Heating, How Water, All-Electric Homes & On/Off-Grid

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Talking Points:

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- Household Energy Use
- Space Conditioning
- The case for “All-Electric” Homes
- Hot Water
- On/Off Grid
- “Green Rebuild Toolkit”

How's the Weather?

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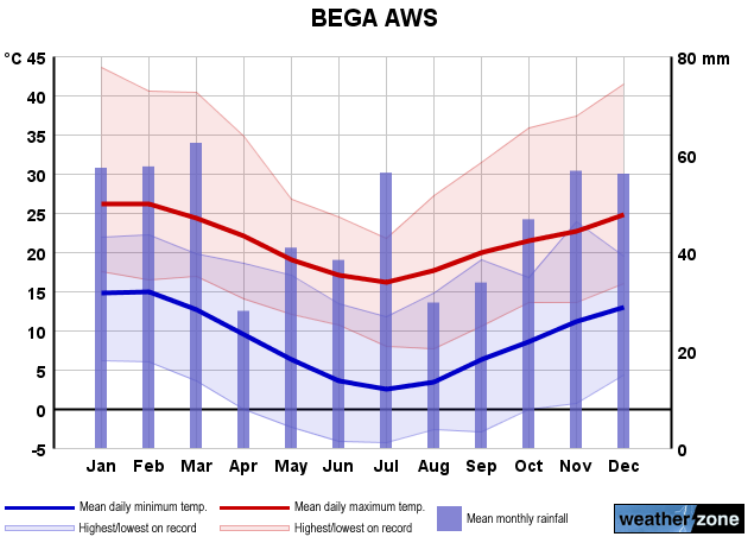

Temp	Days per Year
>30 degrees	29.1
<2 degrees	75.2

How's the Weather?

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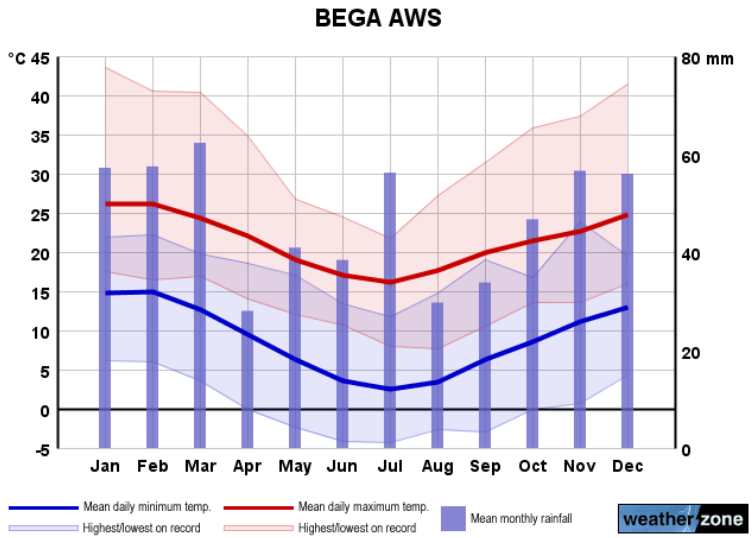

Temp	Days per Year
>30 degrees	29.1
<2 degrees	75.2

- **Heating Dominated Climate**

TYPICAL HOUSEHOLD ENERGY USE:
SOUTHERN/TEMPERATE

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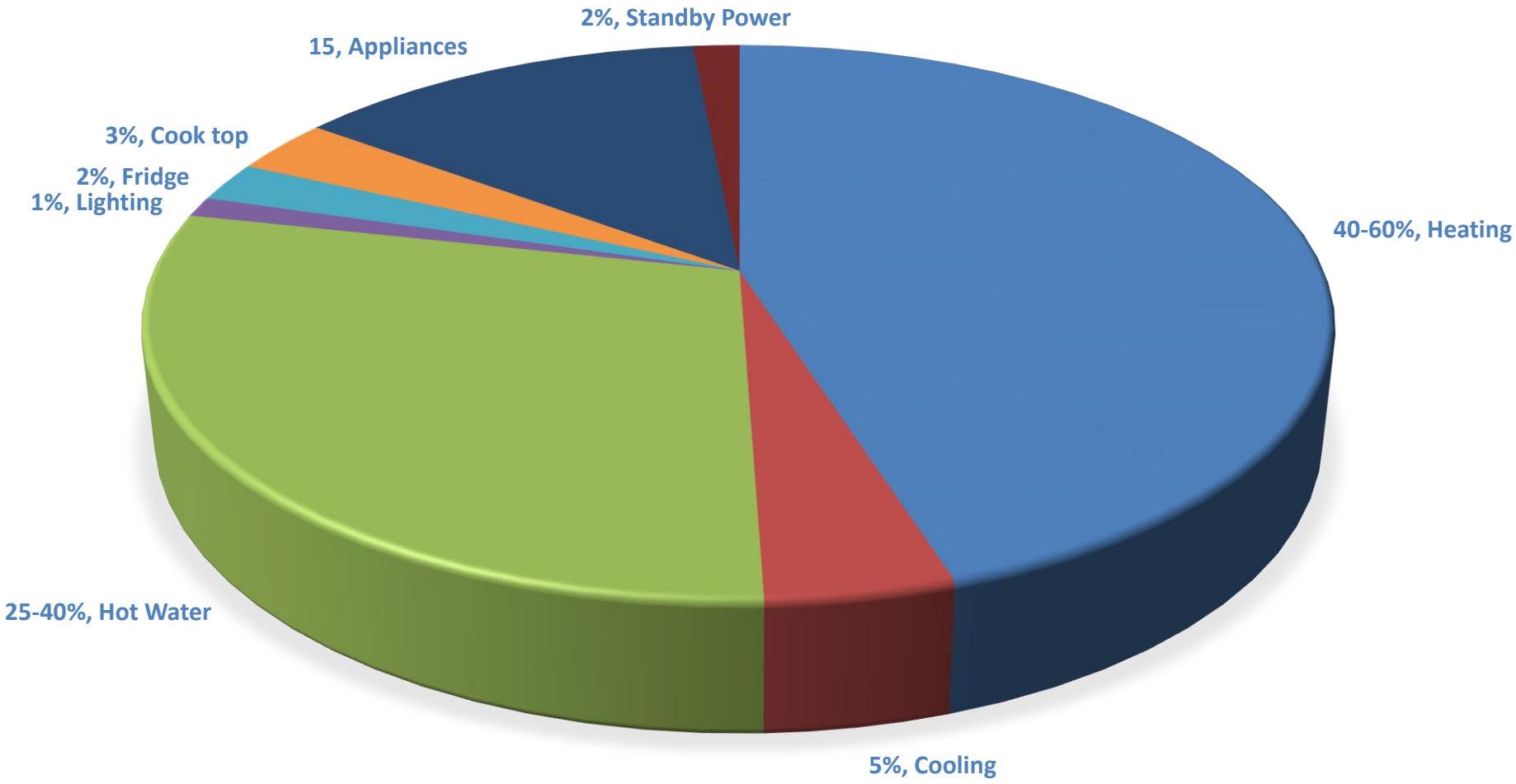

