



Mystery Bay Micro Grid Feasibility Discussion Forum #2



Record of Discussion

*These design briefs developed within communities will contribute to SuRF project
Milestone 5.4 High level concept and design for the eight communities*

CENTRAL TILBA SMALL HALL

17 MAY 2023

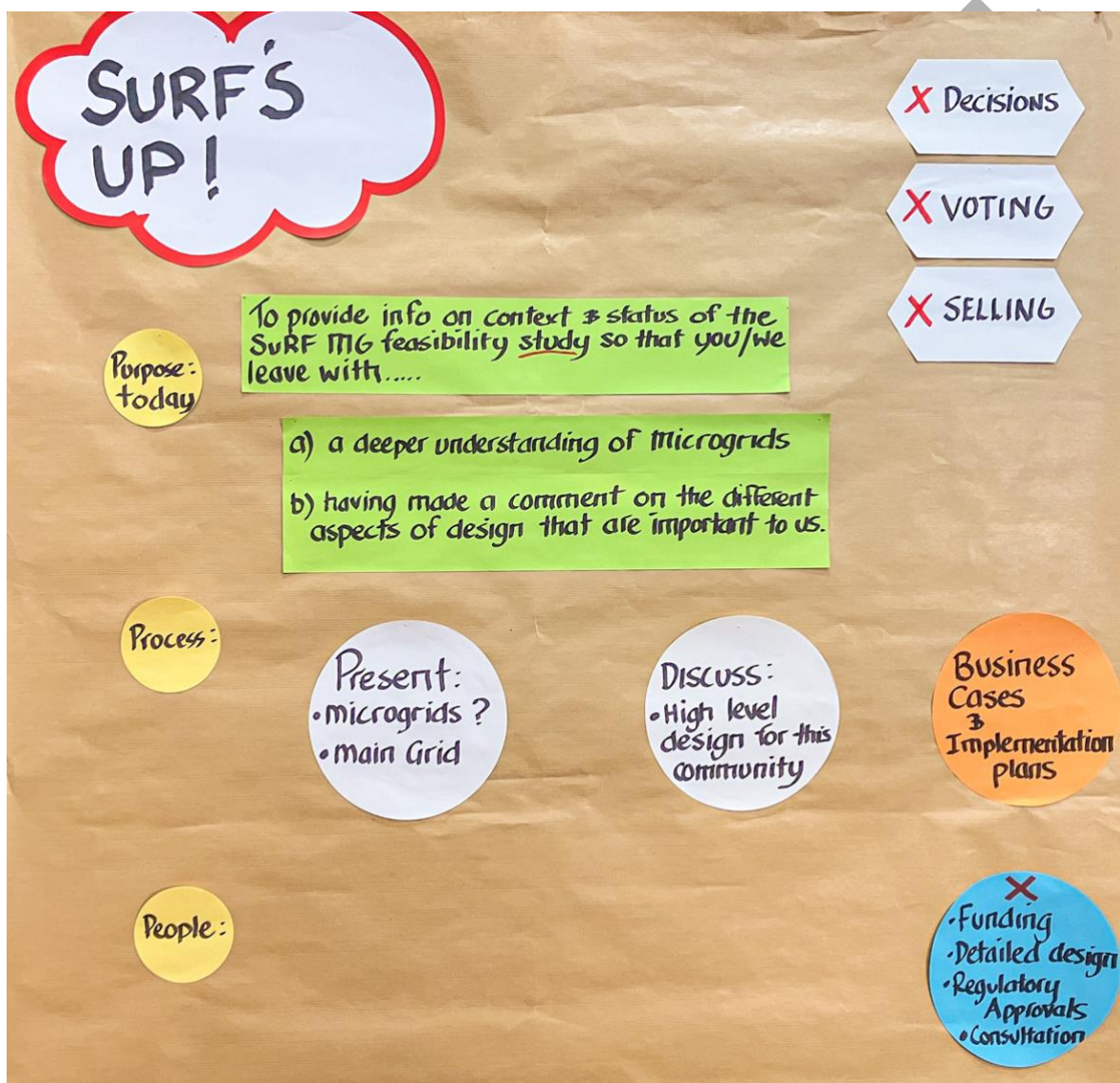
*Presented by & Bjorn Sturmberg (ANU) and Matt O'Neill (Essential Energy).
Moderated by Phil Shorten (SHASA)*

Introduction & Context

The first step of the forum was to introduce the purpose and process of the forum and recognise the group participating in the discussion.

The purpose being to provide information on the context and status of the SuRF Microgrid feasibility study so that those participating leave with a deeper understanding of Microgrids and have a chance to comment on the different aspects of design that are important to them.

The context was provided by way of a series of project fact sheets about the SuRF project.



Moderator Notes...

Introduction and Context

Step One:
The SuRF Project and You!

What should you know about SuRF before you decide how to support this project?

Natural Disaster Resilience is one of SuRF's goals EE

Project Fact Sheet

Surf Community Microgrid (MG) Feasibility Discussion Forum

Funded by:
Department of Industry, Federal Government

Project initiated by:
SHASA - South Coast Health and Sustainability Association

What is Surf?
The Southeast μ -grid Reliability Feasibility (SuRF) is a research project exploring the feasibility of micro-grids in regional contexts that face challenges in resilience from events such as bushfires, specifically in the Eurobodalla shire.

Which communities have been targeted?

- 8 communities were selected
- ANU will be conducting social research and measuring electricity use in two of these communities (Mulligan and Turras Heads)
- SHASA in partnership with ANU will be conducting community forums in Broulee, South Durras, Congo, Bodalla, Mystery Bay, Central Tilba and Tilba Tilba.

What is a microgrid?
A microgrid is a small electricity grid which can operate as an independent system (with its own sites where power is produced, stored and consumed) and/or be connected to the main grid. More information: <https://tsupp.com/research/projects>

Who are the project partners?

Lead partner:

- Australian National University
- Battery Storage and Grid Integration Program
- SHASA
- essential
- zopen

What are their motives?

