

Energy Developments Cooper Pedy Renewable Hybrid Project

Remote Area Power Conference
Melbourne - March 2015



Leaders in Remote and Clean Energy

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Leaders in Remote and Clean Energy



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EDL a Leader in Remote and Clean Energy

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EDL – where to from here



Key Messages

- Energy Developments (EDL) has a 27 year track record of delivering safe, reliable power to remote Australia
- EDL currently operates 84 distributed generation projects with > 900MW capacity globally
- The Coober Pedy Renewable Hybrid (CPRH) project is a further step in EDL's long history of providing its customers safe; innovative; competitive and long term power solutions through technology adaptation and integration
- The CPRH project will establish new global benchmarks and will provide demonstration value to remote power sector stakeholders
 - MW scale – 3MW peak ~1.5MW average load
 - ~70% average annual diesel displacement
 - 100% RE generation approx. 50% of the time
- EDL has a diverse portfolio of long term contracts in its remote energy and clean energy business; strong cash flow; is well funded with an appetite for growth in distributed generation
- As CPRH moves into delivery phase EDL is looking both inside and external to its portfolio to pursue other renewable hybrid opportunities

EDL – Market Leaders in Distributed Generation

>900MW of distributed generation

- Remote Energy 389MW
- Waste Coal Mine Gas 253MW
- Landfill Gas 262MW



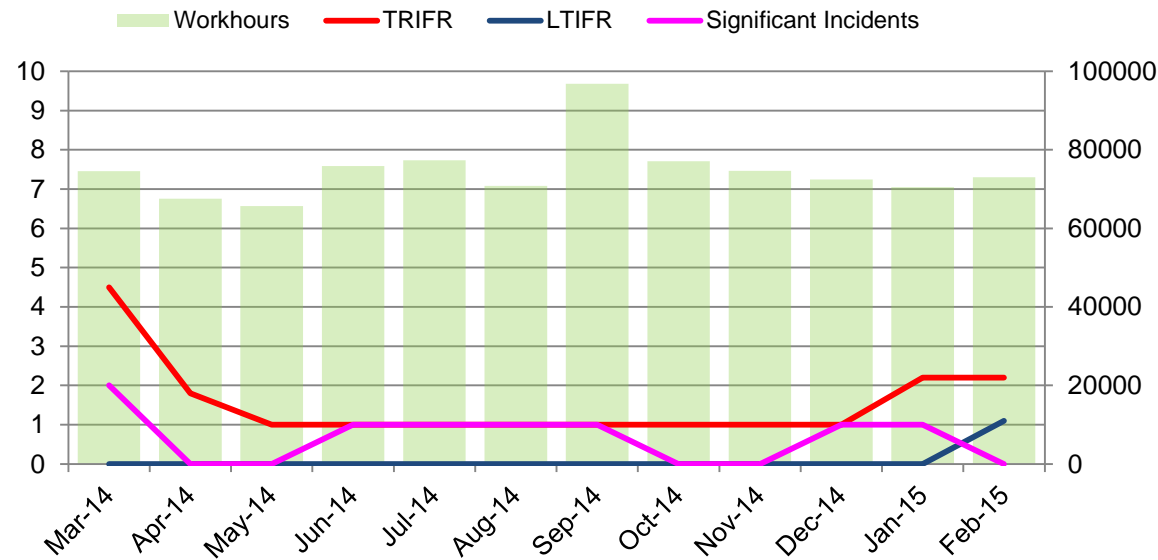
- ✓ Scale
- ✓ Diversified
- ✓ Long life assets
- ✓ Long dated contracts
- ✓ Blue chip counterparties
- ✓ Capability
- ✓ Continuing growth
- ✓ Well capitalised



KEY: ● Landfill Gas ● Waste Coal Mine Gas ● Remote Energy ● Liquefied Natural Gas / Compressed Natural Gas ● Office