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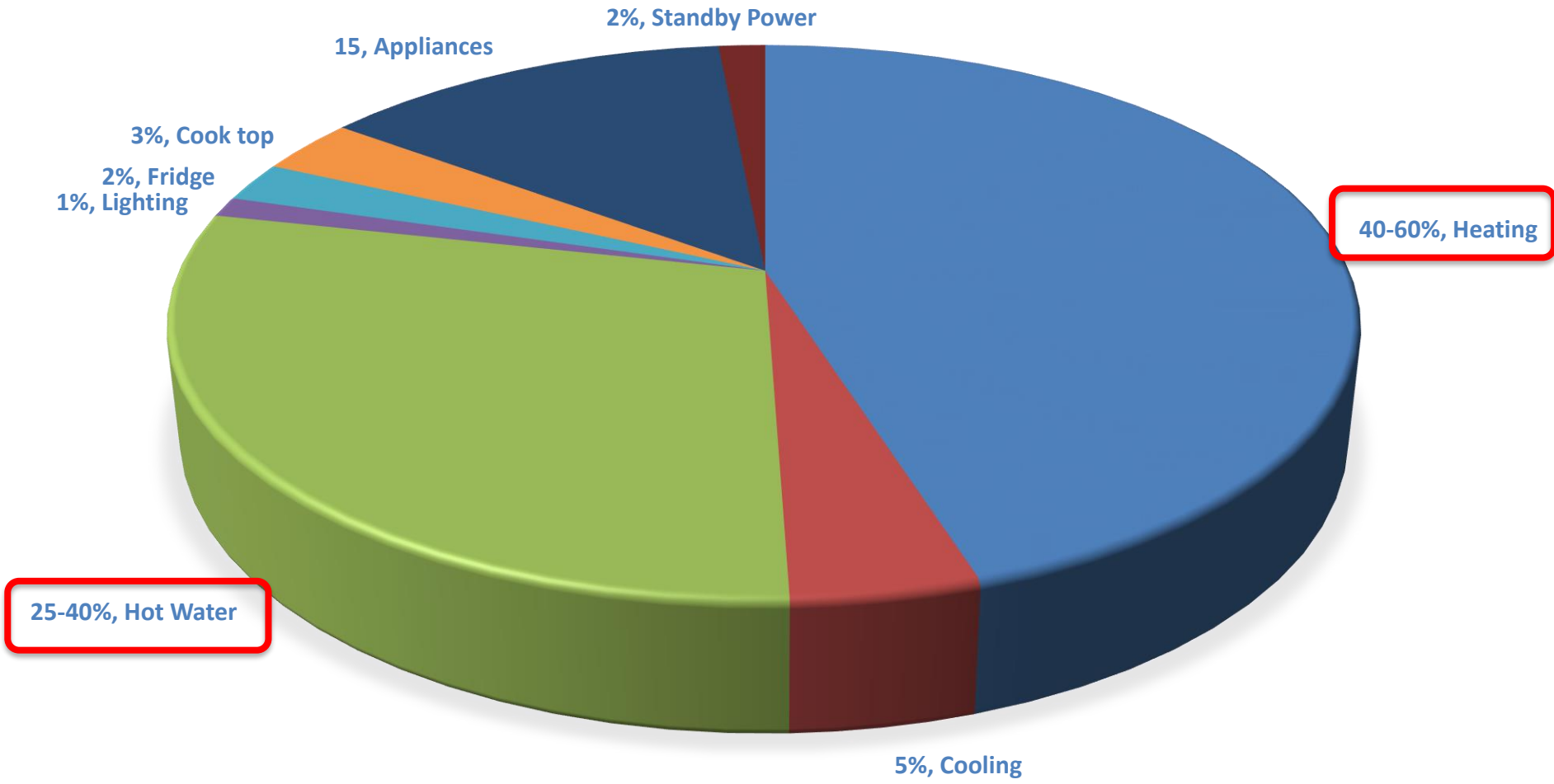

