Lyonville Community

Fireside chat on household and community-level resilience, with a focus on energy.

What is household resilience? (1)

....household disaster resilience was defined as the capacity of a person, or people sharing a living arrangement to:

- **sustain their household**, even under stress
- **adapt to changes** in the physical, social and economic environment
- be **self-reliant** if external resources are limited or cut off
- **learn from the experience** to be **more prepared** for next time.

This definition emphasises that resilience is not simply a state to be attained so that attention can then be paid to other issues. **It is an ongoing process** that requires consistent and repeated reinforcement to be at a **suitably high level** should disaster strike.

https://knowledge.aidr.org.au/resources/ajem-oct-2015-development-of-a-household-resilience-toolkit/

What is household resilience? (2)

- The **resources** of individuals or households and the **level of preparedness** (bolstered by **active support networks** especially in times of need) assist them to adapt, learn and recover more effectively from emergency events and disasters.
- Because **preparedness actions take time to implement**, and because **emergency events are frequently of sudden onset** and are unexpected, the building of household resilience **must be an everyday and sustained activity**.
- The resilience of households will depend on a **range of relatively small actions** and activities that **build resources**, **preparedness** and **connectedness**.

https://knowledge.aidr.org.au/resources/ajem-oct-2015-development-of-a-household-resilience-toolkit/

What does household resilience mean for Jo and Ted at Friths Mill Road?

1. Energy

Our household energy system

System size1
8.3 kWDC (STC)
Estimated annual production
11,388 kWh
Solar panel
20 × 415W LONGi Solar Hi-MO 5m - LR5-54HPH-415M
1722mm × 1134mm · Monocrystalline ·
System efficiency
87%

1. Energy

Inverter

1 × Fronius Primo GEN24 6.0 (AS4777-2 2020) · 6000W Single phase · 97.6% maximum efficiency ·

1. Energy

Battery storage
1 × BYD Battery-Box Premium HVM
13.8kWh
Lithium Iron Phosphate ·

1. Energy

What did our system cost?

System price $29,585

- **[PV+Inverter+Battery+EV charger+install]**
- **[saved on trench digging ☺]**

STC Incentive Less $3185.00

Total price payable - $26408.00 in 2023

1. Energy

++ Kubota diesel generator

- **9kVA – could run the whole house and farm infra in the mountains**
- **$10,000 (GST exc) in January 2020**

