

Heather Smith

Electrical Engineer

Chair - Coalition for Community Energy

Churchill Fellow

8 November 2025 – Northern Rivers





Load Breakdown Tool



What State are you in?

NSW

*Click in cell and use

What Year relates best to your data?

2025

This calculator will not v

How many occupied homes in your community?

18390

Insert your answer. For

What is the name of your community?

Lismore

Postcode (for solar data)

2480

Fuels in your community

Do you have access to gas? Or rely on LPG?

Gas

LPG

Is wood likely to be used in any serious way?

Yes, my community uses wood

Would you like to use this breakdown for homes using each fuel for cooking?

No, I'd like to choose my own breakdown - >

Would you like to use this breakdown for the fuels used to heat homes?

No, I'd like to choose my own breakdown - >

Would you like to use this breakdown for types of hot water used?

No, I'd like to choose my own breakdown - >

Drop down to select State and Year

Work for Australia on average - you'll need to select a state

Rough answer do population divided by 2.5. (your answer is used in the "Your Community" tab)

Some information about your postcode from ABS (2021 Census) and the Clean Energy Regulator (Jan2023):

19041 Occupied Homes

1372 Unoccupied homes

55,542 kW Solar PV as at Feb 2023

10,590 solar PV installations

52% approx (includes business installs)

10.2 kW small wind*

* this data appears

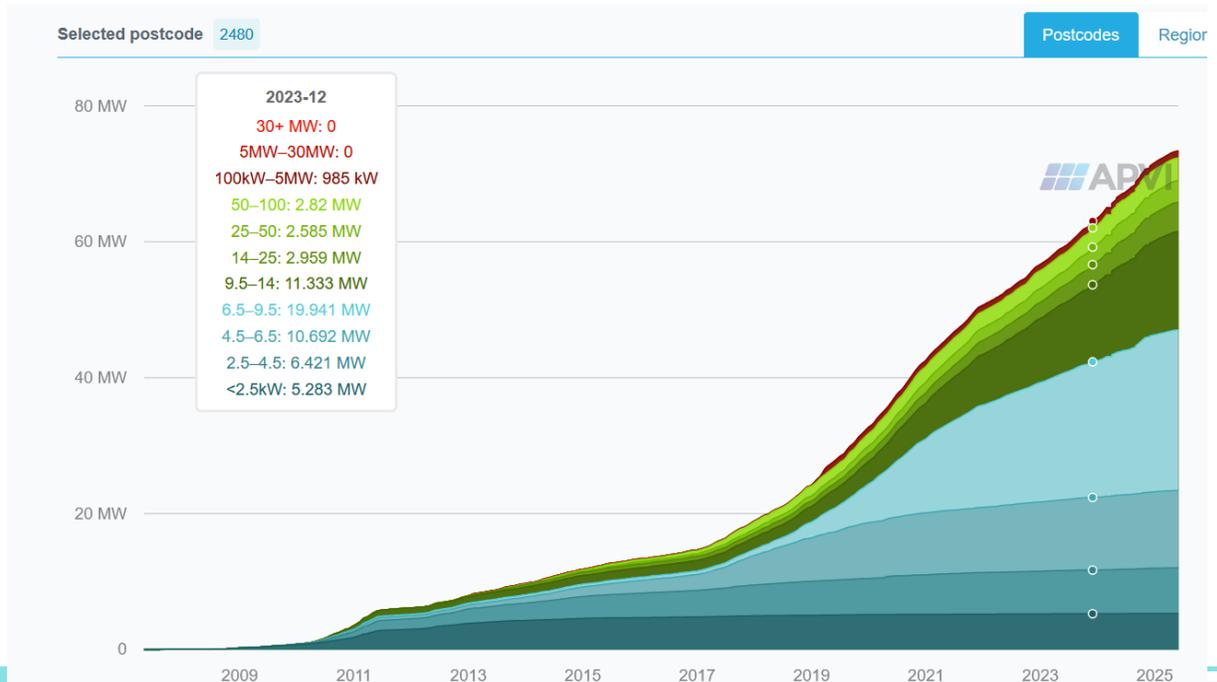
4 kW small hydro*

906 heat pumps for hot water installed

6114 solar hot water systems installed

38,881 kW Solar PV from systems under 10kW

<https://pv-map.apvi.org.au/postcode>

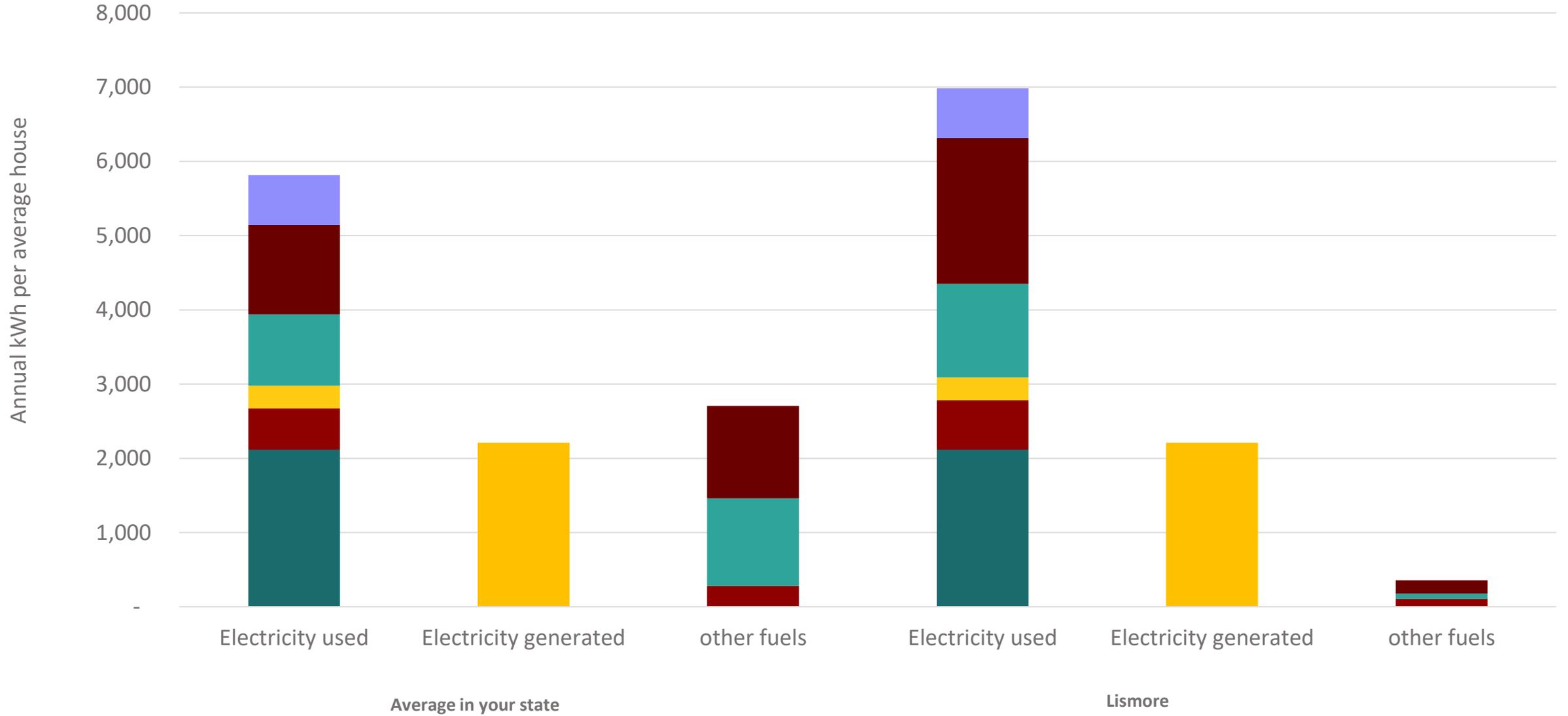


Average annual energy use of:	HM per home?	Electricity all homes kWh	Electricity, elec homes kWh	LPG in LPG homes kWh equiv	Average kWh per home for your state	Average kWh for Lismore breakdowns
Appliances						
Fridges and Freezers	1.9	703			703	703
Washing and dishwashing	1.7	230			230	230
Entertainment and IT	9.0	680			680	680
Other Appliances including chargers	24.6	504			504	504

White goods
Clothes dryers
Clothes washers
Dishwashers
Freezers
Refrigerators
IT&HE
Computers - desktop
Computers - laptop
Game consoles
Home entertainment - other (mostly audi
Miscellaneous IT equipment
Monitors (used with desktop computers)
Set-top box - free-to-air
Set-top box - subscription
Television - composite average
Video players and media recorders
Wireless/Wired networked device

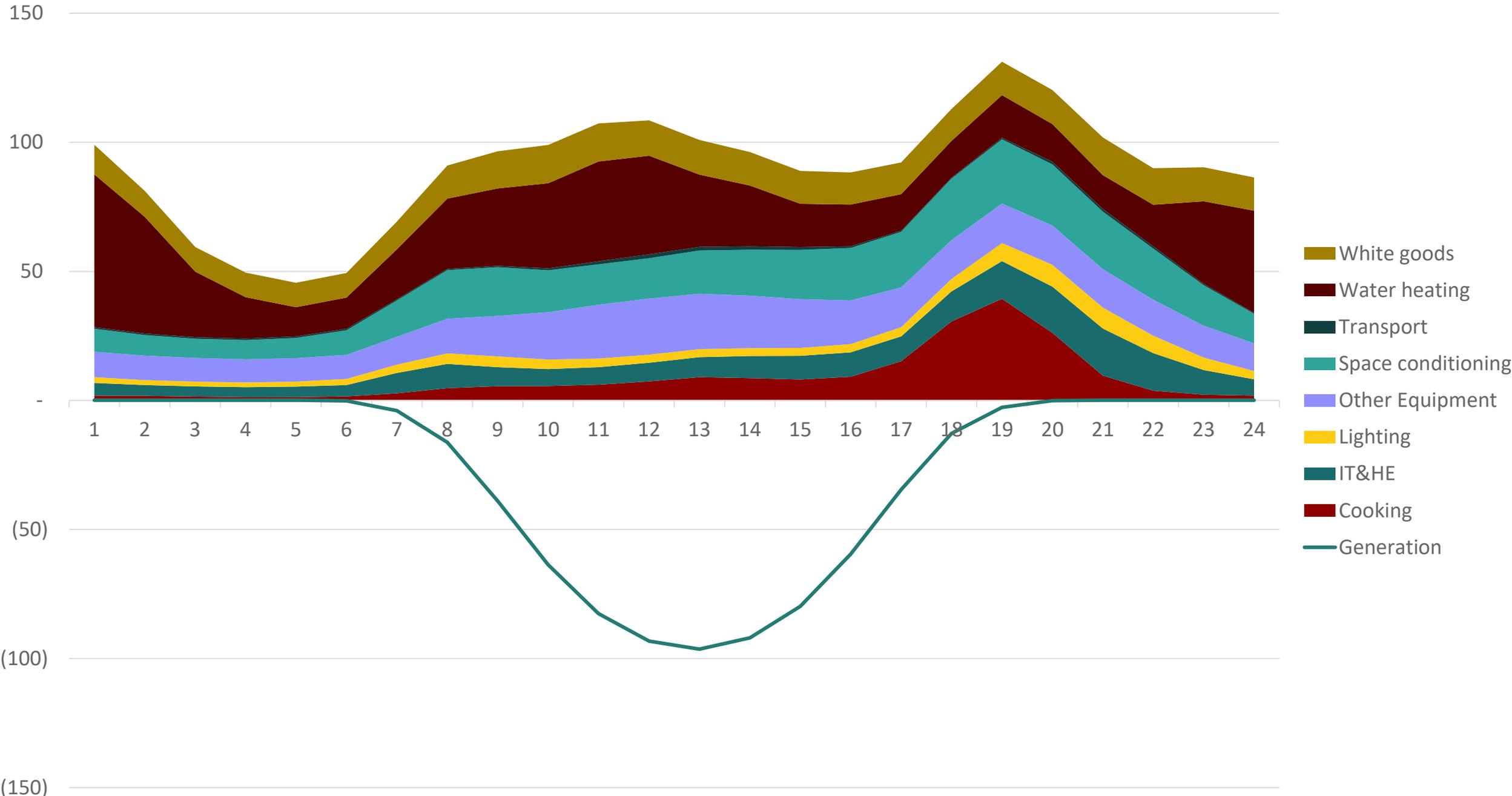
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Appliances						
Fridges and Freezers	1.9	703			703	703
Washing and dishwashing	1.7	230			230	230
Entertainment and IT	9.0	680			680	680
Other Appliances including chargers	24.6	504			504	504
Cooking (ovens, stoves and microwaves)						
Microwave	1.0	109			109	109
proportion of households ->			90%	0%	10%	
Ovens and stovetops or uprights	1.6		625	1,028	730	667
Lighting	44.9	305			305	305
Heating and Cooling (incl Fans)	3.9					
cooling proportion of households ->		4% evaporative	21% fully ducted elec aircon			
Cooling		314	547			
Heating a gas ducted home		269		11,115		
Heating other homes		-111	862	2,676	1,902	5,854
heating proportion of households ->			97%	0%	3.4%	0%
Average space conditioning			1,304	4,191	2,106	5,858
Water heating	1.0		Electricity	LPG	2,138	1,331
hot water proportion of households ->			94%	6%	0.0%	
Electric hot water	58% of total		2,089			Breakdown: 75% Large, 16% Small, 2% Heat Pump, 6% Solar.
Gas Hot Water	38% of total					Breakdown: 63% Instant, 36% Storage, 1% Solar.
LPG Hot Water	3.7% of total			2,929		Breakdown: 67% Instant, 33% Storage, 1% Solar.
Wood Hot Water	0.2% of total					100% Wood

Energy breakdown



■ Appliances ■ Cooking ■ Lighting ■ Heating and Cooling ■ Water heating ■ Uncommon Items ■ Solar Generation

Estimated Annual consumption (MWh) whole community



What State are you in?

What Year relates best to your data?

How many occupied homes in your community?

What is the name of your community?

Postcode (for solar data)

NSW

2025

5800

Byron Bay

2481

*Click in cell and use drop down to select State and Year

This calculator will not work for Australia on average - you'll need to select a state

Insert your answer. For a rough answer do population divided by 2.5. (your answer is used in the "Your Community" tab)

Some information about your postcode from ABS (2021 Census) and the Clean Energy Regulator (Jan2023):

5498 Occupied Homes

15 kW small wind*

* this data app

1336 Unoccupied homes

4 kW small hydro*

18,889 kW Solar PV as at Feb 2023

278 heat pumps for hot water installed

2,926 solar PV installations

1958 solar hot water systems installed

43% approx (includes business installs)

10,460 kW Solar PV from systems under 10kW

Electricity 90%, , LPG 10%

Fuels in your community

Do you have access to gas? Or rely on LPG?

Gas LPG

Is wood likely to be used in any serious way?

Yes, my community uses wood

Would you like to use this breakdown for homes using each fuel for cooking?

No, I'd like to choose my own breakdown - >

Would you like to use this breakdown for the fuels used to heat homes?

No, I'd like to choose my own breakdown - >

Would you like to use this breakdown for types of hot water used?

