source: IEEFA analysis

Upgrading resistive electric appliances offsets some or all of the new electrified load



The net annual impact is a **reduction** in national electricity demand.

Source: IEEFA analysis

The compelling case for expanding appliance standards

- Standards could provide a **unified approach** to encourage the upgrade of both gas and resistive electric appliances
- Standards ‘play nice’ with other policies
- $3.4 billion represents the ‘cost of delay’ for each year appropriate standards aren’t in place

Improved standards could underly other actions to boost efficient electrification

Actions that would support appliance standards:

- Improved low- or zero-interest loan schemes to reduce the **upfront cost burden** of efficient appliances
- Ensuring **new dwellings** already support efficient electric appliances
- Targeted solutions for existing **hard-to-upgrade dwellings**
- Planning to manage reduced utilisation of **gas distribution networks**

Actions that would amplify the benefits of appliance standards:

- Upgrading the **thermal efficiency** of existing homes
- Ensuring heat pump hot water systems operate at the **optimal time of day**
- Increasing the penetration of **rooftop solar** and **distributed storage**

(Many of these actions align to priorities in the National Consumer Energy Roadmap or National Energy Performance Strategy)

We aren’t starting from scratch

- The existing **GEMS Act** aims *“to promote the development and adoption of appliances and equipment that use less energy and produce less greenhouse gases”*
- The **National Energy Performance Strategy** identified upgrades to GEMS as a key supporting action

Improve the performance of appliances and equipment across all sectors		
5.2.1 Streamline, expand and modernise the Greenhouse and Energy Minimum Standards (GEMS) framework		

How could GEMS be modernised and expanded to support efficient electric appliances?

1. Expand GEMS to cover a broader range of appliances
2. Structure GEMS to value the efficiency & GHG savings from electrification
3. Increase minimum energy performance standards
4. Take the opportunity to embed demand flexibility requirements in GEMS

1. Expanding GEMS to cover a broader range of appliances

- Some products in our analysis are already subject to GEMS determinations:
  - Air conditioners (including reverse-cycle)
  - Electric water heaters (excluding heat pumps)
  - Gas water heaters
- However others are missing:
  - Gas space heaters
  - Electric resistive heaters
  - Heat pump hot water systems
  - Cooktops

2. Structuring GEMS to value the efficiency & GHG savings from electrification

- The largest energy savings, and long term GHG reductions, tend to come from electrification of gas appliances.
- Some gas appliances are currently excluded from GEMS
- Others are included in separate determinations from electric appliances
- **Structuring determinations around a single end-use** could enable a direct comparison of gas / electric options

Electric water heaters

Read product information

- Electric un-vented displacement water heaters
- Electric vented displacement water heaters
- Electric heat exchange water heaters