ENERGY USE, **BRISBANE**

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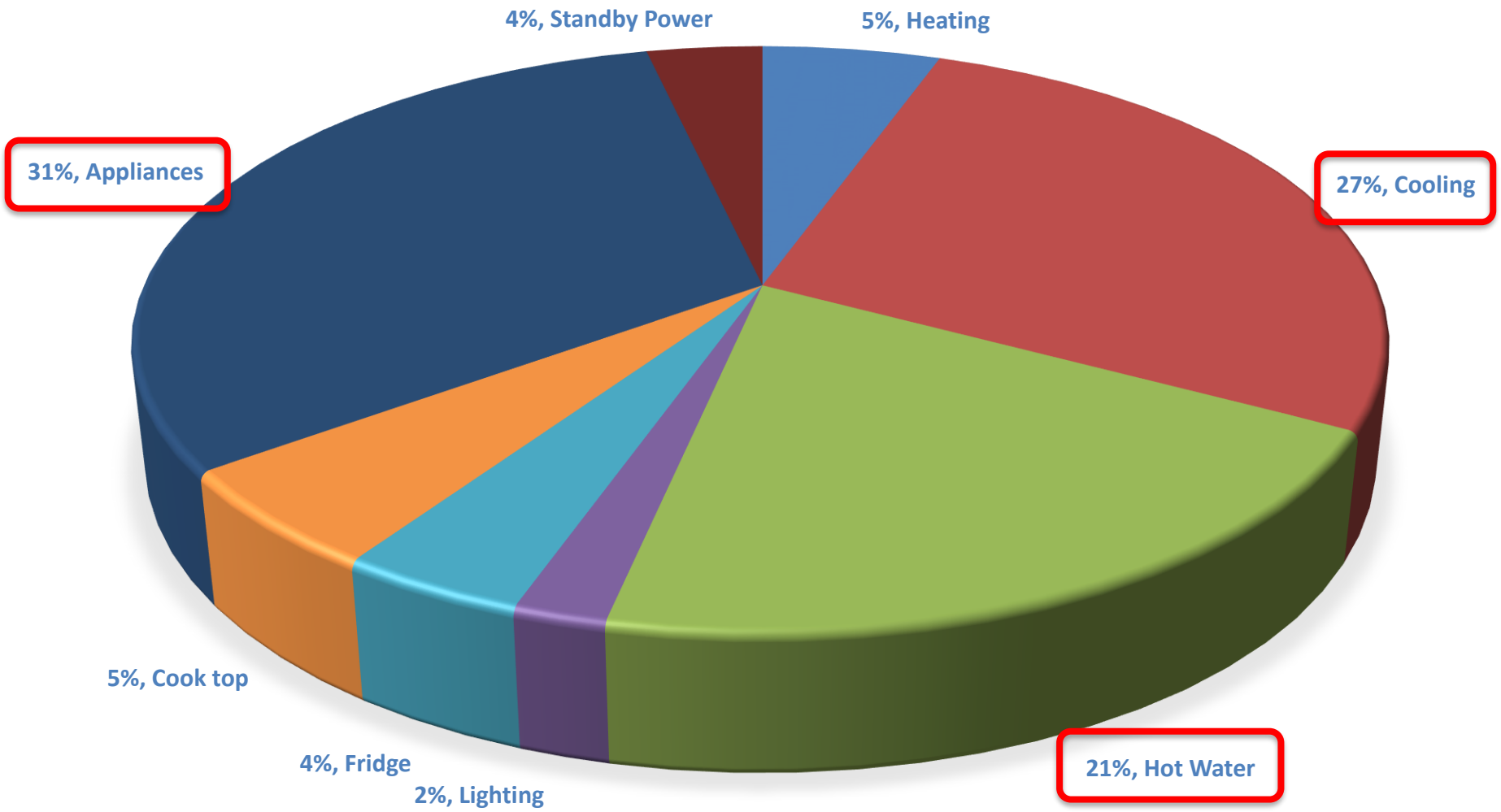

Really important to get heating & hot water right…

Space Conditioning

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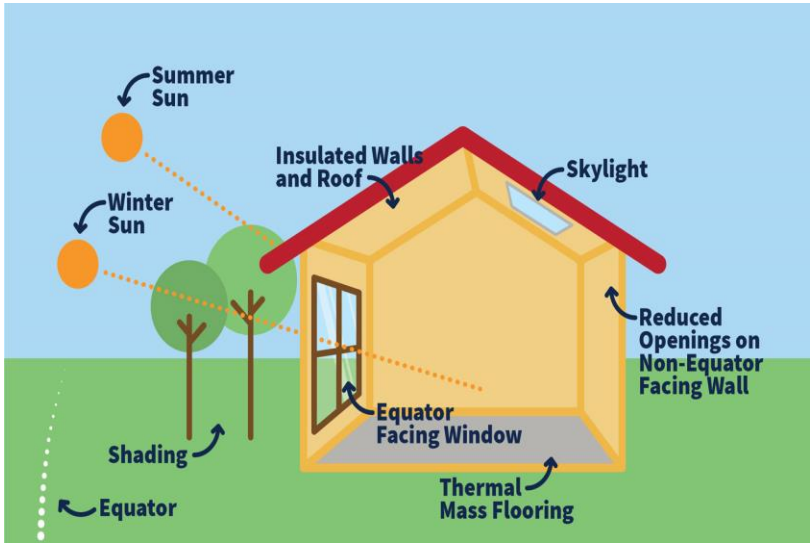
- Starts not with the appliance but with the <u>building:</u>



Space Conditioning

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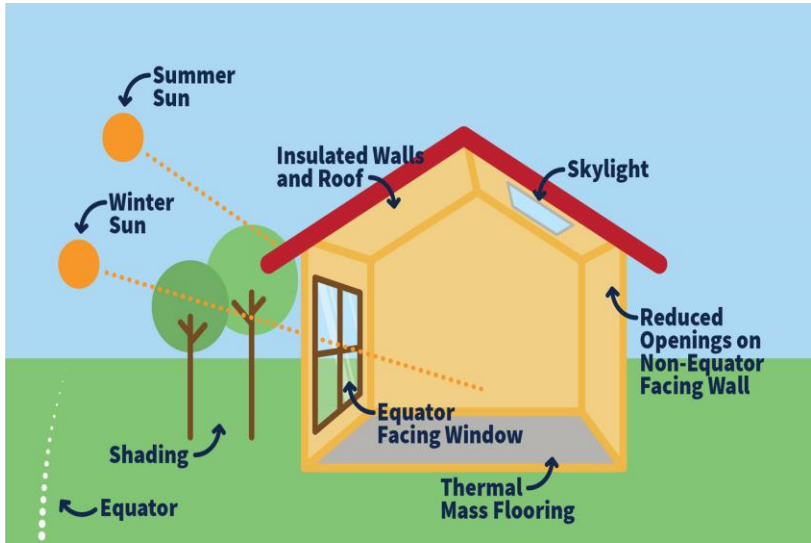
- Starts not with the appliance but with the <u>building:</u>
- For <u>new builds:</u>
  - Go beyond min. compliance
  - Passive solar design
  - More insulation, draft sealing
  - Design to prevailing winds
  - Double/triple glazing
  - External shading
  - Smart use of vegetation
  - And more!



