



## Who are the Energy Security for SA Working Party?

The Energy Security for SA Working Party (ESSAWP) are an independent group of people based on Eyre Peninsula, with no vested interests, who are working together to progress an energy future and energy security solution for Eyre Peninsula and South Australia. ESSAWP have been working with stakeholders across government, industry and the region, on a plan and solution for energy security in SA for over 12 months.

The group brings together a wide range of backgrounds with specific skill sets needed to develop solutions in the best interest of South Australia.

The ESSAWP team have good support from regional bodies, local government and RDA Whyalla and Eyre Peninsula and have established connections with ElectraNet, ESCOSA, SA Power Networks, Minerals, Resources Infrastructure and Investment Taskforce, generators, funders, investors and major commercial users including fishing, manufacturing and mining industry stakeholders. ESSAWP are working with all stakeholders, to secure a collaborative, informed and proactive approach to energy security and energy capacity for South Australia.

The overall objective of ESSAWP is to achieve sustainable, reliable, affordable and energy security for South Australia. The Energy Security for South Australia Working Party's only purpose is to work with government, energy sector companies and agencies, industry and community to get a solution in place for energy security that maximises the generation capacity of the renewable resources and stabilises the grid on Eyre Peninsula, across South Australia, and Australia.

ESSAWP have no political allegiances and have no Commercial interests. We are interested in outcomes and have no specific technology solution preferences.

The Energy Security for SA Working Party (ESSAWP) on Eyre Peninsula are committed to working for a collaborative energy security solution. The ESSAWP has been advocating for immediate energy security improvements and for accessing the abundance of renewable energy capacity, with Eyre Peninsula demonstrating some of the highest reserves of untapped wind and solar and emerging pumped hydro capacity and hydrogen to contribute to secure, affordable and low emission energy generation.

## Our goals are:

- Affordable energy
- Reliable of supply
- Sustainable systems
- Zero emissions from energy
- EP becomes a major exporter of zero emission energy
- Efficient use of energy

ESSAWP, in conjunction with the very successful SALT Festival held 'Line in the Sand', the Energy Security Summit held on April 24, 2017 in Port Lincoln, attended by 84 participants (and viewed by 98,000 online). The summit was held to explore solutions for reliable, affordable, sustainable energy and to secure increased energy generation and supply for Eyre Peninsula and South Australia. It attracted several high profiles speakers such as Professor Ross Garnaut and culminated with an open forum to discuss the energy future of Eyre Peninsula. This resulted in the establishment of a taskforce to progress the agreed objectives and has led to presentations to State Government calling on support for a



set of projects for the Eyre Peninsula to rapidly progress energy security. The Summit, through the taskforce (ESSAWP), has led to the production of a draft, 20 year, staged energy plan for the region, covering all areas of the region's needs, opportunities and infrastructure requirements in Energy, from large scale transmission upgrades down to small scale energy auditing and incentives schemes for residential customers.

The summit featured presentations by Economist Professor Ross Garnaut, Chair of the Outback Community Authority Cecilia Woolford, Chair of Eyre Peninsula Integrated Climate Change Agreement Committee (EPICCA) Brian Foster, Electrical Engineer and a founding member of the Energy Security for South Australia Working Party (ESSAWP) Steve Sawyer, and a facilitated panel session to discuss current issues and opportunities around energy security and climate change for the Eyre Peninsula, and how this sits within the state and national context.

### **Introduction:**

The Australian Electricity System and the National Electricity Market System is now in the beginning of a new revolution which will see substantial changes on the focus and that way the system is structured and operates

It is changing from the model set up in the last century of large centralised generators feeding into a transmission system and then the distribution network to consumers to a system where there is distributed generation, both large and small, from dedicated generators to customers who are also generators. There will be an increase in the use of battery systems to provide grid stability and short-term storage coupled to longer term storage systems such as pumped hydro. This will also be aided by using smarter grids along with increased customer interaction and input.

The current National Electricity Market and rules are no longer appropriate and are an impediment to the transition to the new renewable energy based generation system and interactive grid systems. This is highlighted by the Independent Review into the Future Security of the National Electricity Market by Dr Alan Finkel. 49 of these recommendations have recently been approved by the COAG Energy Ministers Meeting in Brisbane on 14/7/2017.

