

An aerial photograph of a large crowd of people on a beach, arranged in a large number '2'. The people are wearing colorful clothing, and their shadows are cast on the sand. The background is a bright, sunny beach scene with some people walking in the distance.

Community Resilience and Reliable Energy Feasibility Study for Venus Bay and Tarwin Lower

**Report 2
Energy Options,
Community Values and
Pathways to Resilience**



Australian Government

This project received grant funding from the Australian Government

Report Summary

The Venus Bay project aims to:

- Define what resilience means for full-time and part-time residents, business owners, community organisations and holiday makers.
- Explore various energy options that could support our resilience
- Test which of these options might work in Venus Bay and assess what the best options might cost
- Put together a plan that outlines how we could fund and build the best energy options.

The community will investigate its options across four workshops from October 2022 to June 2023

Milestone Report #1 covered project startup and the first workshop.

This second report covers two workshops and a broad range of community engagement activities that have occurred between November 2022 and mid April 2023.

An additional workshop was held in Tarwin Lower with agreement reached that the project will be referred to as the Venus Bay and Tarwin Lower energy project from this point forward because the two towns are interdependent. Reliable energy in both Tarwin Lower and Venus Bay is the best way to support resilience in either part of the community.

Section 1. Workshop 2 – Energy Options Page 4

Milestone 3 involved presenting reliable energy options to the community. A detailed explanation allowed participants to understand how different renewable and traditional energy supplies could be used, which options are available at site level, small cluster or large cluster scales and the electricity infrastructure that defines these scales across the community.

Section 2. Workshop 2 – Community Values Page 17

The workshop developed an understanding of the values and benefits that community stakeholders would prefer and expect. These values inform technical and economic analysis. Further community engagement occurred to deepen the project team understanding of community values.

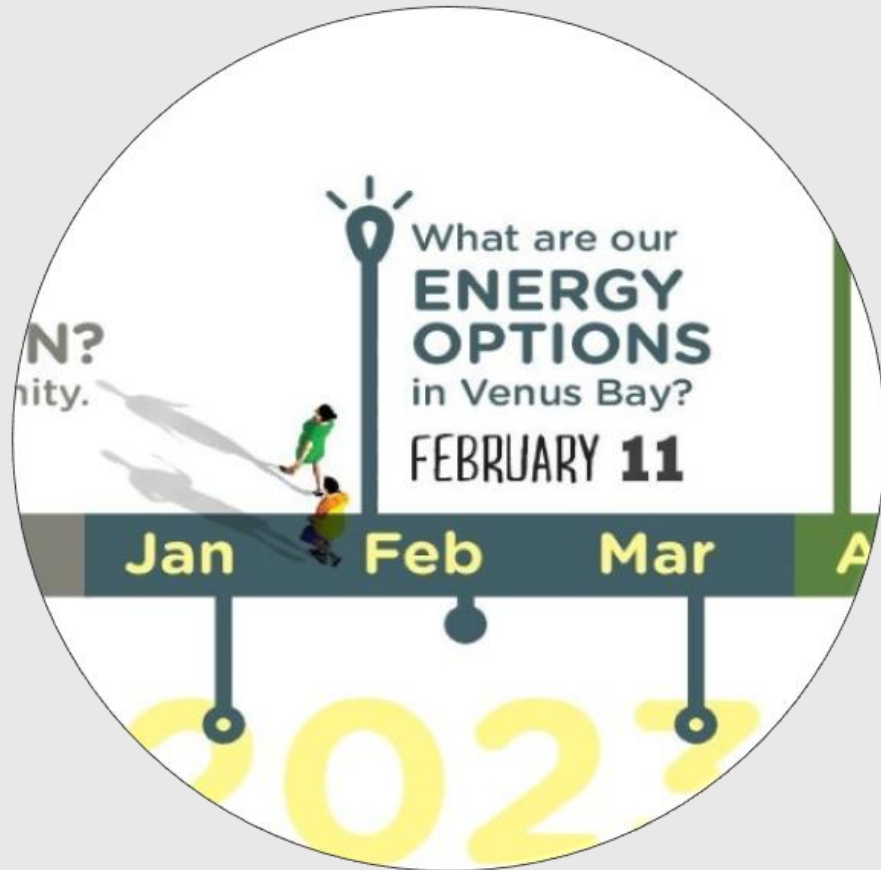
Section 3. Workshop 3 – Pathways Page 32

Workshop 3 on 15 April had the highest level of engagement to date. The workshop was refocused on pathways due to late delivery of data by Ausnet Services which impacted on the timing of technical and economic analysis. Participants found the pathways approach very accessible. Even with limited data, community understanding of technical challenges is significantly higher since the project inception and a shared understanding is being developed around future possibilities which will serve community values.

Section 4. Workshop 3 – Results Page 47

A Community Wealth Building approach was introduced and received an enthusiastic response from Workshop participants. The pathway development achieved in Workshop 3 paves the way for the final Workshop to develop community-led business models and an action plan.

Workshop 2 Summary



Two workshops were held on Feb 9 at Tarwin Lower Bowls Club and Feb 11 at Venus Bay Community Centre.

Pages 4 to 16 in this report summarise the exploration of energy options.

Pages 17 to 26 summarise the community values that were reflected back to the project team and are being considered in the technical and economic analysis.

Pages 27 to 31 demonstrate the community engagement that occurred throughout the period and was provided as a recap and next steps during the workshop

Delays and adjustments to project plan

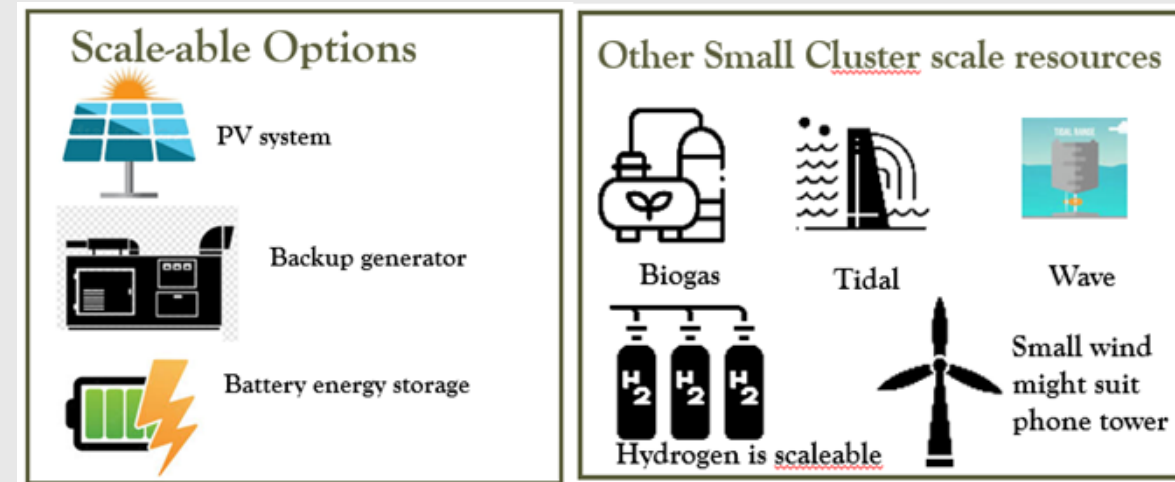
The technical team requested community electricity data from Ausnet Services in July 2022. It was intended that this data would underpin the analysis presented in Workshop 2 but it was not provided until late March 2023.

Due to the delay in data provision the project team adjusted the scope of Workshops 2 & 3 and some techno-economic analysis will be presented to the community in the most-effective ways outside of the workshop formats.

Summary of Workshop #2 – Exploring what are our energy options in Venus Bay and Tarwin Lower

- Two workshops were held to discuss renewable energy options
 - 13 people participated in a 2 hour workshop at Tarwin Lower Bowling Club on Thursday February 9th 2023
 - 27 people participated in a 2 hour workshop at the Venus Bay Community Centre on Saturday February 11th 2023
- We began at both workshops with a recap on the purpose of the Study and a summary of what the workshops, meetings and research have achieved so far.
- Information was presented by the researchers on which energy options are most technically viable at different scales

- The different renewable energy options are being considered at different scales



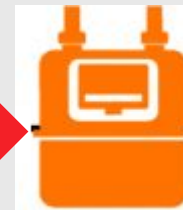
Workshop #2 – presentation #1 - Which energy systems are most viable at the site, cluster and whole-of-community scales

- An explanation of how grid connected systems work at the scale of single sites, small clusters, large clusters and whole-of-community, using a series of illustrations demonstrating the flow of energy between the grid and these various sites
- Additional illustrations were presented to demonstrate how different energy technologies need to be combined to provide 24hrs supply of energy, at the four different scales,
- An estimate of system sizing was then presented to illustrate how much generation and storage might be needed under the essential, enough and everything scenarios
- The following illustrations summarise this presentation. The full set of presentation slides can be found on the Community Energy page of the Venus Bay Community Centre website, under resources

Energy supply & renewable options at single site



Traditionally, energy flows from the grid to the site



Renewable energy options suitable for single-site scale

These renewable energy technologies are readily available for a single site, being a household, community facility or business



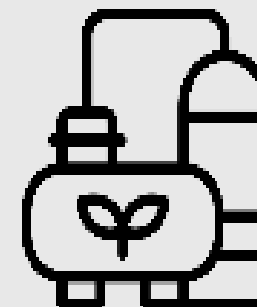
PV system



Backup generator

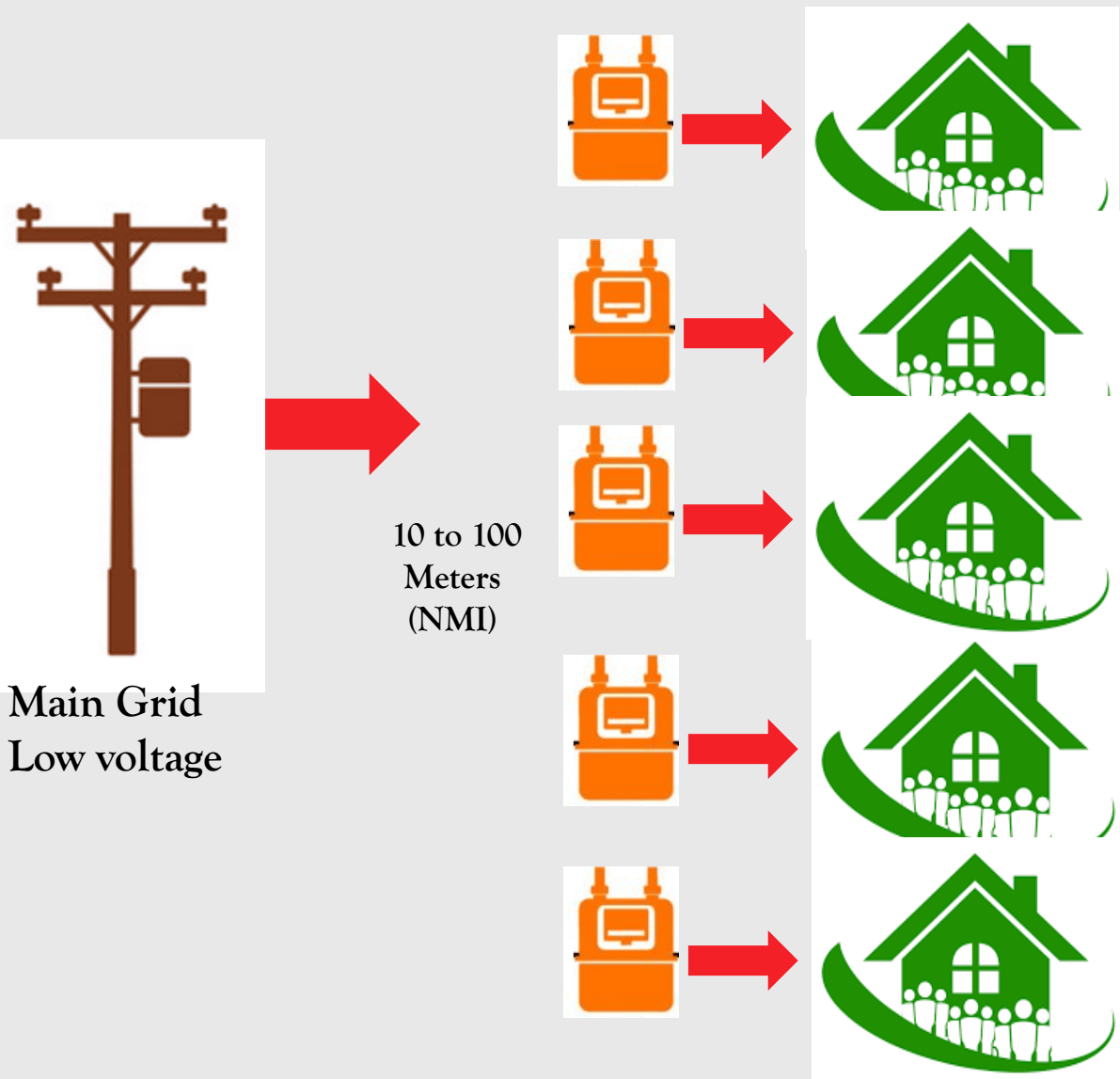


Battery energy storage



Biogas is an option at the site scale in some countries but not seen much, yet, in Australia

Energy flows in small clusters and suitable technologies for this scale






Main Grid
Low voltage

10 to 100
Meters
(NMI)






Many Sites

Flow of power

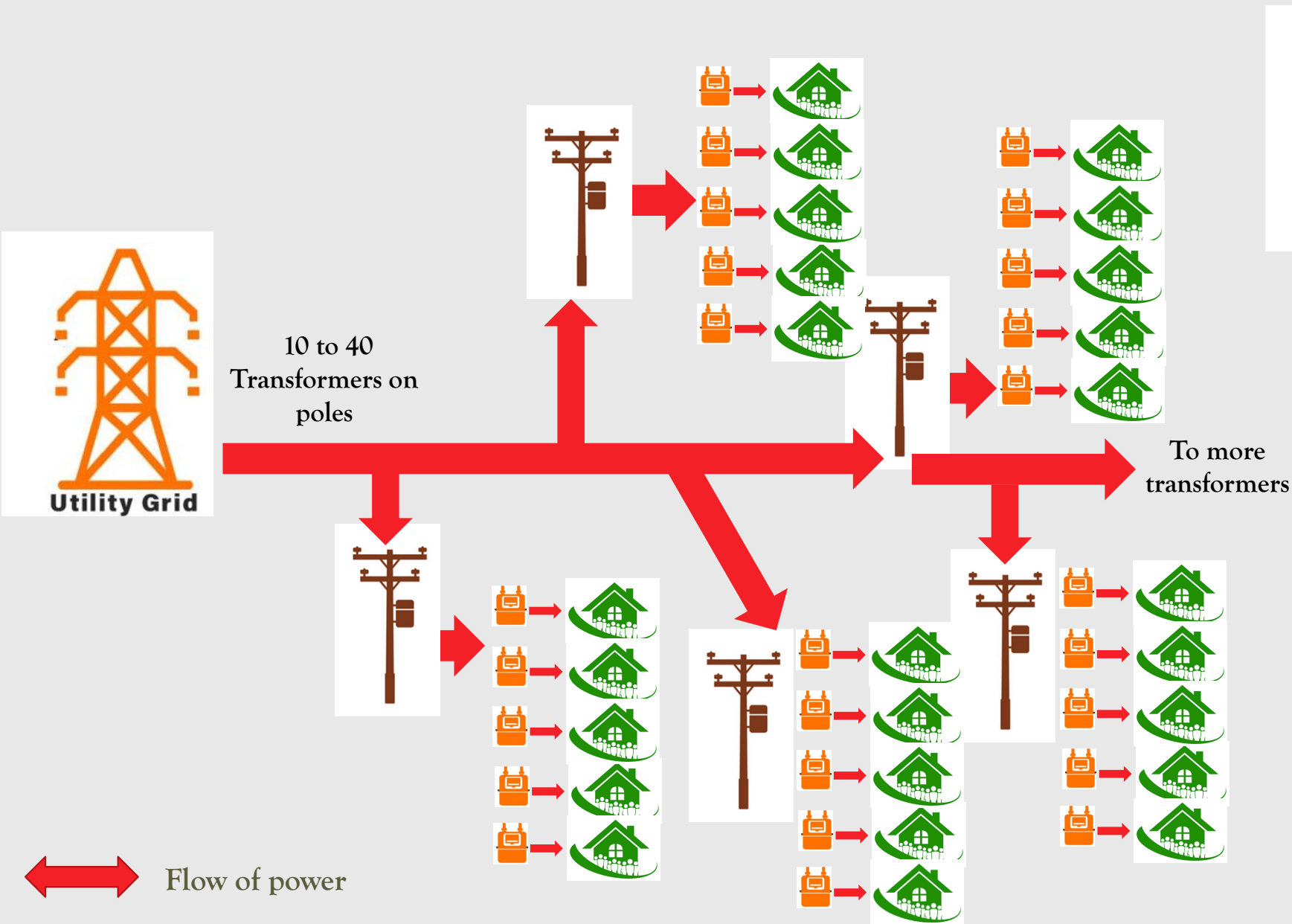
Suitable technology options

-  PV system
-  Backup generator
-  Battery energy storage




Other Small Cluster scale resources

-  Biogas
-  Tidal
-  Wave
-  Hydrogen is scalable
-  Small wind might suit phone tower



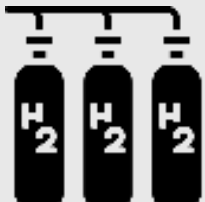
Energy flows in large clusters and scalable energy options



Scale-able Options

-  PV system
-  Backup generator
-  Battery energy storage









Large Cluster scale resources

-  Wind would only need 1 or 2 large turbines
-  Wave
-  Hydrogen


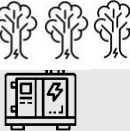






Presentation #2 - Renewable Energy Options – What factors will influence our choice of technologies?

