Powering Bremer Bay

Business Case
South Coast Alliance Inc.
November 2021

Unlocking the potential of Bremer Bay's strategic industries through reliable and affordable energy

RELIANCE AND DISCLAIMER

This business case has been prepared by FAR Lane, For Blue and Keston Economics for the exclusive use of the South Coast Alliance Inc. (SCA) and for the purposes specified in it. This business case is supplied in good faith and reflects the knowledge, expertise, and experience of the consultants involved.

FAR Lane, For Blue and Keston Economics accept no responsibility whatsoever for any loss occasioned by any person acting or refraining from action as a result of reliance on the report, other than the addressee. In conducting the analysis in this business case FAR Lane, For Blue and Keston Economics have endeavoured to use what they consider is the best information available at the date of publication, including information supplied by the addressee.

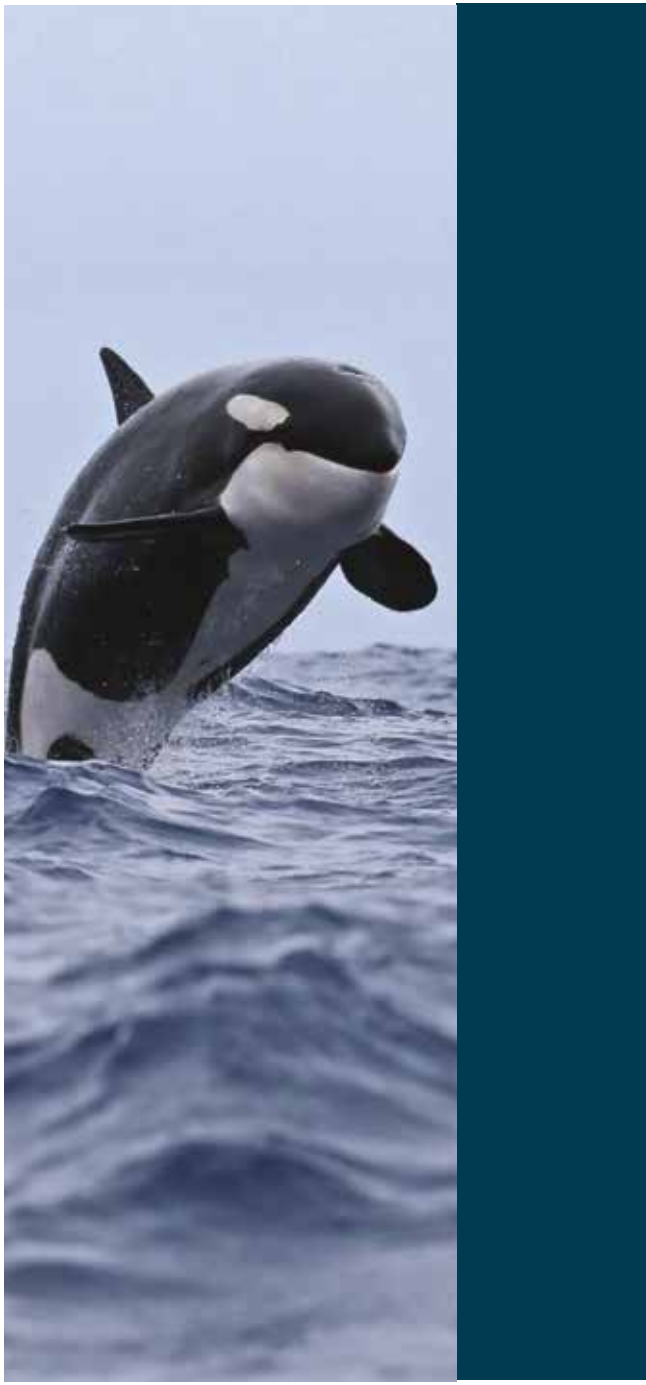
Unless stated otherwise, FAR Lane, For Blue and Keston Economics do not warrant the accuracy of any forecast or prediction in the report. Although FAR Lane, For Blue and Keston Economics exercise reasonable care when making forecasts or predictions, factors in the process, such as future market behaviour, are inherently uncertain and cannot be forecast or predicted reliably. FAR Lane, For Blue and Keston Economics shall not be liable in respect of any claim arising out of the failure of a client investment to perform to the advantage of the client or to the advantage of the client to the degree suggested or assumed in any advice or forecast given by FAR Lane, For Blue and Keston Economics.

Delta Echo Pty Ltd
T/A FAR Lane ABN 47 609 529 928

For Blue Pty Ltd
T/A For Blue ACN 638 580 739

Keston Economics Pty LTD
T/A Keston Economics ACN 640 013 734

The South Coast Alliance acknowledges the Noongar/Nyungar peoples of the South Coast region as the traditional custodians of this land and we pay our respect to their Elders past and present.



Bremer Bay is increasing its profile as a destination for aquaculture and tourism.

Situated along the South Coast of Western Australia, a gateway to pristine beaches, awe inspiring whale watching experiences and the riches of a biodiverse environment, Bremer Bay is ready to step into its potential as a home for aquaculture industry development and an iconic tourism destination.

An opportunity exists to formally investigate the town's long standing energy reliability issues, understand future energy needs, and identify a pathway towards an innovative solution that supports the growth of local enterprises as well as towards net zero carbon emissions. By doing so, Bremer Bay has the opportunity adopt or pilot new energy technology and solutions that can be utilised in other areas throughout the South Coast region that are facing similar challenges, adding to the region's reputation as a leader in renewable and reliable energy.

PROJECT DESCRIPTION

The opportunity

Bremer Bay, a small town in the Shire of Jerramungup, is known for its pristine beaches, adventurous camping, whale watching experiences and access to the Fitzgerald National Park, one of the most biologically diverse national park regions in Australia. The town is experiencing and preparing for growth; planning for a bright future based on record visitation, a growing aquaculture industry development profile, and increased public and private investment in the town. An opportunity exists to provide the energy infrastructure to Bremer Bay that will enable the town to meet its full economic development potential.

The challenge

Bremer Bay is 60km from the nearest main road and is the last location at the end of the South West Interconnected Network (SWIN). This location on the energy supply line leaves Bremer Bay exposed to unreliable energy supply when interruptions occur on the line, and time is required for service teams to identify and fix the issue A local wind and diesel power station was constructed a decade ago to improve energy reliability and has been a great help, however, businesses today continue to report negative impacts on operations and sales due to brown-outs. This problem is exacerbated by the town's peak holiday season, which, since COVID-19 coupled with the town's increasing profile as a premier destination for whale-watching, has been getting longer, increasing the timeframes in which these issues can occur. As thousands of visitors descend on this small town each year, local tourism and hospitality operators are managing days of lost sales and the costs of purchasing and maintaining independent diesel generators. With the current energy reliability issues, some local businesses (including aquaculture and fisheries enterprises) have identified that their plans for expansion will be constrained if a long term, stable energy solution cannot be implemented for the town.

An opportunity for leadership

To attract visitors, residents, and workers, and to enable strategic industries such as aquaculture, fisheries, and tourism to grow, there is an opportunity to investigate and implement a sustainable, long term energy solution that draws on the natural and economic strengths of the region, and its demonstrated leadership in the uptake of renewable energy. Local enterprises are already investigating energy solutions, navigating complex regulatory and infrastructure requirements to manage future growth constraints risks. There is an opportunity for the South Coast Alliance to advocate for and support a coordinated investigation of an energy solution that empowers Bremer Bay's individual enterprises as well as the economy and community as it moves int a period of growth and transformation, helping to ensure the long term needs of the town are met in a way that slows for ongoing industry development and sustainability.

Utilising energy storage and innovative microgrid technology, there is an opportunity to unlock the current and future growth potential of Bremer Bay's strategic industries, support ongoing private and public investment into the town and develop a pathway to net-zero carbon emissions.

Delivering value for the South Coast region

A growing Bremer Bay, with a greater capacity to host visitors and residents at the same time, contributes to the development of the South Coast's tourism offer, bringing more people to the region who will explore other noteworthy destinations along the coast and inland. Investment in more reliable and capable energy infrastructure aligns with planned investment in town centre, which is experiencing record breaking visitor numbers and residential development and must be proactive about how the town will support and benefit from this growth.