Our Capability – Safety and People

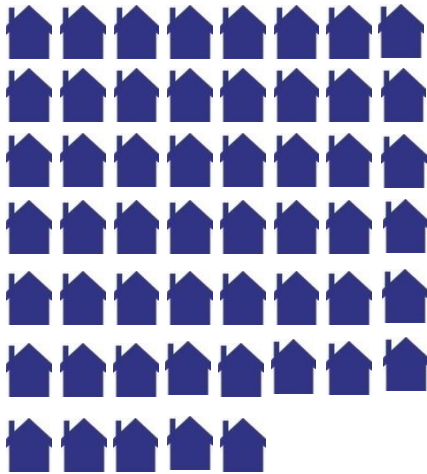
Highly experienced team with a strong track record of safely managing and growing the business



- ✓ Target Zero Harm
- ✓ Industry-leading safety performance
- ✓ LTIFR at 28 February 2015 is 1.1
- ✓ TRIFR (total reportable injury frequency rate: LTIs + MTIs) at 28 February is 2.2
- ✓ Strategies in place to attract and retain key talent
- ✓ Improved MW / FTE from 1.7 in FY12 to 2.2 in FY14

Clean Energy — Leader in Greenhouse Gas Abatement

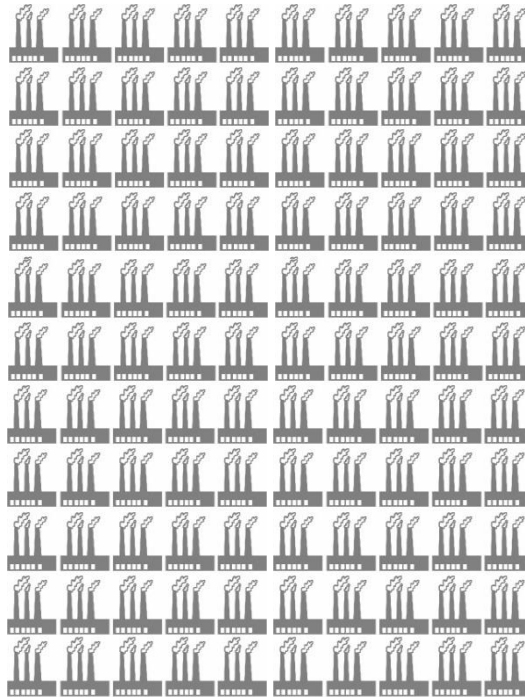
600,000 homes powered



Each home represents 10,000 homes

**= enough electricity to
power every home in
Adelaide¹**

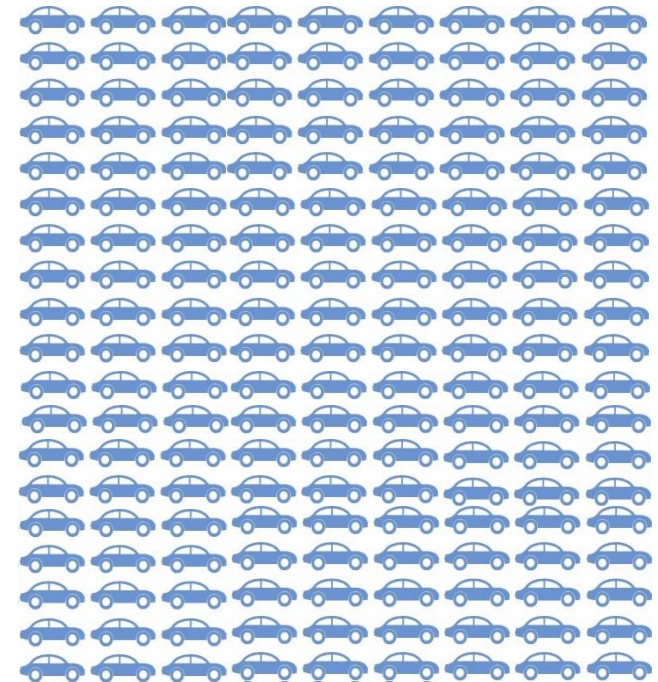
12 million tonnes
CO₂e- abated and avoided



