

# POSITIVE FOOTPRINTS

## Renovating Existing Homes for Net Zero Outcomes

Presenter: Jeremy Spencer

[www.positivefootprints.com.au](http://www.positivefootprints.com.au)







~8T/yr

Residential  
Baseline  
Study 2015

RACE TO  
NET ZERO  
CARBON

A decarbonisation guide for new and existing buildings in Australia

**1.27 TCO<sub>2</sub>/m<sup>2</sup>**







**Follow the  
well trodden path...**

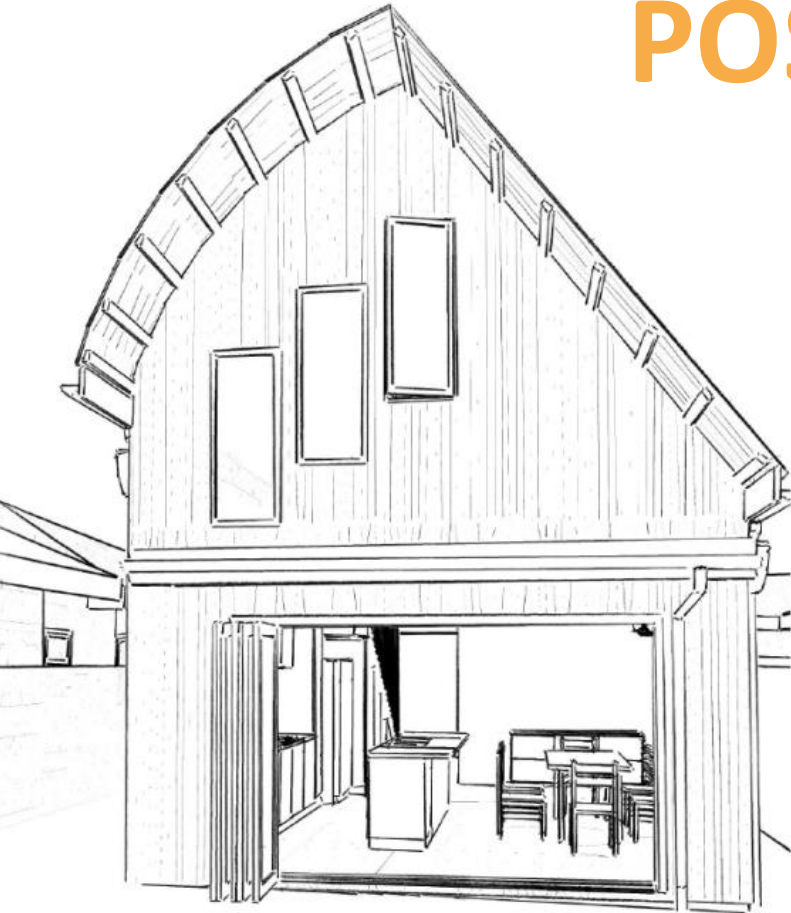
**...to Net Zero!**

Join the Conga Line...



...to Net Zero!

**POSITIVE FOOTPRINTS**

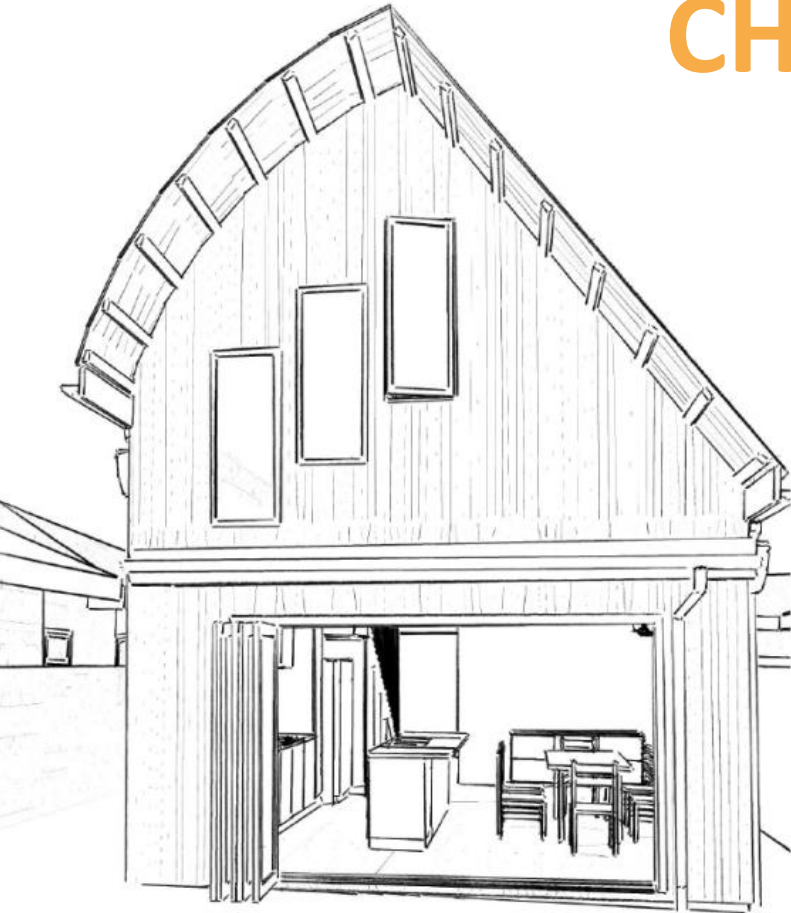


# Cheese House

[www.positivefootprints.com.au](http://www.positivefootprints.com.au)



# CHEESE HOUSE STORY...



**2 Adults, 2 kids**

**~52kWh / day**

**(Combined Gas & Elec )**

**net consumption**

[www.positivefootprints.com.au](http://www.positivefootprints.com.au)

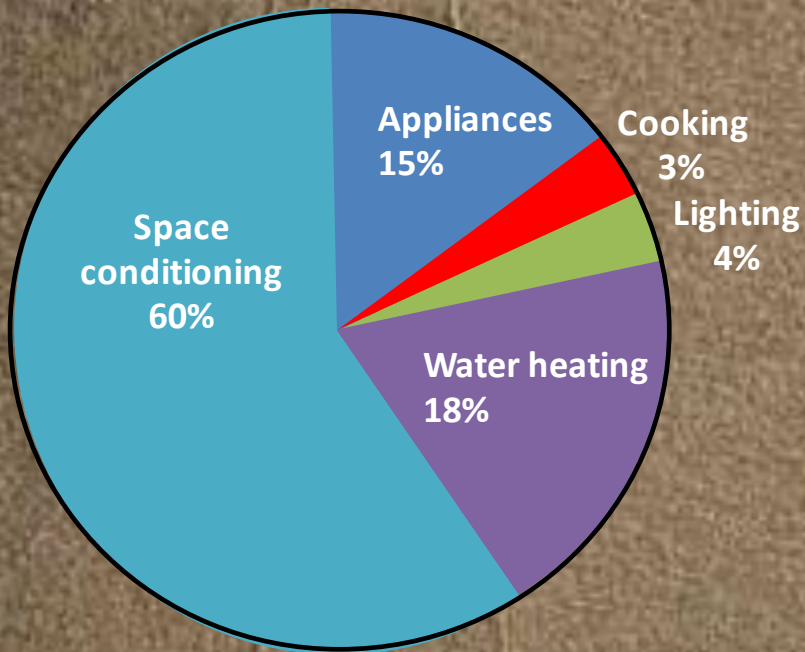




# Original Conditions



# Victoria



**Australian Av. Home Energy Use**  
(2015 Residential Baseline Study)

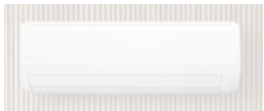
## Average Vic Home:

- **68889 MJ / yr**  
(52kW hr/day Dual)
- **~8 Tonnes CO2 / yr**
- **\$2686 energy bill**
- **~200m<sup>2</sup>**
- **Av. 3 star home**  
(Pre 1990: 1.5stars)



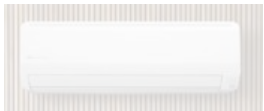
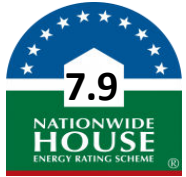
# Step 1:

Minimise  
Space  
Conditioning  
Requirements



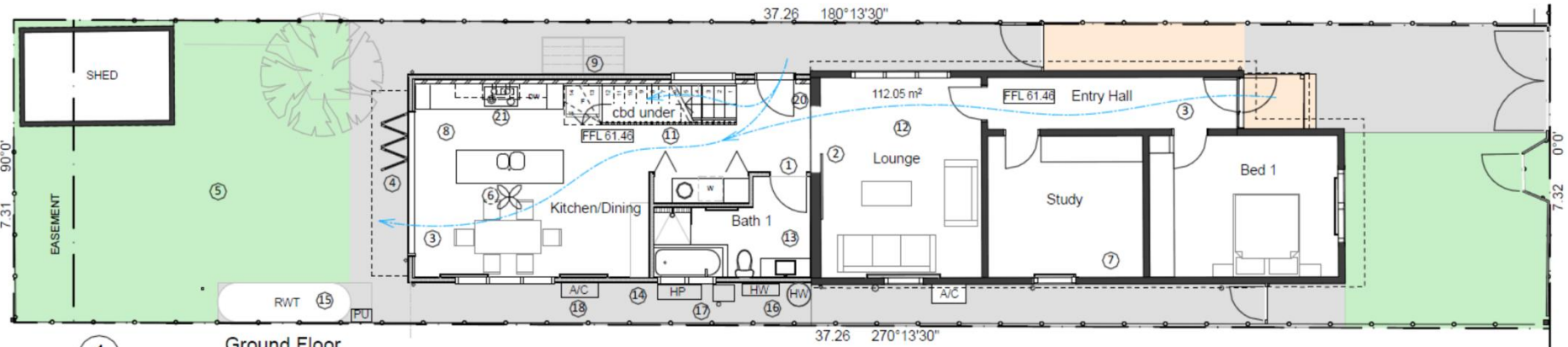
# Step 1:

