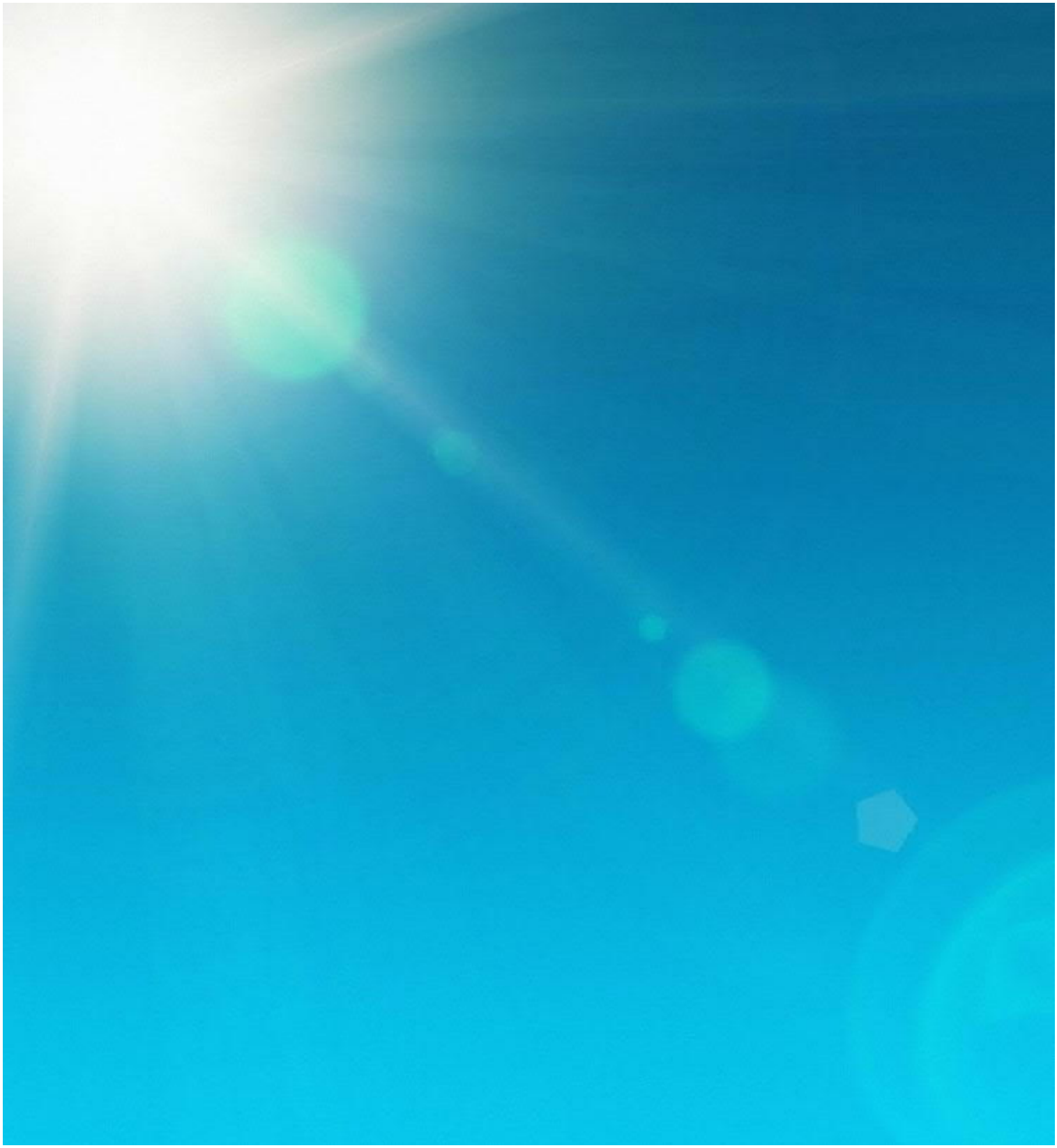
suncable.sg

SUN CABLE

March 2022

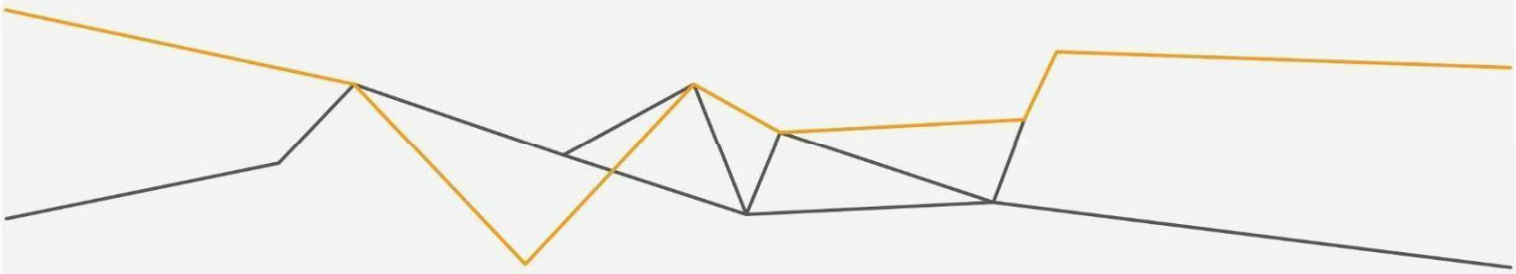
AAPowerLink Glossary of Terms and Acronyms



Glossary of Terms and Acronyms

Revision history

Revision	Date	Purpose	Reviewed by	Approved by
0	25/03/2022	Draft EIS submission	Joe Sheridan	Mark Branson



Key Project Terms

AAPowerLink

Acronym	Term	Definition
AAPowerLink	Australia-Asia PowerLink	Title of Sun Cable's flagship project, which will harness renewable solar energy from Australia's resource-abundant Northern Territory for export to Darwin and Singapore. Project infrastructure includes a Solar Precinct in the Barkly region of the NT, Overhead Transmission Lines from the Solar Precinct to Darwin, a Darwin Converter Site and Cable Transition Facilities at Murrumujuk, Subsea Cable System from Murrumujuk to Singapore.

Solar Precinct

Acronym	Term	Definition
SP	Powell Creek Solar Precinct (Solar Precinct)	A 12,000 ha precinct comprising multiple large-scale solar and storage fields, Battery Energy Storage Systems, Voltage Source Converters, and supporting infrastructure. The Solar Precinct is designed to generate up to 20 GW of renewable electricity for storage and transmission to Darwin and Singapore.
MAV	Maverick System	Units of pre-fabricated ground-mounted DC solar array blocks, each comprised of 90 PV modules.
SA	Solar Array	Solar Arrays will be comprised of PV modules mounted on a Maverick structure or tracker rows connected to inverters. Each array will produce power at low voltage in the range of 1500 V.
	Solar PV array capacity	The nameplate rating of the solar PV array under standard test conditions.
SZ	Solar Zone	Aggregate the Solar Arrays into blocks of ~23-28 MW DC peak capacity tied in to ~60 MWh of energy storage, connected to a 33/132 kV transformer.
