



Bodalla 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

BODALLA COMMUNITY HALL
18 MAY 2023

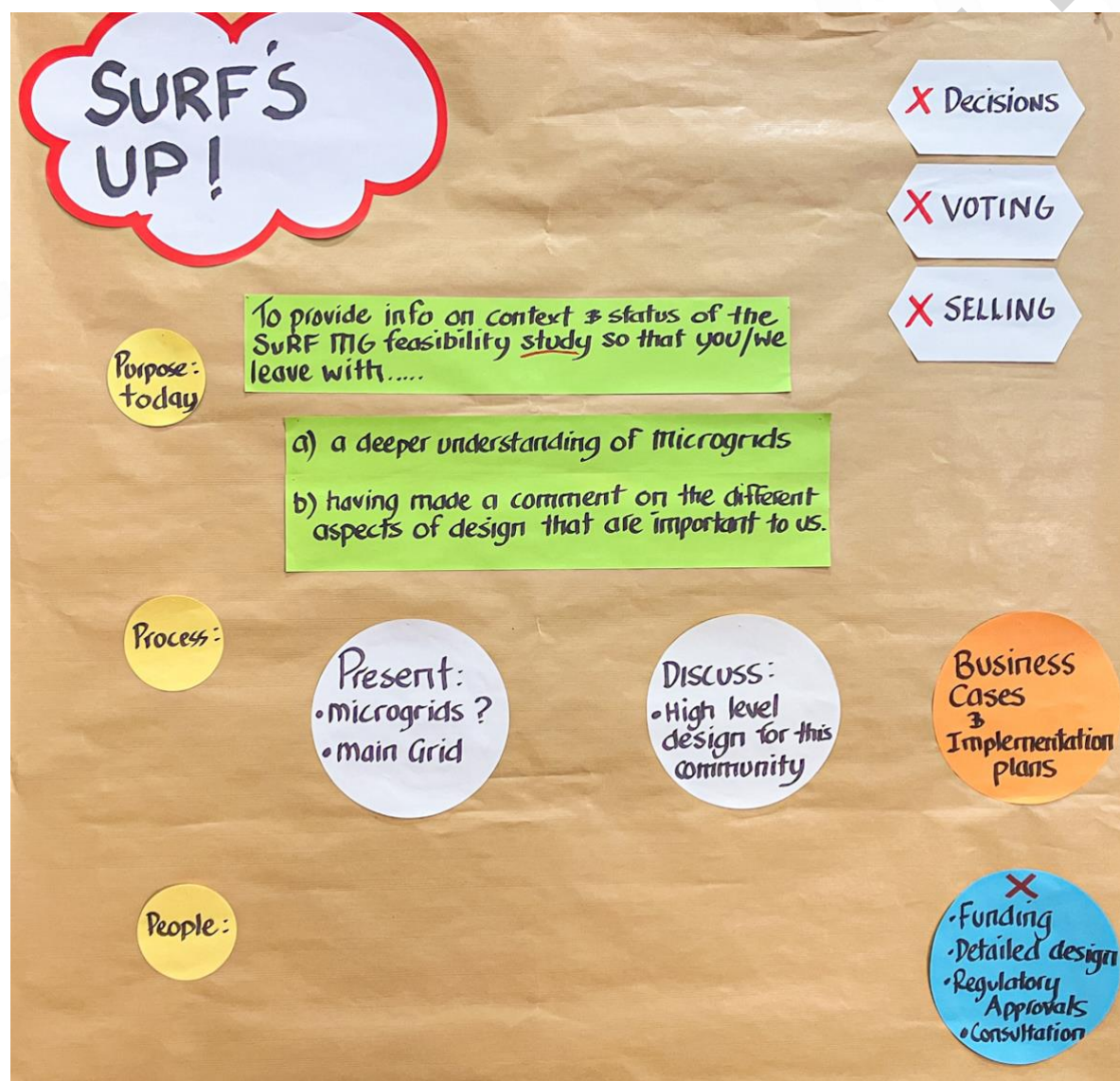
*Presented by & Bjorn Sturmberg (ANU) and Matt O'Neill (Essential Energy).
Moderated by Phil Shorten (SHASA)*

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 Southcoast 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 (Nelligen and Turras Heads).
- SHASA in partnership with ANU will be conducting community forums in Broulee, South Durras, Congo, Bodalla, Mystery Bay, Central Tibba and Tibba Tibba.

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://bsgip.com/research/projects>

Who are the project partners?

Lead partner: Australian National University, Battery Storage and Grid Integration Program

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

Other partners: SHASA, essential energy, zepton

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

PROJECT OBJECTIVES:

- Develop high level microgrid design options
- Produce feasibility business cases (cost and benefits)
 - Cost of major equipment, balance of components
 - Design work, gaining regulatory approvals
 - Installation, operation and maintenance
 - Qualification of services provided including:
 - Length of islanded operation
 - Improvements in solar hosting
 - Electric Vehicle hosting capacity
 - Cost drivers of grid tied microgrids
- Produce Implementation Plans
 - What steps need to be undertaken IF each community wants to progress to a microgrid

TIMING:

- Project commenced November 2021
- Project Completion April 2024

Project Partners: SHASA, ANU, Essential Energy and Zepton

Preferred Installer: Micro Energy systems Australia (MESA)

- Installation of Energy monitors supplied by Watt Watchers for Nelligen and Turras Heads
- Support with costing microgrid design options across all 8 communities

MILESTONES:

- June 2022 - June 2023: Community Microgrid Feasibility Discussion Forums
- October 2022 - June 2023: Microgrid design configurations, informed by community consultations.
- July 2023 - September 2023: Feasibility Business Cases (cost and benefits for each community)
- July 2023 - December 2023: Implementation Plans (steps IF community wish to proceed)