Each factory represents 100,000 tonnes

**= ~2% of Australia's total
carbon emissions³**

Equivalent of about 3.5 million
cars removed from the road



Each car represents 20,000 cars

= ~20% of all Australian cars²

1. Total homes in Adelaide at 2011: 533,511 Census Quick Stats http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/4GADE
2. Total cars in Australia at 2013: 17.2 million <http://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0>
3. Total annual carbon emissions at 2012: 552 million tonnes

Executed Growth – \$500m Successfully Invested Since FY10

McArthur River – in partnership with Glencore

- Supporting Glencore's McArthur River mine expansion
 - Doubling capacity and increasing mine life to 2038
- EDL gas power station since 1995
- 20 year Power Purchase Agreement for 68MW
 - 53MW Wärtsilä expansion
- COD in January 2014



Moranbah North – in partnership with Anglo American

- Supporting Anglo's commitment to reducing carbon emissions and gas extraction costs
- 45MW WCMG power project since 2008
- 18MW expansion underpinned by:
 - 25 year WCMG supply extension with Anglo
 - Network support agreement with Powerlink
- COD July 2014

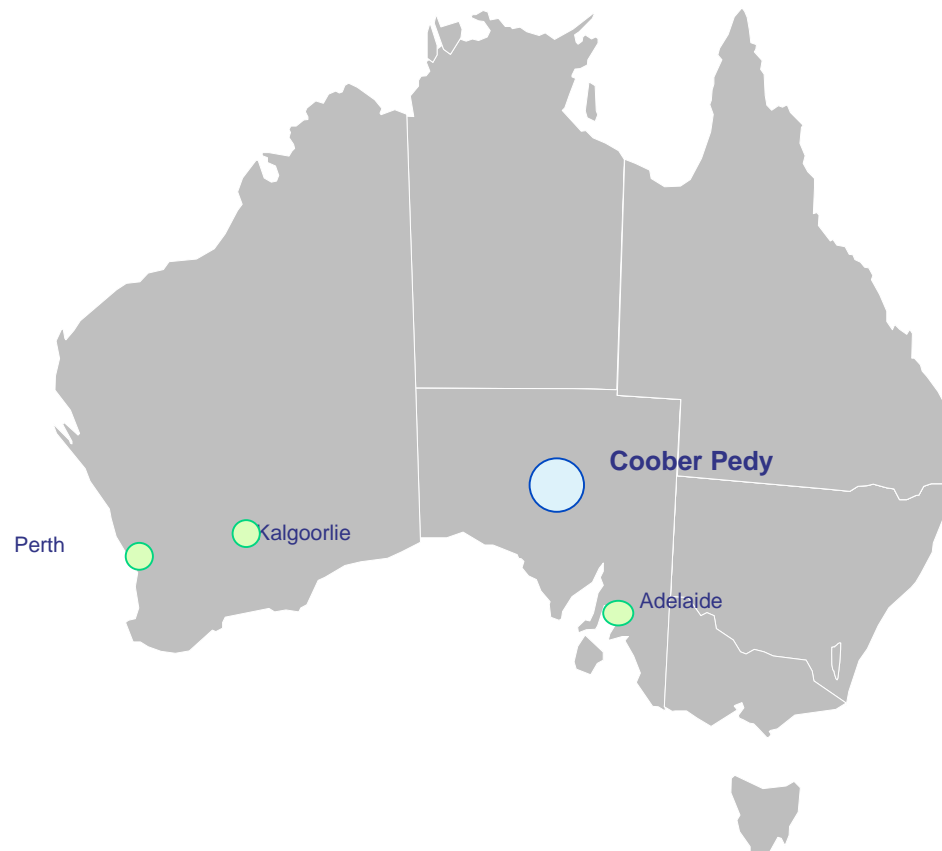


EDL continues to deliver accretive growth projects in a challenging market

CPRH a Large Investment in Coober Pedy, a Strategic Step for EDL

- CPRH Project is supported by up to \$18.5 million in funding from the Australian Renewable Energy Agency (ARENA)
- EDL's investment will be of similar magnitude

This is a very significant project for Coober Pedy and remote Australia



Background to the CPRH Project

Why is EDL investing?