Minimise  
Space  
Conditioning  
Requirements

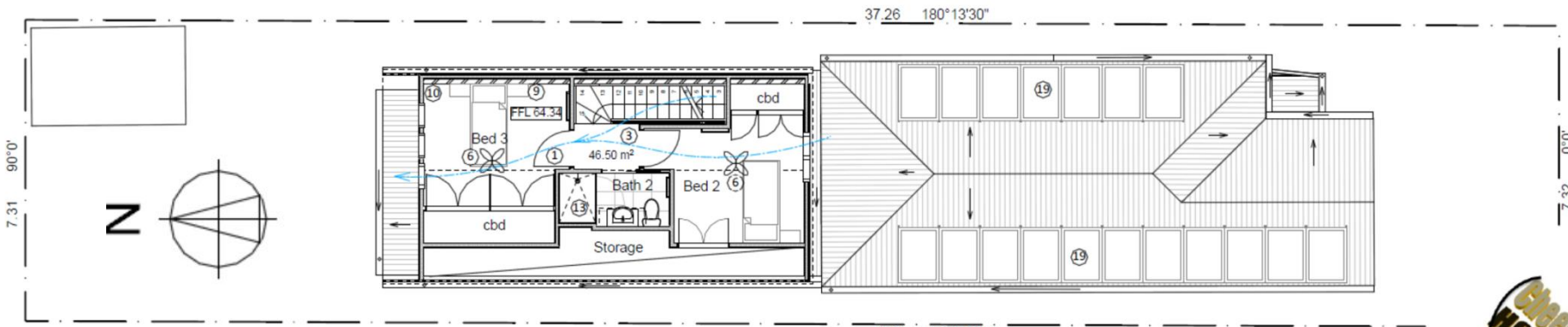




# Living to North



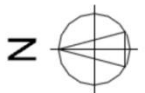
1 Ground Floor  
1:100

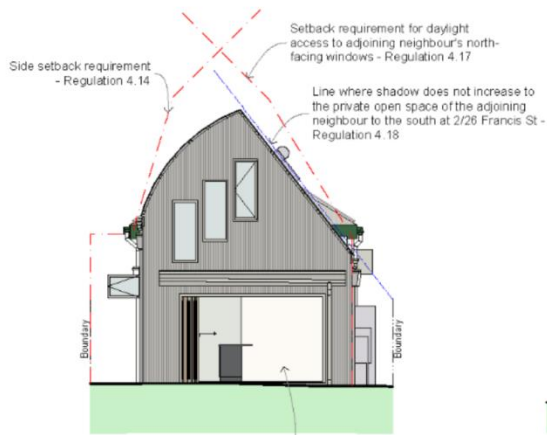


2 First Floor  
1:100

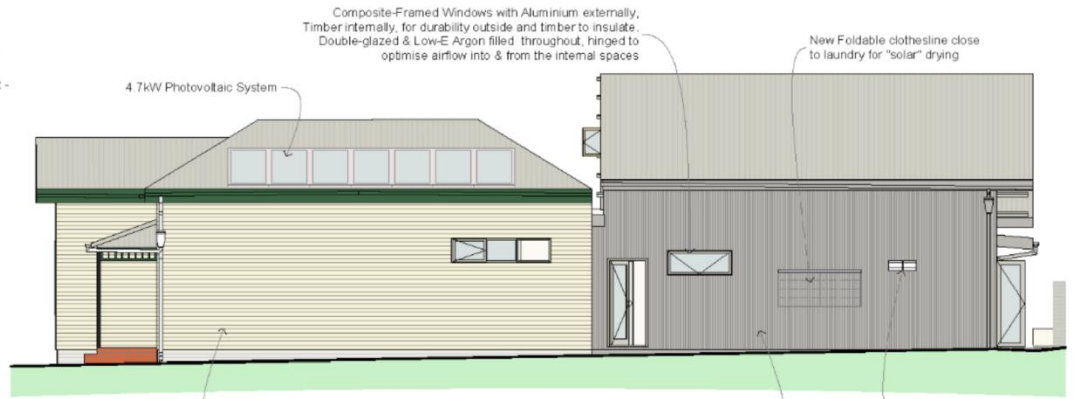
## Floor Plans

1:100@A3





North



East



West



South

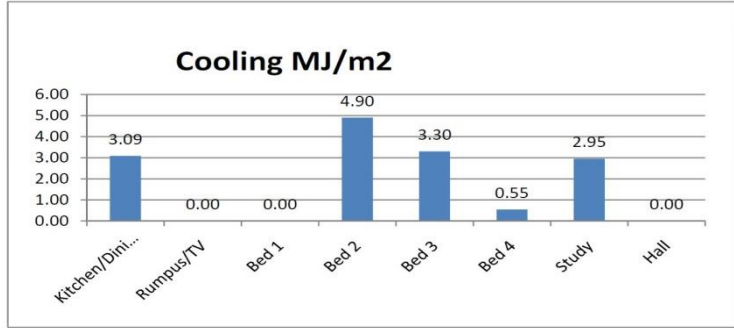
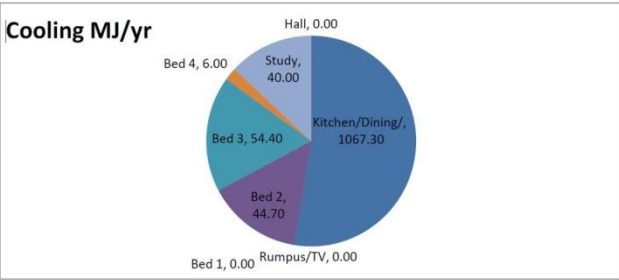
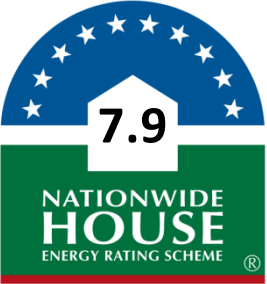
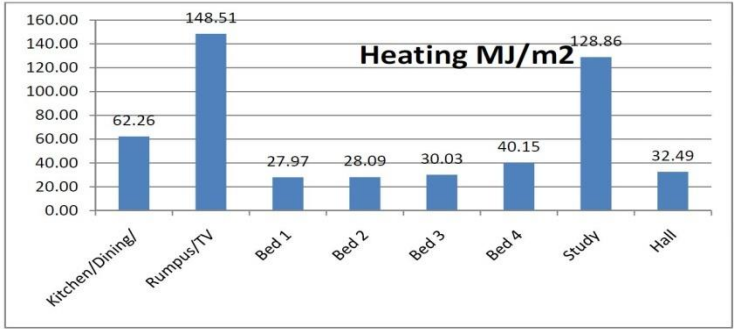
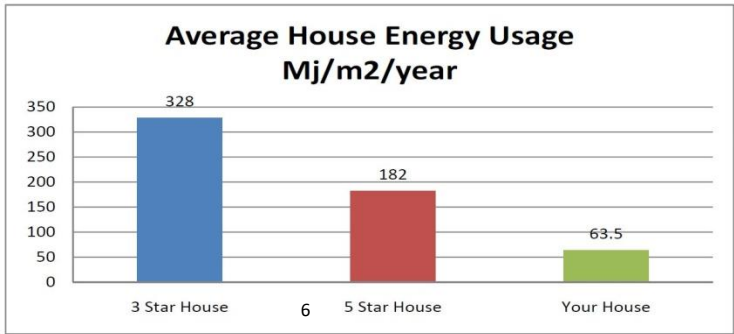
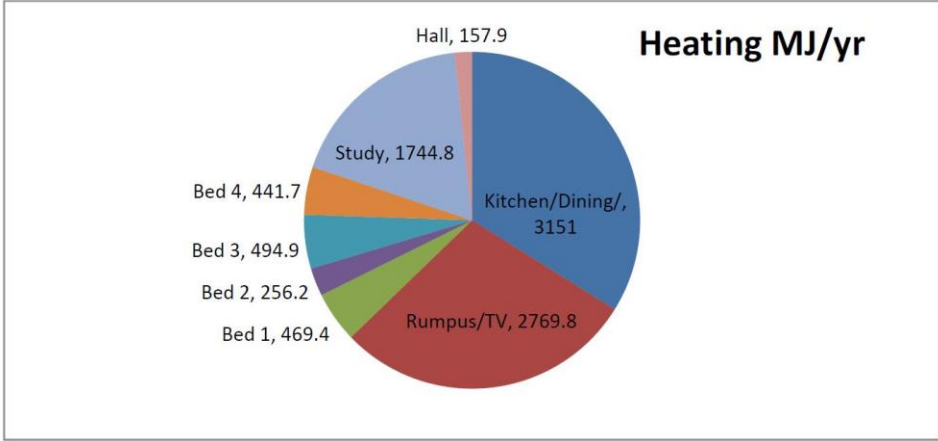


Elevations



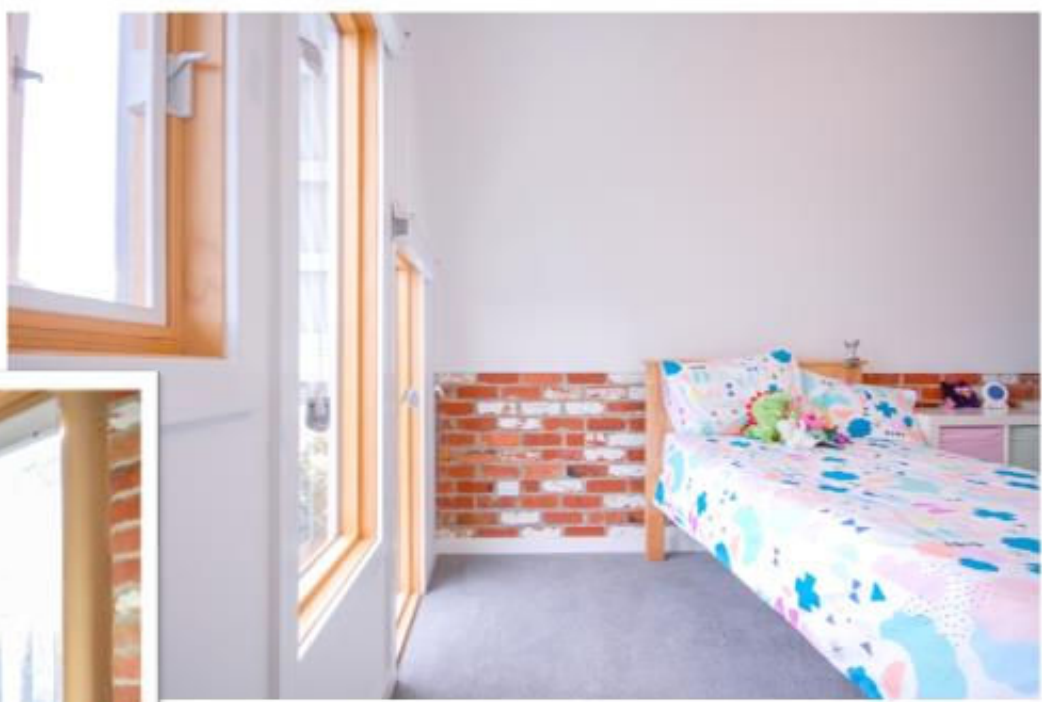


# Use NatHERS software interrogation at design



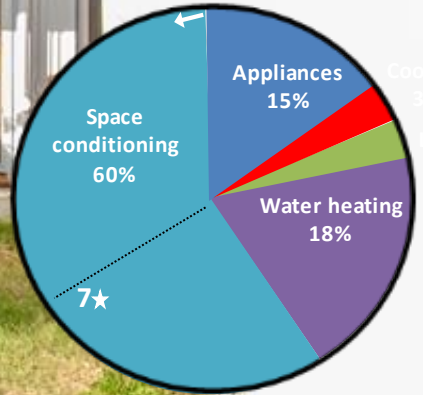
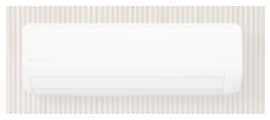
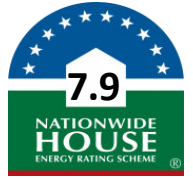


Windows:  
U2.1  
SHCG 0.4



# Step 1:

Minimise  
Space  
Conditioning  
Requirements

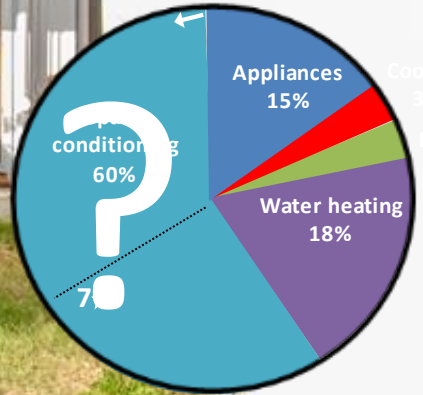
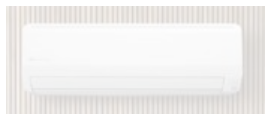
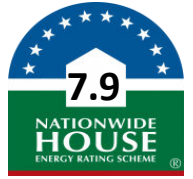