Under the Improve System Planning Considerations, it recommended the development of an integrated grid plan to facilitate the efficient development and connections of renewable energy zones across the National Electricity Market (Recommendation 5.1) Recommendation 5.5 also recommends a review of the Regulatory Investment Test for Transmission, which relates to the preceding recommendations. This change in focus needs to be considered in this current RIT-T as failure now to allow for future developments could make the proposed outcomes of this RIT-T at conflict with this.

Community needs and expectations should also be identified, considered and evaluated.

Where these components conflict with the current RIT-T requirements, this again needs to be identified and separate costings for compliant and non-compliant components which would require external funding

Energy security is an economic imperative for South Australia and the nation. The Eyre Peninsula region of South Australia is a strategic priority. Eyre Peninsula is located at the end of the national grid and has experienced consistent issues regarding reliability, stability of supply and grid capacity. Following the dramatic blackouts of 2016 and the economic impact of rising electricity prices in South Australia, it is evident that immediate effective action is required to establish energy security on the Eyre Peninsula alongside the positive work occurring through the South Australian Government's State Energy Plan.

Eyre Peninsula has a population of 58,000+ people and produces \$4.2 billion of regional product and exports a similar value \$4.1 billion. Eyre Region includes the major centres of Whyalla, Port Lincoln and Ceduna.

Eyre Peninsula is a region of innovation with a diversified economy including agriculture, aquaculture and seafood, tourism, manufacturing, mining and minerals processing and the renewables sector. Economic development is currently constrained due to energy security, affordability and reliability issues. The region's current energy requirements are up



to 30 MW for the Southern Eyre Peninsula inclusive of Port Lincoln and around 50 MW for the balance of Eyre Peninsula.

The Eyre Peninsula region is a major economic contributor to the state's economy. Current electricity infrastructure is not fit for purpose and this includes the power line from Whyalla to Port Lincoln and the significantly under sized power line to Streaky Bay and to Ceduna. The Port Lincoln's Power Station, which is currently identified as the backup power supply in case of blackout, has not successfully operated for some time. It costs \$10 million annually and the generator's ten-year contract for that back-up supply concludes at the end of 2018.

The region has significant electricity generation capacity. The 2010 Select Committee on Wind Turbines Report undertaken by Worley Parsons and Macquarie Capital identified over 4000 MW of easily harvested wind generation. A further capacity of over 4000 MW of solar generation on Eyre Peninsula has been identified.

### **Specific Comments on Sections in the Report:**

#### **Section 4: Potential Credible Options to Address the Identified Need**

##### **4.1 Option 1 – Re-conductoring of the existing 132 kV single-circuit network and the continuation of network support at Port Lincoln.**

Any option that relies the continued operation of the existing power station raises concerns as to the reliability and adequacy of ongoing maintenance and support of the existing generation equipment. As you are well aware, this power station failed during the Sept 28th storm in 2016, costing the community \$8.33M. There is no evidence that has been provided to show that the existing station problems have resolved and the system definitely has not been tested show that it is capable of re-energising supply to Pt Lincoln in the event of an outage on the 132 kV lines feeding Pt Lincoln.

There is no mention in this option of upgrading the capacity of the line, which is already constraining the output of the two existing wind farms.

In the 2012 Report, the only credible options identified were about construction of new 275 kV circuits and the 132 kV option was not progressed. Rebuilding of the 132-kV line with higher capacity was considered in the 2013 PADR and ranked last of the options investigated. This indicates that this is not a credible option.

##### **4.2 Option 2 – Construction of a double circuit 132 kV line.**

This option removes the current concerns about the reliability of the Pt Lincoln Power Station. The capacity of the proposed lines has not been suggested, so it is concerned that this may not even remove the existing constraint.

Construction of a 132 kV provides minimal opportunity for the large generation potential from the Wind and Solar Resource on Eyre Peninsula. While the current generation connection arrangement may not come under the existing RIT-T process, this needs to be acknowledged and stated as a major disadvantage in this option.