SF	Solar Fields	Aggregation of solar zones for collection into high voltage AC collector circuits. Arranged to have up to 20 zones, with a peak capacity of ~400 MW and 1.2 GWh of storage.
	Intermodal Logistics Facility	A centralised facility at the Solar Precinct for the consolidation and management of all inbound and outbound freight, materials and equipment including two rail sidings. A third rail siding is under consideration.
VSC	Voltage Source Converter	Converts AC power into DC for transmission over long distances. Comprised of an AC switchyard, capacitors and filters, internal valve hall, converter transformers, DC switchyard, earthing mat, drainage, lightning protection and ancillary infrastructure.
BESS	Battery Energy Storage System	Regulates electricity discharge from the Solar Precinct and Darwin Converter Site. The BESS functions through energy storage and dispersion for load consistency across time periods of high versus low irradiance (day and night), energy backup that can be used in the event of a system fault, and grid stability which balances the demands of loads and generators.

Acronym	Term	Definition
	Internal Electrical Reticulation	Pertains to either AC overhead or underground transmission cables operating at voltages between ~33-275kV. The internal reticulation network will connect the Solar Fields to the VSC and central battery.
	Airstrip	All-weather sealed airstrip, and associated terminal, at Powell Creek, to be used during construction and operations as well as for emergency services.
	Access track	All weather unsealed access track between the Solar Precinct and the Stuart Highway, approximating 30km in length.
	Main access road	A sealed main access road to Stuart Highway and fibre optic link. This road will be ~42km long, with ~12km being within the Solar Precinct footprint.