The South Coast region is well positioned as a renewable energy producer and can continue to build on this progress. Investment in energy protects, diversifies, and enhances existing and emerging regional industries. Growing interest in conventional and niche energy technologies globally provide strong opportunities for the South Coast region.

Policy makers and consumers are increasingly steering away from fossil fuel energy, despite coal still meeting most of the State's energy needs. The South Coast region, particularly in Albany, is already a strong renewable energy producer. For example, the Albany wind farm producing the equivalent of 80% of Albany's annual electricity needs. This opportunity aligns with regional momentum and investment into energy innovation and technology, with Australian Ocean Energy Group in partnership with NERA, Wave Energy Research Centre, UWA and others partnering on a proposal to develop the world's first Ocean Energy Marketplace and market-facing demonstration site: a scientific and commercial hub for fully integrate Ocean Energy systems in Albany.

The provision of stable and sustainable energy for the town of Bremer Bay has the potential to unlock the growth potential of the Town's aquaculture and fisheries industries. This investment alone could deliver the following economic impacts1 for the Great Southern region by 2030:

ADDITIONAL
$32M
TOTAL OUTPUT

ADDITIONAL
$11M
VALUE ADDED

ADDITIONAL
47 JOBS

ADDITIONAL
$4.6M
IN SALARIES & WAGES

[1] Remplan 2021. Total output includes direct effect, supply chain effect and consumption effect.

MARKET CONDITIONS & PRECEDENTS

Energy infrastructure in Bremer Bay today

Bremer Bay is located at the end of South West Interconnected Network (SWIN). Most of the Town's energy is supplied from Albany and distributed by cables between to two locations (180km by road). As a result, any disruptions along this extensive line can take an extended period to locate, identify and fix, as crews must physically travel the line to locate the problem. As a backup system, Bremer Bay also has access to a microgrid, which consists of one wind turbine supported by diesel generator (diesel is shipped in). This microgrid system has been beneficial to the community to address more structural energy reliability issues that were experienced in past decades.

Demand conditions

Bremer Bay is experiencing record visitation and investment

Local industries are growing. Aquaculture and fisheries related enterprises are looking to expand operations in the next 5 – 10 years with the potential to create an additional 20 local jobs in the Town. Tourism visitation to Bremer Bay has increased significantly in the last 3 years and is expected to stabilize. During the 2018/2019 holiday period, the population of Bremer Bay is estimated to have increased from just under 400 to around 6,000[2]. As with many other regional destinations, COVID-19 has presented a unique opportunity for towns like Bremer to attract more intrastate visitors and establish itself as a premier tourism destination. Local estimates of visitor numbers in the 2019-20 period put the increased population at between 14,000 and 16,000 during the peak period, which itself appears to be extending to take up more of the year, a trend that is expected to continue.

While many of Bremer Bay's visitors are adventurers and campers who do not rely on the Town's electricity, approximately half of the visitors who stayed in the 2017-19 stayed at the Caravan Park, short-stay accommodation or Airbnb / Bed and Breakfasts.

[2] Bremer Bay – Peak Population Study, Consulting Great Southern

Consultation conducted during this period indicates that these types of accommodation were over utilised, with 30 people staying in accommodation only designed for 10 (as an example). This suggests that the town requires additional caravan park, short-stay and bed and breakfast accommodation required to appropriately (and safely) accommodate visitors moving forward.

The Shire of Jerramungup have identified the need for additional infrastructure in Bremer Bay, to service residents and visitors alike. Planned infrastructure enhancements include (but not limited to) a community resource centre (CRC), larger civic / Shire offices, visitors centre and a bigger supermarket. Consultation also indicated that since COVID-19 lock downs and border restrictions commenced, residential property sales have increased significantly, along with development approvals for land that has previously sat vacant. This presents potential additional energy users for the future that will need to be planned for as part of the Town's strategic and sustainable growth.

In addition, the Shire is investigating the sealing of roads from, in, and around Bremer Bay into the Fitzgerald National Park to sure up year-round access for visitors and increase confidence for tourism operators to invest in developing experiences that access the park. Currently, as these roads are unsealed, they are closed during periods of rain to protect the national park from disease introduced through muddy boots and tyres.

Consultation with local business and Local and State Government indicate that there is uncertainty around the ability of the current energy infrastructure to meet the demands of the Town moving forward. This uncertainty is constraining planned business expansion, as energy solutions are incredibly complex to understand and costly to implement for individual businesses. This has implications for strategic industry growth (aquaculture, fisheries, and tourism) as well as additional planned commercial and residential infrastructure planned for the town in the coming years.

Current energy infrastructure is not ready for growth

Consultation conducted with a range of local businesses identified that energy is still creating expensive issues for individual operators, including, but not limited to:

- Brown outs disrupting technical equipment and machine operations. Breakdowns can be extremely costly. Consultation highlighted in some cases this can be up to $5,000 to fix.
- Operating disruption where brown outs or power outs last extended periods – Some hospitality and accommodation venues reported being impacted by brownouts to such an extent that they were required to close operations for the day and lost significant sales as a result.
- Growth constraints – Planned expansion of key local employers not feasible with current supply and reliability (as these enterprises have significant energy requirements). Time frames indicated capacity and growth will impact in 5 years if not addressed.
- Cost of purchasing and maintaining independent diesel generators - $16,000 - $20,000 up front as example. In addition, diesel needs to be dumped and refreshed on an ongoing basis if not used.

Energy requirements

The ultimate solution must achieve the following outcomes to benefit community and businesses:

- **Reliability** – Local businesses must be able to operate at full capacity, particularly throughout the peak holiday season, without the risk of brown-outs and intermittent outages resulting in closures or equipment failure.
- **Capacity to grow** – Local businesses and new businesses must have the confidence to invest in the future of Bremer Bay. Part of this will be ensuring that infrastructure, plant, and equipment can be introduced over time as enterprises are established and grow. In addition, residential development (which is experiencing growth) should also be able to adopt or plug into sustainable energy that can be relied upon all year round.
- **Affordable** – Energy must remain affordable for Bremer Bay's residents and businesses. High energy costs may risk transferring the growth constraint issue from reliability to accessibility.
- **Pathway to net zero carbon** – Bremer Bay is already drawing on a strong mix of renewable energy through its local power station and its supply of energy from Albany's wind farm (via the SWIN). Consultation indicates that local enterprises are keen to ensure renewable energy remains in Bremer Bay's future.
- **Consumer choice** – Residents and businesses should retain their ability to make their own independent decisions about 'behind the meter' power solutions.
- **Flexible for rapidly evolving technologies** – The ultimate solution should not prevent Bremer Bay from adopting and benefiting from new technologies in the future (i.e., electric vehicle charging stations).

Unique geography, population and economic characteristics coupled with a prescriptive regulatory environment will influence the options available to Bremer Bay. Technical expertise is required to identify the most appropriate solution to Bremer Bay's energy challenges and to unlock the potential of local strategic industries.

Identifying a solution

The next steps in this project should focus on exploring the following solutions:

Energy storage – Long term energy storage is required to improve energy performance and reliability and eliminate reliance on high-cost diesel;

Virtual microgrid - The application of a virtual microgrid can provide the ability to control and maximise the capacity and use of stored energy, with the potential to eliminate the impacts of brown-outs and outages, as well as generating revenue.

Pathway to net zero carbon emissions - The addition of other renewables to the mix, i.e., solar and wind in the short to medium term (as these technologies are readily available) should be prioritised to put Bremer Bay (and the South Coast region) on a pathway towards net zero carbon emissions.

Table 1 (next page) provides further detail on the range of energy options available to Bremer Bay, their potential to address the town's energy challenges, as well as the level of cost and difficulty required to implement the solution. Appendix 1 provides additional details to support the assessment in table 1.

Gaps and barriers to innovative energy solutions

The gaps and barriers listed below are typical of innovative energy solution development, particularly those that involve microgrid or stand-alone energy solutions, and have the potential be addressed through the planned actions and through the priority funding sources.

- Regulatory complexities – To protect consumers, the SWIN is a highly prescriptive energy network. Some energy solutions that are innovative or new are likely to require targeted and proactive advocacy to be approved, in addition to expertise in navigating the regulations.
- Capital costs are a key barrier to some technologies, if they cannot generate their income by selling back to the grid, and often require support from funders or a partnership approach to deliver the required infrastructure.
- Political connection / involvement with incumbent energy industries and impedance of renewable technology growth.

