Challenges and Opportunities for Renewables in Australia

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IEC 2011 Open Session – Energy Efficiency and Renewable Technology
Presentation Outline

- Background – ElectraNet and SA
- Opportunities for renewables
- Challenges for renewables
- Questions
ElectraNet Background
ElectraNet - role

- ElectraNet owns and manages the SA regulated high-voltage electricity transmission network, and operates in Australia’s National Electricity Market (NEM).

- Predominantly an asset management, project management and contract management business.
  - Asset value ~ $2bn
  - Revenue >$300m pa
  - Capex about $250M pa
  - approx. 300 staff
  - > 5,600 circuit kilometres of transmission line
  - 82 high-voltage substations
Private business – 4 owners

- **Powerlink**
  - Harold Street Holdings Pty Ltd (a subsidiary of Powerlink Queensland) is a Queensland Government-owned corporation that owns, develops, operates and maintains Queensland’s high-voltage electricity transmission network.

- **YTL**
  - Since 1955
  - YTL Power Investments is an investment company of YTL Power International Berhad, headquartered in Kuala Lumpur and listed on Bursa Malaysia.
  - International multi-utility provider and long term investor in utility infrastructure and regulated assets.

- **Hastings**
  - Hastings Fund Management Ltd as responsible entity of the Hastings Utilities Trust, is a wholly owned subsidiary of Westpac Banking Group.
  - Specialist manager of infrastructure, private equity and high yield investments.
  - Over A$6 billion in funds under management.

- **UniSuper**
  - The investment is managed by Macquarie Specialist Asset Management Limited as trustee for the ElectraNet Trust on behalf of UniSuper.
  - UniSuper is a superannuation fund servicing Australia’s higher education and research sector.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Company</th>
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<tbody>
<tr>
<td>41.11%</td>
<td>Powerlink</td>
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<tr>
<td>33.50%</td>
<td>YTL</td>
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<td>19.94%</td>
<td>Hastings</td>
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<tr>
<td>5.45%</td>
<td>UniSuper</td>
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**ElectraNet**
- Electricity transmission

**ETI**
- ElectraNet Transmission Investments
  - An unregulated investment subsidiary of ElectraNet
National Electricity Market (NEM) Grid

National Electricity Market is made up of five regions joined by transmission interconnectors.

Total Demand: 38,842 MW

Qld 8,891 MW
SA 3,413 MW
Tas 1,790 MW
NSW 14,289 MW
Vic 10,459 MW

Existing Interconnector (export direction)
IEC 61850 at ElectraNet

- First TNSP in Australia to develop and implement a true multi vendor IEC 61850 solution (Clare North)
  - Successfully integrated 6 different vendors with 11 different devices in a substation LAN (Local Area Network)

- Clare North project recently recognised by Engineers Australia
  - won the SA Division Engineering Excellence Award in Project Infrastructure category

- Successful implementation of IEC 61850 has been rolled out to subsequent substation projects saving time and cost (Kadina, Ardrossan, Whyalla)

- A number of wind farm sites are now utilising IEC 61850 based secondary systems due to increased efficiencies
SA Energy Today
SA Electricity Generation by Fuel

Trends are:

- Coal from 35% to ≈ 30% - slow decline but relatively constant
- Gas from high of 55% to 45% - ramped up to replace interconnector then declined
- Wind from 5% to >20% - growing source, SA Govt target is 33% in 2020
- Net Interconnector from high of 18% to low of 0% to 5%
Wind Generation 2003 to 2011

Source: AEMO SA Supply and Demand Outlook, June 2011.
Wind Projects Summary 2011

Legend

Registered/Operating

Under Construction

Future Pipeline

Hallett S4 North Brown Hill (132MW)
Hallett S5 The Bluff (53MW)
Willogoleche (50MW)
Hallett S3 Mt Bryan (99MW)
Hallett S2 Hallett Hill (71MW)
Collaby Hill (150MW)
Robertstown (90MW)
Waterloo (111MW)
Stony Gap (99MW)
Clements Gap (57MW)
Snowtown S2 (206MW)
Snowtown S1 (99MW)
Keyneton (120MW)
Starfish Hill ETSA (35MW)
Kongorong (120MW)
Woakwine (300-600MW)
Yorke Peninsula (600MW)

ElectraNet

Hallett S1 Brown Hill (95MW)
Kulpara (109MW)
Carmody's Hill (140MW)
Mount Millar (70MW)

Mount Hill (80MW)
Wattle Point (91MW)

Cathedral Rocks (66 MW)
Lake Bonney S1 (81MW)
Lake Bonney S2 (159MW)
Lake Bonney S3 (39MW)
Canunda (46MW)
Robe (600MW)

Allendale (69MW)
Wind Generation Outlook

- Since 2003 ElectraNet has connected 13 wind farms to the SA network amounting to about half of the nation’s installed wind capacity
- ~1,200 MW operational and under construction
- 20% of annual energy requirements are met by wind
- Significant potential for further development – capacity for total wind connections of ~ 2,300 MW
- Beyond this requires investment in main transmission grid

On 2 September 2011, a record 1007 MW of wind power was generated and carried over the transmission network (94% of total wind capacity)
Opportunities for renewables in the NEM
Opportunities

- Supportive **Government policies**
  - 20% mandatory renewables by 2020
  - ‘complementary measures’ = subsidies (feed in tariffs, solar flagships, etc.)
  - carbon price

- Social ‘feel good’ factors
Challenges for renewables in the NEM
Challenges

- **Costs**
  - no low cost renewables, only high cost and very high cost
  - some sources are very remote from grid
  - electricity retailers control the game – obligations, ‘ make or buy’ strategy

- Government planning policies e.g. windfarm siting

- **Intermittency** / storage