Broulee
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

BROULEE PRIMARY SCHOOL LIBRARY

11 MAY 2023

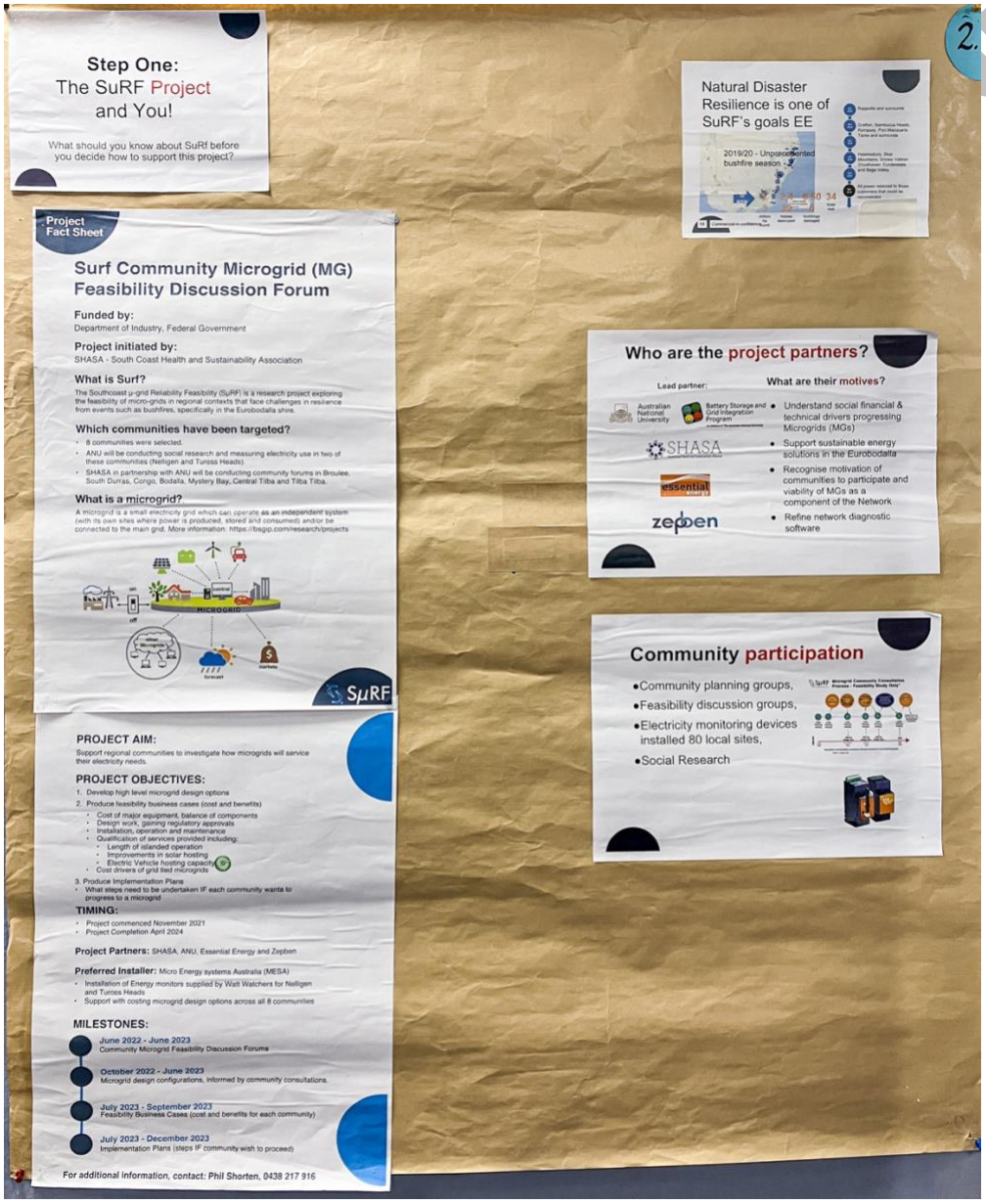
Presented by Hedda Ranson-Cooper & Bjorn Sturmberg (ANU), Warwick Crowfoot & Matt O'Neill (Essential Energy) and Matt O'Regan (ITP). Moderated by Phil Shorten (SHASA)

Introduction and 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.