1. Energy

+ Our switchboard brings it all together

Transport resilience

Driving an electric vehicle

2. Transport

EV charger

1 × Fronius Wattpilot · 22kW

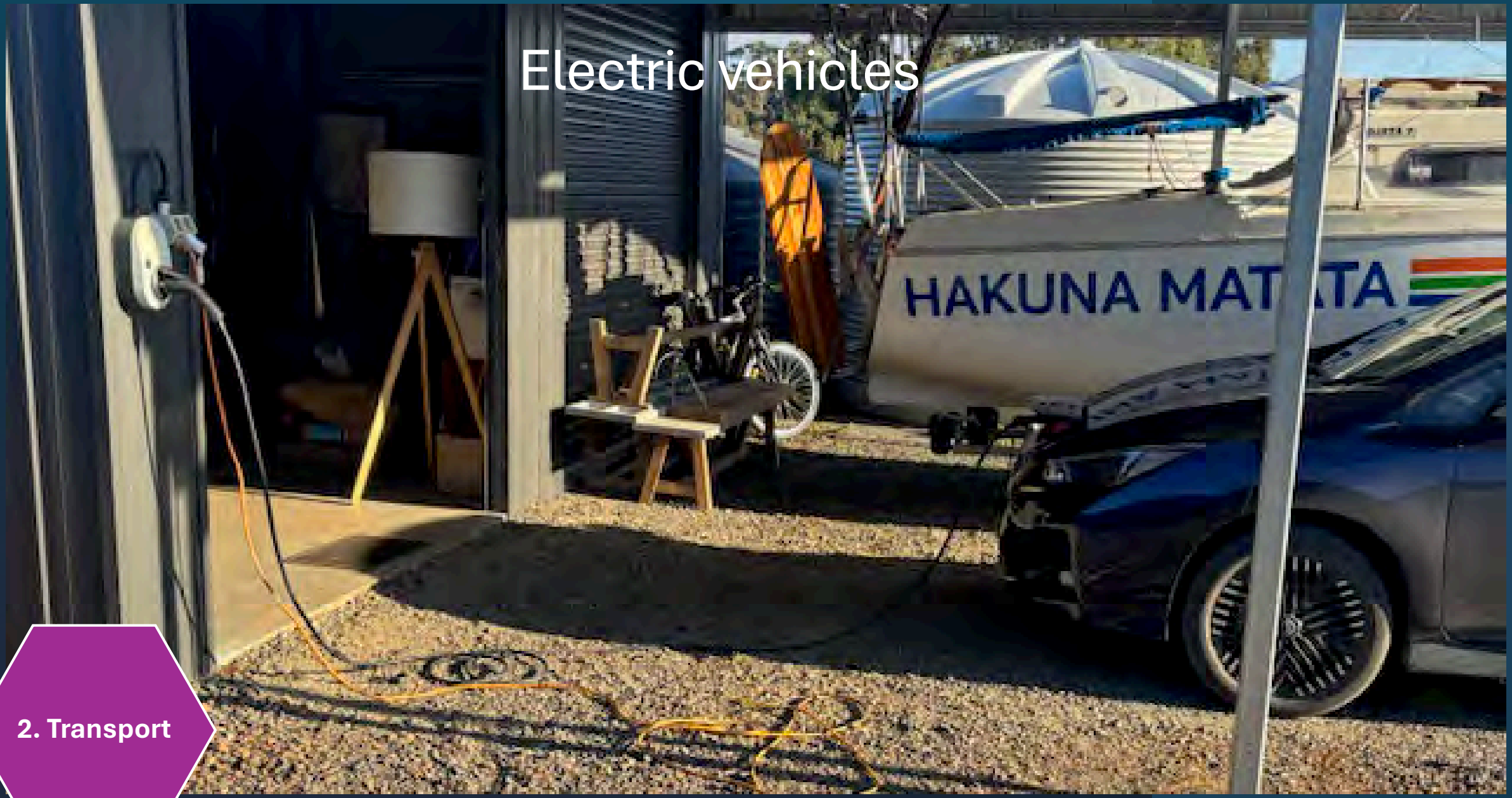
Three phase · Type 2 · Home 22 J ·

1. Energy

Driving on sunshine – emissions free!

2. Transport

Electric vehicles



2. Transport

2. Transport

Electric vehicles

2. Transport

Quick EV facts

- 7.42 % adoption new **battery electric vehicles (BEV)** in Australia Q2 FY (Norway at 97% of new car sales) - BYD has overtaken Tesla as biggest seller
- 23911 in 2025 YTD # on the road now in Australia (ACT highest rate of adoption)
- 6 models only a few years ago, to > 100 models now – Full BEV utes soon
- Price parity now – cheaper than equivalent internal combustion engine (ICE) cars in some cases
- FAR Cheaper to run and maintain (even when paying for energy)
- Range confidence - no worries
- Charger reliability….uh oh, big policy work needed here
- Vehicle to Load (V2L) – *boil the jug, plug in the induction cookplate*
- More soon: Bidirectional batteries, vehicle to grid (V2G) …(V2X)
- Heavy haulage--- great things happening – Linfox volvo battery electric trucks
- www.aeva.asn.au

+ Communication

3.
Communication

- Thanks to Starlink low orbiting satellite internet
- Upload speed: 22 Mbps
- Download speed: 180 - 200 Mbps
- Cost per month: $119
- Mobile to wi-fi phone - no landline
- ++ Game changer in Pacific nations – Papua New Guinea, Fiji, Samoa, Tonga

4. Water

Water resilience

We have invested in:

- VEB –
  Very Expensive Bore
- Sprinklers on house and shed for bushfire events
