Warm and safe?

An exploration of householder practices and perceptions of heating in Victoria

Pabasara Wijeratne

(PhD, BSc (Hons), MRICS)

Post-doctoral Research Fellow

School of Property Construction and Project Management

RMIT University

Introduction

Accelerating the energy transition in housing requires a comprehensive strategy considering public attitudes toward current and future energy technologies.

RP2.1-10 - Understanding householder electricity and gas practices – Managing the transition of customers with vulnerability towards future fuels

To understand how and why householders balance electricity and gas services in the home and what connections there may be to the affordability of energy services and pre-existing vulnerabilities.

- A better understanding of householders' balancing of electricity and gas services.
- A better understanding of how householder energy practices shape, or are shaped, by vulnerabilities and affordability.
- The implications of this new knowledge for the transition to future fuels and the electrification of residential energy.

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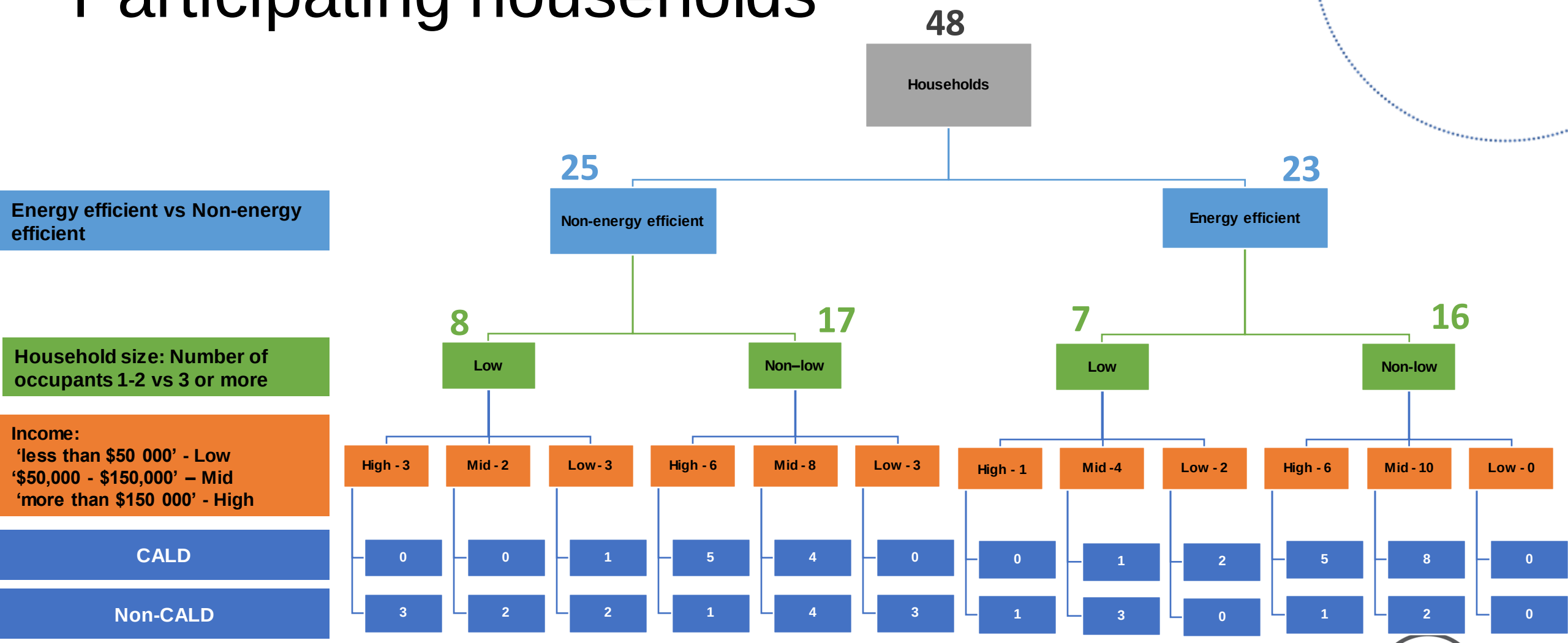
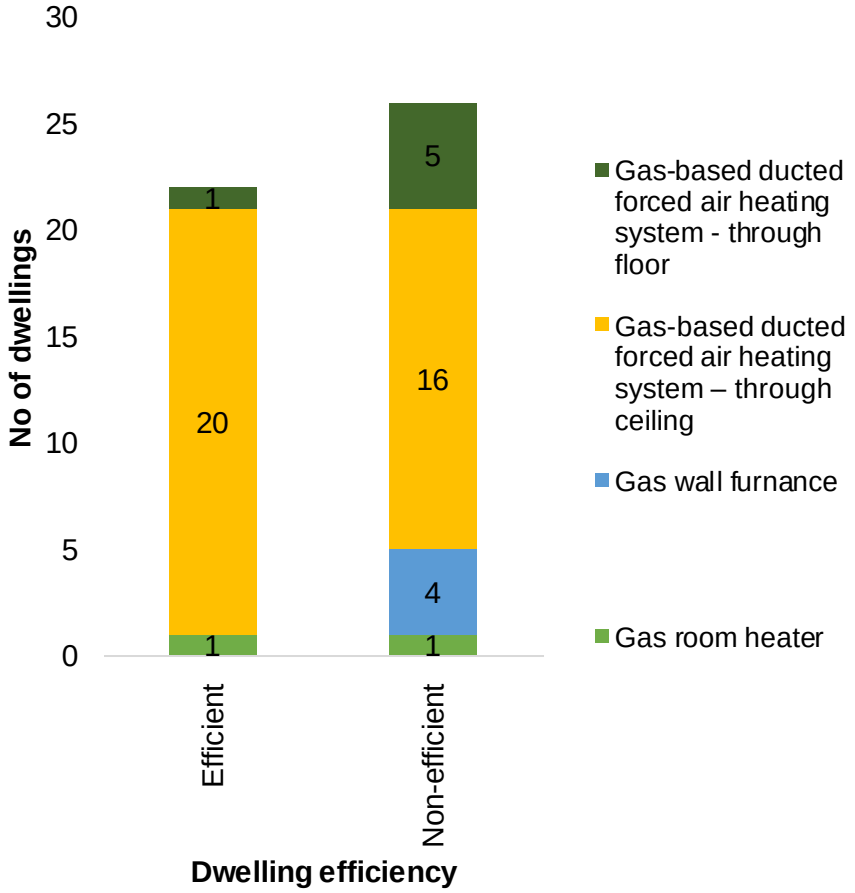
Participating households