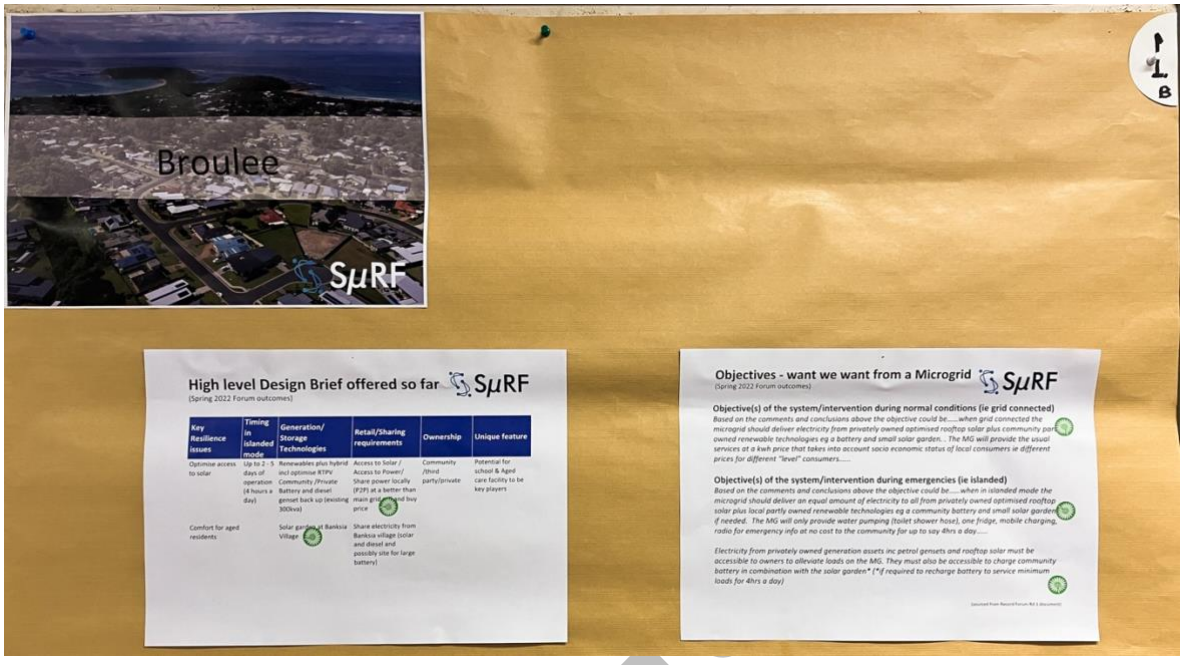
Moderator Notes…

Introduction and Context

Moderator Notes…

STEP 1

Design Objectives from Round 1 Community Discussion Group

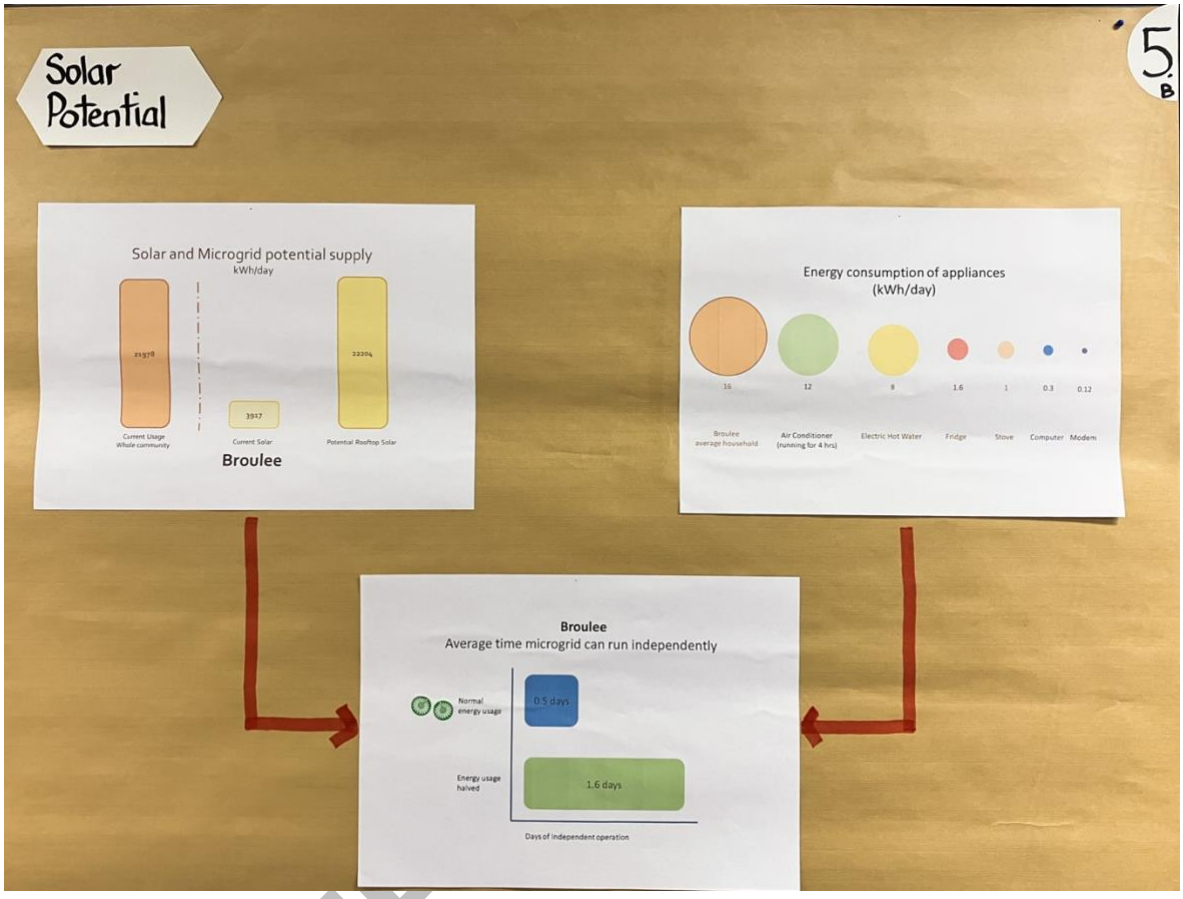


Moderator Notes…

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…

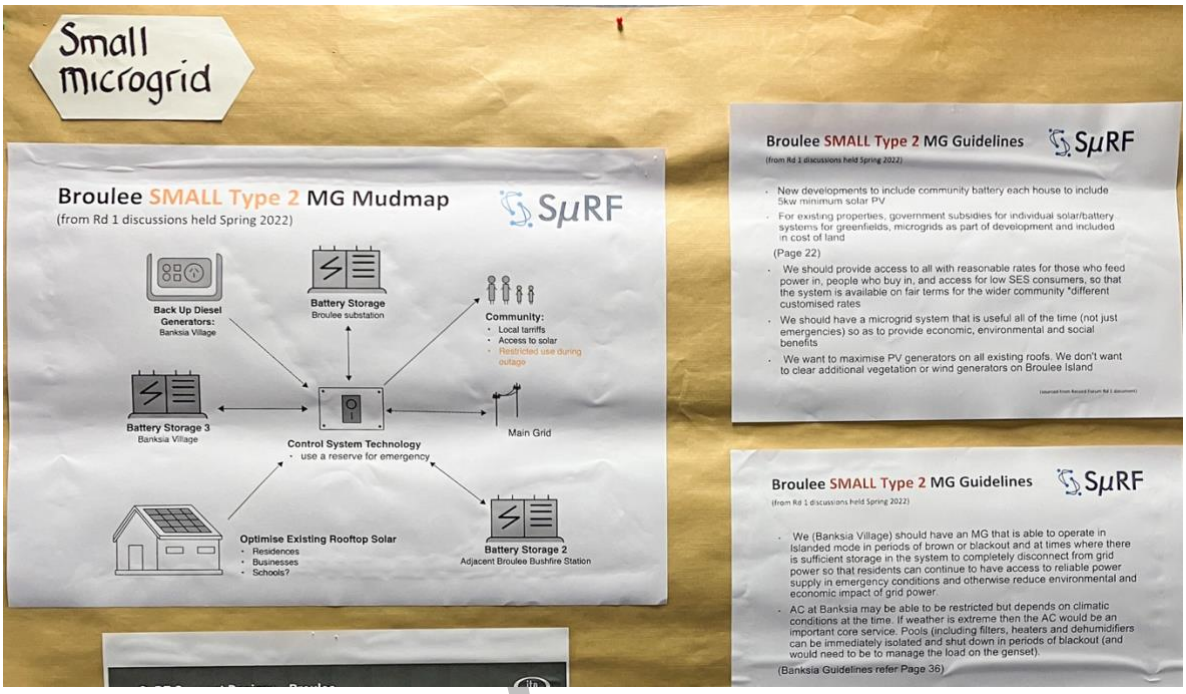
The analysis suggests that battery offered in the microgrid design by the SuRF team will provide almost half (0.5) a day of electricity in islanded (switched off from main) during a main grid outage.

If the community was to restrict their usage by 50% then the islanded time could be extended to 1.6 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.