- 90,000 litres of rainwater tanks (we doubled our storage after purchase)
- Tractor + water trailer + fire pump – for bush fire fighting and watering trees

1. Energy

4. Water

… at this stage we still need fuel for our **generator** and **fire pump**, but we are looking toward **a battery powered fire pump.**

… our other pumps are **electric** (bore, irrigation, household)

5. Food

- 20 month-old food garden
- Food storage – drying, freezing
- Greenhouse to come

6. Carbon forest and biodiversity

- One hectare of blackwoods and snow gums and other eucalypts being planted this year – subject to rain = carbon storage
- Biodiversity plantings too, for our bare potato paddock
- Dealing with invasive species – animals and plants – rabbits, foxes, blackberries etc – talk to David B

Community energy resilience – for Trentham and district

Over to Matthew

Proposed microgrid and battery for central Trentham

Energy Resilient Trentham

Energy Resilient Trentham

‘ The township of Trentham experienced compounding infrastructure outages during this event.. The infrastructure failures across power, telecommunications and water services impacted the community significantly in terms of their ability to remain in place, source information and receive messaging. ’

Community Report June 2021 Extreme Weather Event
Emergency Management Victoria

ENERGY RESILIENT TRENTHAM

The proposed “microgrid” for the Trentham core township,

and the separate neighbourhood battery initiative at ‘The Mechanics,

are Trentham Sustainability Group’s responses to the June 2021 extreme weather event.