Victorian Av. Home Energy Use  
(2015 Residential Baseline Study)



# Step 1:

Minimise  
Space  
Conditioning  
Requirements



Victorian Av. Home Energy Use  
(2015 Residential Baseline Study)



# Re-insulation of existing walls







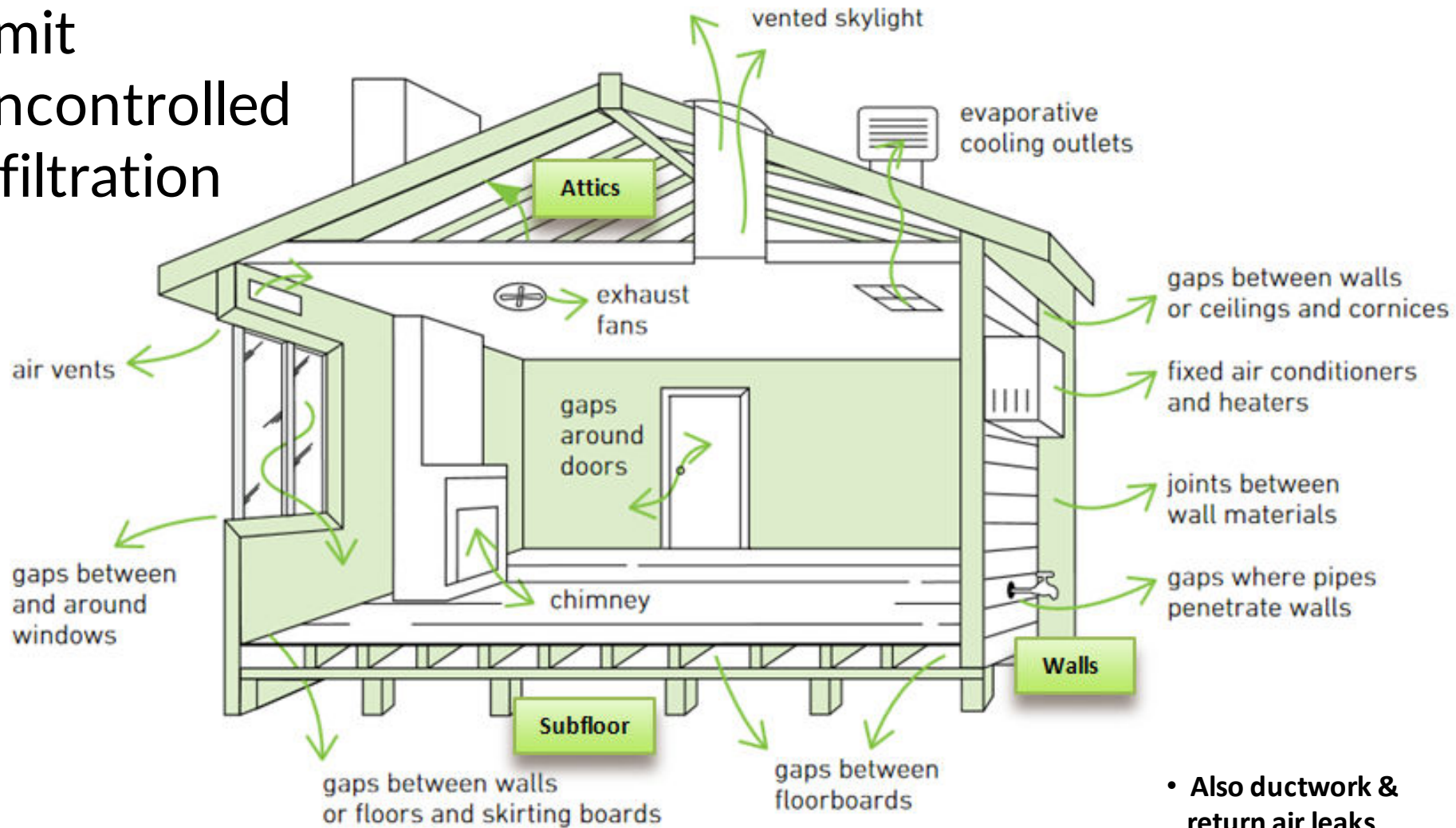
# Re-insulate Existing Floors & Attic



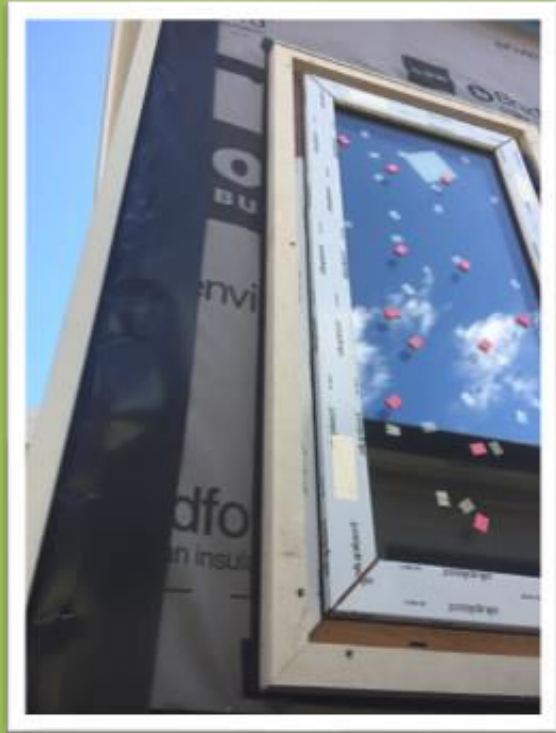




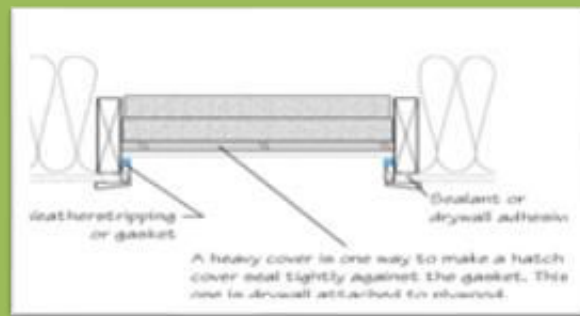
# Limit Uncontrolled Infiltration



- Also ductwork & return air leaks







# Build a High Performance Culture

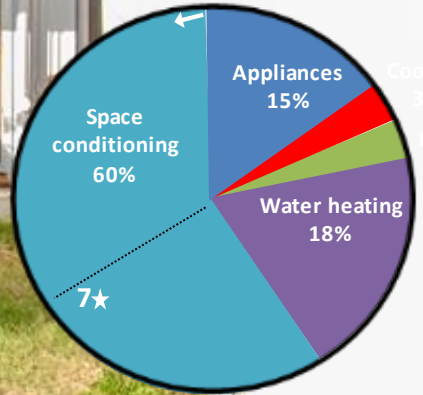
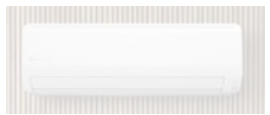
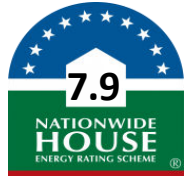


Positive Footprints Thermal Ninjas



# Step 1:

Minimise  
Space  
Conditioning  
Requirements

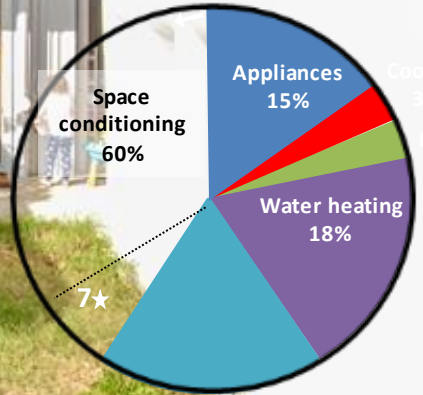
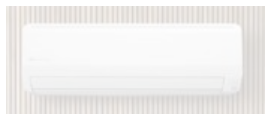
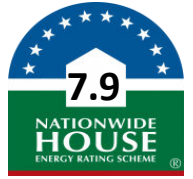


Victorian Av. Home Energy Use  
(2015 Residential Baseline Study)



# Step 1:

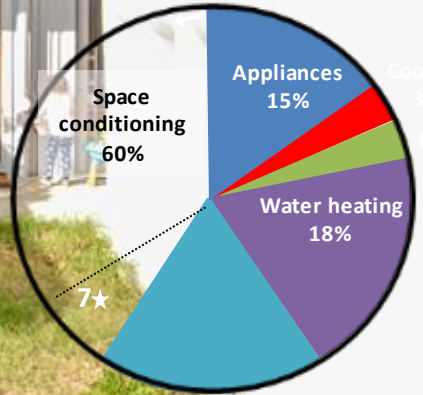
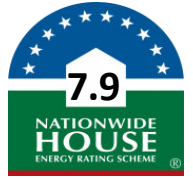
Minimise  
Space  
Conditioning  
Requirements



Victorian Av. Home Energy Use  
(2015 Residential Baseline Study)

# Step 1:

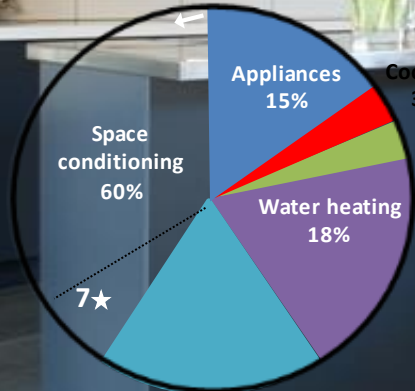
Minimise  
Space  
Conditioning  
Requirements



Victorian Av. Home Energy Use  
(2015 Residential Baseline Study)



# Heat Pump Heating (All Electric House)

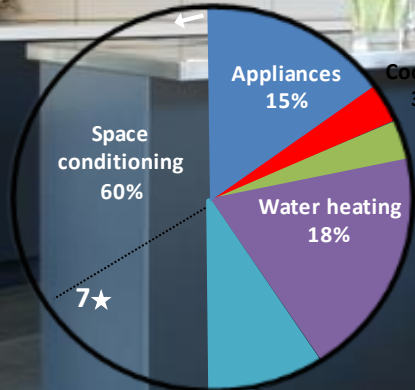


Victorian Av. Home Energy Use

(2015 Residential Baseline Study)



# Heat Pump Heating (All Electric House)

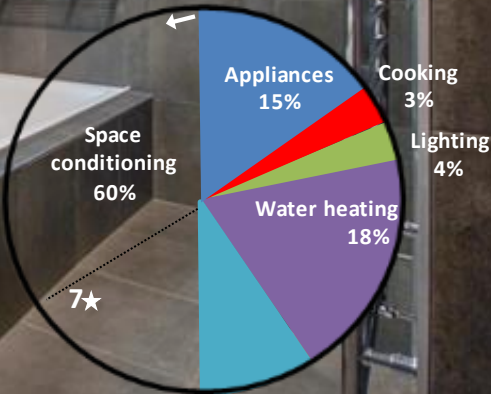


Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

# Step 2:

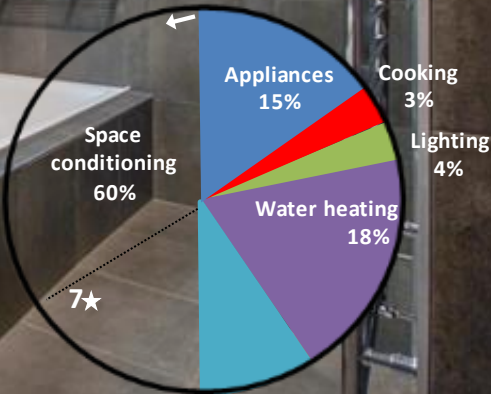
## Minimise Hot Water Energy Use



Victorian Av. Home Energy Use  
(2015 Residential Baseline Study)

# Step 2:

## Minimise Hot Water Energy Use

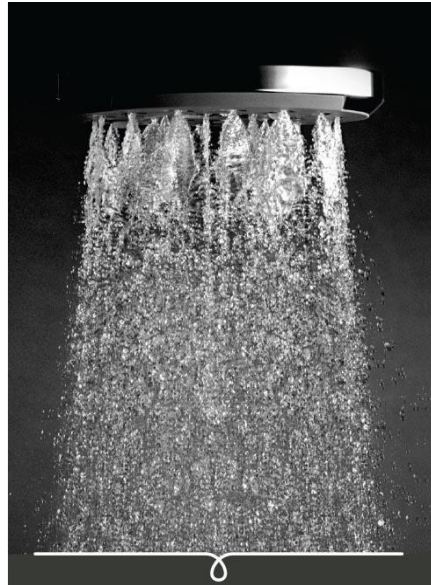


Victorian Av. Home Energy Use

(2015 Residential Baseline Study)



# Install Water Efficient Fixtures



Satinjet®. The unmistakable feeling of 300,000 droplets per second.