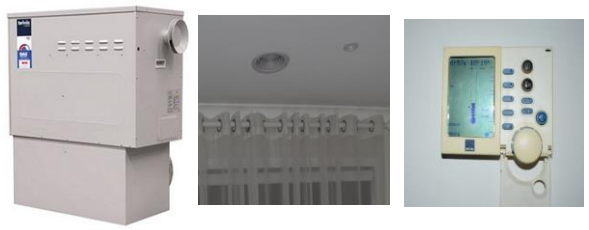


Energy-using heating systems

Gas based heating systems



Ducted forced air heating system – through ceiling



Heating unit – in roof
Source: (Brivis 2017:6,p.6)

Air outlets in the ceiling (HH30)

Thermostat (HH30)

Ducted forced air heating system – through floor

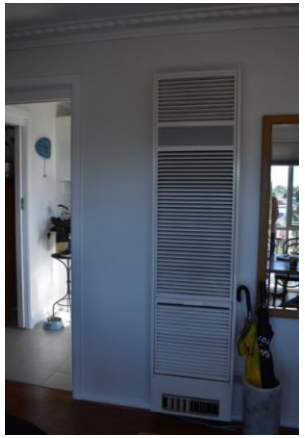
Heating unit – outside (HH33)

Air outlets in the ceiling (HH33)

Thermostat (HH33)

Gas wall furnace/heater

(INT20)