Timeline of key events and activities 2021 to 2025

Energy Resilient Trentham

1. Jun 2021 - Extreme Storm Event
2. Jun 2022 - Engaged Middleton Group to undertake Technical Study.
3. Oct 2022 - ***Energy and Climate Resilient Trentham*** - Middleton Report completed.
4. Dec 2024 - Issued Request for Tender – Microgrid Design and Business Plan.
5. Feb 2025 - Yarra Energy Foundation - engaged – Technical Study and Business Case
6. Feb 2025 - Mycelia Renewables Ltd - engaged - Community engagement program
7. Mar 2025 - Victorian Govt. grant of $423,000 for a battery and increased solar at The Mechanics Hall, Trentham
8. May 2025 – Microgrid Feasibility study Final report

Solution – An islandable microgrid based on the Market Street transformer.

Secured grant funding to develop microgrid design and engage community

Further community engagement once microgrid designs available

Energy Resilient Trentham

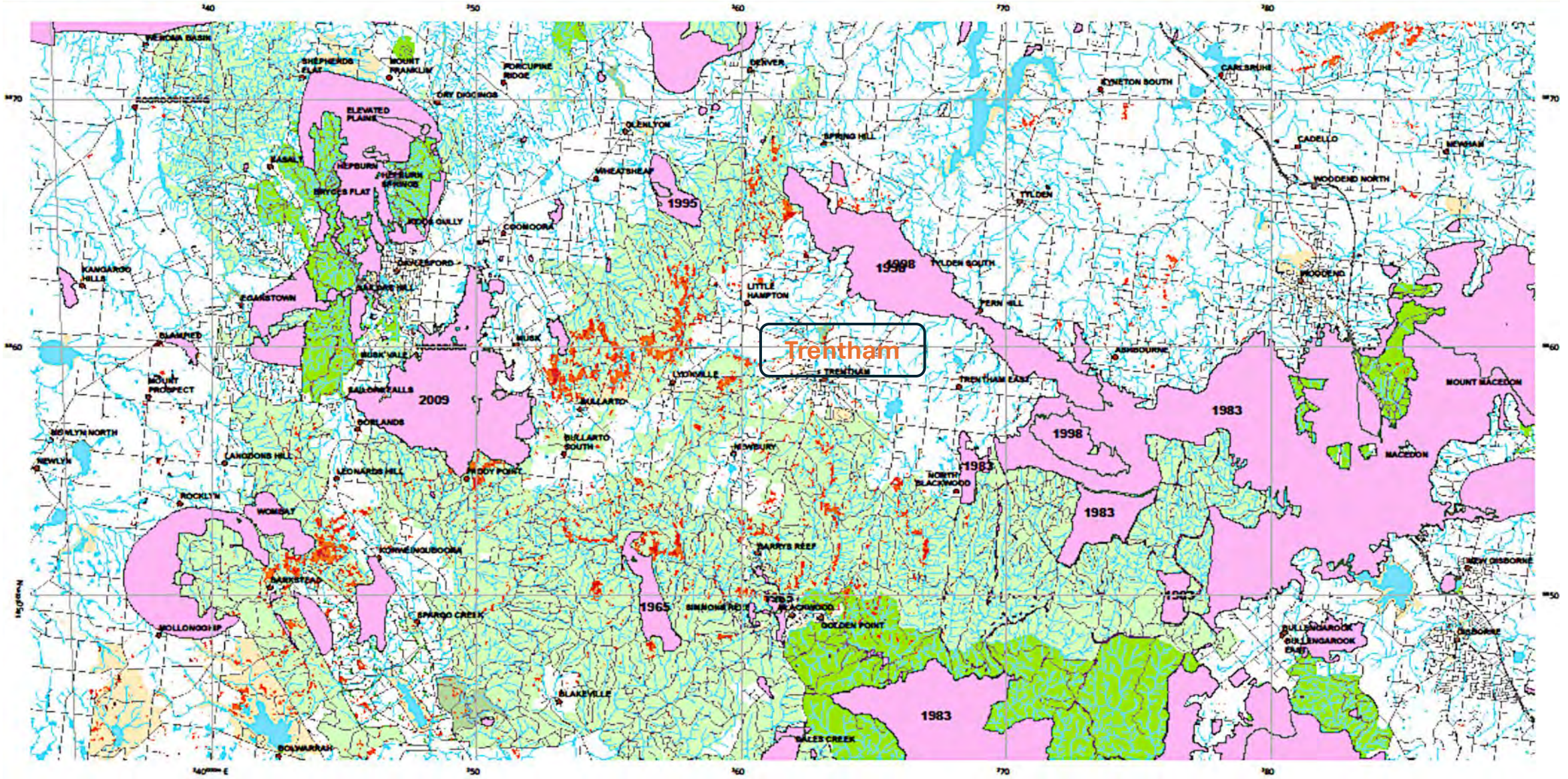
Why an islandable microgrid?