- Understand social financial & technical drivers progressing Microgrids (MGs)
- Support sustainable energy solutions in the Eurobodalla
- Recognise motivation of communities to participate and viability of MGs as a component of the Network
- Refine network diagnostic software

PROJECT AIM:
Support regional communities to investigate how microgrids will service their electricity needs.

PROJECT OBJECTIVES:

1. Develop high level microgrid design options
2. Produce feasibility business cases (cost and benefits)
 - Cost of major equipment, balance of components
 - Design work, gaining regulatory approvals
 - Installation, operation and maintenance

Community participation

- Community planning groups,
- Feasibility discussion groups,
- Electricity monitoring devices installed 80 local sites,
- Social Research

Moderator Notes...

FEASIBILITY

Introduction and Context

Step One: The SuRF Project and You!

What should you know about SuRF before you decide how to support this project?

What happens after SuRF finishes?

- SuRF ends 30 April 2024
- Then what.....?
- Dept industry hardware fund
- ARENA hardware fund
- Funding available now: <https://arena.gov.au/funding/regional-australia-microgrid-pilots-ramp/>
- Community planning groups may undertake further consultation of MG designs to identify preferred option
- Communities have a feasibility study to offer to funders to progress
- Other communities have detailed intelligence & tools to inform how they may go about their own feasibility investigations
- Regulators will consider changes to energy regulations informed by this feasibility study
- Essential Energy will consider community aspirations for ongoing improvements to the network

Regional Australia Microgrid Pilots Program

What happens after SuRF finishes?

Should the community be happy with their microgrid option, they can take the business case study and feasibility study and apply for the next round of Government funding and start community consultation for implementation.

Regional Australia Microgrid Pilots Program

In October 2020, the Australian Government announced the \$20 million Regional Australia Microgrid Pilots Program (RAMP) to support pilot demonstration of microgrid in regional and remote areas.

You can find more information here: <https://arena.gov.au/funding/regional-australia-microgrid-pilots-ramp/>

Why SuRF study is important to Essential Energy

- To understand the technical, social and economic viability of microgrids
- To recognize where, why, how and type of microgrids fit across diverse communities and our network
- To tap data driven knowledge on how microgrids could increase resilience and reduce reliance on long sections of network
- Opportunity to influence governing bodies (Such as the Australian Energy Regulator and Australian Energy Market Operator)

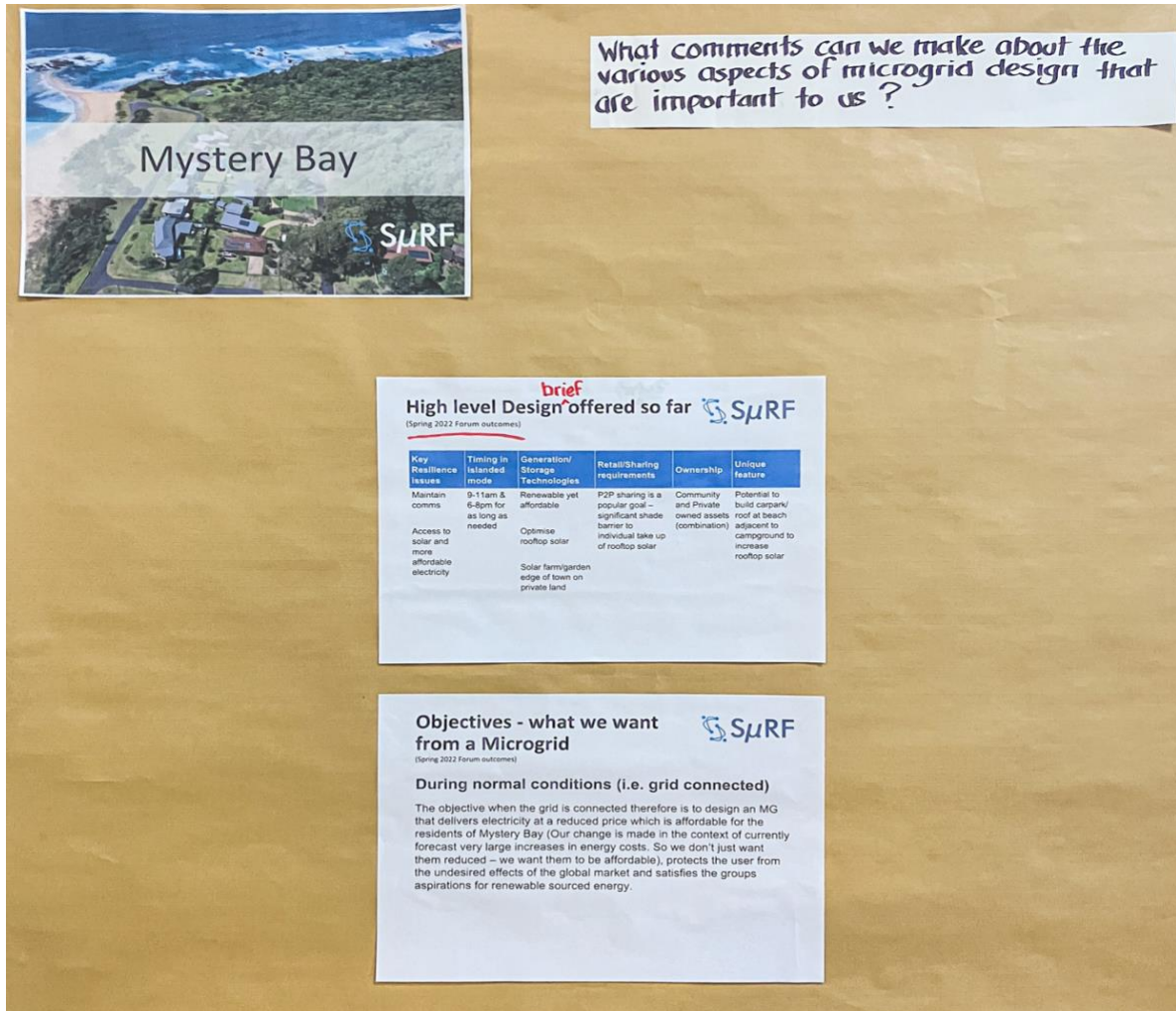
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Moderator Notes...