Unlike conventional showers, Satinjet uses unique twin-jet technology to create optimum water droplet size and pressure, with over 300,000 droplets per second providing greater coverage. The result is an elegant, full-body experience.



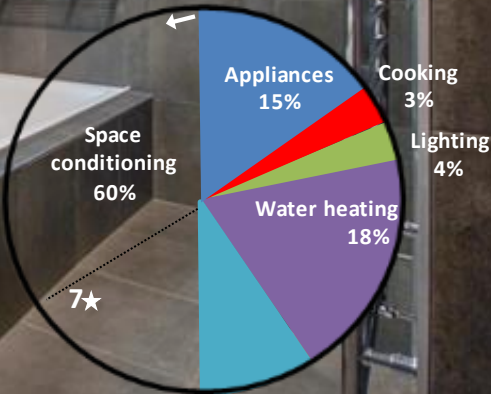
- 3 star – 9 l/min
- 4 star – 7.5l/min
- 5 star – 6l/min



**1/3 Hot Water**

# Step 2:

## Minimise Hot Water Energy Use

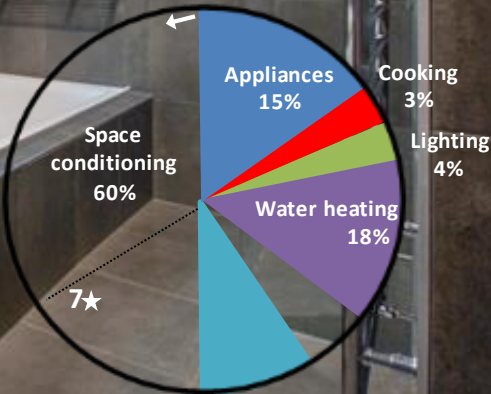


Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

# Step 2:

## Minimise Hot Water Energy Use



**Victorian Av. Home Energy Use**  
(2015 Residential Baseline Study)



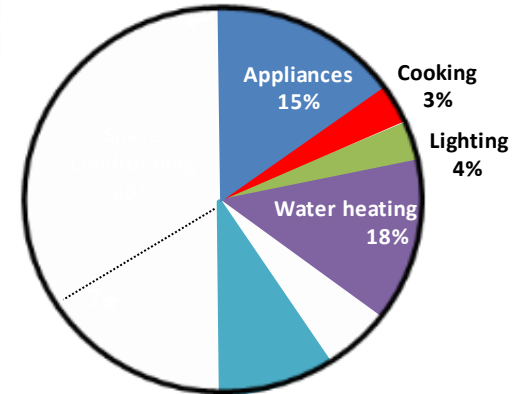
# Step 2:

## Minimise Hot Water Energy Use



Victorian Av. Home Energy Use  
(2015 Residential Baseline Study)

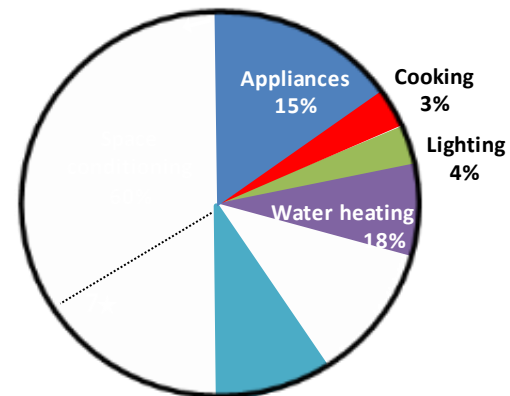
# Install Heat Pump Hot Water



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

# Install Heat Pump Hot Water



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

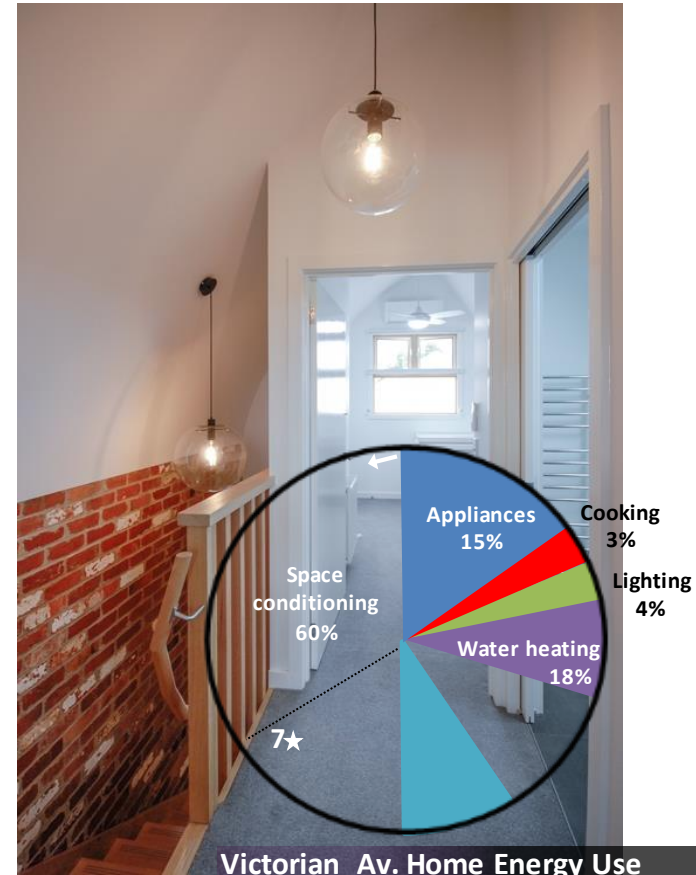


# Step 3:

Minimise  
Lighting  
Energy Use



# LED's & Pendants

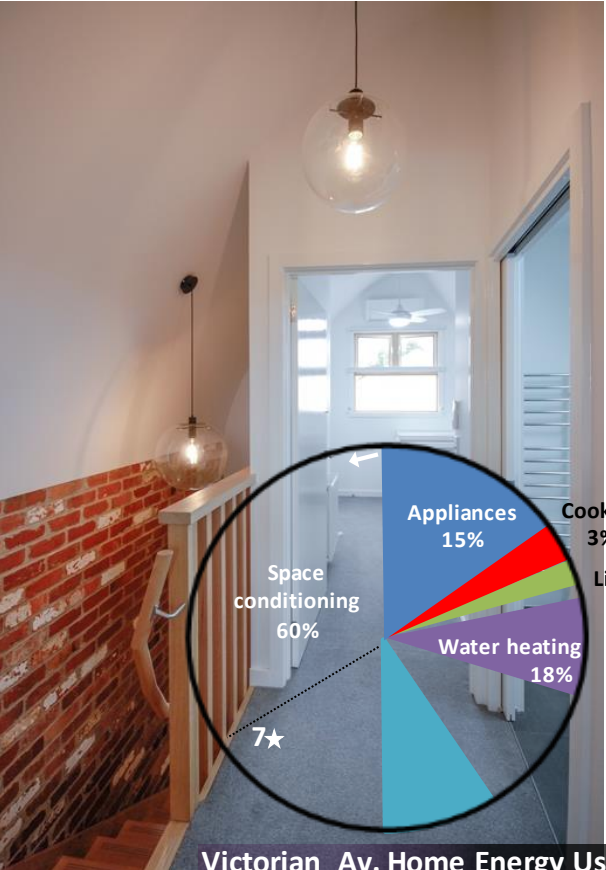


# Step 3:

Minimise  
Lighting  
Energy Use



# LED's & Pendants



Victorian Av. Home Energy Use

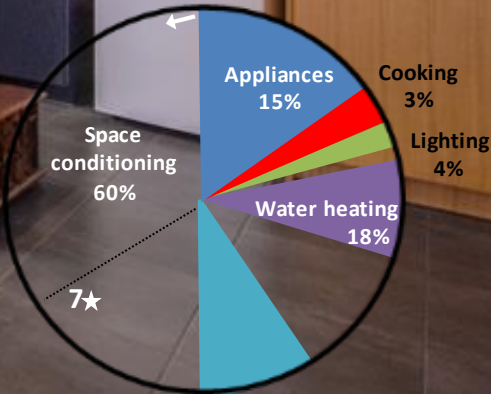
(2015 Residential Baseline Study)

# Step 4:

Minimise  
Cooking  
Energy Use



# Install Induction Cooking



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

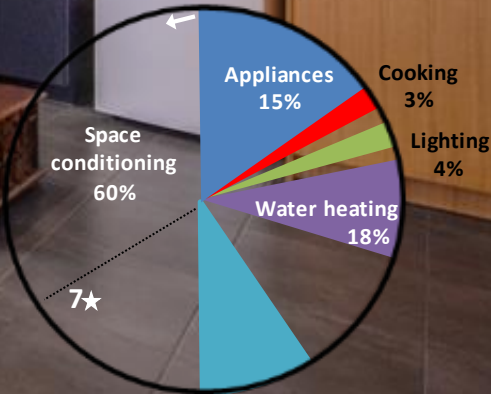


# Step 4:

Minimise  
Cooking  
Energy Use



# Install Induction Cooking



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

# Step 5:

Minimise  
Appliance  
Energy Use

# Choose Higher Star Appliances



Fridge

TV/Computer Monitor

Washer

Dishwasher

Dryer


[www.energyrating.gov.au](http://www.energyrating.gov.au)

More stars, more savings

When comparing similar sized products look for more stars and save money.

Energy Rating Labels are an Australian Government requirement on new appliances, making it easy to compare running costs.

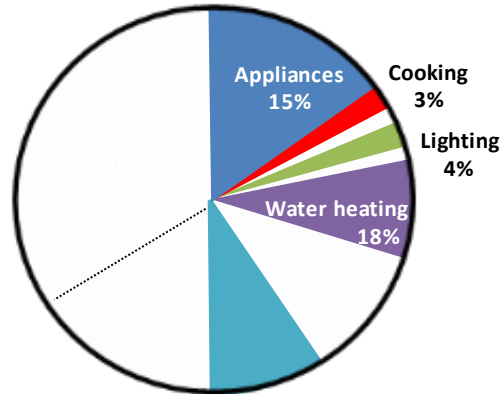


Energy Consumption and Running Costs 

Low score saves more

The lower the energy consumption score, the less electricity the appliance uses, and the cheaper it will be to run.