- When we came back after lunch, the researchers presented their investigations of which types of renewable energy technology might be best suited to Venus Bay and Tarwin Lower
- Six determining factors guided this investigation into the suitability of 16 technology types:
 - Time needed for implementation
 - Level of maturity of the technology on a scale of 1 -least mature to 9 - fully mature
 - Level of experience in operating the technology present or attainable in the community
 - Suitability of the technology to the geographical location
 - System size options and scalability
 - Cost of the electricity generated over the lifetime of the equipment
- In applying these factors to the evaluation of the 16 types, eight technologies were found to be suitable now or potentially in the near future and eight were considered as not suitable now or in the future
- The following two pages summarise these research findings.

Energy Options that measured up well against the criteria - these could stack up in the right circumstances

	Time to implement	Technology maturity	Experience with technology use	Geographical suitability	Size	Cost of all electricity over lifetime
Solar PV 	Rapid implementation.	Mature technology with established supply chain and support systems	The community has experience in operating and maintaining PV systems	Moderate-high amount of solar irradiance and existing infrastructure	Scalable	7c/kWh
Diesel generator 	Very quick timeline to implement	Very mature technology with established supply chains	Widely used across businesses in Venus Bay	Suitable for most geographies	Scalable	50c/kWh
Battery 	Relatively short timeline to implement	Mature technology with established supply chain and support systems	Widely implemented technology with many operational services available	Suitable for most geographies	Scalable	30 to 50 c/kWh
1 - 3 small or large Wind turbines 	Moderate time to implement. Would require earthwork	Mature technology with established supply chain and support systems	Not widely used in distribution level – minimal experience	Wind speeds reduced behind the dunes	Small turbine for critical sites. Large turbine for large clusters	5c (large) to 20c (small) per kWh
Biogas 	Significant time to implement. No existing supporting infrastructure	Mature technology with developed supply chain	Minimal experience for the cattle, landfill and sewage production scale in Venus Bay	Agricultural and food waste is available, but not enough for the generation, no waste water treatment plant	Only small cluster. Household scale in developing countries	20c/kWh
H ₂ storage 	Significant time to implement. No existing supporting infrastructure	Small-scale technology at embryonic stage	Little to no experience – not widely used till date	Suitable for most geographies at small-scale	Small cluster	35c/kWh
Tidal 	Very long time to implement with significant earthwork required	Not matured enough	Minimal experience in the community	Environmental Impacts at location of turbines – Gap to Inverloch or mouth of tidal river.	Small cluster	20c/kWh
Wave 	Very long time to implement with significant offshore work required	Not matured enough	No experience in the community level application	Not suitable for Venus Bay due to low to moderate height of the wave	Small and large clusters	10c/kWh

Options considered but deemed unsuitable due to factors described below

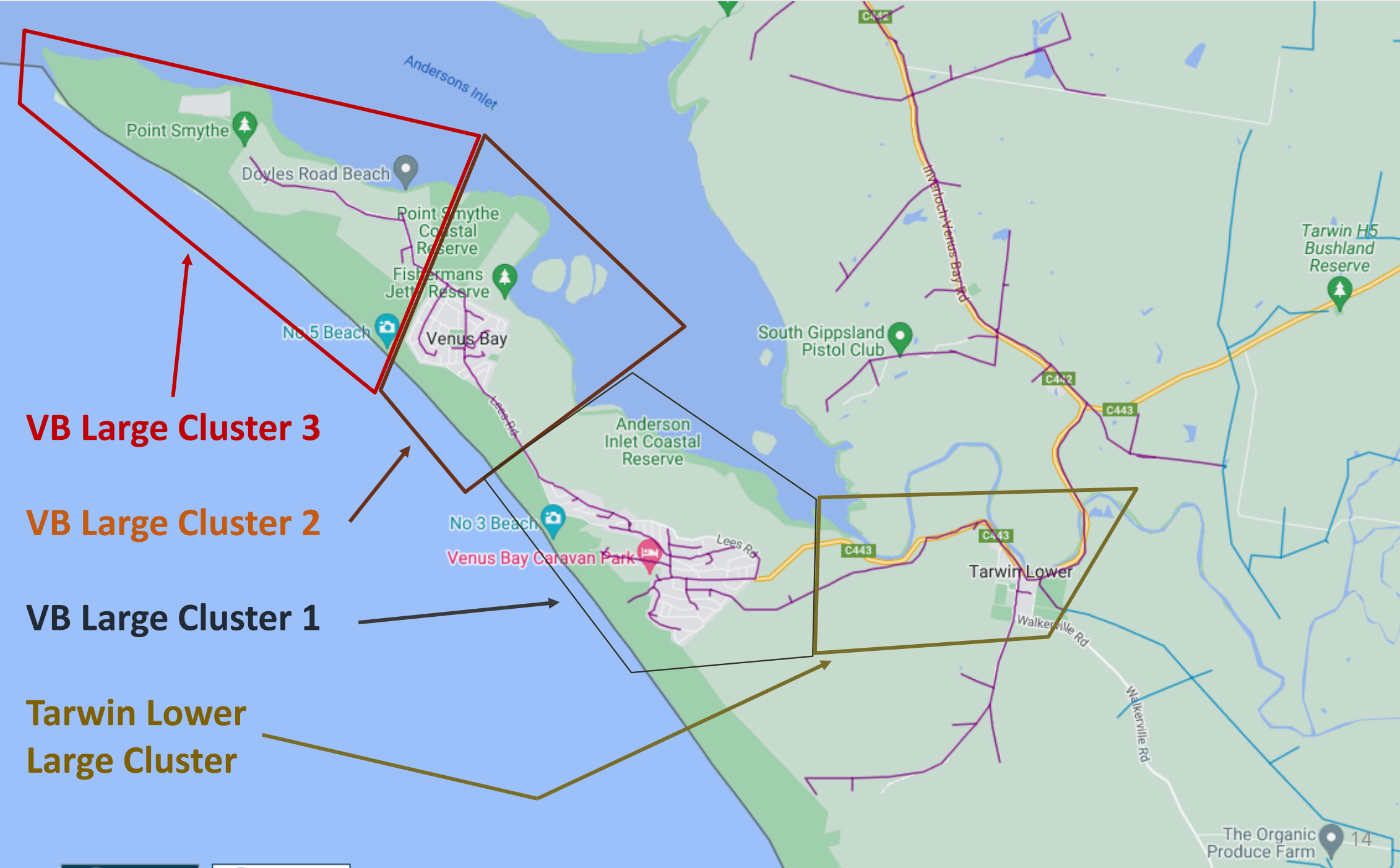
		Time to implement	Technology maturity	Experience with technology use	Geographical suitability	Size	Cost of all electricity over lifetime
Solar Thermal		Moderate time to implement.	Mature technology but limited application in Australia	No experience	Moderate-high amount of solar irradiance and existing infrastructure	Only suitable for whole community	12-16c/kWh
Biomass		Moderate time to implement. Would require large chimney for emissions safety	Very mature technology with established supply chains	Timber and sugar industries have modest experience	No waste biomass resource in Venus Bay	Only suitable for whole community	12 - 35c/kWh Resource dependent
Hydro & pumped storage		Significant time to implement. Permissions for interacting with water resources are considerable	Mature technology with established supply chain and support systems	Experience limited to hydroelectric sector	No significant water resource, existing dams or water storage	Large or small clusters	8 - 50c/kWh Resource dependent
Offshore Wind		Significant time to implement. Permissions for all marine developments are new	Mature technology with established supply chain and support systems	No Australian experience yet	Victorian nominated sites are a long distance from Venus Bay and likely to be developed for very large offshore wind farms	Too big	4 to 7c/kWh
Gas peaker		Significant time to implement. No supporting infrastructure to deliver gas	Mature technology with developed supply chain	No experience at community scales	Plants are located near gas pipelines	Too big	15-35c/kWh
Nuclear		Significant time to implement (decades). Australia lacks nuclear expertise	Small-scale nuclear untested in stationary energy applications	No experience in Australia	Needs to be part of a secure nuclear supply and waste chain	Too big	14-34c/kWh
Flywheel Storage		Moderate time to implement. Technology is not well known and needs to be made safe	Mature only for some niche applications. Limited applications in Australia	Minimal experience in the community	Needs locations where potential failure does not cause safety issue	Small cluster	15 - 50c/kWh
Gravity Storage		Novel technology so may have a long time to implement with planning permission for height.	Not matured enough	No experience in the community level application	Unknown - market still developing. Venus Bay has no obvious high places	Unknown	Unknown

Bringing social connections together with electrical connections

- The locations that the community determined were important to them during the relational mapping activity at Workshop #1 are re-presented in the table on page 13 as key sites and the adjoining places that could create small clusters
- Page 14 shows the larger clusters where neighbourhood batteries could be located
- Page 15 provides an example of the local electricity network and where the transformer are located - check out how many there are !!!

Sites and clusters – how its looking

Sites	Clusters
VBCC	Possibly on same connection as NBN & Telstra exchange
General store	Shops, general store, chemist, Cavity and real estate agents + pizza/fish & chips
Mens Shed	Mens shed & CFA
Fishing club	Fishing club, BBQs & public toilets
Surf club	Single connection - nothing else seems to cluster with SLSC
Petrol station	All sites between IGA and petrol station plus fire station appear to be on the same connection. This would include the Post Office
Caravan Park	Caravan park has a dedicated connection
Telstra tower	Optus and NBN assets might also be on this site. Transfer station.
Health Centre	School, Rec reserve and all clubs
Other Tarwin Lower sites	Pub, Motel, Hall, Hardware, Churches are all split across three feeders and it is unclear which cluster together
Single house	Residential cluster of houses - 30 to 150 at a time.
	More sites in second estate?, Site in third estate?
Not a site but...	Avenues for news and information, relationships, FB groups, locations

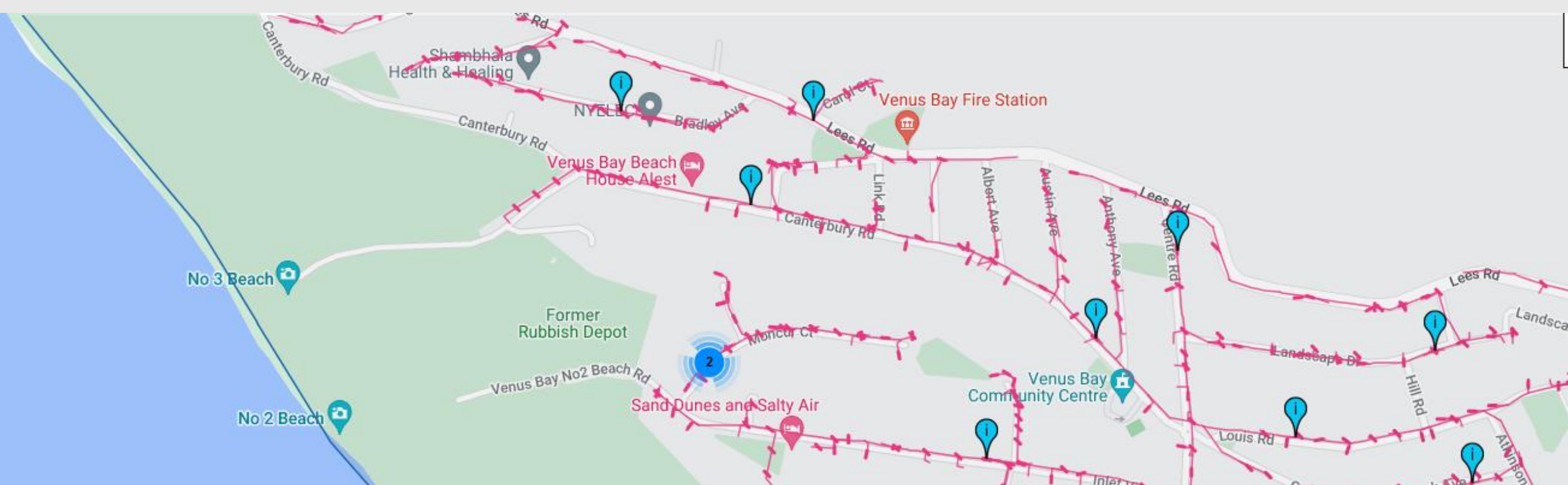


VB Large Cluster 3

VB Large Cluster 2

VB Large Cluster 1

**Tarwin Lower
Large Cluster**

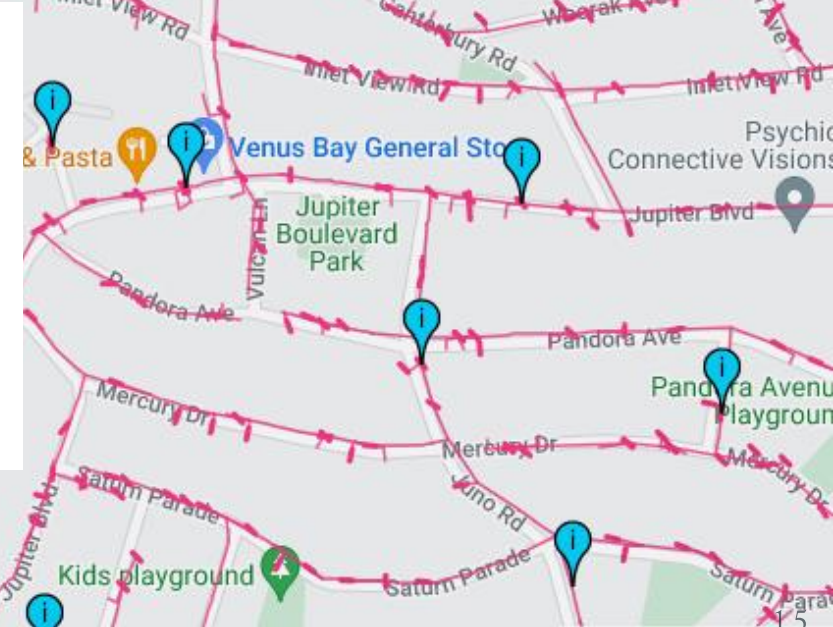
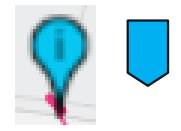


Maps on tables

Medium Voltage (22kV) marked in Purple

Low Voltage (415V) marked in Pink

Transformers 22kV to 415V in turquoise



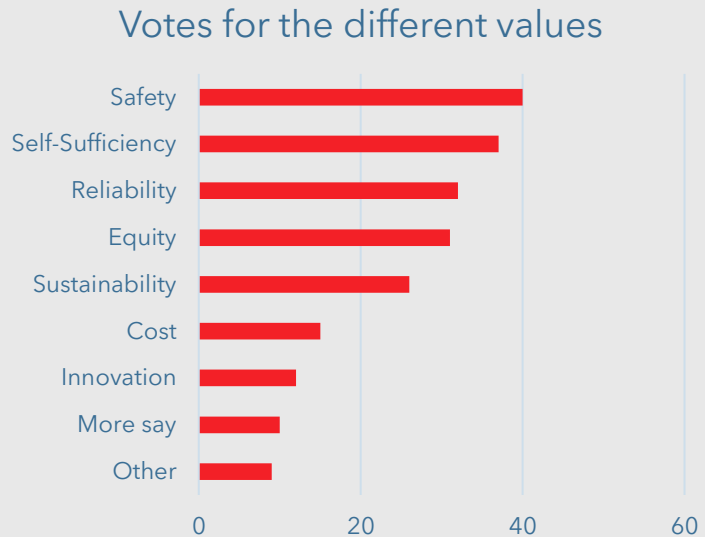
- This illustration captures the whole group discussion on how community values need to influence our choices and prioritisation of technologies, locations and scale

- Ownership and financial models and ways of generating wealth and multiple benefits for community will be considered at Workshops #3 and #4, to shape the plan for what we do next



Summary continued.....

