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Powerlink Queensland

Transmission Network Forum

2016

Breakout Session One

How the transmission network can support large-scale renewable generation

Presenter: Simon Taylor
Facilitator: Gerard Reilly

Session timings

- Presentation - 30 minutes
- Group discussion - 45 minutes
- Wrap-up and Q&A - 15 minutes

Introduction

This session explores the connection of renewable energy generation to Powerlink's transmission network

It provides:

- Overview of the current renewable landscape in Queensland
- Outline of Powerlink's analysis of renewable opportunities
- Discussion on a new 'clustering' model developed by Powerlink
- Case study and group discussion topics

Background

- Australian Renewable Energy Agency (ARENA) was established through the Australian Renewable Energy Agency Act 2011 to improve affordability and increase supply of RE
- Allocated $2.5 billion in funding to promote diversification of Australia's energy mix
- Shortlisted 22 solar projects across Australia – 10 of which are located in Qld (372MW)

Australian State and Territory Targets - 2015

State / Territory	RET	When
Australian Capital Territory	100%	2020
South Australia	50%	2025
Queensland	50%	2030
Victoria	20% (updated to 25% by Victoria Government)	2020

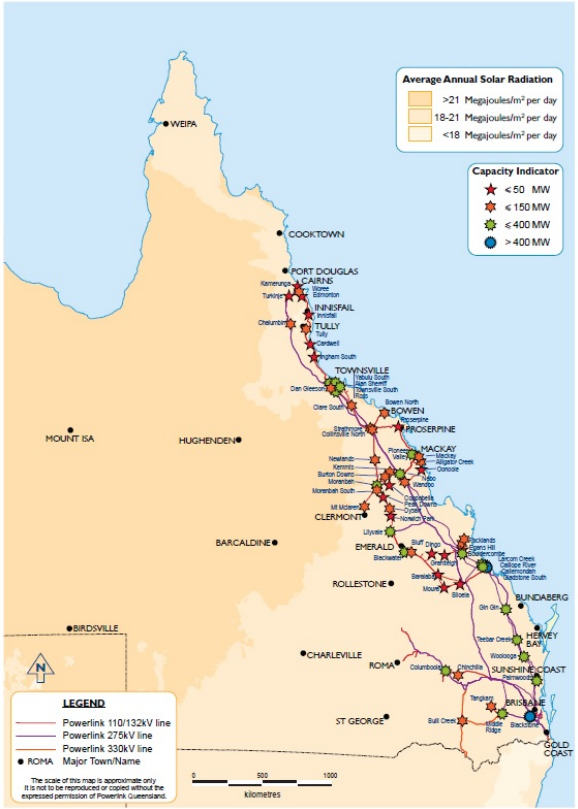
Context

Current renewable generation landscape in Queensland is positive and healthy:

- Powerlink has received over 40 enquiries, primarily regarding solar PV
- Queensland's transmission network is strong and well positioned
- Powerlink's analysis of opportunities indicates a number of locations where renewable generation is clustering
- New and innovative options for renewable network connections such as Renewable Energy Zones are currently being explored

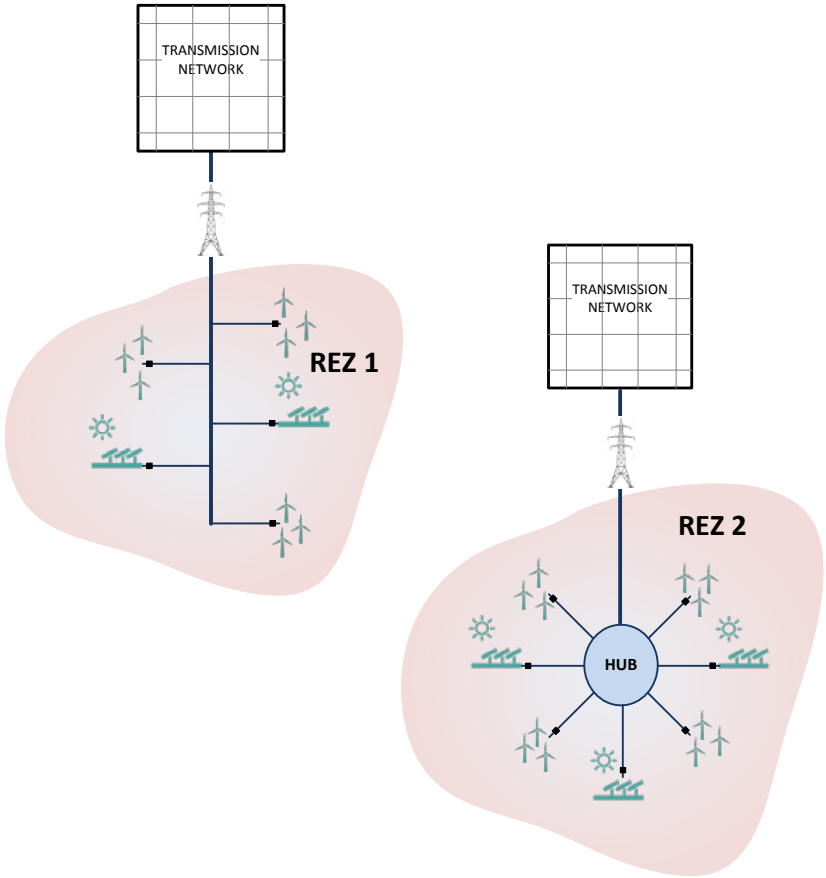
Network Capacity for renewable generation