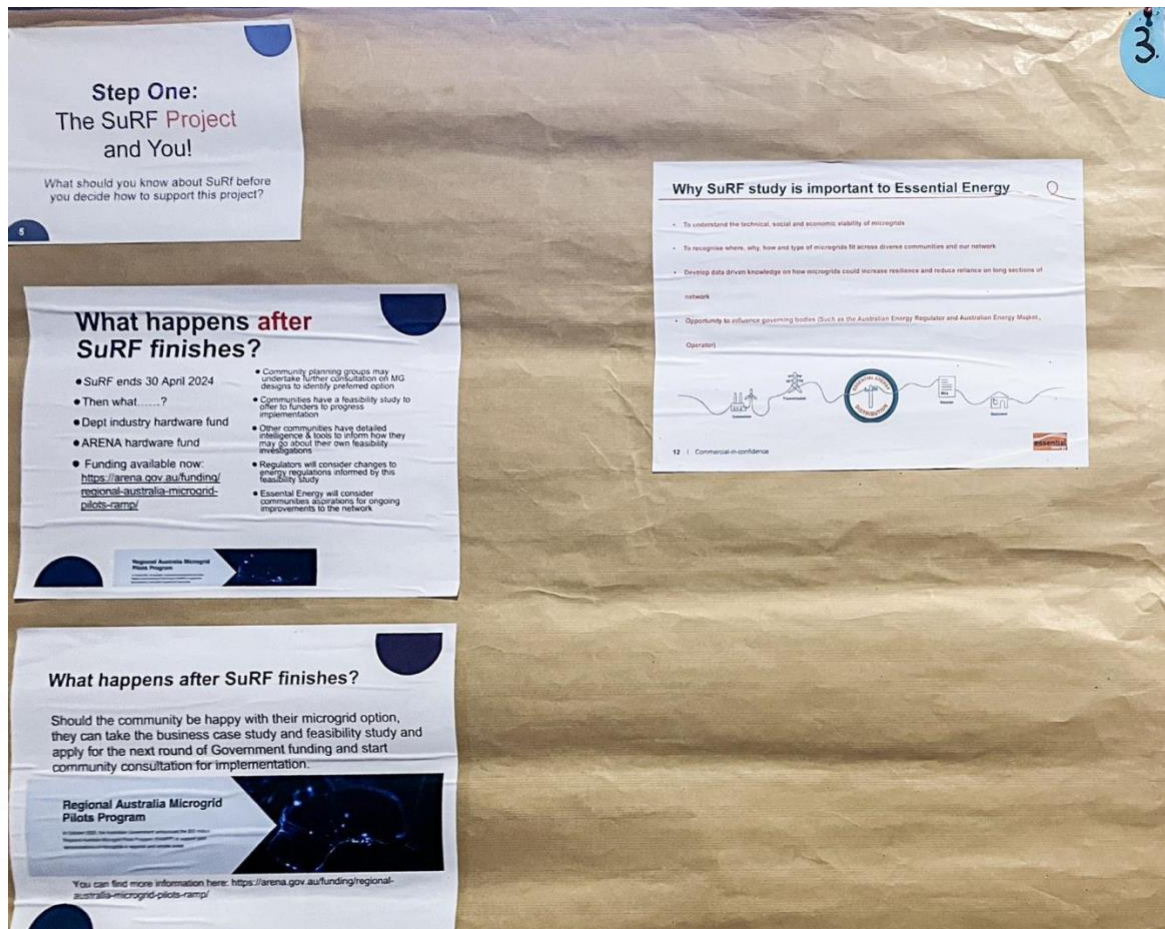
For additional information, contact: Phil Shorten, 0438 217 916

Community participation

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

Moderator Notes...

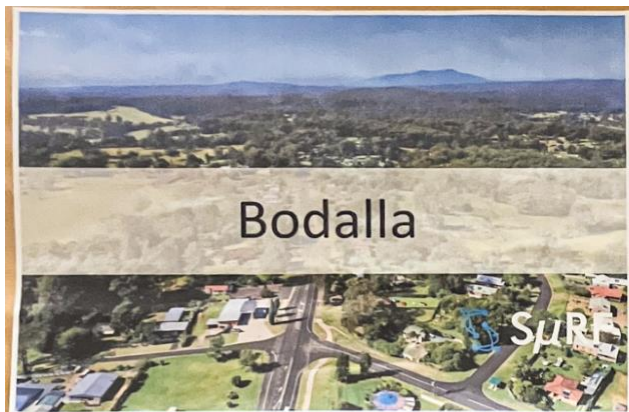
Introduction and Context



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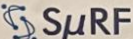
STEP 1

Design Objectives from Round 1 Community Discussion Group



High level Design Brief offered so far 
 (Spring 2022 Forum outcomes)

Key Resilience Issues	Timing in standard mode	Generation/ Storage Technologies	Retail/ Sharing requirements	Ownership	Unique feature
Cost of current supply arrangements (main grid)	4 hrs a day or for a time that exploits tariff structures in favour of users	The Microgrid could be a combination of: A community battery. A community solar farm. A VPP network. A Bidirectional EV charge stations. But not a Rapid style VPP.	P2P sharing desirable. An NFP community retailer maintains a platform with a community subscriber application, allowing for buying/ selling of solar PV, home battery, EV battery energy dynamics. A larger commercial trading entity engaged to represent the parochial Micro Grid supported NFP community retailer on the NEM, to negotiate sale of peak time stored energy inputs and purchasing over demand energy requirements. A parochial NFP community retailer P2P platform could offer a standardised algorithm which is based lowest a collective rather than an individual benefit. (Probably offset against the demands of the NEM traders margin requirement)	Private solar optimised Party community owned solar garden/battery. Subscribers could take advantage of community storage hub peak time sales, community solar inputs for low shoulder tariffs. The hub battery maintain enough capacity to provide a fast response black start buffer until big synchronous generator comes on line. The P2P platform offer flexibility for a user controlled dynamic trading platform, to buying cheap solar inputs selling battery storage at peak times, within the NFP community retailer bounds.	Multiple grids (4) – Main Street (CBD) /South Residential West/ estate/ Farmers WNW