FEASIBILITY

STEP 1

Design Objectives from Round 1 Community Discussion Group



Moderator Notes...

FEASIBLE

STEP 1

Design Objectives from Round 1 Community Discussion Group

Design Brief:
from community discussions 2022

What comments can we make about the various aspects of microgrid design that are important to us?

Objectives - what we want from a Microgrid
(Spring 2022 Forum outcomes)

During normal conditions (i.e. grid connected)

- Sharing energy is a popular goal
- Renewable and affordable
- Community owned rather than third party
- More Renewable rather than fossil fuelled
- Optimise use of solar power and reduce electricity costs

Objectives - what we want from a Microgrid
(Spring 2022 Forum outcomes)

During emergencies (i.e. islanded)

The aim is to develop an alternative electricity supply system (or improve existing) to increase the level of satisfaction of the community and meet all of their needs and wants in both the immediate and long-term future.
(Page 6 info)

These needs include avoid wasting frozen food, the need to maintain internet/comms so that households and businesses do not suffer and that water supply via pressure pumps continue to operate for those who are preparing and/or fighting fires. (Page 6 info)

Objectives - what we want from a Microgrid
(Spring 2022 Forum outcomes)

During normal conditions (i.e. grid connected)

- A reliable, fireproof, net zero emissions system
- Protect me from volatility of global market
- 100% self-sufficient – produce (electricity) energy for all of my needs plus sell to cover costs.
- To be able to charge an EV and to be functional during long blackouts

(Page 7-12 info)

Objectives - what we want from a Microgrid
(Spring 2022 Forum outcomes)

During emergencies (i.e. islanded)

The objective when the MG is in islanded mode is to design a system that supplies electricity for minimal power supply for essentials i.e. fridge, water, batteries, phone to recharge and limited power points for lighting and stove top (not oven) for all electricity users in MB. (Page 9 info)

A timeframe has been offered for households to access MG generated power - (9am-11am & 6pm-8pm) for as long as needed. However, that regime for limited domestic access may not work for businesses such as the accommodation businesses of Oakleigh Farm and Mystery Bay Cottages, which may need an alternative regime.

Objectives - what we want from a Microgrid
(Spring 2022 Forum outcomes)

During normal conditions (i.e. grid connected)

A sharing system accessing electricity from optimised rooftop PV may be the operating system that facilitates the desire for cheaper kWh's as well as accessing power from the MG during peak electricity periods during the day.

A system that charges the community owned battery from the main grid when electricity prices are lower. A system that allows community access to that battery power when main grid electricity is at higher prices (during peak periods) is also desirable.

Objectives - what we want from a Microgrid
(Spring 2022 Forum outcomes)

During emergencies (i.e. islanded)

The electricity must be generated using renewable sources, solar wind and hydro have been flagged.

Some if not all assets should be community owned (who operates is not clear)

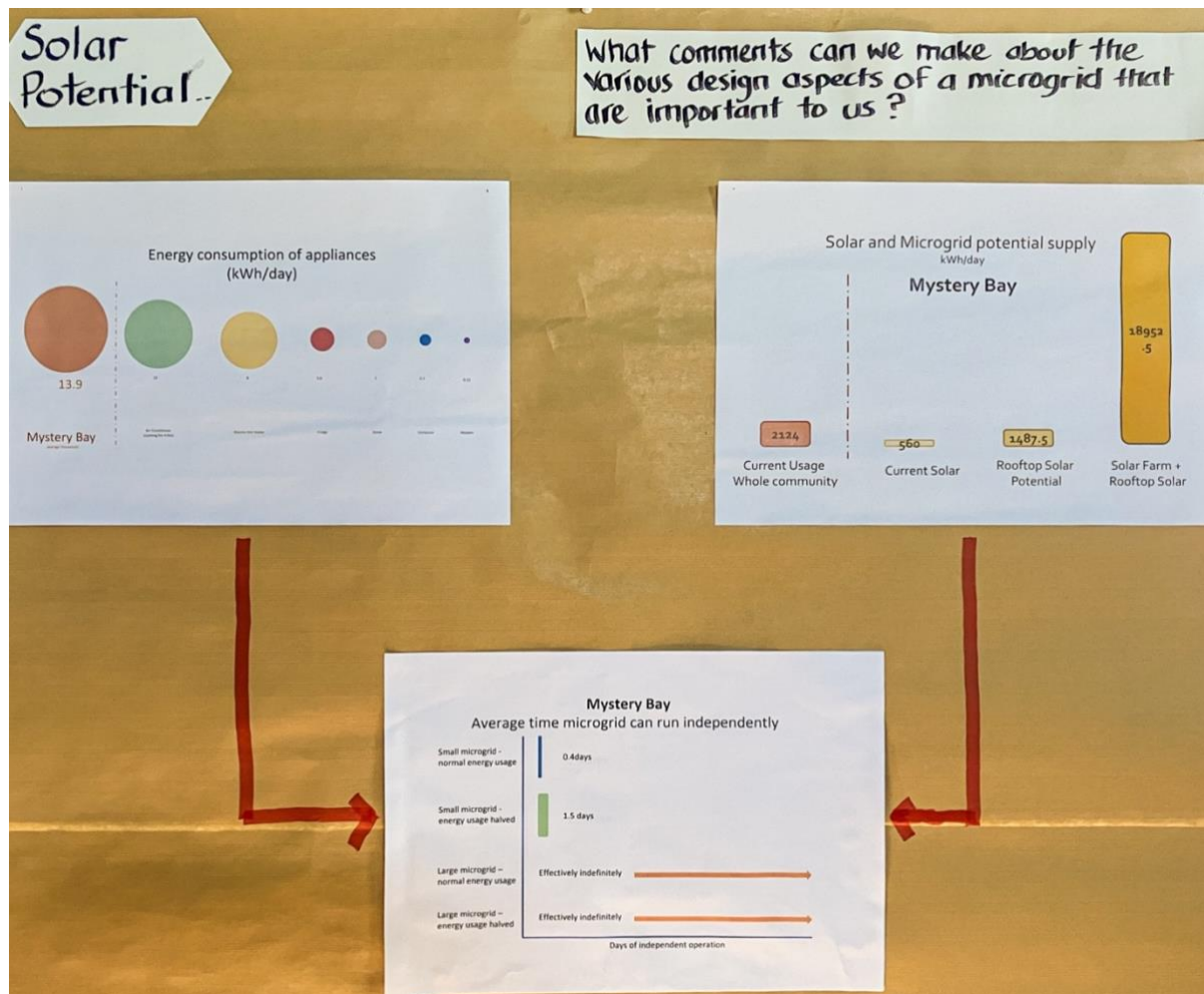
(Page 11 Discussion Forum)

Moderator Notes...