##### **4.3 Option 3 – Construction of two single circuit 132 kV lines.**

This option also removes the current concerns about the reliability of the Pt Lincoln Power Station. The capacity of the proposed lines has again not been suggested, so again it is concerning that this may not remove the existing constraint.

Again, construction of a 132 kV provides minimal opportunity for the large generation potential from the Wind and Solar Resource on Eyre Peninsula. While the current generation connection arrangement may not come under the existing RIT-T process, this needs to be acknowledged and stated as a major disadvantage in this option.

##### **4.4 Option 4 – Construction of a double circuit 275 kV line.**



This option also removes the current concerns about the reliability of the Pt Lincoln Power Station. The capacity of the proposed lines has again not been suggested. Both the 2012 and 213 Reports nominated the Cultana to Yadnarie options of 1000 MVA or 600 MVA and from Yadnarie to Pt Lincoln and Yadnarie to Wudinna as 600 MVA

The 600 MVA lines does allow for connection of proposed loads such as the iron Road Development but only allows for a small part of the large generation potential from the Wind and Solar Resource on Eyre Peninsula. This is not sufficient to allow the development of the full potential of the resources. Again, while the current generation connection arrangement may not come under the existing RIT-T process, but this needs to be acknowledged and stated as a major disadvantage in this option.

#### **4.5 Option 5 – Construction of two single circuit 275 kV lines.**

This option also removes the current concerns about the reliability of the Pt Lincoln Power Station. The capacity of the proposed lines has again not been suggested. Both the 2012 and 213 Reports nominated the Cultana to Yadnarie options of 1000 MVA or 600 MVA and 600 MVA from Yadnarie to Pt Lincoln and Yadnarie to Wudinna

The 600 MVA lines provides minimal opportunity of the large generation potential from the Wind and Solar Resource on Eyre Peninsula, but it is not sufficient to allow the full potential. Again, while the current generation connection arrangement may not come under the existing RIT-T process, this needs to be acknowledged and stated as a major disadvantage in this option.

#### **Options not considered**

**4.6.1 De-energised re-conductoring version of Option 1**, which is re-conductoring of existing line while running on Pt Lincoln Power Station. Any option involving the continued use Pt Lincoln Power Station raises the current concerns about the reliability of the ongoing use of this station.

We concur that this option should not be considered

#### **4.6.2 Continuation of generation support at Port Lincoln and staged building of a new double circuit 132 line**

Any option involving the continued use Pt Lincoln Power Station raises the current concerns about the reliability of the ongoing use of this station.

We concur that this option should not be considered.

#### **4.6.2 Decommission existing line and operate Eyre Peninsula as a series of micro-grids**

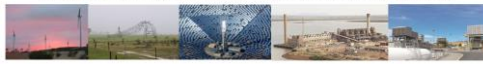
We concur

#### **4.6.5 500 kV transmission options.**

As you have stated, this may not be justifiable in terms of the incremental market benefits it may return, (under the existing NEM requirements).

However, if the new recommendation in the Finkel Report and as approved at the recent COAG Energy Ministers Meeting, this maybe no longer a valid assessment

The installation of a large 500kV network across Eyre Peninsula (couple to new interconnectors) is fundamental to enabling the connections of vast quantities of renewable generation and large scale storage options which is vital for the future of South Australia. It also enables other emerging technologies to piggy back on this resource such as hydrogen production (which fits into the State's Energy Plan) and fertiliser production.



ESSAWP has recently updated its plans taking into account the rapidly changing energy scene to a short term plan to improve the reliability on Eyre Peninsula and a longer term plan to integrate the proposed generation, loads such as the Iron Road Development, large scale storage scheme near Whyalla and the establishment of hydrogen generation system near Whyalla. The long term concept is shown in Figure 1.

