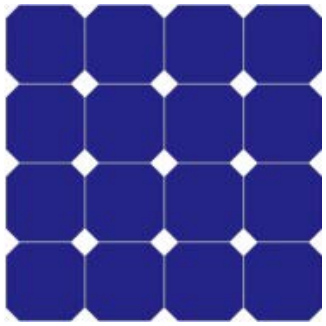
Gas – electricity – solar

Household fuel choice in the 21st century: preliminary findings



Alternative Technology Association
February 2018

Agenda

- Refresher…
- Explanation of fuel load and cost comparison models
- Results and key findings
- Discussion and questions
- Next steps

Household Fuel Choice Project

- Funded by Energy Consumers Australia
- Understand the *economics* of fuel choice
  - Other factors affect fuel choice; but understanding the economics is necessary for any choice to be fully informed.
- Gas or electricity…
- …for heating, hot water, and/or cooking…
- …with or without existing or new solar

The household fuel choice project was funded by Energy Consumers Australia as part of its grants process for consumer advocacy projects and research projects for the benefit of consumers of electricity and natural gas. The views expressed in this presentation do not necessarily reflect the views of ECA.

The Rationale

Technological changes in heating, hot water, and cooking appliances mean that consumers' understanding of the economics of different fuels may be out of date.

Increasing fuel prices make the cost outcomes more significant.

Accurate information on the economics of gas and electricity as household fuels for new appliances will help consumers make informed decisions about appliance replacement, and inform public policy.

The Question

When replacing a gas appliance (heater, hot water, cooker), what's the economic benefit (or cost) of:

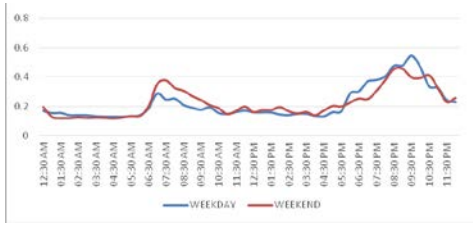
- choosing electric rather than gas?
- also replacing other gas appliances with electric equivalents?
- how does having (or installing) solar PV help?

Reverse-cycle aircon *vs.* *gas ducted or wall furnace*

Heat pump hot water *vs.* *gas instantaneous or storage*

Induction cooktop/elec. oven *vs.* *gas cooktop/gas oven*

The Question

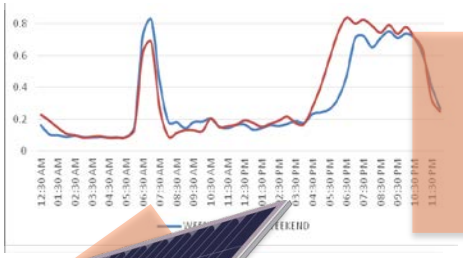


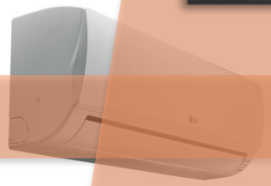
5 different household types:

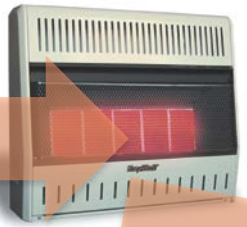
1. *Couple, frugal, small house*
2. *Medium family, consistent daytime usage, medium house*
3. *Medium family, low daytime usage, medium house*
4. *Large family, large house*
5. *Large family, large newish (6-star) house*

16 locations

The Question







The Approach

Year 0

Year 10

Year 20

Key findings (1)

SYDNEY: Unless you only have one gas appliance, may as well stick with gas

HOBART: for most households, always better getting off gas

SOLAR: Favours switch to all-electric, especially HWS (improves value across the board)

COOKERS: Makes little difference unless switching allows you to disconnect from gas and avoid the fixed charge

NEW HOMES:

- Get solar and go all-electric
- If you can't get solar, still go all electric (marginal for Sydney and Adelaide)

Key findings (2)

ONE GAS APPLIANCE:

- Always worth switching to electric and end the gas fixed charge

HEATING when you have other gas appliances:

- Always worth switching to electric (RCACs) except Sydney
- If you also switch other gas appliances, better results if it's a stove, worse if it's stove and HWS

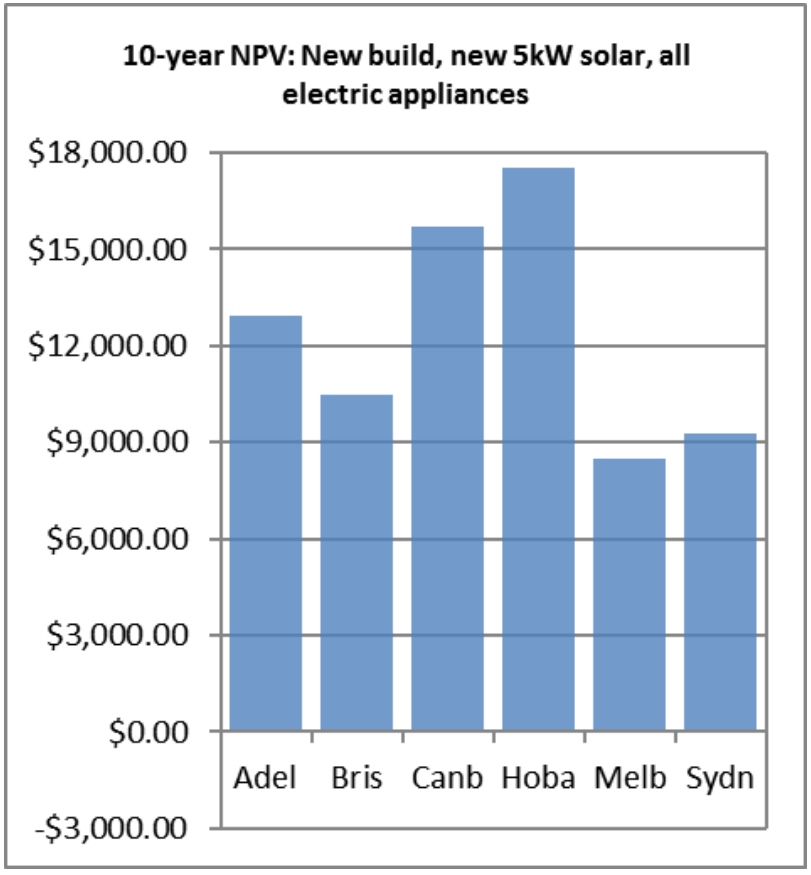
HWS when you have other gas appliances:

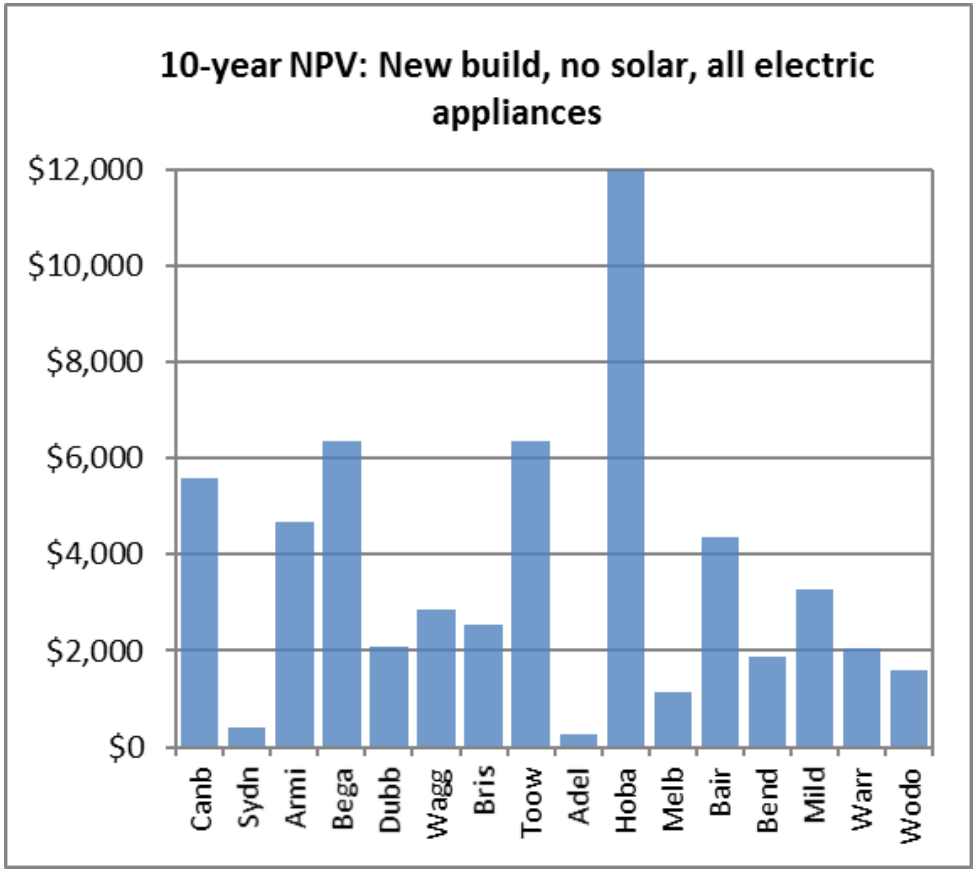
- Rarely worth switching to heat pump unless (for some places, mostly Queensland) you also switch a gas stove and you don't have gas heating
- If you also switch other gas appliances, better results if it's a stove, and even better if it's stove and heating (still marginal or negative for most people, though positive for most locations)
- Solar helps quite a bit