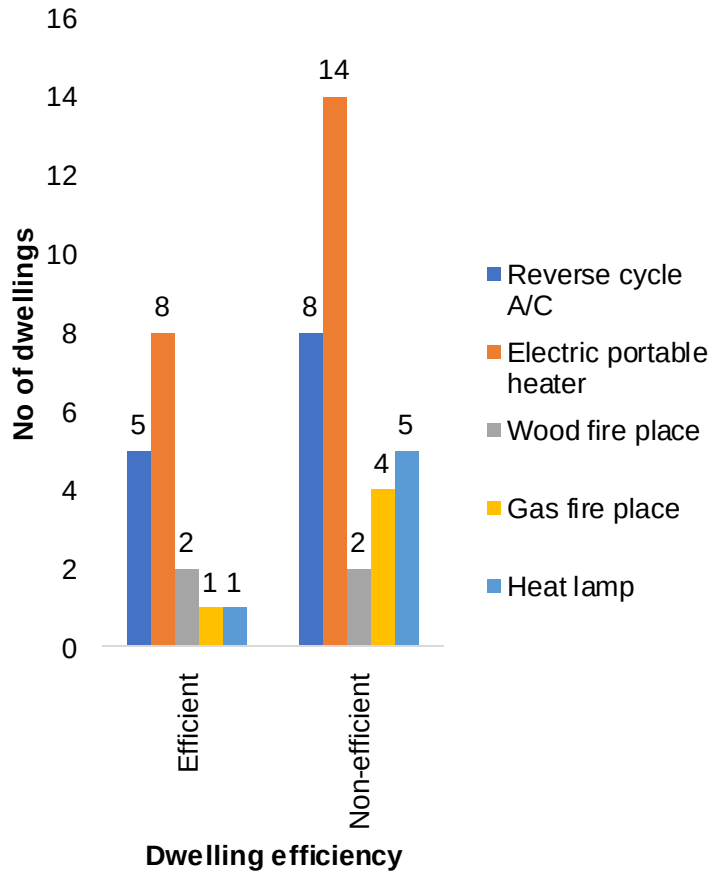


Gas room heater

(INT11)

Energy-using heating systems contd.

Auxiliary heating systems



Reverse cycle air conditioning

(HH25)

Electric portable heaters

Oli heater (HH33) Panel heater (HH39) Fan heater (HH37)

Gas fireplaces

(HH46)

Wood fireplaces

(HH39)

Heat lamp in the bathrooms

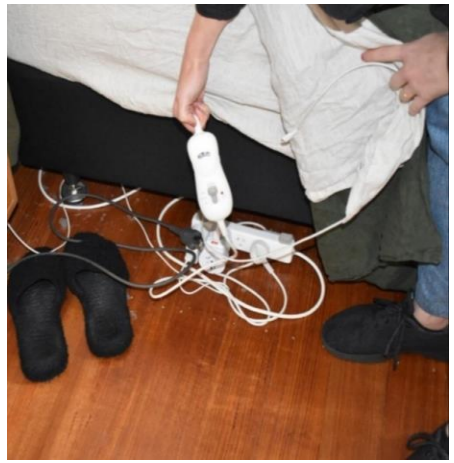
(HH38)

Non-energy-using mechanisms

- Extra layer of clothing (Jumpers, cardigans, Oodies, long pants, puffer jackets and socks)
- Thermal blankets and bedding
- Warm water bottles or heat packs
- Exercising – 100 sit-ups!
- Hot showers
- Coffee

*I **don't have my heater on all the time**. I make my kids **wear extra jumpers**, and **jackets**.*
(HH23, high income, CALD, energy efficient home)

Throws used in the living room (INT3)



Electric blanket (INT17)

Heating practices

The householders pursued partial/spatially restricted heating as normal:

- Preferable when not all household members are at home.
- Heating the whole dwelling when only a few rooms were occupied was perceived as wasteful.
- Zoning the heat distribution of the central heating systems.
- Using portable heaters to provide warmth in a single room.