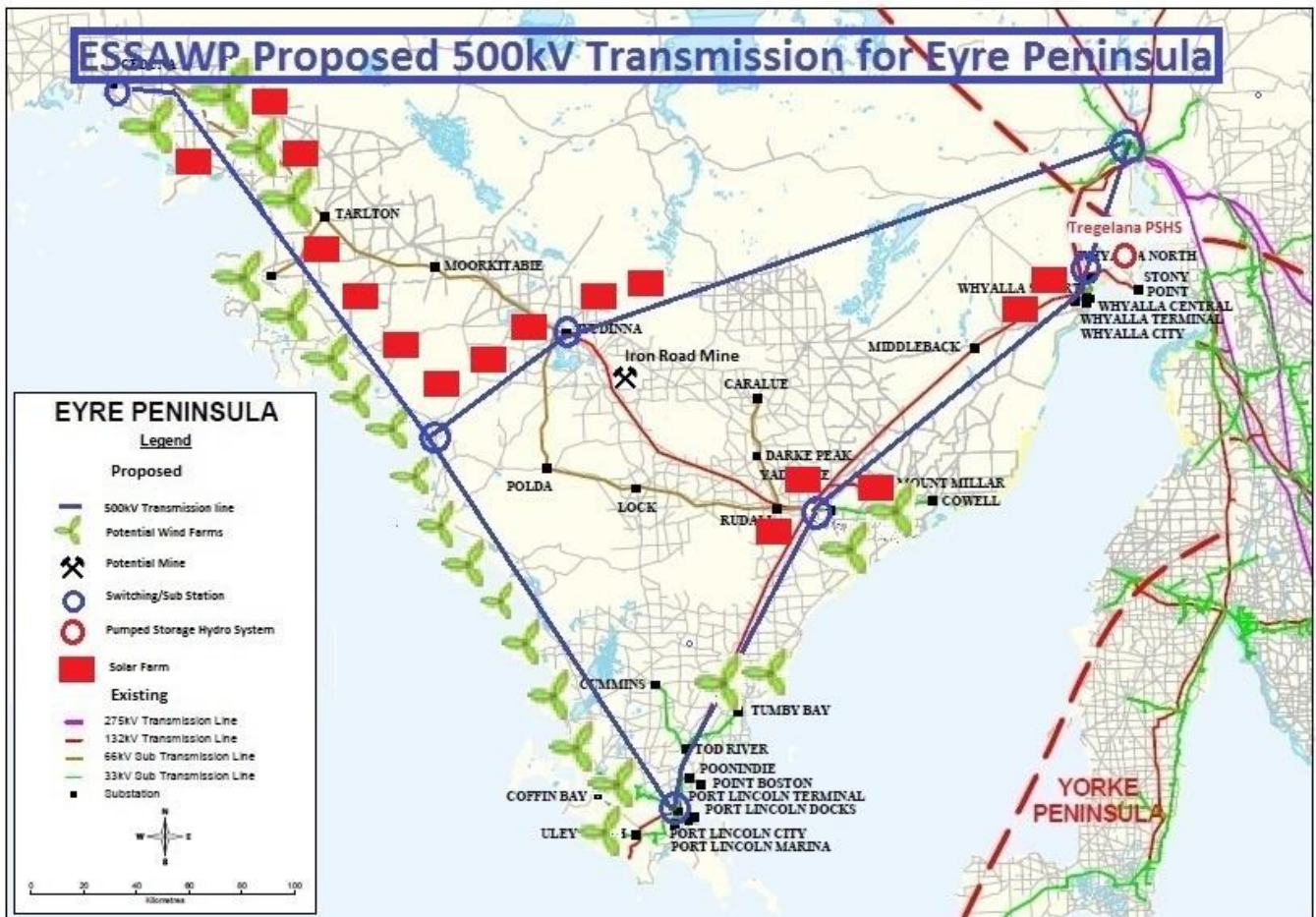


Figure 1

This concept plan takes into account:

- Network reliability by providing two geographically separate single circuit lines which provides a ring for Port Lincoln to meet the ETC reliability standards (as well as improving this in other parts of the peninsula)
- Allows for large load customers such as the Iron Road Mine Development
- Allows for the connection and utilisation of the large amount of wind resources identified on Eyre Peninsula and enables getting to market.
- Allows for the connection and utilisation of the large amount of solar resources identified on Eyre Peninsula and enables getting to market.
- Allows for the connection and integration of large scale pumped hydro storage schemes such as the Tregalana Pumped Hydro System.
- Allows capacity for the transport of the energy from across the Peninsula to location such as Whyalla to feed the former Arrium plant and a proposed hydrogen manufacturing facility .