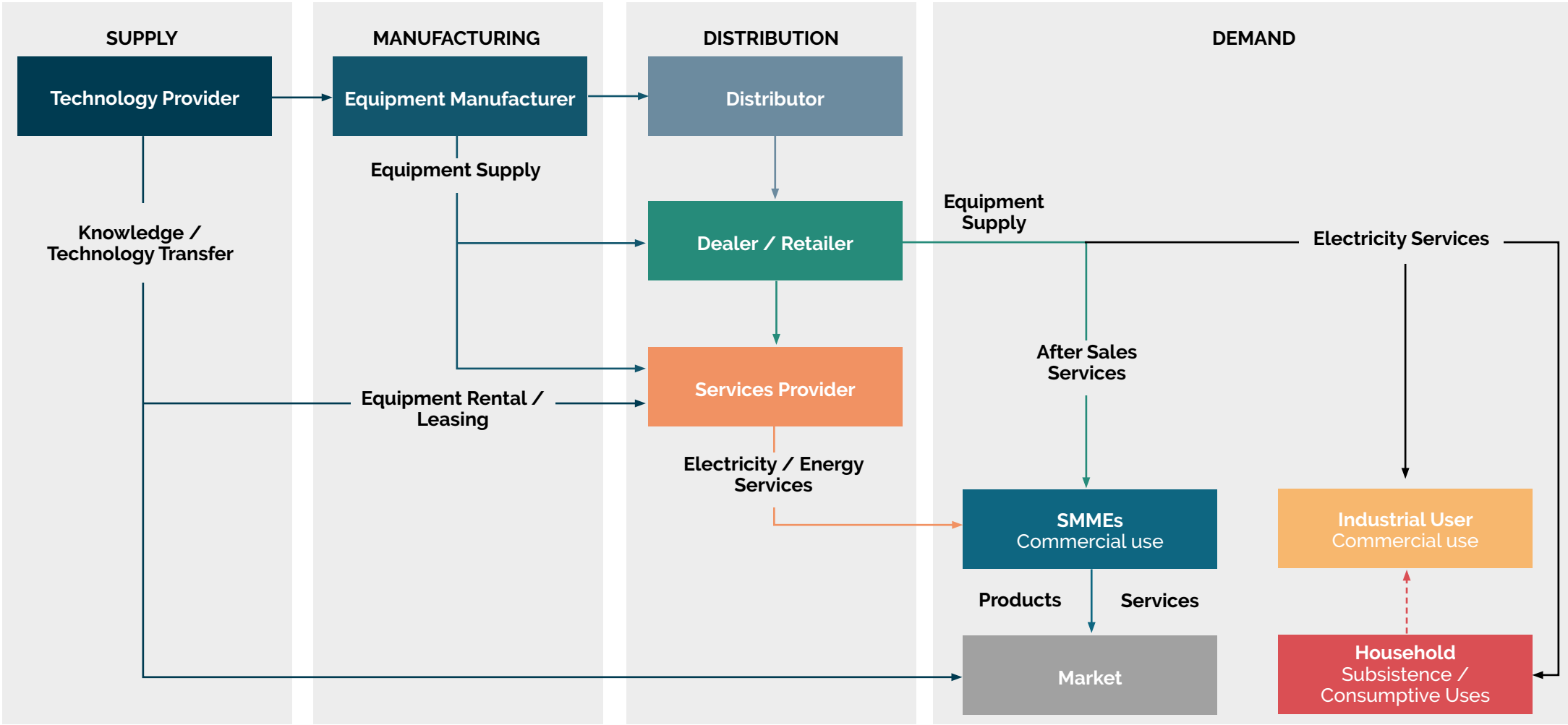
Table 1 - Solutions requirements and implementation matrix

TECHNOLOGY OR SOLUTION	ALIGNMENT WITH KEY REQUIREMENTS						IMPLEMENTATION FACTORS	
	RELIABILITY	GROWTH CAPACITY	AFFORDABLE TO USERS	PATHWAY TO NET ZERO	CONSUMER CHOICE	FLEXIBILITY	COST	DIFFICULTY
Disconnected microgrid	Strong	Average	Average	Strong	Limited	Average	High cost	High difficulty
Virtual microgrid (Simple)	Strong	Strong	Strong	Strong	Strong	Strong	Low cost	Low difficulty
Virtual microgrid (Complex)	Strong	Strong	Strong	Strong	Average	Average	Low cost	High difficulty
Standalone power systems	Strong	Average	Strong	Strong	Limited	Average	Average cost	Average difficulty
Energy storage	Strong	Strong	Average	Strong	Strong	Strong	Low cost	Low difficulty
Solar	Average	Strong	Strong	Strong	Strong	Strong	Low cost	Low difficulty
Ocean	Limited	Unknown	Unknown	Strong	Unknown	Unknown	High cost	High difficulty
Wind	Strong	Strong	Strong	Strong	Strong	Strong	Average cost	Average difficulty
Hydrogen	Unknown	Unknown	Limited	Average	Unknown	Unknown	High cost	High difficulty
Biomass	Average	Limited	Average	Average	Unknown	Unknown	High cost	High difficulty

Supply Chain

Figure 1 – Energy supply chain

The below diagram demonstrates the complexity of the energy supply chain, and the systems and stakeholders that require navigating in order to progress solutions. Demand users can implement their own 'standalone' solutions, however, in order to implement systems which benefit a network of users (commercial and residential), collaboration and coordination is required.



Precedents

Bremer Bay's energy challenges are shared with several similar towns in the Great Southern region of Western Australia. Existing and planned projects (detailed below) provide insights into some of the solutions which can be learned from and guide the investigation of a long-term solution for Bremer Bay.

ESPERANCE, WESTERN AUSTRALIA

From 2022, the communities and businesses of Esperance will benefit from a new, integrated power solution. Supported by a new power station that combines wind, solar and a battery system, the power station is estimated to reduce the carbon footprint of power supply to Esperance by almost 50% per annum compared to the existing power supply arrangements. In addition, it will improve the energy efficiency responding to variabilities in power transmission. This will also help reduce the likelihood of power fluctuations which impact businesses (similarly to Bremer Bay). Esperance's project provides a useful example that Bremer Bay can learn from to address its own energy challenges. It should be noted that a driver for this project is that Horizon Power's current contract with Esperance Power Station will expire in early 2022, and as such, it is a strategic time for the town to explore its options[3].

RAVENSTHORPE, WESTERN AUSTRALIA

In 2016 Western Power installed six individual power systems on a number of rural farms in the Ravensthorpe area as part of a 12-month pilot of stand-alone power systems technology. The systems were installed in areas that reported heightened reliability issues.

The results of the trial were positive with customers experiencing significantly fewer power interruptions than customers on the SWIN network in the same area – that is, around five hours of power outages in a year, compared to 70 hours of power outages each year on the SWIN network. The stand-alone power systems were proven to be robust in extreme weather events, and more than 90 per cent of electricity has been generated from the solar PV.[4]

Standalone power stations / systems provide a useful example of the types of energy technology that may be applicable to individual properties or businesses who want to establish independence from the network.

WALPOLE, WESTERN AUSTRALIA

An innovative energy project is taking place in Walpole, a town which is experiencing similar challenges to Bremer Bay and is also located in the Great Southern region, at the end of the SWIN. Drawing on a combination of 1.5 megawatt pumped hydro for energy (through farm dams), solar, and the technology of a virtual microgrid, this project will act as a 'bank', with the capacity to facilitate 'long term storage', more than what is possible with a battery.

Power Research and Development (the company leading the project) aims to provide energy storage services to commercial and rural businesses in the area but has also secured a contract with Western Power to supply back-up power to Walpole during periods of disruption to the main transmission line from Albany. The system provides savings to Western Power by cutting penalty costs for interruptions and will also be able to sell energy back to the grid during periods of peak demand.[5]

[3] https://www.horizonpower.com.au/our-community/projects/goldfields-esperance/epp/

[4] https://www.aemc.gov.au/news-centre/media-releases/new-cheaper-options-power-remote-communities

[5] https://www.abc.net.au/news/2021-11-01/renewable-energy-fix-walpole-power-problems/100579700

PROJECT RESOURCING, TIMEFRAMES, RISKS AND CONSTRAINTS

Resources and timeframes

Unique geography, population and economic characteristics coupled with a prescriptive regulatory environment will influence the options available to Bremer Bay. Technical expertise is required to identify the most appropriate solution to Bremer Bay's energy challenges and to unlock the potential of local strategic industries. Appendix 2 provides additional information to support the development of scopes of work for the proposed phases below.