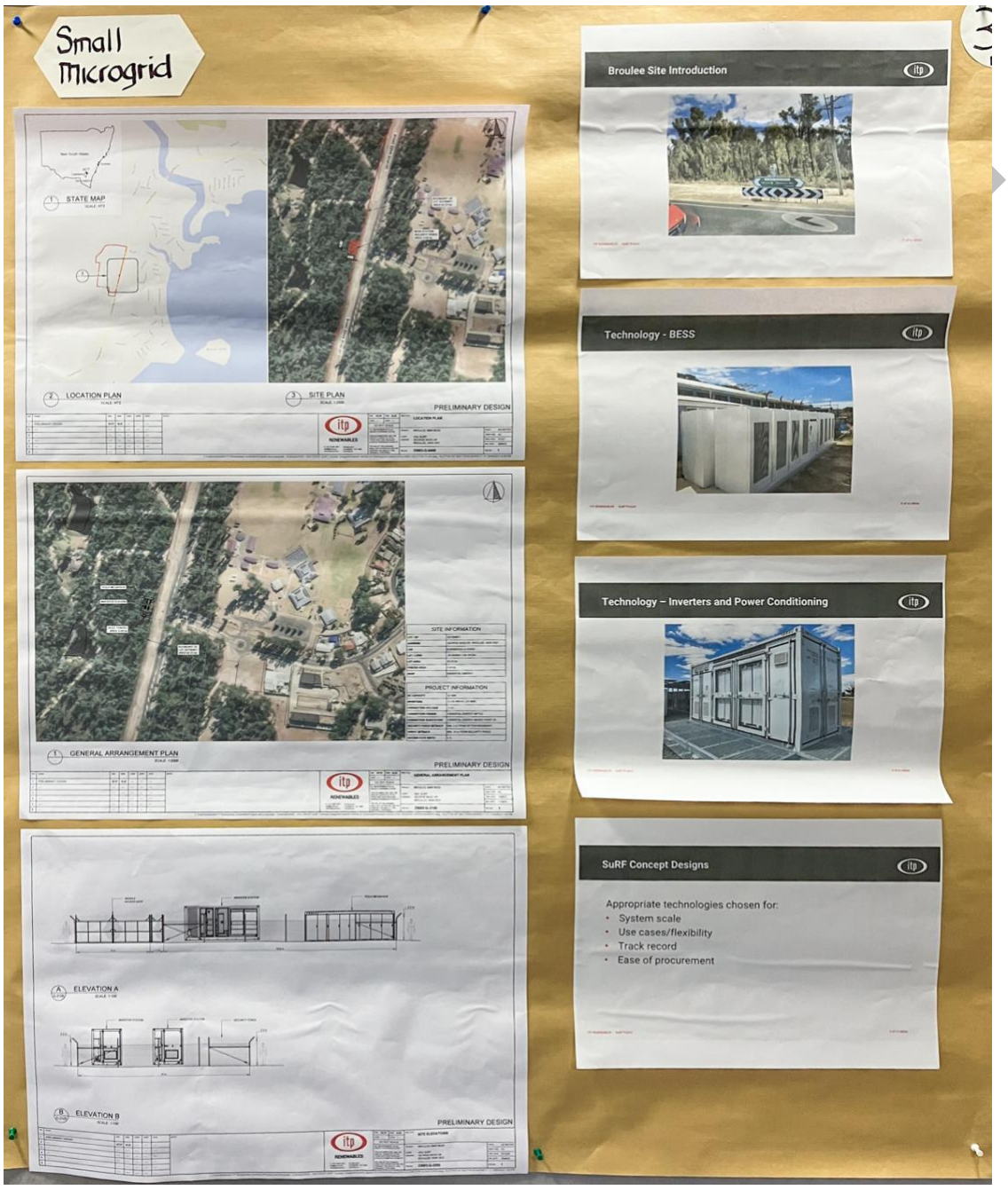


Moderator Notes…

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 3

Small Microgrid: High Level Design Concept

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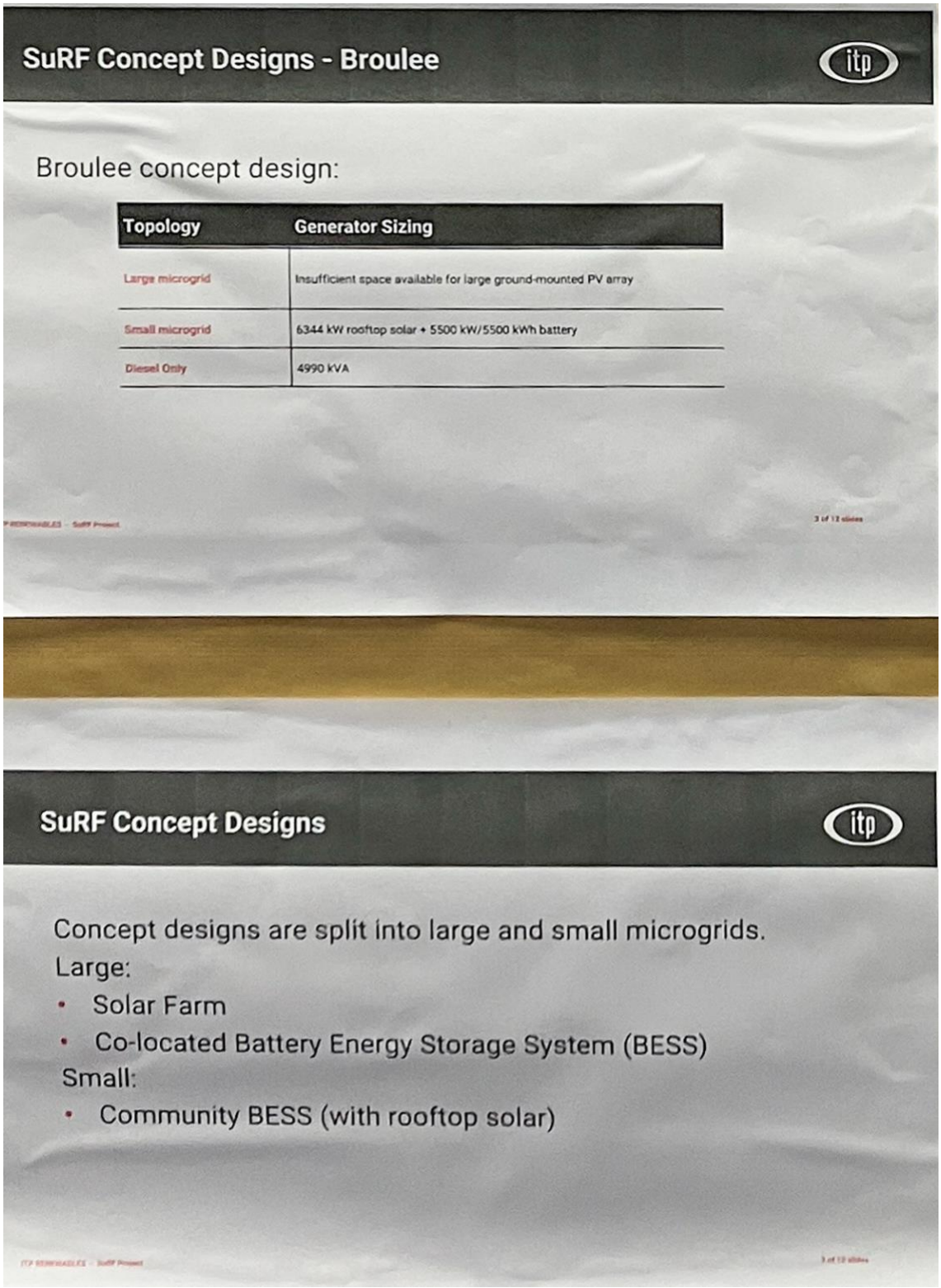


SuRF Concept Designs - Broulee

Broulee concept design:

Topology	Generator Sizing
Large microgrid	Insufficient space available for large ground-mounted PV array
Small microgrid	6344 kW rooftop solar + 5500 kW/5500 kWh battery
Diesel Only	4990 kVA

SuRF Concept Designs

Concept designs are split into large and small microgrids.