- Strategic opportunity through displacement of fossil fuels with renewable energy investment
- Reduces cost to customer and organic growth for EDL in existing projects
- CPRH will demonstrate the technical viability for high penetration renewable hybrids which will become commercially viable as result of:-
 - Learnings that increase efficiency and reduce complexity
 - Further reduction in renewable hybrid costs particularly enablers
 - Higher fossil fuel costs including further carbon imposts

Why Coober Pedy?

- EDL has delivered safe, reliable power supply to Coober Pedy since 2004
- Good complementary solar and wind resource
- High marginal cost of current generation (diesel)
- Able to support MW scale hybrid project but small enough to attain high penetration without onerous financial investment for demonstration project
- Supportive customer, iconic remote location – high demonstration value

Why Hydro Tasmania? (Project Design)

- Proven track record in renewable energy
- One of the few (only?) that has achieved off grid high penetration; zero diesel at scale
- Technology agnostic



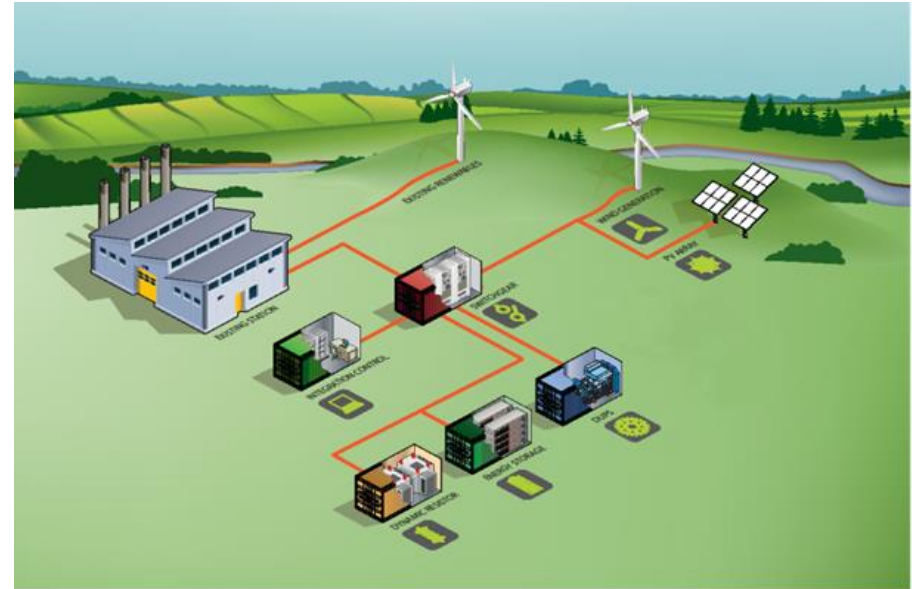
EDL's existing Coober Pedy power station



Wind monitoring mast, installed May 2014

Project Outline

- Proposed system configuration
 - 3MW wind
 - 2MW solar PV
 - 1MW / 250kWh Battery (short term intermittency)
 - 2-3 * 850kW DUPS
 - 2.5MW resistor
 - HT control architecture
- Following tender for key components final configuration will be optimised in response to component offerings
- Key requirements are
 - High ~ 70% average penetration
 - Wind and solar
 - Mix of enabling technology
 - Maintain quality and reliability of supply
 - Reduce cost to customer