STEP 2

Analysis of solar potential within the community

Analysis showing the potential generation available from rooftop solar and the time the microgrid could operate in islanded mode.



Moderator Notes...

The analysis suggests that battery offered in the microgrid design by the SuRF team will provide almost half (0.4) a day of electricity in islanded (switched off from main) during a main grid outage.

If the community was to restrict their usage by 50% then the islanded time could be extended to 1.5 days

STEP 3

Small Microgrid: Design brief offered from Rd 1 community discussion group

The design brief was informed by the outcomes from the Round 1 consultations held during the Spring of 2022.

Design Brief:
Small MG.

What comments can we make about the various design aspects of a microgrid that are important to us?

Mystery Bay SMALL Type 2 MG Mudmap
(from Rd 1 discussions held Spring 2022)

Residents with/without solar

Solar Garden (private land small solar farm)

Optimised Existing Rooftop Solar

CONTROL SYSTEM

MAIN GRID

Distributed batteries on private land or public land (council)

Mystery Bay SMALL Type 2 MG Guidelines
(from Rd 1 discussions held Spring 2022)

- We should have a system which can cater for a variety of emergencies so that it is operable for bushfires, storms, short outages ('design concept')
- We should ensure that the design concept can cater for general power, phones, possible telco tower/small cell network and pump for village water supply so that it is adaptable to the need
- We should ensure the design concept services essential household needs - some lights and power outlets, septic/biobicycles, refrigeration, some cooking so that households can function
- We should have controls in the design concept which limit access by time for households (9am-11am & 6pm-8pm) or on the power board so that emergency power is equitably shared and battery size/cost is managed.

Mystery Bay SMALL Type 2 MG Guidelines
(from Rd 1 discussions held Spring 2022)

- However, that regime for limited domestic access may not work for businesses such as the accommodation businesses of Oakleigh Farm and Mystery Bay Cottages, which may need an alternative regime.
- We should have access to control technologies that allow us to switch off from the main power supply so that we have access to renewable batteries in case of broader emergencies

Moderator Notes...

FEASIBILITY

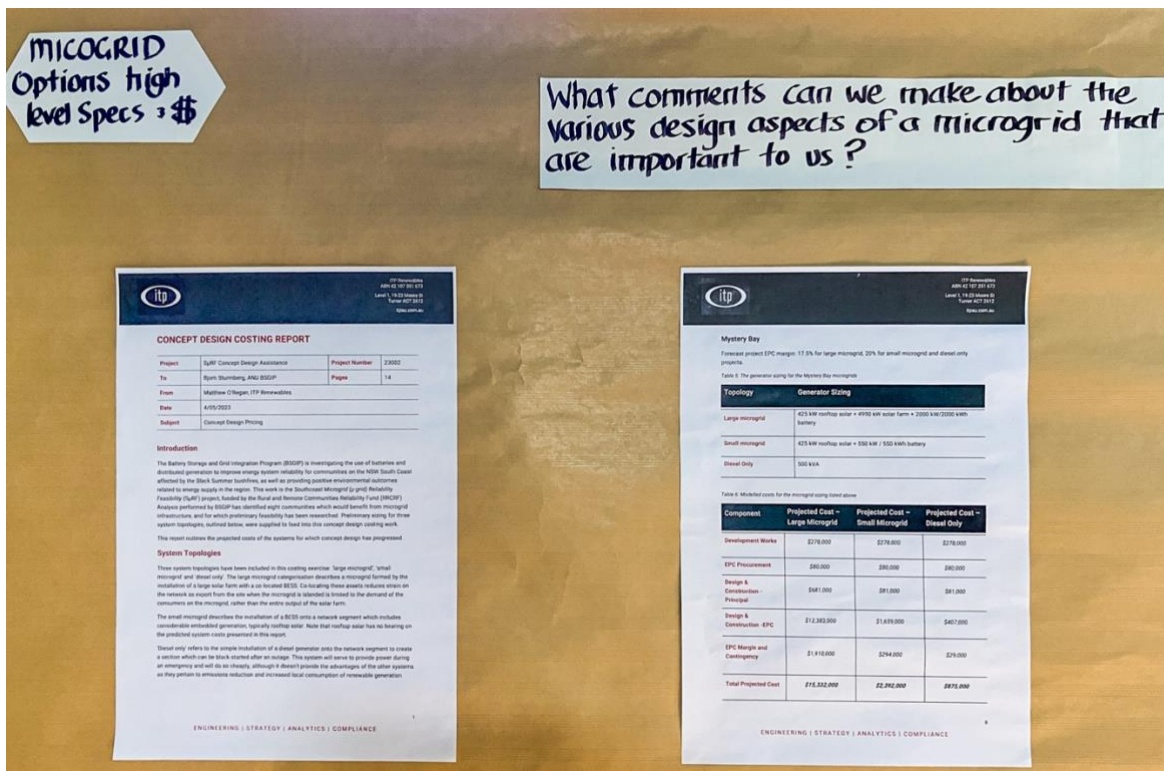
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STEP 3

Small Microgrid: High Level Design Concept

Technologies with technical specifications and costings compiled by the SuRF team for the small Microgrid were made available for comment.



Moderator Notes...

STEP 4

Large Microgrid: Design Brief offered from Rd 1 community discussion group.

The design brief was informed by the outcomes from the Round 1 consultations held during the Spring of 2022.

Design Brief
Large MFG

What comments can we make about the various design aspects of a microgrid that are important to us?