Space Conditioning

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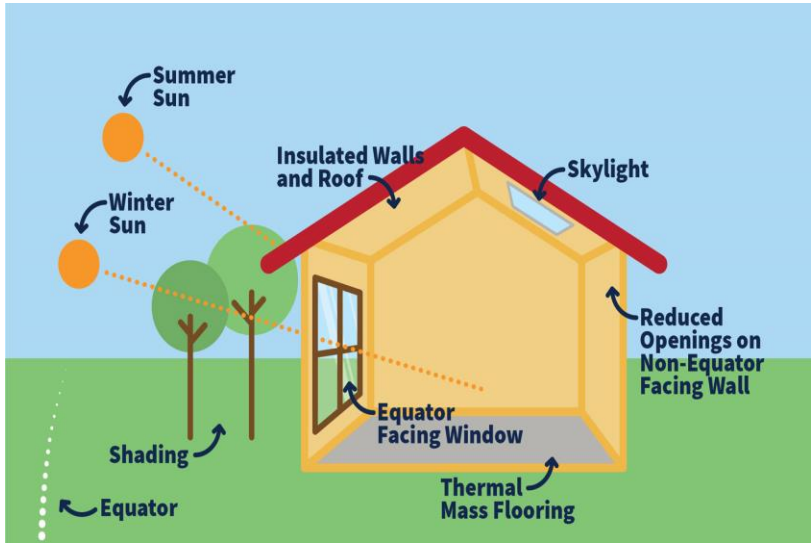
- Starts not with the appliance but with the building:
- For existing homes:
  - Insulate, insulate, insulate
  - Draft seal
  - Curtains and pelmets
  - External shading
  - Zone rooms
  - Smart use of vegetation
  - Double glazing?



Space Conditioning

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- **Then you can have a smaller & more efficient heating/cooling system**

Space Conditioning

- How to heat?
  - Wood
  - Gas (LPG)
  - Electric:
    - Resistive panels/radiators
    - Reverse cycle (heat pumps)

Fuel Type Characteristics

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	Upfront $	Running $	Efficiency	Carbon	Notes
Wood	Med-High	Med-High	Low	Low-Med	Depends on wood source, particulates
Gas (LPG)	Medium	High	Very Low	Med-High	Really expensive and will get worse
Elec - Resistive	Low	Very High	Low	Med-High	Good for small spaces
Elec - Rev Cycle	Med-High	Low	High	Low-Med	Includes cooling, can be run from solar

What does efficiency actually mean?

Efficiency is measured by:

- energy in; versus
- energy out

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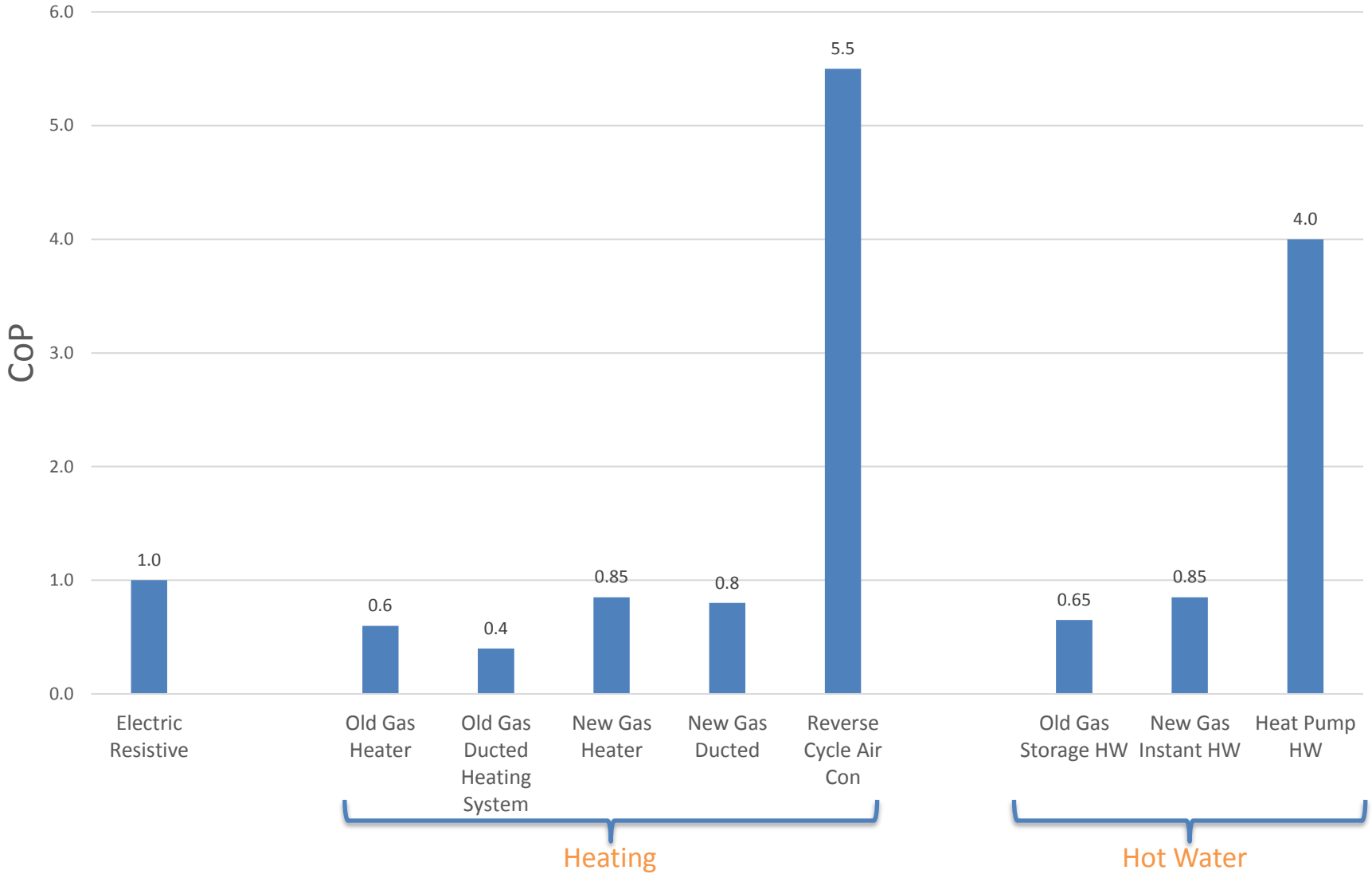
Co-efficient of Performance of Heating/Hot Water Systems