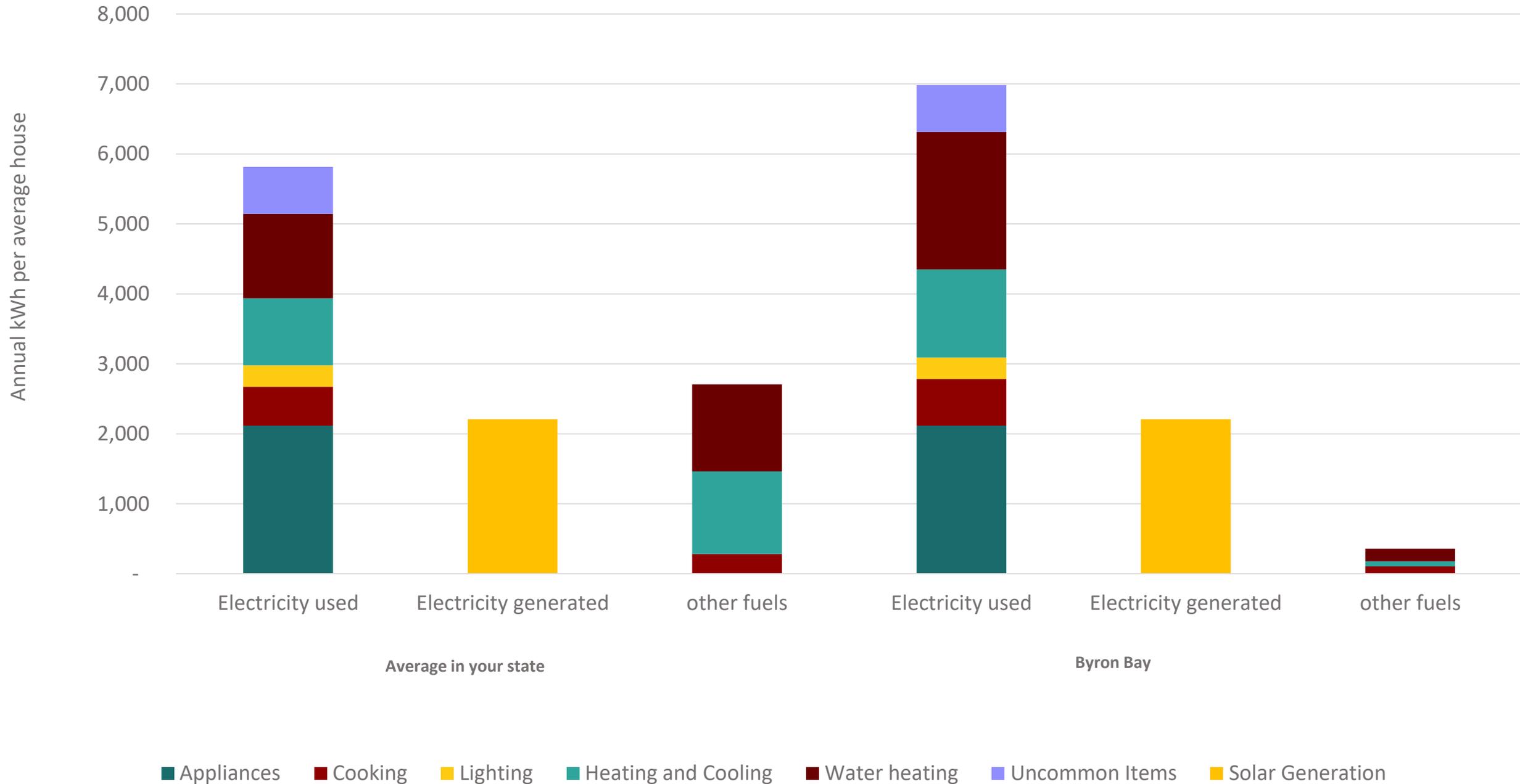
No, I'd like to choose my own breakdown - >

Electricity 97%, , LPG 3.4%,

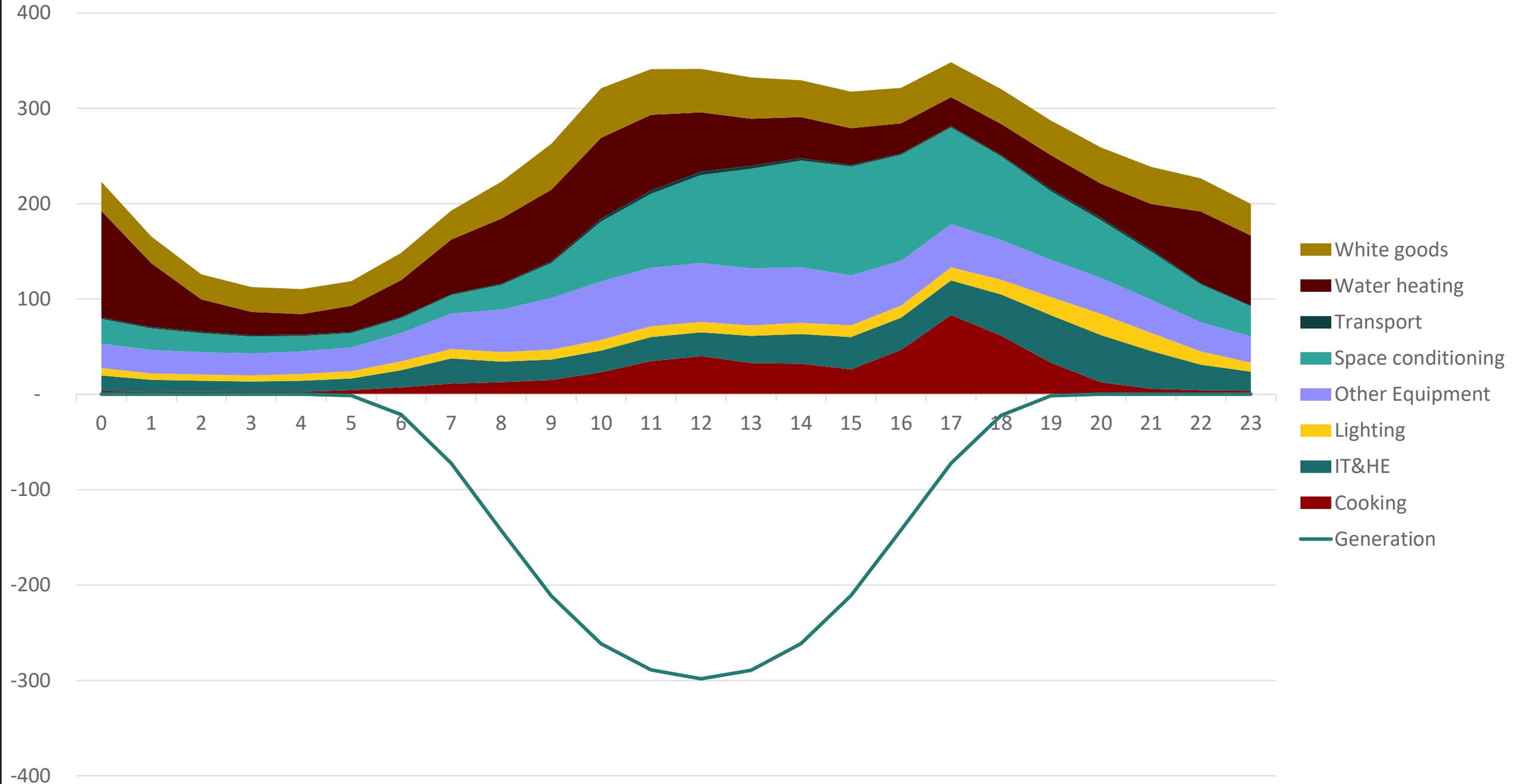
Electricity 94%, , LPG 6.1%,

Average annual energy use of:	HM per home?	Electricity all homes kWh	Electricity, elec homes kWh	LPG in LPG homes kWh equiv	Average kWh per home for your state	Average kWh for Byron Bay breakdowns
Appliances						
Fridges and Freezers	1.9	703			703	703
Washing and dishwashing	1.7	230			230	230
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Cooling		314	547			
Heating a gas ducted home		269		11,115		
Heating other homes		-111	862	2676	1902	5654

Energy breakdown



Weekends (kW) - Uki Summer 2025



What State are you in?
 What Year relates best to your data?
 How many occupied homes in your community?
 What is the name of your community?
 Postcode (for solar data)

NSW
 2025
 306
 Uki
 2484

*Click in cell and use drop down to select State and Year
 This calculator will not work for Australia on average - you'll need to select a state
 Insert your answer. For a rough answer do population divided by 2.5. (your answer is used in the "Your Community" tab)

Some information about your postcode from ABS (2021 Census) and the Clean Energy Regulator (Jan2023):

7970 Occupied Homes 0.4 kW small wind* * this data app
 651 Unoccupied homes 1.9 kW small hydro*
 26,507 kW Solar PV as at Feb 2023 1434 heat pumps for hot water installed
 4,843 solar PV installations 1676 solar hot water systems installed
 56% approx (includes business installs) 17,815 kW Solar PV from systems under 10kW

Fuels in your community

Do you have access to gas? Or rely on LPG?

Gas LPG

Is wood likely to be used in any serious way?

Yes, my community uses wood

Would you like to use this breakdown for homes using each fuel for cooking?

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Would you like to use this breakdown for the fuels used to heat homes?

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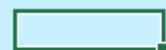
No, I'd like to choose my own breakdown - >

Electricity 90%, , LPG 10%

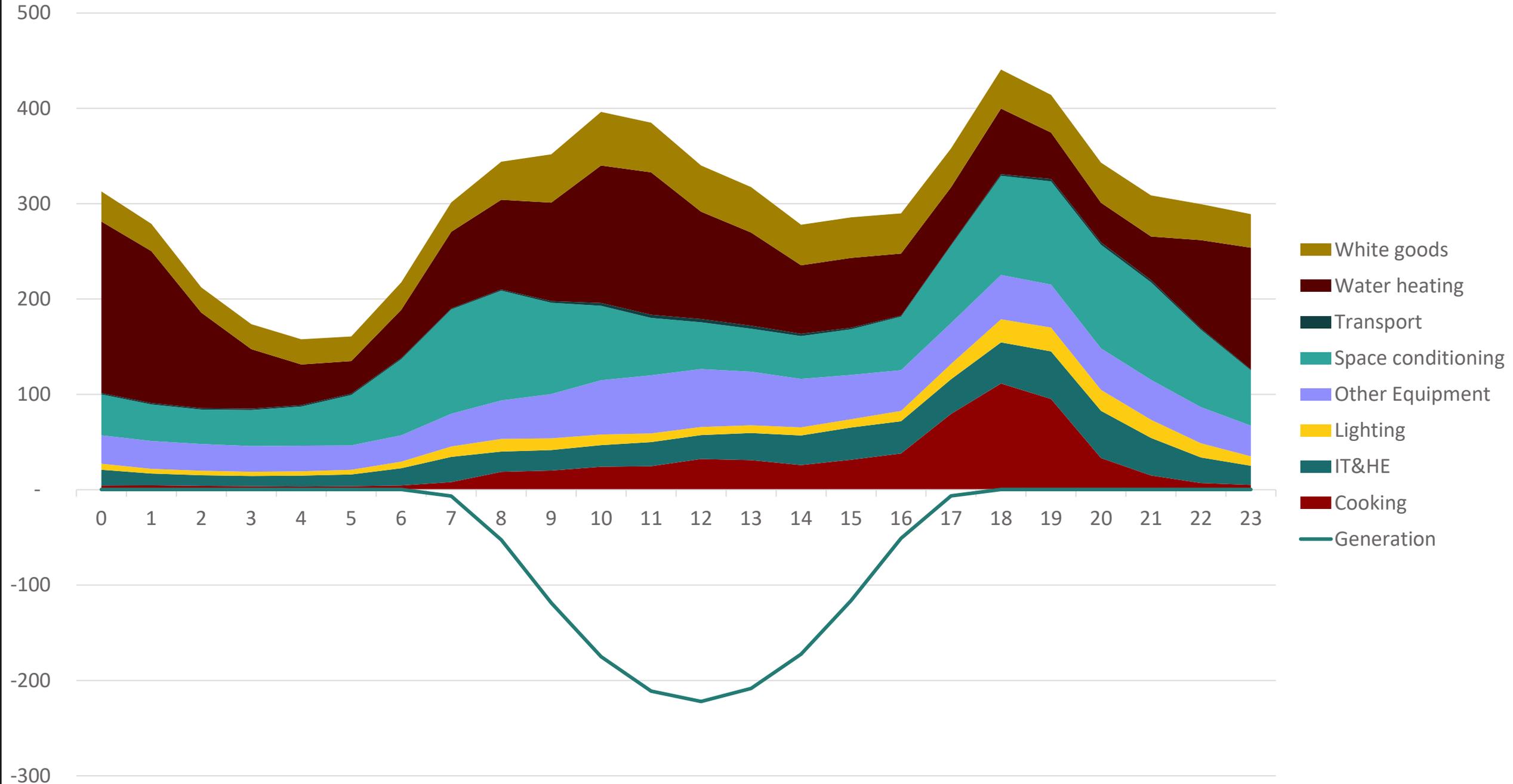
Electricity 97%, , LPG 3.4%,

Electricity 94%, , LPG 6.1%,

Average annual energy use of:	HM per home?	Electricity all homes kWh	Electricity, elec homes kWh	LPG in LPG homes kWh equiv	Average kWh per home for your state	Average kWh for Uki breakdowns
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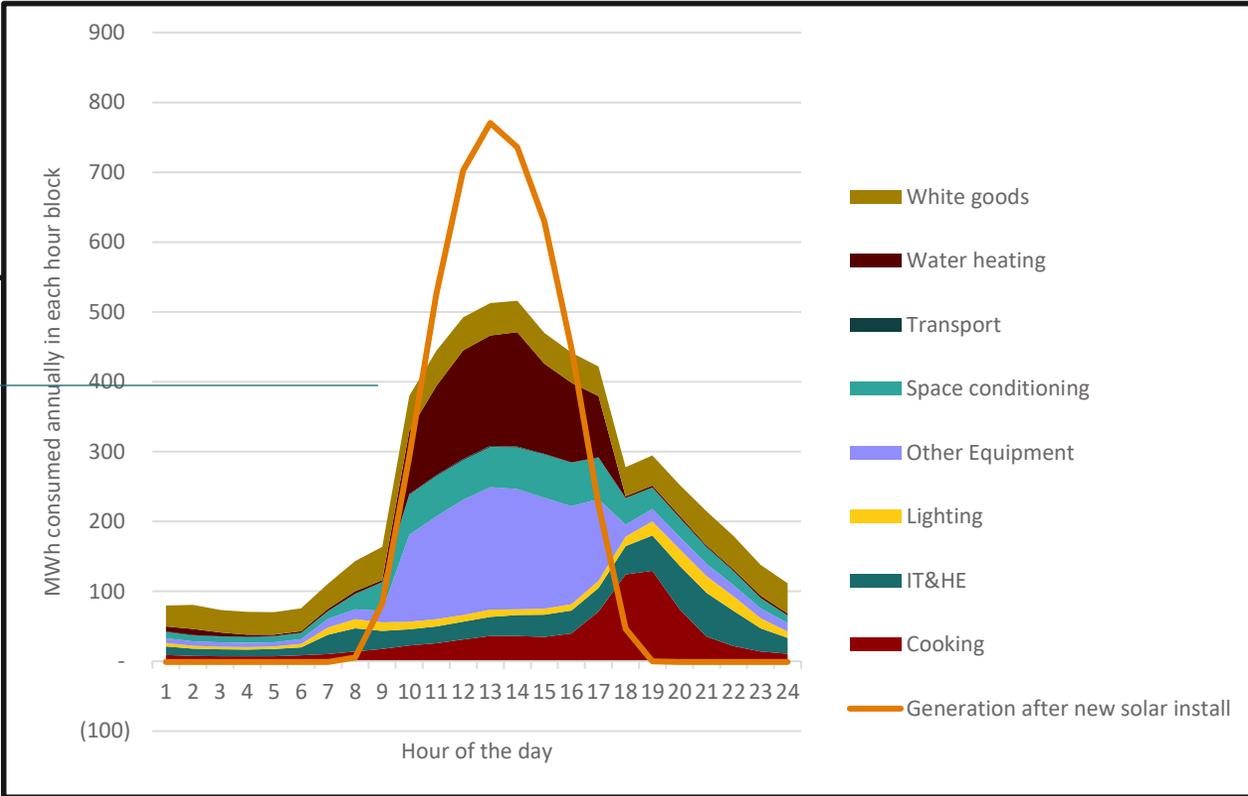
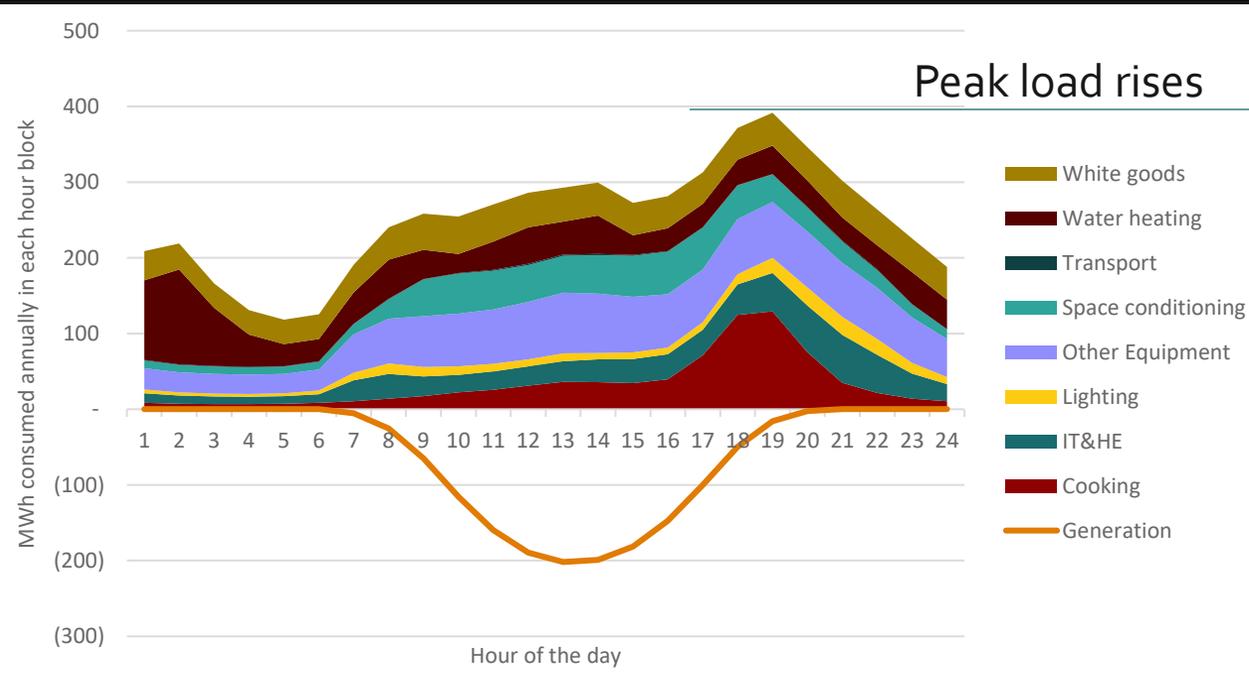
Weekends (kW) - Uki Winter 2025