Large:

- Solar Farm
- Co-located Battery Energy Storage System (BESS)

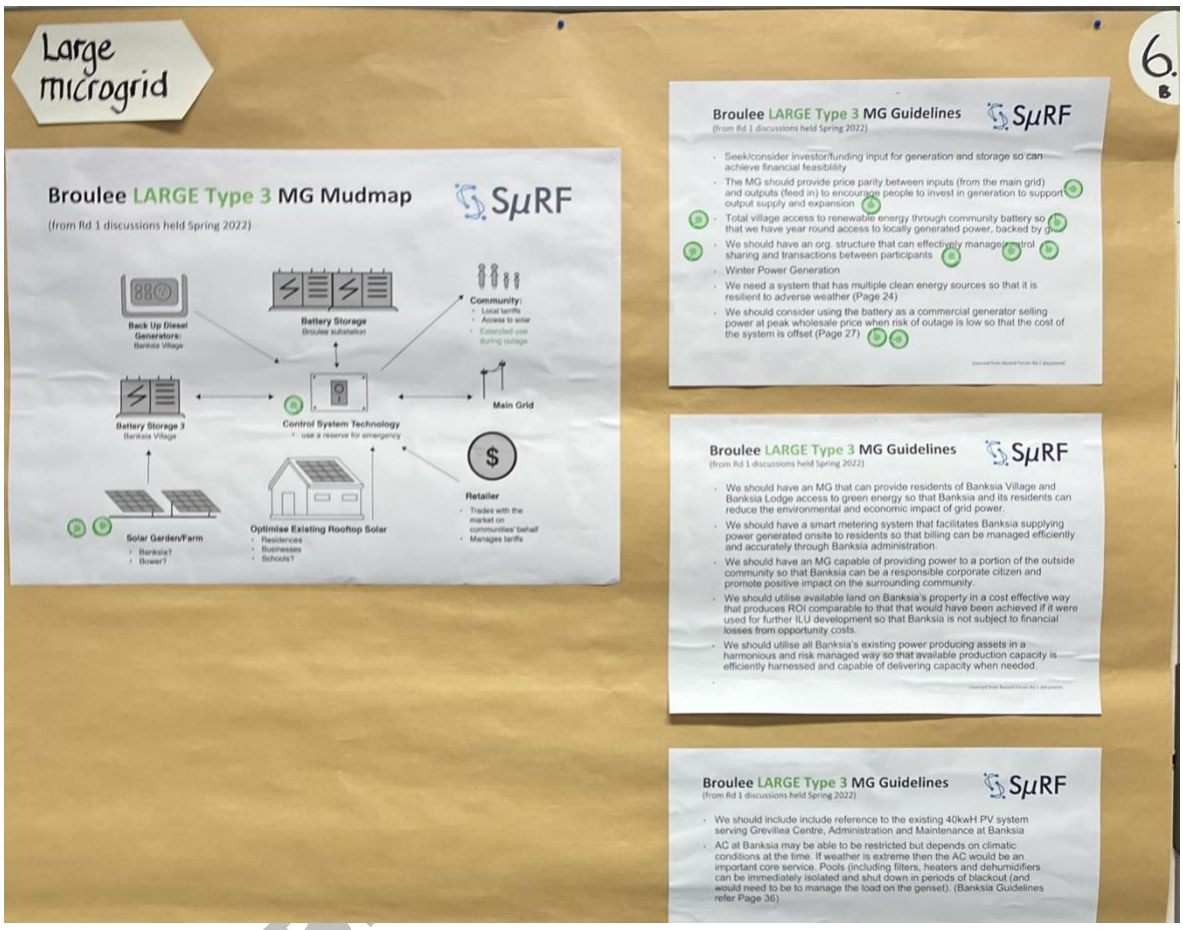
Small:

- Community BESS (with rooftop solar)

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.

