



Murraylink Electricity Transmission Interconnector

Murraylink and its operating environment

Murraylink – Purpose of workshop

The purpose of the workshop is to outline the operating environment of Murraylink.

This will provide an opportunity for stakeholders to understand and comment on Murraylink's priorities.

The elements that influence Murraylink's proposal:

- Murraylink's location and design;
- Murraylink's use
- Murraylink's condition
- Murraylink's commercial arrangements.



We want to understand our stakeholders' priorities and reflect these in our Transmission Determination Proposal.

Murraylink location and design

Mark Allen

Murraylink – location

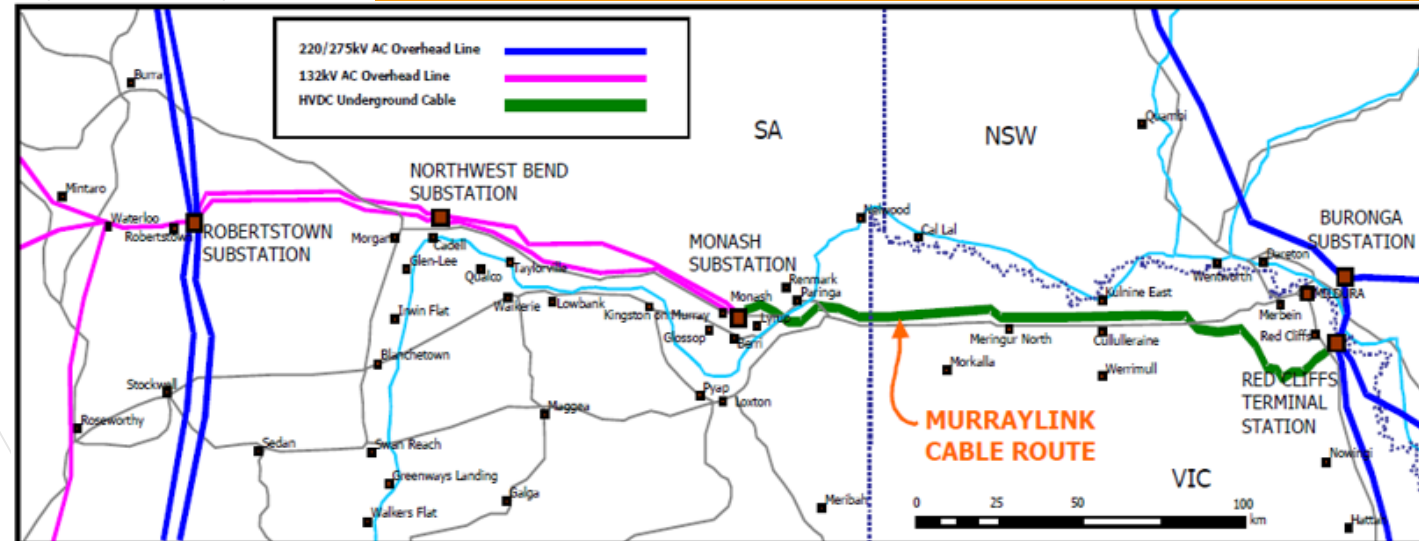
Murraylink comprises the following elements:

- 300m long HV AC line to Ausnet network
- 800m long HV AC line to ElectraNet network
- Converter station at Red Cliffs, Victoria
- Converter station at Berri, South Australia
- 176 km HVDC underground cable

Murraylink's cable runs through the Lyrup Wetlands (environmentally sensitive area)

The Murraylink interconnector has a capacity of 220MW

Operates in environmentally sensitive area and in high ambient temperatures



Murraylink – Technology

Murraylink was constructed in 2002.

Murraylink has two voltage source converter stations.

- The converter stations use three-level inverter technology; cutting edge technology at the time of its construction
- The cables at $\pm 150\text{kV}$ DC (symmetric monopole)

Murraylink technology has capability for fast and accurate control of power and voltage; supporting grid stability

Murraylink uses Hitachi (ABB) generation 2 IGBT technology



Murraylink – Condition and Asset Management

Stuart Dodds

Murraylink – Condition

Murraylink has high levels of reliability – 99% average planned availability (excludes planned outages for maintenance and projects)

Murraylink assets are generally in good condition

- Cable in very good condition, protected by underground installation and regular above ground surveillance and community liaison
- Converter equipment – maintained in very good condition, protected by site security and fire protection systems
- Buildings and structures – inland location, limited environmental degradation, very good condition

Strategic Risks

- IGBTs – maintaining strategic spares is critical; component obsolescence not expected to impact until after the next current revenue period
- Global warming – cooling systems must evolve with changing expected ambient conditions; high ambient temperatures limit Murraylink transmission services when most needed

Murraylink has identified only minor capital expenditure



Murraylink – APA asset management

Murraylink is managed consistent with APA's asset management framework

Identification of need for asset augmentation, repair or replacement based on strategic risks, asset condition assessment and manufacturer's recommendations

All identified works are assessed and prioritized according to the APA risk matrix

Non-urgent prioritised projects are managed within the EII Board approved budget

Procurement is completed in accordance APA's purchasing policies. This requires competitive procurement for amounts above \$100,000

- Key converter equipment is Hitachi intellectual property leading to monopoly over the provision of this equipment

APA manages EII assets in accordance with its asset management practices



Murraylink – APA contract

APA operates Murraylink under contract to EII – Management, Operations and Maintenance and Commercial Services Agreement (MOMCSA)

APA a minor shareholder of EII

There are two elements to the contract:

- Management, Operations and Maintenance component
 - Projects that are approved by the EII board are charged to EII on a cost plus 10% basis
 - Murraylink and Directlink have demonstrated this is an efficient contract.
- Commercial services component
 - A flat non-indexed fee that is allocated to individual EII assets based on proportion of EII revenue (approx 600,000 to Murraylink)
 - It covers accounting, treasury, taxation, operations management, commercial management, engineering management, strategic planning, legal, regulatory and company secretariat.

The contract is currently operating under a 5 year extension option

The concepts behind AER incentive arrangements (CESS and EBSS) still apply to majority shareholders of EII.

Additional support costs are not recovered under the contract - e.g. IT costs



Murraylink - Use

Stuart Dodds

AEMO uses Murraylink to manage the dispatch of power from generators to users, securely and reliably, and in the most economic and efficient manner

Murraylink is a controllable power transmission line that facilitates the AEMO dispatch of power by:

- Reliably transferring power according to the dispatch targets, set by AEMO every five minutes.
- Controlling the AC network voltage locally where each converter station connects to the AC network
- Rapidly responding to emergency power transfer adjustments when necessary to keep the AC network secure and stable.

Murraylink provides AEMO variable control of power transmission whereas normal AC transmission lines are uncontrolled.

Murraylink – Role in the NEM