1. Because Trentham's grid power supply can be affected by:
   - localised bushfires
   - localised storm events
   - remote storm and bushfire events
   - ageing network infrastructure

2. And the benefits can include:
   - Keeping the centre of town operating and providing food and essential services during outages
   - Providing multiple places for people to go, stay connected, power up devices, keep informed
   - Avoid or reduce food wastage and impacts on local businesses

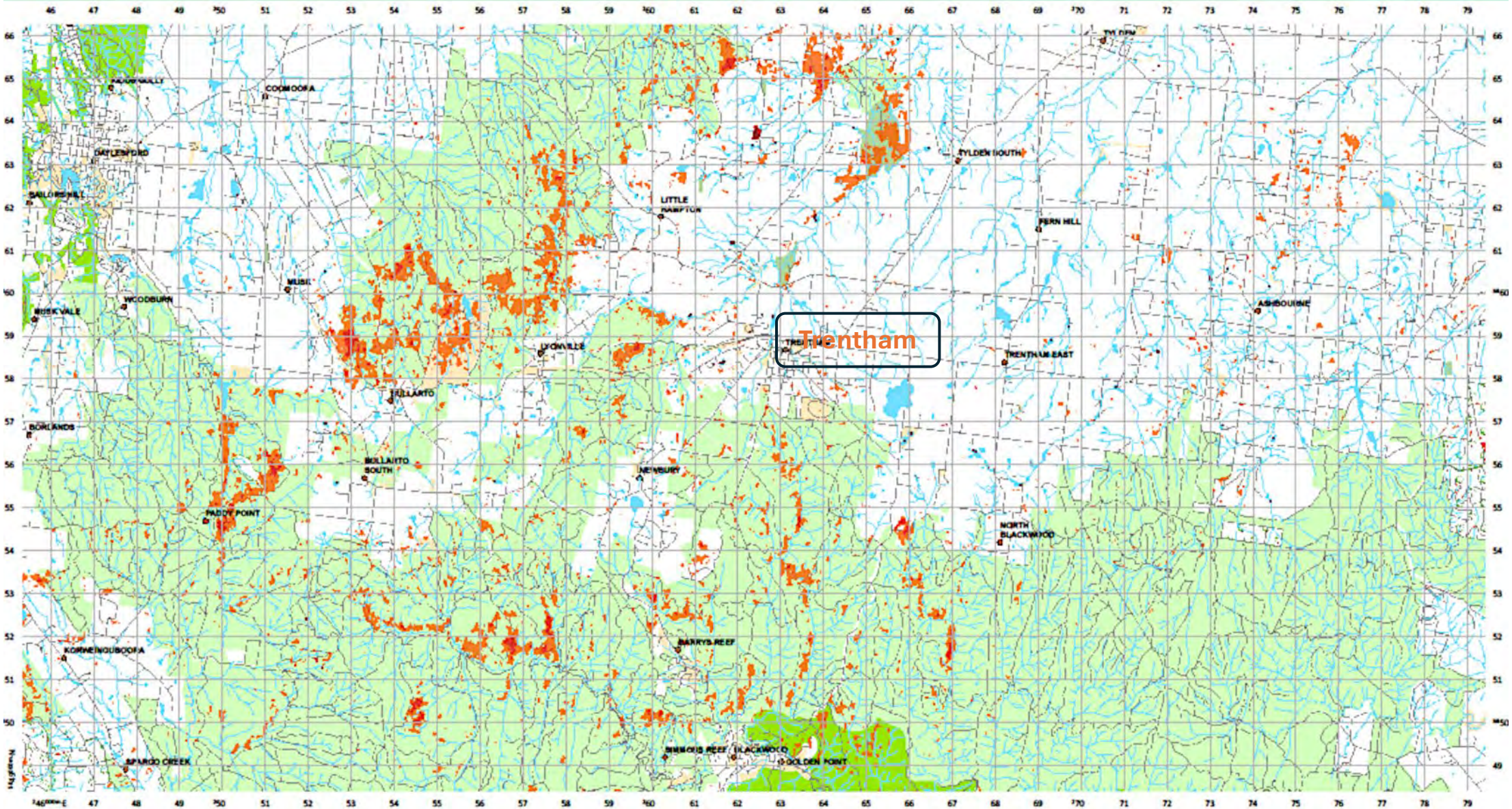
Trentham - Blackwood
Fire History

FOREST FIRE MANAGEMENT VICTORIA



Trentham - Blackwood
June 2021 and October 2021 Storm Event Severity Mapping

FOREST FIRE MANAGEMENT VICTORIA



Extreme weather events causing grid to fall across the State

- Anakie – February 2024 - 6 towers destroyed.
- Cressy – January 2020 - 6 towers destroyed and 2 damaged on 2 different transmission lines.

- Kinglake - February 2009

Our ageing electricity infrastructure – Poles & Wires

Energy Resilient Trentham

Table 1 – Average Structure Age by Voltage

Voltage Class	Average Age
500 kV	41.4
330 kV	52.0
275 kV	31.0
220 kV	53.6
66 kV	43.3
Overall Avg.	**52.6**

The expected service life of AusNet towers is 70 years.

AusNet Services AMS 10-77 Transmission Line Structures
July 2020

The extended period of time we might be without power is what we are trying to address

‘ Nine of the 16 major fires on 12 February 1977 (inc Creswick..) were caused by electrical assets.....

On Ash Wednesday, 16 February 1983: it appears that four of the eight major fires on that day were caused by electricity assets.....(Macedon)

On 7 February 2009 the pattern was repeated. Failed electricity assets caused five of the 11 major fires that began that day .....

The importance of Victoria’s electricity infrastructure to this Commission’s investigations is highlighted by the devastation wrought by the Kilmore East fire: 119 lives were lost as a result of that fire, which was caused by electrical arcing after a conductor—which was probably 43 years old broke.... ’

2009 Victorian Bushfire Royal Commission – Final Report

It’s bloody dry...