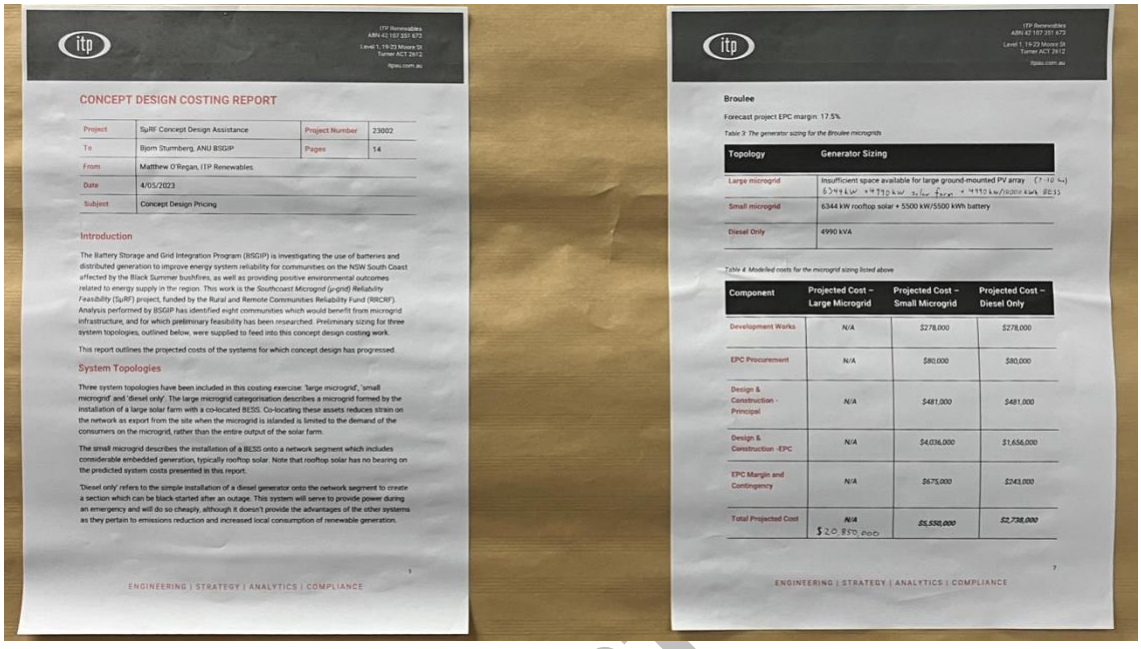


Moderator Notes...

STEP 4

Large Microgrid: High Level Design Concept

Technologies, technical specifications and costings for the large Microgrid were not developed due to the lack of appropriate land being available for a solar farm.



CONCEPT DESIGN COSTING REPORT

Project	SuRF Concept Design Assistance	Project Number	23002
To	Bjorn Sturmberg, ANU BSGIP	Pages	14
From	Matthew O'Regan, ITP Renewables		
Date	4/05/2023		
Subject	Concept Design Pricing		

Introduction

The Battery Storage and Grid Integration Program (BSGIP) is investigating the use of batteries and distributed generation to improve energy system reliability for communities on the NSW South Coast affected by the Black Summer bushfires, as well as providing positive environmental outcomes related to energy supply in the region. This work is the Southcoast Microgrid (µ-grid) Reliability Feasibility (SuRF) project, funded by the Rural and Remote Communities Reliability Fund (RRCRF). Analysis performed by BSGIP has identified eight communities which would benefit from microgrid infrastructure, and for which preliminary feasibility has been researched. Preliminary sizing for three system topologies, outlined below, were supplied to feed into this concept design costing work.

This report outlines the projected costs of the systems for which concept design has progressed.

System Topologies

Three system topologies have been included in this costing exercise: 'large microgrid', 'small microgrid' and 'diesel only'. The large microgrid categorisation describes a microgrid formed by the installation of a large solar farm with a co-located BESS. Co-locating these assets reduces strain on the network as export from the site when the microgrid is islanded is limited to the demand of the consumers on the microgrid, rather than the entire output of the solar farm.

The small microgrid describes the installation of a BESS onto a network segment which includes considerable embedded generation, typically rooftop solar. Note that rooftop solar has no bearing on the predicted system costs presented in this report.

'Diesel only' refers to the simple installation of a diesel generator onto the network segment to create a section which can be black-started after an outage. This system will serve to provide power during an emergency and will do so cheaply, although it doesn't provide the advantages of the other systems as they pertain to emissions reduction and increased local consumption of renewable generation.

ENGINEERING | STRATEGY | ANALYTICS | COMPLIANCE

Broulee

Forecast project EPC margin: 17.5%

Table 3: The generator sizing for the Broulee microgrids

Topology	Generator Sizing
Large microgrid	Insufficient space available for large ground-mounted PV array (7-10 ha) 6344 kW + 4990 kW solar farm + 4990 kW/19200 kWh BESS
Small microgrid	6344 kW rooftop solar + 5500 kW/5500 kWh battery
Diesel Only	4990 kVA

Table 4: Modelled costs for the microgrid sizing listed above

Component	Projected Cost – Large Microgrid	Projected Cost – Small Microgrid	Projected Cost – Diesel Only
Development Works	N/A	$278,000	$278,000
EPC Procurement	N/A	$80,000	$80,000
Design & Construction - Principal	N/A	$481,000	$481,000
Design & Construction -EPC	N/A	$4,036,000	$1,656,000
EPC Margin and Contingency	N/A	$675,000	$243,000
Total Projected Cost	N/A $20,850,000	$5,550,000	$2,738,000