To see how much that new appliance is really going to cost you select an appliance above and calculate the running costs.



# Step 5:

Minimise  
Appliance  
Energy Use

# Choose Higher Star Appliances



Fridge

TV/Computer Monitor

Washer

Dishwasher

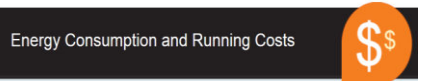
Dryer

[www.energyrating.gov.au](http://www.energyrating.gov.au)

More stars, more savings

When comparing similar sized products look for more stars and save money.

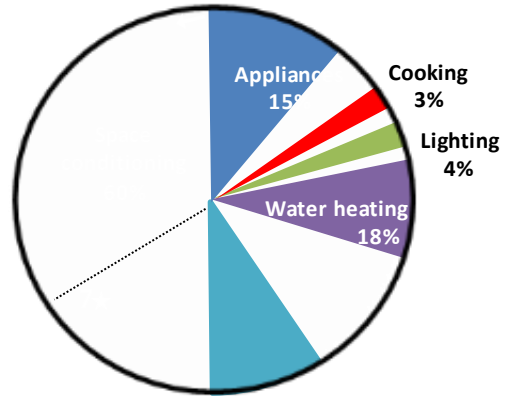
Energy Rating Labels are an Australian Government requirement on new appliances, making it easy to compare running costs.



Low score saves more

The lower the energy consumption score, the less electricity the appliance uses, and the cheaper it will be to run.

To see how much that new appliance is really going to cost you select an appliance above and calculate the running costs.



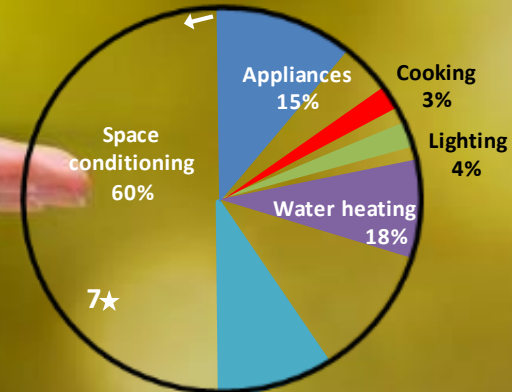


# Step 6:

Offset  
With PV



# Install Solar Photovoltaics



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

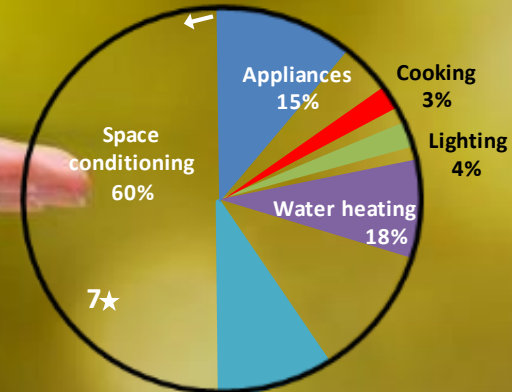
# Step 6:

Offset  
With PV



# Install Solar Photovoltaics

(4.7kWp system)



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

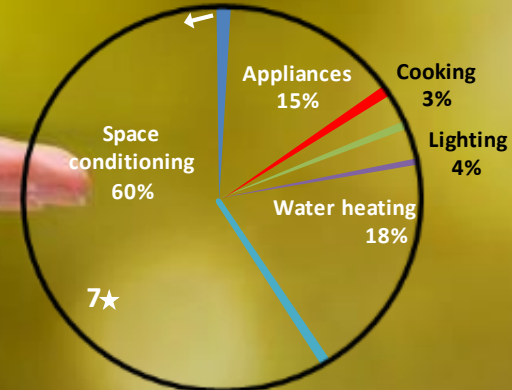
# Step 6:

Offset  
With PV



# Install Solar Photovoltaics

(4.7kWp system)



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)



# Step 6:

Offset  
With PV

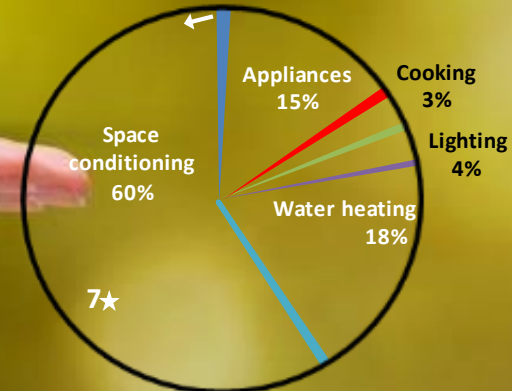


# Install Solar Photovoltaics

(4.7kWp system)

2 Adults, 2 Kids

~3.3kWh / day  
net consumption



Victorian Av. Home Energy Use

(2015 Residential Baseline Study)

# NOW, Use Whole of Home to size PV

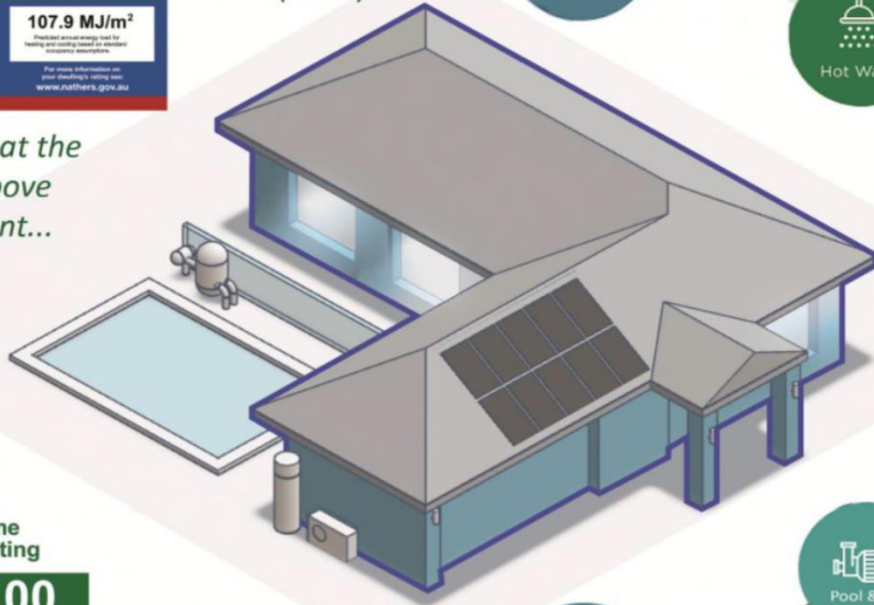


Thermal Shell



Then use the Whole of Home (WoH) tool...

First achieve thermal rating at the minimum or above NCC requirement...



Plug in Appliances



to generate your WoH rating.



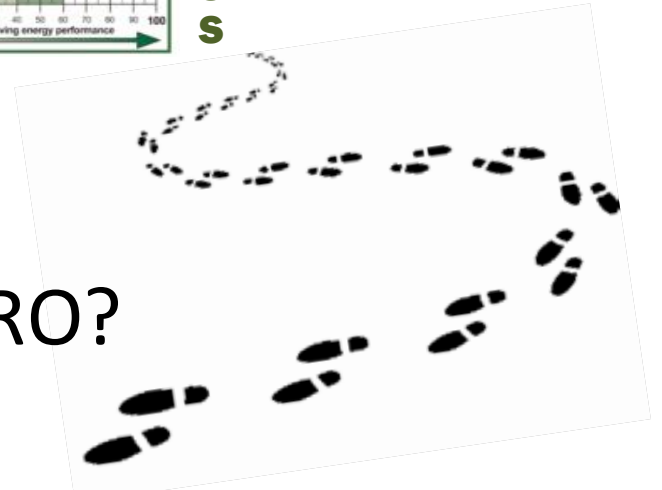
PASS

Net ZERO

# ➔ Aim for ZERO!



Q. What is the difference,  
between a Pass and Net ZERO?



**Net ZERO**

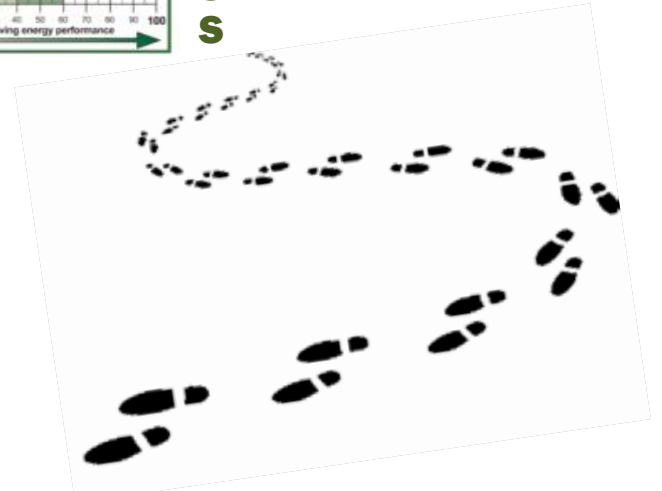




# ➔ Aim for ZERO!



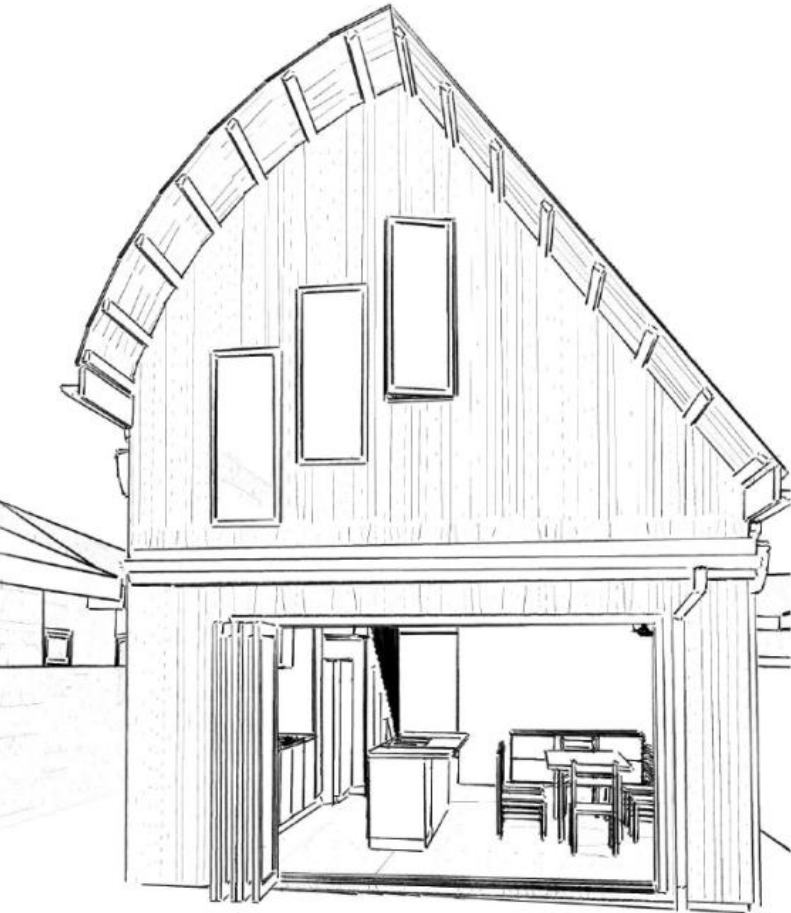
A. The PV is **bit** Bigger!