- *Activity #1 - we then explored a set of values that could be used to help with deciding and prioritising the best energy options*

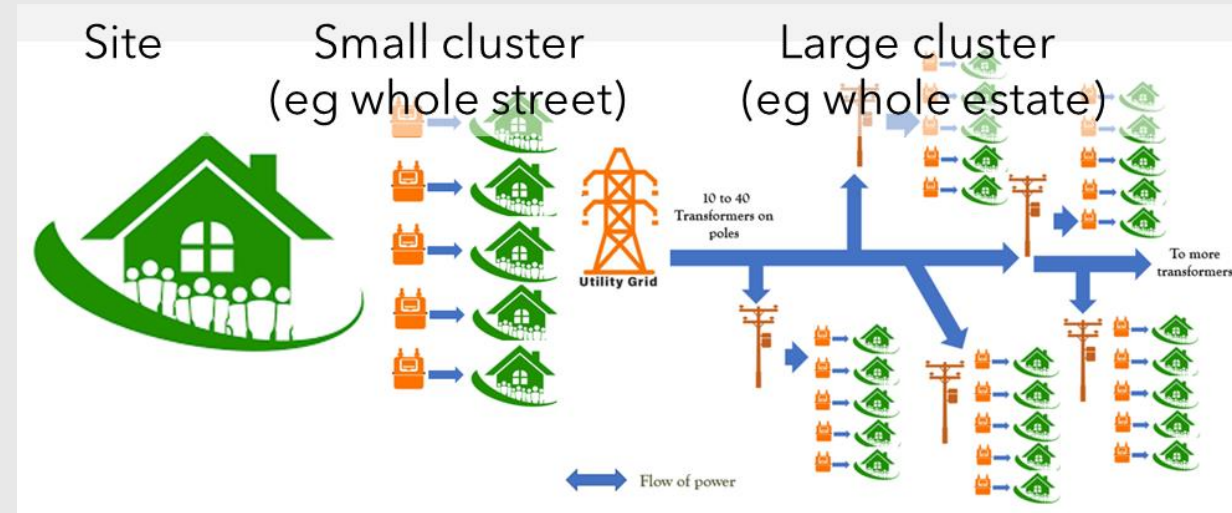


- The Community's values will guide choices of energy options and locations

The workshop participants ranked these values the highest:

1. Safety
2. Self-sufficiency
3. Reliability
4. Equity
5. Sustainability

- Further information was then presented on potential placement of energy systems at the single site, cluster and whole-community scales



- *Activity #2 (Venus Bay only) - we had a whole group discussion about applying the values to the actual energy options presented at the four potential scales*
- The workshop wrapped up with by outlining the purpose of Workshop #3, which will focus on choosing and prioritising particular energy options and exploring the financial, organisational and ownership considerations

Activity #1 -How can we make decisions as a community about different energy options and where they might be located?

Following the presentation of how different energy technologies can provide energy during outages, we explored a set of values that could help us choose the technology types and where to put them. The following values were presented for discussion in Activity #1.

- *Reliability - reducing the disruptions and impacts from loss of energy supply*
- *Safety - Reducing risks associated with energy (e.g., bushfires, electric shocks) and enhancing community safety with energy, communications, safe locations etc.*
- *Equity - making sure everyone benefits from energy investments and no one is left behind in the energy transition*
- *Cost - lowering energy bills, reducing energy consumed, making the most of low-cost sources of energy*
- *Self-sufficiency - increasing self reliance and reducing dependence on multinational companies and distant sources of energy. Growing energy security in the long term.*
- *Sustainability - renewable energy, reducing carbon emissions, eliminating fossil fuel use, reducing environmental impacts*
- *Innovation - leading the way by being prepared to try new technologies, processes and business models. Experimenting, researching and learning*
- *More say - influencing major energy decision and investments for the benefit of communities*



We worked in groups of four to six people to discuss what these values mean to us locally. This illustration provides key insights into these discussions.

POSSIBLE VALUES & CRITERIA 


RELIABILITY 

SAFETY 

EQUITY 

 Important for Medical equipment
 Food safety

 Critical
Must work

Individuals \swarrow \searrow Community
 Emergency Services
CFA

Support EVERYONE in the COMMUNITY 
 Community vision



INNOVATION

System needs to be able to be updated



Equity models



ACTIVITY #1
COMMUNITY ENERGY FOR VENUS BAY + TARWIN LOWER

Safety of System




SELF-SUFFICIENCY 


 connected to reliability

 Sustainability

Safety
personal \swarrow \searrow community


 effective costing

 GOAL = Microgrid

 Convince government of economic benefit

 COST



keep domestic bills down

Generate excess energy & sell for income



Fair for usage



Scale up & add on options

Adaptable system




Community energy storage

SUSTAINABILITY 




Environmentally friendly

 role modelling

 Renewable energy



PEACE & TRANQUILITY

location of equipment 

Protection of place 



And this is what we heard about why these values are important to people in Tarwin Lower and Venus Bay

Safety for us is

- safe places for people to go during outages as a priority
 - at personal and community levels
 - Critical for keeping communications channels powered up during emergencies e.g., bushfire,
 - Providing power for medical needs
 - Pumping water for drinking and other uses
 - choosing batteries that won't combust or cause fires
 - prioritising communications for essential services
 - relief and recovery hubs = Centre of Resilience
 - Electrical system safety
- Self-sufficiency for us is
 - localised
 - a process involving community
 - connected to reliability
 - separation from big profit driven companies
 - having control and say about our energy
 - Inclusive of economic benefits for us and government,
 - Being smart about not using so much energy,
 - putting power of decision making on energy back in community
 - A strong community value
 - Having a microgrid

Values descriptions continued.....

Reliability is.....

- resilience
- Strongly related to self-sufficiency,
- crucial as it influences quality of life
- important when prioritising placement of energy systems at sites, clusters and whole-of-community

- Energy that works no matter what
- Accommodation of a fluctuating population
- The ability to support small clusters so a break in the line doesn't affect everyone down the line,
- secure energy supply in at least one place in each large cluster,
- important for businesses and food safety & security, petrol, post office

Equity is.....

- related to cost
- Involving of the whole community (locals, businesses, groups, visitors)
- Not limited by geography
- Possible ownership of the grid
- supporting everyone in community

- About sharing power and fair usage
- When people with medical needs are prioritised
- Visionary
- When finance & ownership models deliver multiple benefits
- Accessible and inclusive of full-time, part-time, visitors, businesses and community groups

Further values descriptions.....

Sustainability is.....

- Inclusive of cost - "if it's not cost effective, it's not sustainable",
- it is 'renewable' energy,
- helping us move away from fossil fuels,
- environmentally friendly, I
- Technology that is reusable or recyclable
- being prepared to link to wind energy,
- long lasting technology, going many days without grid power
- scalable to suit essential needs,
- keeping size & scale low will have positive impact on sustainability,
- Protective of the environmental
- About leadership

Cost.....

- Is included in self-sufficiency
- Takes into consideration upkeep
- Includes selling excess power to earn an income that helps pay for upkeep
- Is about lowering energy bills and impacting positively on cost of living
- Effectiveness of each component
- keeps domestic bills down,
- Is reduced by government investment
- Needs to consider scalability and add-ons to enable cost comparisons,
- includes adaptability and open source,
- Encourages living simply and using less

Final values descriptions

Innovation is

- less important for our communities, but we can help lead the way for others and be role models for other end-of-line communities
- we can learn from and improve on what's come before
- integrating future tech like electric vehicles, Wi-Fi transmission
- evident in systems that adaptive, modular, replicable and emerging technologies
- Seen in equity models that cover essentials needs first then enough and everything
- how we can get more control over the grid
- Our opportunity to be leaders because we have been left behind

More say is

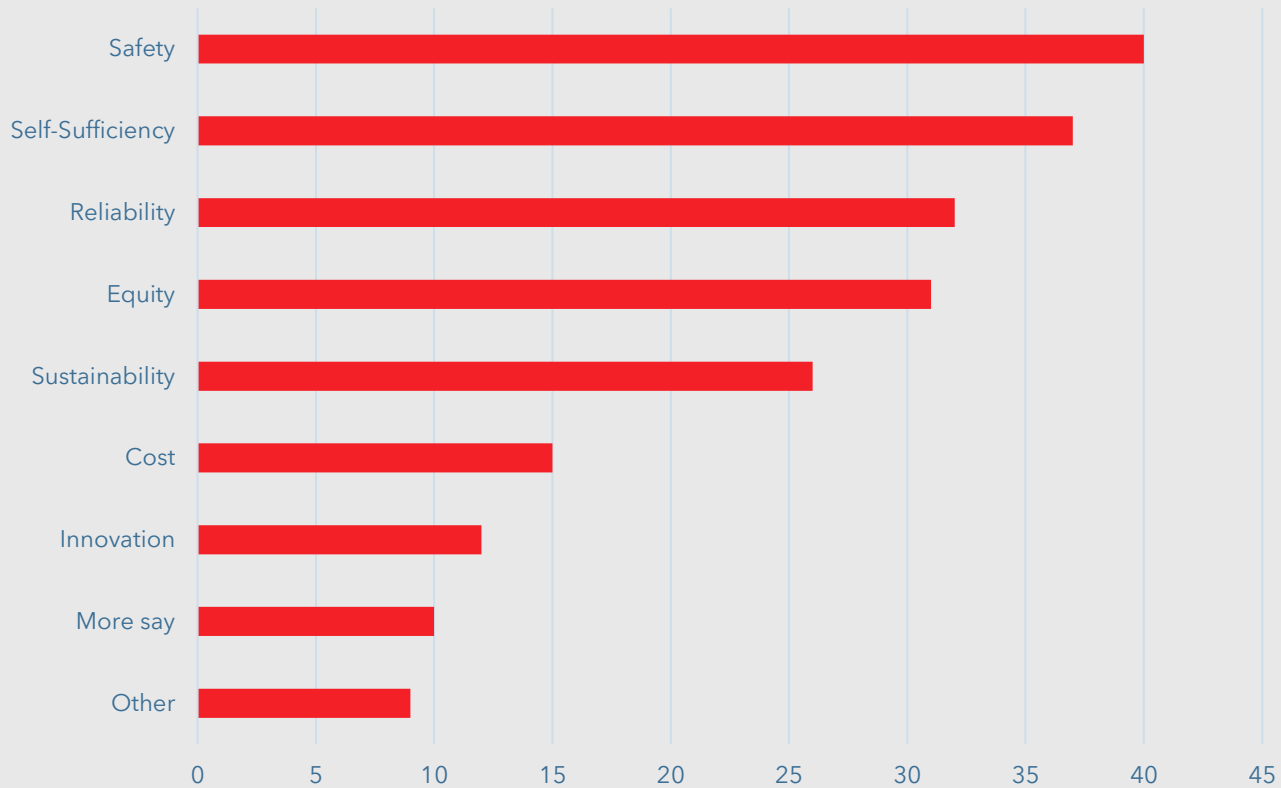
- included in self-sufficiency,
- Influencing flexible or community feed-in tariffs
- buy-in of non-residents too
- our energy future
- continued engagement of people in the study and the plan as it's rolled out,
- encouraging others to have more say by role modelling how community can lead in the design and decision making

Other values and considerations

- Community building
- Collaboration
- Who runs it/owns it/maintains it/covers insurance,
- location needs to not damage peace and tranquility of our landscapes or be divisive to our communities,

Values ranked by participants

After the discussions, participants were invited to rank the values. Each person was given six sticky dots and invited to place them next to the values they considered most important to the community - this graph aggregates results from both workshops



We need to bring everything together, but that's a lot to consider

- Energy for essential, enough, everything scenarios - the resilience lens - needs factoring in
- Sites and clusters, and whole community needs - we need to identify suitable locations
- We need to work with the electricity network and existing infrastructure, e.g. transformers
- Energy technologies will need to work together to provide adequate generation, storage and control within each site or cluster
- Our shared community values need to overlay all of these considerations
- And we want to ensure the systems we land on deliver multiple benefits to whole of community plus households, community groups and businesses
- Workshop #3 will begin the process of developing some pathways that combine these considerations and help us make well-informed choices

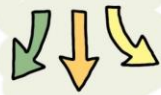
To round things off, this graphic helps us take in everything that was covered in Workshop #2



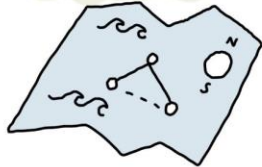
A recap on where the project's at allows newcomers to catch up and builds shared understanding

- The Energy Reliability and Resilience Study arose from the Venus Bay community wanting to increase its resilience in the face of increased power outages, the loss of telecommunications, having one road in and out and the vulnerability this can cause for many people, particularly during fire, flood and storm events.
- The Study was proposed by Venus Bay Community Centre, supported by a team of facilitators and researchers from Changing Weather, Mycelia Renewables and Federation University and funded by the Australian Government's Preparing Communities Fund.
- Since the Study began in July 2022 the team have been working with an Advisory Group and many people across the community, exploring and developing:
 - Understanding of our social connections and community infrastructure across Venus Bay and Tarwin Lower
 - Potential for locating energy systems at single sites (households, community buildings and businesses), clusters of buildings or streets and whole-of-community scales
 - Gathering information to calculate how much energy is required to meet our needs under essential, enough and everything scenarios through Workshop #1, surveys, focus groups, market stalls, electricity data from AusNet, meetings with Telstra, NBN Co, Council

OVERVIEW + RECAP



Social network maps have been created



Community benefits



07
Begun in July 2022



Submission required by

JUNE

Iterative workshops to reflect community needs



Mid level analysis completed



The community wants Resilience to emergencies

Microgrid in 10-20 years

Disconnection point



PRINCIPLES OF OPERATION

Solar



cheap & Scalable



Batteries



wind

Biogas



Not enough electricity



ENERGY NEEDS



Venus Bay Community Centre



EVERYTHING

WHO PAYS? grants government



What energy options meet our needs?