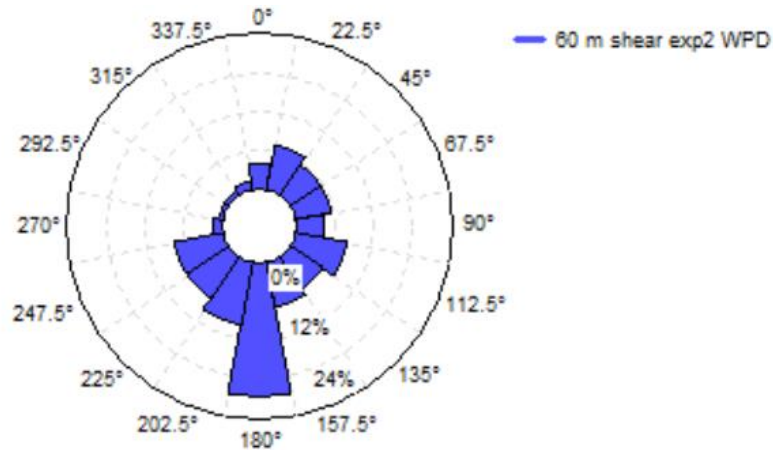
Stakeholders

- Local community
- District Council of Coober Pedy
- South Australian Government
- Australian Renewable Energy Agency (ARENA)
- SA Department of State Development
- SA Department of Environment, Water and Natural Resources
- AMYAC –Traditional owners
- Opal Miners Association
- Key suppliers
 - Hydro Tasmania – integration
 - Tender process underway

All stakeholders have shown support for the project

Wind Resource – Consistent and Complementary with Solar

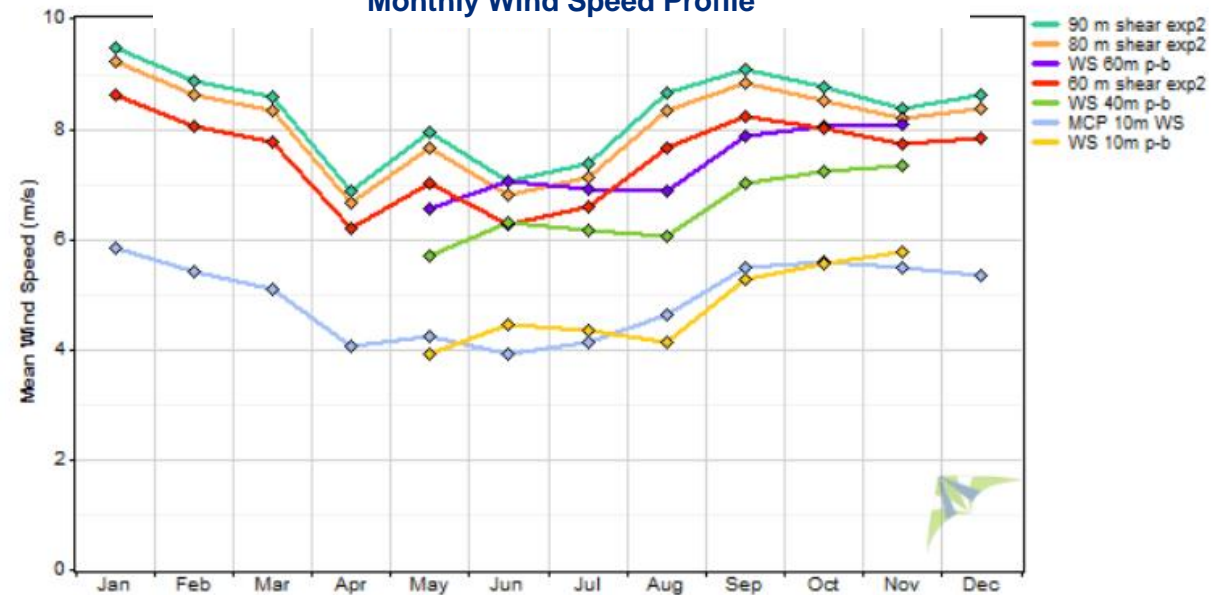
Proportion of Total Wind Energy vs. MCP 20m Direction