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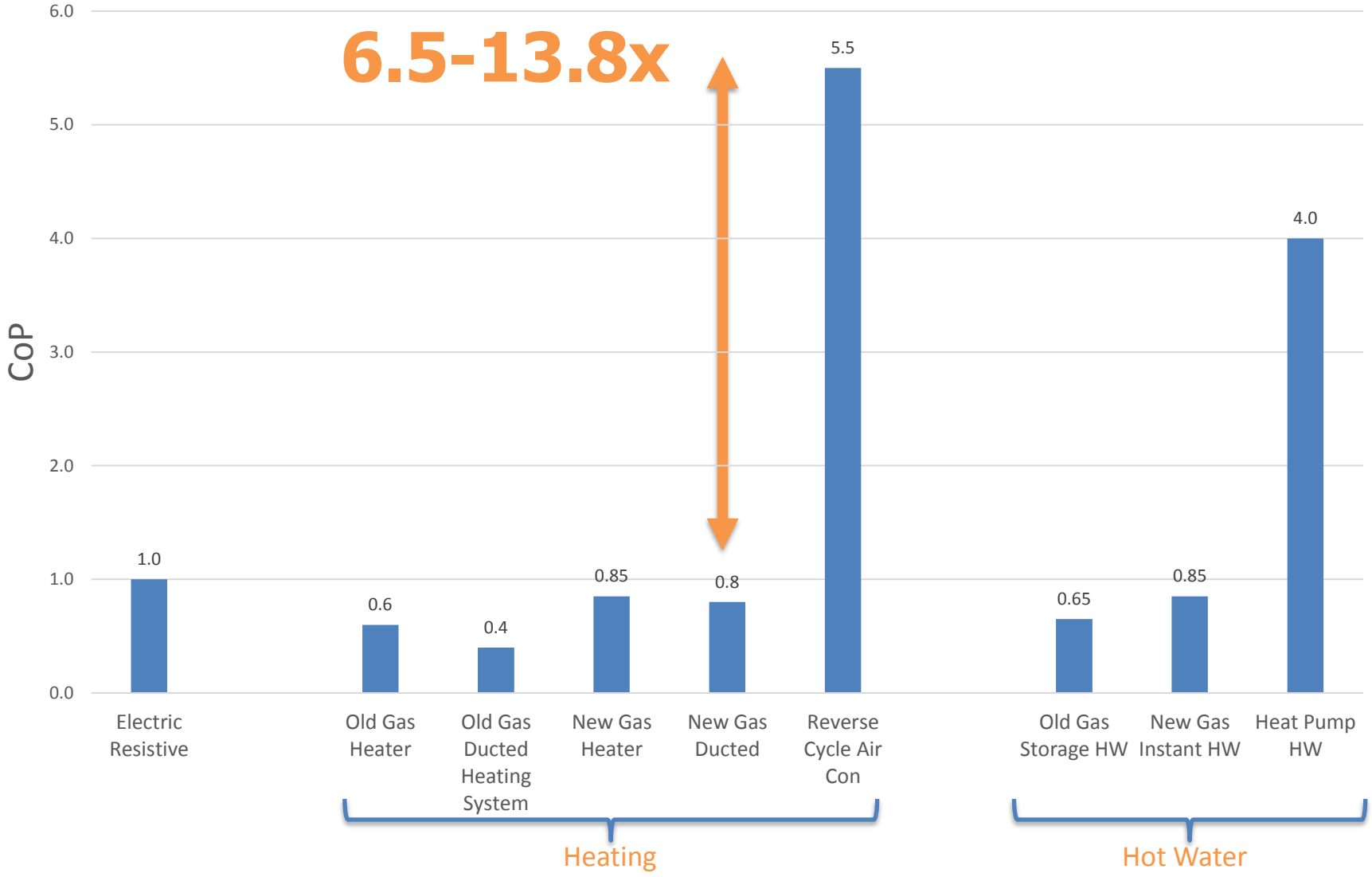