Net ZERO

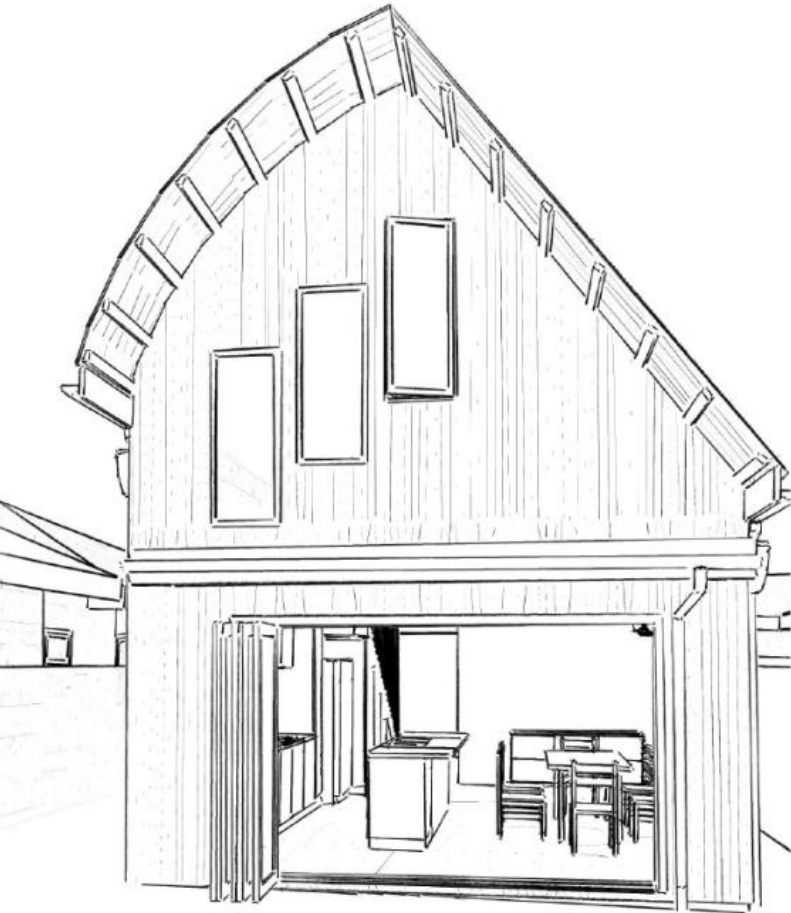


# Savings



# Savings

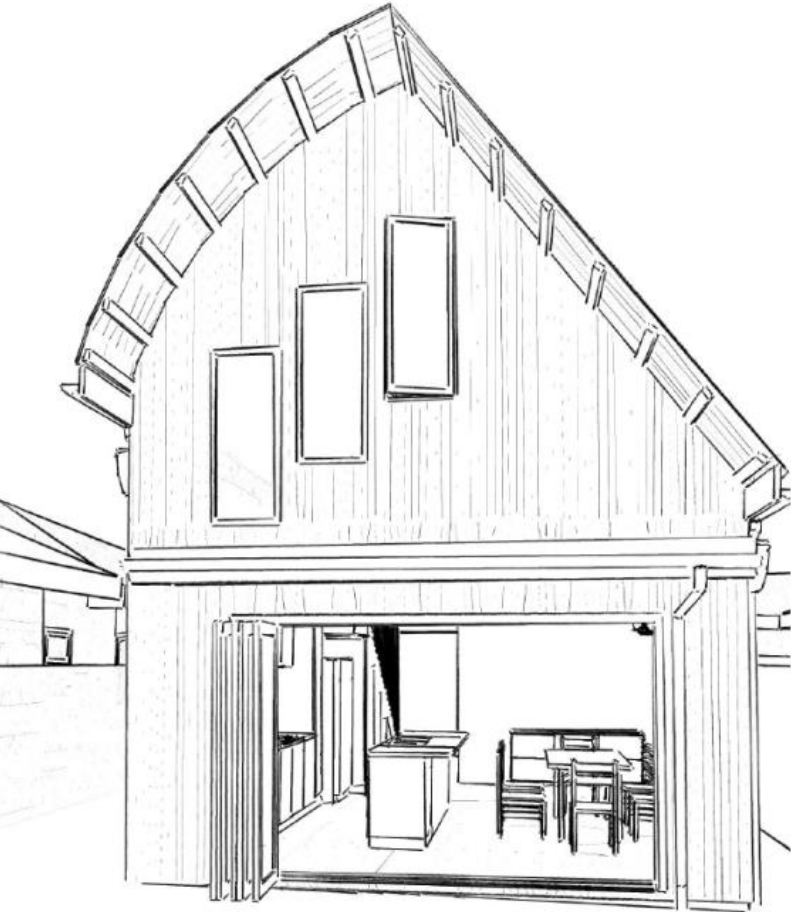
- \$\$\$





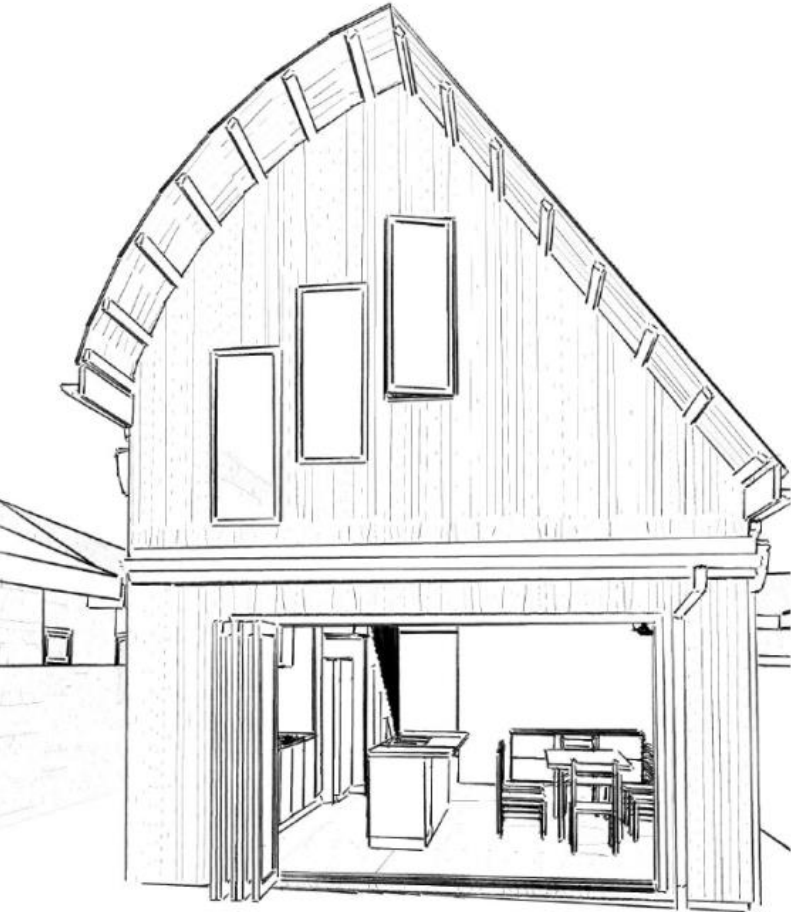
# Savings

- \$\$\$
- Comfort & Sanctuary



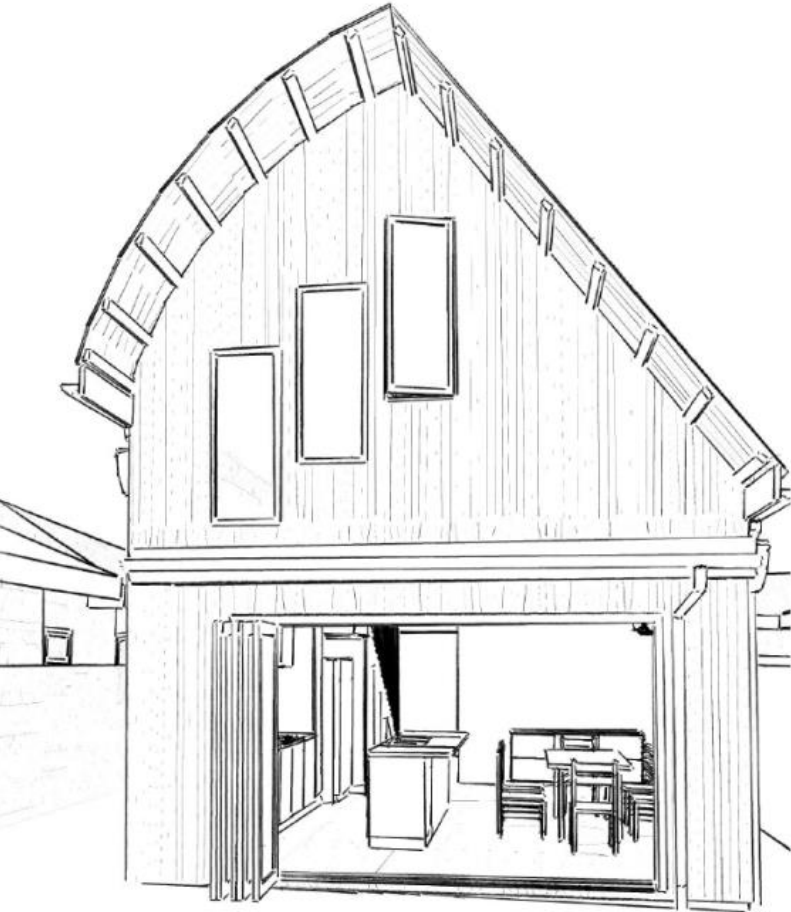
# Savings

- \$\$\$
- Comfort & Sanctuary
- ~8 tonnes CO2/yr

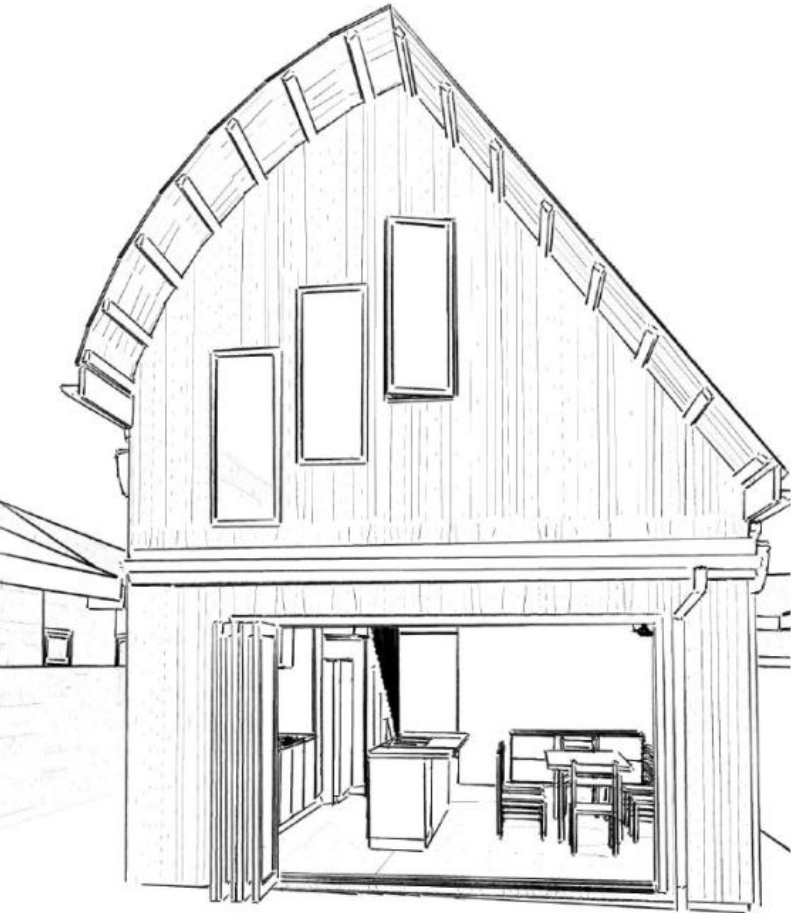


# Savings

- \$\$\$
- Comfort & Sanctuary
- ~8 tonnes CO2/yr
- **100+ tonnes**  
(Embodied Carbon Savings)