New homes

Put solar on if you can, and go all-electric …probably

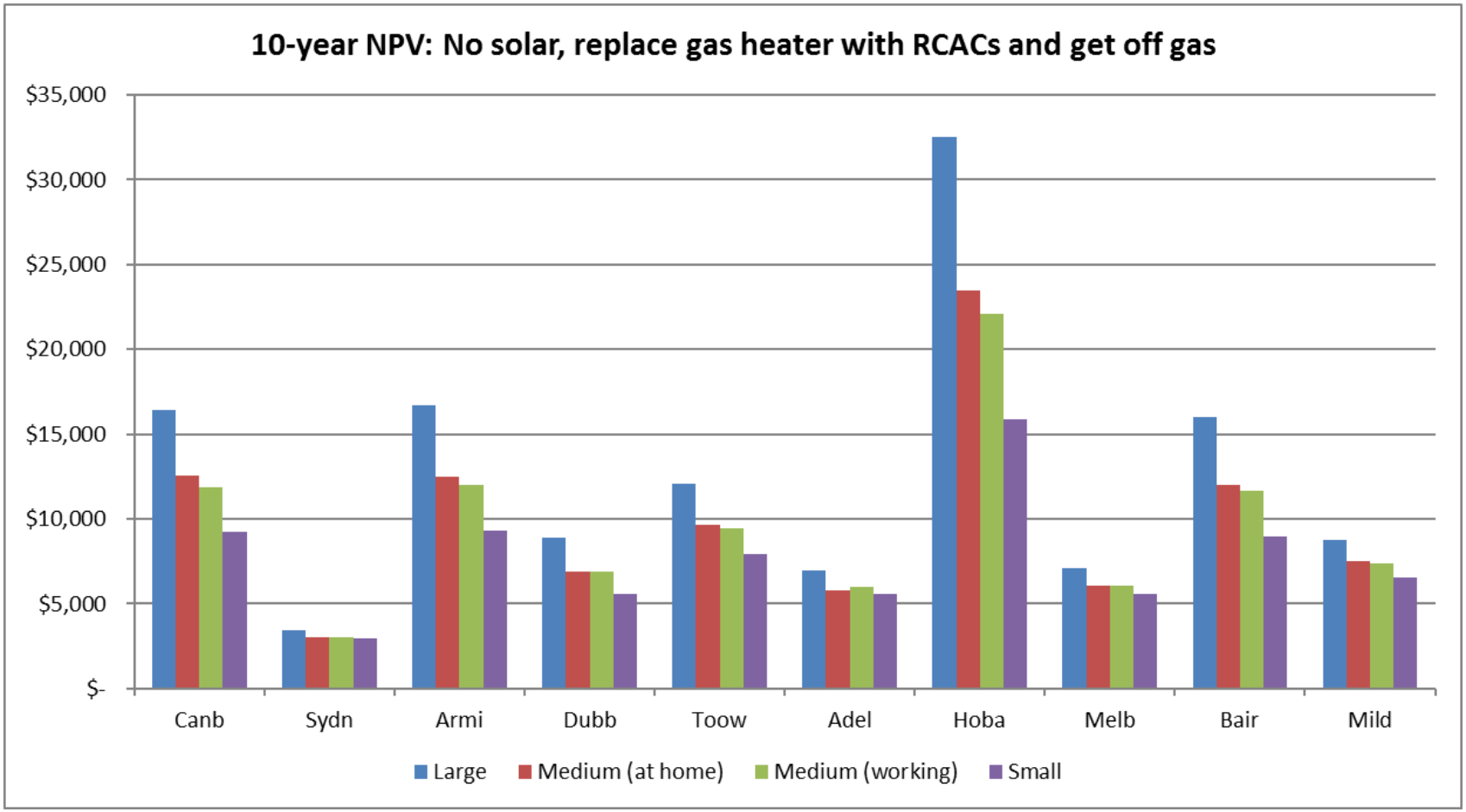
If you can't put solar on, still go all-electric …though it's marginal for Sydney and Adelaide (a quarter of the population…)





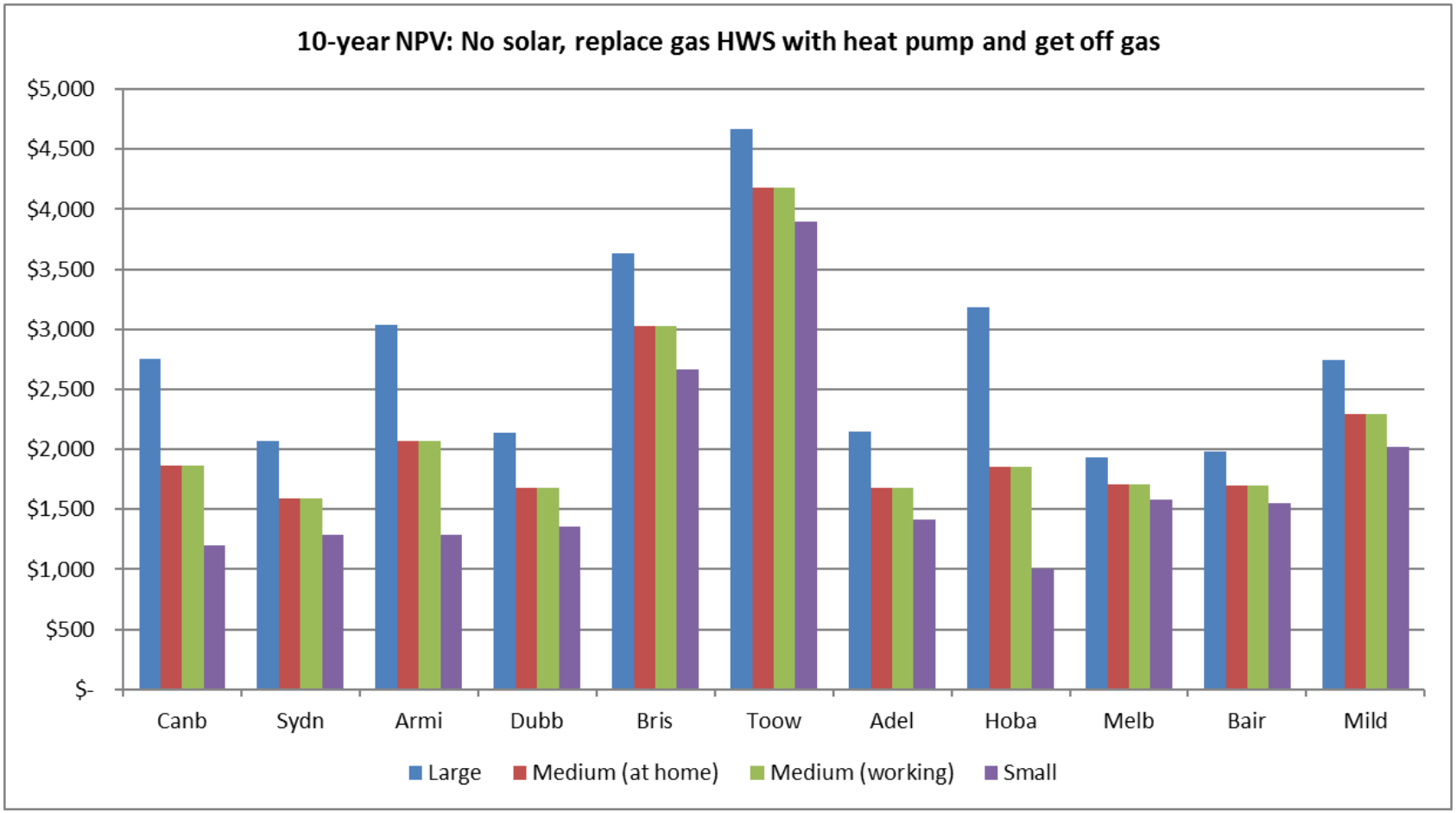
One gas appliance

Replacing failing gas heater with RCACs and disconnect from gas:
Always a benefit. *Even better with solar or if you have existing RCAC*