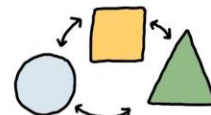
COMMUNITY ENERGY FOR VENUS BAY + TARWIN LOWER



SITES



HUBS

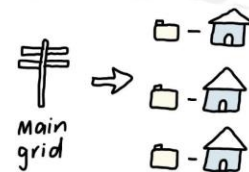


CLUSTERS



PENINSULA

Serves lots of small clusters



TRADITIONAL CLUSTERS



Recap continued:



- The team has also produced lots of communications materials and received guidance for the work, including
 - Monthly newsletters, a brochure, facts sheets and website updates
 - Met with the Advisory and Accountability Groups monthly since July 2022

Recent events included:

- At Workshop #2 at the Bowls Club, it was proposed that Tarwin Lower Community be formally included in the research and development of community energy options - which reflects the community, social, economic and environmental connections between the two places
- Angharad Neal-Williams has joined the team as a graphic illustrator to help capture the ideas and discussions forthcoming during workshops.
 - A reproduction of what she captured at the Venus Bay Workshop #2 can be found on the following page, which represents the discussions, ideas and questions that surfaced during the day

What's next?

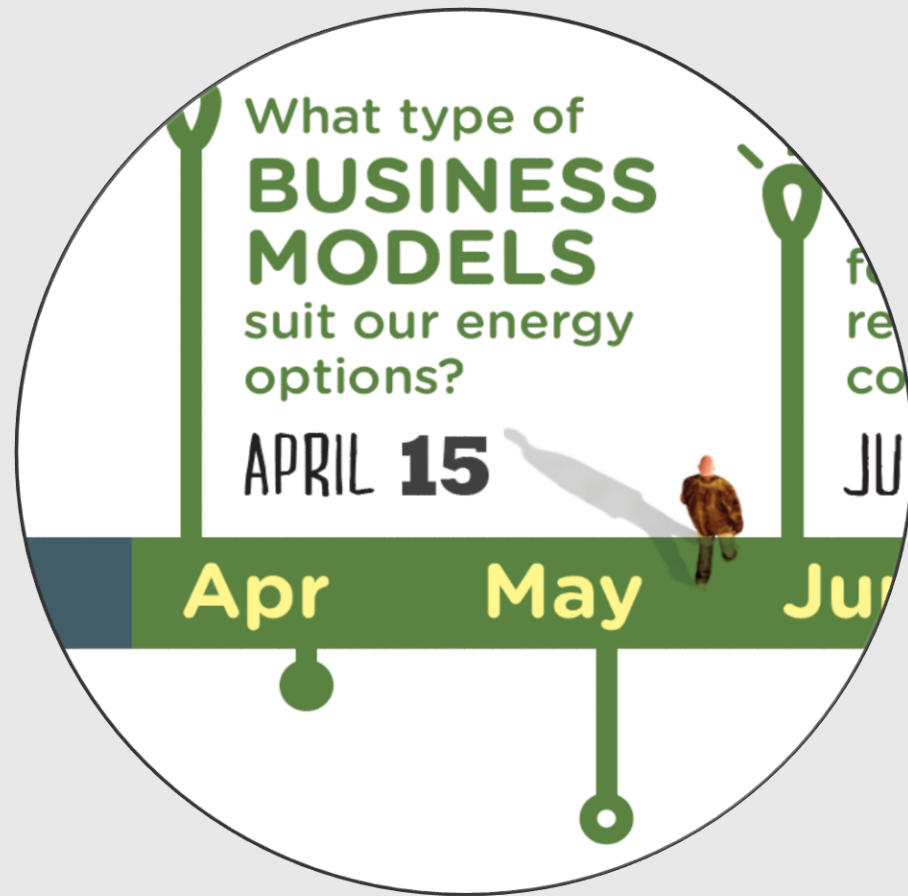
- Five possible pathways for developing renewable energy options at single site, cluster and whole of community scales will be presented at Workshop #3
- What's needed to realise each pathway, how they align with our community values and other considerations will be the work we do
- We'll end up with these pathways fleshed out and prioritised so we can then evaluate the possible finance and ownership options that can get us started
- We will also explore how our choices and decisions might generate multiple benefits for community, households, community groups and businesses

Look out for these ways
you can connect and
have your say

1. This Harvest Report will be shared across the community and people invited to comment on and contribute information about any aspect
2. Project Team members and volunteers will be reaching out to discuss the values with more people across the community
3. Remember to look out for project information and updates in the Monthly Community Energy Bulletins by visiting www.vbcc.org.au/communityenergy
4. Videos – [Project Overview](#)
[Update Clip](#)
[How a microgrid could work](#)
5. Workshop #3 is on Saturday April 15th, 2023 – this will be a great session on working through the viable energy options at different scales and different locations and applying the values to decide on which options to take into the financial and ownership analysis



Workshop 3 Summary



The focus for Workshop 3 was adjusted from a business model focus to one of pathways and planning.

Page 33 of this report provides the Workshop 3 agenda. We extended the workshop to four hours to cover a substantial amount of work. This proved the right decision as everyone stayed through the entire period.

Page 34 provides a recap. The project team agreed that an illustrator would be valuable and this has been funded beyond the original budget. It has provided a substantial improvement in our ability to engage members of the community with attractive and succinct summaries of our work.

Pages 35 to 38 showed participants the results of three community conversations about priorities and values.

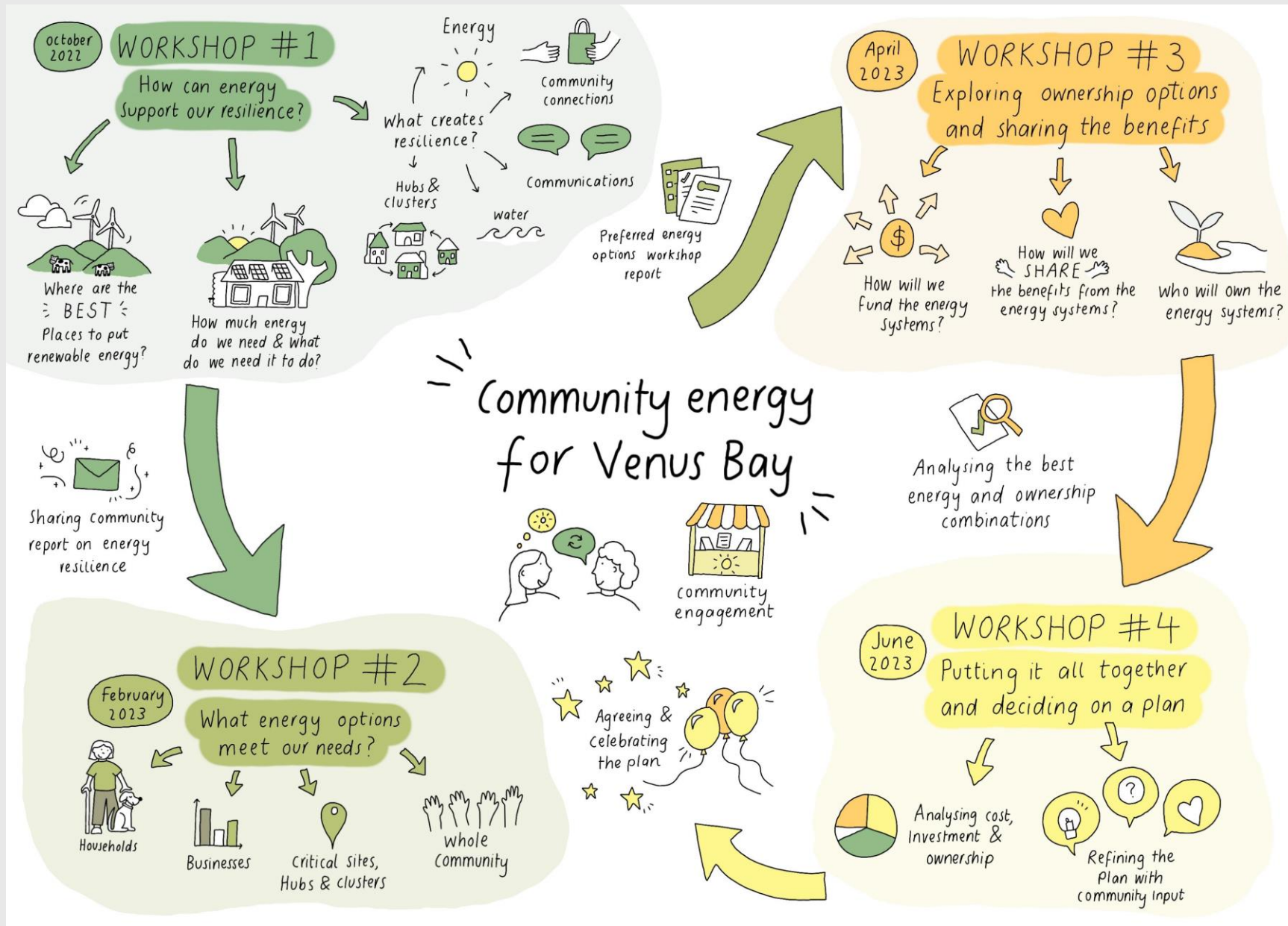
Pages 39 to 46 introduce the pathways and highlight the energy consumption challenges that each pathway wants to improve.

Pages 47 to 57 show the results of the pathways work. The two activities were interspersed with a presentation on Community Wealth Building.

Our Agenda for the day



Time	Item
12 to 12:10pm	Welcome and Acknowledgment. Overview and recap.
12.10 - 12.30	Values - Community perspectives from Wkshp#2, markets and online survey.
12.30 - 1pm	Introduce Activity #1 Pathways and metrics to capture each pathway's contribution
30 mins	Break for lunch
1.30 to 2.20pm	Activity #1 Possible pathways for achieving our energy objectives - Households, community facilities, businesses, small clusters, whole of community.
2.20 - 2.50pm	Report back and general discussion
2.50 to 3.20pm	Community Wealth Building concepts and examples from Ethical Fields
3.20 - 3.50pm	Activity #2 Adding community wealth building to our pathways
3.50 - 4pm	Wrap up, next steps, wine and cheese



We had shifted our focus in workshop #2 to discussing community values and how they need to be applied to our energy options.

We had to pivot in our original workshops plan because of delays in receiving community energy data.

The team has since analysed these data and presented some of the findings at Workshop #3, including energy options under Essential, Enough and Everything scenarios and the pathways we might take to realise these options.





Surveying the Community


As with Workshop 1, a simple survey was available on the website after Workshop 2 to all residents, part timers and visitors to contribute to the insights about community values.

A stall at the Tarwin Lower markets was also used to help people understand the project and invite them to fill in the survey and talk about their preferences.

Summary of Workshop #3 – Exploring possible pathways for implementing energy options for Venus Bay and Tarwin Lower

 36 people participated in a 4-hour workshop - biggest attendance yet, with people that hadn't been before representing a range of businesses, community groups, part-time and full-time residents.

 We began with a recap on the framing of reliability, resilience and the community values that are guiding the Study and informing our Action Plan.

 Information was then presented on the five possible energy pathways that could take us to a full microgrid for Tarwin Lower and Venus Bay

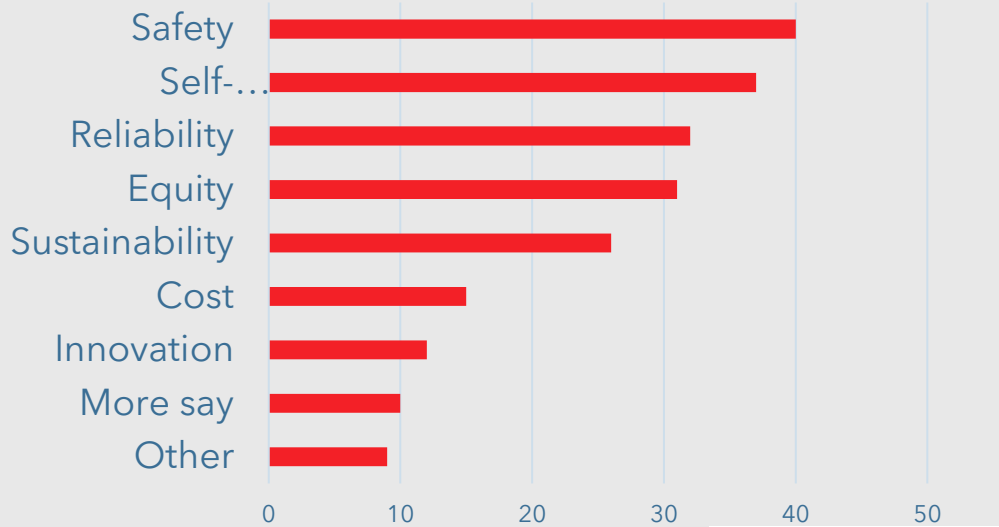


The engagement in and enthusiasm for this Community Energy Study continues to grow, as participants find ways of collectively making sense of complex energy information from individual and community perspectives. Excitement about Community Wealth Building is also growing due to how this emphasises the role of and benefit for all in community that can arise from Community-owned renewable energy assets.

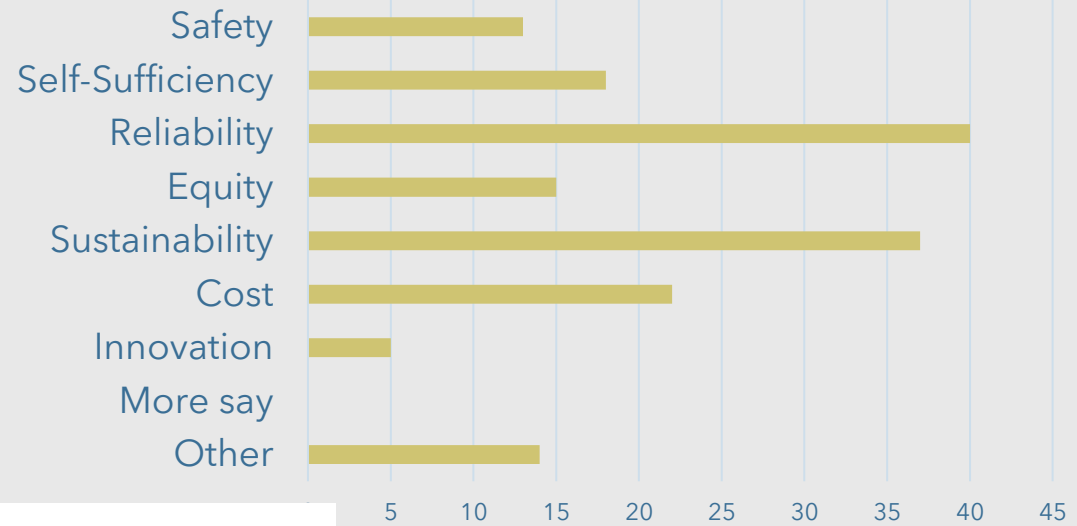
Our Community Values that are guiding our energy choices, were discussed at Workshop #2 and shared widely since at market stalls and through an online survey. They were ranked consistently but slightly differently through each of the engagement opportunities



Workshop 2

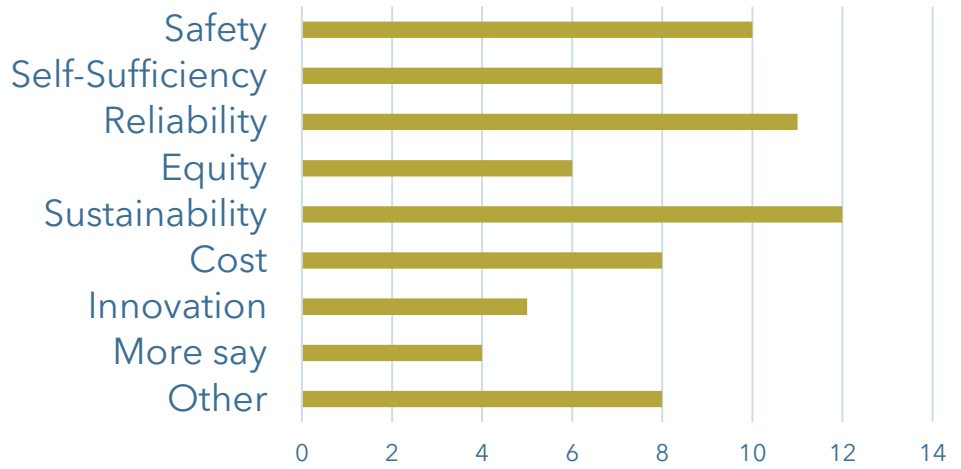


Tarwin Markets



The Safety value ranking at the Venus Bay Workshop #2, was possibly due to the impact of the 2021-22 New Years Eve fire and the stark reminder of the vulnerability from one road in and out of this community.