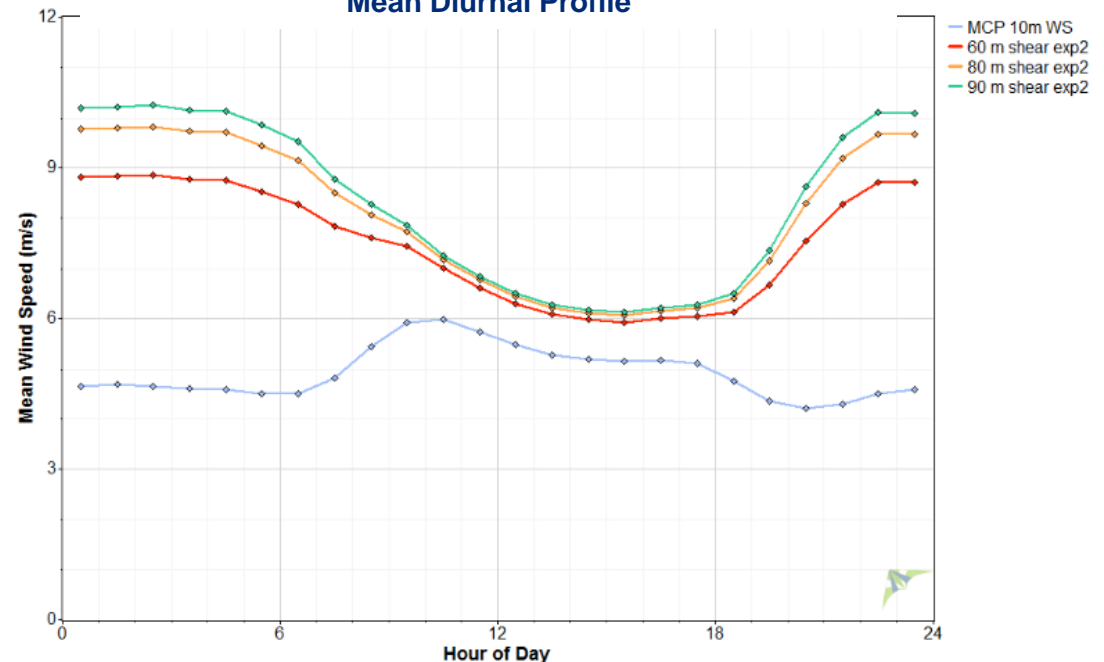
Energy Rose

- 20 years of resource data @ 10m height
- The wind in Coober Pedy is stronger at night, complementing the solar resource
- Wind direction is very consistent
- Data from the wind mast installed in May 2014 has confirmed the modelled wind speeds