Social practices don't change by technology alone

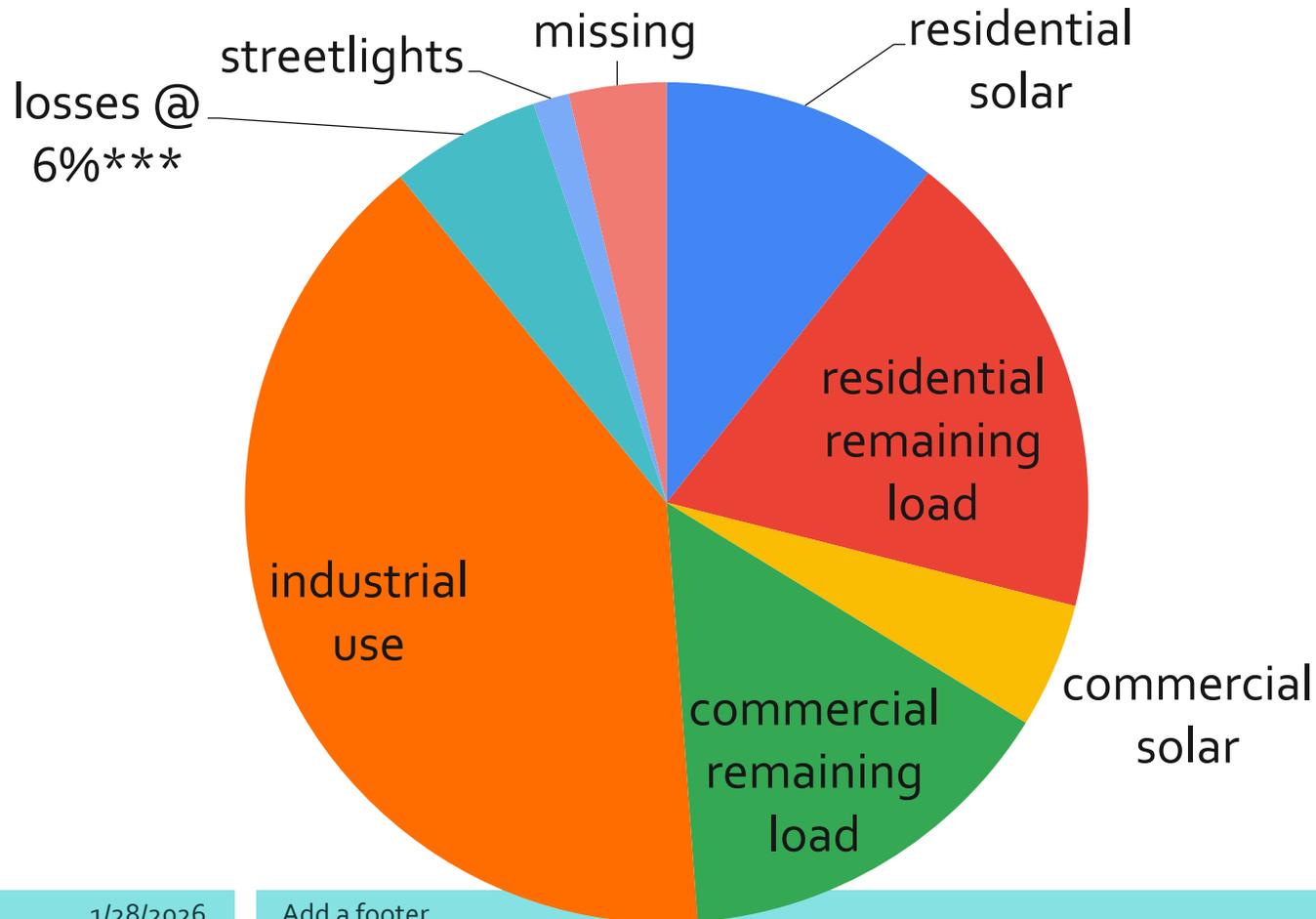
Tomorrow

Today

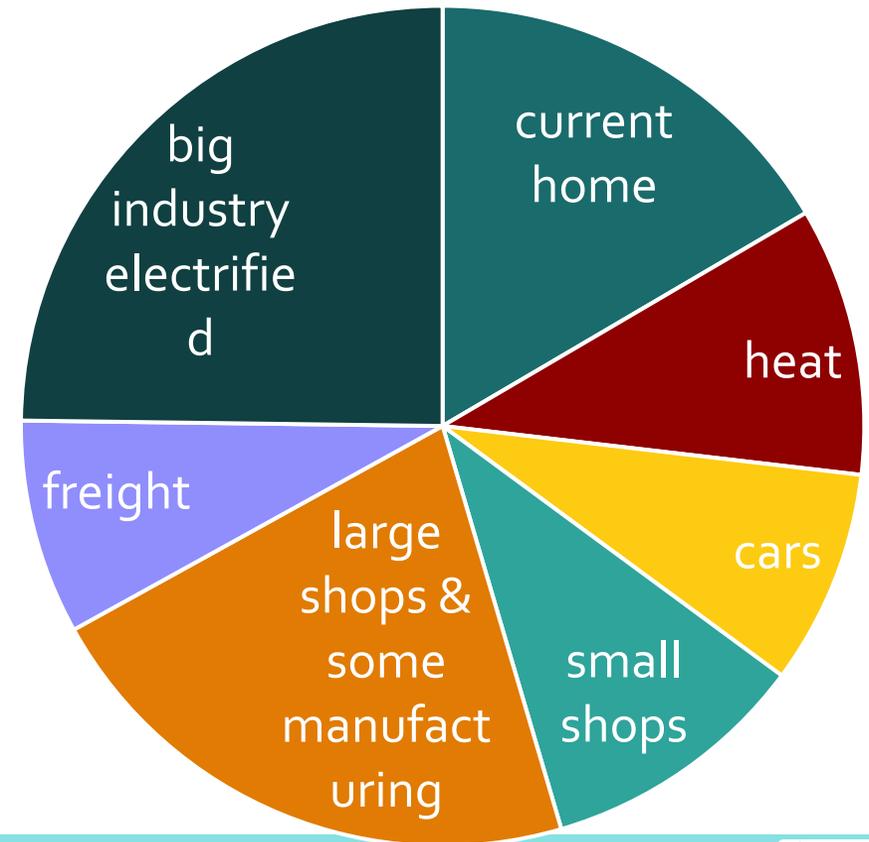


It's not all residential

Heyfield electricity use breakdown



Estimated economic footprint



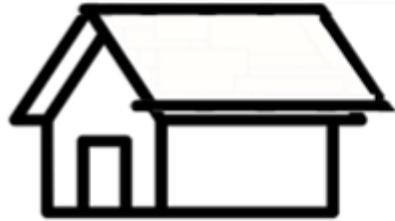
Economic energy footprint

Some typical numbers (reality is always location specific)

LV Customer	MV:LV transformer	Feeder	Zone Sub	Region	Territory	State
Household or organisation	Street Set of shops Large commercial	Whole towns Industry	Council / suburb?	Region / Alliance	DNISP	State Govt.
Household energy, electrification of heat	Electrified cars 8% (could be higher) Small shops 10%	Large shops	Freight	Big industry		
27%	18%	21%	8%	25%		

% Renewable energy use

Now



24%

Triple
the solar



37%

Using Energy
Flexibly



60%

Add Electric
Vehicles



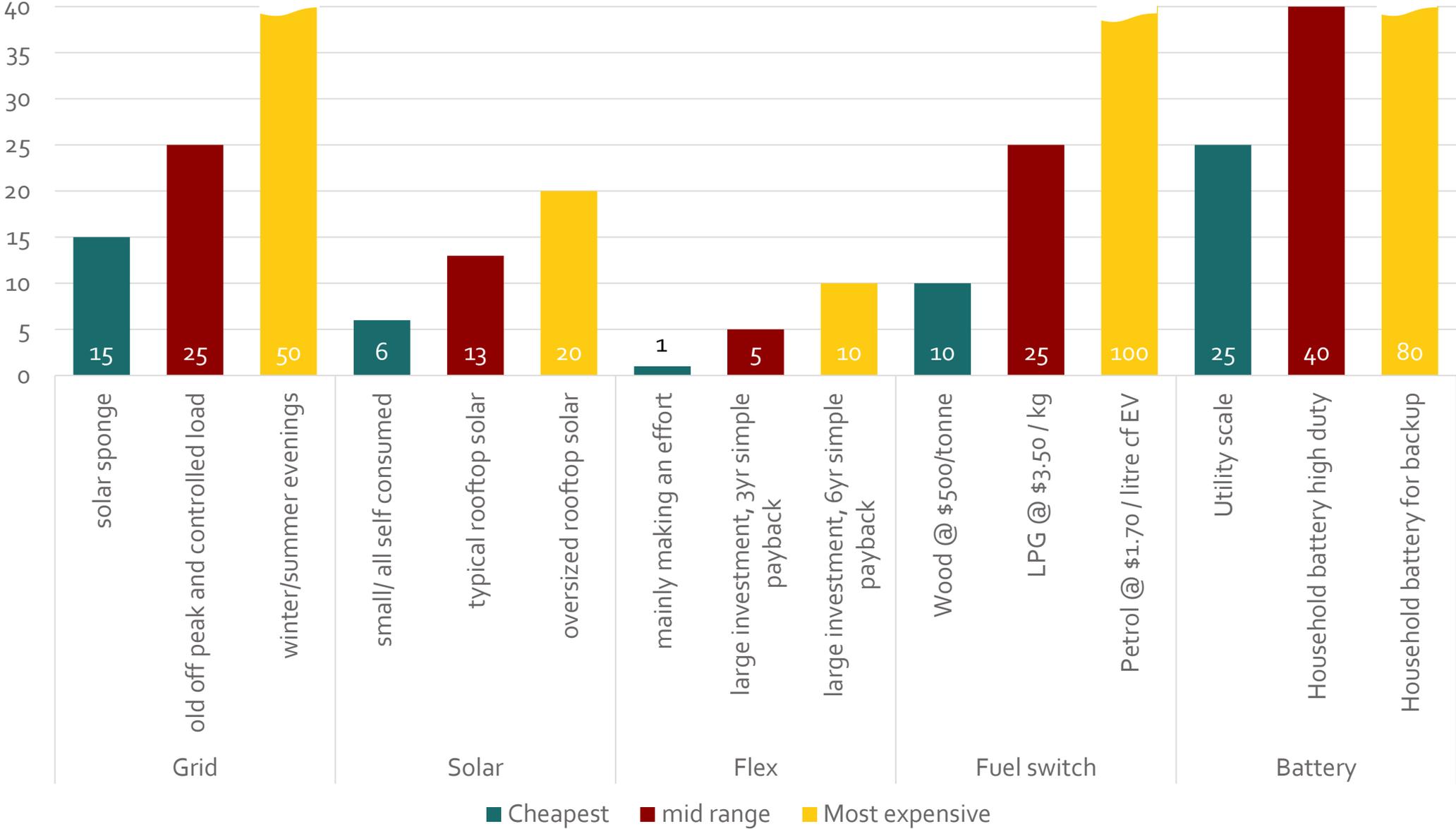
80%



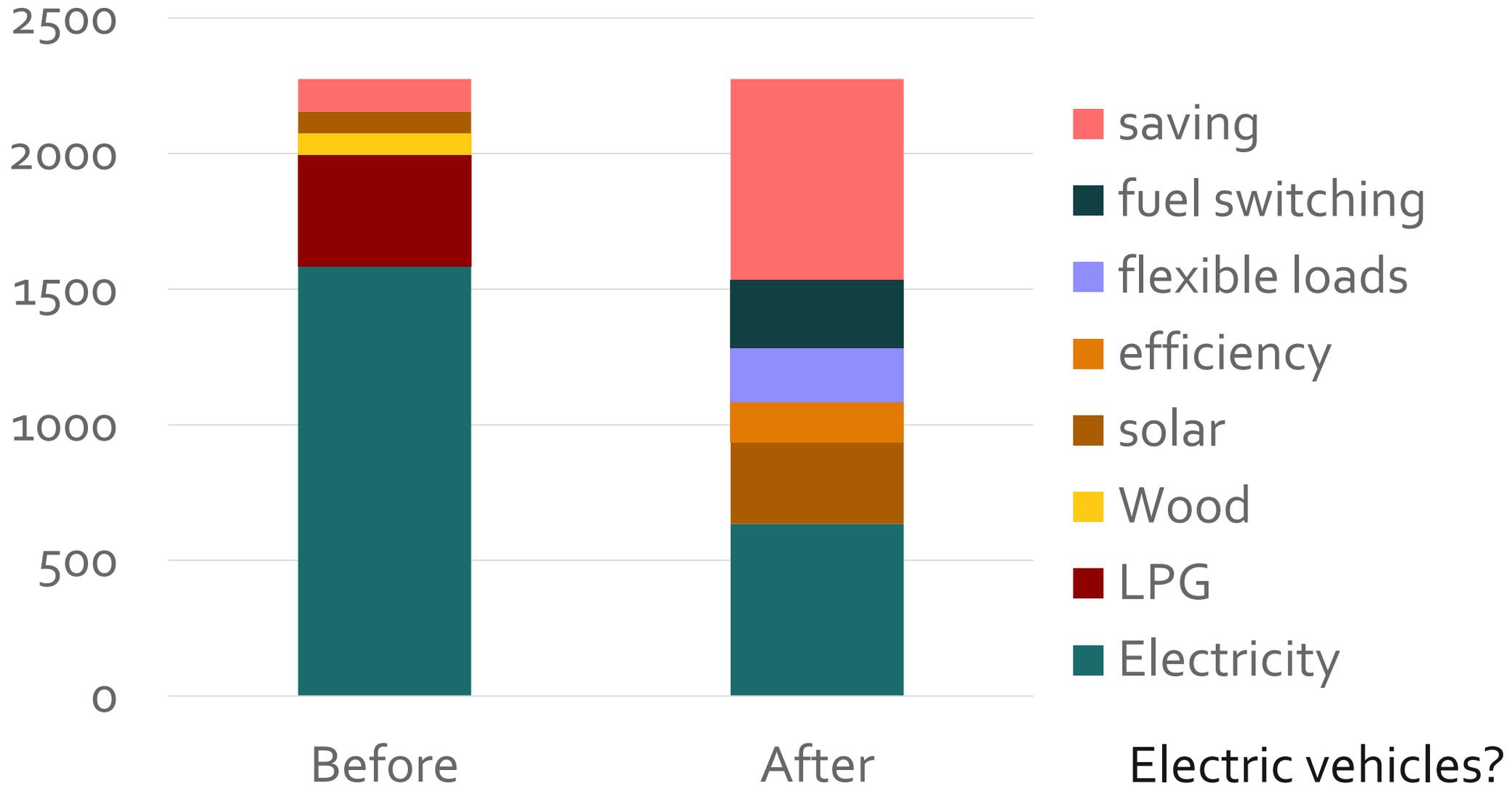
What is enough?

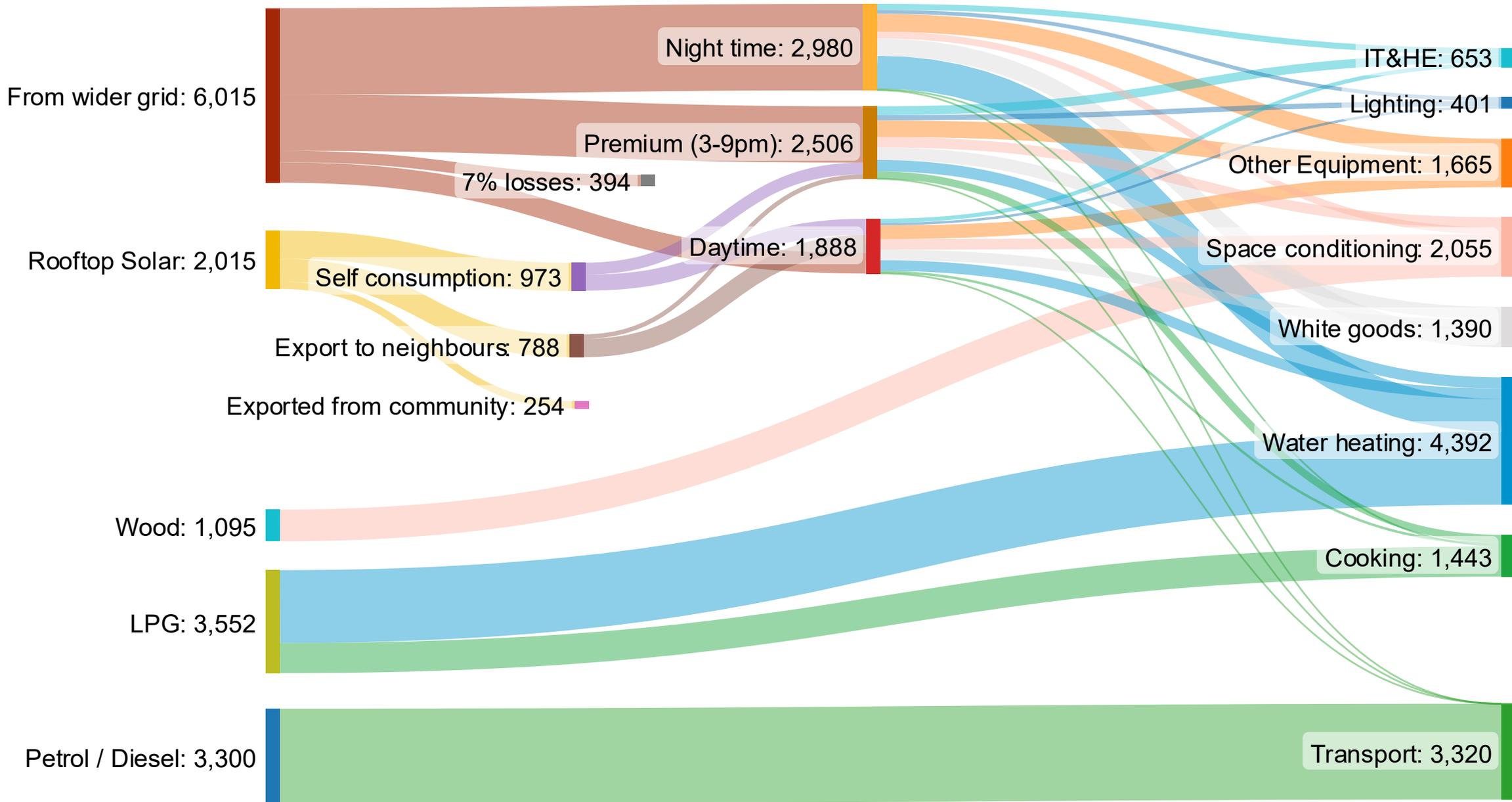
- Solar = 1.6MW now, 4MW valuable, 8MW eventually
- Wind = some value, investigate social feasibility
- Flexible Use of Energy & control = must maximise, (30-40% of all energy) turn off non-essentials during outages
- Storage = In essential locations first.
 - Significantly smaller and cheaper when we do generation and control first.
 - Possibly $\frac{1}{4}$ size of initial assessment.