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

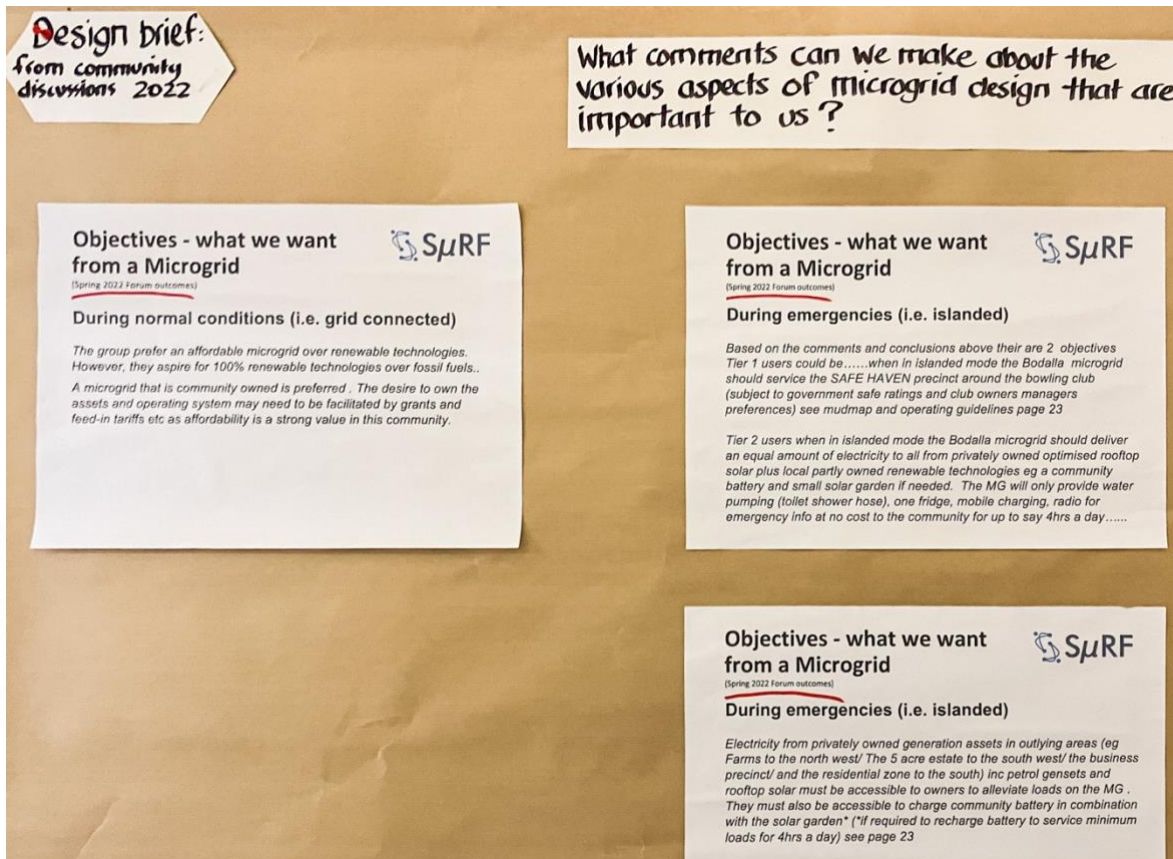
During normal conditions (i.e. grid connected)

Based on the comments and conclusions above the objective could be.....when grid connected the microgrid should deliver electricity at a more affordable rate than the main grid. To support this goal the MG will deliver electricity to the main grid (export) from privately owned optimised rooftop solar plus community owned renewable technologies eg a battery and small solar garden. . The MG will provide the usual services at a kwh price that takes into account socio economic status of local consumers ie different prices for different "level" consumers especially for those that are "disadvantaged in the Bodalla community....."

Moderator Notes...