Table 2 – Proposed project resourcing and timeframes

ACTIVITY	DESCRIPTION	EST. RESOURCING	YEAR 1	YEAR 2	YEAR 3
Market needs Assessment	Independent study with local businesses, community and government on current and planned growth and infrastructure requirements for next 10-20 years in Bremer Bay. Focus should be on consultation with local businesses to obtain greater clarity on economic and social impact of current energy challenges, and the local planning processes that are scheduled to be undertaken by Local Government for Bremer Bay.	**$30,000-$50,000 Consultant funding**	$30,000 - $50,000		
Options Assessment	Investigation of growth and energy supply scenarios utilising alternative energy solutions. Focus should be on identifying potential energy projects and partners that are suitable for Bremer Bay, generating relationships and opportunities to pilot innovative solutions or adopt blueprints from similar projects throughout Western Australia.	**$60,000 - $100,000 Consultant funding**		$60,000 - $100,000	
Implementation plan	Utilising outputs of previous phases, develop a detailed implementation plan which addresses practical and technical delivery of the identified solution. The plan should be developed in consultation with industry and community to ensure that it gathers the required buy-in, and that key stakeholders have clarity on their role in progressing the solution.	**$30,000 - $50,000 Consultant funding**		$30,000 - $50,000	
Implementation & construction	Implementation and construction of resulting renewable energy solution.	**Planning and capital expenditure**			To be determined
	Total estimated resource requirements				**$120,000 - $200,000**

Risks

The following risks and management strategies have been identified for this project.

Table 3 – Potential project risks

RISK	DETAIL	PROBABILITY	CONSEQUENCE	MANAGEMENT
Complex regulatory requirements	To protect customers, the South West Interconnected Network is highly regulated. Transitioning to some alternative energy solutions will require advocacy (to obtain the necessary approvals).	Probable	Moderate	Engaging the advice of an energy expert (either through a consultancy or a private energy provider) who can anticipate and navigate how potential solutions will interact with rules and regulations will be important. The SCA and Shire of Jerramungup will be valuable in lending advocacy support should a solution that is not currently supported by regulations be required.
Capital costs	Capital costs can be key barrier to implementing innovative energy solutions, particularly those that are less mature or have complex infrastructure and transmission requirements.	Possible	Moderate	Commercial energy solutions (those which have the potential to generate revenue), and solutions which utilise infrastructure or assets that are transportable or modular (so they can be moved or on-sold) will assist in securing capital for energy projects.
Rapidly evolving technology	Energy solutions are evolving and becoming smarter at an increasing rate. There is a risk that existing or planned infrastructure is not adaptable to innovative solutions as they become available.	Possible	Moderate	Any energy solutions considered for Bremer Bay need to be flexible and adaptable to future technologies (i.e., electric vehicle charging stations). Technical expertise utilised should be required to consider this as a key factor in the design, development, and construction of the solution.

ECONOMIC IMPACT

There are a range of benefits of investing in a long term, sustainable energy solution for Bremer Bay:

- Remove barriers to growth for aquaculture and fisheries industries, significant local employers with plans to increase operations in the next 5 - 10 years and create up to 20 new local jobs; and
- Protect and grow the local tourism industry by providing confidence to invest in new and existing enterprises in the Town. If current trends continue, Bremer Bay's population will experience annual influxes of between 10,000 – 15,000 during the peak holiday period, which is extending. This will require additional accommodation and services to ensure visitors return year on year and can sustain the local visitor economy.

The provision of stable, sustainable and renewable energy for the town of Bremer Bay has the potential to unlock the growth potential of the Town's aquaculture and fisheries industries in the long term, with the following potential benefits to the regional economy:

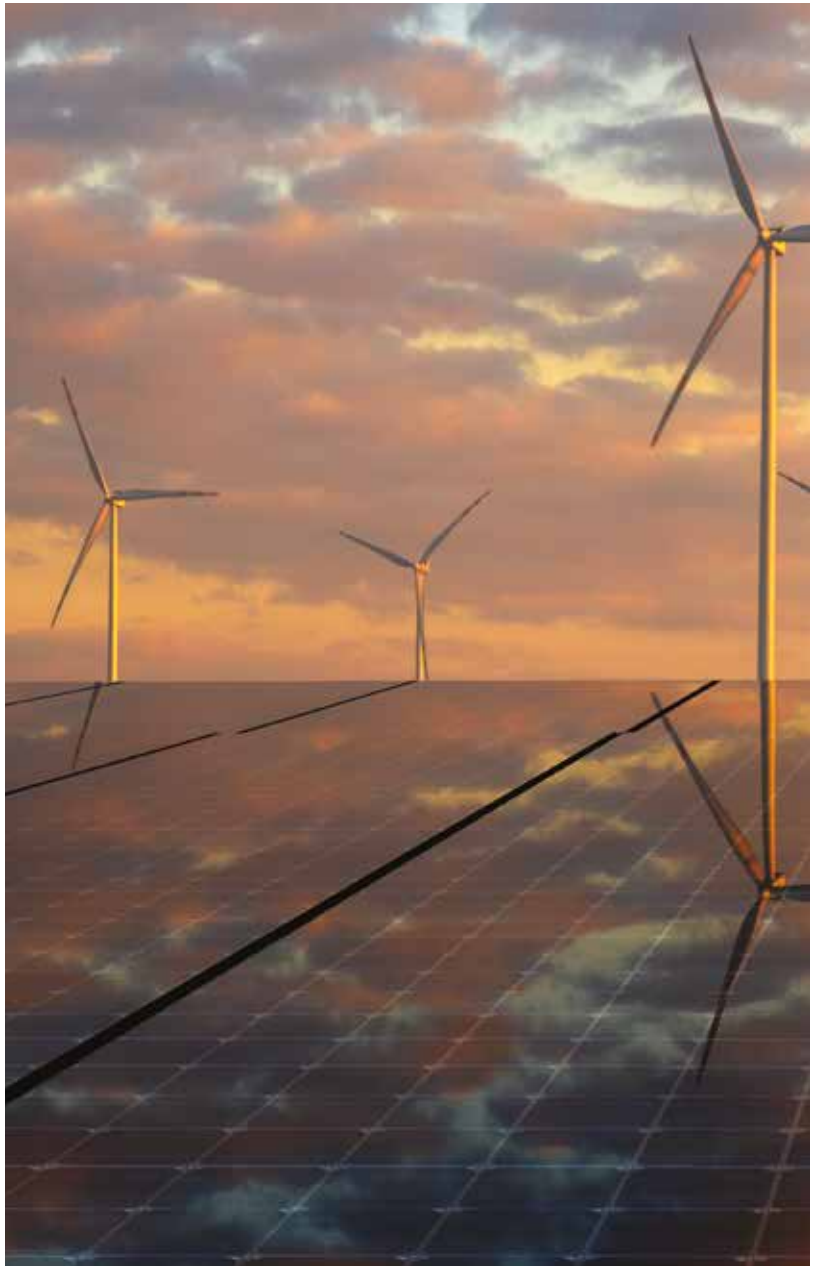
Table 4 - Estimated regional economic impact of renewable energy solution to enable industry growth in Bremer Bay by 2030*