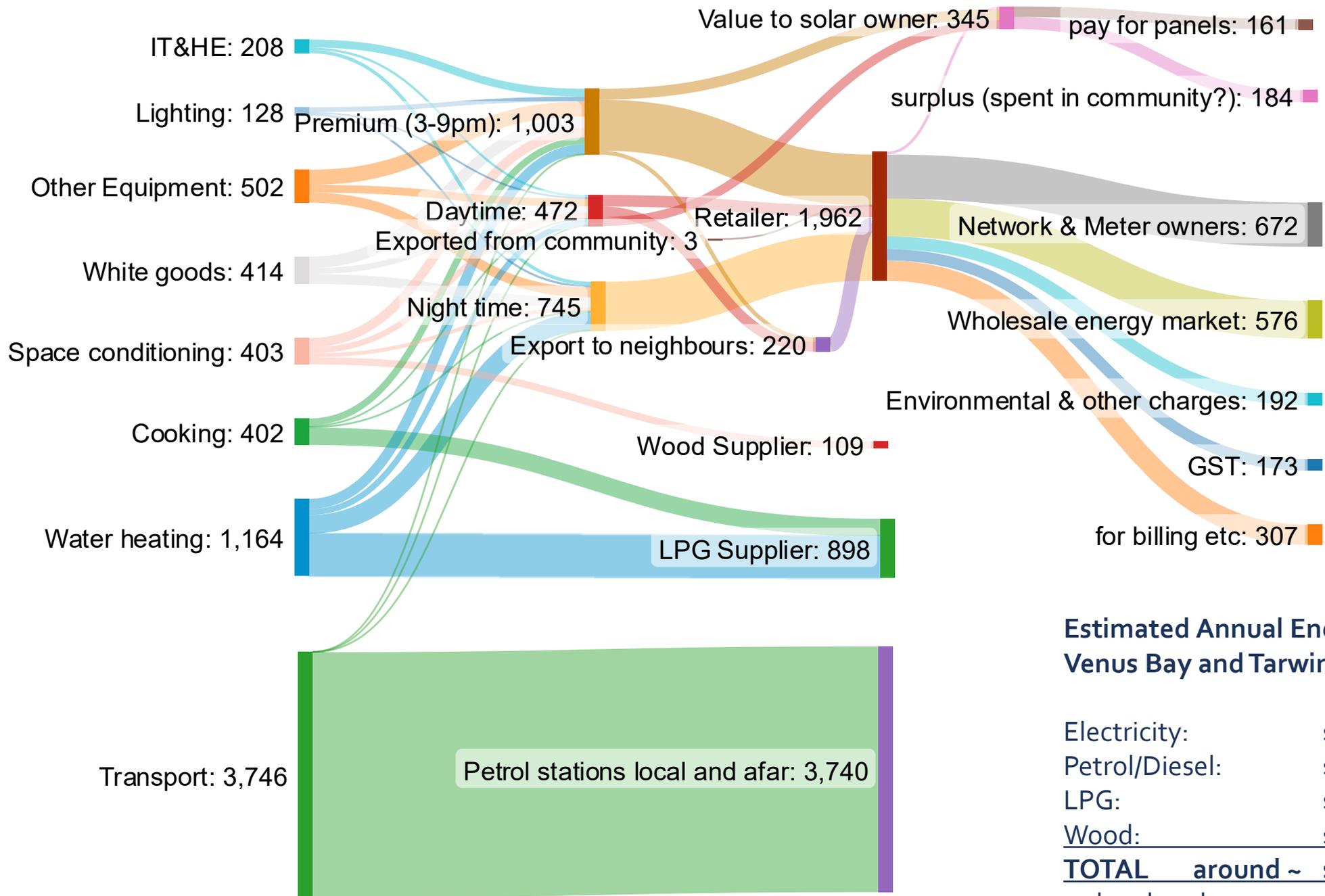
Raw Economics for Local Energy – c/kWh for different options



Alternative Energy Expenditure





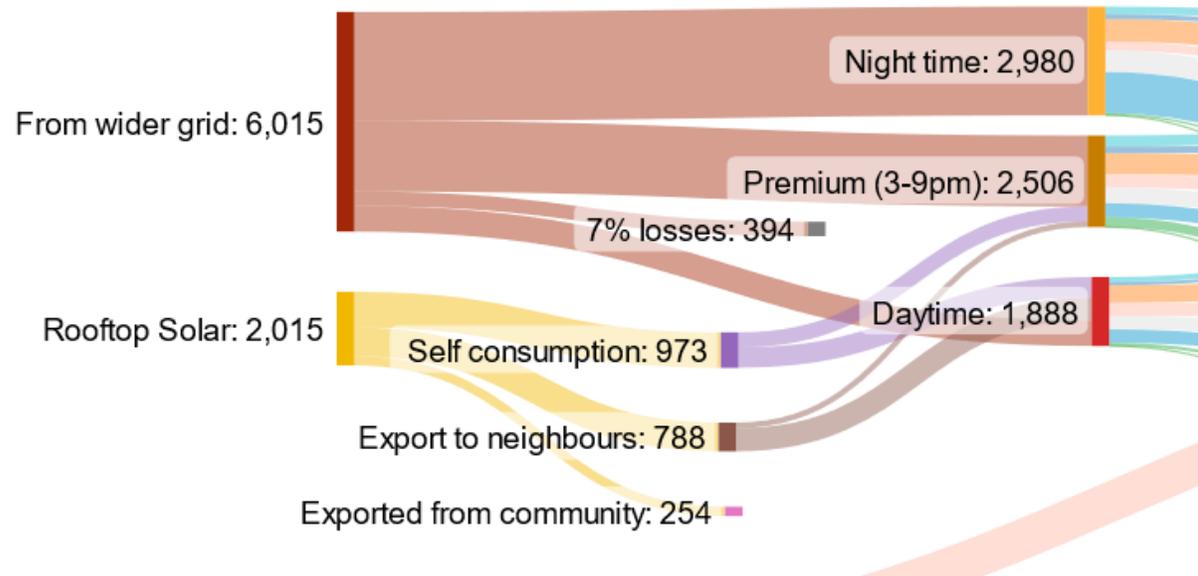


Estimated Annual Energy costs for Venus Bay and Tarwin Lower

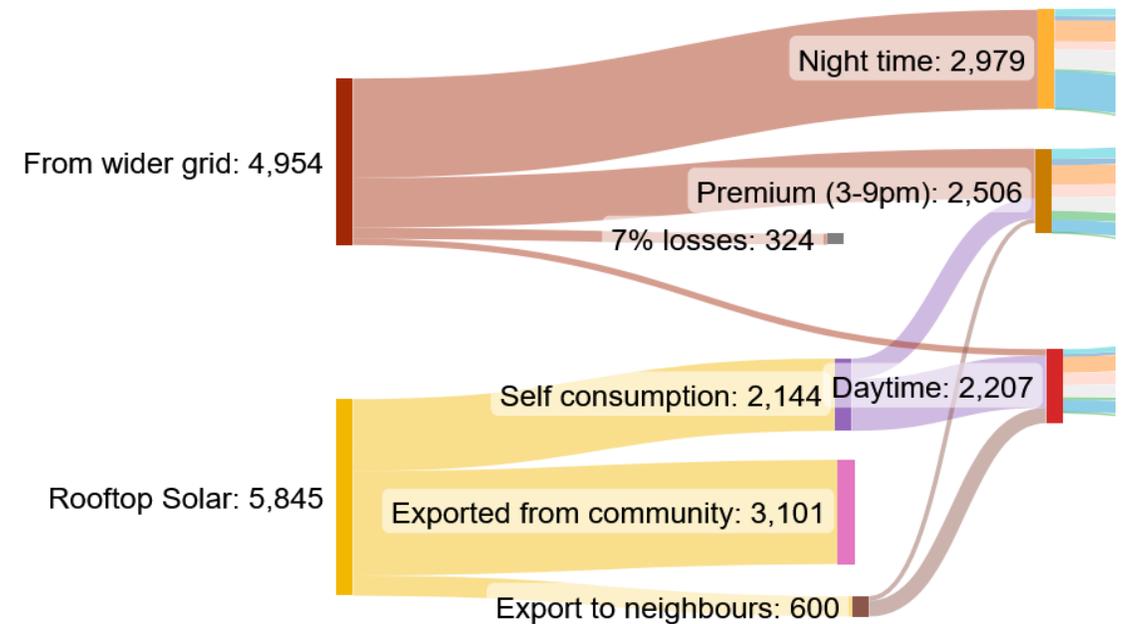
Electricity:	\$1.9m
Petrol/Diesel:	\$3.7m
LPG:	\$900k
Wood:	\$110k
TOTAL	around ~ \$6.7m
solar already saves	\$345k

What happens if we triple solar?

BEFORE



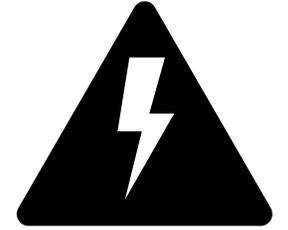
AFTER



Resilience and reliability



ELECTRICITY SUPPLY – RELIABILITY FACTORS



Essential Energy: Power Supply & Customer Impact

65% of customers are on short rural feeders like Evans Head

- Total of **960 short rural feeders** across the region

Evans Head Feeder Details

1. **Ballina Depot → Woodburn B2 → Evans Head South**
 - Serves **1,139 customers**
2. **Ballina Depot → Woodburn B5 → Evans Head North**
 - Serves **1,033 customers**

Performance Monitoring

Essential Energy tracks

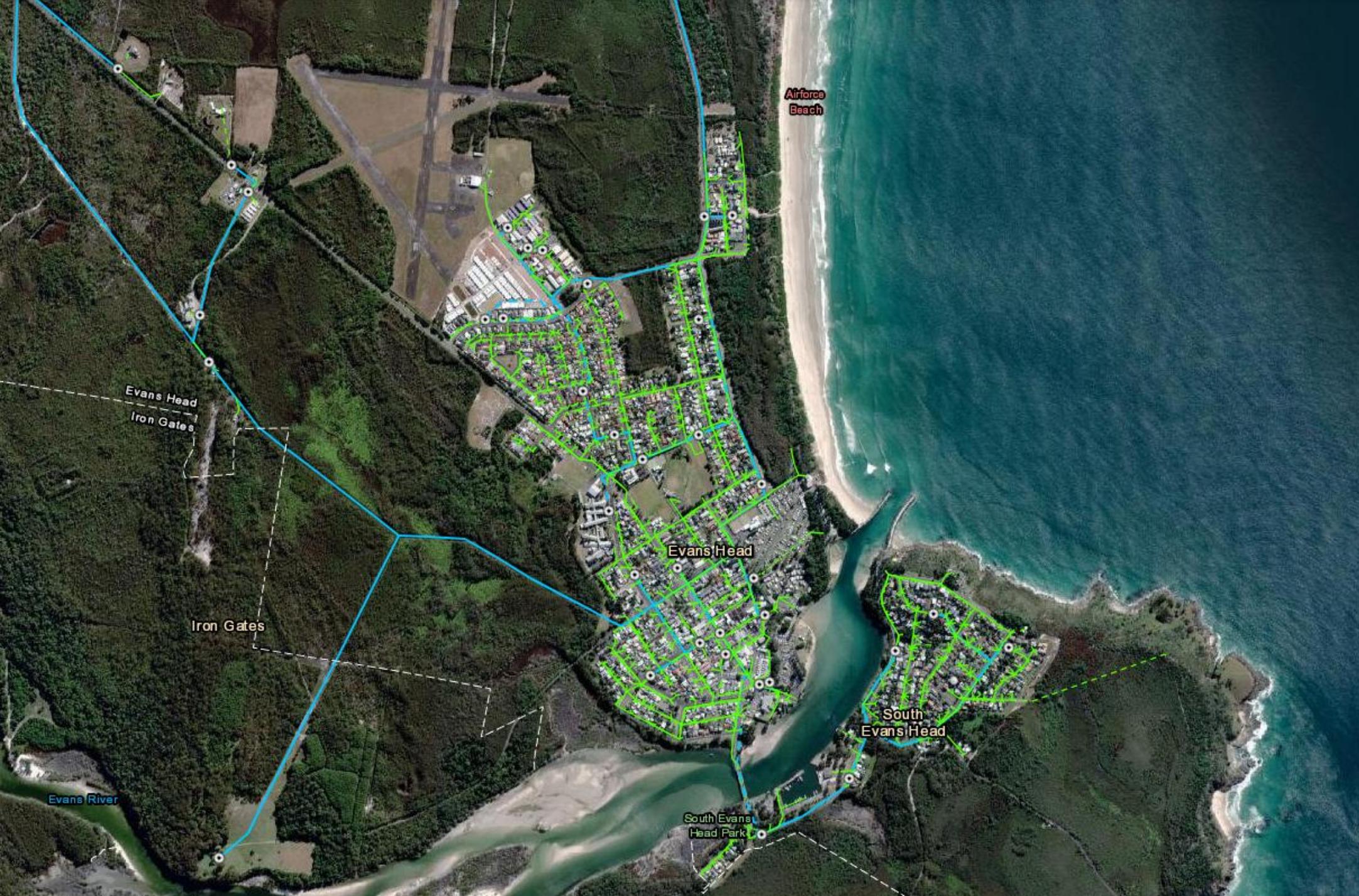
- **Number of customers impacted by each outage**
- **Duration of power outages (in minutes).**

Performance Targets

- Focus on reducing average blackout minutes
- Minimizing the number of outages.

Major Event Days (e.g. floods) **do not count** against performance targets.

- Outages **not caused by Essential Energy** (e.g., Broken Hill blackout) are excluded from performance metrics.