*"Y**ou're not in every room**, **it's only three people** in the house and if I turn on the heater then I think **it's a waste sometimes and also expensive**."*

(HH38, mid-income, CALD, non-efficient house)

Heating practices contd.

Switch from gas to electric heating shaped by perceptions of control:

- Zoning of gas ducted heating systems allowed some control of spatial restrictions.
- However, not finely tuned as reverse cycle air conditioning.
- Utilization of solar power to reduce bills.

*"As soon as we know if we're going to get **solar panels**, then I will try and **get the split systems** done quickly."*

(HH39, mid-income, non-CALD, non-energy efficient house)

*"If I'm in the house by **myself**, [..] I will **switch on** just the **reverse cycle for that room** so I'm not wasting the heating for the entire house."*

(HH36, mid-income, CALD, energy efficient house)

Maintenance of gas heating systems

Maintenance:

- Routine maintenance:
  - Regular cleaning of the vents and grills, replacing air filters, replacing the thermostat batteries etc.
- Repairs due to heating system installation
  - Problems in zoning, gas leaks etc.

Cleaned return air vent - HH34

*"As long as **it's still working**, I think **it's okay**. And then also it's a bit **difficult to find a good technician**.[..]. So, I **never maintain it**."*
(HH38, mid-income, CALD, non-efficient house)

Shaped by:

- Age of the system
- Affordability of professional services.
- The level of knowledge and understanding of the household.
- Planning for the energy-related future

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Safety of gas heating

Most householders were confident of the safety of the system.

*"[..]; I would generally say I've got **no qualms** about it."*

(HH25, non efficient dwelling, non low household, mid income, Non-CALD)

*"I have **no clue** how to protect it to be honest. [..] I don't even know which technician I need to call in way."*

(HH38, non-efficient dwelling, non low household, mid income, CALD)

Some householders took it for granted.

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Safety of gas heating contd.

Some concerns re carbon monoxide

*"“The only concern I think in ducted heating is does it produce **carbon monoxide**? .. carbon monoxide is - it's a **deadly gas** and you would **not notice the pollution** because it's odourless and it's colourless. [….]"*

(HH36, efficient dwelling, non low household, mid income, CALD).

HH22

INT20

Householder archetypes

Entrenched in gas

Householders who like/love gas and how it provides heating/cooling/hot water/cooking.

"Gas is - it's cheaper, it's more reliable. We have so much gas here in Australia that we can use, [..]."
(INT15, mid income, low household size, non-CALD, non-efficient dwelling)

Energy agnostic

Householders who are concerned about the best performance/cost was at the time of replacement.

"But it just all depends on prices. Once upon a time there was a massive push to go gas. And today we find ourselves in a time and an age where gas is frowned upon and it's all about electric."
(HH43, high income, non-low household size, non-CALD, non-efficient dwelling)

Moving to all-electric - cost

Householders who think the cost of gas is rapidly going up, therefore they see it as more cost-effective to be all-electric.