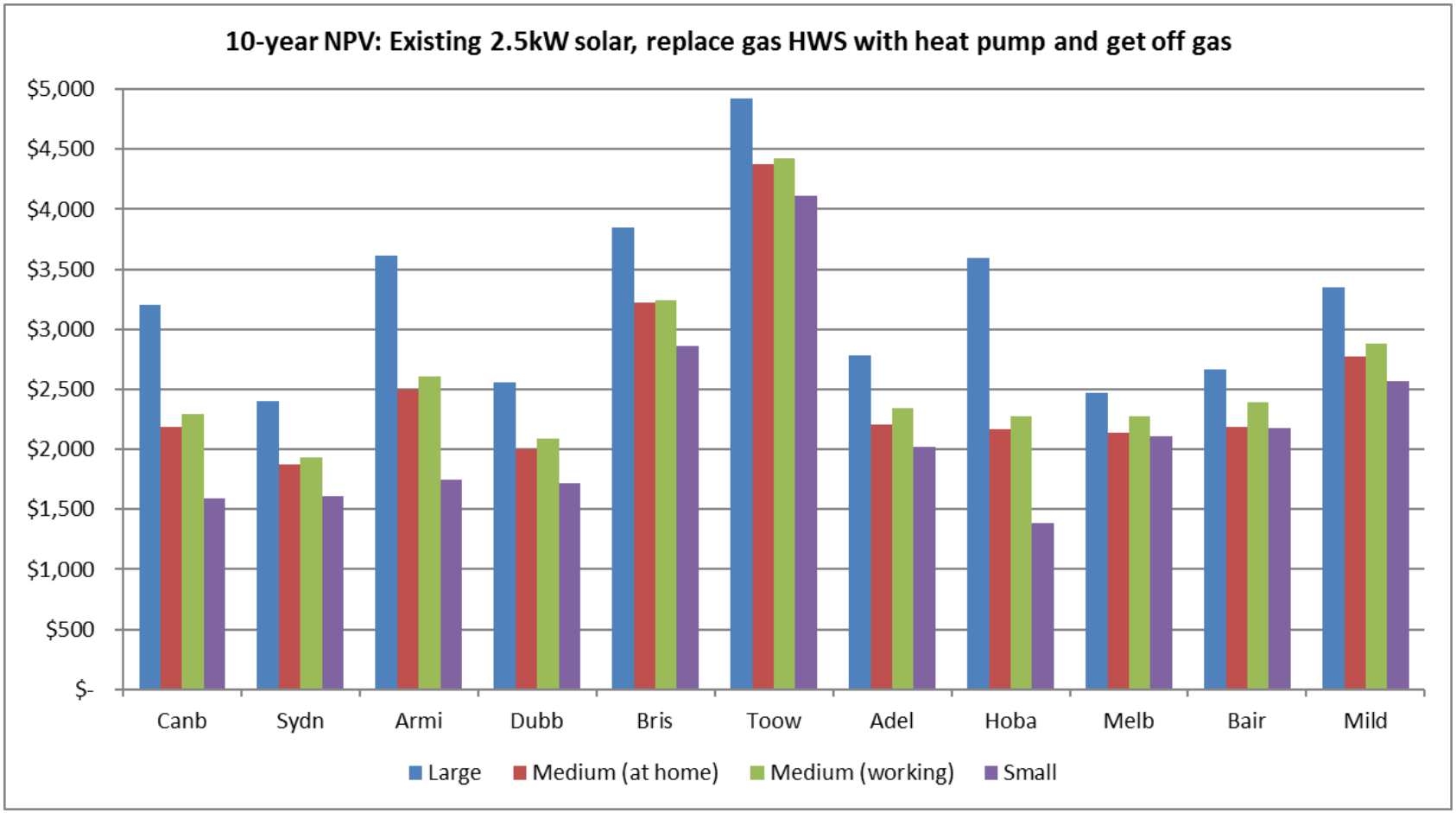
One gas appliance

Replacing a failing gas HWS with heat pump and disconnect from gas:
Always a benefit (though a relatively small one for small households in Canberra and Hobart)



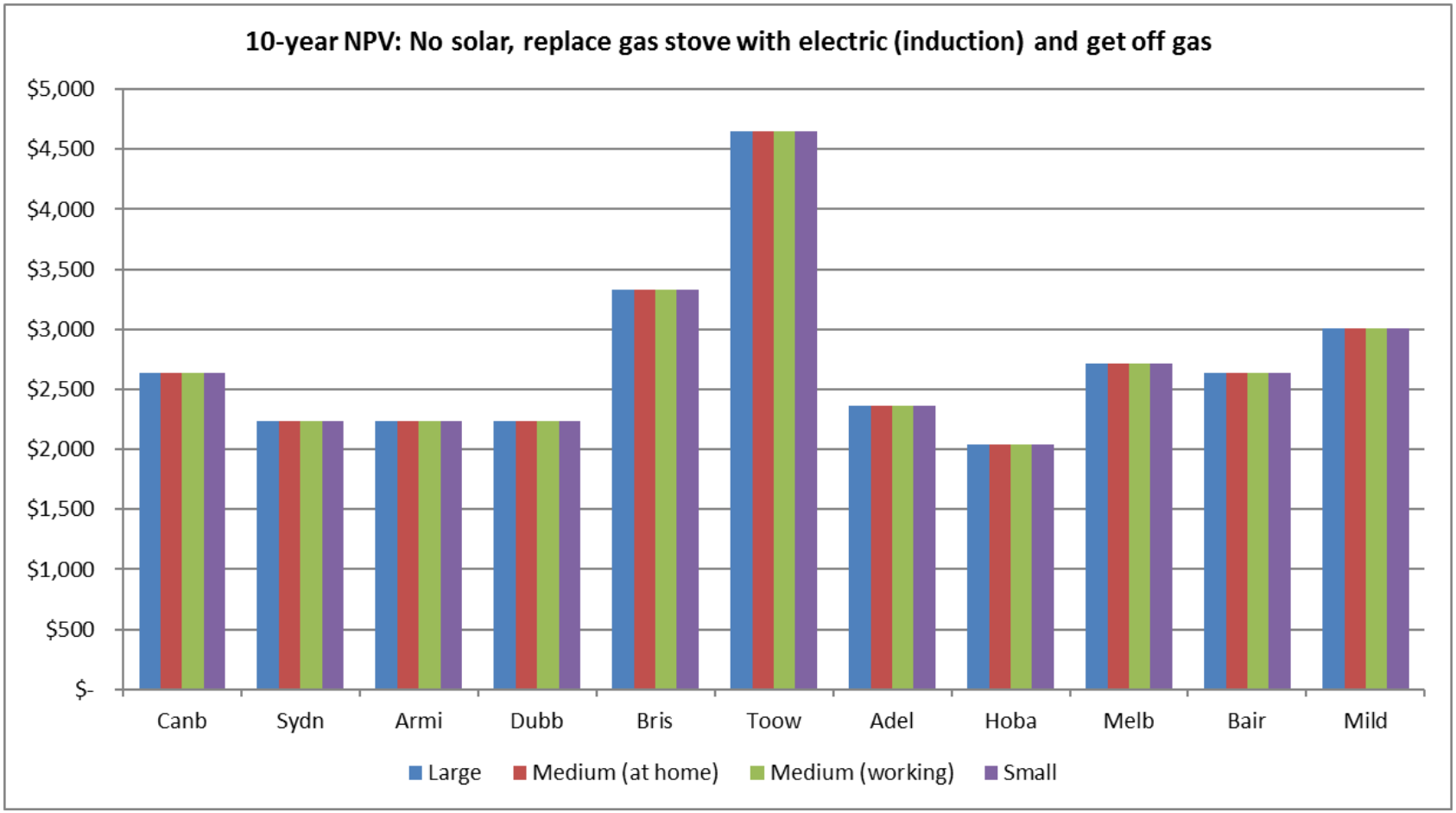
One gas appliance

Replacing a failing gas HWS with heat pump when you have 2.5kW solar PV:
Even better (a bit).