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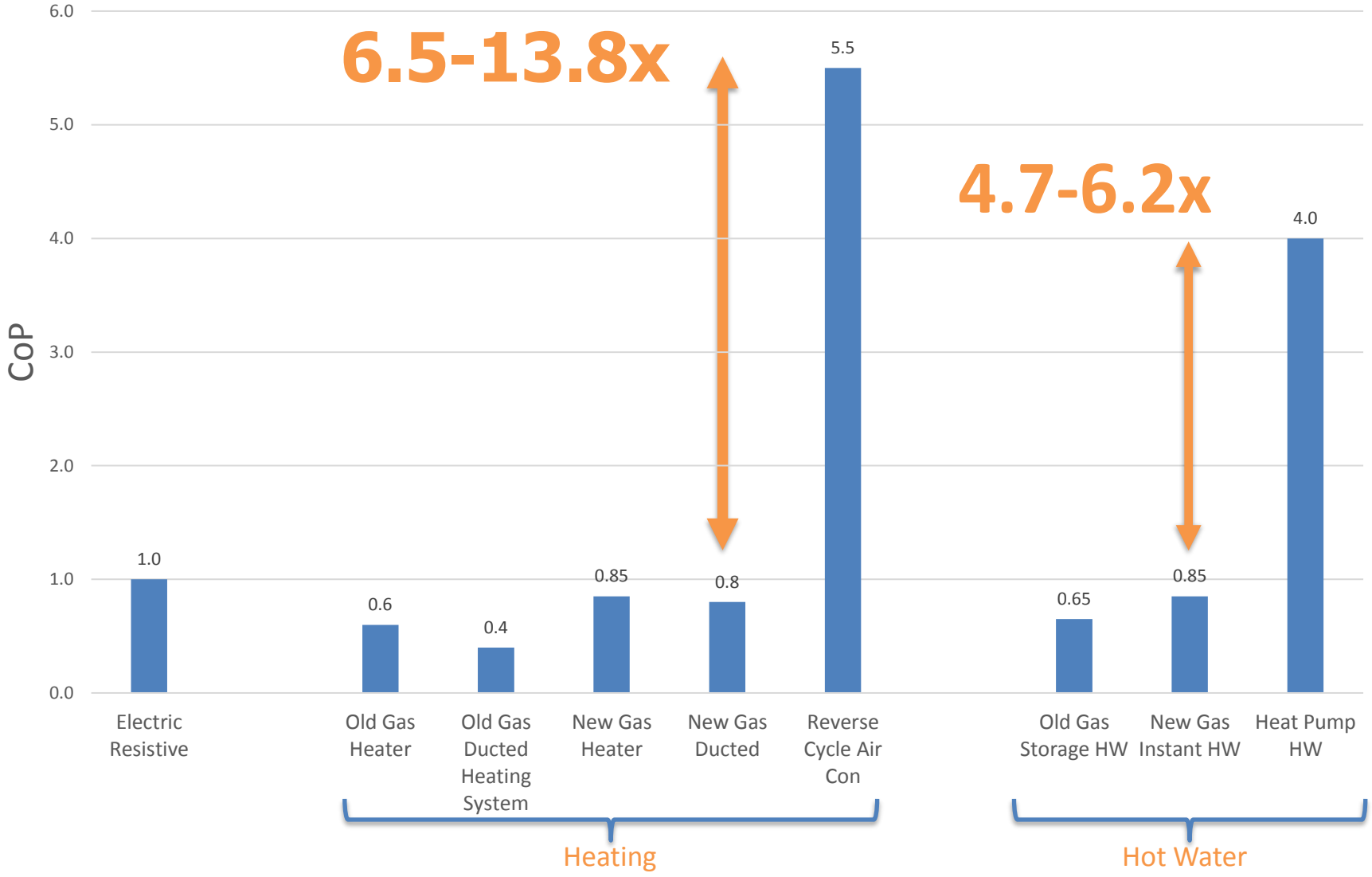

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The case for All-Electric homes

Why “All-Electric”?

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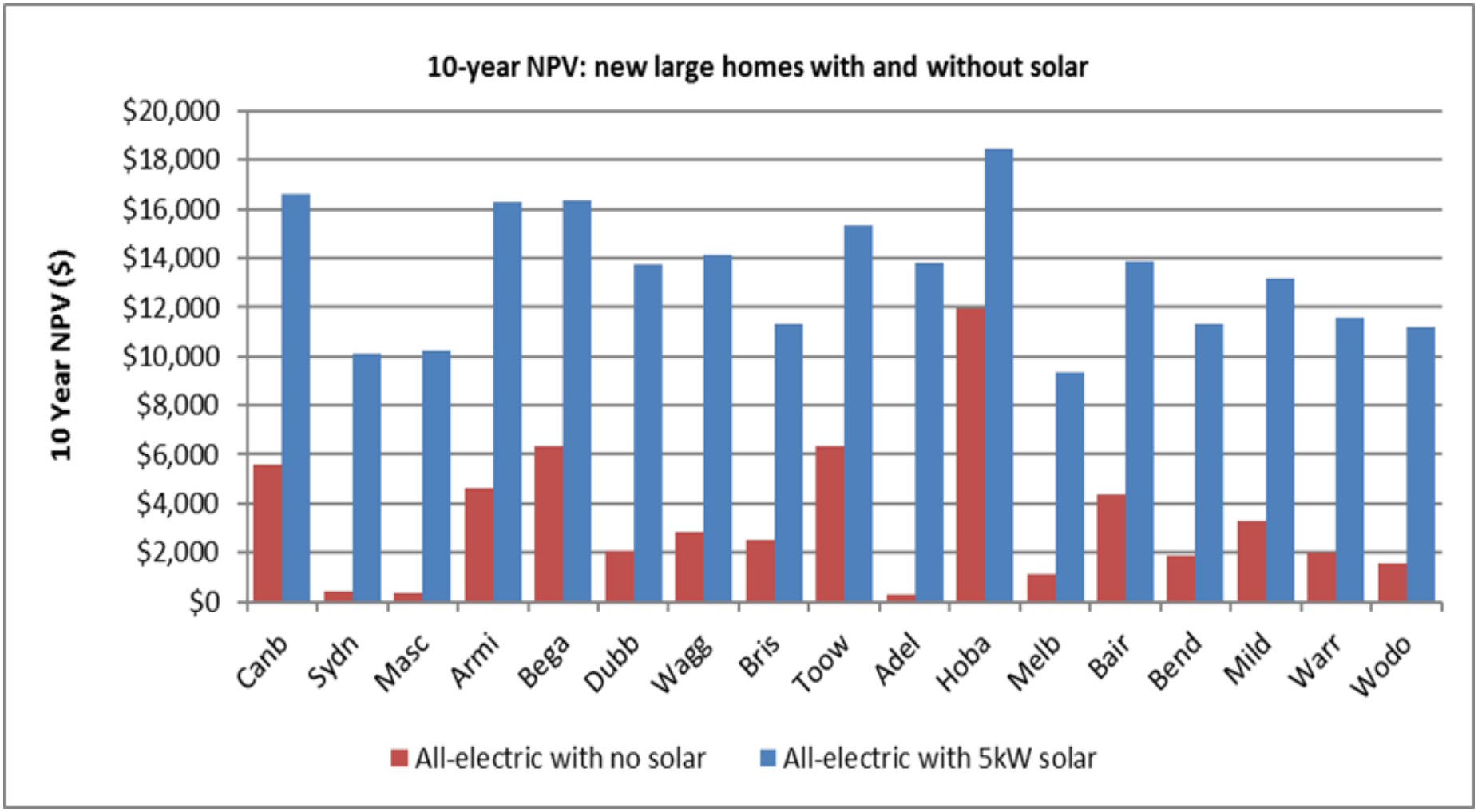