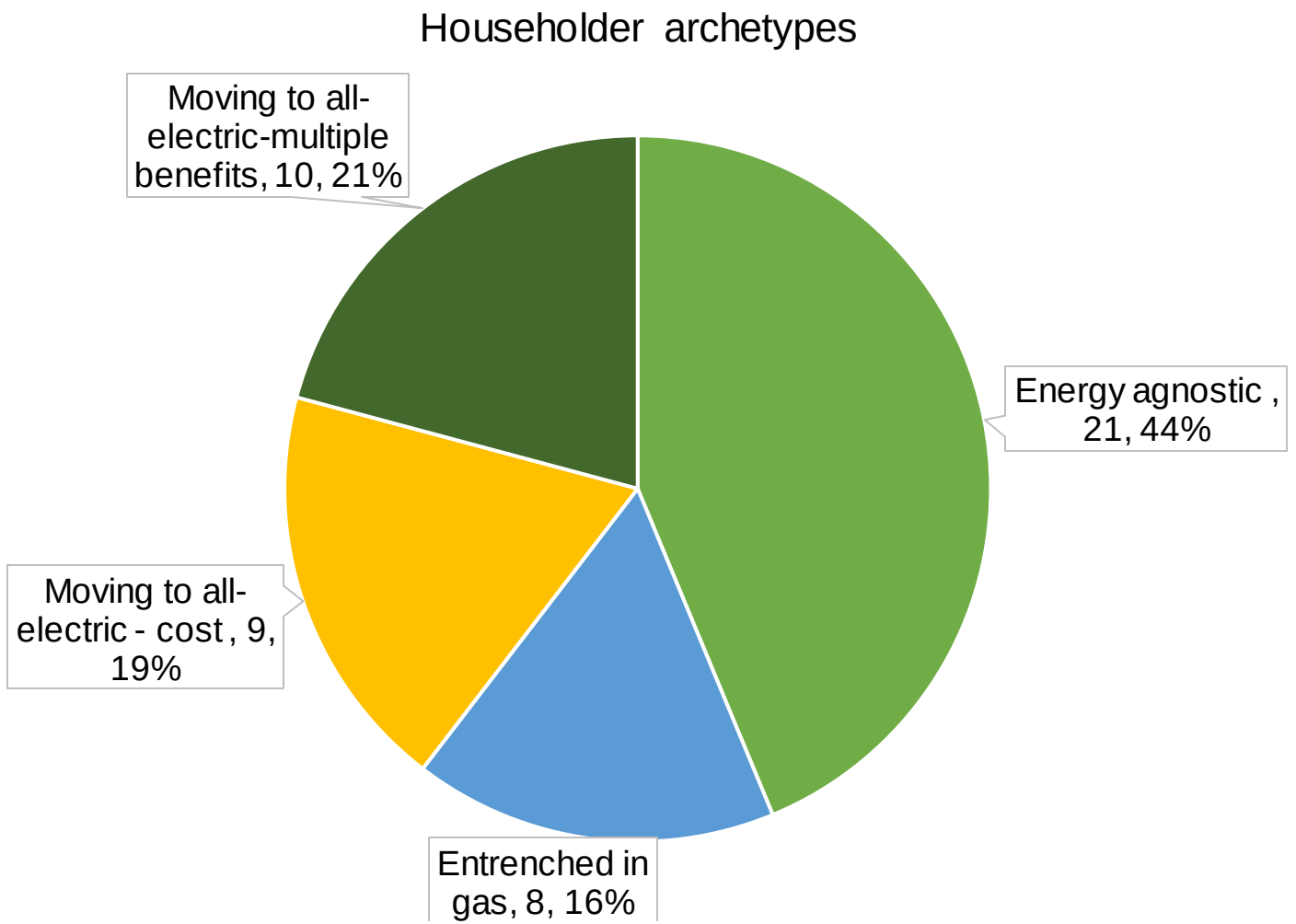
"Yeah, we are planning to switch over the whole heating from gas to electric. […]because the gas is getting more expensive. "
(INT13, high income, non-low household size, CALD, non-efficient dwelling)

Moving to all-electric – multiple benefits

Householders who want to reduce the energy-related environmental impact, reduce health issues, as well as reduce costs.

"I've got solar, I'm trying to move away from fossil fuels and the price of gas. [..]. I'm terrified of climate change."
(INT5, low income, low household size, non-CALD, non-efficient dwelling)

Householder archetypes contd.



Conclusions

- Households are proactively minimising the amount of heating they use.
- Some households consider transitioning from their current gas-ducted heating to an electric split air conditioning system (in conjunction with solar panels).
- Maintenance of gas heating systems was suboptimal in some households.
- Safety of gas heating taken for granted – except some awareness of CO.
- Broad range of views can be crystalized into 4 distinct archetypes
- Technology experts may benefit from considering individual and social energy use practices in the home when shaping the vision towards low carbon transition in housing.
- Similar analysis of cooling, cooking and hot water energy use may further inform the transition.

Enabling the decarbonisation of Australia's energy networks

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Thank you !