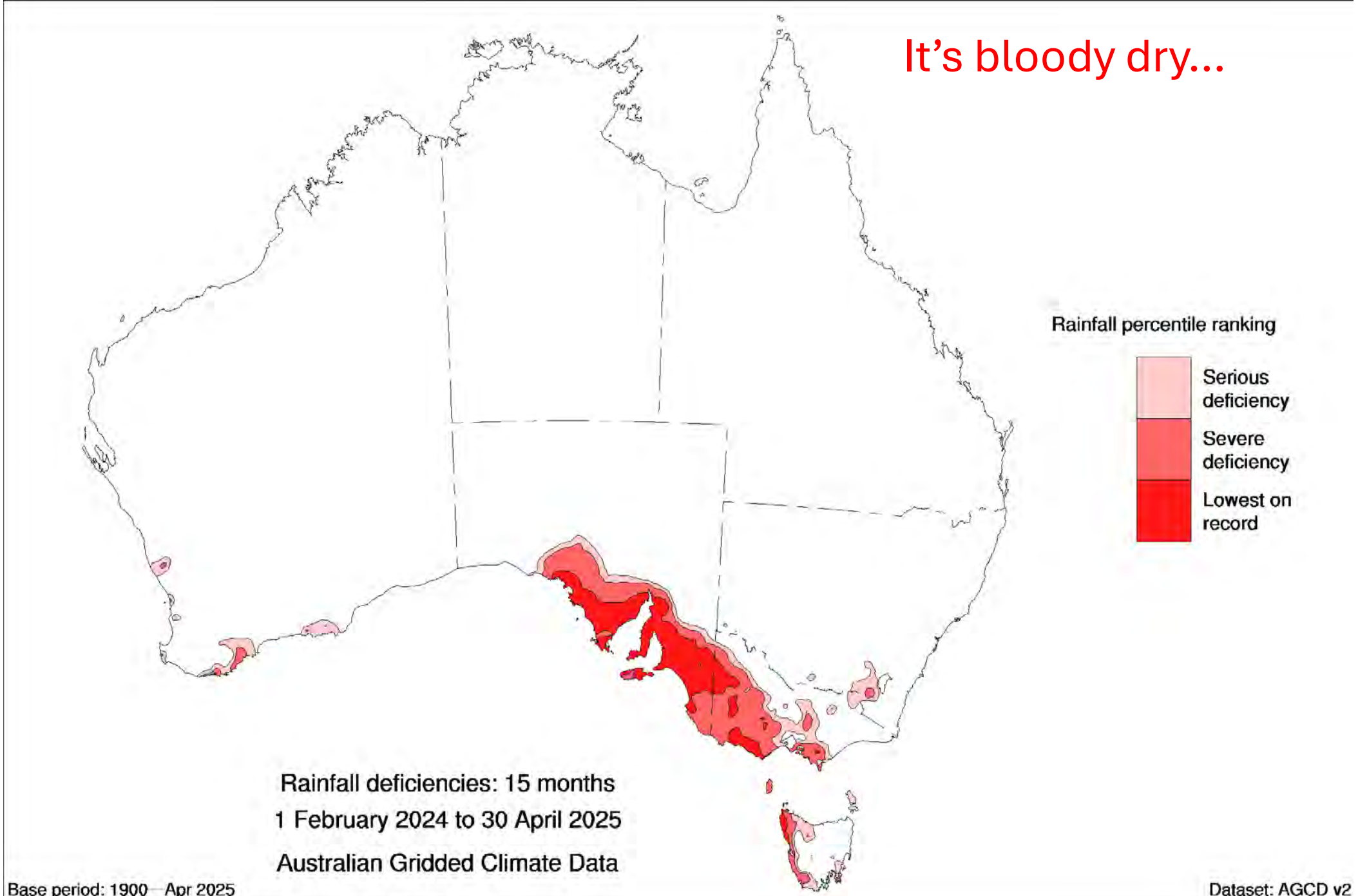


FIGURE 9 PROPOSED TIE LINE

1. Trentham Neighbourhood Battery – ‘The Mechanics’

A **neighbourhood** or **community battery** is…

an energy storage system sized between a home battery and a utility scale battery (i.e. ~50kW-250kW).

- Usually installed on the low voltage distribution network
- Often trades on the electricity markets
- Typically expected to involve or benefit local residents/customers
- **Can provide energy resilience through site backup.**

Cabarita Community Battery, Ausgrid (NSW)

The Mechanics – Community Emergency Hub

- The additional energy backup system comprises 100kW/280kWh battery and additional 30kW solar PV system adding to the existing 28kW solar.
- There is also a 100kVa generator at the Mechanics, which will be fuelled with diesel, and can be used to provide energy to the Mechanics if the battery is empty.
- With the combination of battery, additional solar and the generator the Mechanics will be able to keep operating for as long is needed in extended grid outages.
- One of 10 across the region – Central Victoria Greenhouse Alliance

Energy Resilient Trentham

2. Low voltage islandable microgrid

Energy Resilient Trentham has commissioned a Technical Feasibility Study for a low voltage, islandable, microgrid for the core Trentham township.

The study will be finished next week, end May.

What is a microgrid?