Overhead Transmission Line

Acronym	Term	Definition
OHTL	Overhead Transmission Line	An OHTL is an electric power transmission line suspended by towers or poles. A HVDC OHTL will be constructed to transmit electricity from the Solar Precinct to the Darwin Converter Station.
	OHTL corridor	A corridor initially 22- 60 m wide for construction to accommodate pole structures, and conductors. Operations phase OHTL corridor will maintain a 6 m wide maintenance access track. For the first 722km, the OHTL is situated within the existing Railway easement, which ranges from 100-200m width. The final 66 km for the OHTL corridor is within a NT Government Utilities Corridor.
	Utilities Corridor	Utilities Corridor refers to the NT Government Utilities Corridor designated for the potential to contain future infrastructure. The total easement width is up to 200 m wide, of which the OHTL corridor will be situated.
	Railway Corridor	The Railway Corridor refers to the Railway easement from Powell Creek Station to Livingstone. The easement width ranges from approximately 100-200m from the outer rail.
HVDC	High Voltage Direct Current	Form of energy transmission used for transmission long distances across the OHTL and subsea cables.
	Overhead powerlines (conductors)	Multiple conductors will be strung between each structure, typically in a 4-wire bundled arrangement with capacity to add additional conductors in the future. Considered conductor types include but are not limited to ACSR (aluminium conductor steel-reinforced) and AAAC (all aluminium alloy conductor).
	Tower/pole structures	Steel monopoles ranging in height from 43-56m will be used for most structures along the route.
	Electrode	Used only during system faults to supply a grounded electrical current return path for proper operation across the Powell Creek – Murrumujuk HVDC link. Two electrodes are under investigation for placement over 10km distance from Powell Creek Solar Precinct and Darwin Converter Site.

Darwin Converter Site, Murrumujuk

Acronym	Term	Definition
DCS	Darwin Converter Site	A site covering 124 ha located at Murrumujuk, 31km North-East of Darwin. The DCS will facilitate the conversion of the HVDC power delivered by the OHTL, to HVAC, enabling the dispatch of electricity to the Darwin region.

Acronym	Term	Definition
BESS	Battery Energy Storage System	Provide backup, fault protection and ancillary services to the Darwin electricity system and the operation of the VSCs. The Darwin BESS will add reliability to the system and provide extra grid services during operation.
VSC	Voltage Source Converter	VSCs are self-commutated converters that connect HVAC and HVDC systems using devices suitable for high power electronic applications. Two receiving VSCs will accept power supplied from the OHTL and convert the electricity to HVAC.
	AC Substation	Infrastructure within the Darwin Converter Site containing electrical equipment that accommodates power reticulation to the Darwin electricity system.
	Switch yard	Open air infrastructure within the Darwin Converter Site that accommodates local power input.
HVAC	High Voltage Alternating Current	Output from Darwin Converter Site to enable connection to the Darwin electricity system.

Cable Transition Facilities, Murrumujuk

Acronym	Term	Definition
CTrF	Cable Transition Facilities	The Cable Transition Facilities comprise three separate components to transfer power from onshore to offshore: Underground Cable Corridor, Land Sea Joint Station and Shore Crossing Site.
	Underground Cable Corridor	A corridor approximately 2.7 km and up to 70 m wide proposed to run parallel to the south of Murrumujuk Drive and north of the Gunn Point Beach access track. Cable burial will be undertaken in the corridor during the construction phase followed by vegetation reinstatement.
LSJ Station	Land Sea Joint Station	A fenced 1.5 ha site located approximately 300 m inland from the beach, near the junction of the access tracks to Gunn Point Beach and Tree Point Road. The station will house six bays (one for each cable) excavated to dimensions of approximately 20 x 5 m, to house the physical connection between the onshore and offshore cables.
	Shore Crossing Site	Located immediately to the south of the current Gunn Point Beach access track. A temporary construction corridor approximately 500 m wide and 500 m long will be established from the Land Sea Joint Station, out to the low water mark in Shoal Bay to accommodate the cable trenches and construction machinery and equipment.

Subsea Cable System

Acronym	Term	Definition
SCS	Subsea Cable System	A corridor up to 1.2 km wide containing up to six HVDC cables, installed 50-200 m apart, either laid on the sea floor or buried in seabed sediments up to 1 m depth. Disturbance for each cable will be an approximately 12m wide footprint. The subsea cables will transfer electricity over 4,200 km from Murrumujuk to Singapore.
	Subsea Cable	The positive and negative cables are 161 – 176 mm in diameter and weigh approximately 66 – 85 kg/m each, while the Metallic return cable is approximately 120 mm in diameter and weighs approximately 36 kg/m.
CLB	Cable Lay Barge	Vessel specialised for cable laying in water depths lesser than 10m. Equipped with carousels, tensioners and winches for cable laying in shallow waters.
CLV	Cable Lay Vessel	Vessel specialised for cable laying in water depths greater than 10m. Equipped with carousels, tensioners, winches, engines and thrusters to efficiently lay the subsea cable in deeper waters.