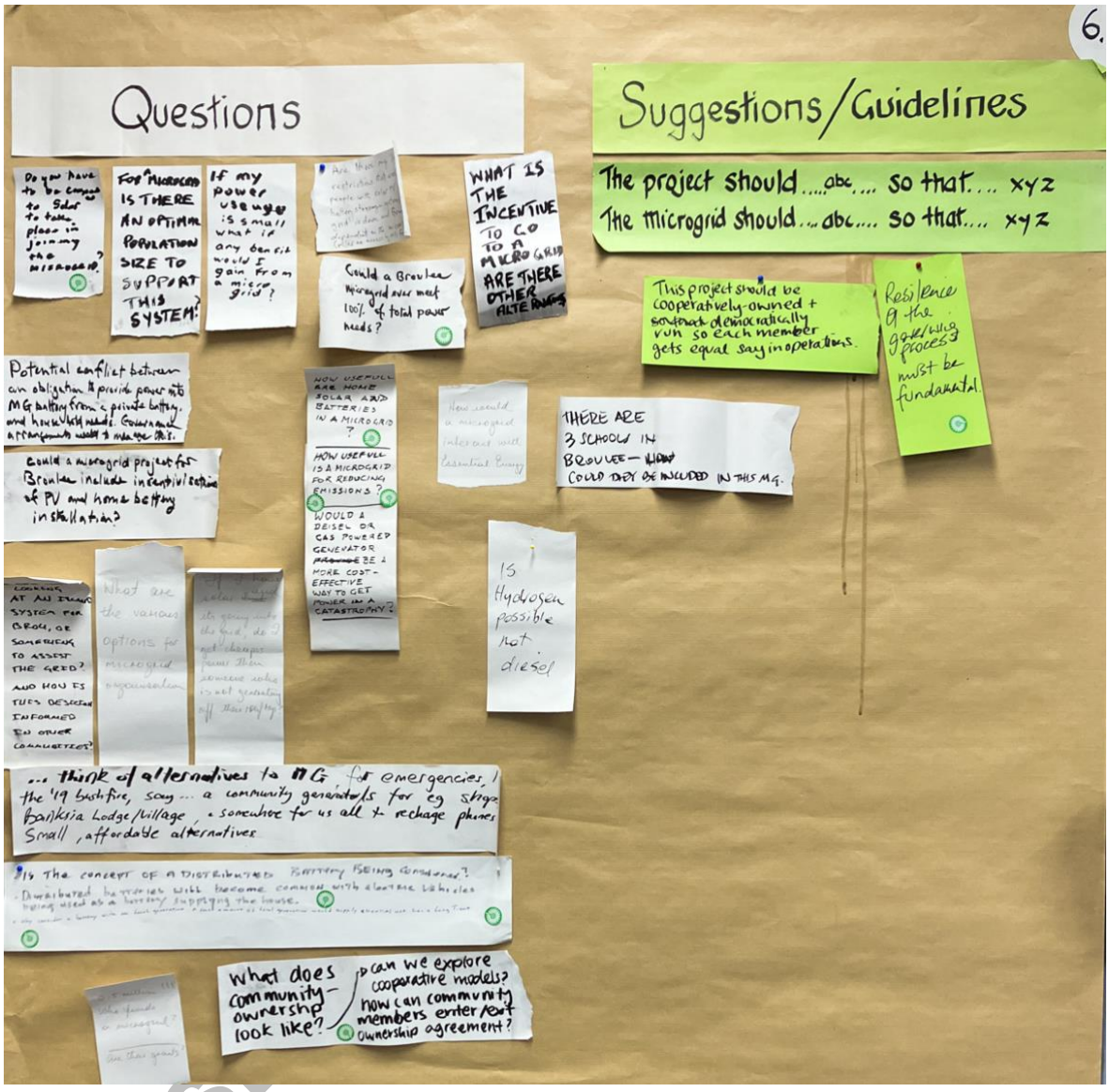
ENGINEERING | STRATEGY | ANALYTICS | COMPLIANCE

Moderator Notes…

The SuRF team will produce alternative Microgrid and other options later that may be suitable for Broulee. These options will be informed by the design guidelines offered during both community forums (Round 1 & 2)

STEP 5

Questions, Suggestions/Guidelines



QUESTIONS

QUESTION	RESPONSE FROM SuRF Project team
1. Do you have to be connected to solar to take place in joining the microgrid?	
2. For a microgrid is there an optimal population size to support this system?	
3. If my power usage is small, what if any benefit would I gain from a microgrid?	
4. Are there any limits or restrictions that would apply to people with solar PV and home battery storage systems when the grid is down and Broulee is dependent on the microgrid? (Rules on access by MG from private systems)	
5. What is the incentive to go a microgrid are there other alternatives	
6. Could a Broulee microgrid ever meet 100% of total power needs?	
7. How useful are home solar and batteries in a microgrid?	
8. How useful is a microgrid for reducing emissions?	
9. Would a diesel or gas powered generator be a more cost-effective way to get power in a catastrophy?	
10. Potential conflict between an obligation to provide power into MG battery from a private battery and household needs. Governance arrangements need to manage this	
11. Could a microgrid project for Broulee include incentivisations of PV and home battery installation?	
12. How would a microgrid interact with Essential Energy?	
13. There are 3 schools in Broulee – could they included in this MG?	

14. Are we looking at an Island System for Broulee or something to assist the grid? And how is this design informed in other communities?	
15. What are the various options for microgrid organisation	
16. If I have solar and it's going into the grid, do I get cheaper power than someone who is not generating off their rooftop?	
17. Is hydrogen possible not diesel?	
18. …think of alternatives to MG, for emergencies, like the '19 bushfire, say… a community generator/s for eg shopsl Banksia Lodge/Village, and somewhere for us all to recharge phones etc. Small, affordable alternatives.	
19. Is the concept of a distributed battery being considered? 20. Distributed batteries will become common with electric vehicles being used as a battery supplying the house 21. Why consider a battery with no local generation. A small amount of local generation would supply essential use for a long time.	
22. 2.5 million!!! Who funds a microgrid? Are there grants?	
23. What does community ownership look like? Can we explore corporate models? How can community members enter/exit ownership agreement?	