Votes against different values - Online Survey



The higher ranking of Reliability at the market stall was possibly due to the hot topic of outages and their impact on people and community.

Whilst Self-sufficiency and Sustainability were fairly consistent across the board which reflects this rural community's identity as and desire to be more self-reliant and resilient.

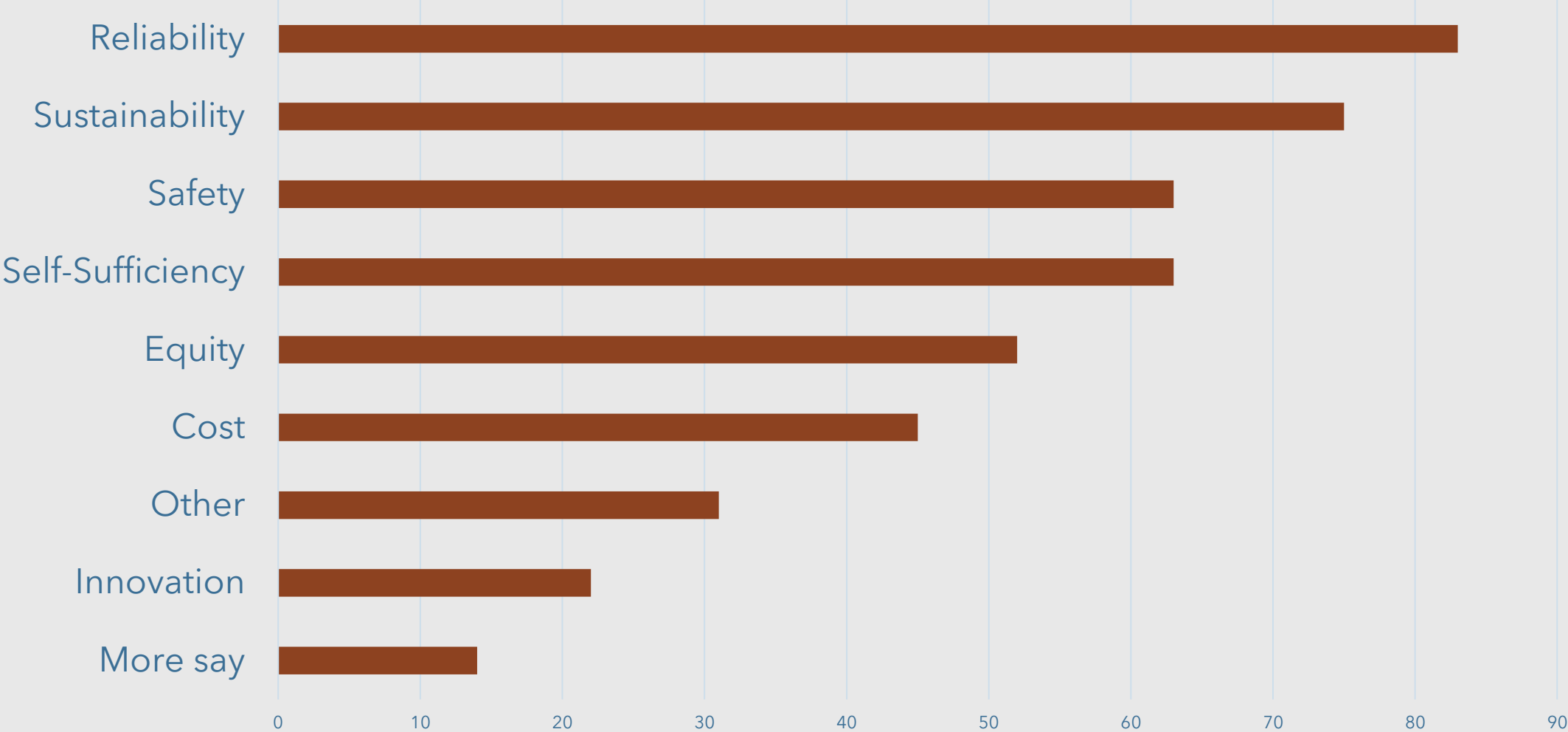
Overall community values ranking when all results from all sources are combined. This ranking is our guide for ongoing analysis of energy options and business models, as we put together the business case for a resilient Community Energy Plan



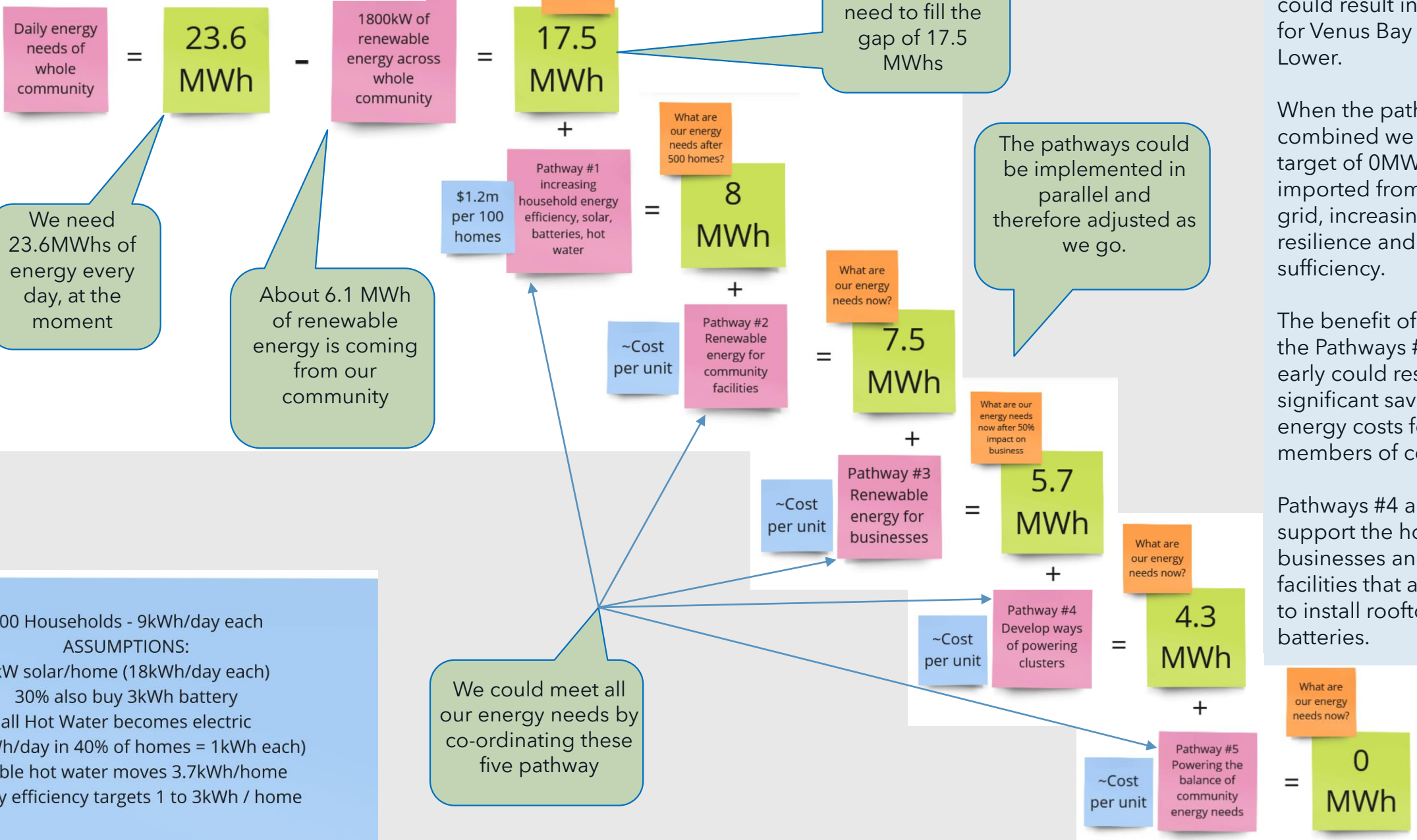
COMMUNITY ENERGY
for Venus Bay?



Votes against different values - Overall Ranking, all sources



Five possible pathways for fulfilling our energy goals



We need 23.6MWhs of energy every day, at the moment

About 6.1 MWh of renewable energy is coming from our community

Future installations need to fill the gap of 17.5 MWhs

The pathways could be implemented in parallel and therefore adjusted as we go.

We could meet all our energy needs by co-ordinating these five pathway

100 Households - 9kWh/day each
 ASSUMPTIONS:
 5kW solar/home (18kWh/day each)
 30% also buy 3kWh battery
 all Hot Water becomes electric
 (2.6kWh/day in 40% of homes = 1kWh each)
 flexible hot water moves 3.7kWh/home
 energy efficiency targets 1 to 3kWh / home

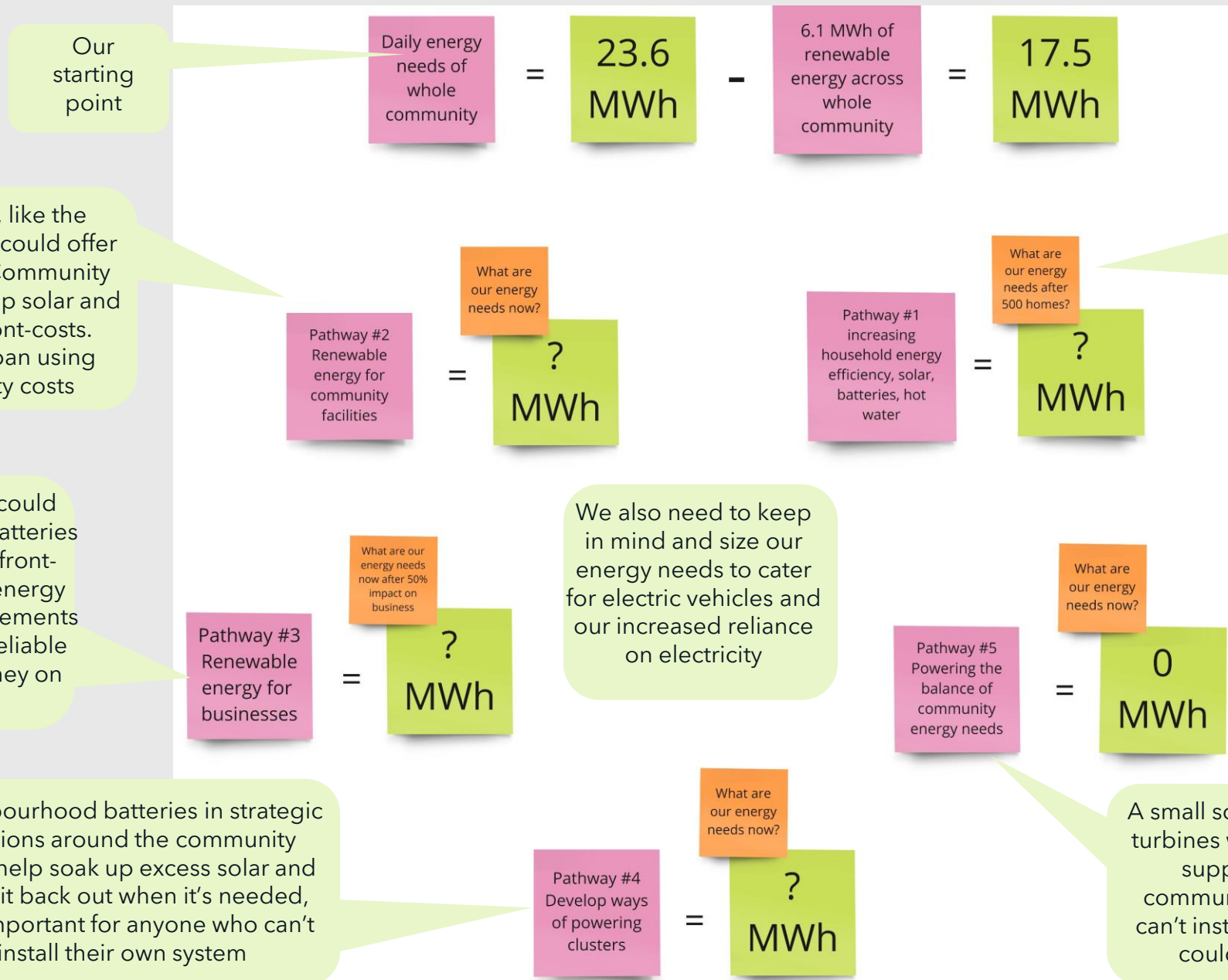
Five possible pathways for co-ordinated installation of renewable energy that could result in a microgrid for Venus Bay and Tarwin Lower.

When the pathways are combined we can reach a target of 0MWh of energy imported from the main grid, increasing our resilience and self-sufficiency.

The benefit of developing the Pathways #1, #2 and #3 early could result in significant savings in energy costs for these members of community.

Pathways #4 and #5 can support the households, businesses and community facilities that are not able to install rooftop solar and batteries.

Potential pathways for pursuing our energy goals can be implemented at the same time, as long as this is done in ways that compliment efforts in each pathway and express our community values.



Our starting point

Energy efficiency upgrades first. Bulk buy solar and batteries can be co-ordinated to help with understanding technical issues and may help reduce costs

A Community Fund, like the Southern CORE Fund, could offer low interest loans to Community Groups to install rooftop solar and batteries at no-upfront-costs. Groups pay off the loan using savings in electricity costs

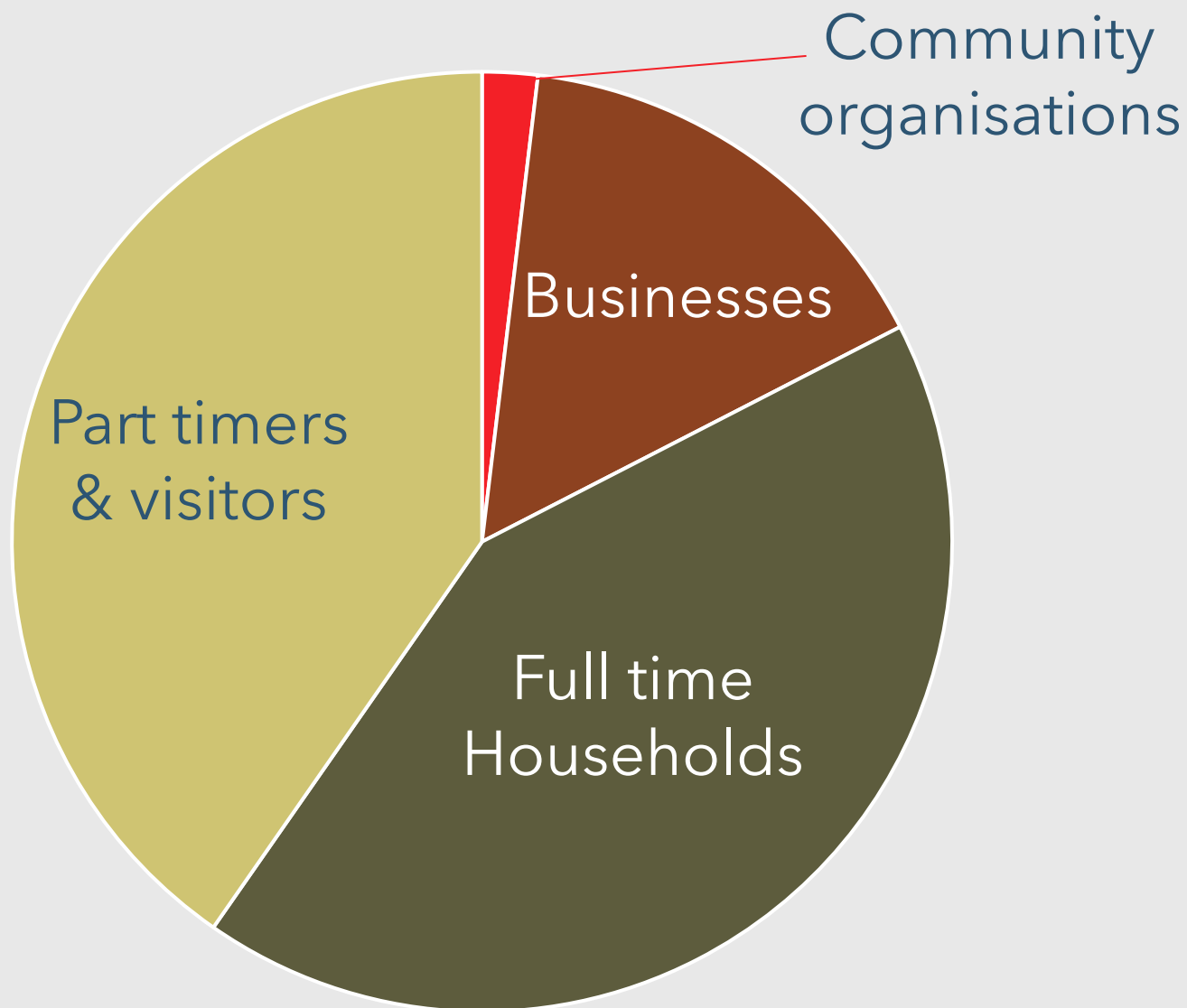
The Community Fund could offer rooftop solar and batteries to businesses at no-upfront-costs. Businesses buy energy at low-cost through agreements with the fund, gaining reliable energy and saving money on energy bills.