One gas appliance

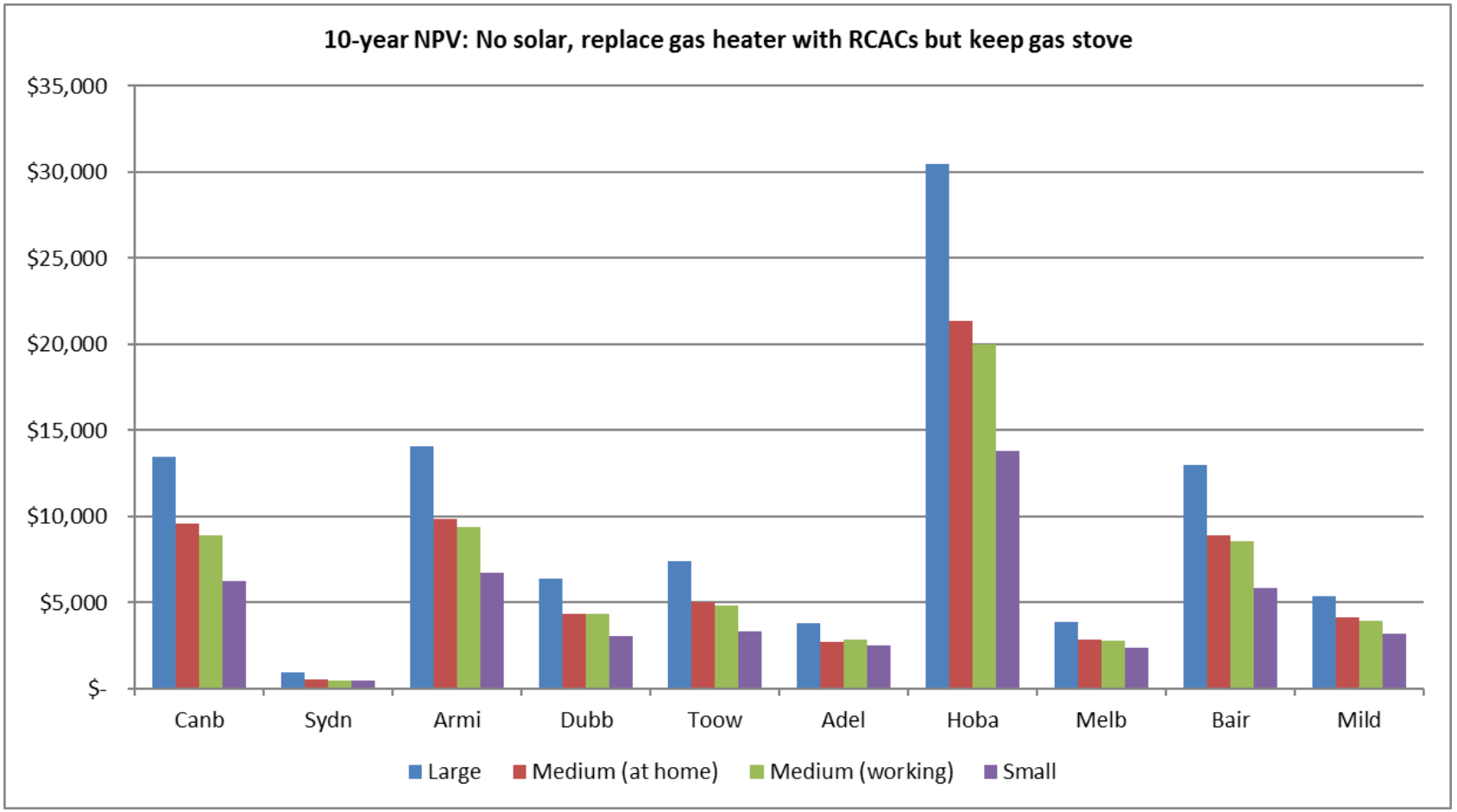
Replacing a failing gas stove with induction electric and disconnect from gas:
Saving the fixed charge is the bulk of the benefit



Two gas appliances

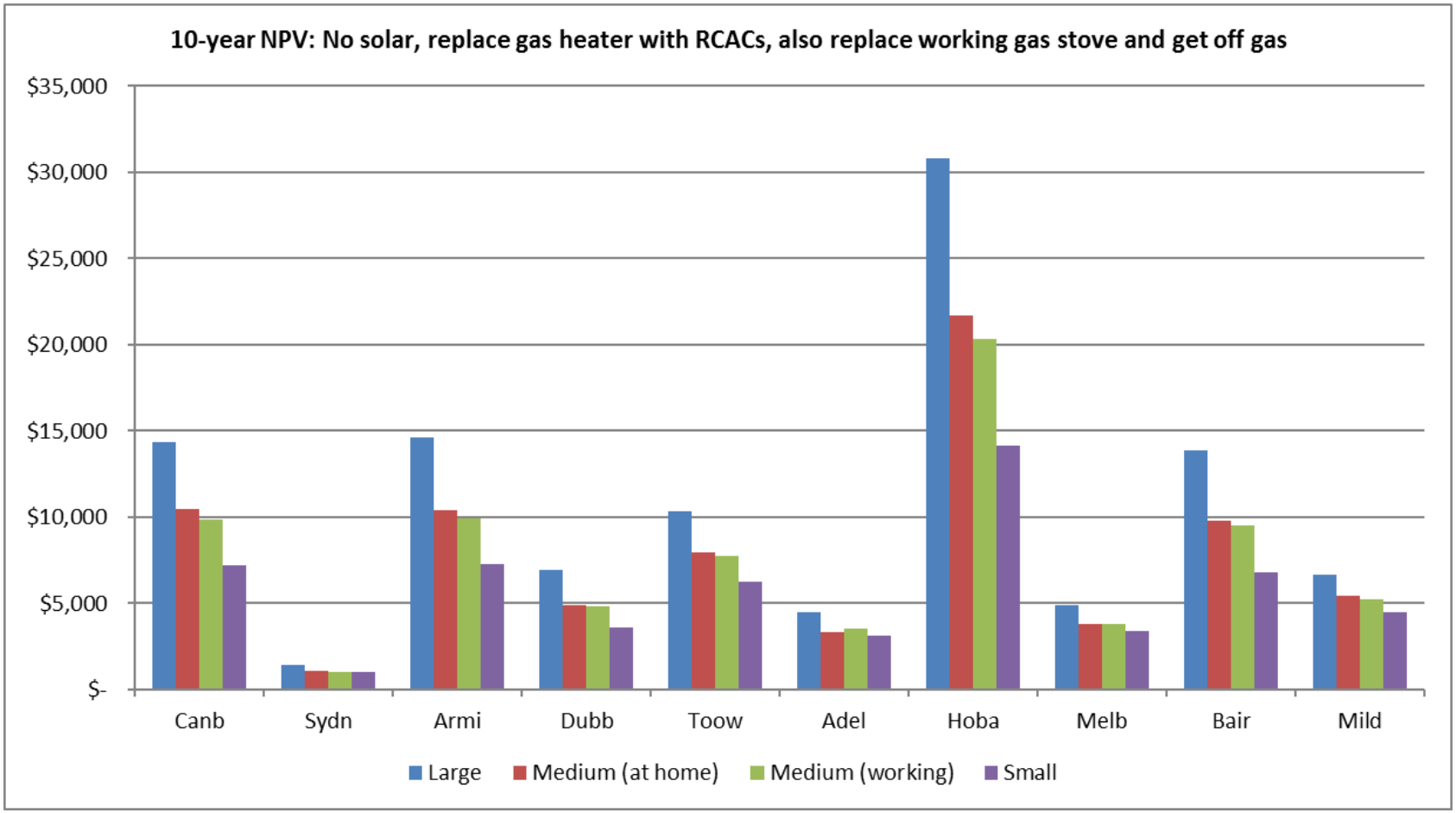
Replacing a failing gas heater with RCACs, keep gas stove:

Always a benefit, though marginal in Sydney



Two gas appliances

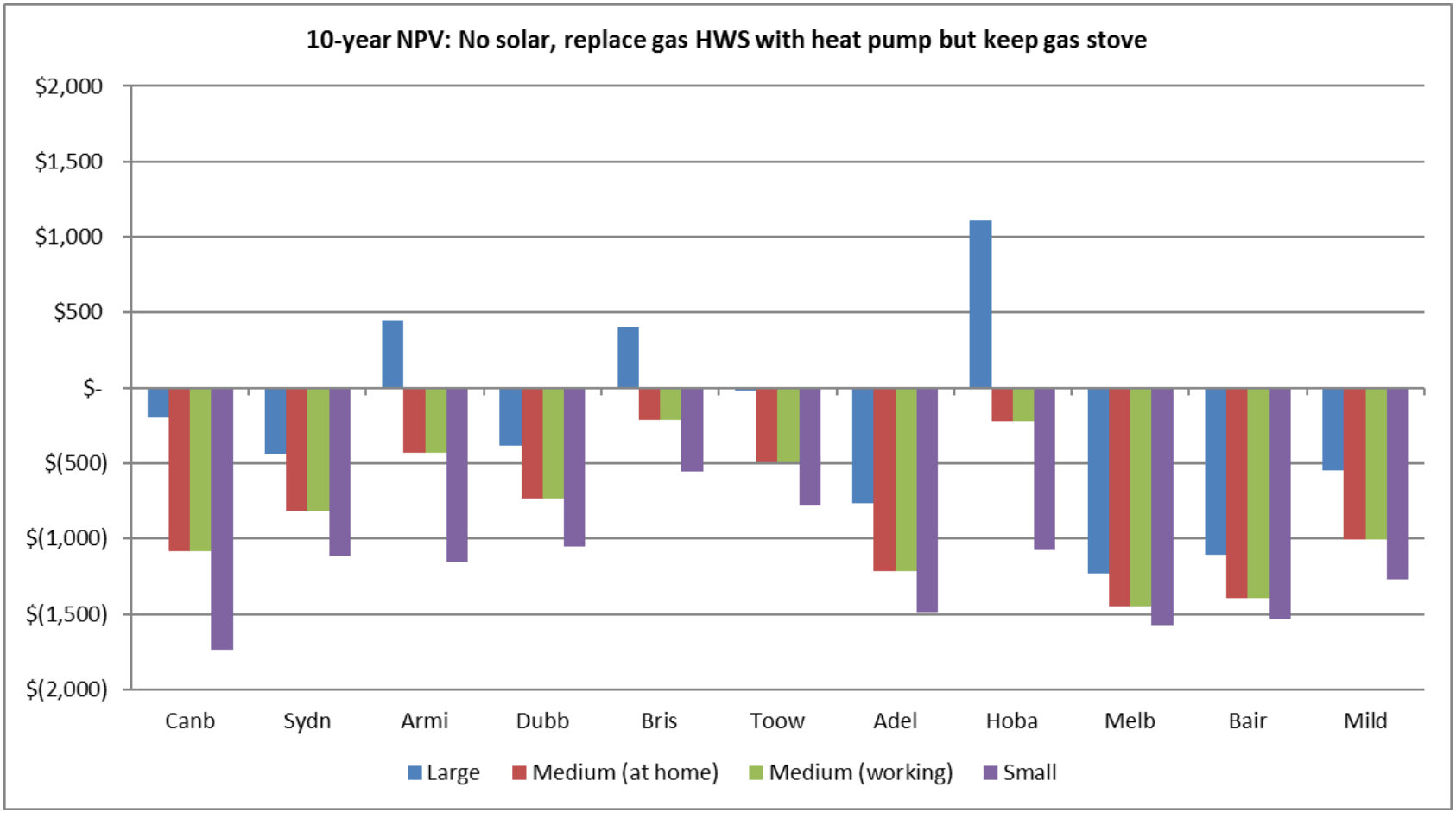
Replacing a failing gas heater with RCACs, also replace working gas stove:
Disconnecting from gas saves the fixed charge and improves value everywhere, making it concrete rather than marginal in Sydney.



Two gas appliances

Replacing a failing gas HWS with heat pump, keep gas stove:

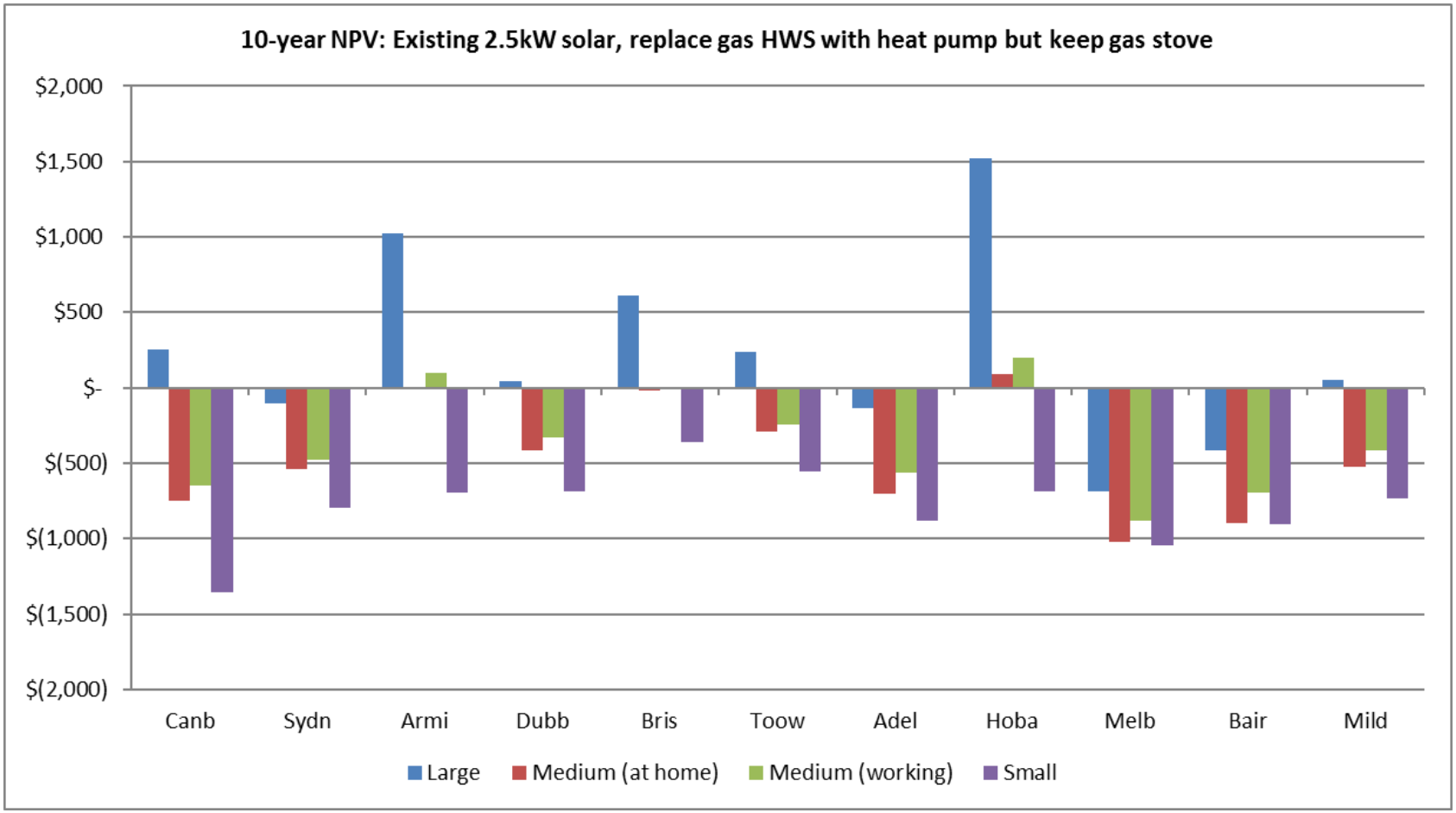
Only a benefit (and a marginal one at that) for a few large households. Gas gives better value elsewhere, though it's marginal in most cases.



Two gas appliances

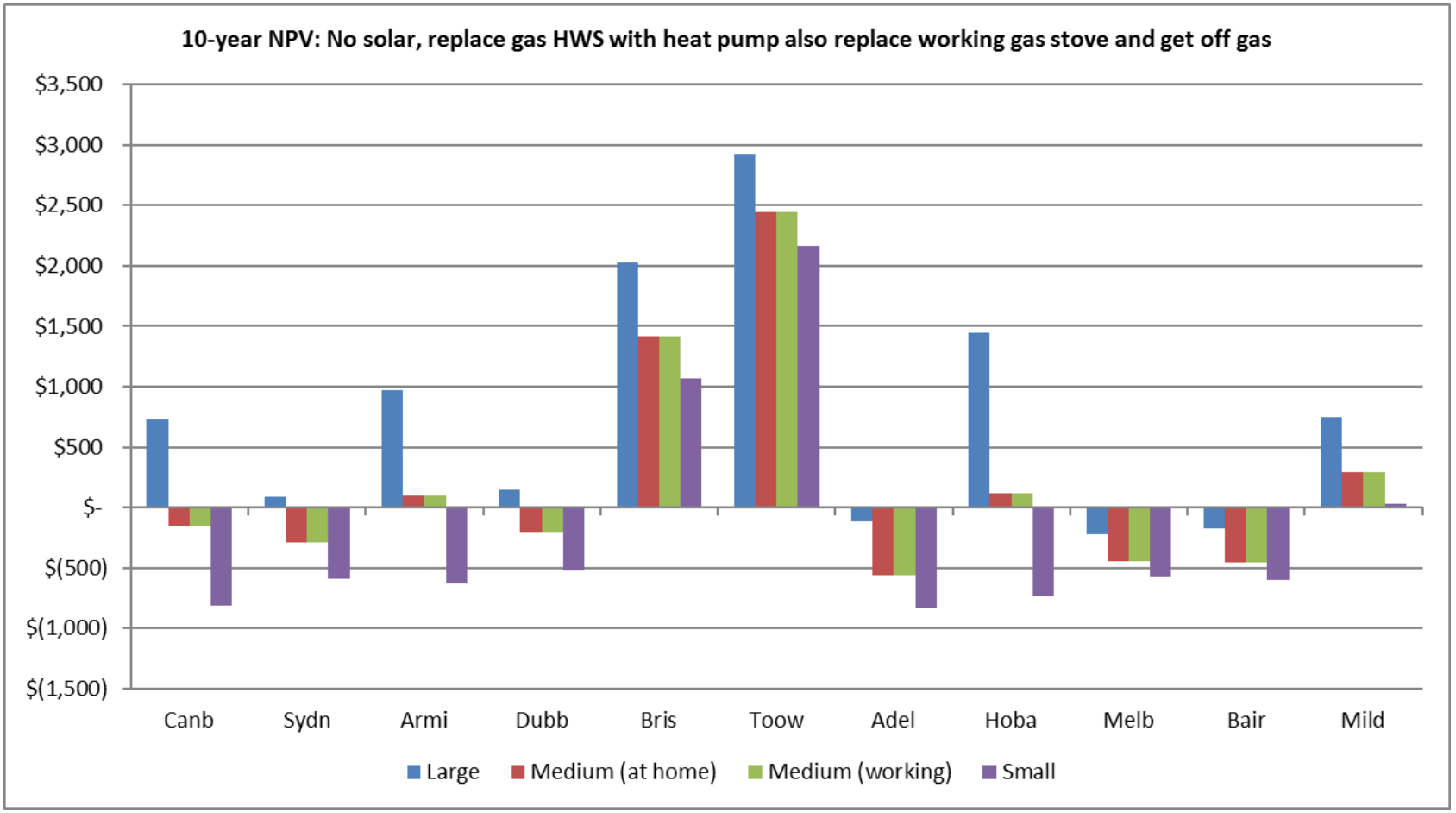
Replacing a failing gas HWS with heat pump, keep gas stove:

Impact of solar favours heat pump switch slightly



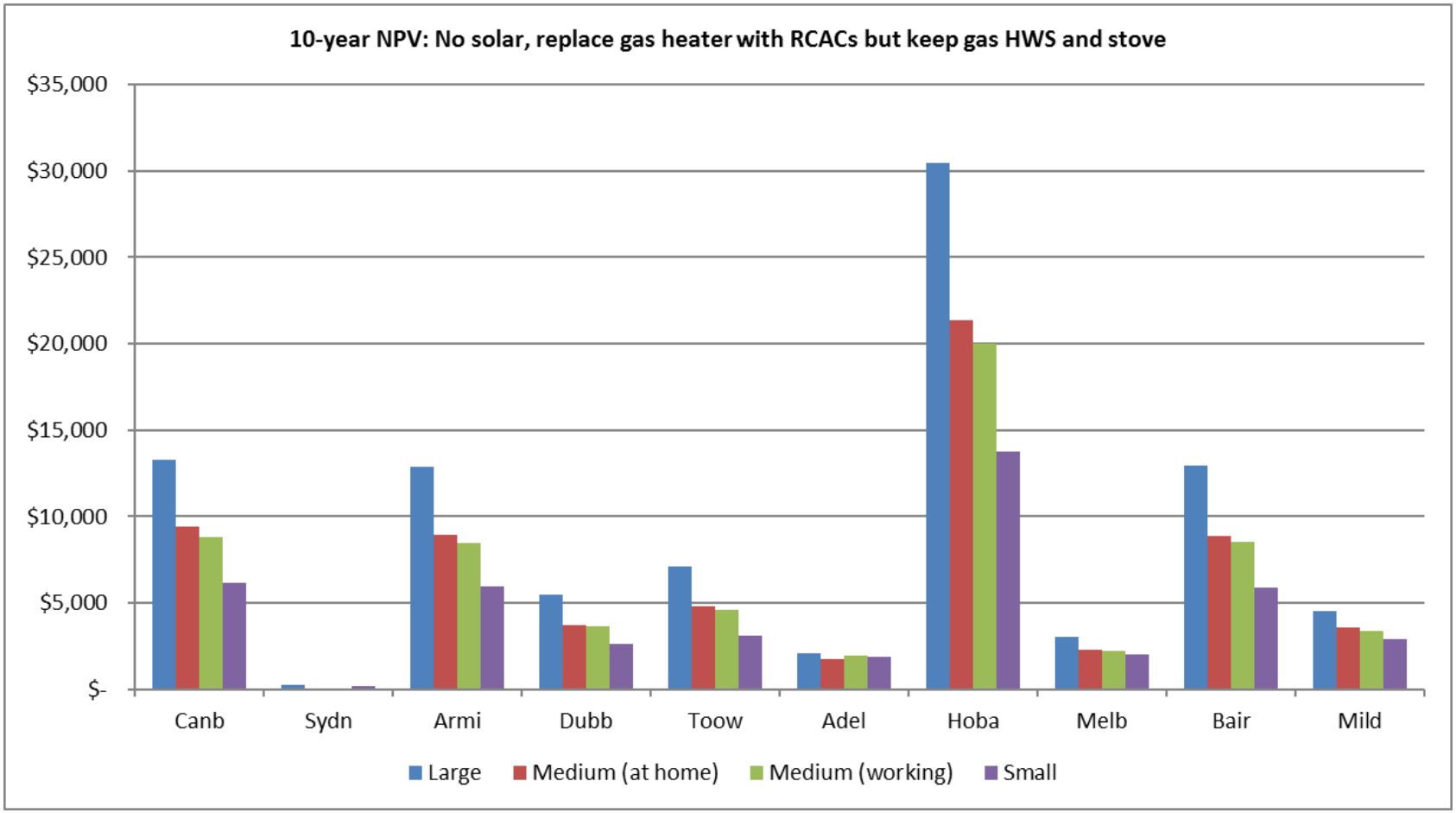
Two gas appliances

Replacing a failing gas HWS with heat pump, also replace working gas stove:
Disconnecting from gas makes it a solid benefit in Qld and some large households elsewhere, marginal for everyone else



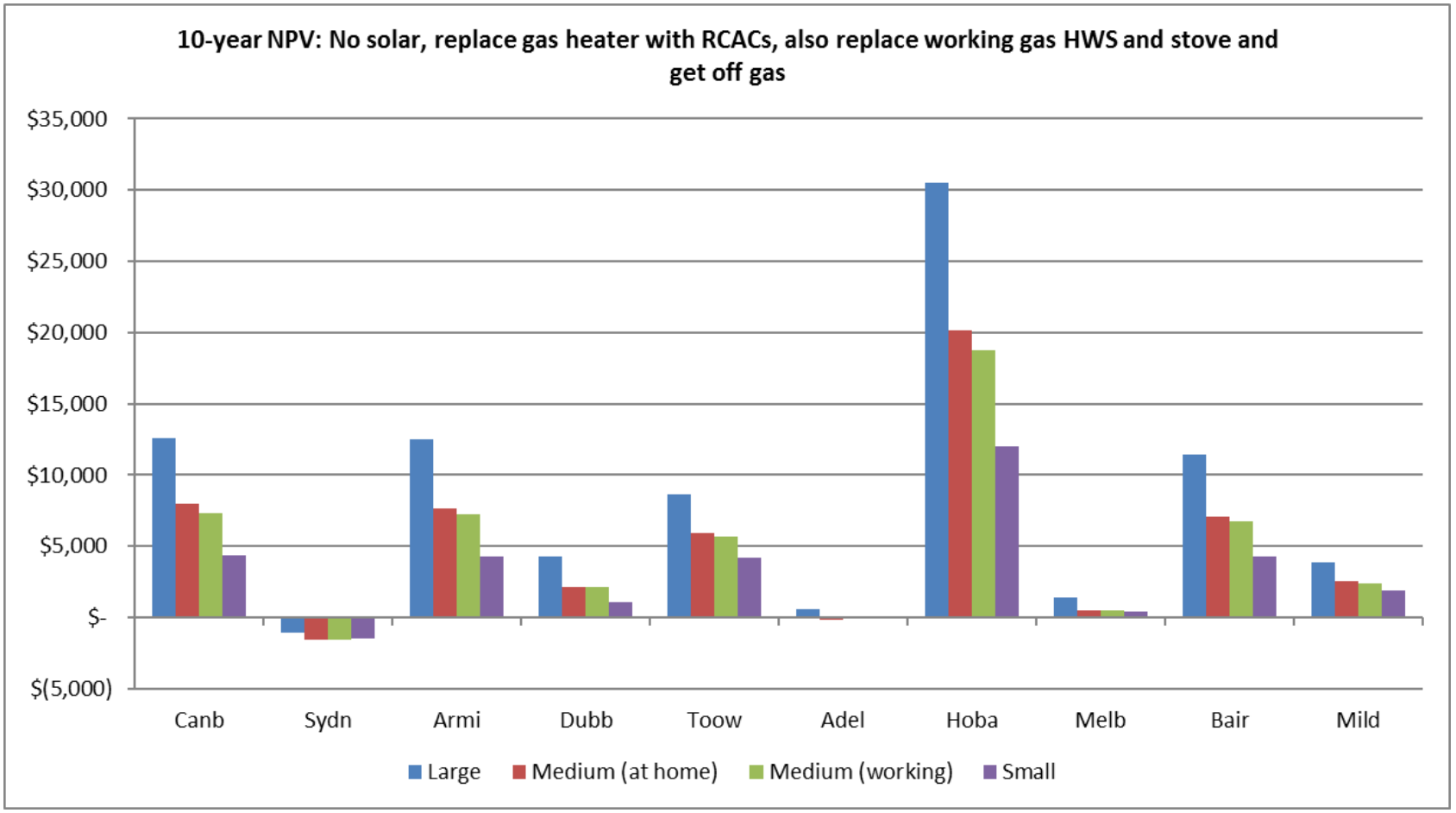
Three gas appliances

Replacing a failing gas heater with RCACs, keep gas HWS and stove:
Positive benefit everywhere but Sydney