SUGGESTIONS/GUIDELINES

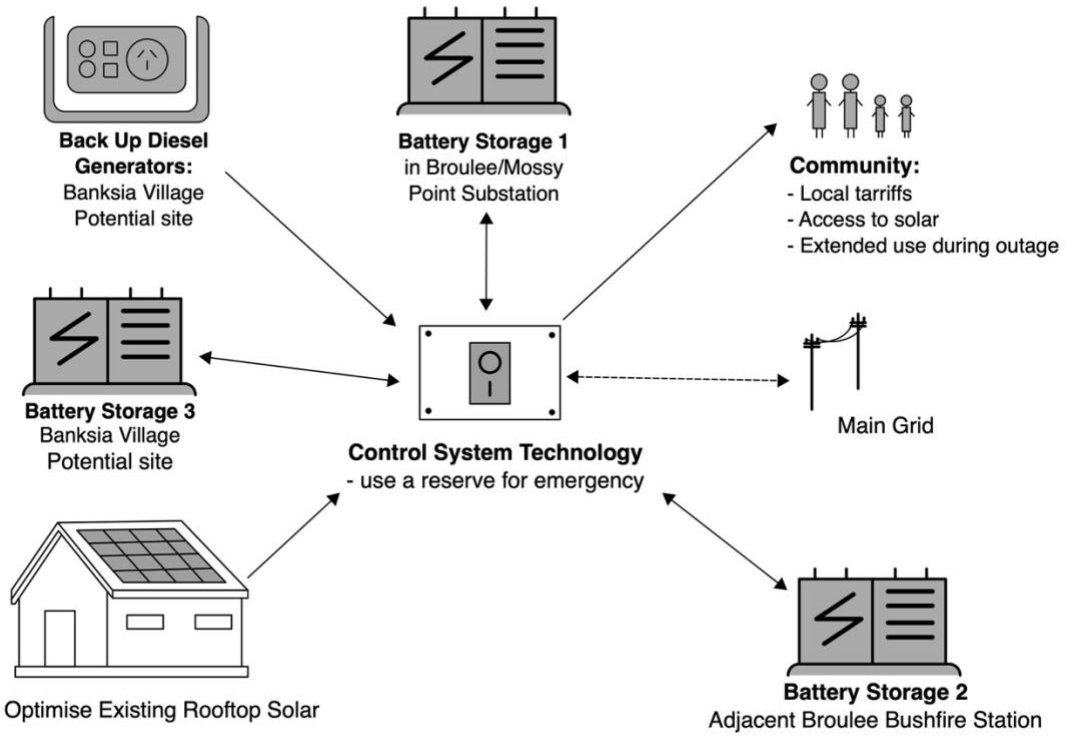
The project should … abc … so that … xyz
The microgrid should … abc … so that … xyz

DESIGN GUIDELINE	Response from SuRF project team
This project should be cooperatively owned and democratically run so each member gets equal say in operations.	
Resilience of the governing process must be fundamental	

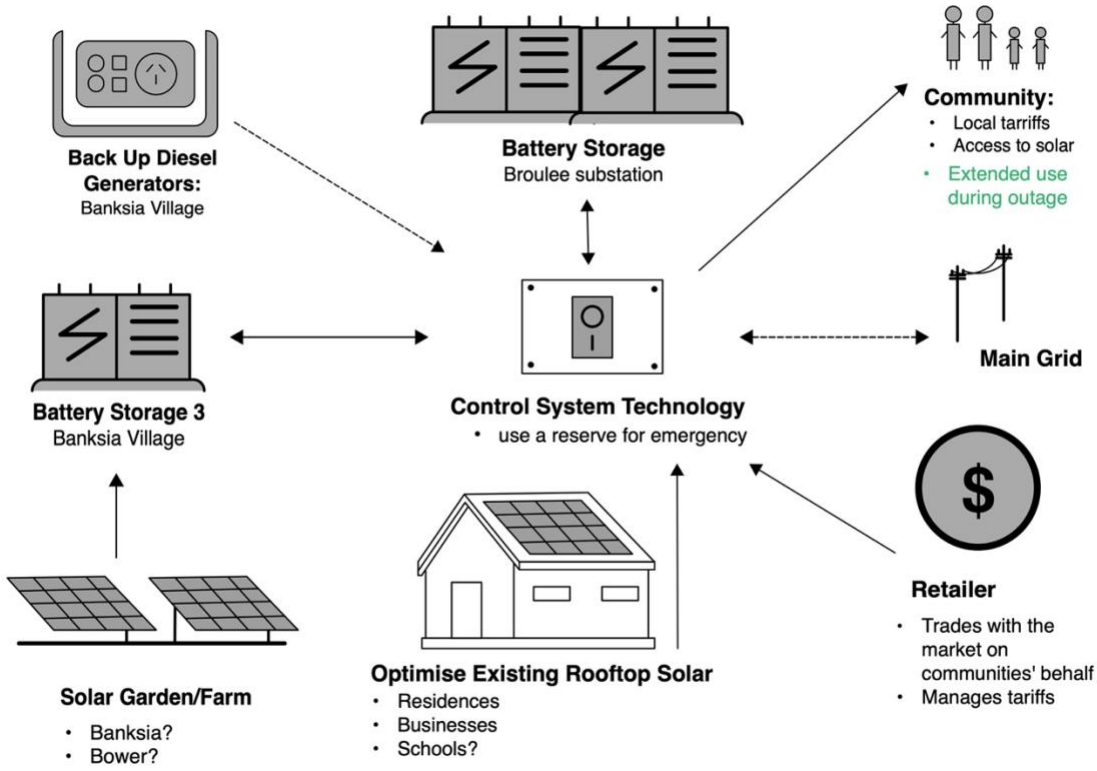
Moderator Notes…

APPENDIX

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 Broulee community participating in Rd2 who gave their time, provided their insights and support for this important Microgrid feasibility work:

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Andy Telfer
Deb Stevenson
Brett Stevenson
Janis Lacey

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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