We also need to keep in mind and size our energy needs to cater for electric vehicles and our increased reliance on electricity

Neighbourhood batteries in strategic locations around the community could help soak up excess solar and share it back out when it's needed, also important for anyone who can't install their own system

A small solar farm or one or two small wind turbines with batteries could be critical for supplying energy to households, community facilities and businesses that can't install their own energy systems and could make a microgrid possible.

Who uses the energy now?



Understanding who uses energy helps us to think about which pathways might achieve the best outcomes.

With households as a group being the biggest energy consumers in our community, Pathways #1 and #4 are likely to yield the best results for energy use at this scale.

Renewable energy for community buildings and businesses will address the community desire for increased resilience, through the goods and services they provide and the people they employ within the local community.

The inclusion of energy efficiency in all pathways ensures the investment in renewable energy will be more cost effective at any scale and offers savings for households, community groups and businesses that can't install rooftop solar or batteries.

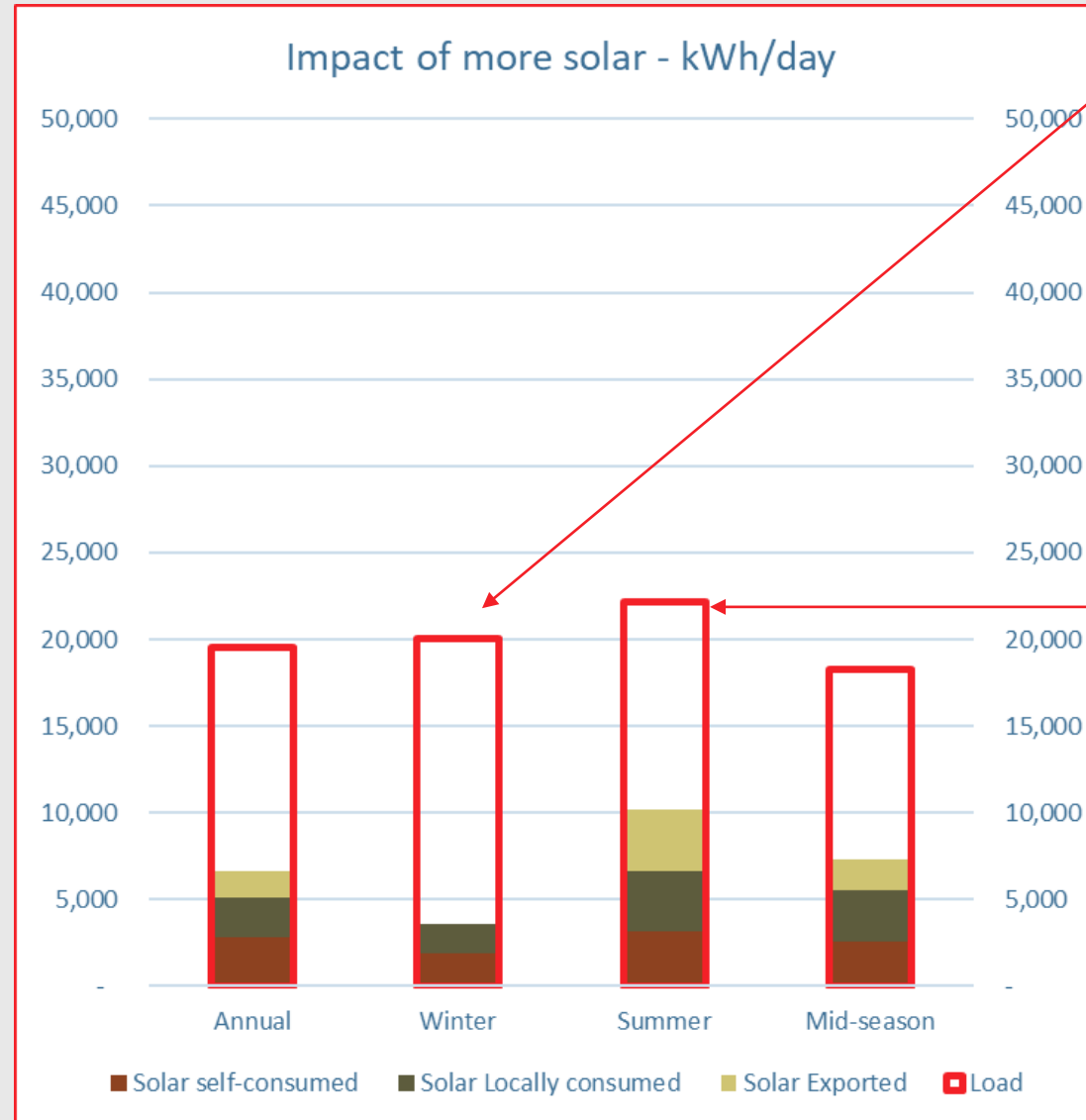
Pathways #4 and #5 also offer access to renewable energy for everyone, including households, community groups and businesses that can't install their own systems. This demonstrates that Equity is a strong value in the Venus Bay and Tarwin Lower communities.

When energy is used influences our options

Current situation
617 homes with solar
+ some businesses

At the moment Venus Bay and Tarwin Lower uses almost all the solar energy that it produces.

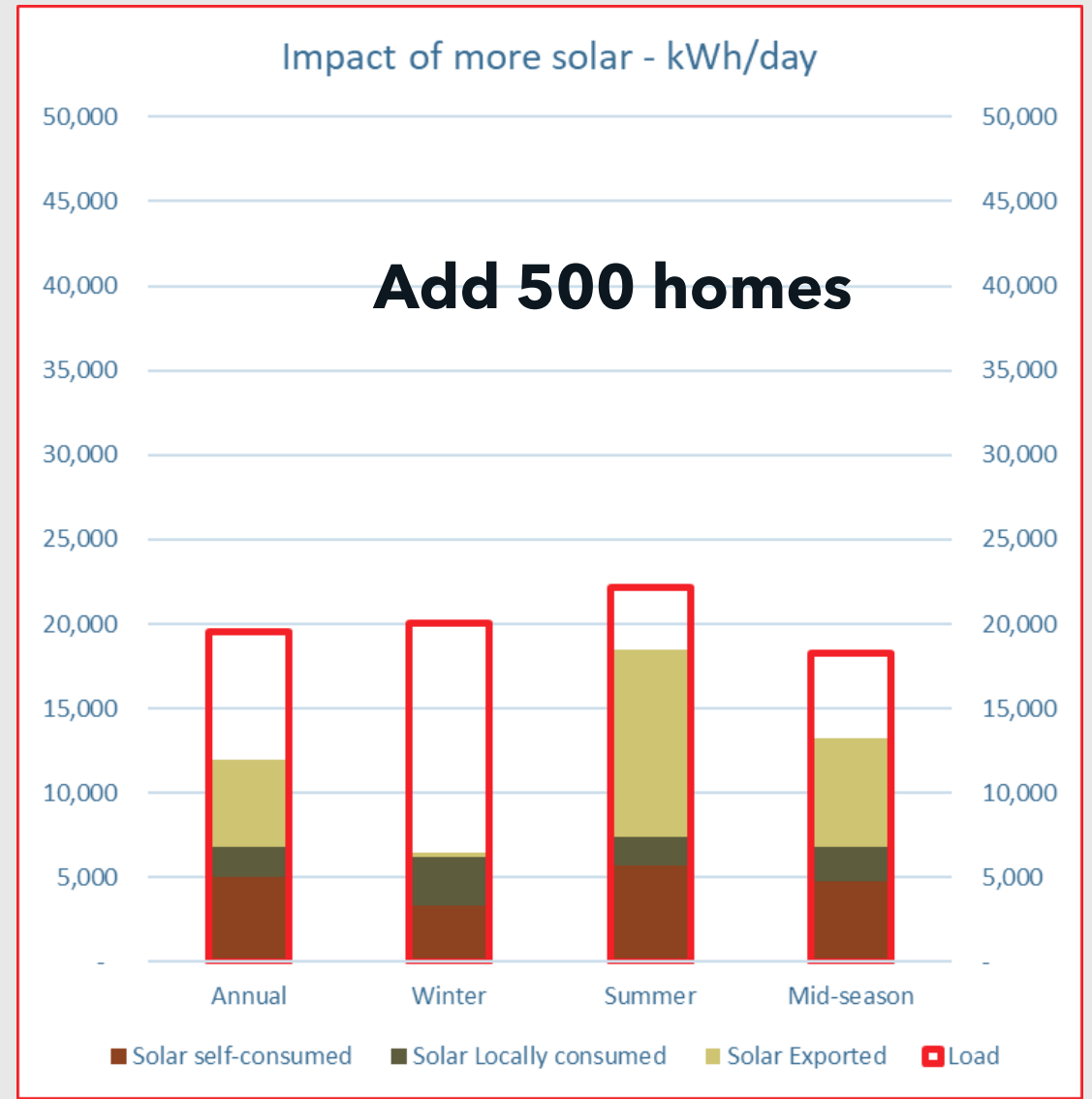
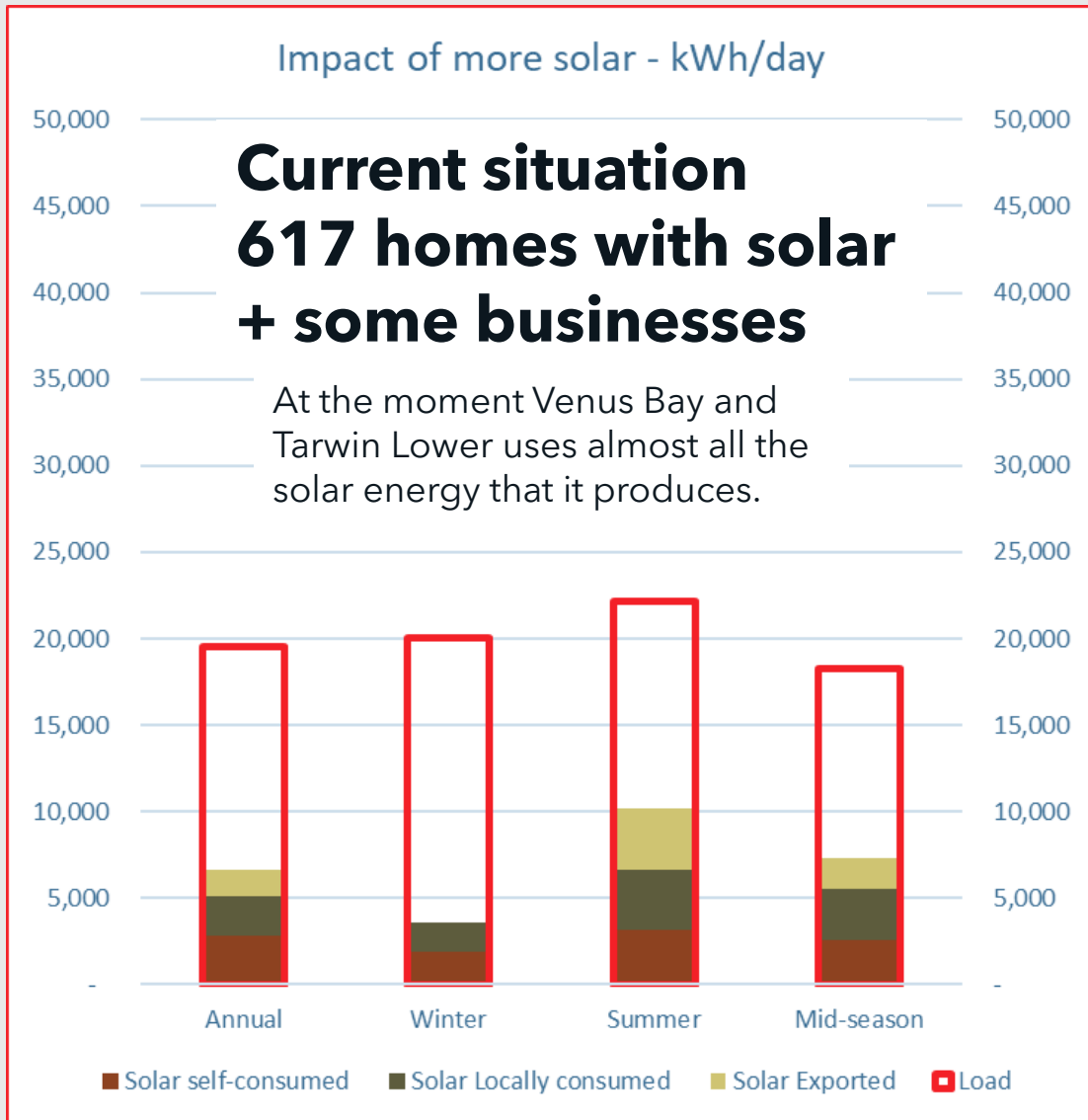
Many households export solar at times and it is soaked up by their neighbours. We don't see this on our electricity bills because it is difficult to identify who uses which source of energy. So, we currently pay for a *system* of energy production where everyone's surplus solar electricity is simply absorbed into that system.