Legend

Substation



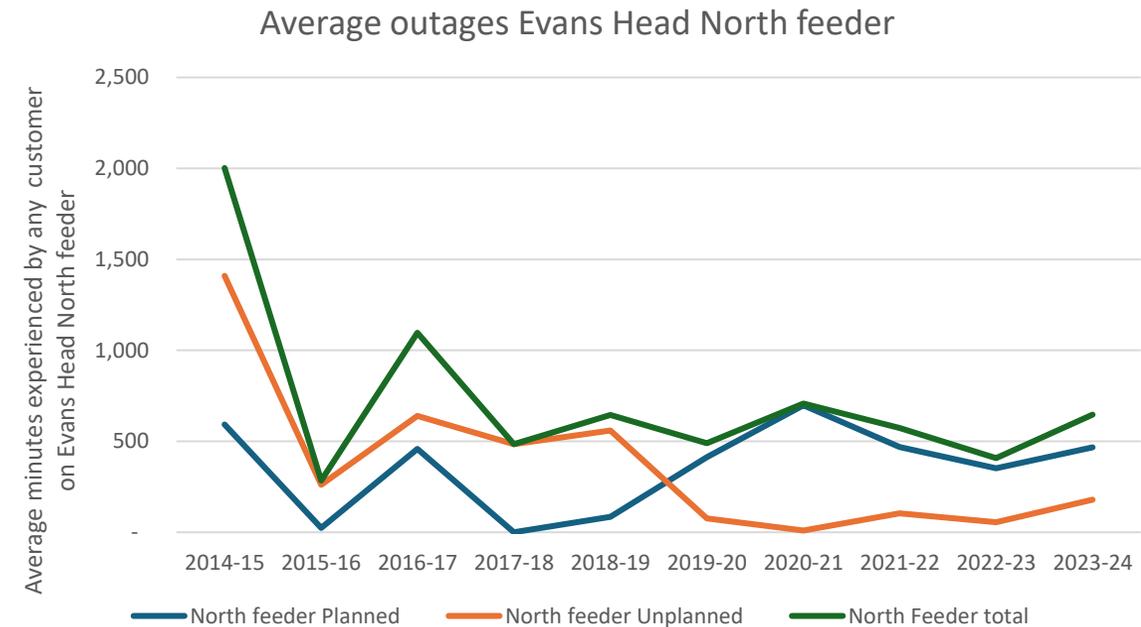
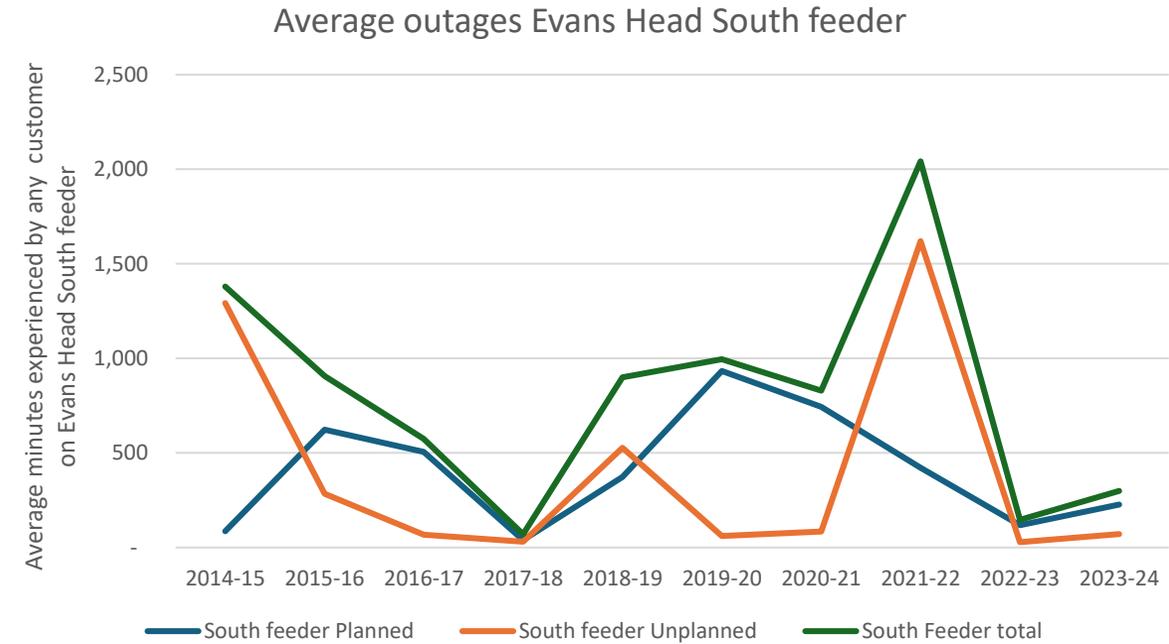
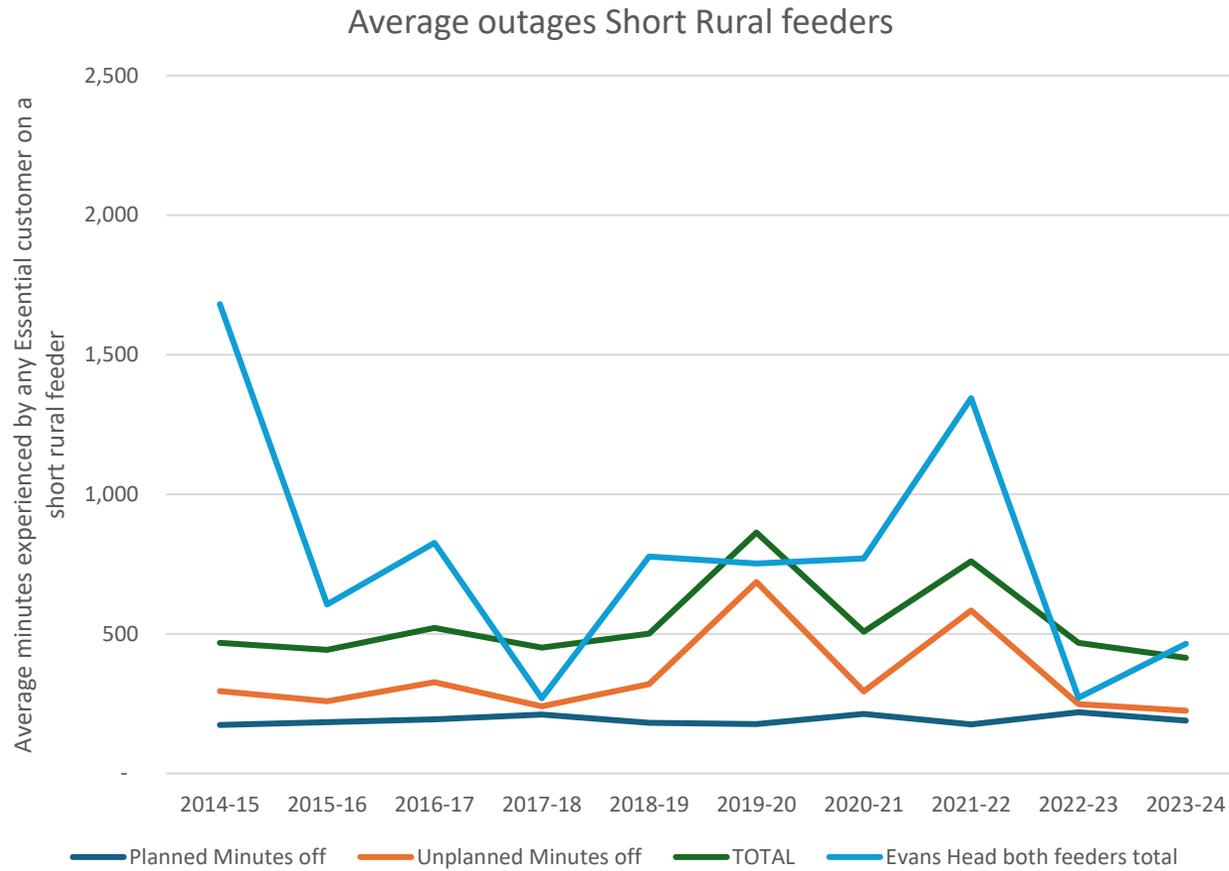
EE OH Span

- 6.6kV
- LV
- 11kV
- 12.7kV
- 19.1kV
- 22kV
- 33kV
- 66kV
- 110kV
- 132kV
- 220kV
- <all other values>

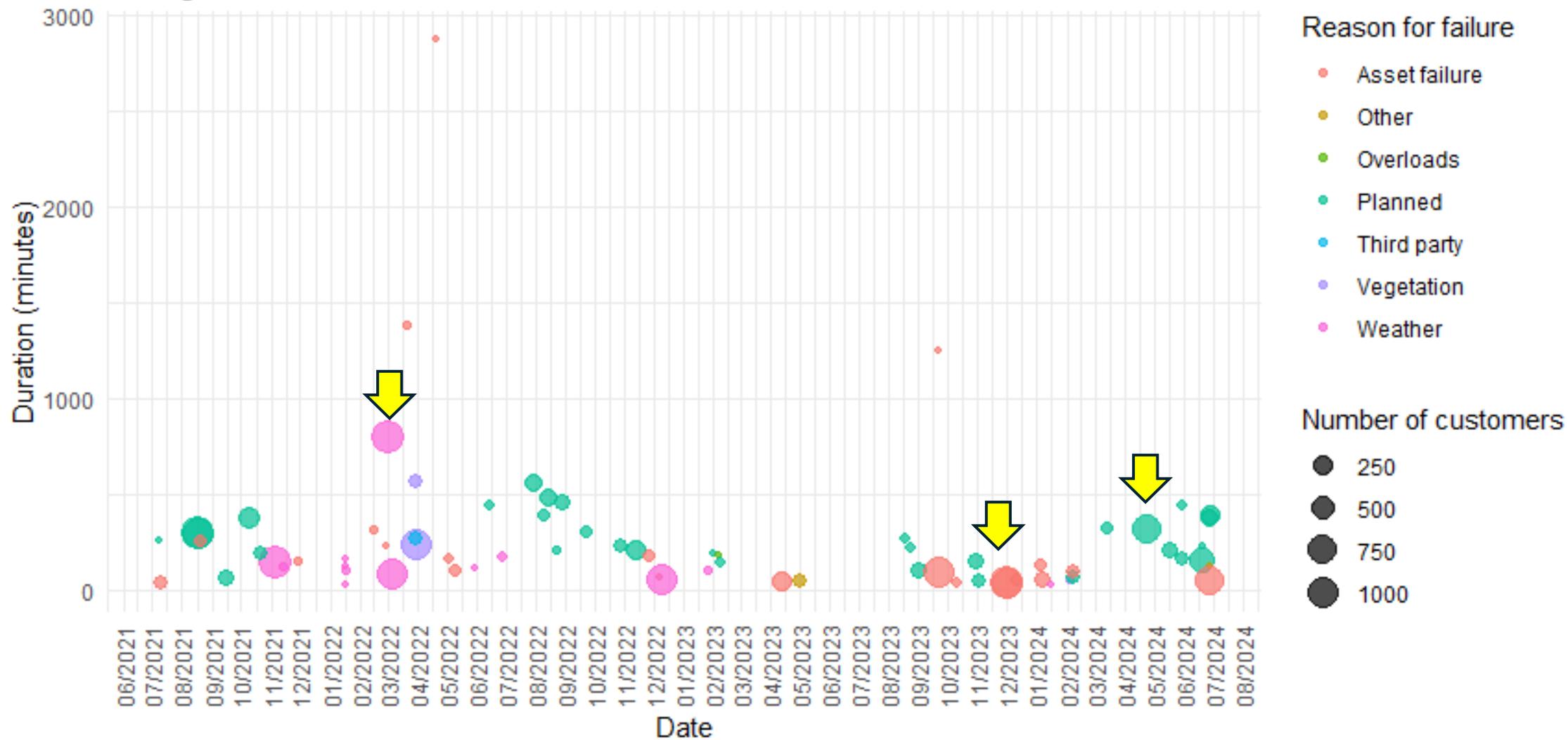
EE UG Cable

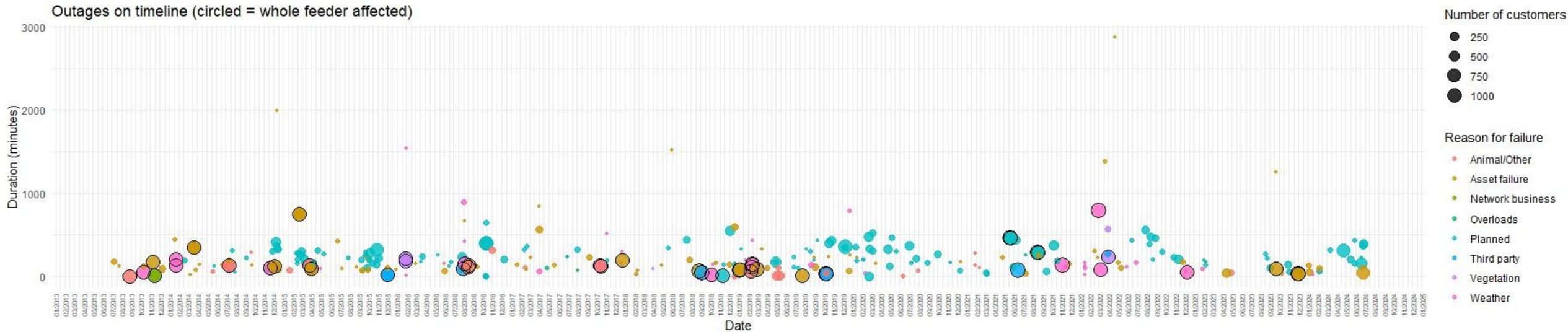
- 6.35kV
- 6.6kV
- LV
- 11kV
- 12.7kV
- 19.1kV
- 22kV
- 33kV

Evans Head Blackouts Overview



Outages on timeline





Ring around circle = outages of more than 900 customers

Note: “more than 900 customers” also means one of the two feeders was completely knocked out and the problem was "upstream" of Evans Head because there weren't that many customers on either feeder to Evans after Doonbah split

Not shown on graph but in source data:

If you look at the sheet of detailed outages, you'll see that some faults are classified as HV.

I originally thought those were faults that would knock out the whole Woodburn Zone substation and therefore the whole area, but if you look at them, some only have 100 customers affected, so it's not clear.

I also think some of the "third party" faults are upstream, but this is a broad category so I can't be sure.