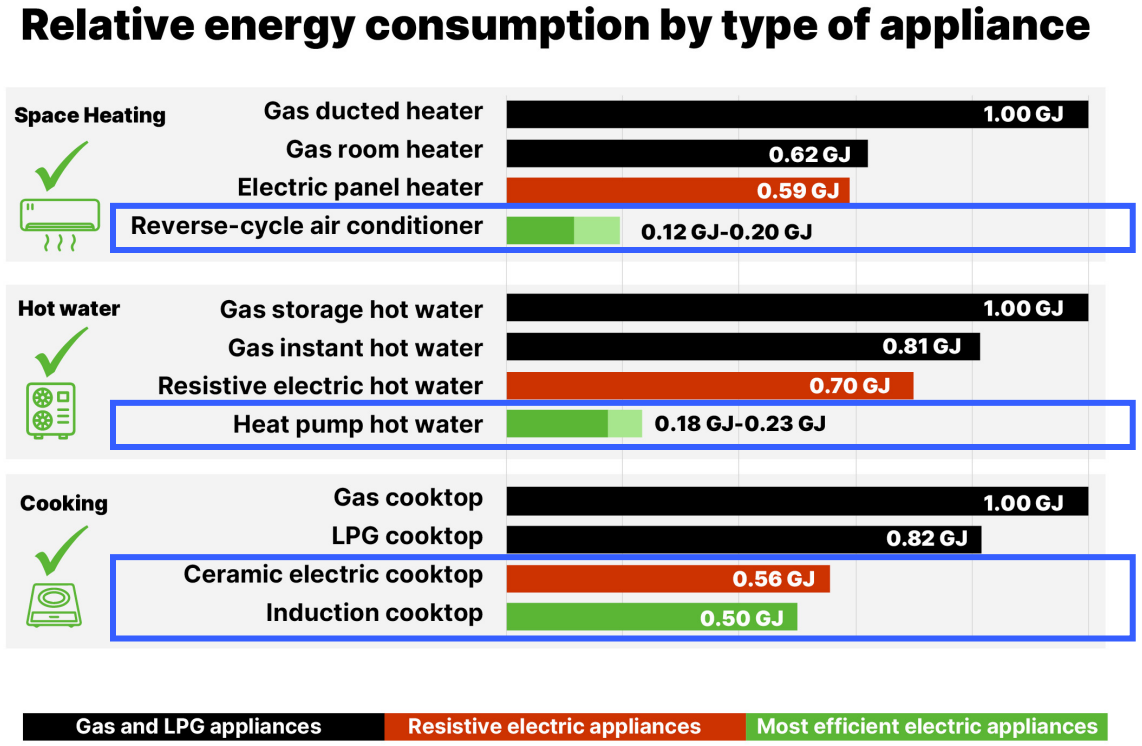
Gas water heaters

Read product information

- Gas storage water heaters
- Gas instantaneous water heaters

3. Increasing minimum energy performance standards

- Any expansion or restructuring of GEMS would require new decisions regarding MEPS
- By far the largest efficiency gains are from upgrading to heat pump-based appliances
- For cooktops, either electric technology offer significant efficiency gains over gas or LPG appliances



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

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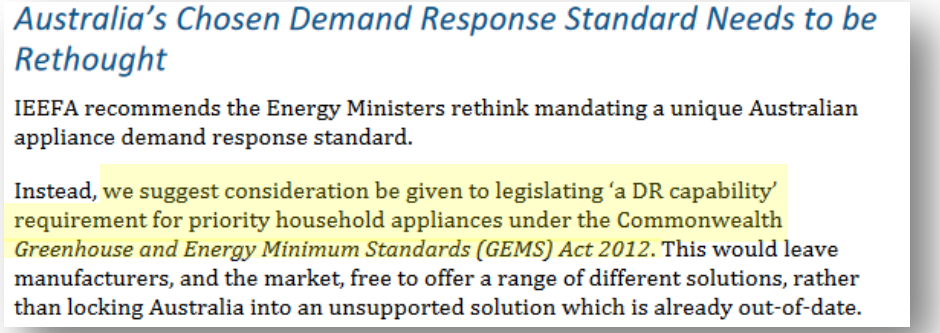
4. Embedding demand flexibility in GEMS

- The savings in our analysis assume no change to the time-of-use of appliances.
- However, embedding flexibility – particularly for hot water systems – can offer significant additional savings
- Flexibility is a vital part of the ‘swiss army knife’ of DER
- Embedding demand response capabilities in GEMS would help future-proof our rapidly electrifying appliance base
- Some states are requiring heat pumps to include basic timer controls to be eligible for rebates

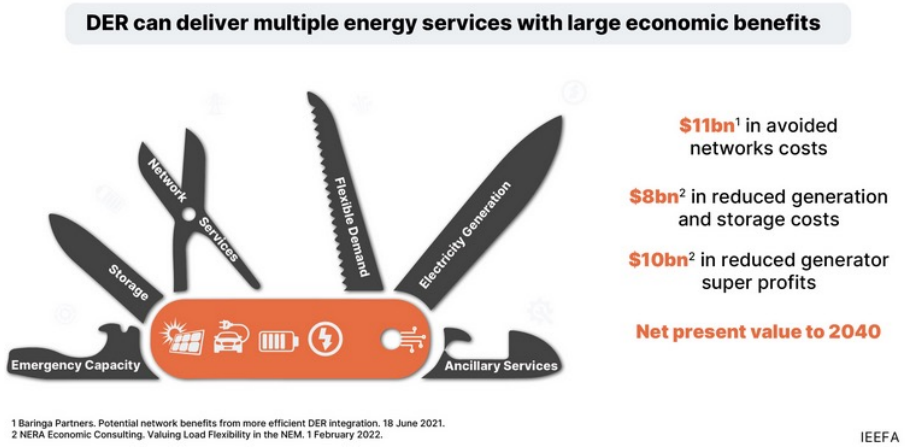


Australia’s Chosen Demand Response Standard Needs to be Rethought

IEEFA recommends the Energy Ministers rethink mandating a unique Australian appliance demand response standard.

Instead, we suggest consideration be given to legislating ‘a DR capability’ requirement for priority household appliances under the Commonwealth *Greenhouse and Energy Minimum Standards (GEMS) Act 2012*. This would leave manufacturers, and the market, free to offer a range of different solutions, rather than locking Australia into an unsupported solution which is already out-of-date.

IEEFA - *Mandating AS4755 Ignores Households and Widely Supported International Solutions*



IEEFA - *DER could provide $19 billion economic boost by 2040*

Thank you

Contact

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Read the briefing note:

https://ieefa.org/resources/appliance-standards-are-key-driving-transition-efficient-electric-homes

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