Why “All-Electric”?

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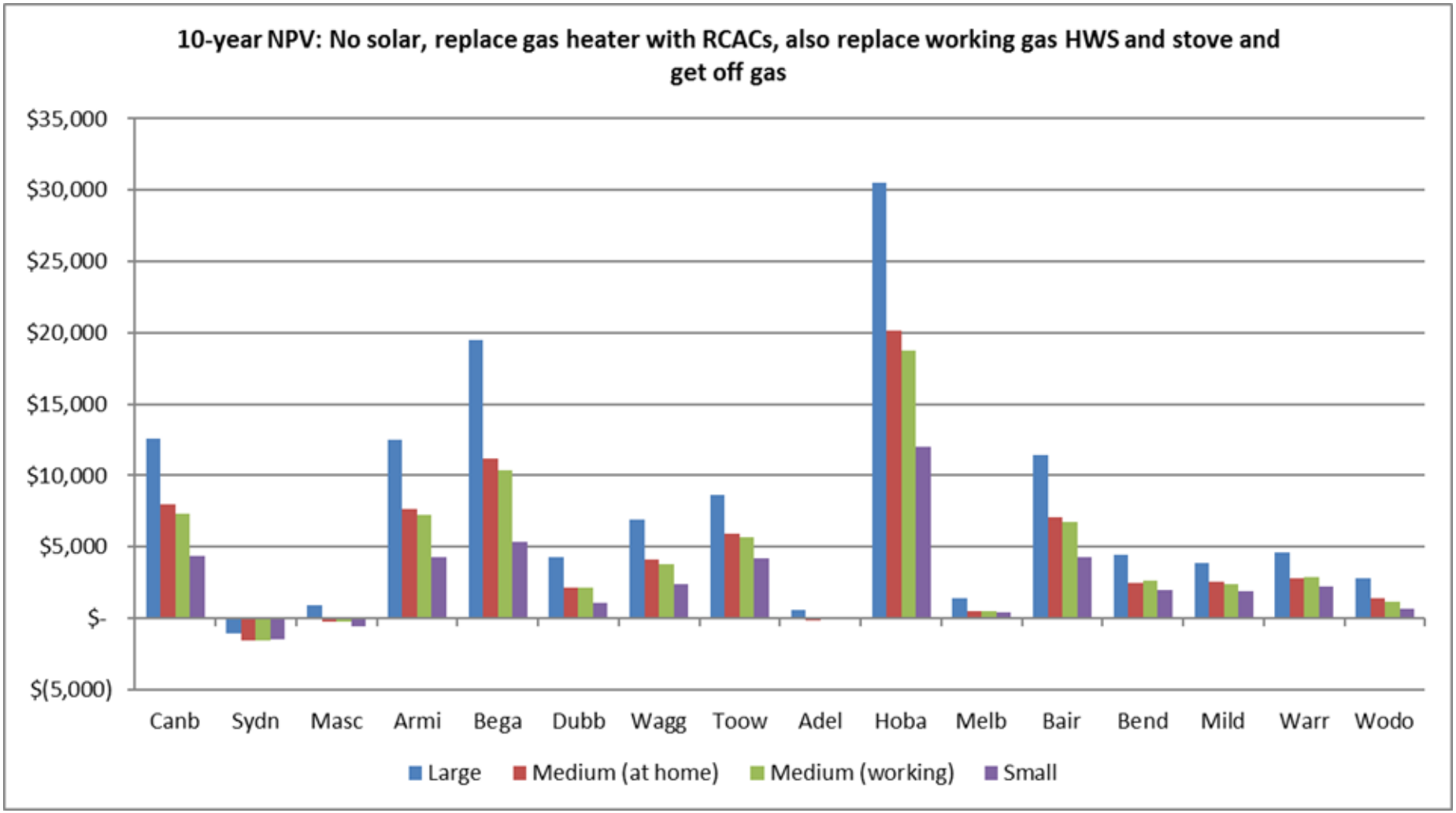

What about Hot Water?