Facilitating assets

Acronym	Term	Definition
SAAF	Solar Array Assembly Facility	A facility that will assemble prefabricated Maverick Solar Arrays (Mavericks) at the East Arm (Darwin, NT). These will then be transported to site via rail and rapidly deployed on the Solar Precinct site using a telehandler forklift. The facility will also house a regional office and distribution centre for the Mavericks.
MAB	Middle Arm Battery	The Middle Arm Battery facility will be located at Channel Island Road (Wickam, NT). The facility will include a battery energy storage system of up to 100MW/200MWh capacity, a substation and switchyard, ancillary facilities and a ground-mounted fixed panel solar generation facility (~8MW capacity).

EIA Terms

Acronym	Term	Definition
	Area of influence	The area surrounding the proposal footprint that has the potential to be impacted by the proposal activities.
ALARP	As Low as Reasonably Practicable	Principle used in risk assessment that describes the level to which environmental impacts are expected to be avoided of mitigated. For an impact to be ALARP it must be possible to demonstrate that the cost involved in reducing the risk further would be grossly disproportional to the benefit gained.
	Avoidance	The principle of designing the proposed actions to avoid adverse impacts on the environment in accordance with the principles of environmental decision-making outlines in section 26 of the *Environmental Protection Act 2019*.
	Cumulative impact	Changes to the environment that are caused by the residual impacts of an action in combination with the residual impacts of other past, present, and reasonably foreseeable future activities.
	Direct impact	An event or circumstance that is a direct consequence of the action. Direct impacts occur via a direct interaction of the project or activity with a component of the environment, e.g., land clearing impacting vegetation.
	Duration	The longevity of the impact, including whether it is reversible.
	Environmental factor	Environmental factors – as defined by the NT EPA (2021) – are broad groups of environment aspects that may be impacted by a proposed action. There are 14 environmental factors in the NT EPA Factors and Objectives framework, 12 of which could be impacted by the AAPowerLink and are assessed in this draft EIS. The NT EPA has set an objective for each factor that is referenced in determining whether impacts are likely to be significant.
	Environmental context	Environmental context refers to the sensitivity, value and quality of the environment including consideration of significance to stakeholders and beneficial uses. Environmental context is a key determinant of the significance of environmental impacts.
	Environmental value	The qualities or uses of the environment or environmental factor that we wish to protect.
	Indirect impact	An event or circumstance that is an indirect consequence of the activities associated with construction or operations and the action is a substantial cause of that event or circumstance. Indirect impacts occur as a result of the project activities via impact pathways (e.g. impacts to water quality or availability indirectly affect downstream water users.
	Intensity (of an impact)	Intensity refers to the strength or concentration of impacts. The intensity of an impact is determined by considering is scale (geographic extent), magnitude of change and duration/frequency. Intensity is a key determinant of the significance of environmental impacts.
	Matters of National Environmental Significance	MNES are matters protected under the Commonwealth EPBC Act. There are nine MNES. The AAPowerLink EIS is required to assess impacts to three of those.
	Mitigation	Action taken to minimise, reduce or control the harm or severity of an impact.
	Monitoring	Refers to environment monitoring as an action taken to observe environmental values, characterise its quality, and establish environmental parameters, for the purpose of accurately quantifying the impact an activity has on an environment.
	Offset	A measure designed to compensate for a significant residual impact of an action on the environment as defined in the *Environmental Protection Act 2019*.

Acronym	Term	Definition
	Proposal Footprint	The geographical extent and boundary of the area that will be directly affected by construction and operation of the proposal.
	Residual impact	The impact that remains after all feasible and practicable mitigation measures have been implemented.
	Scale	The spatial extent of the impact, considering both the impact footprint (direct disturbance) and/or area of influence (indirect disturbance).
	Sensitive receptors	Sensitive receptors are locations where people are regularly present, such as homes, workplaces, schools, care facilities and recreation sites, and therefore are sensitive to exposure to emissions or contaminants.
	Significant impact	As defined by the Environment Protection Act 2019: An impact of major consequence having regard to: (a) the context and intensity of the impact; and (b) the sensitivity, value and quality of the environment impacted on and the duration, magnitude and geographic extent of the impact.