STEP 1

Design Objectives from Round 1 Community Discussion Group

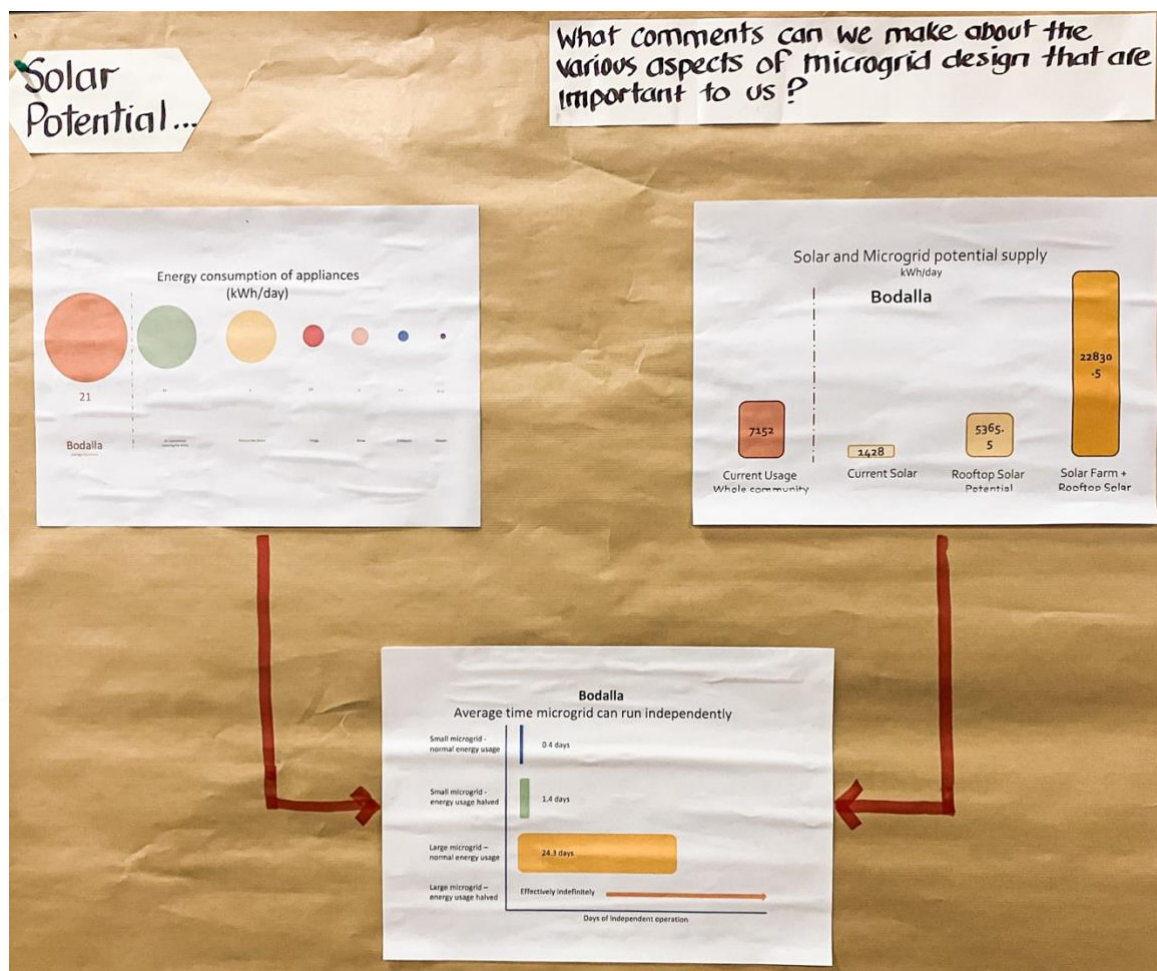


Moderator Notes...

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...

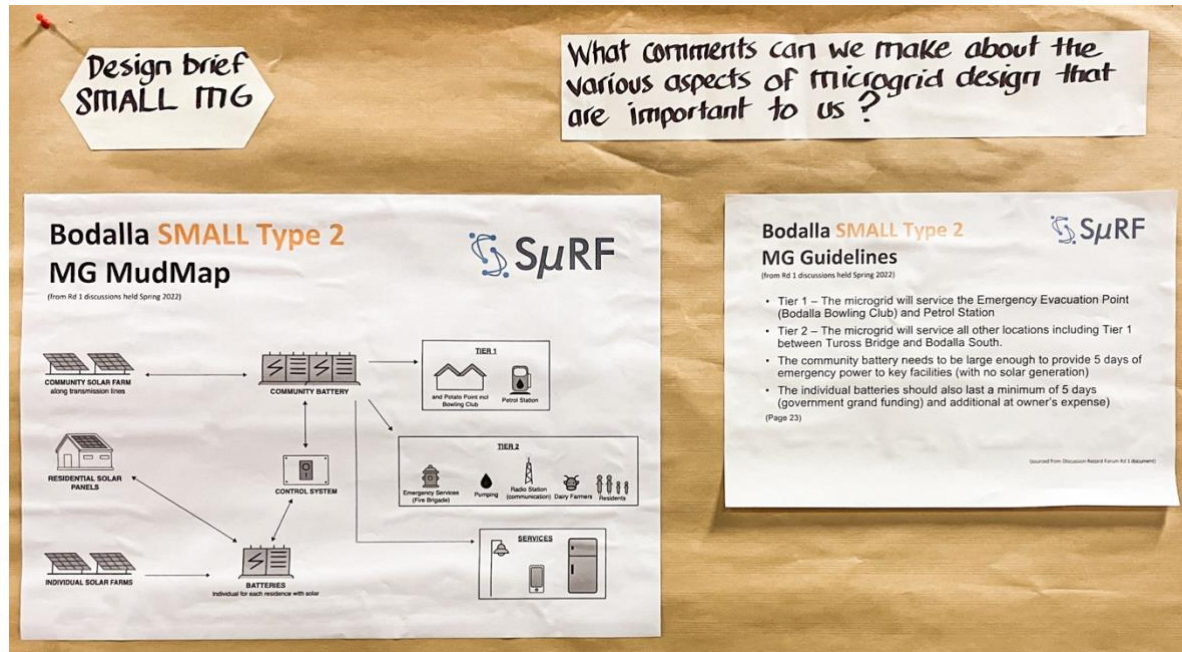
The analysis suggests that battery offered in the microgrid design by the SuRF team will provide almost half (0.4) a day of electricity in islanded (switched off from main) during a main grid outage.

If the community was to restrict their usage by 50% then the islanded time could be extended to 1.4 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.