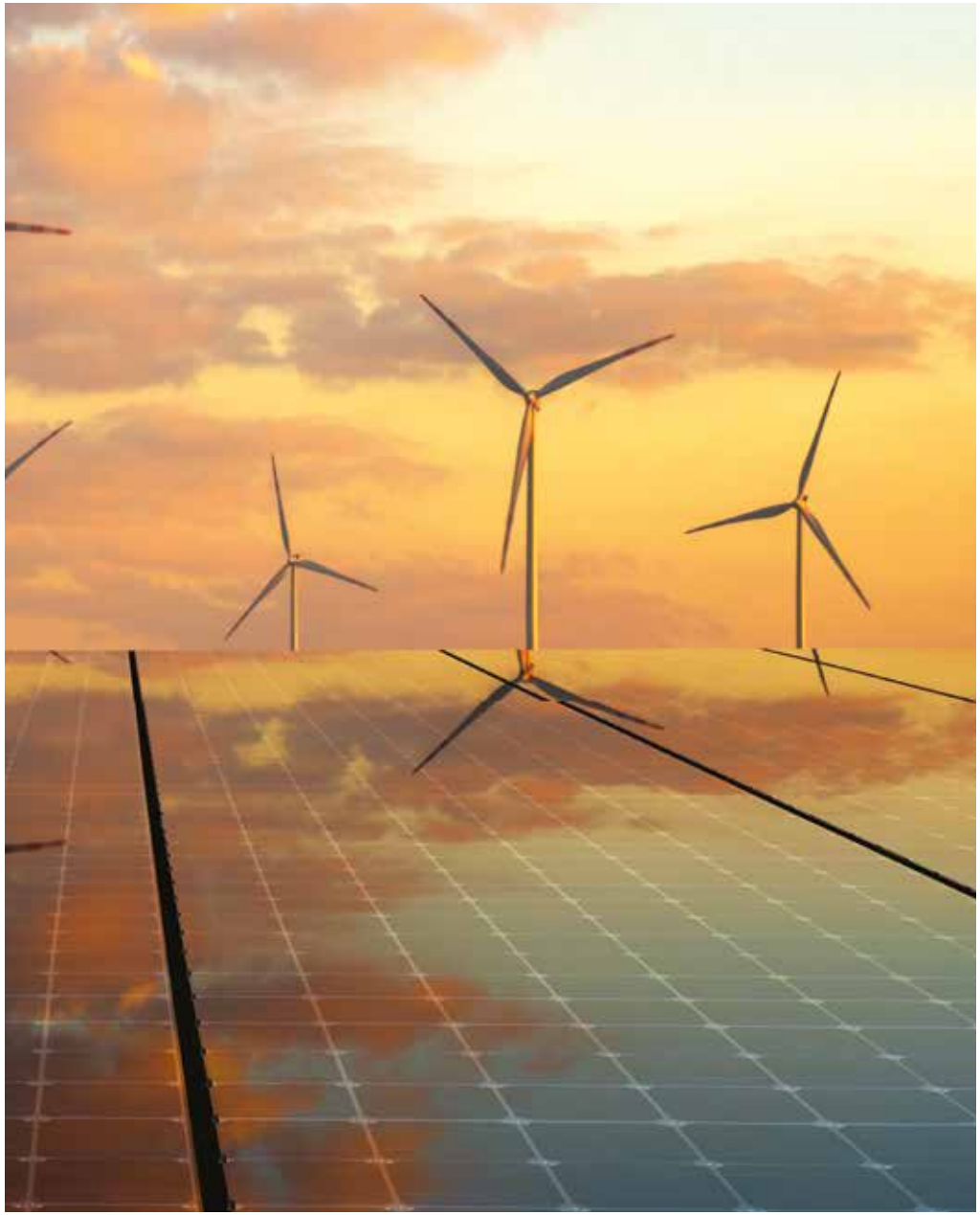
IMPACT SUMMARY	DIRECT EFFECT	SUPPLY-CHAIN EFFECT	CONSUMPTION EFFECT	TOTAL EFFECT
Additional Output ($million)	$15 - $21m	$7 - $8m	$3m	$26 - $47m
Additional Employment (Jobs)	23 – 24	13 – 14	9	45-47
Additional Wages and Salaries ($million)	$2m	$1 - $2m	$1M	$4 - $5m
Additional Value-added ($million)	$5 - $6m	$2-$3m	$1-$2m	$10-$11m

Source: Remplan, 2021. *Economic impact analysis utilises the Great Southern region as a functional economy. Ranges in table describe a range of potential economic impacts based on a range of CAPEX costs for potential energy solutions. See appendix 1 for a glossary of economic terms and appendix 3 for further details of the economic impact analysis. See appendix 2 for a glossary of economic terms and appendix 3 for further details of the economic impact analysis.

The increased capacity of these industries has the potential to contribute the following impacts to the South Coast region:

- Destination development and regional leadership – Bremer Bay is experiencing significant visitation growth which is helping to establish the Town as an iconic Western Australian destination with unique experiences on offer. This offer is heavily reliant on the region's natural land and marine assets. The implementation of stable and sustainable energy has the potential to enhance the Town, and the region's destination identity as a leader environmentally sustainable tourism and aquaculture, providing a roadmap for other towns in the South Coast to replicate or learn from.
- Managed, sustainable growth and infrastructure planning to support community and visitors – By aligning an investigation of energy solutions for Bremer Bay with planned town centre infrastructure planning, there is an opportunity to ensure that amenities and services are set up to service a growing population in the long term. This will provide enhanced and ongoing investment confidence, empowering stakeholders to advocate for future economic development opportunities, such as the establishment of a range of new enterprises and population services.





FUNDING AND INVESTORS

Positioning

Bremer Bay is growing as a tourism destination and hub for marine industries, including aquaculture. It is also on the edge of the SWIN power grid, where provision of electricity is expensive and unreliable. This makes local, distributed, renewable energy production an attractive option to support future growth. Providing affordable, reliable energy will also likely demonstrate innovative technologies applicable to other locations in the region and state.

Strategy

A market needs assessment would determine the existing and project energy demand out to 2040. The demand scenarios can be matched with supply scenarios, considering a mix of energy technologies and sources of funding and investment. The combination of scenarios can be the basis for attracting the funding and investment to deliver the best solution(s). Throughout the process, collaboration amongst key stakeholders will be critical to address complex regulatory requirements, changing energy marketplace and ensure the solution(s) implemented are going to deliver the social and economic benefits.

Funding and investment

Commitment of time, and some cash, from existing private and government stakeholders will be necessary to attract matching public funding. Beyond the initial needs assessment and scenario development, the project implementation may be funded through a range of options: private investment, public funding, a build-own-operate model etc. The SCA and individual local governments can assist through auspicing initial funding applications, contributing matched funding, facilitating stakeholder collaboration and providing support for the project and e.g. administration support, hosting meetings. Private SMEs in Bremer may contribute cash or in-kind initially. Energy companies or private investors may invest if they see this as a profitable opportunity or chance to demonstrate innovative technologies. Other organisations, such as universities, may also contribute depending on the scope, technology-focus and stage of the project.

The top four sources of possible funding are identified in table 4. See appendix 4 for the full prioritised list of relevant funding. The list of potential private investors, including charitable organisations is extensive and is not included on the table on the next page.

Table 5 – Shortlisted potential funding sources

FUNDER*	WHAT THEY FUND / RELEVANCE	$ AVAILABLE	PRIORITY	SUGGESTED NEXT ACTION
Regional Economic Development Grants	Invests in community-driven projects that support efforts to create long-term economic growth and job sustainability in regions. Matched dollar-for-dollar.	Up to $250,000 per project	H	Engage with GSDC and apply prior to October 21 deadline, or position for future rounds.
Cooperative Research Centres Projects (CRC-P) Grants	Short-term (up to 3 years), industry-led collaborations to: • develop a product, service or process that will solve problems for industry and deliver real outcomes • benefit small to medium enterprises (SMEs) • include education and training activities.	Up to $3 million per project	H	Engage with Australian Government representatives and apply prior to November 16 deadline, or position for future rounds.
Advancing Renewables Program	Supports a range of development, demonstration and pre-commercial deployment projects. This includes opportunities to optimise the transition to renewable electricity and commercialise clean hydrogen. Matched funding.	Up to $50 million	H	Review guidelines, engage with ARENA and if suitable, apply.
Building Better Regions Fund	Create jobs, drive economic growth and build stronger regional communities into the future. Two streams: infrastructure, and community investments. Matched dollar-for-dollar.	Up to $10million per project	H	Engage with Australian Government to position for when new rounds announced.

* Funder names include hyperlinks to relevant websites.

STAKEHOLDERS & CALL TO ACTION

Strong stakeholder engagement and collaboration will be critical to progress this opportunity. Key stakeholders and potential roles to progress this opportunity are outlined as follows.