Mystery Bay LARGE Type 3 MG Mudmap
(from Rd 1 discussions held Spring 2022)

SuRF

OPTION A
Solar farms + battery farms in appropriate land eg. Outwash Farm

OPTION B
Distributed Solar Banks 48 solar panels, solar gardens

OTHER OPTIONS
Hydro? Wind?

OPTION C
Beach carpark roof or high ground carport (COUNCIL OWNED)

Distributed batteries in various locations in Mystery Bay (4 or 3 batteries?)

Optimised Existing Rooftop Solar (those who opt in)

Central battery at our Mystery Bay Rd and Colvener Dr (COUNCIL LAND Lot 319 H-DPT52155)

Phone Tower (for emergencies) and consistent access

Campers - EV charging station at beach

MAIN GRID

CONTROL SYSTEM

Mystery Bay LARGE Type 3 MG Guidelines
(from Rd 1 discussions held Spring 2022)

- We should have a microgrid that ensures capacity to run hot water, lights, bicycle, communications so that the community has a reliable power supply
- We should configure the microgrid to service our peak load under normal operating conditions so that we have affordable energy and save money
- We want the technology to manage the investment of those generating power to incentivise them so that as many residents as possible will invest/engage in access i.e. price parity with generators. Wholesale price.
- We need technologies that recognise our limitations with aspect (many shaded locations) so that we can generate sufficient level of power

(Sourced from Discussion Record Forum Rd 1 documents)

Mystery Bay LARGE Type 3 MG Guidelines
(from Rd 1 discussions held Spring 2022)

- The microgrid should support a phone tower so that we have consistent reliable access to phone services especially in time of emergencies
- We should have distributed generation so that we minimise the visual impact on our scenic environment
- We should have a microgrid that can power electric cars and bikes so that it can accommodate future needs. There are already several residents in Mystery Bay who own electric cars
- We should optimise existing PV → neighbourhoods then connect neighbourhoods so that the system is scalable, low impact, affordable/accessible

(Page 13 Discussion Forum)

(Sourced from Discussion Record Forum Rd 1 documents)

Moderator Notes...

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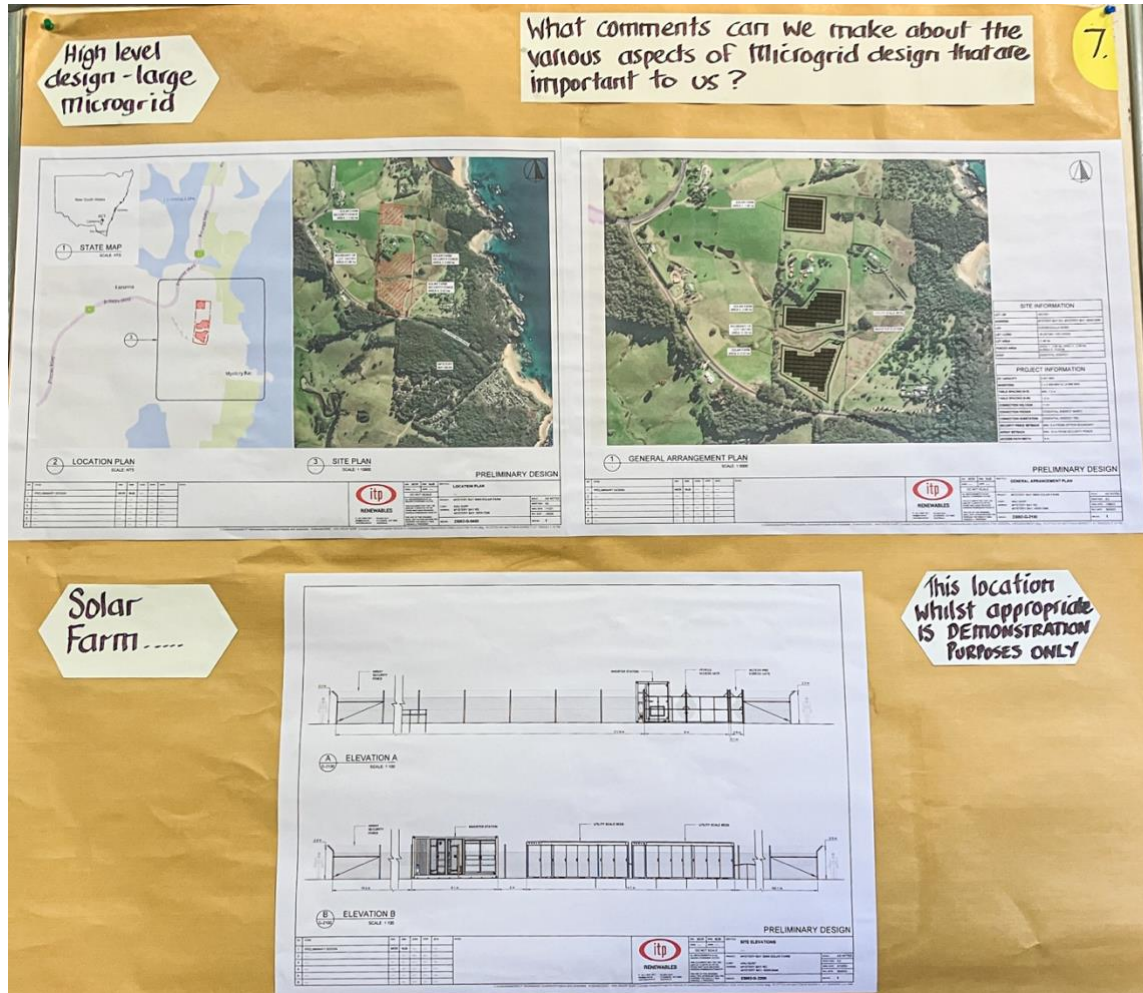
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STEP 4

Large Microgrid: High Level Design Concept

Technologies with technical specifications and costings compiled by the SuRF team for the large Microgrid were made available for comment.