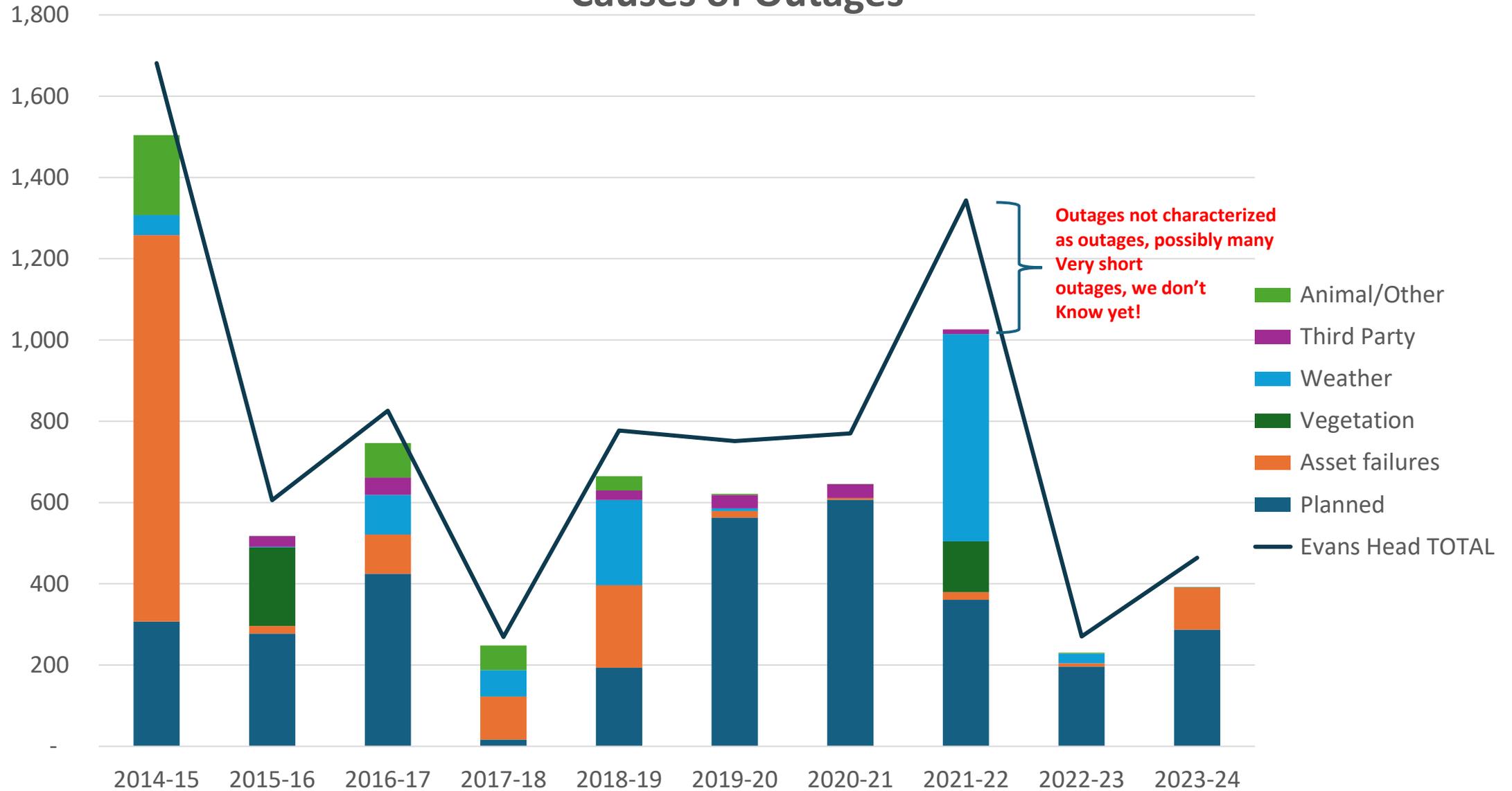
Heather Smith April 6 2025

Top 60 Outages Sorted By Number Of Customers Affected

year	Date of event	Time of interruption	Asset ID	Feeder classification	Reason for interruption	Detailed reason for interruption	Number of customers affected by the interruption	Average duration of sustained customer interruption
21/22 stats	01/03/2022	4:23:06 PM	WBN3B2 Evans Head Sth	Short Rural	Weather		1,094	792
23/24 stats	01/12/2023	9:31:09 PM	WBN3B2 Evans Head Sth	Short Rural	Asset failure	Zone substation	1,094	32
21/22 stats	06/11/2021	11:22:05 PM	WBN3B2 Evans Head Sth	Short Rural	8 - STPIS Exclusion (3.3)(c)		1,072	138
21/22 stats	18/08/2021	11:00:14 PM	WBN3B2 Evans Head Sth	Short Rural	Planned		1,070	292
20/21 stats	23/05/2021	8:30:38 AM	WBN3B2 Evans Head Sth	Short Rural	Planned		1,049	460
20/21 stats	16/06/2021	12:22:21 PM	WBN3B2 Evans Head Sth	Short Rural	Third party	Vehicle impact	1,047	69
18/19 stats	14/02/2019	12:15	WBN3B2 Evans Head Sth	Short Rural	Weather		1,043	146
18/19 stats	28/02/2019	00:32	WBN3B2 Evans Head Sth	Short Rural	Asset failure	HV	1,043	81
18/19 stats	28/08/2018	16:14	WBN3B2 Evans Head Sth	Short Rural	Asset failure	HV	1,042	59
18/19 stats	5/01/2019	14:45	WBN3B2 Evans Head Sth	Short Rural	Asset failure	Subtransmission	1,042	77
19/20 stats	08/10/2019	3:40:55 PM	WBN3B2 Evans Head Sth	Short Rural	5 - STPIS Exclusion (3.3)(a)	Fire	1,042	34
18/19 stats	4/09/2018	13:53	WBN3B2 Evans Head Sth	Short Rural	Third party	Vehicle impact	1,041	46
22/23 stats	10/12/2022	18:27	WBN3B5 Evans Head Nth	Short Rural	8 - STPIS Exclusion (3.3)(a)		1001	50
23/24 stats	01/12/2023	9:31:09 PM	WBN3B5 Evans Head Nth	Short Rural	Asset failure	Zone substation	996	33
23/24 stats	21/09/2023	4:45:09 PM	WBN3B5 Evans Head Nth	Short Rural	Asset failure	HV	996	93
15/16 stats	1/12/2016	14:06	WBN3B2 Evans Head 8th	Short Rural	6 - STPIS Exclusion (3.3)(a)	Switching and protection error	884	27
15/16 stats	28/01/2018	17:21	WBN3B2 Evans Head 8th	Short Rural	Vegetation	Blow-In/Fall-In	884	186
21/22 stats	06/03/2022	3:24:22 PM	WBN3B5 Evans Head Nth	Short Rural	Weather		994	81
21/22 stats	18/08/2021	11:00:14 PM	WBN3B5 Evans Head Nth	Short Rural	Planned		988	292
14/15 stats	21/02/2015	00:30	WBN3B2 Evans Head Sth	Short Rural	Asset failure	Subtransmission	987	751
14/15 stats	1/04/2015	15:42	WBN3B2 Evans Head Sth	Short Rural	Asset failure	Subtransmission	987	91
14/15 stats	11/07/2014	00:12	WBN3B2 Evans Head Sth	Short Rural	Other		985	131
13/14 stats	20/03/2014	07:47	WBN3B2 Evans Head Sth	Short Rural	Asset failure		984	355
20/21 stats	23/05/2021	8:30:38 AM	WBN3B5 Evans Head Nth	Short Rural	Planned		980	461
13/14 stats	23/01/2014	06:56	WBN3B2 Evans Head Sth	Short Rural	Weather		978	139
13/14 stats	15/11/2013	12:05	WBN3B2 Evans Head Sth	Short Rural	Network business		972	9
13/14 stats	27/08/2013	14:25	WBN3B2 Evans Head Sth	Short Rural	Animal		971	3
19/20 stats	08/10/2019	3:40:55 PM	WBN3B5 Evans Head Nth	Short Rural	5 - STPIS Exclusion (3.3)(a)	Fire	966	34
19/20 stats	25/07/2019	11:10:34 AM	WBN3B5 Evans Head Nth	Short Rural	Asset failure	HV	961	10
18/19 stats	5/10/2018	07:00	WBN3B5 Evans Head Nth	Short Rural	Weather		959	25
18/19 stats	9/11/2018	08:00	WBN3B5 Evans Head Nth	Short Rural	Planned		959	7
18/19 stats	5/01/2019	14:45	WBN3B5 Evans Head Nth	Short Rural	Asset failure	Subtransmission	959	80
18/19 stats	8/02/2019	05:07	WBN3B5 Evans Head Nth	Short Rural	Animal	Animal impact	959	61
18/19 stats	13/02/2019	20:25	WBN3B5 Evans Head Nth	Short Rural	Weather		959	117
14/15 stats	4/12/2014	23:18	WBN3B2 Evans Head Sth	Short Rural	Asset failure	Subtransmission	958	124
18/19 stats	14/02/2019	12:15	WBN3B5 Evans Head Nth	Short Rural	Weather		958	146

17/18 stats	14/10/2017	16:01	WBN3B6 Evans Head Nth	Short Rural	Weather		862	137
17/18 stats	16/10/2017	10:38	WBN3B6 Evans Head Nth	Short Rural	Animal	Animal impact	862	130
17/18 stats	24/12/2017	03:04	WBN3B6 Evans Head Nth	Short Rural	Asset failure	HV	861	201
16/17 stats	31/07/2018	20:26	WBN3B6 Evans Head Nth	Short Rural	Third party	Fire	847	80
16/17 stats	4/03/2018	01:12	WBN3B6 Evans Head Nth	Short Rural	Weather		847	163
16/17 stats	16/03/2018	08:07	WBN3B6 Evans Head Nth	Short Rural	Asset failure	HV	847	116
16/17 stats	20/03/2018	22:33	WBN3B6 Evans Head Nth	Short Rural	Animal	Animal impact	847	132
14/15 stats	26/03/2015	22:50	WBN3B5 Evans Head Nth	Short Rural	Animal	Animal impact	934	139
14/15 stats	1/04/2015	15:42	WBN3B5 Evans Head Nth	Short Rural	Asset failure	Subtransmission	934	91
15/16 stats	28/01/2018	17:21	WBN3B6 Evans Head Nth	Short Rural	Vegetation	Blow-in/Fall-in	834	216
15/16 stats	1/12/2016	14:06	WBN3B6 Evans Head Nth	Short Rural	6 - STPIS Exclusion (3.3)(a)	Switching and protection error	833	27
14/15 stats	19/11/2014	20:15	WBN3B5 Evans Head Nth	Short Rural	Weather		926	105
14/15 stats	4/12/2014	23:18	WBN3B5 Evans Head Nth	Short Rural	Asset failure	Subtransmission	926	124
14/15 stats	21/02/2015	00:30	WBN3B5 Evans Head Nth	Short Rural	Asset failure	Subtransmission	926	750
13/14 stats	9/10/2013	12:26	WBN3B2 Evans Head Sth	Short Rural	Weather		921	48
13/14 stats	20/03/2014	07:47	WBN3B5 Evans Head Nth	Short Rural	Asset failure		919	354
14/15 stats	11/07/2014	00:12	WBN3B5 Evans Head Nth	Short Rural	Other		919	131
21/22 stats	30/03/2022	6:41:14 AM	WBN3B2 Evans Head Sth	Short Rural	Vegetation	Blow-in/Fall-in	917	240
13/14 stats	23/01/2014	07:14	WBN3B5 Evans Head Nth	Short Rural	Weather		916	209
13/14 stats	8/11/2013	12:35	WBN3B5 Evans Head Nth	Short Rural	Asset failure		912	173
13/14 stats	15/11/2013	12:05	WBN3B5 Evans Head Nth	Short Rural	Network business		912	9
16/17 stats	12/10/2018	03:30	WBN3B6 Evans Head Nth	Short Rural	Planned		890	400
19/20 stats	09/12/2019	10:01:24 PM	WBN3B2 Evans Head Sth	Short Rural	Planned		890	359
16/17 stats	12/10/2018	03:30	WBN3B2 Evans Head 8th	Short Rural	Planned		881	388
23/24 stats	27/06/2024	10:57:51 AM	WBN3B5 Evans Head Nth	Short Rural	Asset failure	HV	798	44
23/24 stats	24/04/2024	9:31:08 AM	WBN3B5 Evans Head Nth	Short Rural	Planned		794	311
15/16 stats	28/10/2016	03:30	WBN3B2 Evans Head 8th	Short Rural	Planned		781	323
23/24 stats	21/06/2024	9:17:43 AM	WBN3B5 Evans Head Nth	Short Rural	Planned		523	155

Causes of Outages



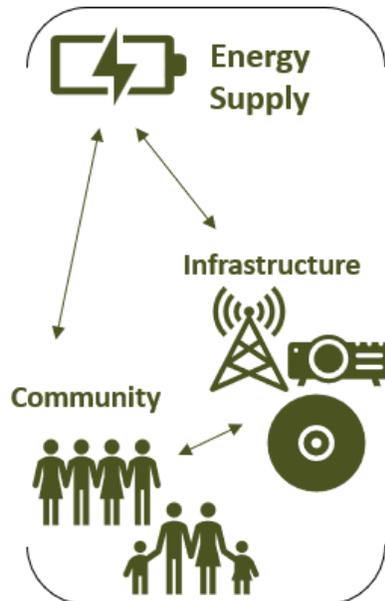
Key issue to resolve: what is feeder interconnection at or after Doonbah split to avoid outages from one feeder going down?

What we understood – Resilience

Resilience Framework



1. Resilience of what?



2. Disturbances - Resilience to what?

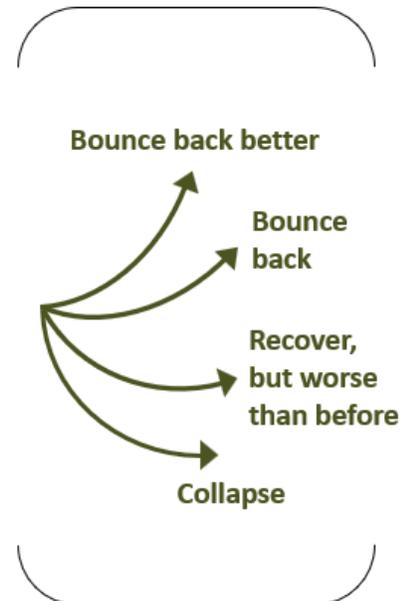


3. Capacity to deal with disturbance

What do you think?

- Being prepared
- Knowing who can help - connectivity
- Spare capacity, diversity, flexibility, alternatives / multiple options
- Adaptability
- Managing with less
- Support from authorities

4. Reaction to disturbance



5. Due to what actions?

- Better** = learning, adapting and transforming
- Bounce Back** = Preparation, monitoring, responding
- Recover..ish** = Coping, absorbing the shock but performance declines
- Collapse** = fundamentally changed by the event/s

Resilience of what?



Important Energy *Users*

- community buildings, businesses and the services they could provide (if they had access to energy)

Important Energy *Uses*

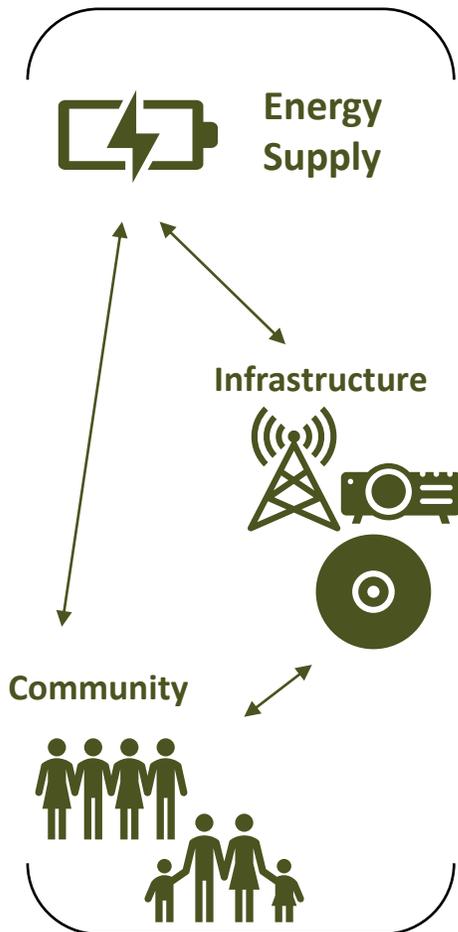
- Essential needs, enough – and everything including preparing for the future

Important Infrastructure

- Telecommunications, all communications
- Water
- Emergency services
- Petrol, money etc all link back to the services and users

Community groups, community connections, community sites

How we are interconnected – social connections and how we relate to our energy and infrastructure options



Understanding Criticality

Level	Category	Consequence
0	Everything	Future proof, enhancing community well-being
1	Everything	No impact to minor annoyance
2	Enough	Annoyance but alternatives exist
3	Enough	Annoyance but no alternatives exist
4	Essential	Major annoyance or monetary loss
5	Essential	Health / Safety risk, Major loss

IDEAS

- Everything
- Enough
- Essential

Category Ideas

- Light
- Food
- Heat / cool
- Water
- Hot water
- Phone/internet
- Health
- Transport
- Money
- Help
- Entertainment

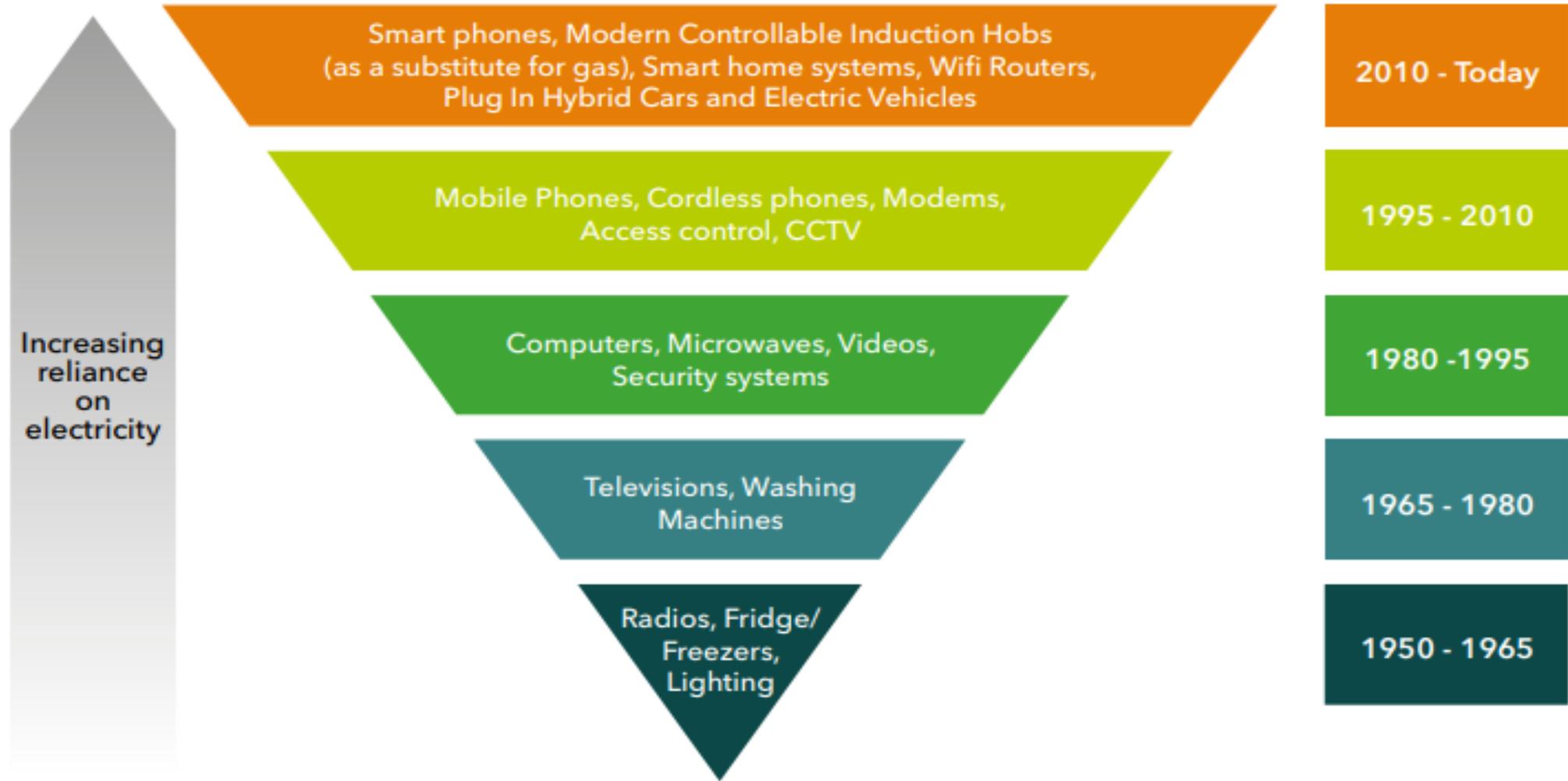


Figure 8: The increasing reliance upon electricity over the last 70 years

What we understood - Essential, Enough, Everything

Understanding energy criticality

Level	Category	Consequence
0	Everything	Future proof, enhancing community well-being
1	Everything	No impact to minor annoyance
2	Enough	Annoyance but alternatives exist
3	Enough	Annoyance but no alternatives exist
4	Essential	Major annoyance or monetary loss
5	Essential	Health / Safety risk, Major loss

Instructions

Think through your needs for electricity and please indicate how important different appliances and uses are to you. For example, outages less than 8 hours, outages 1 - 2 days, outages of greater than 3 days and emergencies (where these cause you to be without electricity for more than 24 hours). Use the guide above – is it essential? (4 or 5), better to have than go without? (2 or 3) or discretionary? (0 or 1). Please indicate the level of importance in the second column and make notes in the last column to help us understand the situation and alternatives you were thinking about.

Outages < 8 hours	Outages 1 - 2 days	Outages > 3 days	Emergencies	Alternative strategies and notes
1-2 lights	1	4	4	5 I can charge in my car Candles and torch Few alternatives if torch runs out of battery.

VENUS BAY COMMUNITY CENTRE

ABOUT NEWS BE INVOLVED OP SHOP COMMUNITY ENERGY COMMUNITY CONTACT

Workshop 1 - What did we miss?

