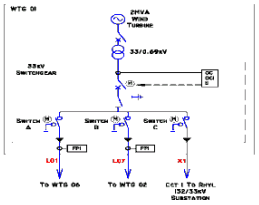
Grid Connection for Community Renewable Energy







Community Power Australia Conference

Bendigo 14-15 Nov 2011

Who are Senergy?

- Senergy is an integrated energy services company

- Turnover: $US120m
- Staff: 500+

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Survey & GeoEngineering

- Site Investigation Project Management
- Integrated Geohazard Assessment
- Geotechnical Engineering
- Desk Studies
- GIS Services

Oil & Gas

- Exploration & Appraisal
- Field Development & Management
- Subsurface Consultancy
- Well Operation
- Commercial Services
- Software Products
- Reservoir Seismic Characterisation
- Advanced Drilling Techniques
- Petrophysics Products
- Well Engineering Consultancy
- Formation Integrity
- Production Technology Products
- Performance Drilling
- Carbon Storage
- Training
- Ternan

Power Engineering

- Wind - Onshore & Offshore
- Wave & Tidal
- Hydro
- Solar - large scale CSP & PV
- Geothermal
- Utility scale gas, thermal & diesel
- Off grid power systems

Technical Disciplines

- Reservoir Engineering
- Well Engineering
- Production Technology
- Geology
- Geophysics
- Geomechanics
- Carbon Transport & Storage
- Petrophysics
- Software Design & Engineering
- *Electrical Engineering*
- *Power Systems Engineering*

Technology

- ODM3™
- IP™
- Eikos™

Why Community Renewables Now?

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A perspective over time.

- There have been plenty of reasons articulated by the previous speakers as to why community renewable energy projects are likely become prevalent in the near future.
- Over my relatively short career, I have seen massive change of the energy sector in Australia. Corporatisation of the state owned energy companies, start of the National Electricity Market, and emergence of vibrant and innovative private energy companies. At the same time, large scale renewable technology progressed from R&D to the dominant source of new energy in Australia.
- Community Renewables are a natural progression in the shift to low carbon generation, and opening of the energy markets to anyone who wishes to participate.
- Community Renewables do have the ability to match or better the economics of larger scale projects.
- It is now a matter of us rolling up our sleeves and sorting out the detail of turning these ideas into reality.
- The large scale renewable sector was at a similar stage of development 5-7 years ago. Many lessons are directly applicable to community projects.
- Senergy has extensive experience in large scale renewables, policy work along with small to medium scale community and commercial projects. I will outline some of the more important considerations for grid connection based on this experience.

Grid Connection for Medium Scale Renewables

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- Medium Scale renewables are projects ranging from 100kW to 15MW.
- It is envisaged that most community projects will be in this range, be they wind, solar, biomass or geothermal.
- Projects in this range can very sensitive to grid connection costs compared with the large projects that have characterised the Australian renewables market to date.
- Some unique technical issues arise with connecting projects at distribution voltages that are only now gaining the attention of network companies, developers and policy makers.
- As community renewables transition from unique pioneer projects to large scale adoption, consideration of grid connection issues will become critical to the success of medium scale projects.

Technical considerations

Emerging technical issues

- Voltage rise, particularly on rural distribution feeders (particularly 33kV and below)
- Voltage Flicker impact on regulating equipment. In particular on rural networks.
- Capacity constraints – more than one project targeting the same line
- Network company staff safety is top priority:
  - Communications requirements for inter-tripping.
  - Managing “islanding risk” where part of the system can remain “viable” after disconnection from the main grid once embedded generation matches customer demand.

Capital cost considerations

- The higher the voltage, the higher the cost of both cut in and extension of lines to the site.
- At voltages above 33kV, cutting into the line can require an expensive new substation at the cut in point.
- Should voltage rise or flicker become an issue, expensive reactive power control equipment (ie. Statcoms) and/or complex control schemes can become necessary.

Regulatory Issues

- Information availability. To understand the feasibility and likely cost of a network connection requires collation of a large volume of technical data by the network company. This costs them time and money with little potential of a return for. So network companies often struggle to meet expectations of smaller scale generation projects.
- Management of capacity rationing and cumulative effects of distribution connected generation is not well defined in the existing regulations, resulting in individual network companies developing informal “policies” in a reactive manner.
- There is little incentive for network companies to progress connections in a timely manner once a project wishes to proceed. This is due to lack of either a profit motive or workable sanctions under existing regulations.

Is it all too hard?

- NO!
- The challenges being faced by small and medium scale renewables are not dissimilar to those faced by large scale renewables 5-10 years ago.
- For these larger sites, supposedly in-surmountable hurdles have progressively been removed through technological change and ongoing refinement of the regulatory regime.
- Small to medium scale projects can benefit from the learnings from larger projects.
- Here are a few simple rules of thumb that can maximize the potential for success.

Maximise the chances of success

- Consider transmission in site selection – transmission can be as or more important than resource quality for these smaller projects
- Transmission is like salt in porridge – too little or two much is bad news. A small project connecting to a high voltage line will suffer from excessive costs, while a large project connecting to a lower voltage line may encounter voltage or capacity constraints. The trick is to find the combination that is “just right”.
- Targeting direct connection to existing substations can present a low risk, low cost option. This is particular applicable to solar where there is often good flexibility in siting.
- Maximise your chances of success with the network company by building a rapport with the connections officer and being careful to clearly request only the data you really need at each stage of the project.
- Be prepared to dig deep on connection issues at the early stages of a project if necessary. If connection is potentially a fatal flaw, best to detect this as quickly and cheaply as possible.
- Talk to your peers and share experiences & knowledge.
- Tuning up of the in the current regulatory process will require significant motivation and community backing to overcome but will benefit community RE in the longer term.

Thank you !

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