132kV and 110kV Substation Connection Nodes Assessed			Indicative Connection Point Capacity Limit
Baralaba	Egans Hill	Norwich Park	up to 50MW
Biloela	Grantleigh	Oonooie	
Cardwell	Ingham South	Peak Downs	
Coppabella	Innisfail	Proserpine	
Dingo	Kamerunga	Turkinje	
Edmonton	Moura		
Alligator Creek	Collinsville North	Pandoin	between 50MW and 150MW
Bluff	Dan Gleeson	Rocklands	
Bowen North	Dysart	Strathmore	
Bulli Creek	Kemmis	Tangkam	
Burton Downs	Mackay	Tully	
Chalumbin	Moranbah South	Wandoo	
Chinchilla	Mt. McLaren	Woree	
Clare South	Newlands		
Alan Sheriff	Larcom Creek	Pioneer Valley	between 150MW and 400MW
Blackwater	Lilyvale	Ross	
Bouldercombe	Middle Ridge	Teebar Creek	
Callemondah	Moranbah	Townsville Sth	
Columboola	Nebo	Woolooga	
Gin Gin	Palmwoods	Yabulu South	
Blackstone	Calliope River	Gladstone South	potentially greater than 400MW



Renewable Energy Zones (REZ)

- Development of REZ may be a practical solution
- A REZ arrangement will generally be more cost effective
- The implementation of REZ would require consideration of:
  - economic benefit to customers
  - energy resource potential
  - infrastructure availability and access
  - stakeholder and local authority support
  - environmental suitability
  - opportunity for deferral or replacement of planned network investment projects



Powerlink value for renewable generation

Powerlink has adapted its value proposition for renewable connection, with the key features being:

- Single circuit connections
- Transformation and reticulation at generation site
- Fit for purpose procurement and construction
- Staged development, with potential for future upgrades
- Sharing of connections

Our services

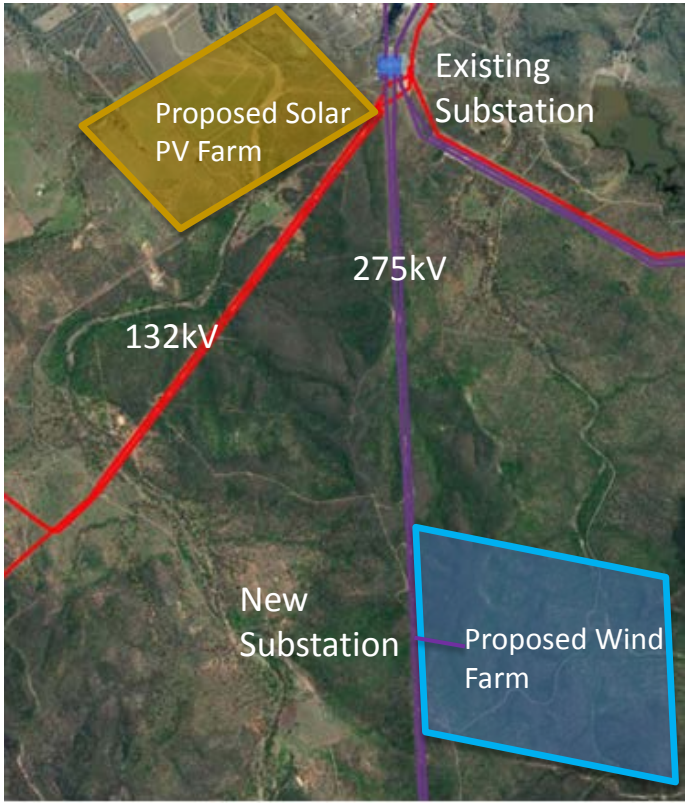
Services

- Connection – Design and Construct (D&C) from transmission network to renewable location
- Connection – Build, Own, Operate and Maintain (BOOM) to renewable location
- Distributed on site internal supply system services
- Shared connections
- Generator compliance assessment services

Benefits

- Established working relationships with all parts of NEM
- Large portfolio of connections
- BOOM of over 250km of assets including multiple substations
- Fast turn around network capability and planning services and modelling
- Flexible and agile – able to provide bespoke solutions

Renewable connection scenario



Discussion

1. Connection Process
   - Facilitate and streamline connection
   - Targeted renewable guideline for renewables

2. Fit For Purpose Connection
   - Understanding renewable generator needs
   - Focused solutions and value
   - Prefeasibility reports
   - Commercial models

3. Information Powerlink can provide
   - Published information (TAPR, Website etc)
   - Usefulness of generic connection costs/generic contract provision etc
   - Format of information

4. Renewable Energy Zones
   - Usefulness of existing information
   - Commercial issues
   - REZ concept

Powerlink QUEENSLAND