1. Tell us about your household.

- Full time resident
- Part time resident
- Holiday maker
- Visitor

in Venus Bay Centre

Electricity Metering Data Requests

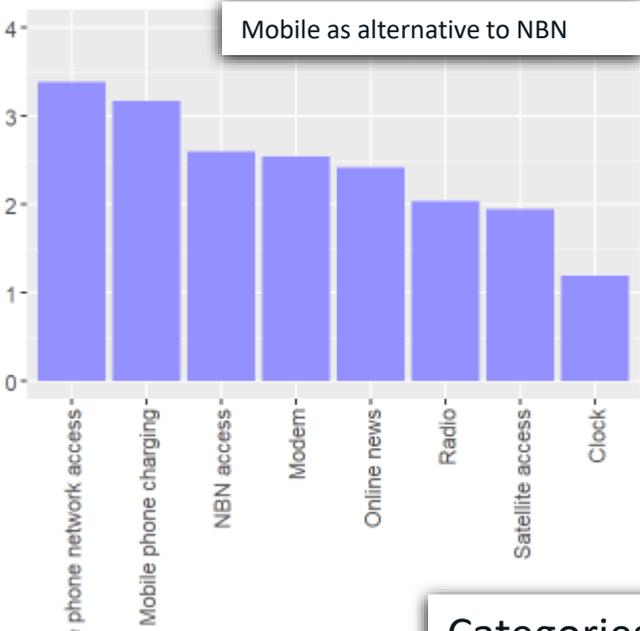
Make a request for my metering data

[Get Started >](#)

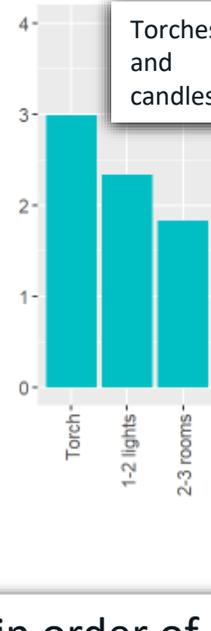
AusNet services

Data Collecting

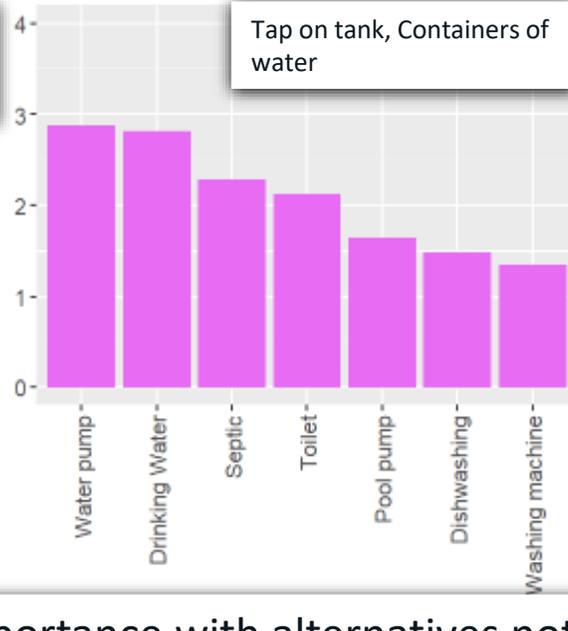
Phone/internet



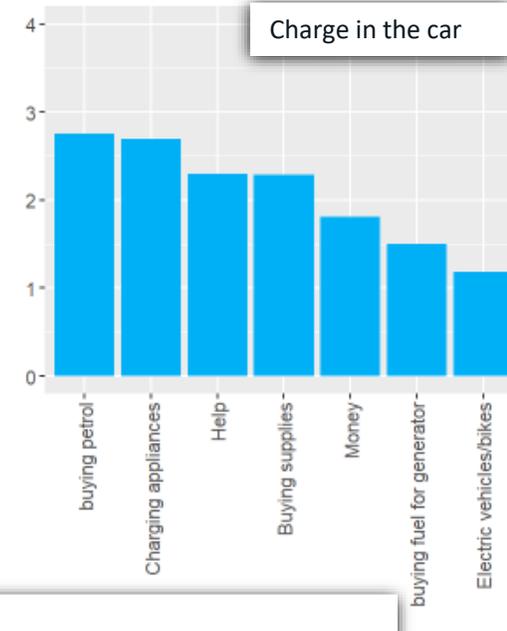
Light



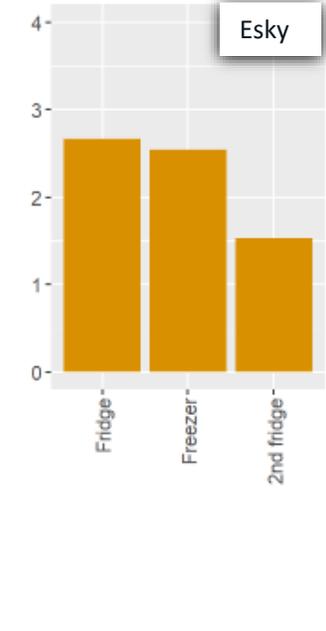
Water



Other

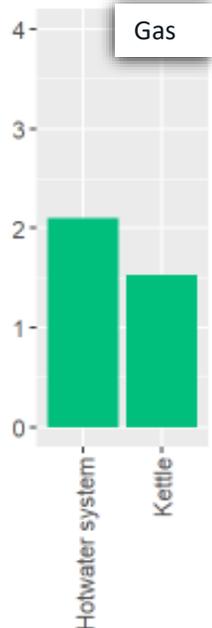


Food Storage

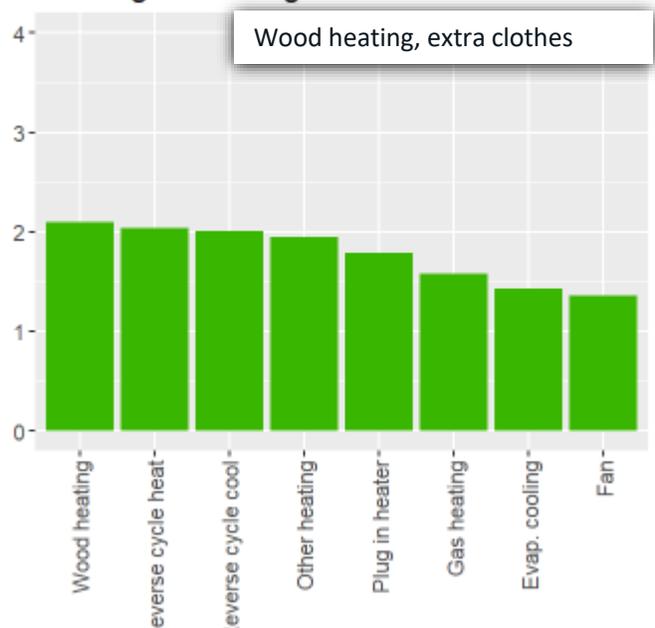


Categories in order of importance with alternatives noted

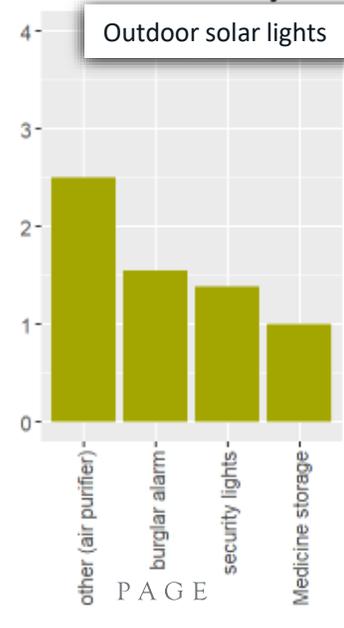
Hot Water



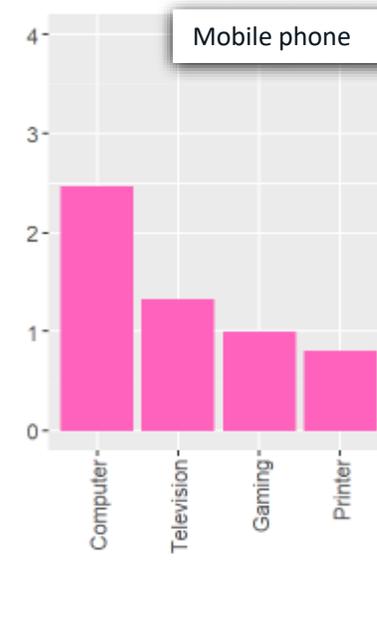
Heating & Cooling



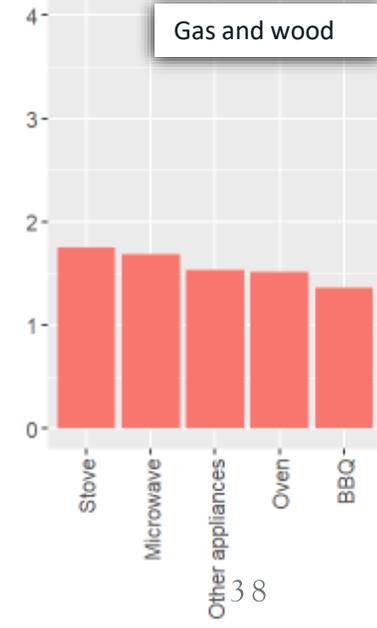
Health & Security



Work & Entertainment



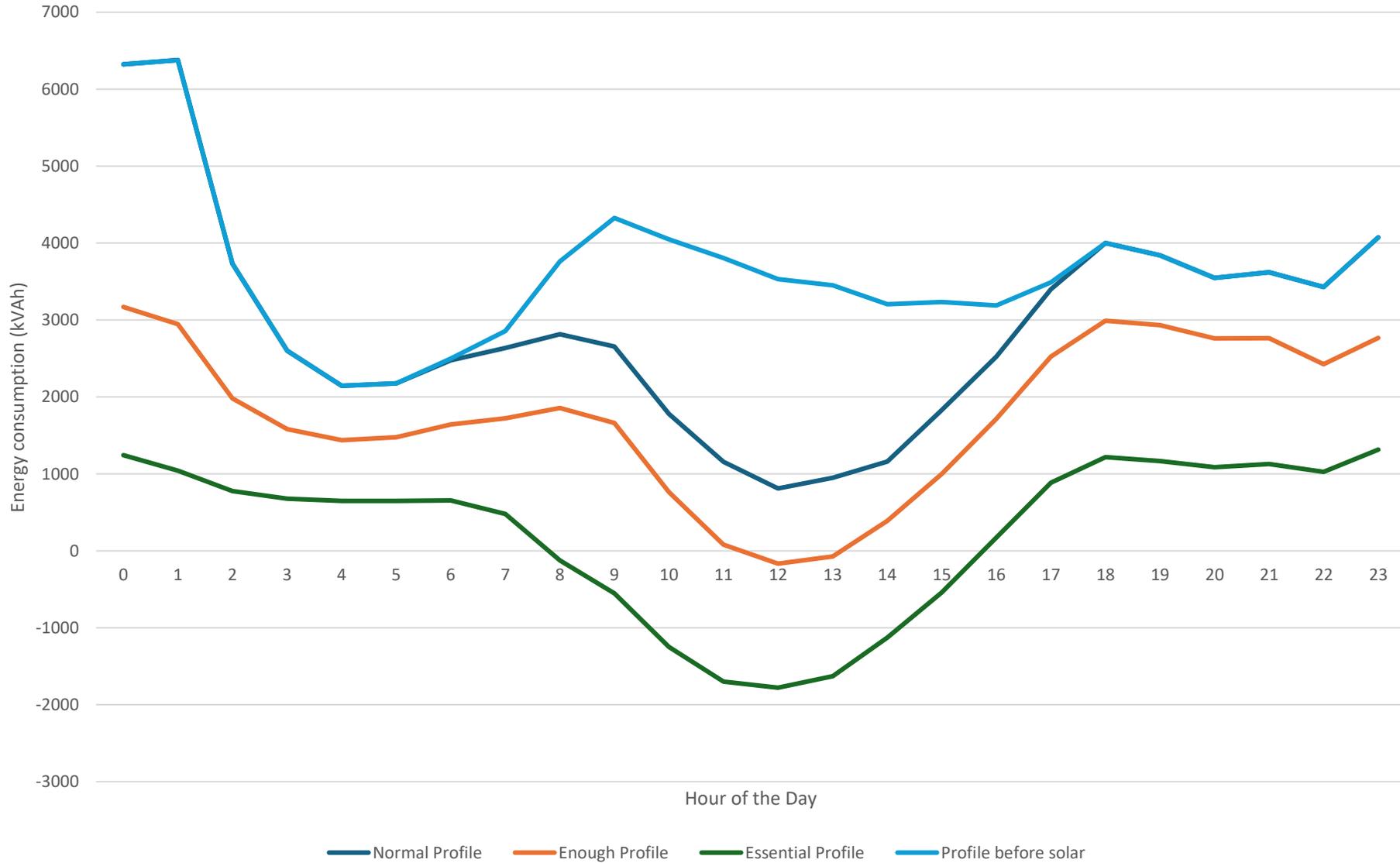
Food



Essential and enough

Breakdown	Essential	Enough
heating&cooling	10%	80%
Cooking	50%	80%
IT&HE	50%	100%
Lighting	20%	80%
Other Equipment	25%	75%
Transport		
Water heating		25%
White goods	100%	100%

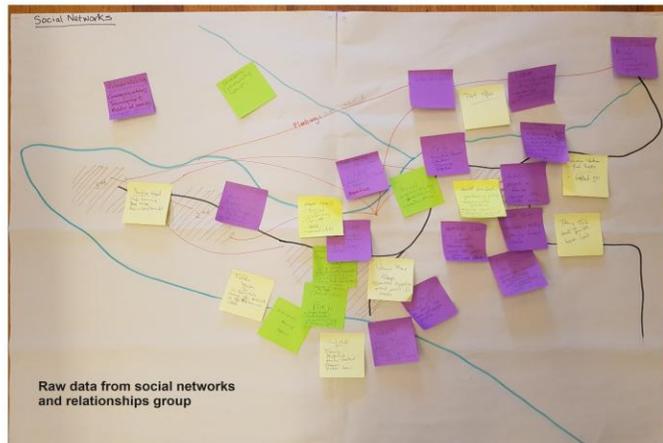
Winter load profiles for Cantor Fishermans LV feeder



What we understood - Critical sites

How we are connected

This map was produced from the ideas discussed at two workshop tables - Social networks and Hubs & Clusters. The map illustrates the social networks, connections and relationships that exist between people, groups, organisations and infrastructure. Overlaid on this map are the ideas people had for powering particular buildings or clusters of buildings in local hubs to meet the communities needs during power outages. Further work is needed to discuss this more widely, to test the ideas and explore which sites we might power first if we need to prioritise some before others.



Social network top vulnerabilities

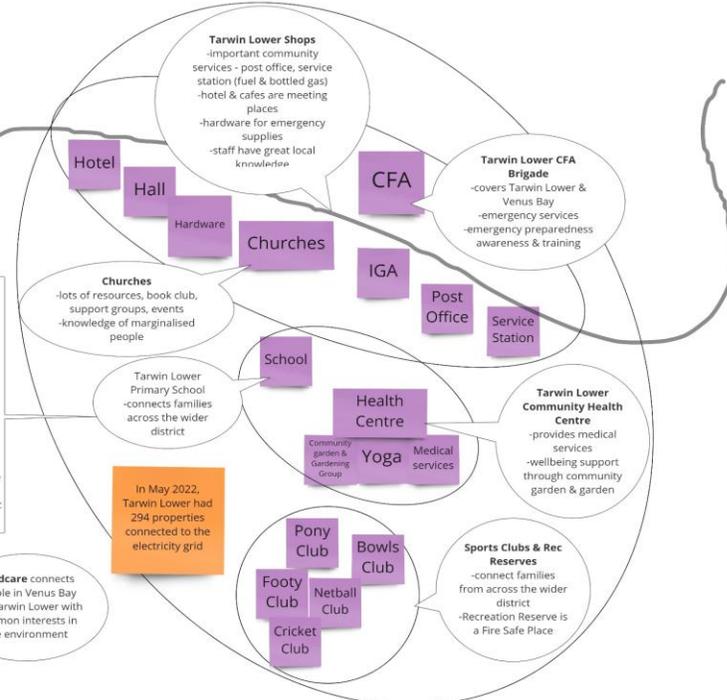
1. Communications - power out means no phone or internet
2. Transport - we have no public or community transport
3. Medical services are limited and it is unclear which organisation is responsible for the vulnerable persons register

One road in and out of Venus Bay makes this community particularly vulnerable during emergencies

Hubs and Clusters - places to independently power in Tarwin Lower

- CFA particularly during emergencies
- Hall during outages or recovery
- Service station to get fuel and gas
- IGA & Mitre 10 so we can get supplies
- School has lots of facilities
- Medical Centre so can offer services all the time
- Rec Reserve as is Fire Safe Place

Install Satellite phones at specific Hub sites for emergency use.