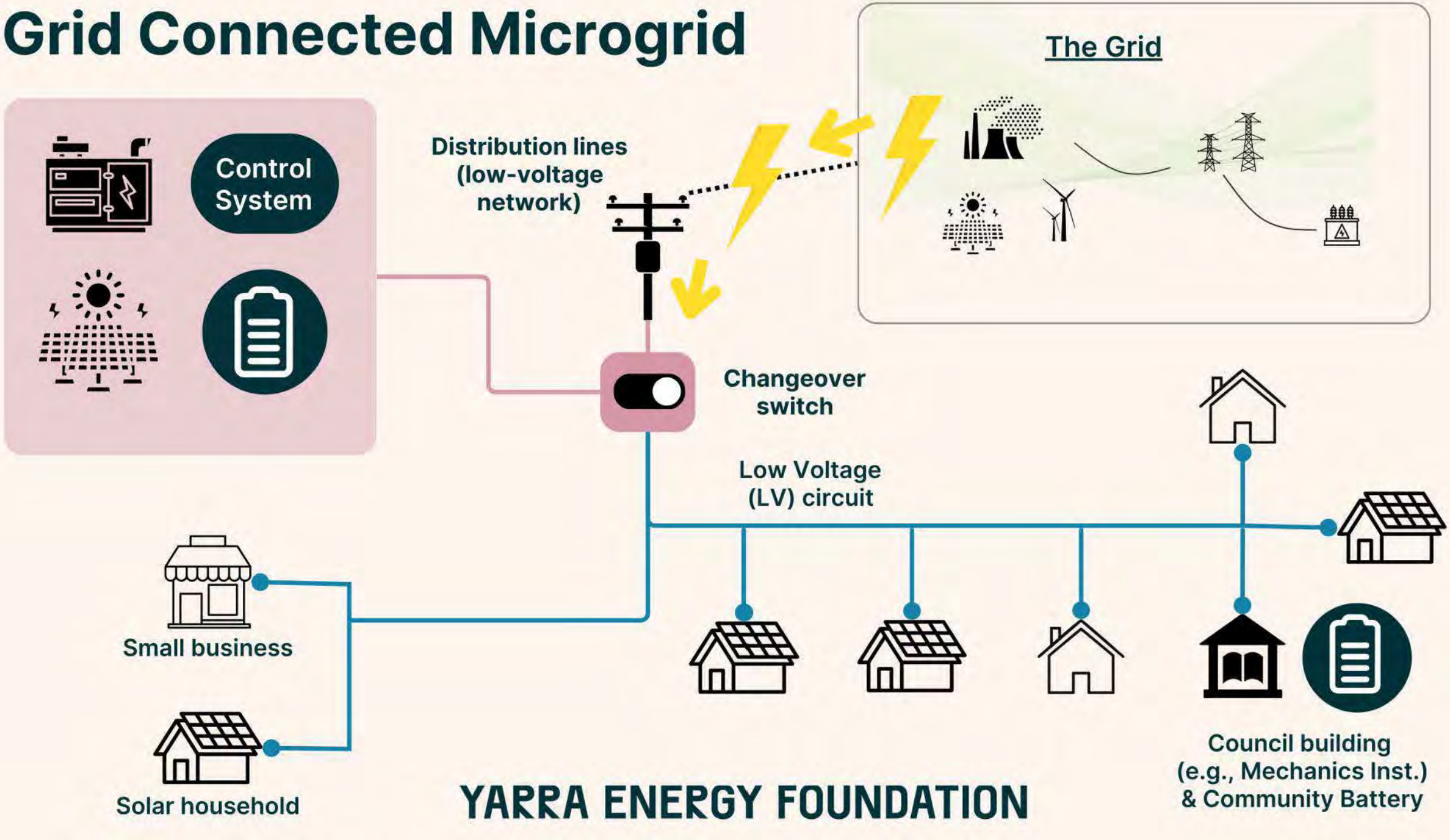
Trentham's low voltage, islandable microgrid:

Will likely comprise:

1. A big battery
2. A big generator
3. Additional solar and small batteries on businesses and houses
4. Switching gear and integration software
5. Additional wires

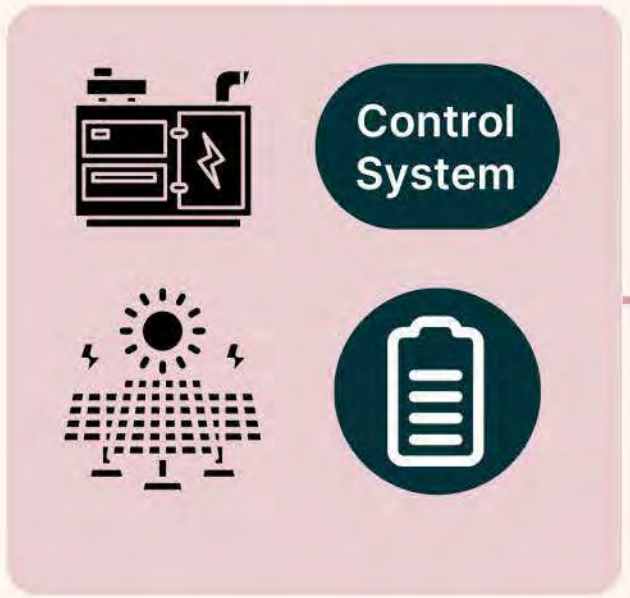
- And will be joined to the Market St Transformer on the grid (Poles and wires) in Trentham