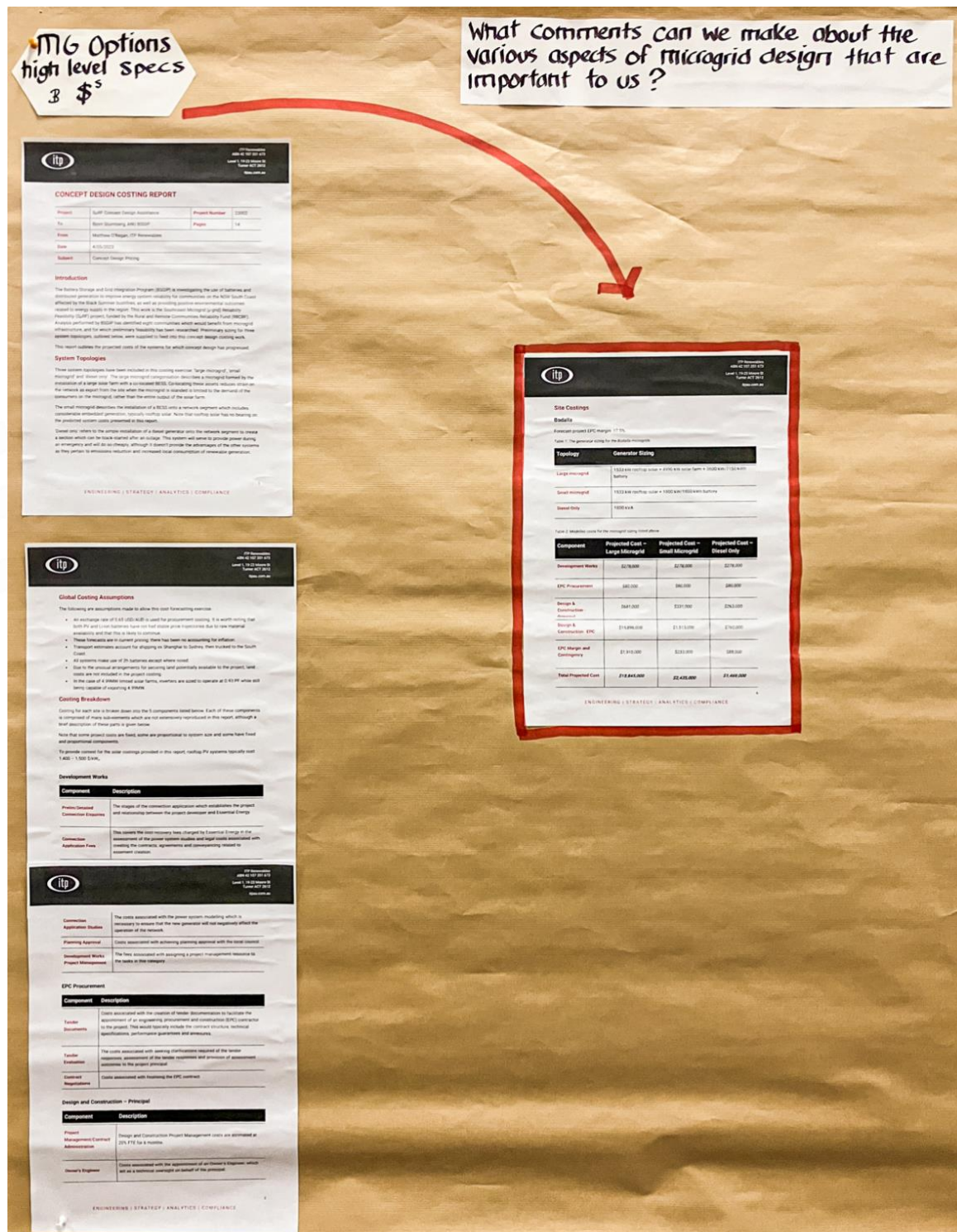


Moderator Notes...

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 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 MG

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

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

SuRF

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

- Use microgrid(s) to reduce cost of electricity
- We should create an opportunity to access local electricity from private residences/commercial businesses so that locals can have access to cheaper energy and excess energy isn't wasted
- Purpose: To give access to 100% renewable energy by all Bodalla residents at affordable prices
- The microgrid should have a solar farm so that we have access to cleaner local energy
- Would like this project to cover Bodalla area south of Tuross Bridge through to Bodalla Park Drive

Sourced from Discussion Record Forum Rd 1 document

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

- If the microgrid solution includes an islanding capability, it would probably not be available to every subscriber in these larger more complex communities.
- However, all subscribers could take advantage of the community storage hub peak time sales and community Solar inputs for low shoulder tariffs.
- The hub battery would only need to maintain enough capacity to provide a fast response black start buffer until the big synchronous generator comes on line.
- The P2P platform would also offer flexibility for a user controlled dynamic trading platform, ie buying cheap solar inputs and selling battery storage at peak times, within the NFP community retailer bounds.

Sourced from Discussion Record Forum Rd 1 document

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

- Utilise solar power from holiday houses, out of tourism peak to help facilitate lower cost of power e.g. Potato Point
- Utilise land for solar farm/microgrid at Gannons Pt Farm and Blue Wren Place, Bodalla, 295 Potato Point Rd, Bodalla
- Normal time: Islanded mode as much as possible
- Emergency time: 100% on Islanded mode; if our own power cuts out – rely on main grid
- Ability for those not generating energy to purchase energy at affordable rates
- Access (if/when required) to broader (national) grid
- Ability to sell excess household solar generation to grid – as it will encourage residents to install household systems (page 23)

Sourced from Discussion Record Forum Rd 1 document

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

- There is no reason this model would not work for any/ all of the sites. Providing the integrity of the base charter is maintained, ie Multiple parochial NFP retailer groups P2P trading within their own collective, whilst working in synergy with a commercial trader for NEM trading using the support of a funded community battery(s) and community Solar farm(s). (Page 32)