Acronyms List

Acronym	Definition
AAAC	All Aluminium Alloy Conductor
AAPA	Aboriginal Areas Protection Authority
AAPowerLink	Australia-Asia PowerLink
AARC	AustralAsia Railway Corporation
AC	Alternating Current
ACSR	Aluminium Conductor Steel Reinforced
ADD	Access, Delivery & Development
AEEZ	Australian Exclusive Economic Zone
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AIMS	Australian Institute of Marine Science
ALARP	As Low as Reasonably Practicable
AMD	Acidic and metalliferous drainage
AOI	Area of Interest
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
AS	Australian Standard
ASEAN	Association of Southeast Asian Nations
AS/NZ	Australian/New Zealand Standards
ASS	Acid Sulphate Soils
ANZG	Australian and New Zealand guidelines for Fresh and Marine Water Quality
AVTUR	Aviation Turbine Fuel
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
BMP	Best Management Practice
BEP	Best Environmental Practice
BP	Before present
CAD	Computer Aided Drafting
CAPEX	Capital Expenditure
CECP	Construction Environmental Control Plan
CEMP	Construction Environmental Management Plan
CH	Chainage
CHMP	Cultural Heritage Management Plan
CIA	Cumulative Impact Assessment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLA	Cambrian Limestone Aquifer
CLB	Cable Lay Barge
CLC	Central Land Council
CLV	Cable Lay Vessel
CM	Contractor Managed

Acronym	Definition
CMT	Culturally Modified Trees
CSIRO	Commonwealth Science and Industrial Research Organisation
CTF	Cable Testing Facility
Cwth	Commonwealth
DAC	Darwin Coastal
DAB	Daly Basin
DAWE	Department of Agriculture, Water and Environment
DC	Direct Current
DCS	Darwin Converter Station
DENR	Department of Environment and Natural Resources
DEPWS	Department of Environment, Parks and Water Security (NTG)
DHACRG	Darwin Harbour Advisory Committee Research Group
DIPL	Department of Infrastructure, Planning & Logistics (NTG)
DITT	Department of Industry, Tourism & Trade (NTG)
DLRM	Department of Land Resource Management (NTG)
DoH	Department of Health (NTG)
EA Act	*Environmental Assessment Act 1982* (NT) (superseded)
EEZ	Exclusive Economic Zones
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EM	Environmental Monitor
EMF	Electromagnetic Field
EMS	Environmental Management System
ENA	Energy Networks Australia
EP	*Environment Protection Act 2019* (NT)
EPBC Act	*Environment Protection & Biodiversity Conservation Act 1999* (Cwth)
ERIN	Environmental Resources Information Network
ESCP	Erosion and Sediment Control Plan
ESMS	Environmental and Social Management System
ETC	Estimate to Complete
EWP	Elevated Work Platform
FIFO	Fly-In Fly-Out
FTE	Full-Time Employee
GDE's	Groundwater dependent ecosystems
GDP	Gross Domestic Product
GGAP	Greenhouse gas abatement plan
GHG	Greenhouse gas
GHGe	Greenhouse gas equivalent
GIS	Geographic Information System
GPS	Global Positioning System
GTP	Gross Territory Product

Acronym	Definition
HAZMAT	Hazardous Materials
HDD	Horizontal Directional Drilling
HIA	Heritage Impact Assessment
HSE	Health, Safety and Environment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IA	Impact Assessment
IAIA	International Association for Impact Assessment
ICN	Industry Capability Network
ICPC	International Cable Protection Committee
ICNIRP	International Commission for Non-Ionizing Protection
IEEE	Institute of Electrical and Electronics Engineers
ILUA	Indigenous Land Use Agreement
IMO	International Maritime Organisation
IPDT	Integrated Professional Development Team
ISO	International Standardisation Organisation
IUCN	International Union for the Conservation of Nature
KEF	Key Ecological Features
KP	Kilometre Point
KPI	Key Performance Indicator
LEH	Lake Effect Hypothesis
LAT	Lowest Astronomic Tide
LGA	Local Government Area
LGM	Last Glacial Maximum
LSJ Station	Land Sea Joint Station
LSLUP	Litchfield Sub-Regional Land Use Plan
MAV	Maverick System
mbgl	meters below ground level
MER	Metallic Earth Return
MFE	Mass Flow Excavator
MMS	Material Management System
MNES	Matters of National Environmental Significance
NAXA	North Australia Exercise Area
NEPM	National Environment Protection Measure
NLC	Northern Land Council
NOPSEMA	National Offshore Petroleum Safety and Environmental Manager
NPUP	Non-Pastoral Use Permit
NR Maps	Natural Resource Maps
NTA	*Native Title Act 1993* (Cwth)
NT EPA	Northern Territory Environmental Protection Agency
NTG	Northern Territory Government