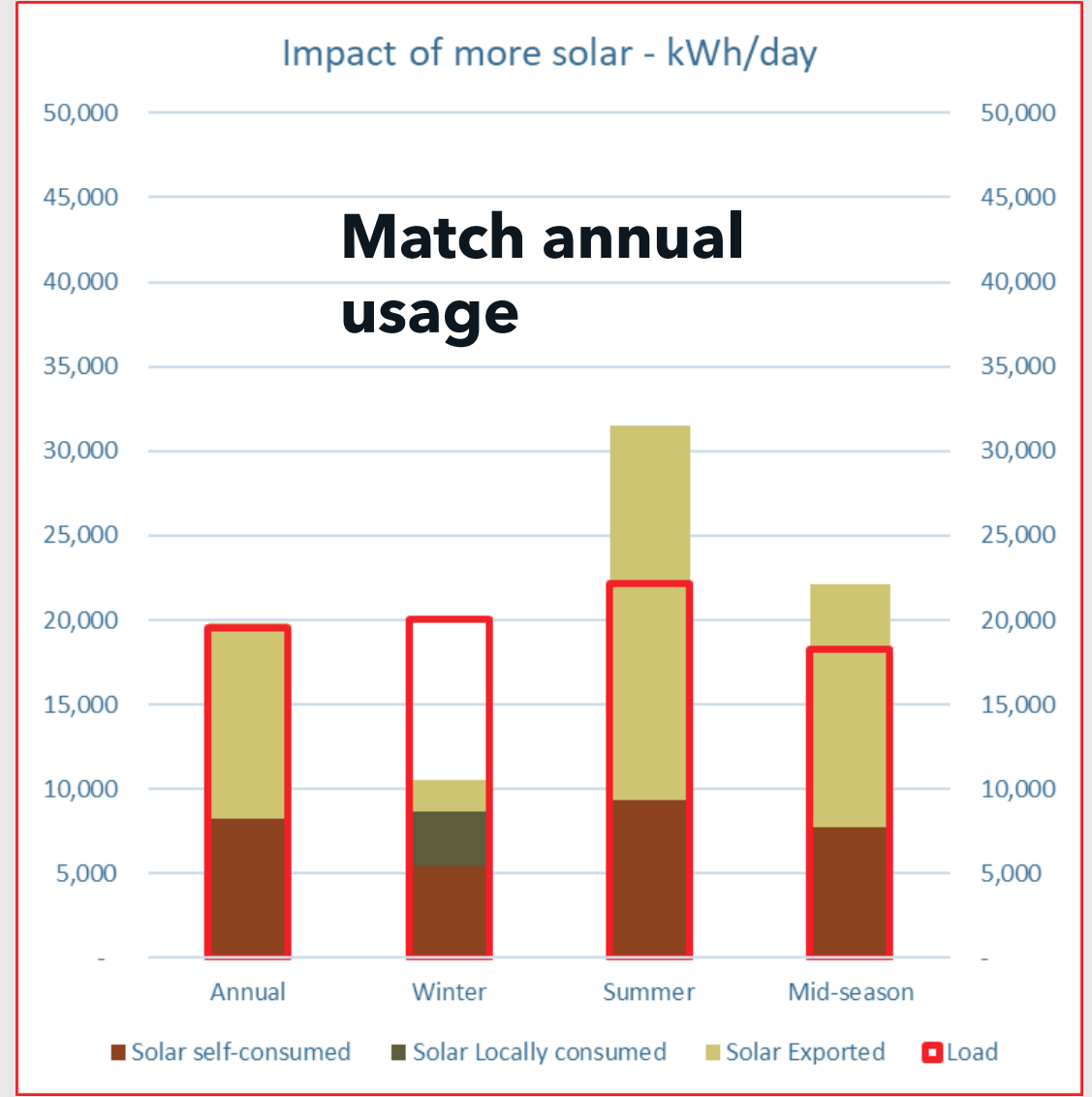
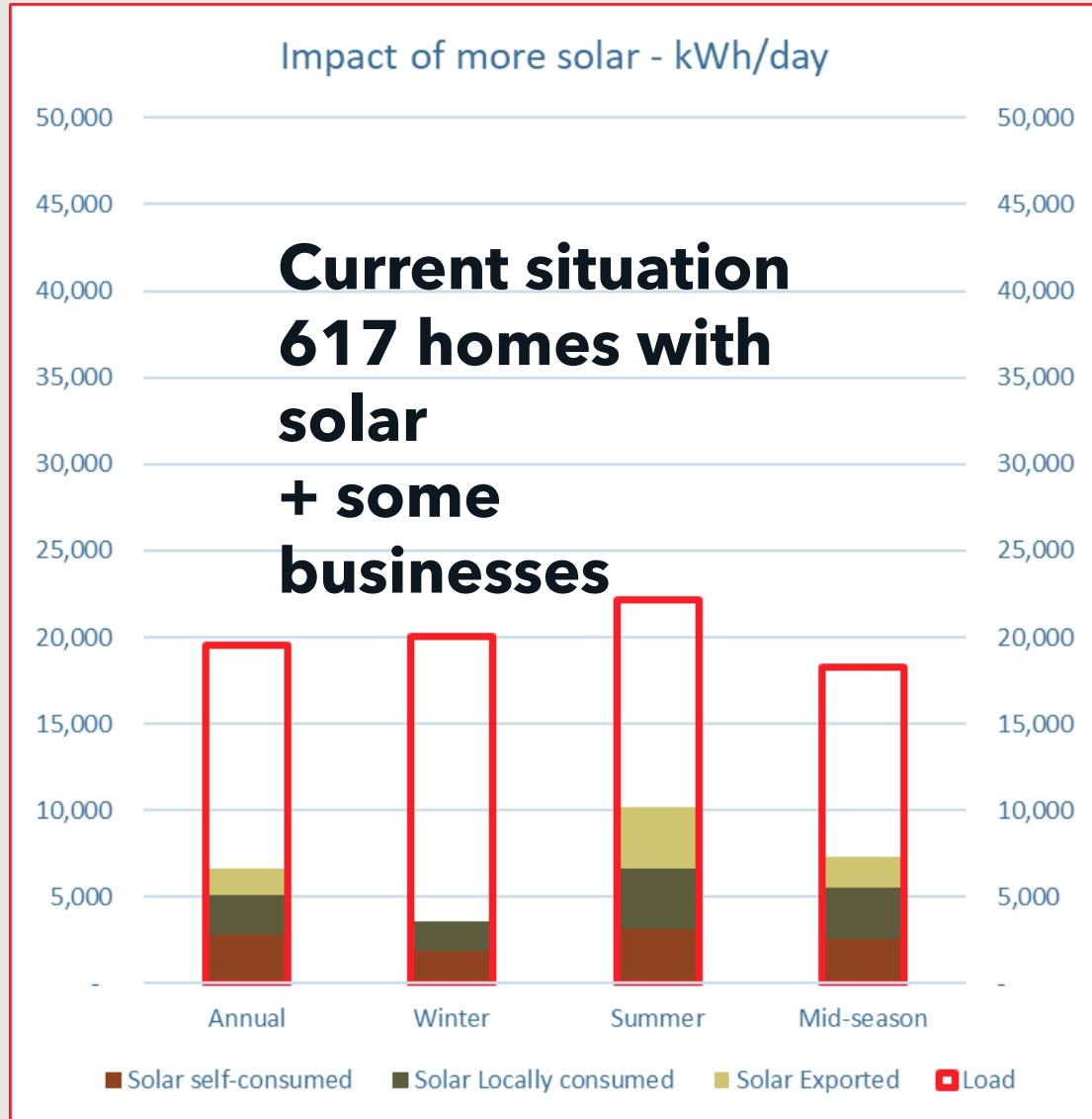
During winter, energy consumption is higher because there is less solar energy generated, more heating is needed and people spend more time indoors

During the summer peak, energy consumption is higher because there are so many visitors

Adding solar to 500 homes means we could generate what we use in summer



Generating as much solar as we use year round means a surplus in summer and a deficit in winter



When considering any of the pathways, the size and location of systems and how they work together, a key aim is to ensure the following three things guide decision making:

- **We need adequate generation**

Increasing resilience by generating as much electricity as we use. There may be times when we have a surplus and can supply it to our neighbouring communities

- **We need adequate flexibility and control**

Flexibility to use renewable energy when it is available - Creating and storing hot water, for example, allows us to use surplus and cheap renewable energy when the sun is shining.

Forms of control can include timers to turn on dishwashers or washing machines during the day

- **Adequate storage**

Storage allows us to absorb surplus solar energy and use it when electricity is more expensive or when the main grid suffers an outage.

**Example
100
households
with solar
and battery**

Safety 1
Solar*: 330 kW
Batteries: 1000 kWh

Self Sufficiency 2
Solar: 520 kW
Batteries: 1000 kWh

Reliability 3
Solar: 330 kW
Batteries: 1600 kWh

Equity 4
Solar: 330 kW
Batteries: 400 kWh

Sustainability 5
Solar: 660 kW
Batteries: 2000 kWh

*Doesn't
include
solar hot
water

Our values influence how we size systems in each pathway. Our top five community values suggest sizing the total amount of solar and battery capacity differently. For example, under our reliability value we would have more battery storage than under equity.

1. Safety (focus on emergency situations)
 - Large battery to last a long time
 - Not worried if it is charged by solar or grid
2. Self - Sufficiency
 - Large solar and large battery
 - Much better if we can make homes more efficient
 - Much better if we move hot water to use solar
3. Reliability (focus on outages)
 - Large battery
 - Control to limit use to essential loads
 - Need to forecast so we can predict best times to discharge the battery and make some money
4. Equity
 - Investments sized to make money
 - Energy efficiency and flexible hot water are cheaper
5. Sustainability
 - Large solar but could use grid instead of large battery
 - Control to make use of surplus wind on market

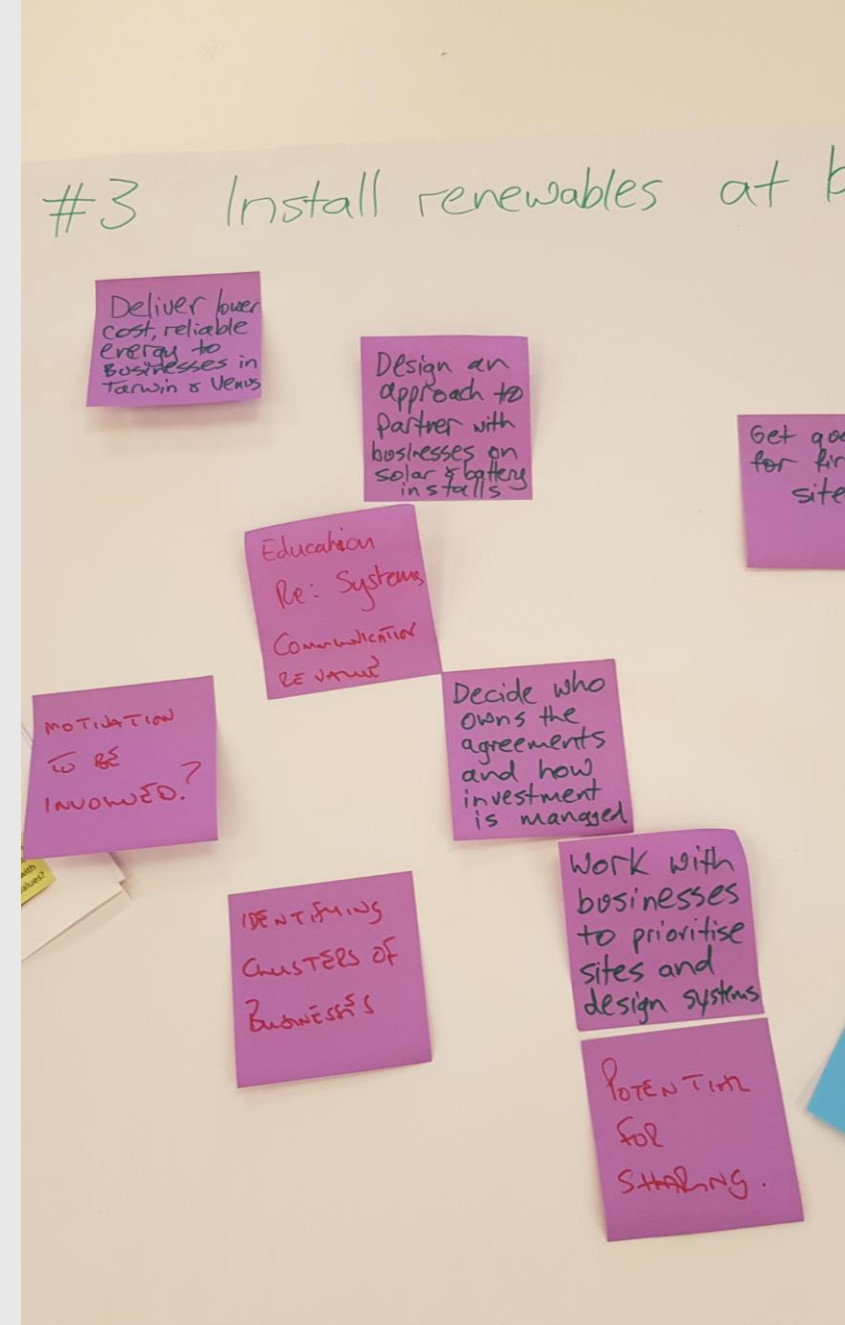
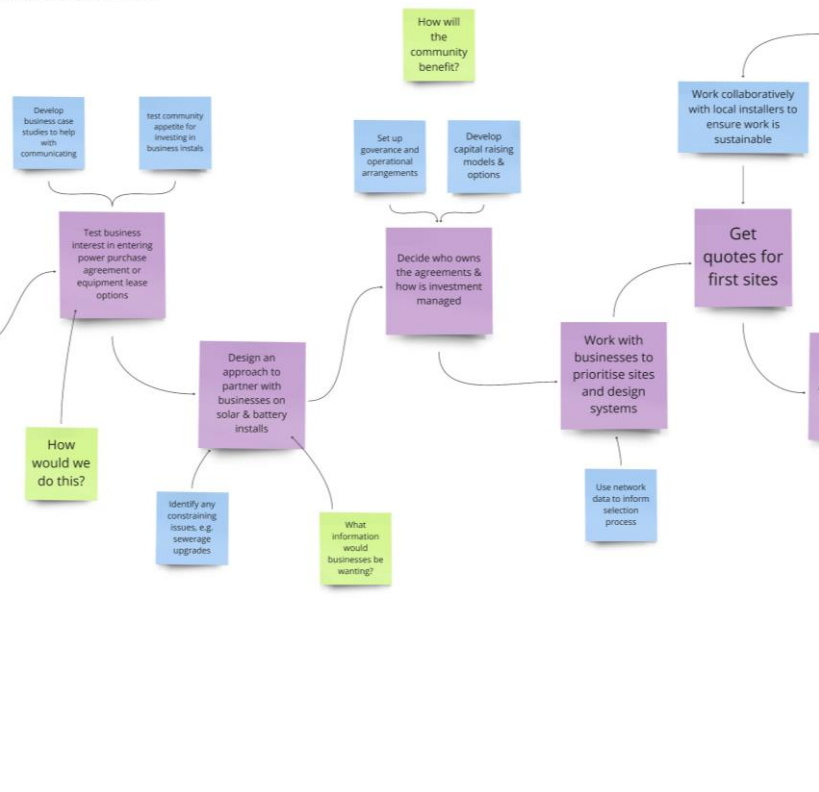
Activity 1



The pathways were presented to the whole group, questions were answered and further ideas discussed before Workshop participants were invited to choose a pathway to work on in small groups. Community buildings