Table 6 - Project stakeholders and potential roles in the project

STAKEHOLDER NAME	POTENTIAL ROLE
Shire Of Jerramungup	Advocate for innovative regional energy developments and stimulate sector investment Advocate for increased government investment in clean energy Assist in sourcing / connecting prospective clients and/or providers with micro-grid technology / equipment providers Assist prospective investors / providers in sourcing viable land for renewable energy technology development
South Coast Alliance	Advocate for increased government investment in clean energy Advocate for approval of innovative technology solutions not currently supported by SWIN regulations, and that can provide precedents for towns in the South Coast region who may face similar challenges
Private energy provider/s or energy expertise	Partner with community to investigate and develop innovative, affordable solution to energy challenges, drawing on experiencing implementing projects in similar contexts. Access to innovative technology and infrastructure.
National Energy Resources Australia & Australian Ocean Energy Group	Advocate and partner in identifying and piloting integrated energy solutions in the South Coast region Advocate for approval of innovative technology solutions which currently supported by SWIN regulations, and that can provide precedents for towns in the South Coast region who may face similar challenges
Western Power	Distribution of renewable energy solution within Bremer Bay Pilot project partner
Synergy	Provider of renewable energy solution (or elements of integrated solution) Co-investor and pilot project partner
Local industry	Participate in studies, contribute knowledge and information to understand energy requirements Co-investors in pilot project initiatives
Local community	Contributors of a vision for Bremer Bay's energy future Participants in energy solution development and up take of technology

The South Coast Alliance Inc. are looking for partners, innovators, and experts to progress this project and implement an innovative and sustainable energy solution that delivers energy reliability to Bremer Bays businesses and community, unlocks the potential of local strategic industries and contributes to a regional pathway to net zero carbon emissions.

For more information about this opportunity, contact the South Coast Alliance Executive Officer: ceo@southcoastalliance.org.au

Appendices list – Powering Bremer Bay

1. Potential power solutions for Bremer Bay – Additional details
2. Resourcing and timeframes – Additional details
3. Glossary of economic development terms
4. Economic impact analysis – Additional details
5. Funding sources – Additional details
6. Market analysis – Additional details

Appendix 1 – Potential power solutions for Bremer Bay – Additional details

The information provided in the following table is based on consultant research and consultation conducted within the scope of this project.

Table 6 – Potential energy solutions and technologies, opportunities and challenges for Bremer Bay

Solution / technology	Description	Opportunities	Challenges
Disconnected microgrid	A small, isolated network operating independently from the rest of the grid. Involves renewables, often solar power, supported by a battery and diesel generator backup. Microgrids have the capacity to provide power to more than one group / property / business.	Establishing full energy independence for Bremer Bay (eliminating exposure to SWIN and related interruptions). The remote microgrid market is expected to increase to over A$20 billion annually by 2024[1]. There is currently interest from the WA Labour Government in investing in pilot disconnected microgrid projects in regional Western Australia, including the Great Southern.	The following factors needs to be considered for disconnected microgrids: • Significant planning and expertise to identify the most appropriate design and solution (high cost); • Complex governance and ownership, and a reduction of customer choice (example: If customers choose to 'exit' the grid, the costs are passed onto the remaining members). • Security and funding – disconnected microgrids do not often generate revenue, therefore securing capital from lenders can be challenging. These are often 'at cost' solutions, rather than commercial solutions. • Currently require Ministerial approval within the SWIN. • Disconnection from the grid is not necessarily a cost-effective solution for communities.
Virtual microgrid	A virtual microgrid is a local network of connected energy users who can buy and sell electricity within a localised area. Virtual microgrids do not involve disconnection from the grid. Microgrids can utilise a range of energy sources and storage options and share energy	The following opportunities or advantages should be considered for virtual microgrids: • Virtual microgrids have the potential to be commercial systems that generate revenue by selling energy back to the grid at no cost to the community as well as offsetting costs	More complex applications of virtual microgrids require extra governance and coordination between community and businesses who want to participate (i.e., via a 'hive' or 'swarm'). Virtual microgrids must be connected to a storage option in order to be effective in enhancing

[1] AusTrade and Australia Unlimited, 2017

	via peer-to-peer enabling technology. There is a spectrum of options available when designing virtual microgrids, depending on the challenges it is required to address.	for power companies who pay penalties when there are outages. This element assists with accessing capital funding, as banks can be provided with some measure of security. • Simple applications of virtual microgrids protect individual consumer choices and freedom. • While there are rules to protect consumers, there are versions of microgrids that already comply with regulations and do not require Ministerial approval in WA. • There is currently interest from the WA Labour Government in investing in pilot disconnected microgrid projects in regional Western Australia, including the Great Southern. It is not clear if virtual microgrids would also be considered. • An innovative virtual microgrid supported by pumped hydro is being developed in Walpole which experiences similar challenges to Bremer Bay (see Precedents section for further information).	reliability during times when the grid (SWIN) is down or interrupted.
Standalone Power systems	Stand-alone power systems are off-grid systems that operate independently from the main electricity network and provide power to a single user. Each SPS consists of a renewable energy supply such as solar panels, battery energy storage system and, where necessary, a backup generator. This means they are completely self-sufficient power units. They are most often used to power remote properties.	Options for SPS to be utilised to provide immediate solution for individual enterprises looking to expand in the next 5 – 10 years. SPSs will increase in adoption as part of a decentralised and decarbonised energy future. SPSs have already been utilised for some remote properties in the Shire of Jerramungup.	Solutions for individual enterprises may miss opportunity to address broader energy infrastructure challenges in Bremer Bay. In addition,
Energy storage Battery	Energy storage is a vital enabling technology for intermittent energy, improving competitiveness and renewable penetration by smoothing out energy supply on grids, allowing delivery at peak	Bremer Bay is home to a wind and diesel powered power station that is providing a measure of back-up power supply to the town when the SWIN experiences interruptions. By	Investigation would be required to assess if the current power station infrastructure and line connections are battery storage compatible. If

	times, reducing peak load and allowing providers to better. Batteries are a flexible form of energy storage and can respond faster than other energy storage or generation technologies and help maintain grid stability by turning on and off in fractions of a second.	introducing a large network battery or energy storage to the existing system, Bremer Bay can eliminate its reliance on diesel, which is vulnerable to rising diesel fuel costs, as well as the cost of transporting fuel long distances and environmental considerations. 'Behind the meter' solutions may also be a potential for individual enterprises or households who currently or plan to draw their energy from renewable sources (i.e., solar).	not, additional upgrades of infrastructure may be required to enable this technology.
Energy storage Pumped Hydro	Pumped hydro projects work by pumping water uphill from one dam to another during periods when power is cheap. Water is then released downhill through a generator to produce electricity when supply is low and prices are high.	Micro pumped hydro, when combined with a virtual microgrid has the ability to provide reliability beyond what is generally available in a battery. This is due to the system allowing for 'long term storage', which is storage that can essentially be 'banked' and utilised during times of need. The pumped-hydro system being developed in Walpole is estimated to be able to provide up to 72 hours of back-up power to the town during outages.	Pumped hydro requires the existence (or construction of) two dams at the right level of elevation from each other to generate the amount of energy required to be effective. In many case, it is easier and more cost effective to construct the dams than re-purpose existing dams.
Smart grids	A smart grid is an evolved electricity supply network that uses digital communications technology to improve the two-way communication between supply and consumer, detect and react to local changes in usage, automation, and connectivity of the various components of the power network. The main components of a smart grid are electric power generators, electric power substations, transmission and distribution lines, controllers, smart meters, collector nodes, and distribution and transmission control centres. Smart grids will increasingly be utilised moving forward and are likely to become more mainstream in 5 – 10 years' time.	Smart grids will support greater reliability, availability and efficiency as the technology evolves over time. This is likely to include: • Ability to adapt to new technologies as they arise. • More efficient transmission of energy. • Quicker restoration of electricity out of power disturbances. • Reduced operations and management costs. • Reduced peak demand. • Increased integration of large-scale renewable energy systems.	Smart grids require leadership and coordination in order to achieve the maximum intended benefits for the communities or businesses involved.