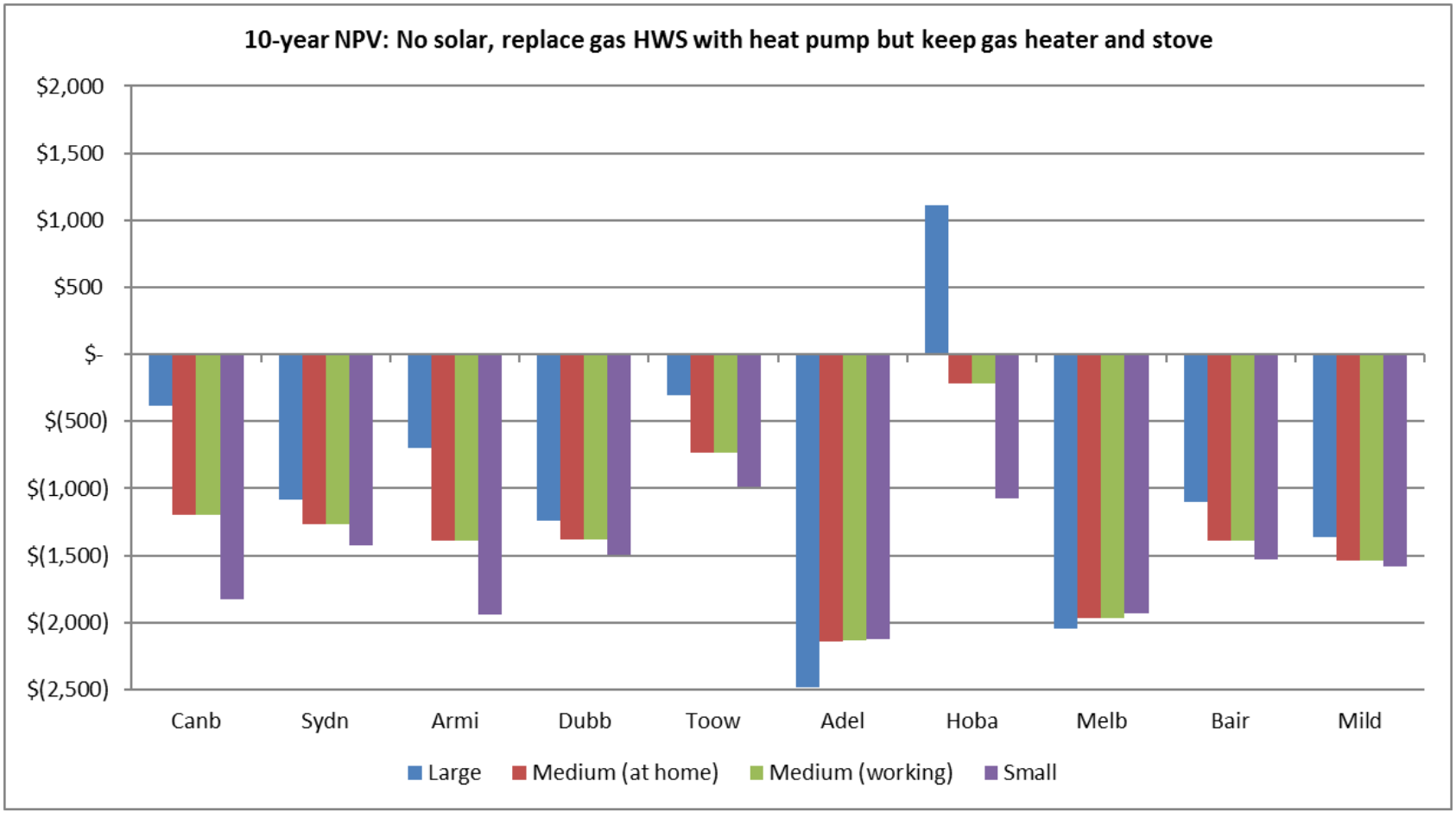
Three gas appliances

Replacing a failing gas heater with RCACs, also replace working gas HWS and stove and disconnect from gas: Great everywhere except Sydney, Melbourne, and Adelaide (half the population). **With solar:** switch everywhere but Sydney



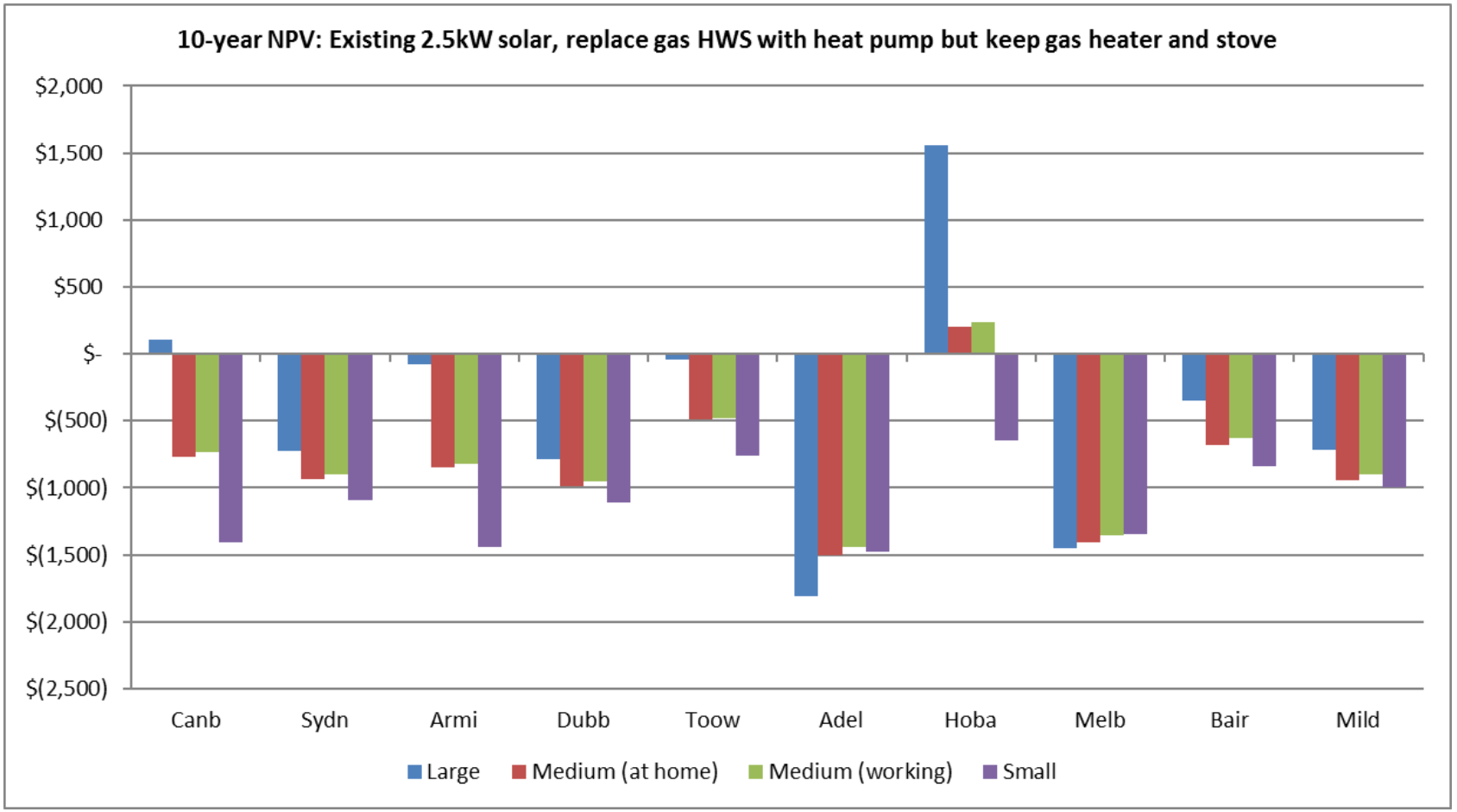
Three gas appliances

Replacing a failing HWS with heat pump, keep gas heater and stove: Marginal in Hobart (medium only) and Qld. Positive for large households in Hobart. Elsewhere, stick with gas