- Businesses
- Households
- Small clusters
- Whole community

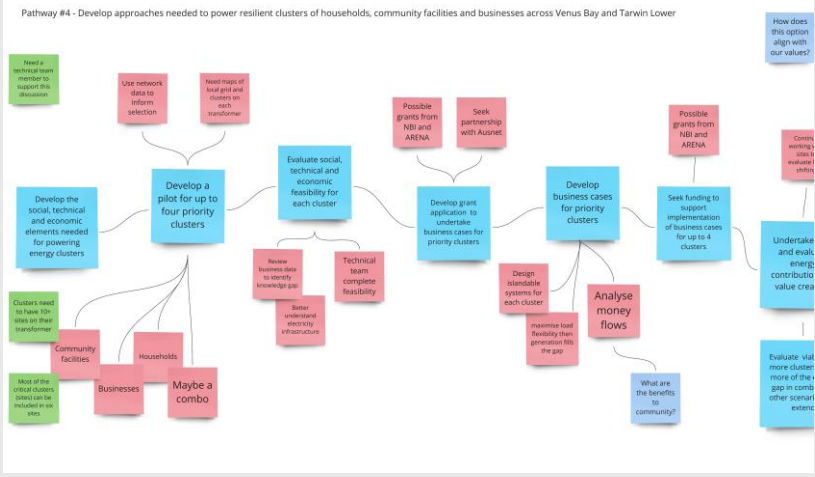
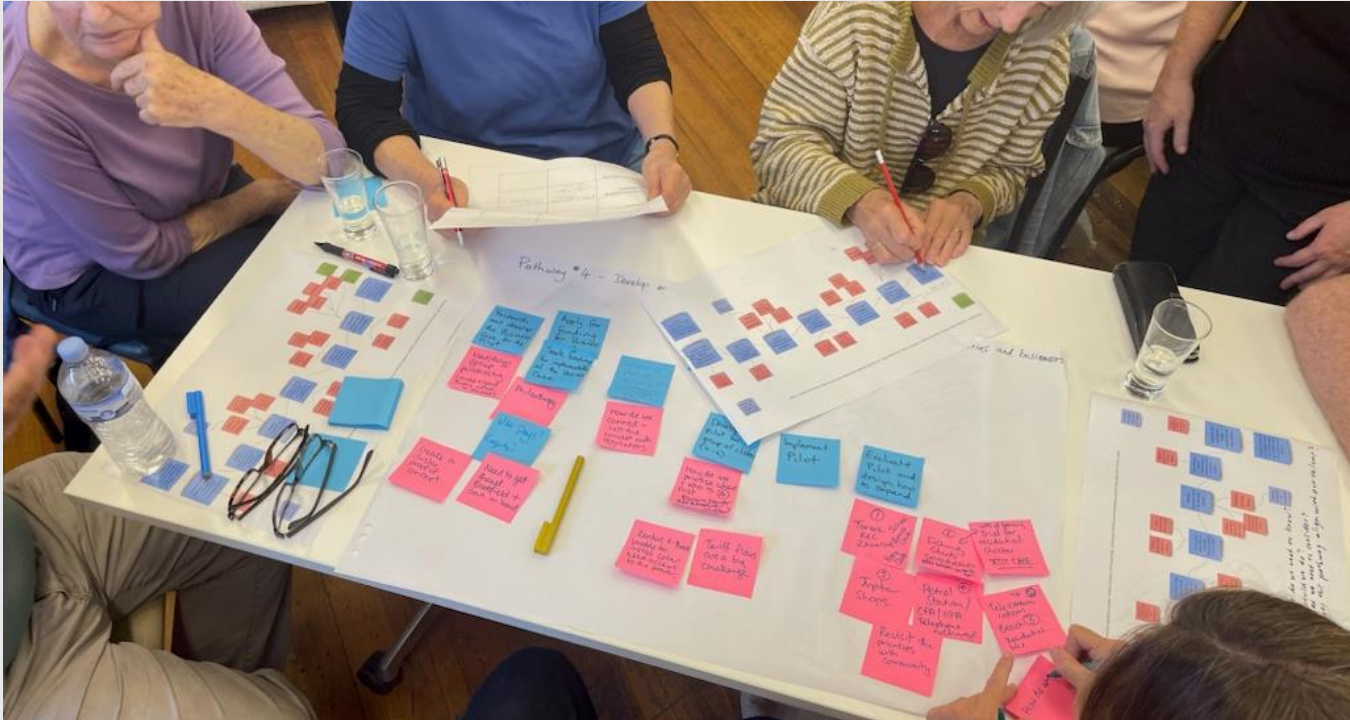
The following slides present the pathways information that were provided to each group and the highlights of their discussions. Full details of the additions to the pathways will be source material for the Action Plan that is being developed and will be shared in draft for people to reflect on and give feedback on:



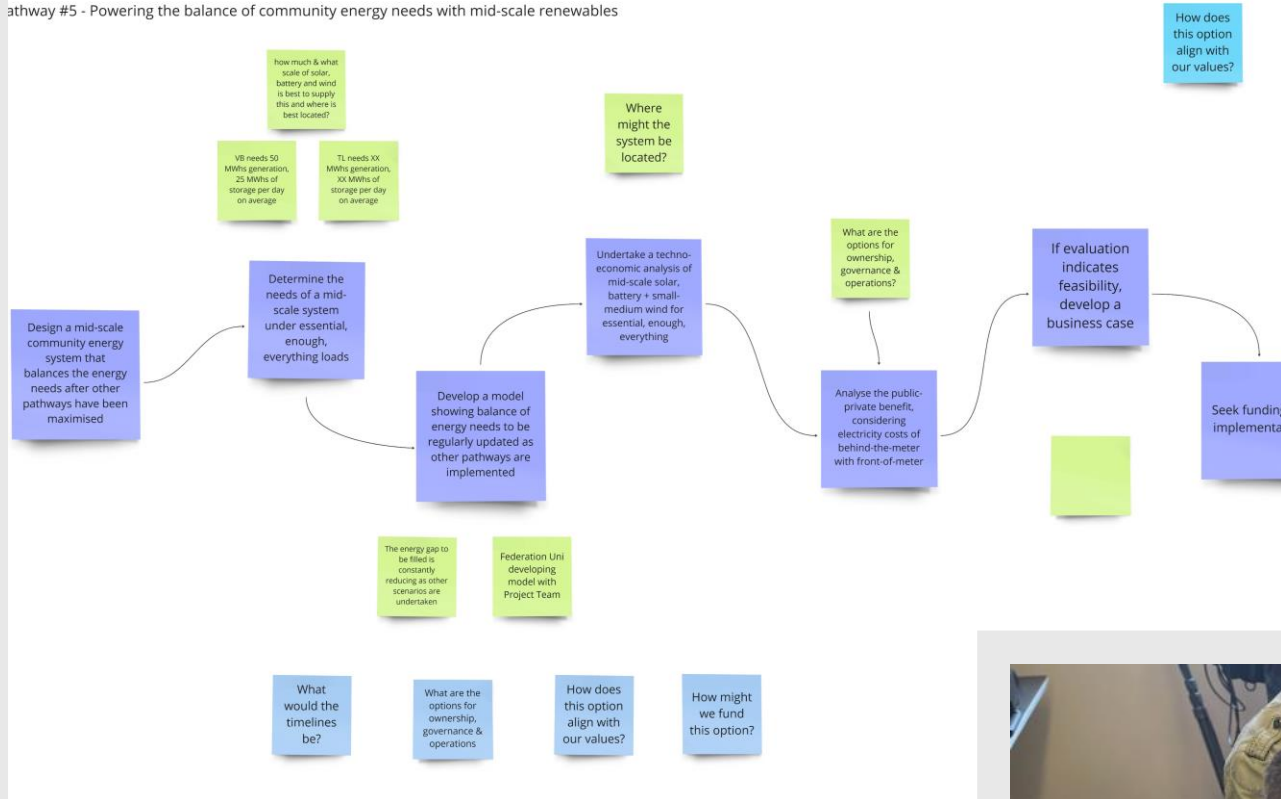
Pathway #3 – Powering businesses with renewable energy

- Keeping the power on at businesses helps them and the community - less spoilage, more service
- Access to local renewable energy for businesses should lower their energy costs, helping with their sustainability
- Need to work with business and building owners to prevent any unintended consequences, like rent rises.

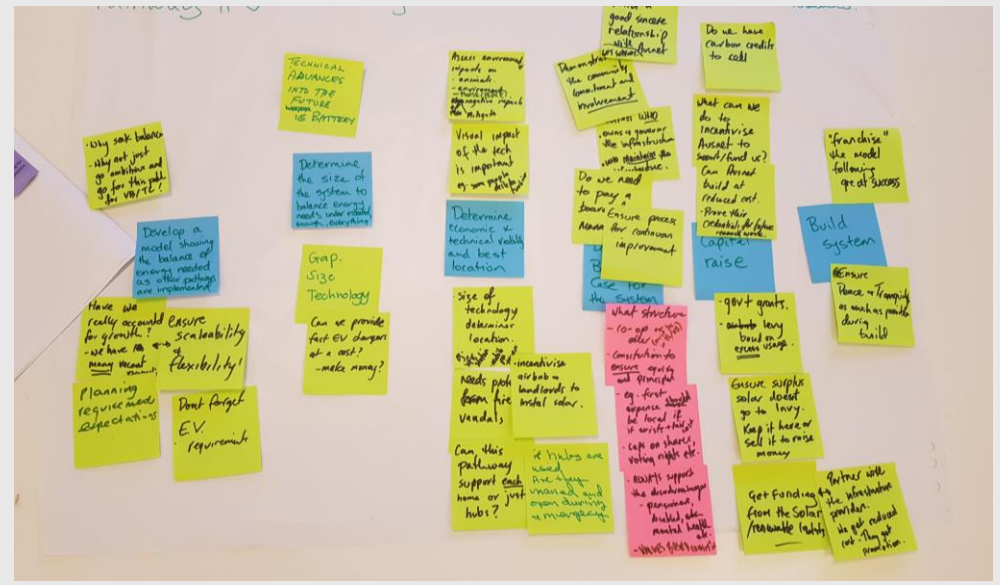
Pathway #4 - Developing approaches for powering clusters of households, community facilities and businesses



- This option is complex and needs lots of thought and discussion
- How do you ensure energy is equitably shared from a neighbourhood battery amongst full-timers, part-timers and visitors?
- Several small trials would be the best way to test different approaches and develop new ways of capturing and re-distributing energy that fulfill our community values



How does this option align with our values?



Pathway #5 - Powering the balance of community energy needs with mid-scale renewables

- A locally owned-entity, returning profits to community is what we want to see on this pathway
- This pathway is critical for supplying energy to anyone who can't install their own system
- This pathway will be important to fulfill our goal of a microgrid

1 INCREASING HOUSEHOLD ENERGY EFFICIENCY

Help households adopt energy efficiency & load shifting

Use existing programs Baw Baw Sustainability group

Equity system could be piloted

Inefficient housing is very common

Education & Awareness

Utilise Community Houses

BULK BUY!



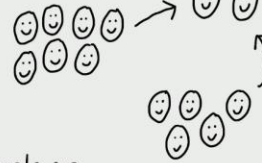
Strong governance

Use rates info to contact rate payers



Pilot ready streets

Establish working groups & representatives



check on building structure



2 INSTALL RENEWABLES AT COMMUNITY FACILITIES



Install renewables at #10 community facilities

Criteria Ratings to select facilities

Identify groups

Particulars of each participation owned/leased

Batteries different to lithium

Who do we need to work with

Rethink what the energy system does at each site

Capital raising

5 BALANCING COMMUNITY ENERGY NEEDS W/ MID SCALE RENEWABLES

Essential Enough Everything

Complement the other pathways



SOLAR BATTERY WIND

COMMUNITY ENERGY FOR VENUS BAY + TARWIN LOWER



4 POWER RESILIENT CLUSTERS

HOUSEHOLDS

Prioritise where? who?

VALUES SAFETY COMMUNITY BUILDING

COMMUNITY FACILITIES

Philanthropy

BUSINESSES

RELIES on group purchasing

Tariff flaws are a big challenge

3 INSTALL RENEWABLES AT BUSINESS SITES



Education

Decide who owns the agreement

Get quotes for first sites

1 Work with businesses to prioritise sites

VALUES

RELIABILITY

EQUITY

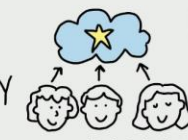
Deliver

Reliable energy to businesses

Approach to partner with businesses

Potential for Sharing

ENERGY PATHWAYS



COLLABORATION



Introducing Community Wealth Building

- Sam Doove and Gareth Priday from Ethical Fields have joined the Venus Bay and Tarwin Lower Community Energy Study Project Team
 - They bring knowledge and skills in the area of economic analysis and business case development – through a Community Wealth Building lens
- Two videos were shown to introduce key concepts of community wealth building and how this approach could be applied in our Study. These examples, many of which are in Victoria, and some nearby, made these concepts much more real. Please follow the links below to watch these:
 - Link to [presentation video](#)
 - Link to community wealth building [video](#)
- A sample of quotes from people below illustrate the positive response to the inclusion of Community Wealth Building as our approach to economic analysis.
 - “Our table was really switched on by the connectedness and success that was created by the other community projects (in the videos). And the idea of a co-op or shareholder type funding structure was an eye opener. We loved that idea but felt that Trust and Equity (especially for the elderly and renters) had to be at the front of whatever we end up doing...”
 - “Format and structure of workshop enabled people to engage and bring a complex story together. Lot of excitement about Ethical Fields, showing the actual value to the community”.
 - “I was blown away by the success of the workshop - at least a dozen new people who all got on board, real engagement around the tables, everyone stayed to the end and not for the wine and cheese - and I think everyone came away with a really clear picture of what might be possible. I know I did. Looking forward to the next one”.

Activity 2

After listening to Sam's and Gareth's presentations, participants were invited to reflect on how they feel the principles of Community Wealth Building could be applied to their pathways.

COMMUNITY WEALTH BUILDING

Ethical Fields

- Enterprises
- Supply chains
- Workforce
- Finance
- Assets



- Benefits local people
- Create local economies
- utilise anchor organisations



COMMUNITY ENERGY FOR VENUS BAY + TARWIN LOWER

WONTHAGGI COAL MINE

- Solar + Battery System
- Interest free loans
- Benefits community

LOCAL WEALTH

YACKANDANDAH COMMUNITY DEVELOPMENT COMPANY

- Raised \$412,000
- Built a new petrol station
- Local people invest
- 50% of profits go to community projects

PINGALA CO-OP

- Facilitate businesses to install solar
- business pays Pingala
- Pingala provides dividends to investors

CO-OPS = Democratic

DISCUSSION

- Constitution to ensure equity
- Invest in assets, goods, services
- Create a board
- Open investment to whole community
- Support disadvantaged
- Power to sell & export for better prices
- Set up community development fund
- Reach to part time population
- utilise local organisations
- Accountability & Trust
- Need a Journey Map
- Values based constitution

NEXT STEPS

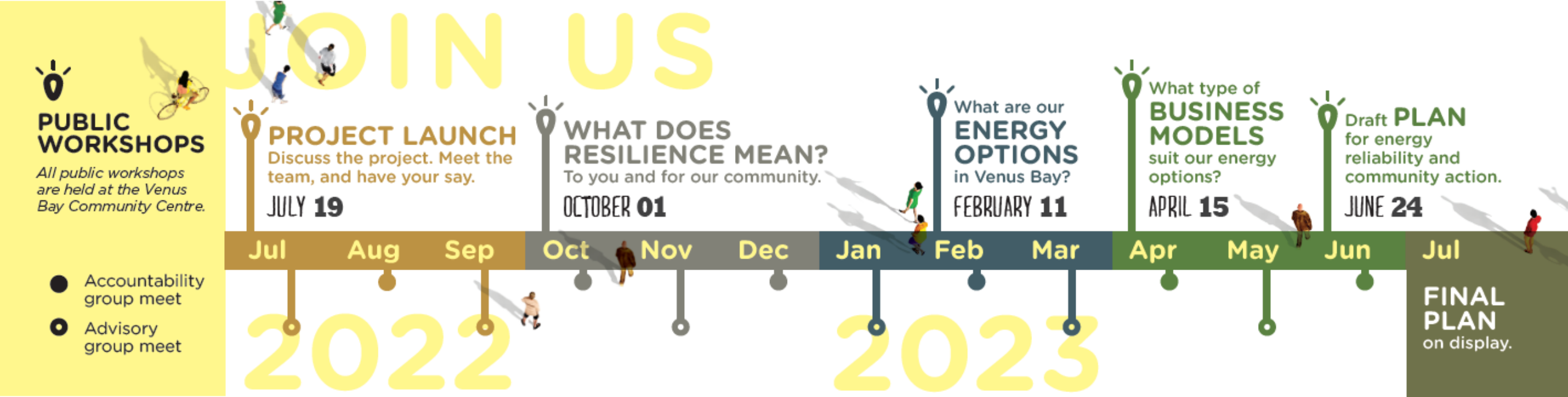
- Pathways
- organisations & community wealth

The small groups reported back their reflections to the whole group on how Community Wealth building could be reflected in each of the Pathways.

The overwhelming response was that this approach to economic analysis and business case development aligns really well with our community values.

The examples provided of community-owned enterprises also helped people see and feel how this community energy study could be implemented, for real!

One critical feature from several groups was that good governance will be key



Next Steps

- Think about:
 - Five energy pathways - what information will enhance your involvement?
 - Organisations and community wealth building - this will be what we work on in Workshop #4
 - Look out for the next video, monthly bulletins and some case studies on business options
 - If you are already involved please reach out to anyone you know who hasn't yet connected with the Community Energy Study and help them to explore and understand this work. Invite them to Workshop #4
- Community Wealth Building - Workshop #4 June 24th, 2023