Solar energy	Solar power can be implemented by individual households and businesses or can be part of larger solar 'farms' that provide energy to communities or areas. Solar can operate with or without storage, depending on the needs of the user. Solar and wind power are the dominant renewable energy sources used for off-grid projects because they suit most locations in Australia and are readily combined with battery systems or energy storage solutions.	Solar power, including battery storage, may be a suitable solution for individual enterprises who are seeking greater power supply and independence from the main grid so they are not exposed to unforeseeable brown outs. As part of a broader solution that addresses general energy across the town's enterprises and residents, solar may be a useful addition to an energy mix that can increase the town's energy independence.	Solutions for individual enterprises may miss opportunity to address broader energy infrastructure challenges in Bremer Bay.
Ocean energy	Ocean energy includes energy generated from waves, tidal movements and thermal energy conversion.	The South Coast region is uniquely positioned to draw on the abundance of ocean energy available along the coastline. This position has prompted significant investment in establishing the region as a leader in ocean energy research and development (UWA Wave Energy Research Centre and the proposed Ocean Energy Research Marketplace being led by the Australian Ocean Energy Group) which presents opportunity for Bremer Bay to be a trial site for existing or new ocean technology.	There is only a small market at present for tidal, wave and ocean thermal energy. While supply of ocean energy is abundant in the region, the technology required to harness that energy is still relatively young and is still high cost. In addition, the application of these types of energy is highly dependent on site suitability.
Wind energy	The South Coast Region is a major adopter of wind farms to general power to the SWIN. Solar and wind power are the dominant renewable energy sources used for off-grid projects because they suit most locations in Australia and are readily combined with battery systems or energy storage solutions.	Bremer Bay already harnesses wind power through a single turbine at their back up power station (supported by a diesel generator). This indicates that the wind conditions in Bremer Bay are already assessed to be conducive to wind as an energy source which may mean it is a more streamlined process to implement additional turbines or infrastructure, if that would assist with energy reliability.	Without the application of an energy storage solution, additional wind energy may not be effective in solving energy reliability issues in Bremer Bay or add any value to the existing infrastructure.
Hydrogen	Hydrogen is the most abundant chemical in our world, it can be processed into an energy carrier using a renewable method such as electrolysis, or traditionally through steam reformation. Hydrogen can be safely stored and used in	Western Australia is investing in the skills and projects required to be a leader in clean hydrogen exports and domestic use. There is potential for the technology, skills and infrastructure that are proposed as part of the	Hydrogen is unlikely to play a role in Bremer Bay's energy infrastructure in the short to medium term and will rely on the industry and technology maturing further before it can be applied in the local context. The potential for

	power generation and energy storage, as fuel for hydrogen vehicles, or as a feedstock for chemical products.	Western Green Energy Hub (Esperance) may benefit Bremer Bay in the long term through proximity and the opportunity to utilise hydrogen to store energy or fuel vehicles.	Bremer Bay to be a pilot site for hydrogen energy technologies would need to be investigated.
Biomass	Biofuel is any fuel derived from recently living organisms or their by-products. This includes wood and wood waste, animal manure and effluent, agricultural by-products such as straw and bagasse or even dried municipal waste. There are three different processes identified as being the most likely prospects for the production of biomass energy in WA: gasification of plant waste, biogas production through anaerobic digestion and ethanol generation from crop residues respectively.	The use of bio-fuels can be helpful for providing energy to single operators or properties, where the 'plant' is on the same site as the equipment or infrastructure requiring power. This may be applicable for some of the operators in Bremer Bay who are investigating alternative energy sources to support expansion.	Biomass is best suited to use in environments where feedstock (wood, wood waste, animal manure, effluent, agricultural by-products etc) is readily available. The availability of feedstock would need to meet the requirements of the technology in order to produce value for the user.

Appendix 2 – Resourcing and timeframes – Additional details

This business case proposed that initial steps towards solving Bremer Bay's energy problems will require further technical investigation and understanding to ensure the most appropriate solution can be implemented. This appendices provides additional guidance on the areas of inquiry that should be investigated through these two processes and can be utilised to help develop the scope of works required.

Market Needs Assessment

The purpose of the market needs assessment is to gain a stronger understanding of the current and future energy requirements of Bremer Bay's community and businesses. Due to the technical complexity of energy infrastructure and services, a greater level of detail is required to understand the potential impacts of investment in infrastructure (or the cost of no investment) on the local and regional economy. More consultation is also required with the community in general to understand the vision and aspirations that community have for potential solutions, and their appetite for innovative approaches. It is not sufficient to only consider current challenges, the assessment should look into the future to understand the town's growth trajectory and residential and industry profile. The assessment should seek to answer the following questions outlined in table 8.

Table 8 – Market needs assessment areas of inquiry

Population	• What is Bremer Bay's projected population growth for the next 15 – 20 years. • How and where will this population growth be accommodated with and around the town. • What kinds of infrastructure will be required to support the growing population.
Economy	• What are the current cost of unreliable energy to the local economy each year, and the potential future costs if energy infrastructure does not change. • Quantify the potential of the development of local strategic industries with a focus on tourism, aquaculture and fisheries and population services, to understand the future capacity requirements of any energy solution. • Identify priority industries or sectors which require more immediate energy support to capitalise on regional trends and opportunities.
Community	• What does the community of Bremer Bay want to see prioritised as part of an energy solution in Bremer Bay. • What characteristics should the ultimate solution entail to deliver the desired outcomes of the community.
Energy (Information to be requested from Western Power)	Bremer Bay specific information: • Peak demand • Average demand • Profile (daily and annual)

	• 12 month and 1.2 year demand • Number of connections • Exceptional needs (i.e., health, safety, size infrastructure) • Forecast 5 year and 10 years

Options Assessment

The options assessment will draw on the data collected in the market assessment to identify the most appropriate, sustainable and growth-enabling energy solution for Bremer Bay. The options assessment will require the input of technical energy expertise and understanding of the Western Australian energy context, market and technologies. The identified expert should ideally also be able to provide recommendations regarding advocacy and processes to obtain approval for innovative energy technology or projects that may not currently be supported by SWIN regulatory frameworks. The assessment should seek to answer the following questions:

- What are the most appropriate energy solutions that:
    - Meet the physical, technical and economic requirements Bremer Bay's businesses and community in the short, medium and long term;
    - Meet the values and aspirations of Bremer Bay's businesses and community;
    - Support the town's plans for future infrastructure and service development;
    - Leverage regional projects and investment into energy innovation and renewable energy projects;
    - Leverage Bremer Bay's unique geography and renewable energy advantages;
    - Retain customer choice and independence;
    - Provide a pathway to net-zero carbon emissions.
- What are the relevant regulatory requirements that will need to be addressed or considered;
- How would different solutions need to be staged / delivered to meet the above requirements in a way that promotes sustainable growth;
- What are the environmental benefits involved in potential energy solutions and how to they respond to policy and regulation; and
- Who are the potential partners, providers and stakeholders required to deliver on potential energy solutions.

Implementation Plan

Likely to be incorporated into the work package of the previous phase (options assessment) the implementation plan should put forward a practical pathway to delivery for stakeholders to pursue. The implementation plan should aim to break down the required actions into phases which can be resourced and advocated for strategically. The plan should also identify or consider capital and ongoing expenditure costs and Ongoing communications with stakeholders, business and community.

Appendix 3 – Glossary of economic development terms

Table 9 – Glossary of economic development terms

Additional Output / Output effect	Additional economic output (i.e., business conducted) in dollars due to changes to a particular industry or business.
Additional Employment	Additional jobs created due to changes to a particular industry or business.
Additional Wages and Salaries	Additional wages created due to changes to a particular industry or business, due to either to new jobs being created, or changes to existing jobs resulting in pay rises due to higher skillsets being required.
Additional Value-added	The increase in value (measured in dollars) that a business or industry creates by improving an input product (for example, adding value to wheat by baking it into bread).
Consumption	The act of goods and/or services bought by people, with value measured in dollars.
Consumption effect	Measures the change in consumption for all goods and services arising from the increase in output (i.e., the increases in good or services being produced).
Direct impact	The impact that directly results from changes to a particular industry or business. Can apply to jobs, output, wages, etc.
FTE (Full Time Equivalent)	The equivalent of one person working full time (for example, two part time employees may make up the hours of one FTE).
Indirect impact / Supply chain effect	Refers to the impact that changes to a particular industry or business create *in*directly on all stages of the supply chain. Essentially a "ripple effect" of the direct impact.
Supply Chain	A network between a company and its suppliers that shows how a specific product or service is made and then distributed to the final consumer.