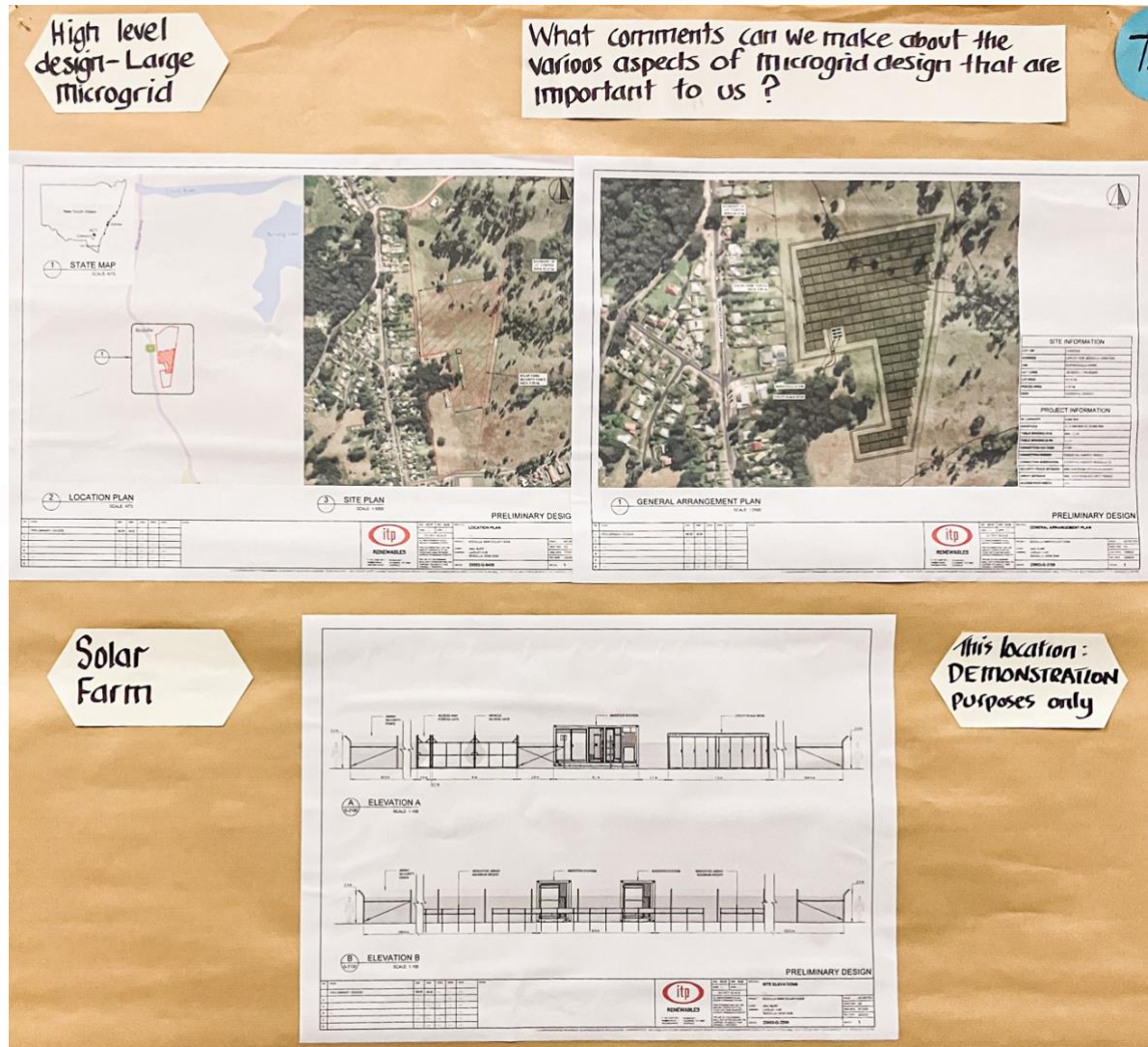
Sourced from Discussion Record Forum Rd 1 document

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 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.

MG Options
high level specs
B \$ \$

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

CONCEPT DESIGN COSTING REPORT

Project: South Coastal Energy Transition **Project Number:** 00000

To: Bob Bonner, with SuRF **Pages:** 14

From: Matthew O'Rourke, ITP Associates

Date: 6/15/2023

Subject: Concept Design Pricing

Introduction

The Battery Storage and Load Integration Program (BLIP) is investigating the use of batteries and distributed generation to improve energy system resiliency for communities in the South Coast Region Affected by the Black Summer bushfires, as well as increasing system resiliency and energy security in energy hubs in the region. This work is the foundation for the report to provide community feedback on the BLIP program, funded by the Rural and Remote Communities Resiliency Fund (RRCRF). Funding provided by BLIP has identified eight communities which would benefit from increased resiliency, and for which community feasibility has been established. Feasibility study for these eight communities, outlined herein, was required to feed into the 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 considered in the costing work: 'large microgrid', 'small microgrid', and 'standalone'. The 'large microgrid' configuration involves a microgrid formed by the installation of a range of technologies and associated BESS (including those already installed) on-site for the network as a whole from the day after the microgrid is deployed in response to the demand of the community of the microgrid, rather than the more typical of the state grid.

The 'small microgrid' describes the installation of a BESS unit in a network segment which includes considerable distributed generation, including rooftop solar. Note that rooftop solar has to be taken on the generation system costs of generation in the report.

Stand alone refers to the simple installation of a best generator into the network segment to meet a specific need which can be replaced after its output. 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 the project for community resiliency and reduced risk consumption of renewable generation.

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Site Costings

Details

Forecast project EPC Margin: 17.1%

Cost: The proposed costing is for 2023/2024.

Topology	Generator Sizing
Large microgrid	15.1 MW storage asset + 4 MW AC solar with 4 modules (1.5 MW AC solar)
Small microgrid	15.2 MW rooftop solar + 1500 kWh/1000 kWh battery
Stand Alone	1500 kWh

Note: Details used for the microgrid costing, listed above.

Component	Projected Cost - Large Microgrid	Projected Cost - Small Microgrid	Projected Cost - Stand Alone
Development Works	\$276,000	\$276,000	\$276,000
EPC Procurement	\$80,000	\$80,000	\$80,000
Design & Construction	\$848,000	\$237,000	\$263,000
Design & Construction - EPC	\$1,404,000	\$2,153,000	\$2,742,000
EPC Margin and Contingency	\$1,810,000	\$2,633,000	\$353,000
Total Projected Cost	\$1,810,000	\$2,433,000	\$1,409,000

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Global Costing Assumptions

The following assumptions made to allow this cost forecasting exercise:

- An exchange rate of 1 AUD (2023 AUD) is used for government costing. It is worth noting that the 2023 AUD exchange rate is not the same as the 2022 AUD exchange rate for the financial year and that this is likely to continue.
- These forecasts are a general pricing that has been developed for reference.
- Transport estimates account for shipping on freight to Sydney, then to the South Coast.
- All systems have a 20% (2023) margin unless stated.
- Due to the amount of engineering to be done and completed, available in the project, some items are not included in the project costing.
- In the case of a BESS storage asset, battery reserves are sized to operate at 0.1 C/R, which will be more capable of expanding & flexing.