Hot Water

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Main types:

- Gas instant (LPG)
- Gas storage (with tank, LPG)
- Wood
- Electric storage
- Solar hot water
- Heat pump
- Electric Instant

Hot Water

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	Upfront $	Running $	Efficiency	Notes
Gas Instant (LPG)	Medium	Med-High	Low	Expensive on LPG
Gas Storage (LPG)	Med-High	Med-High	Low	Expensive on LPG
Wood	High	High	Low	Depends on wood source, particulates
Elec Storage	Low	High	Low	Cheap to buy, high energy use
Solar hot water	High	Low	High	Efficient, more expensive than HP, doesn't integrate well with solar PV
Heat pump	High	Low	High	Most efficient, best value. Integrates best with solar PV
Electric instant	Low	Med-High	Medium	Only for small hot water demand

Heat Pump Hot Water

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- Avoid cheap brands (noise, reliability)
- Best ones use CO2 as the refrigerant gas
- Look for a high COP (~ 4.0)
- Long warranties:
  - 10+ yr tank
  - 4+ yr compressor

Split

Integrated

Appliances: Niches

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- Very low hot water consumption?
  - perhaps instantaneous gas/electric
- Very big solar system?
  - perhaps resistive electric with special controller
- Special hot water requirements?
  - perhaps solar thermal e.g. evacuated tubes
- Specific cooking requirements?
  - perhaps bottled gas
- Off-grid?
  - may have special needs

On-Grid v Off-Grid

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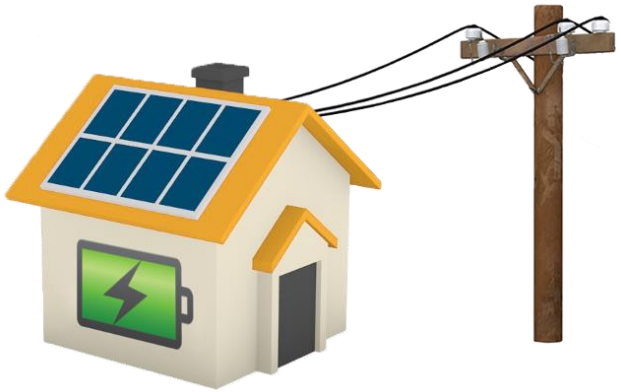

On-Grid v Off-Grid

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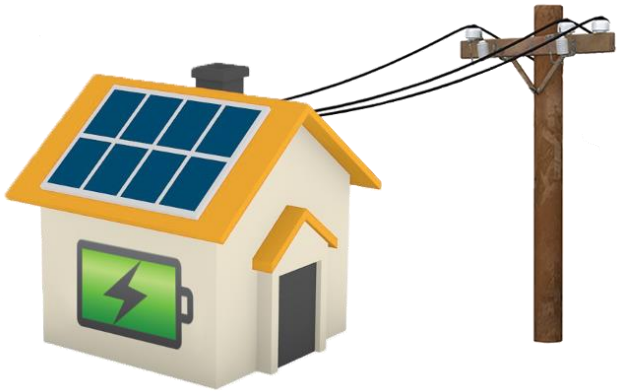

<u>On</u>-grid:

- The grid is the back-up
- Gets you thru winter
- Can have smaller solar and/or battery sizes
  - (maybe $5k to $20k solar or solar/batt system)

On-Grid v Off-Grid

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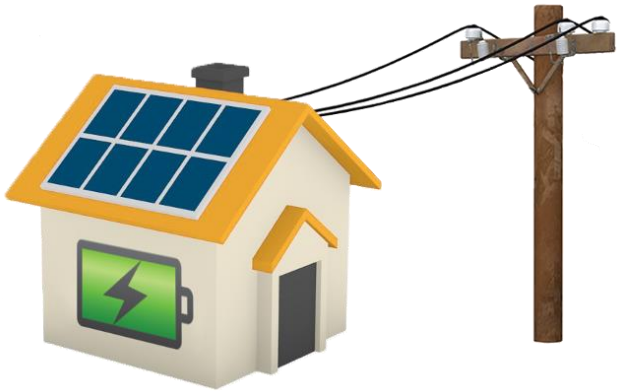

<u>Off</u>-grid:

- Need big solar & batteries to get thru winter
  - and usually back-up generator
- $30k to $100k+ solar or solar/batt system
  - ~$5k per kWh load required
- Can you afford to run electric heating/hot water in winter?

On-Grid v Off-Grid

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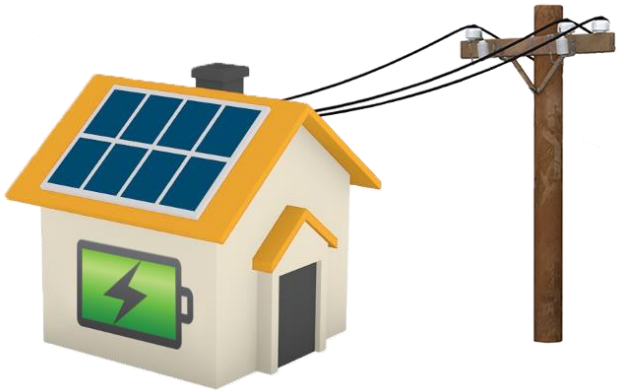

<u>Off</u>-grid:

- When wood heating or LPG hot water has a role…

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Green Re-Build Toolkit

Green Re-Build Toolkit

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- Resources & events to help fire-affected communities on how to rebuild for future climate

- Website (Dec) resources & case studies:
  - site planning
  - bushfire resistant & efficient design
  - finding the right experts
  - materials
  - renewable energy / rainwater systems

- Opps for communities to connect with experts:
  - webinars late Jan/Feb, range of topics

Green Re-Build Toolkit

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- Speed Date a Sustainable Expert events
  - April onwards
  - connect directly with experts
  - gain one-on-one advice

- One-on-one Consults with experts
  - further refine their house plans
  - maximise energy efficiency

Contact: Jacinta@renew.org.au

www.greenrebuildtoolkit.com

Renew's vision is to create a world in which communities thrive in a way that does not cost the earth.

Our strategic objectives are built on more than 38 years of knowledge on sustainable housing, networks in the building sector and expertise in market advocacy.

www.renew.org.au

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