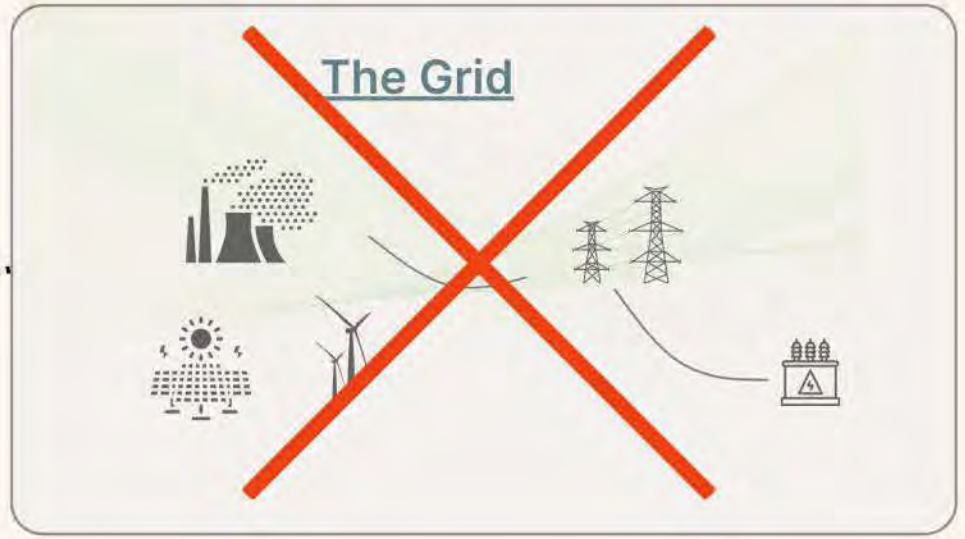
Grid Connected Microgrid



YARRA ENERGY FOUNDATION

Grid Connected Microgrid





Distribution lines (low-voltage network)

Changeover switch

Low Voltage (LV) circuit

Small business

Solar household

Council building (e.g., Mechanics Inst.) & Community Battery

YARRA ENERGY FOUNDATION

Benefits

- **Essential services for the district -** keeping the lights on in town when the grid falls.
- Potential to **encourage uptake of clean energy** technologies in the local area.
- Microgrid battery storage **can act as a community battery**, generating additional benefits.

Trentham has a long history of power outages

ENERGY RESILIENT TRENTHAM MICROGRID STUDY

The Technical Feasibility Study on a microgrid and battery for the centre of Trentham will be presented by Yarra Energy Foundation.

We will then explore how the microgrid and battery could work for our community.

DATE & PLACE:

MONDAY, JUNE 16TH

ARRIVE 6.15 FOR 6.30PM TO 8.30PM MEETING
MECHANICS HALL
66 HIGH ST.,
TRENTHAM

Tea & coffee provided

Please join us to explore the results, to learn how the microgrid can operate and the benefits it can deliver for Trentham.

We have been researching how a microgrid and battery could be established in Trentham to help address impacts of power outages, particularly during and after extreme weather events.

Yarra Energy Foundation will present the findings of the Technical Feasibility Study for a low voltage islandable microgrid for the centre of Trentham township, covering:

- the recommended specific location
- the area the microgrid could cover
- the size of the battery
- how it could operate
- who might operate it on behalf of our community

We will then explore the benefits and opportunities for:

- Trentham residents and businesses that will be located on the proposed microgrid
- the wider benefits and opportunities for other Trentham and district residents.

Trentham Sustainability Group is supported by the following partners and funders:

YARRA ENERGY FOUNDATION

Mycelia Renewables

ANZ

Community Bank Trentham & Districts

Bendigo Bank

FRRR Foundation for Rural Regional Renewal

Hepburn SHIRE COUNCIL

Trentham Sustainability Group thanks the following organisations for their partnership and support:

Energy Resilient Trentham

Community Bank Trentham & Districts

Bendigo Bank

Hepburn Shire Council

FRRR Foundation for Rural Regional Renewal

ANZ

YARRA ENERGY FOUNDATION

Mycelia Renewables

Australian Government's new household battery offer
Your household energy resilience?

Over to:

- Mick McDonald,
- Trentham Electrical and Solar

https://www.trenthamelectrical.com/

TRENTHAM
ELECTRICAL & SOLAR

1300 3458 00

info@trenthamelectrical.com

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