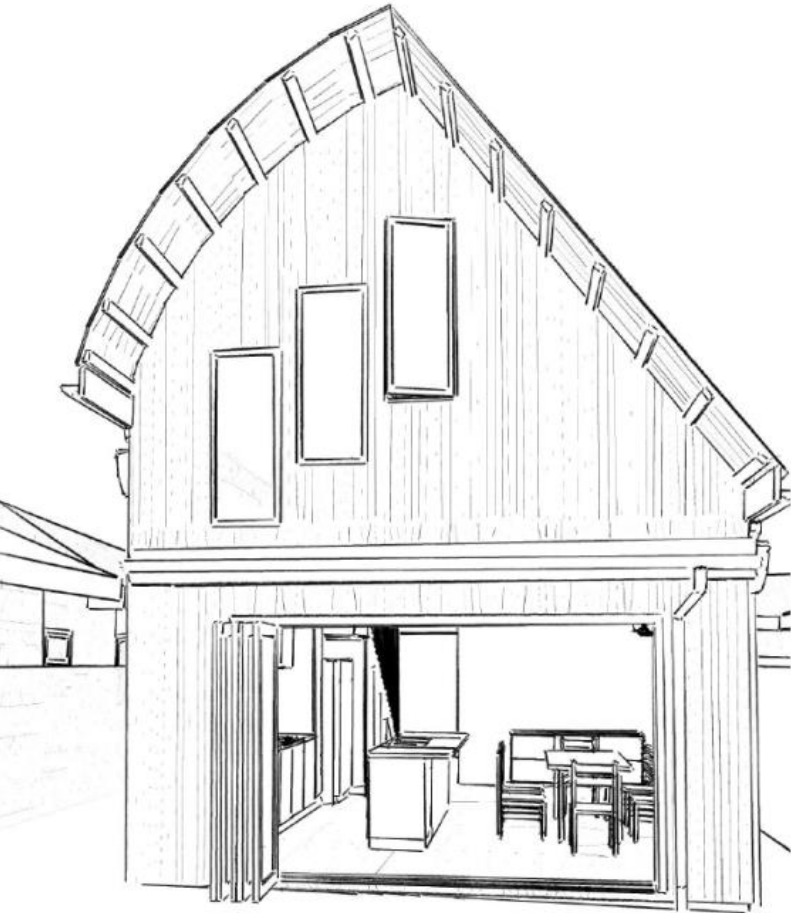




# Savings

- \$\$\$
- Comfort & Sanctuary
- ~8 tonnes CO<sub>2</sub>/yr
- **100+ tonnes**  
(Embodied Carbon Savings)

**Walk the well  
trodden path...**

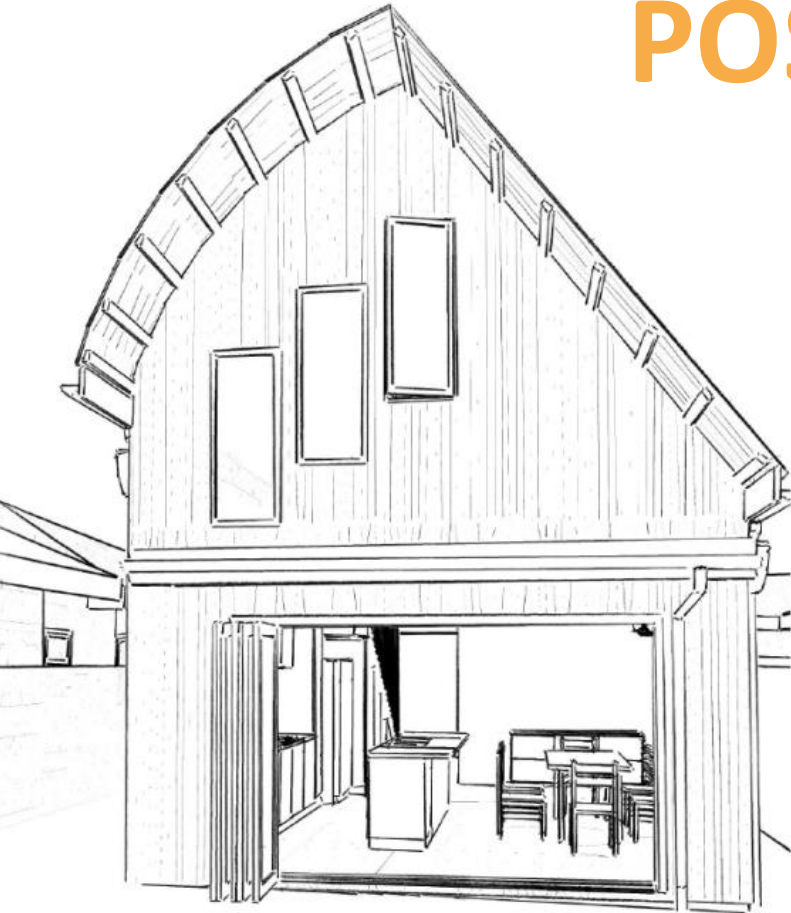


# Savings

- \$\$\$
- Comfort & Sanctuary
- ~8 tonnes CO<sub>2</sub>/yr
- **100+ tonnes**  
(Embodied Carbon Savings)

**Make your  
Footprints Positive**

# POSITIVE FOOTPRINTS



# Cheese House

Presenter: Jeremy Spencer

[www.positivefootprints.com.au](http://www.positivefootprints.com.au)







Climate file CLIMAT21.txt

Start 1 JAN  
Day Month Day No  
1 1 1

Duration Days  
366

End 1 JAN Day No 366

Project 1

C:\Program Files (x86)\Acco  
Penola  
St\_Contract

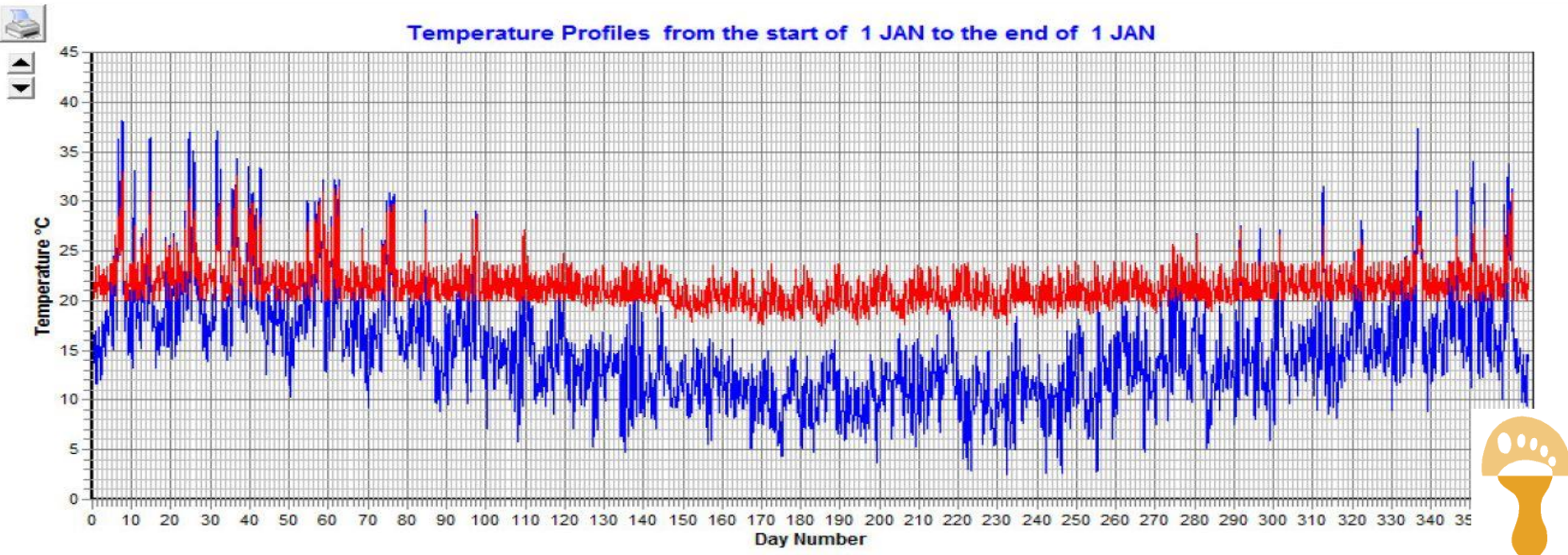
- Outdoor
- Kitchen Living
- Studio Work Are
- Study
- Master Bed
- Bed 2
- Gournd Bathroom
- Upper Bathroom
- Void over Livin

Project 2

Clear All Delete All

P1 Outdoor  
  P1 Kitchen Living

Temperature Profiles from the start of 1 JAN to the end of 1 JAN



## Potential Scores:

Suggested Strategies	Benefit	Approx. Cost
Add Blow-in insulation to existing external walls (R1.5 average)	+1.1 stars	\$50/m2
OR, Reclad existing walls & insulation with R2.7batts plus reflective foil	+1.3 stars	This cost \$28900 on a recent job, including replacing of weatherboards with more durable Linea Scyon boards.
New windows to existing W01-W04	+0.2 stars	\$4000
Roof insulation to R6.0	+0.05 stars	\$1000
R2.5 batts to existing subfloor	+0.3 stars	\$3500
Insulate behind subfloor walls in existing section with R2.0 polystyrene board	+0.05 stars	\$950
Reverse Brick Veneer to KitLiv East & Sth wall	+0.3 stars	\$150/m2
Reverse Brick Veneer wall to courtyard wall	+0.05 stars	\$150/m2
Internal brick walls to hall/bed1-bath wall	+0.05 stars	\$150/m2
Internal brick walls to kitchen/laundry	+0.05 stars	\$150/m2
Reverse Brick Veneer to existing Living external walls	+0.3 stars	\$150/m2
Tiles to hall and Bed 1over new slab	+0.05 stars	Usually slight saving compared to bamboo overlay currently specified, dependent on tile.
Make those tiles dark	+0.05 stars	No cost.
Remove side panel (reduce to 1800 wide) of D13 closest to entry (more shadow from portico.)	+0.1 stars	Saving (~\$500)
Canvas awnings over D13	+0.05 stars	\$1300 dependent on type. Could be retrofitted.
Canvas awnings over D12	+0.025 stars	\$1300 dependent on type. Could be retrofitted.
Upgrade to highest performing windows (Precedence Marvin Integrity)	+0.3 stars	Probably around \$10,000. Will require a quote
Add insulative curtains and pelmets, or slimline head fixed pleated type (Eg. Luxaflex Duette blinds). Note: Regulators have deemed that as curtains can change with fashion over time they are not included in rating mode in any of the rating softwares. Curtains however do give significant improvements, even for high performance windows – where the occupants actually use them!	Usually about 1 degree.	Depends on type. Usually not a cheap exercise for quality curtains.