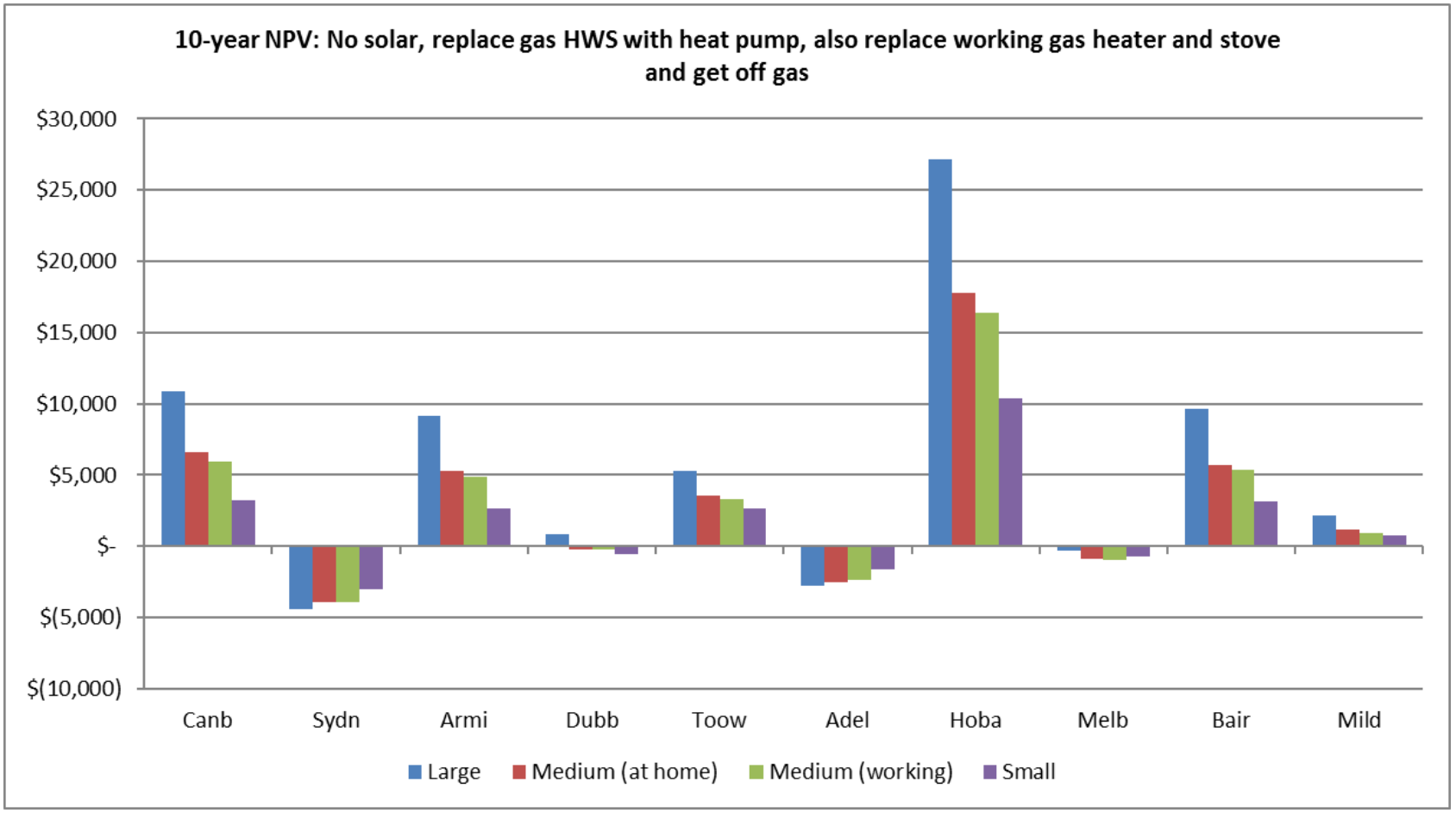
Three gas appliances

Replacing a failing HWS with heat pump, keep gas heater and stove: Better with solar, but still marginal in most places and worse than gas in some



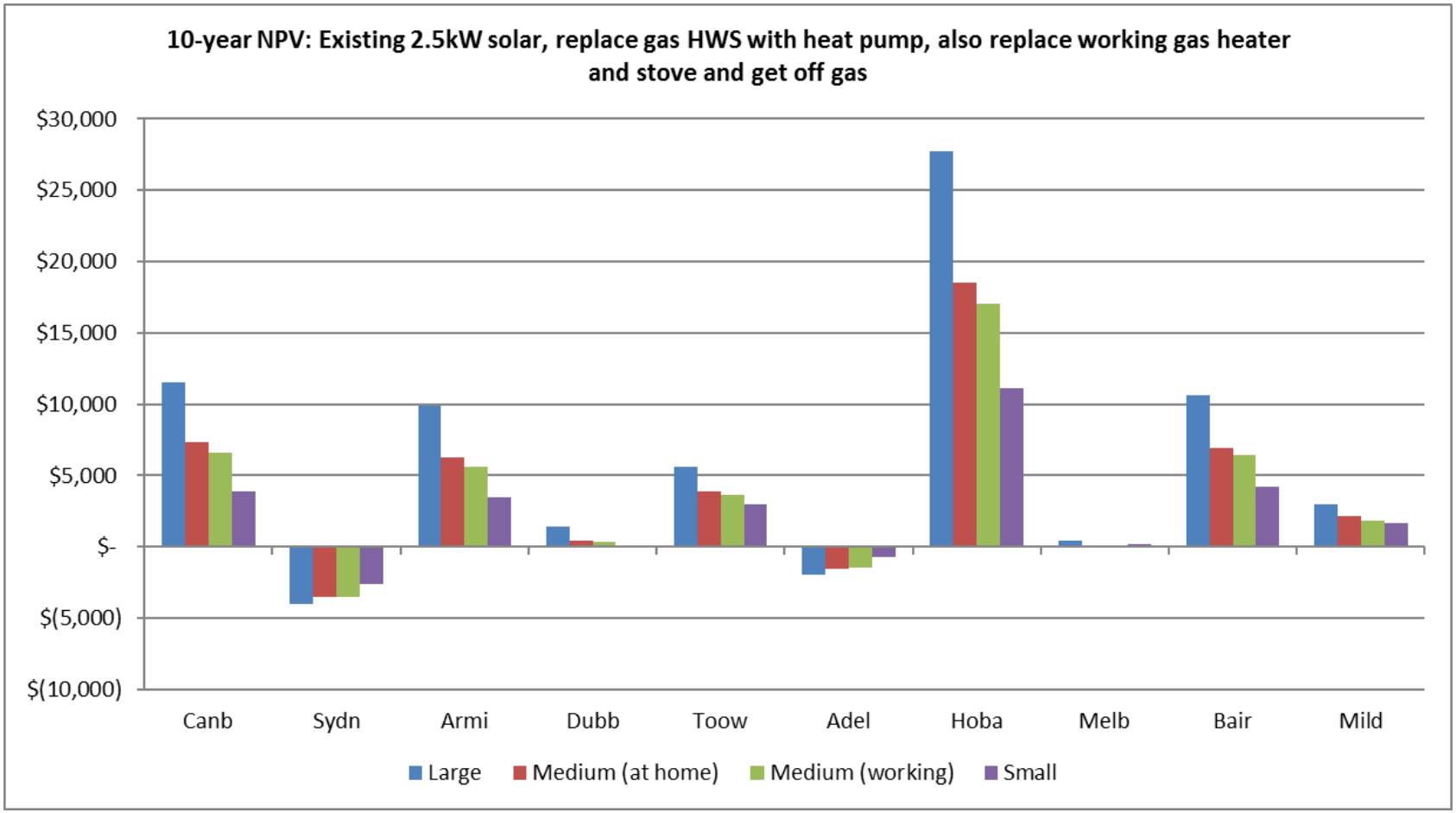
Three gas appliances

Replacing a failing HWS with heat pump, also replace working gas heater and stove and disconnect from gas: In Adelaide and Sydney, stick with gas. Elsewhere, the full switch gives better value (marginal in Melb, Dubbo, some Mildura)



Three gas appliances

Replacing a failing HWS with heat pump, also replace working gas heater and stove and disconnect from gas: WITH SOLAR gas is still better in Adelaide and Sydney; Melbourne and Dubbo are still marginal but tending positive)



Further analysis

A few more questions to answer:

- New solar
  - Analysis doesn't really distinguish between the value of solar and the value of the fuel switch. We need a different BAU case of new solar with all gas appliances.
- Hot water
  - Existing or new solar with resistive HWS instead of heat pump.
- Space heating
  - What if there's an existing RCAC in main living area? Heating switch only requires new smaller units elsewhere.
- Different tariffs
  - Absolute best tariffs instead of best of big three
  - ToU and demand tariffs

Questions, Comments?