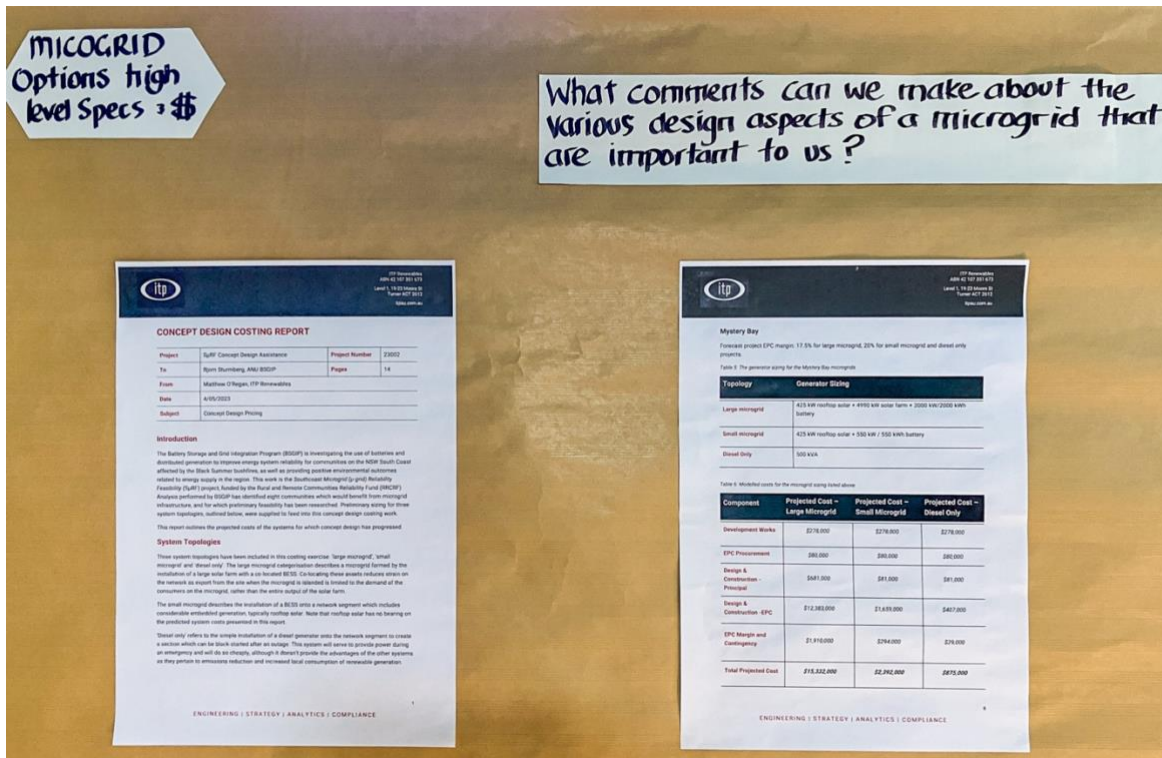


Moderator Notes...

STEP 4

Large Microgrid: High Level Design Concept

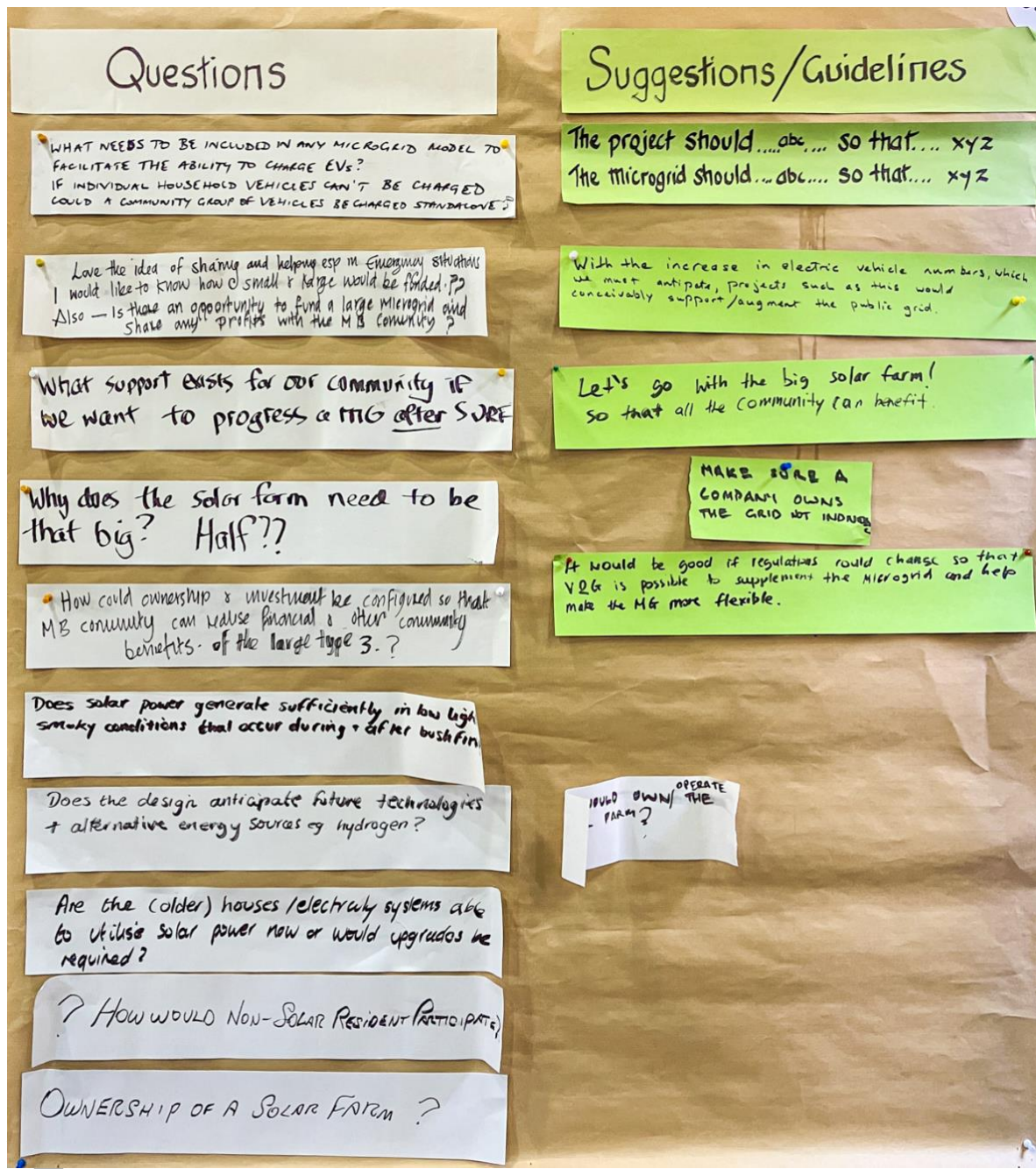
Technologies with technical specifications and costings compiled by the SuRF team for the large Microgrid were made available for comment.