**Nationwide House Energy Rating Scheme**  
**NatHERS Certificate No. 0005274394-01**  
 Generated on 08 Oct 2020 using AccuRate Sustainability V2.4.1.21

**Property**  
 Address: 11 Youngman Street, Preston, VIC, 3072  
 LotID: Lot 43  
 NCC Class\*: 1.2  
 Type: Renovation  
 Plans: 11/09/2020  
 Prepared by: Positive Footprints

**Construction and environment**  
 Assessed floor area (m<sup>2</sup>): 150.0  
 Conditioner\*: 150.0  
 Unconditioner\*: 15.4  
 Total: 165.4  
 Garage: 21  
 Exposure Type: Suburban  
 NatHERS climate zone: 1

**Thermal performance**  
 Heating: 55.8 MJ/m<sup>2</sup>  
 Cooling: 15.1 MJ/m<sup>2</sup>

**Accredited assessor**  
 Name: Jeremy Spencer  
 Business name: Positive Footprints  
 Email: jeremy@positivefootprints.com.au  
 Phone: (03) 93150566  
 Accreditation No.: VIC:EDAV/100014  
 Assessor Accrediting Organization: ICAPV  
 Declaration of Interest: Employed by designer of the building.

**Verification**  
 To verify this certificate, scan the QR code or visit [nher.com.au/QRGenerator?prf=16762626](http://nher.com.au/QRGenerator?prf=16762626).  
 When using either link, ensure you are visiting [nher.com.au](http://nher.com.au)

**National Construction Code (NCC) requirements**  
 The NCC's requirements for NatHERS-rated houses are detailed in 3.12.5(3g) and 3.12.5.1(2) of the NCC Volume Two. For apartments the requirements are outlined in 3.12.5 and 3.12.5.1(2) of the NCC Volume One.  
 In NCC 2019, these requirements include minimum star ratings and separate heating and cooling star limits that need to be met by buildings and apartments through the NatHERS assessment. Requirements additional to the NatHERS assessment that must also be satisfied include, but are not limited to, insulation installation methods, thermal breaks, building sealing, water heating and plumbing, and artificial lighting systems. The NCC and NatHERS Heating and Cooling Load Limits (Residential Building Code Book) Standard are available at [www.doh.gov.au](http://www.doh.gov.au). State and territory variations and additions to the NCC may also apply.

\*New to buyers  
 Generated on 08 Oct 2020 using AccuRate Sustainability V2.4.1.21 11 Youngman Street, Preston, VIC, 3072

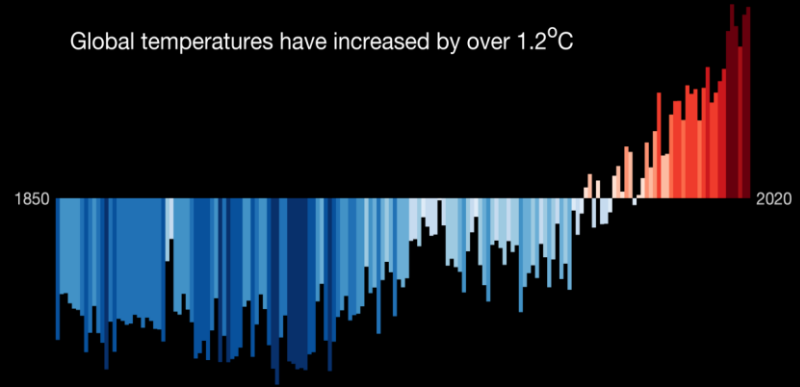
*This means  
 2 Ratings  
 each Job...*



# Climate Change is here, now

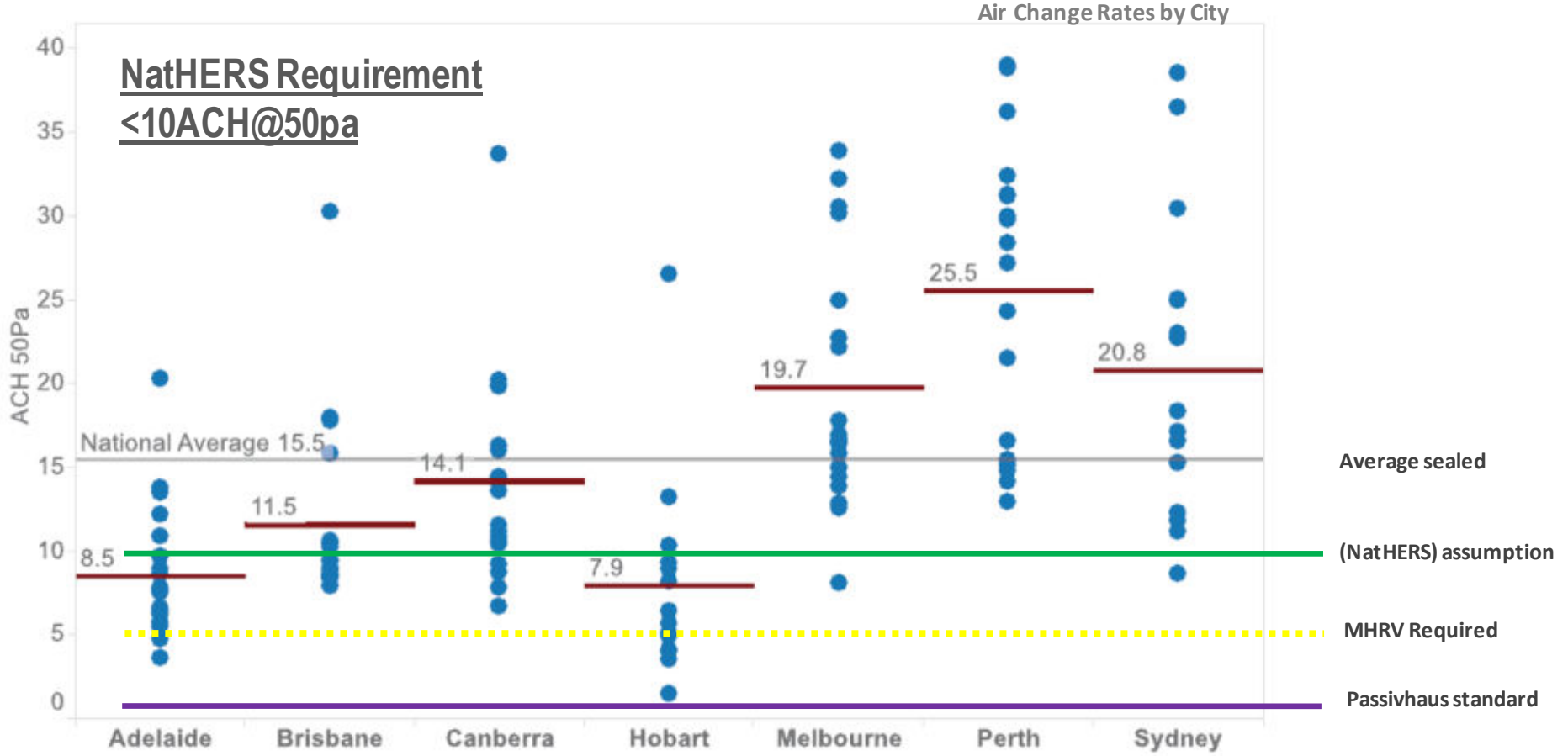


Global temperatures have increased by over 1.2°C

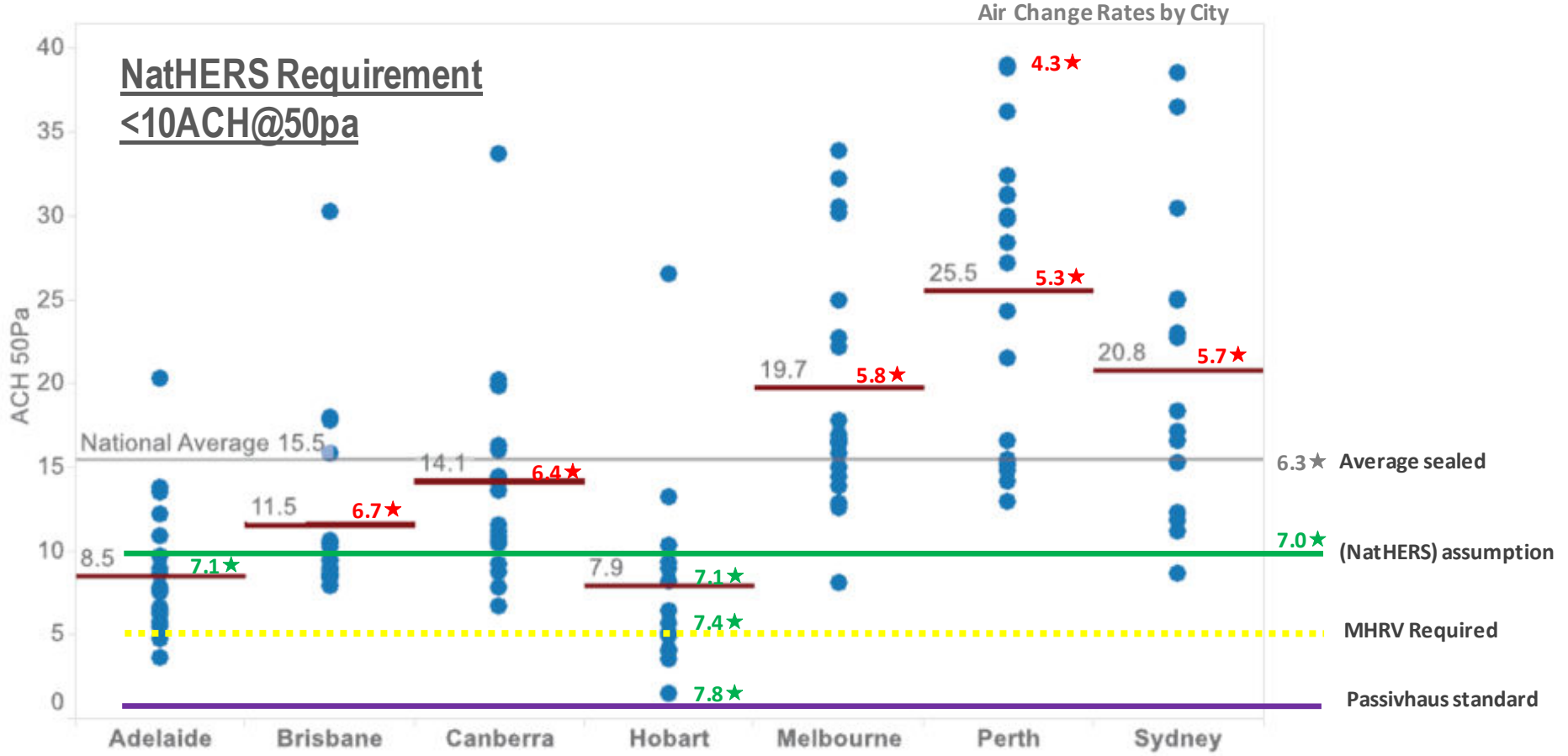


So are we...

# Limit Uncontrolled Infiltration



# Limit Uncontrolled Infiltration





# What Rating is your Home?

## SV On-Ground Assessment Study