Appendix 4 – Economic impact analysis – Additional details

Methodology:

Economic impact analysis conducted utilised a 'goal seek' approach to identify the potential impacts of investment in:

- Capital expenditure required to deliver energy solution;
- Planned capital expenditure (where information was made available) by local business on expansion of operations, should energy solutions be solved; and
- Potential new jobs enabled by enterprise expansion (should energy solutions be solved).

This information was analysed by a regional input output model to produce potential additional output, employment, wages and salaries and value add to the regional economy by the year 2030. While this project is focused on the four South Coast Alliance councils, economic impact analysis utilise the Great Southern region as a functional economy, recognising that impacts and supply chains are likely to involve other centres throughout the Great Southern region. In addition, potential funders are likely to recognise the Great Southern region as a functional economy and utilise aligned data for their own assessment and impact reporting.

Table 10 – Input output summary of impacts based on energy solution capital expenditure (benchmarks only) by 2030

Benchmark	Impact area	Direct Effect	Supply-Chain Effect	Consumption Effect	Total Effect	Type 1 Multiplier	Type 2 Multiplier
Solar Farm Renewable Newstead $2.7M investment	Output ($M)	$2.70	$1.15	$0.30	$4.15	1.425	1.536
	Employment (Jobs)	1	1	1	3	2	3
	Wages and Salaries ($M)	$0.16	$0.17	$0.07	$0.40	2.056	2.489
	Value-added ($M)	$0.68	$0.48	$0.17	$1.34	1.705	1.955
Hydrogen Denham Hydrogen Demonstration Site $8.9M investment	Output ($M)	$8.90	$2.03	$0.53	$11.45	1.228	1.287
	Employment (Jobs)	2	2	1	5	2	2.5
	Wages and Salaries ($M)	$0.28	$0.30	$0.12	$0.70	2.056	2.489
	Value-added ($M)	$1.21	$0.85	$0.30	$2.36	1.705	1.955

Source: Remplan, 2021. Renewable Newstead Planning Documents, ARENA (Australian Government).

Table 11 – Strategic local business growth impacts by 2030

Business	Impact Area	Direct Effect	Supply-Chain Effect	Consumption Effect	Total Effect
Strategic business 1 Planned CAPEX: $1.7M Planned additional jobs: 5	Output ($M)	$4.54	$2.24	$0.96	$7.74
	Employment (Jobs)	7	4	3	14
	Wages and Salaries ($M)	$0.60	$0.46	$0.22	$1.28
	Value-added ($M)	$1.76	$0.99	$0.55	$3.30
Strategic business 2 Planned CAPEX: Not provided Planned additional jobs: 15	Output ($M)	$8.13	$3.55	$2.00	$13.68
	Employment (Jobs)	15	8	5	28
	Wages and Salaries ($M)	$1.35	$0.86	$0.47	$2.67
	Value-added ($M)	$3.25	$1.49	$1.15	$5.89

Source: Remplan, 2021. Consultation with local businesses conducted by consultant team. Estimates only provided and names not utilised as information is commercially confidential.

Appendix 5 – Funding sources – Additional details

Table 12 – Additional potential funding sources

Building Better Regions Fund	Create jobs, drive economic growth and build stronger regional communities into the future. Two streams: infrastructure, and community investments. Matched dollar-for-dollar.	Up to $10million per project	Medium	Engage with Australian Government to position for when new rounds announced.
Growth Grants & Smart Projects and Supply Chains	For SMEs: help improve specific business areas to improve the ability and skills of your business to trade. The 'SMART' project is focused on reducing emissions, and energy consumption. Matched dollar-for-dollar.	Up to $20,000 per application, for either program.	Medium	Encourage SMEs to apply to grow, while also being more energy efficient.
Regional Australia Microgrid Pilots Program	To improve the resilience and reliability of electricity supply in regional communities and demonstrate solutions to technical, regulatory or commercial barriers to the deployment of microgrid technologies in Australia. Funds deployment, not feasibility studies. Matched funding.	Up to $5 million over 6 years.	Medium	Apply after completing feasibility study.
Western Power projects and trials	Precedent projects of Western Power using end-of-grid communities to pilot alternative and renewable energy solutions.	tbc	Medium	Engage with Western Power regarding feasibility study or piloting of technology.
Regional New Industries Fund	Provide grants across the nine regions of Western Australia to support venture creation, accelerate small-medium enterprise growth and seed innovation initiatives.	No maximum, but likely less than $250,000 per project.	Low	Engage with DPIRD to position for when new rounds announced.
Innovation Connections	For SMEs: to research an idea with commercial potential, including energy alternatives, with the support of a facilitator and pairing with a researcher.	Up to $50,000 per application	Low	Encourage SMEs to apply.

Appendix 6 – Market analysis – Additional details

Market Conditions

According to the Clean Energy Council[2], the growth of Australia's renewable energy industry showed no sign of slowing in 2020 as increased support from state and territory governments saw numerous records set across the large- and small-scale sectors.

The industry passed a significant milestone in 2020, with more than a quarter of the country's total electricity generation coming from renewable sources for the first time. Renewables were responsible for 27.7 per cent of total generation in 2020, an increase of 3.7 percentage points compared to 2019.

Much of this increase was due to the small-scale solar sector, which added more than 3 GW of new capacity in 2020 to record its fourth-straight record-breaking year. This brought the sector's share of Australia's renewable energy generation to 23.5 per cent, pushing it past hydro into second place for the first time.

The large-scale sector contributed almost 2 GW of new capacity in 2020 as 32 projects were completed around the country. While most of these projects were large-scale solar farms, representing 893 MW of new capacity, the wind sector accounted for the bulk of new generation, adding 1097 MW throughout the year. This was a new record for the sector, comfortably surpassing the 837 MW record set in 2019.

According to Mordor Intelligence, The Australian renewable energy market is expected to record a CAGR of more than 8% during the forecast period of 2020-2025. Factors, such as supportive government policies, rapid acceptance of domestic solar energy in the past two years (2018 and 2019), and pressure to meet the power demand using renewable energy sources are expected to be the significant contributors to the growth of the market. With the commitment of the government for different cities like Canberra, Hepburn Shire, City of Sydney, and others to provide 100% renewable energy to the city buildings and supplying rest to public lighting, the share of renewable has grown at such a significant rate that Australia achieved its 2020 goal in 2019. Additionally, the declining costs of renewable technologies are becoming competitive with fossil fuel sources, and additional subsidies on renewables are driving the renewable market further. On the other hand, with the absence of any new initiatives, a decline in renewable energy investment in 2019, and limited power capacity by variable renewable energy sources, is expected to hinder the growth of the renewable market in the country.

- Australia witnessed rapid growth in the solar market during 2018-2019. With the second highest per-capita solar capacity, following Germany in 2018, Australia successfully increased annual solar installation by three folds in 2018, comparing to the installations in 2017.
- With Renewable Energy Target (RET) of 2020, Australia was aiming to achieve a 20% renewable share in electricity generation. Further aiming for 50% renewable share by 2030, Australia is likely to present a huge opportunity to the players involved in renewable market soon.

[2] Clean Energy Council, Clean Energy Australia Report, 2021

- Australia has many ambitious renewable projects lined up. With enormous solar, wind, and hydro energy potential, the country is ready to take a leap in the renewable market. Along with six auctioned projects in the state of Victoria in 2018, three in the wind, and three in solar, Australia has many projects with several Gigawatts of capacity in the forecast period.

The following statistics support the existence of a general trend towards commercial and residential demand and uptake of renewable energy solutions.

- 27.7% Australia's electricity generation from renewable sources in 2020.
- >3 GW small-scale solar capacity added in 2020.
- 76 large-scale wind and solar projects under construction at the end of 2020.
- 12 GW new transmission capacity promised by the New South Wales Government’s Electricity Infrastructure Roadmap.
- 16 utility-scale batteries under construction at the end of 2020.
- 23,796 small-scale batteries installed by Australian households in 2020.
- 238 MWh combined capacity of household batteries installed in 2020.
- Of renewable energy generation in Australia, 35.9% is wind, 23.5% small-scale solar PV, 23.3% hydro, 10.9% large-scale solar PV, 5.0% bioenergy, and 1.4% medium-scale solar PV.