Moderator Notes...

STEP 5

Questions, Suggestions/Guidelines



Questions

WHAT NEEDS TO BE INCLUDED IN ANY MICROGRID MODEL TO FACILITATE THE ABILITY TO CHARGE EVs? IF INDIVIDUAL HOUSEHOLD VEHICLES CAN'T BE CHARGED COULD A COMMUNITY GROUP OF VEHICLES BE CHARGED STANDALONE?

Love the idea of sharing and helping esp in emergency situations I would like to know how small & large would be funded?? Also - Is there an opportunity to fund a large microgrid and share any profits with the MB community?

What support exists for our community if we want to progress a microgrid after SuRF?

Why does the solar farm need to be that big? Half??

How could ownership & investment be configured so that MB community can realize financial & other community benefits of the large type 3?

Does solar power generate sufficiently in low light smoky conditions that occur during & after bushfire?

Does the design anticipate future technologies & alternative energy sources eg hydrogen?

Are the (older) houses / electrical systems able to utilise solar power now or would upgrades be required?

? How would non-solar resident participate?

OWNERSHIP OF A SOLAR FARM ?

Suggestions/Guidelines

The project should... abc... so that... xyz
The microgrid should... abc... so that... xyz

With the increase in electric vehicle numbers, which we must anticipate, projects such as this would conceivably support/augment the public grid.

Let's go with the big solar farm! so that all the community can benefit.

MAKE SURE A COMPANY OWNS THE GRID NOT INDIVIDUALS

It would be good if regulations could change so that V2G is possible to supplement the microgrid and help make the MG more flexible.

WOULD OWN/OPERATE THE FARM?

QUESTIONS

QUESTION	RESPONSE FROM SuRF team
1. What needs to be included in any microgrid model to facilitate the ability to charge EVs?	
2. If individual household vehicles can't be charged could a community group of vehicles be charged standalone?	
3. Love the idea of sharing and helping especially in emergency situations. I would like to know how a small and large microgrid would be funded?	
4. Also – is there an opportunity to fund a large microgrid and share any profits with the Mystery Bay community?	
5. What support exists for our community if we want to progress a microgrid after SuRF?	
6. Why does the solar farm need to be that big? What about half?	
7. How could ownership and investment be configured so that Mystery Bay community can realise financial and other community benefits of the large Type 3?	
8. Does solar power generate sufficiently in low light smoky conditions that occur during and after bushfires?	
9. Does the design anticipate future technologies and alternative energy sources eg hydrogen?	
10. Are the (older) houses/electricity systems able to utilise solar power now or would upgrades be required?	
11. How would non-solar residents participate?	
12. Who has ownership of a solar farm?	
13. Who would own /operate the solar farm?	

SUGGESTIONS/GUIDELINES

The project should ... abc ... so that ... xyz
 The microgrid should ... abc ... so that ... xyz

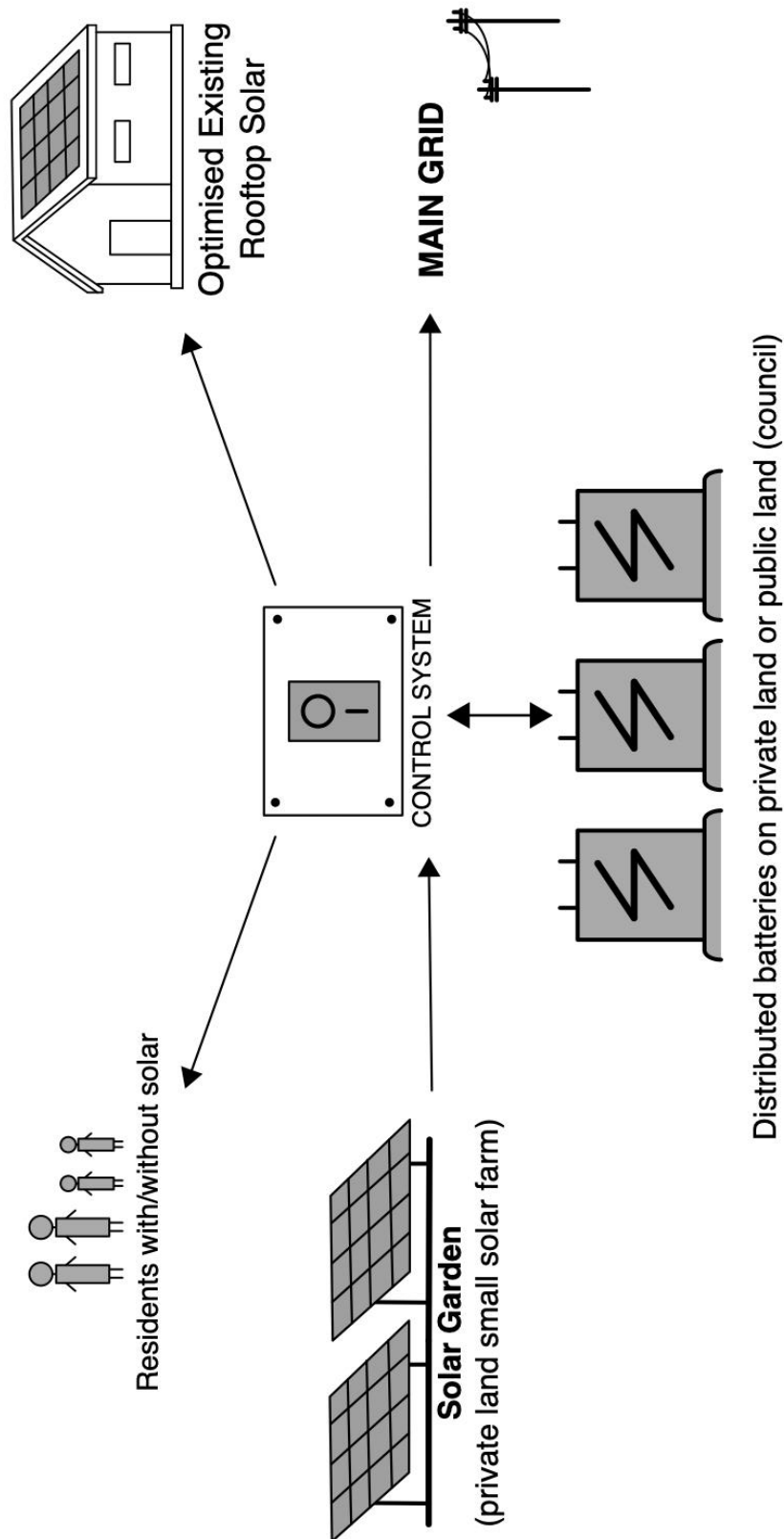
QUESTION	RESPONSE FROM SuRF Project team
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FEASIBILITY STUDY ONLY