Many social groups span both townships

Landcare

Local groups and Facebook pages

CERT

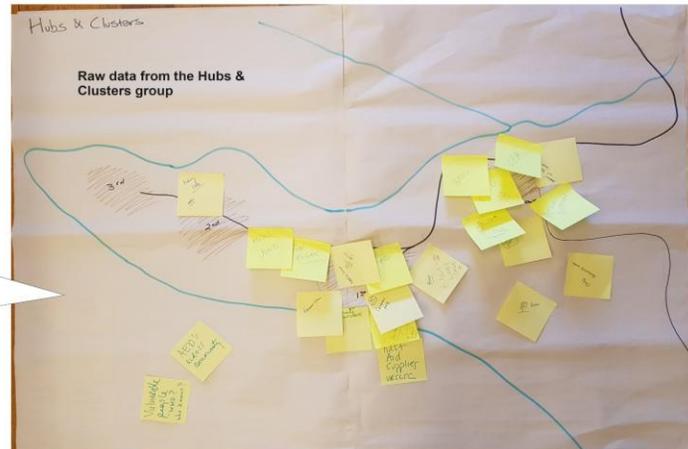
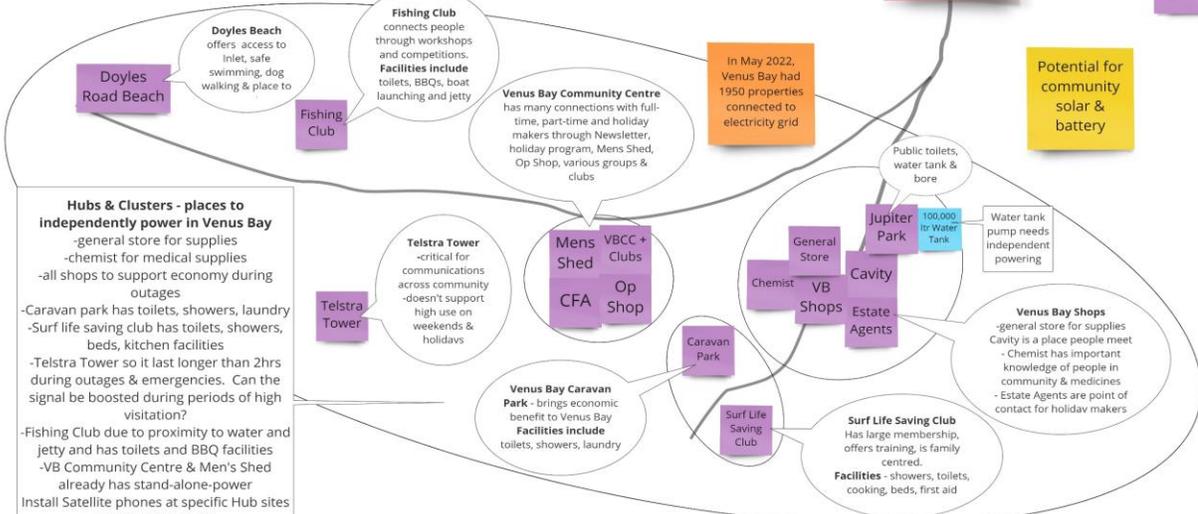
Landcare connects people in Venus Bay and Tarwin Lower with common interests in the environment

CERT Team

- covers Venus Bay, Tarwin Lower & beyond.
- High value knowledge of community and individual needs

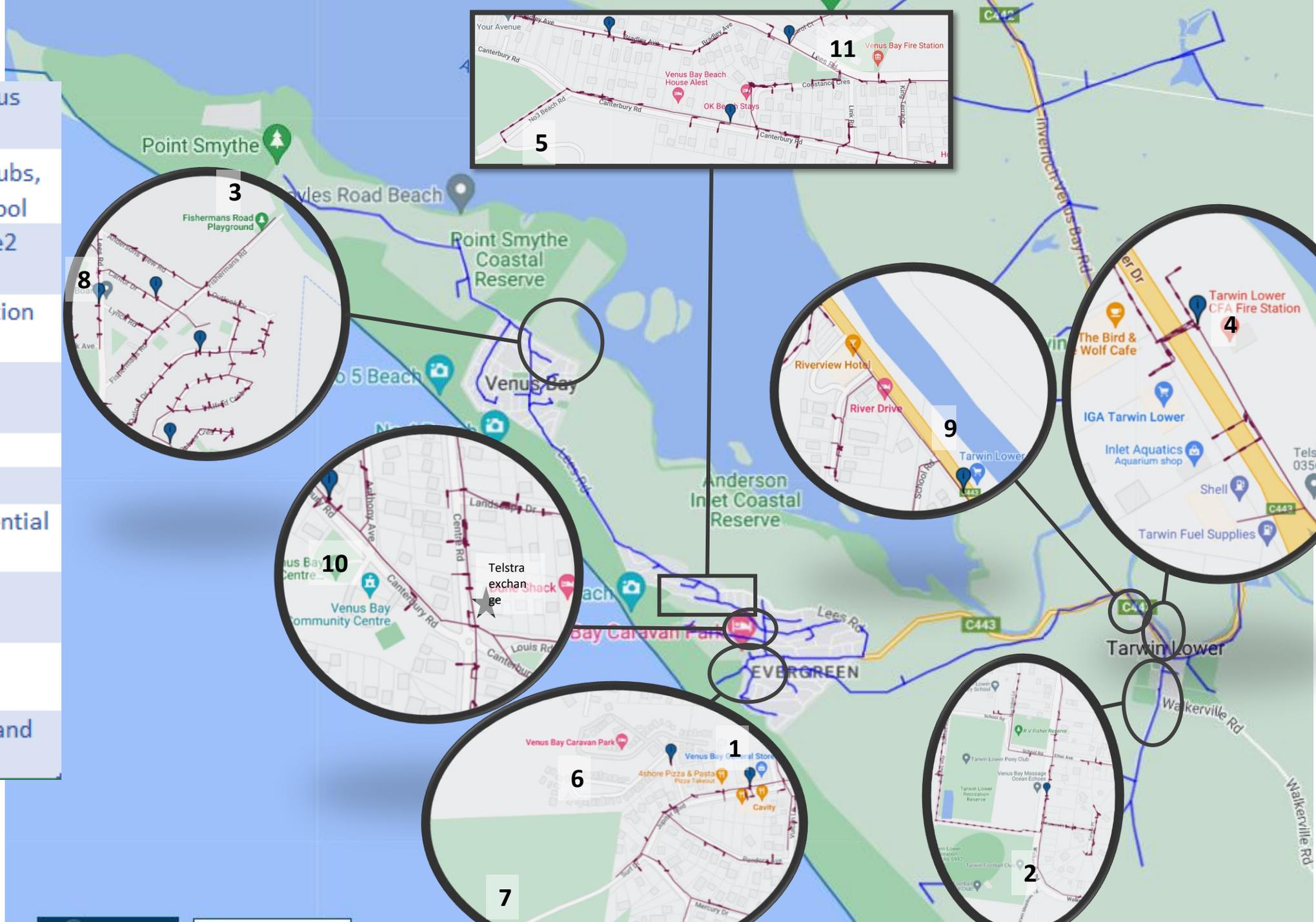
Potential for community solar & battery

In May 2022, Venus Bay had 1950 properties connected to electricity grid



Key

- 1 General store and Venus Bay shops
- 2 Recreation Reserve, clubs, Health Centre and School
- 3 Fishing club and Estate2 residential
- 4 Petrol station, Fire Station and IGA (plus shops)
- 5 Telstra tower and residential
- 6 Caravan Park
- 7 Surf club
- 8 Second possible residential cluster (Estate2)
- 9 Motel and pub, Tarwin Lower
- 10 Venus Bay Community Centre and residential
- 11 Mens Shed, CFA shed and residential



What we understood - Community Values

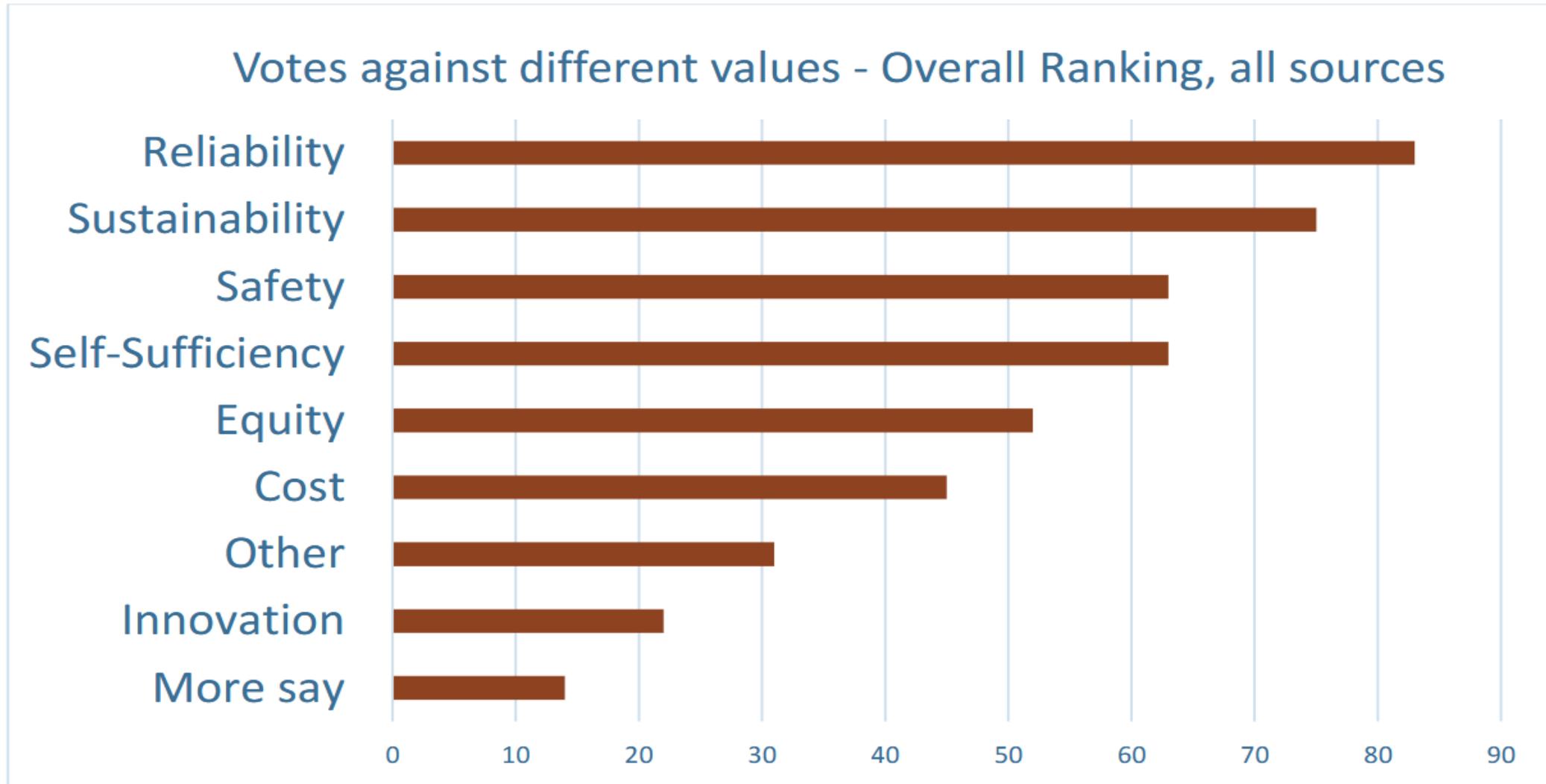


Figure 2 Community Values for local energy solutions



Solar PV vs Solar Hot Water



Which is best for generating hot water?

Solar PV

- Heat pump uses less electricity per year in Adelaide
- Expensive
- Using roof space for electricity generation is more flexible (electricity has many uses)
- Maintenance and space
- Heatpump might be flexible enough to use surplus wind. Doesn't like being turned on and off

Solar Hot Water

- Solar hot water does not need much electrical boost in Northern NSW
- Also expensive, slightly less so
- If you have plenty of roof space not a problem
- Maintenance can be awkward on the roof, leaks can be a problem and unseen
- Booster can be set to use surplus wind in future

Annual averages

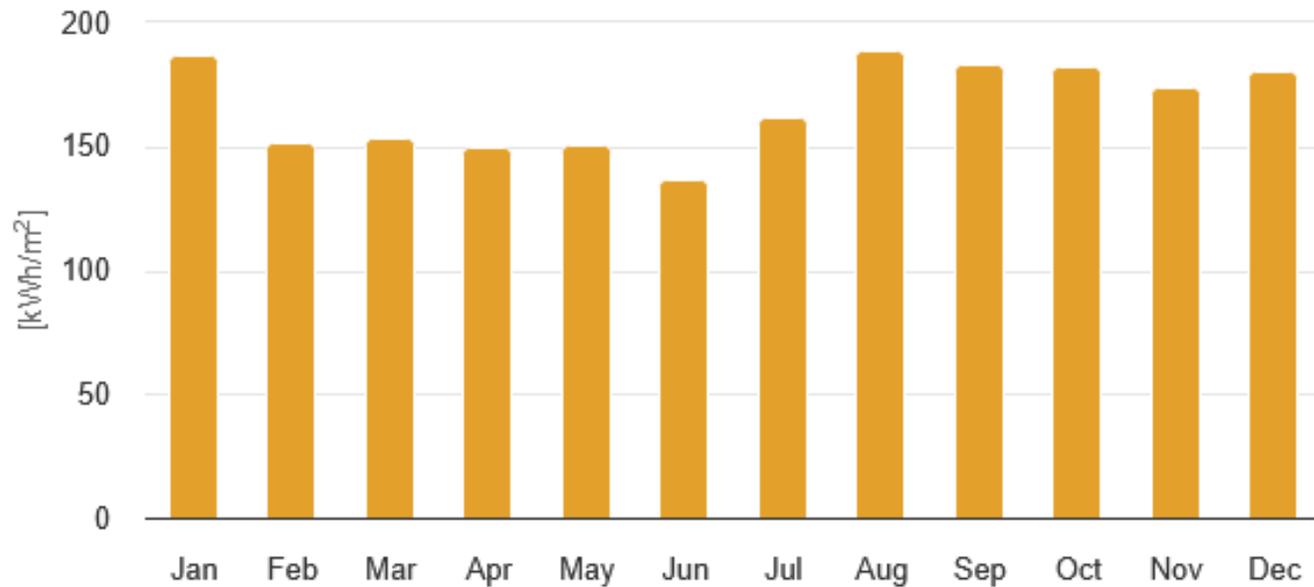
Direct normal irradiation

1999.1

kWh/m² per year ▼

Monthly averages

Direct normal irradiation



Annual averages

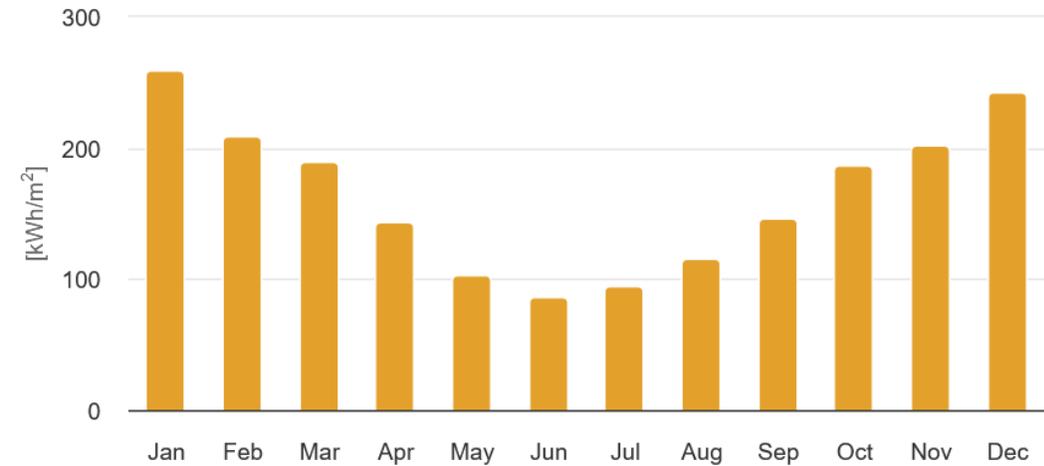
Direct normal irradiation

1980.5

kWh/m² per year ▼

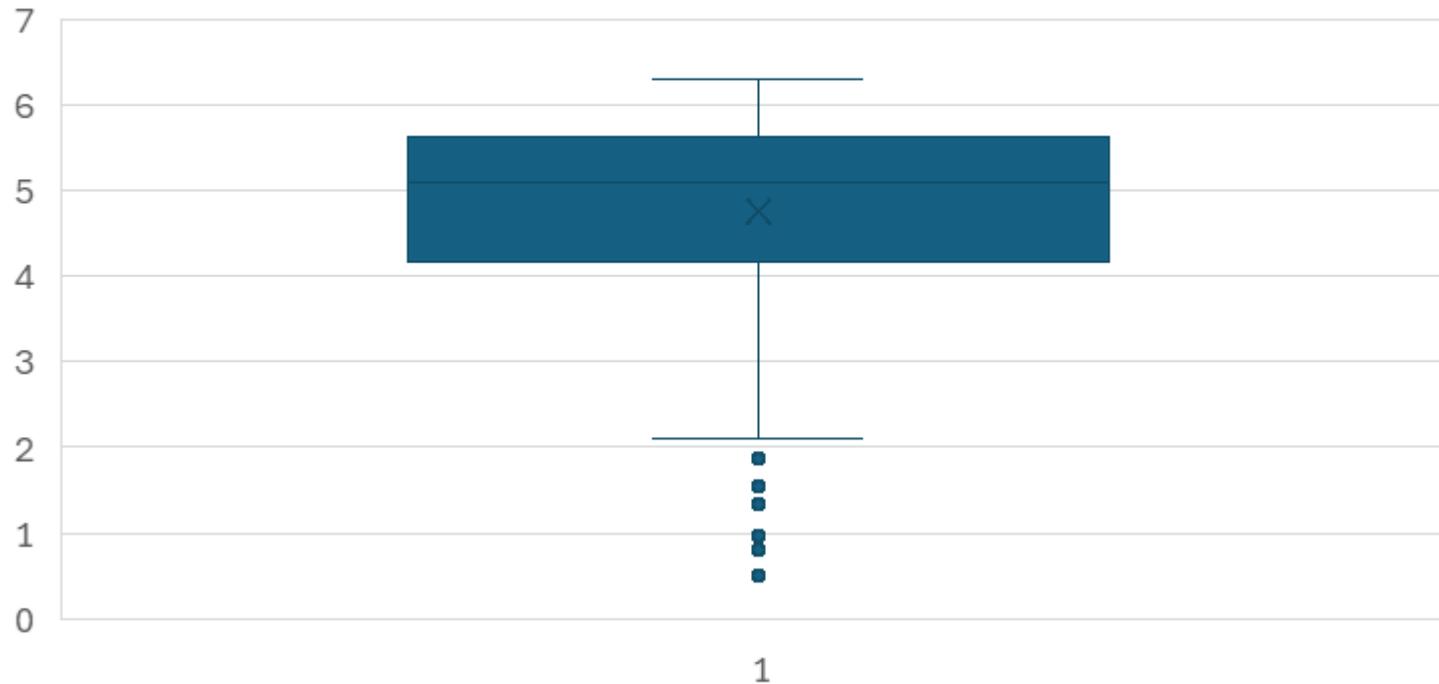
Monthly averages

Direct normal irradiation



<https://globalsolaratlas.info/>

Evan's Head daily output from 1kW of solar (based on 2019)



<https://www.renewables.ninja/>

Only 76 days per year with less than 4kWh in the day (which may need boosting)