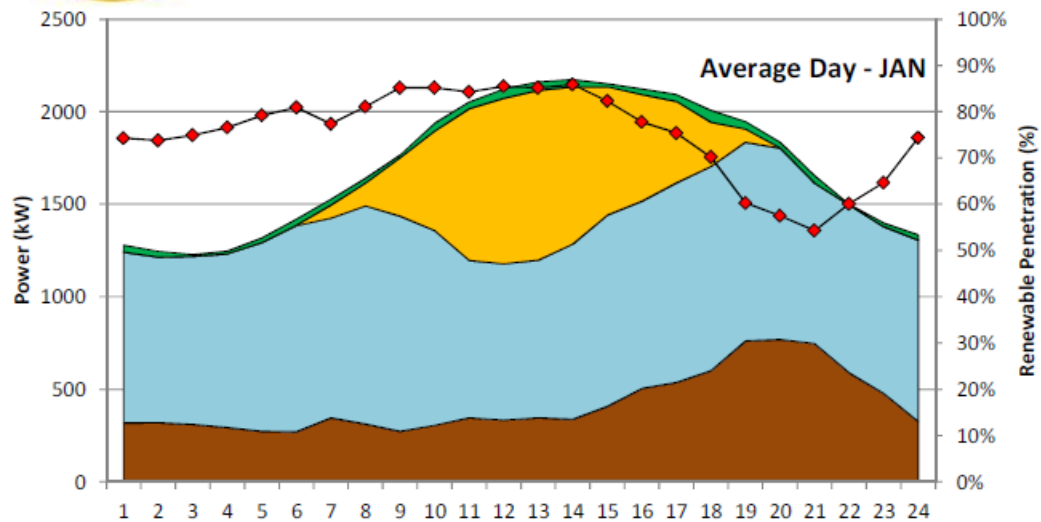
Monthly Wind Speed Profile



Mean Diurnal Profile

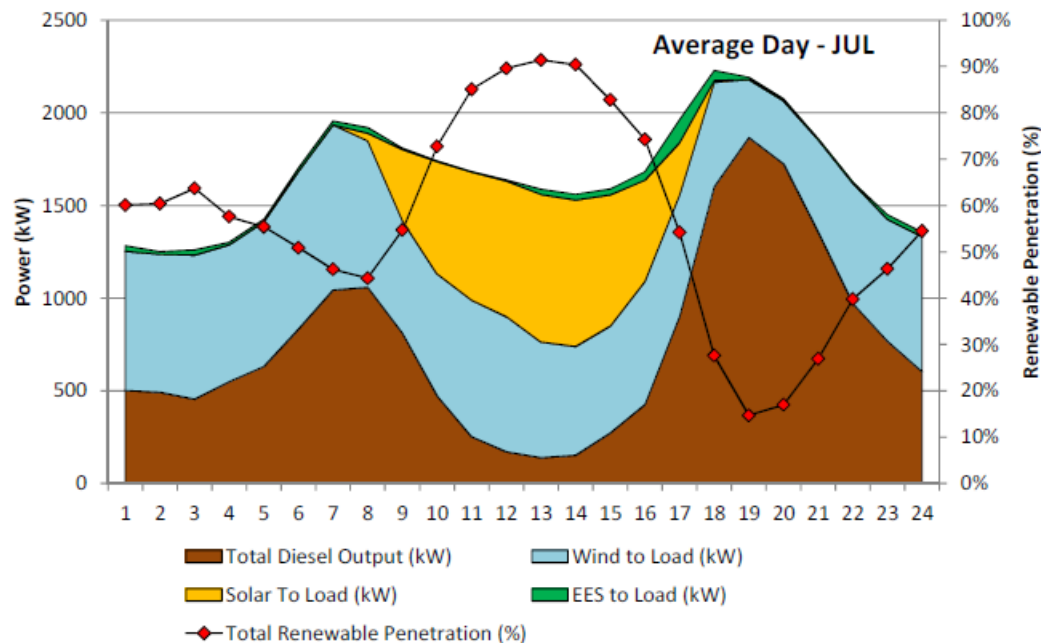


Performance Modelling – Average Profiles



Summer load profile

- Most generation from wind
- Solar assists during day time
- Diesel generation increases during evening for Air Conditioning

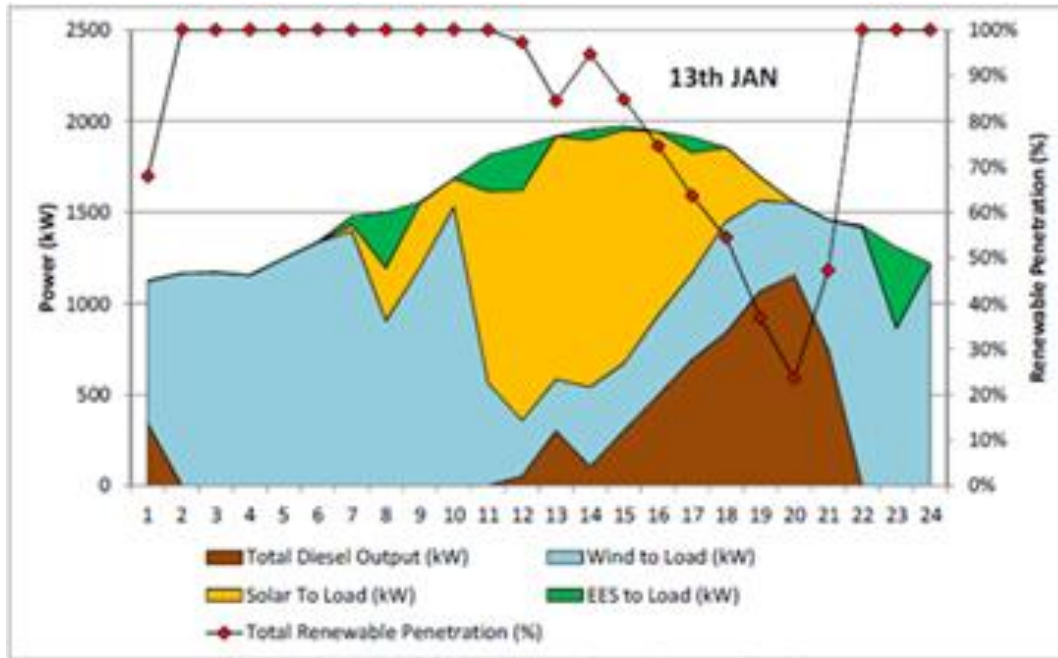


Winter load profile

- Most generation still from wind
- Solar assists during day time
- Diesel generation increases slightly during morning and evening for heating