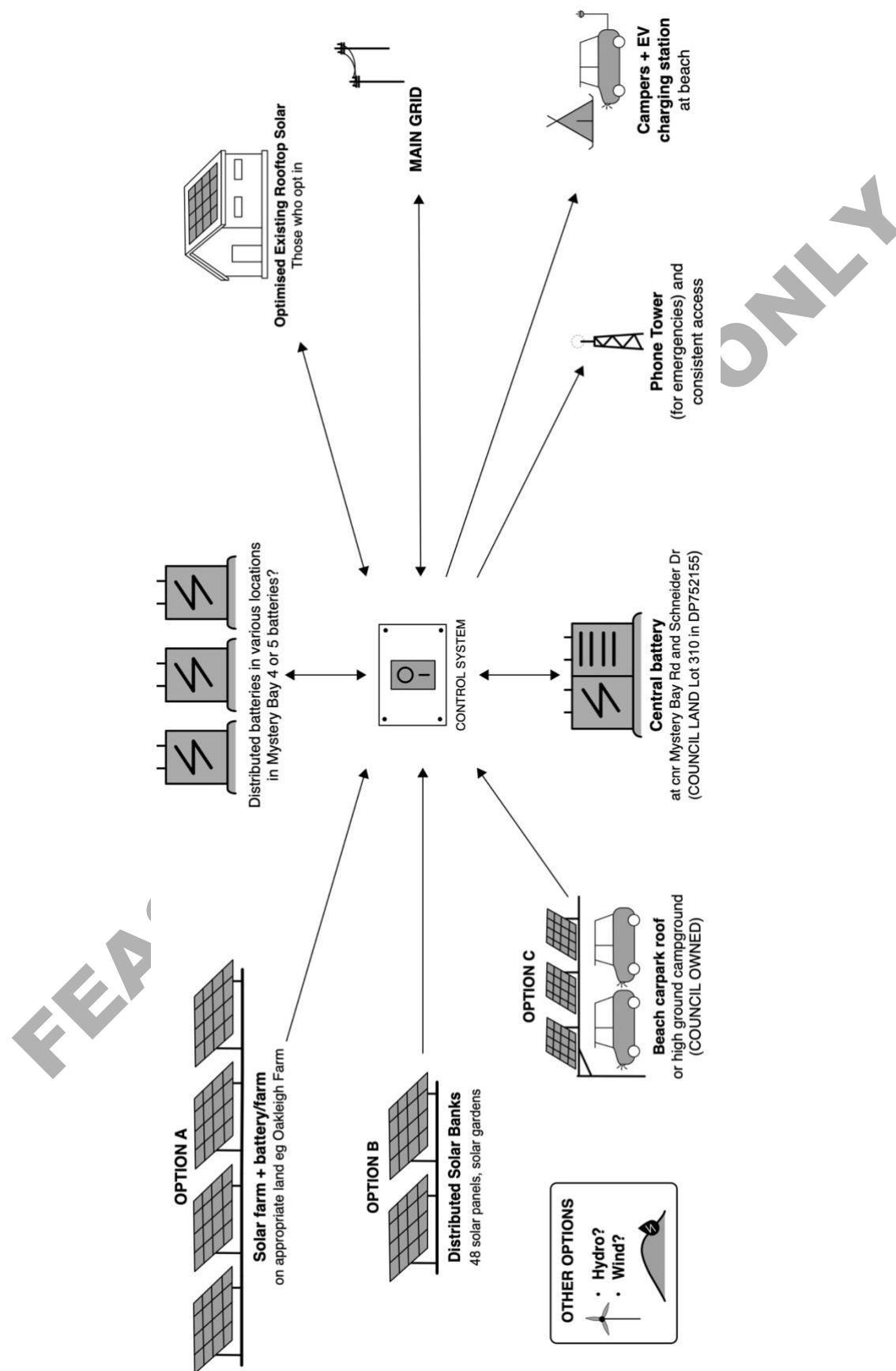
APPENDIX

FEASIBILITY STUDY ONLY

APPENDIX A: SMALL (Type 2) MG design mud map offered from Rd1



APPENDIX B: LARGE (Type 3) MG design mud map offered from Rd1



ACKNOWLEDGEMENTS

The SuRF project team consists of: The Australian National University, SHASA, Zepben and Essential Energy.



The SuRF team would like to thank ITP for their valuable analysis and concept design insights.

The SuRF project team would like to acknowledge and thank the members of the Mystery Bay community who gave their time, provided their insights and support for this important Microgrid feasibility work

*Peter and Jill Gorman
Mark Hanigan
Ann Christiansen?
Stuart Bayley
Mandy Anderson
David Connor
Andrew Duggan
Mark Stubbings
Sue Beitz
Aspa Carter
Mike Roberts
Charmian Roberts
Ian Wood
Fraser Argue?
David Bain
Danielle Butters*

The SuRF project team acknowledges that we meet at various locations across the traditional lands of the Yuin People. We pay our respects to the Elders, past, present and future.

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