ESSAWP therefore strongly recommends the inclusion of a 500 kV network as a credible option with full assessment and funding options.



## 5.1 Assistance meeting the ETC reliability standards at Port Lincoln Terminal

The existing arrangement of a single transmission line coupled with a Network Support Agreement with the existing power station owned by Synergen/Engie has demonstrated that this existing arrangement does not meet the ETC Reliability Standard. Up to date information has revealed that this station is at the end of its economic life and some plant has never been reliable since the day of recommissioning on this site.

Replacement of the existing power station with more reliable plant is not an option which is supported. The existing cost of this Network Support Agreement of approximately \$10M per annum (and presumably a new agreement would be considerably more expensive, particularly because of the relatively short lead time proposed) does not represent a worthwhile investment and the option of a second transmission line would provide additional benefits if it follows a different route to help allow network access which is currently not feasible.

While any plant installed to provide the backup for the transmission line is not expected to run for many hours per year, any fossil fuelled arrangement is not recommended.

## 5.2 Improving regional reliability and energy security

The level of residential and commercial rooftop PV systems is increasing and proposed programs will increase this further. Advances and decreasing costs of battery behind the meter battery systems will see these become common place. Keeping these online is also critical to preventing sharp increases in demand during/following faults and disturbances. This may require increased Frequency Controls and Ancillary Services (FCAS) being provided in the form of grid scale battery systems.

As ESSAWP have major concerns about the reliability of the grid across the Peninsula, we undertook a risk study of all the 13 larger towns connected via the Yadnarie Substation. This modelling took into account population, length of line from the secure source and the number of alternate means of supply available.

This modelling indicates that Port Lincoln has the highest risk, even though it has a backup power station. Second and third was Ceduna and Streaky Bay respectively, primarily due to the added length of about 200 km of distribution system from Wudinna. This finding also reflects the length of time (up to 5 days) customers in these areas were off supply during the September 28<sup>th</sup> 2016 storm. To reduce this a proposal was formulated to reduce the outages and provides some short term storage utilising 2 or 3 grid connected battery systems as indicated in Figure 2. If option 2 is implement, it will require other sources of generation such as wind and solar farms to be connected to provide power beyond the storage capacity of the batteries.

If both options are implemented, this covers approximately 75 % of the customers on the Peninsula.

The battery system located at Pt Lincoln would provide short term power after loss of the incoming supply, allowing the Pt Lincoln Power Station to come online. This no break system would also all the grid connected solar systems to remain on line and not increase the demand. Continued operation of the nearby Cathedral Rocks Wind Farm can also be continued by controlling its dispatch. After restoration of the incoming supply, it can seamlessly transfer back to the transmission line and taking the Pt Lincoln Power Station off line. The FCAS services that can be provided by the grid battery system may also help the stability and reliability of the Port Lincoln Power station



# ESSAWP Proposed Short Term Battery Plan and Options

Options 1 & 2 cover approximately 75 % of the Eyre Peninsula's Population



Figure 2

## Environmental Considerations

ElectraNet’s Overarching Environmental Policy as published on the web states “facilitating uptake of new and emerging renewable energy sources”. As the RIT-T Report does not consider any options in relating to providing capacity for connection of these systems (as you cannot facilitate connection if you do not have the system capacity). Hence the 5 credible options listed may not comply with this policy statement. Each of the options should state if this requirement is to achieve and how much capacity each option provides?

## In Conclusion

The Eyre Peninsula will become a major exporter of renewable energy and this will require a 500 kV grid to provide the required capacity. Any upgrade needs to take this into account.

The South Australia Government Energy Plan outlines policy support behind increasing generation and grid capacity upgrades to enable increased renewable generation across the state.



The recently adopted Finkel Review has also recommended policy changes that support the transition to the new renewable energy based generation systems

ESSAWP highly recommends that ElectraNet include a 500 kV network as a credible option and as the preferred option for the Eyre Peninsula