Costing Breakdown

Costing for each site is broken down into 4 components listed below. Each of these components is comprised of many sub-components which are not detailed in this report, although a brief description of these parts is given below.

Note that some project costs are fixed, some are proportional to system size and some have fixed and proportional components.

The general context for the site costing provided in this report, rooftop PV systems typically cost 1,400 - 1,500 \$/kW.

Development Works

Component	Description
Process Design	The design of the connection apparatus which establishes the project and relationship between the project developer and Essential Energy.
Construction	This includes the site surveying, site design and construction (EPC) contracts to the equipment of the power system (batteries and digital assets) installed with creating the electrical, agreement and commissioning related to connection to the grid.
Application Fees	The costs associated with the power system installation, which is included to ensure that the fees generated will not negatively affect the operation of the network.
Planning Approval	Costs associated with achieving planning approval with the local council.
Development Works - Principal	The fees associated with designing a project management resource to the needs of the site design.

EPC Procurement

Component	Description
Tenders	Costs associated with the creation of tender documents to facilitate the procurement of an engineering, procurement and construction (EPC) contractor to the project. This should include, among other things, technical specifications, performance guarantees and warranties.
Finalise	The costs associated with seeking clarifications required of the tender responses, approval of the tender responses and provision of assessment services to the project principal.
Finalise	Costs associated with finalising the EPC contract.

Design and Construction - Principal

Component	Description
Project Management/Construction Management	Design and Construction Project Management costs are estimated at 20% FTS for 6 months.
Owner's Engineer	Costs associated with the appointment of an Owner's Engineer, which are not a traditional overhead on behalf of the project.

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Moderator Notes...

STEP 5

Questions, Suggestions/Guidelines

Questions

How can the small (more affordable) MG be configured + operated to exploit tariffs to realise the "lower cost kWh" ambitions

How could the small MG facilitate the development of the "safe haven" or similar → community hall/school/club?

If houses already have solar + batteries does the power come from those homes than the houses that don't → is there a rebate for those homes.

What revenue is available in these MGs for excess solar being fed back to the grid by customers?

What's the cost benefits comparison between individual solar/batt combo and the small or large MG for Bodalla?

What ownership arrangements/options for Solar Farm and what cost implication for each option for a small community like Bodalla

Why 5 MW for the large Solar Farm eg.

Suggestions/Guidelines

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

- Small MG/Tier 1, providing safe haven/place of last resort, to be minimum, and should be included within all other options.

Solar farm seems necessary for Bodalla-scale MG.
Makes sense to supplement this with linked household solar.

QUESTIONS

QUESTION	RESPONSE FROM SuRF team
1. How can the small (more affordable) microgrid be configured and operated to exploit tariffs to realise our “lower cost kwh” ambitions?	
2. How could the small microgrid facilitate the development of the “safe haven” or similar (such as the community hall/school/club?)	
3. If houses already have solar and batteries does the power come more from those homes than the houses that don't and is there a rebate for these homes?	
4. What revenue is available in these microgrids for excess solar being fed back to the grid by customers?	
5. What's the cost benefits comparison between individual solar/battery combo and the small or large microgrid for Bodalla?	
6. What ownership arrangements/options for solar farm and what cost implications for each option for a small community like Bodalla?	
7. Why 5MW for the large solar farm?	

SUGGESTIONS/GUIDELINES

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

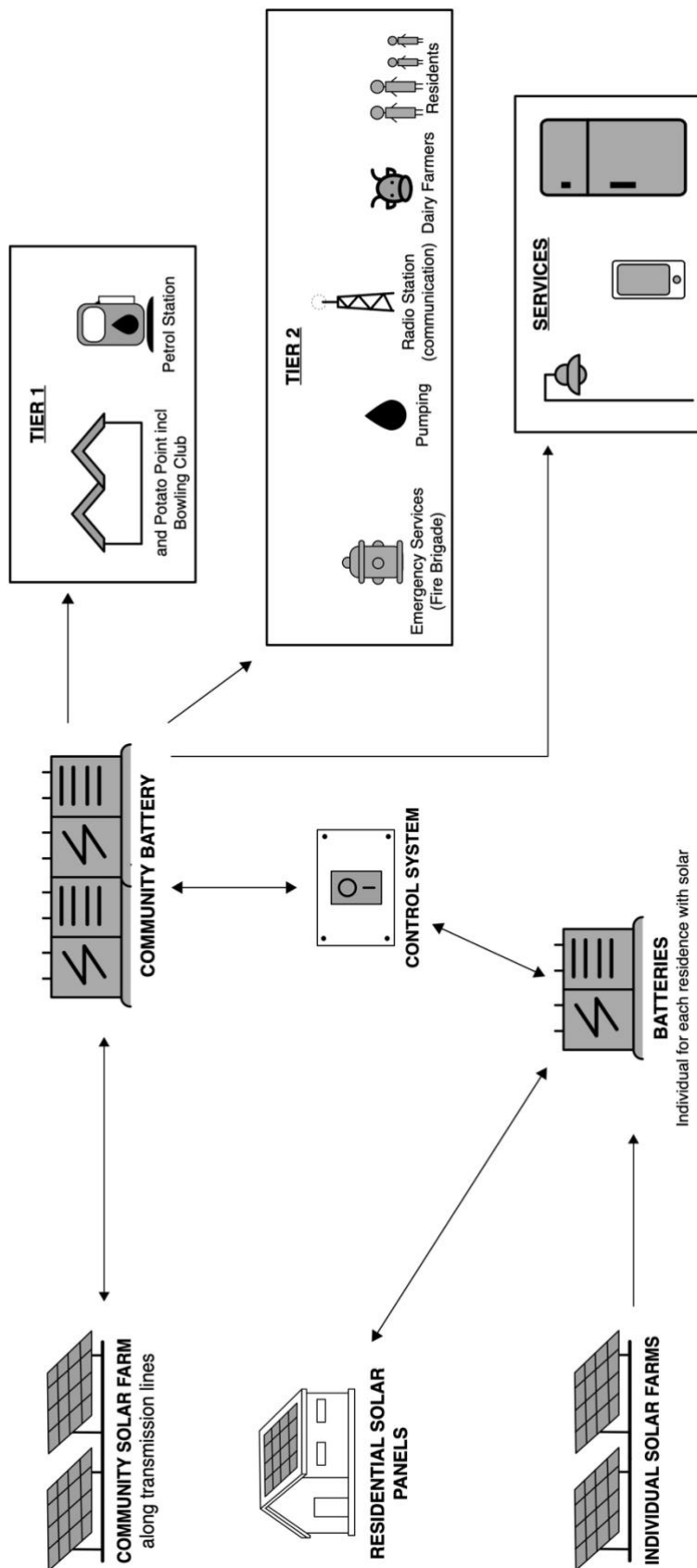
The microgrid should ... abc ... so that ... xyz