Acronym	Definition
NVIS	National Vegetation Information System
O&M	Operations & Maintenance
OEMP	Operations Environmental Management Plan/s
OHTL	Overhead Transmission Line
OSMP	Oceanic Shoals Marine Park
PALI	Police Auxiliary Liquor Inspectors
PASS	Potential Acid Sulphate Soils
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PKKPRL	Persetujuan Kesesuaian Kegiatan Pemanfaatan Ruang Laut
PLGR	Pre-Lay Grapnel Run
PM	Particulate matter
PMST	Protected Matters Search Tool
PCK	Pine Creek
PPE	Personal Protective Equipment
PV	Photo-Voltaic
PwC	PricewaterhouseCoopers
PWC	Power and Water Corporation (NT)
RAAF	Royal Australian Air Force
RAP	Reconciliation Action Plan
RFP	Request for Proposal
ROV	Remotely Operated Vehicle
RWA	Restricted works areas
SAT	Single Access Tracker
SCS	Subsea Cable System
SDS	Safety Data Sheet
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
SoCS	Site of Conservation Significance
SSC	Subsea Cable
SSC	Suspended Sediment Concentrations
STU	Sturt Plateau
TAN	Tanami
TBP	Territory Benefit Plan
TEC	Threatened Ecological Community
TEU	Twenty-foot equivalent unit
TLC	Tiwi Land Council
ToR	Terms of Reference
TPWC Act	*Territory Parks and Wildlife Conservation Act 1976* (NT)
TR	Transport Request
TSP	Total Suspended Particles
ULP	Unleaded Petrol

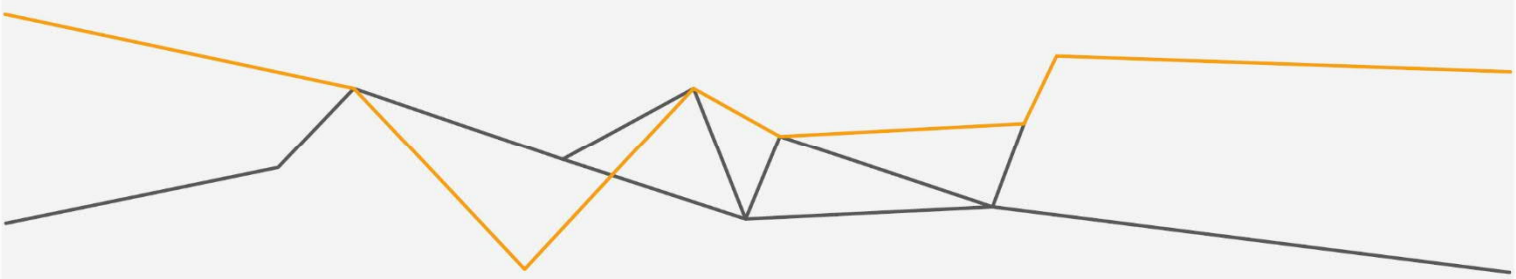
Acronym	Definition
VSC	Voltage Source Converter
WCD	Water Control District
WHO	World Health Association
WHS	Workplace Health and Safety
WQO	Water Quality Objectives
WRAP	Western Regional Air Partnerships
XLPE	Cross-Linked Polyethylene

Scientific Units

Abbreviation	Unit of Measurement
dB	Decibel
GW	Gigawatts
ha	Hectares
HV	High Voltage
km	Kilometres
km²	Kilometres squared
KP	Kilometre Point
kV	Kilovolts
kW	Kilowatts
m	Metres
m²	Metres squared
MV	Megavolts
MW	Megawatts
MWh	Megawatt hours
NM	Nautical Miles
V	Volts
W	Watts

suncable.sg

SUN CABLE



Singapore

80 Robinson Road
#14-02
Singapore 068898

Jakarta

The South Quarter Building, Tower C,
Mezzanine Level, Jl RA Kartini Kav 8,
Cilandak, Jakarta Selatan 12430

Darwin

Suite 3, Level 17
19 The Mall
Darwin NT 0800

Sydney

Suite 78, Jones Bay Wharf
26-32 Pirrama Road
Pyrmont NSW 2009

info@aapowerlink.sg