Coober Pedy Project – Establishing New Benchmarks

A day in the life of Coober Pedy



- Designed to achieve ~70% diesel displacement over the project life
- 100% renewable reliance over extensive periods of the day– all diesels OFF for 50% of year
- There is expected to be days when no diesel generation is required
- Significant % of RE generation will be spilled
- Opportunity to introduce storage at a later stage

EDL believes this COMBINED solar / wind combination and HIGH total renewable energy contribution will set new benchmarks for off grid renewable hybrids at a GLOBAL level



Project Timeline

• ARENA IRAR EOI	Dec 13	✓
• Wind Mast Installed	May 14 - monitoring ongoing	✓
• ARENA Funding Agreement	Jul 14	✓
• Development and Land Access Applications	Jan 15	✓
• Cultural Heritage Survey	Feb 15	✓
• Commence Tender	Mar 15	✓

• ILUA	Apr 15	in progress
• PPA - State Government Approval*	Apr 15	pending cabinet decision
• Tender Close	Apr 15	in progress
• Finalise PPA with DCCP	May 15	
• EDL FID	June 15	
• Construction commence	Oct 15	
• Project commissioning; operations start	1Q 17	

* Note: All Project Timelines are current as at the date of this presentation but are subject to change. EDL has experienced positive engagement with the DCCP as PPA counterparty and SA Govt. as ultimate PPA approving stakeholder in negotiating the PPA, and the matter is currently with the SA Govt. for approval.

Demonstration Value & Lessons Learned

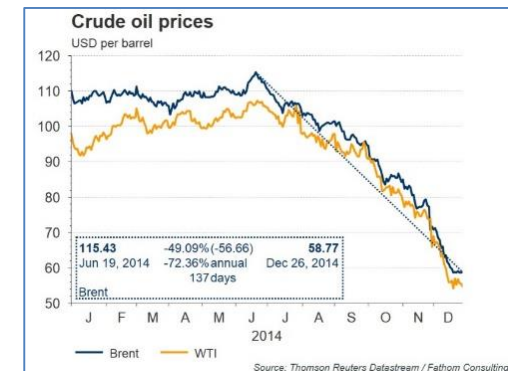
CPRH will provide learnings for the broader remote power sector as a result of

- Proven integration of renewable & thermal generation by an established remote power generator
- Integration of several RE technologies safely providing power no less reliably than current performance
- CP is representative of remote towns – environmental conditions; load profile; resources
- Modularised design is scaleable both up and down
- Knowledge Share Plan with ARENA which will share project details through to early years of operation

Learnings to date include

- Hybrid technology development is dynamic with many products being promoted to provide the integration system
 - filtering supplier claims to identify proven products is important
- EDL has not identified a MW scale product outside HT with the **proven** ability to operate at diesel off to maintain reliable supply while integrating intermittent generation and variable loads
- Customer acceptance of changing from a variable based cost profile (diesel) to a largely fixed cost is not straight-forward.
- Compared with diesel generation renewables are land hungry. Even with support from all stakeholders land access still remains a complex issue even in remote areas.
- Even renewable projects have an X factor....agreeing a view of the alternative case is critical

The X factor





Summary

- CPRH is progressing as planned
- Site wind data and more detailed modelling confirm high diesel displacement can be achieved with intended configuration
- Current tender process is an important milestone – will suppliers deliver to their sales pitch?

Where to from here for EDL?

- Low penetration opportunities in existing portfolio
- Additional high penetration projects opportunities – potential further ARENA applications
- Adaptation of CPRH technology for different load profiles e.g. mine
- EDL is open for business and has capacity for new customers with diverse energy needs

Cooper Pedy Views with CPRH Superimposed



Thank You

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