QUESTION	RESPONSE FROM SuRF team
Small Microgrid/Tier 1, providing safe haven/place of last resort, to be minimum, and should be included within all other options	
Solar farm seems necessary for Bodalla-scale microgrid. Makes to supplement this with linked household solar.	

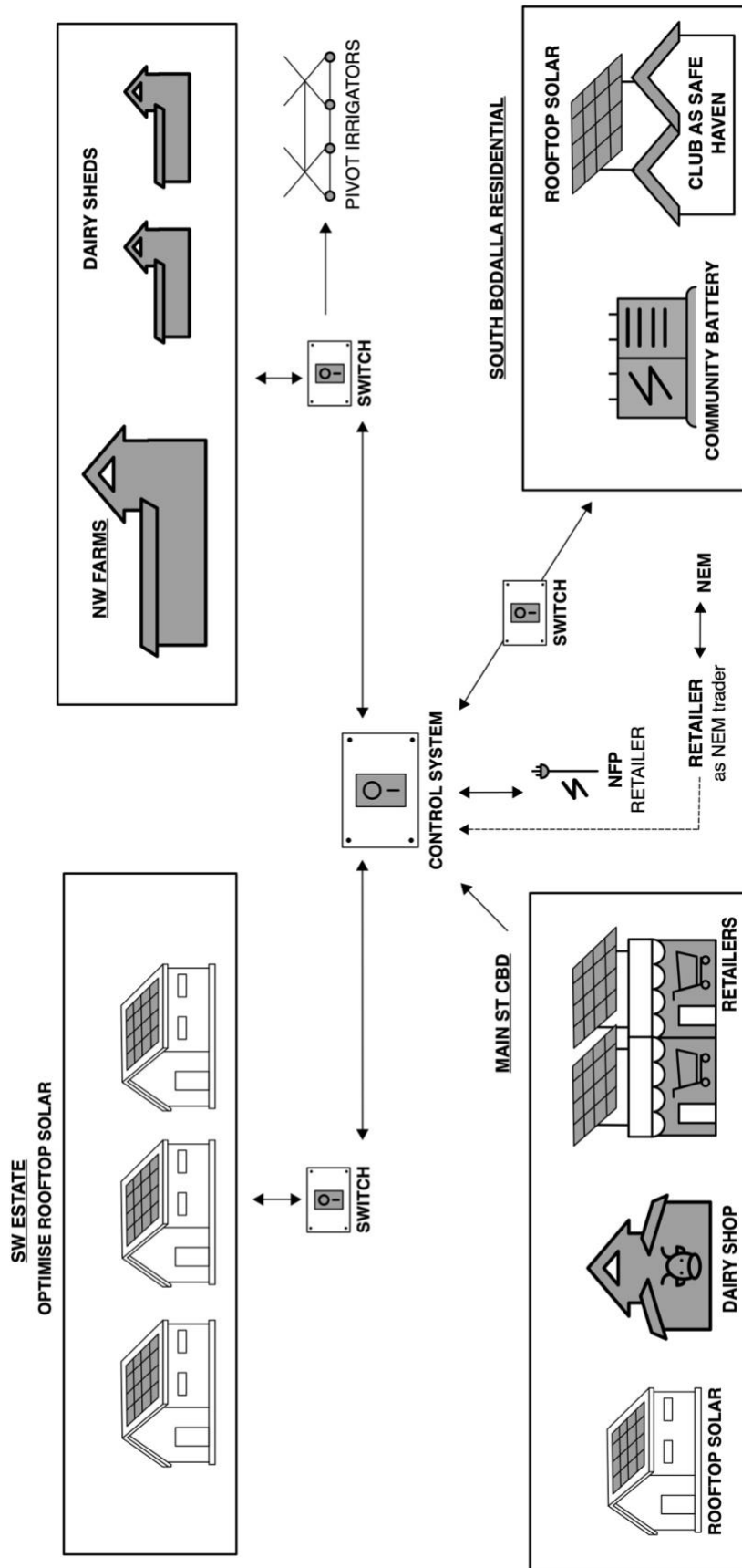
APPENDIX

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 Bodalla community who gave their time, provided their insights and support for this important Microgrid feasibility work

*Donna Murray
Barry Ryan
Karyn Outten
Jim and Chris Longworth
Michael Brown
Valerie Faber
Tony Lowe*

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.

This SuRF project work is funded by the Department of Industry Science Energy and Resources.

The SuRF team would like to thank the team from Sourced Energy for providing content around energy sharing solutions.