



SUMMER DEMAND FORECAST

Network Demand Forecasting Section

2018 – 2027

Prepared by

A blue ink signature of Dai Huynh.

Dai Huynh
Forecasting Analyst

Prepared by

A black ink signature of Franki Lee.

Franki Lee
Senior Forecasting Analyst

Endorsed by

A black ink signature of Frank Bucca.

Frank Bucca
Network Demand Manager

Endorsed by

A black ink signature of Jason Lu.

Jason Lu
Capacity Planning Manager

Approved by

A black ink signature of Peter Langdon.

Peter Langdon
Branch Manager
Asset Strategy & Planning

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1 EXECUTIVE SUMMARY

A revised forecast of expected summer maximum demands for the ten-year period of 2017/2018 to 2026/2027 has been developed for Endeavour Energy's zone substations and transmission substations following the summer peak period of 2016/2017. This forecast is produced for each zone substation and includes details of the demand drivers. The zone substation forecasts are aggregated to develop the transmission substation forecasts which are then further aggregated to generate bulk supply point and total Endeavour Energy aggregated diversified forecasts. This forecast is produced to facilitate network operational planning and network investment planning.

This summer demand forecast has identified a range of growth rates for the 163 Endeavour Energy zone substations (not including customer only substations) and are summarised below:

- 46 are expected to experience demand growth rates of greater than 1.5%;
- 57 are expected to experience demand growth rates of between 0% and 1.5%; and
- 60 are expected to experience a decline in demand (negative growth rate).

The zone substations with a negative growth rate are a result of Endeavour's forecasting methodology to incorporate post model adjustments (PMA) that include the take up of rooftop photovoltaic (PV) and other energy efficiency and demand reducing measures. This incorporates demand reduction into the zone substation forecast regardless of other external factors. The analysis of this group shows the following:

- 33 have shown a positive growth in the previous 5 years 50% PoE actuals;
- 7 have shown a positive growth in actual demand but due to an aggressive PMA for 2016/17 has resulted in a negative growth in the 50% PoE demand;
- 6 that have shown a negative growth rate supply or partly supply industrial load;
- 11 that have shown a negative growth rate are small rural substations; and
- 3 that have shown a negative growth rate have experienced a load transfer;

Of the group with a high growth rate there are 18 zone substations with growth greater than 5% per annum of which 13 are located within the greenfield development areas. There are also 22 with growth rates between 2% and 5% of which 18 are brownfield development areas with the remaining being greenfield areas.

It is important to note that AEMO¹ have stated, for their NSW demand forecast, that the growth in the residential growth will be more than offset by the increased generation from PV and energy efficiency measures. AEMO uses an aggressive PMA that includes an increase in the annual numbers of PV systems connected till the mid 2020's. Endeavour's recent statistics of PV connections has seen the size of systems increase but the numbers of systems connected decrease with the total KW being connected remaining constant. With the housing construction in the greenfield areas consisting of predominantly small housing (townhouses) and apartments, the opportunity for large PV systems will decrease together with the space to install batteries. The demand growth in greenfield site is forecast to remain strong for Endeavour's network area for the forecast period.

The forecast has identified a number of network substation assets that will approach their firm capacity rating within the next ten years. This includes 16 zone substations which are all in greenfield development areas. All of these substations have a growth rate greater than 5%. The transmission substations and sub-transmission lines that will also reach firm rating within the 10 year horizon of the forecast will be detailed in the Transmission Network Planning Review following review of the network capability in the light of this latest forecast data.

¹ AEMO (2017): Electricity Forecasting Insight. Australian Energy Market Operator Ltd.

Our network's greenfield development areas includes the North West and South West priority growth areas in Greater Western Sydney which are projected to accommodate 500,000 new residents, the equivalent to two cities the size of Canberra and Wollongong, over the next 30 years. These priority growth areas are the result of the biggest coordinated greenfield land release in the state's history. Additionally, demand growth is created by the development of the Western Sydney Airport at Badgerys Creek and the large surrounding residential, commercial and industrial areas planned to support the Greater Sydney Commission's vision of a 'third city' for Sydney with a potential 100,000 dwellings and 100,000 jobs. There is also growth occurring as part of the Western Sydney Employment Area, Greater Macarthur Priority Growth Area and the West Lake Illawarra Growth Area.

The validity of the forecasting processes and the forecast outcomes has been assessed by comparing recent historical loads to forecast predictions using a Mean Absolute Percentage Error (MAPE) assessment. The MAPE is calculated at an aggregate level by comparing the 50% Probability of Exceedence (PoE) summer demand forecast and the actual 50% PoE weather normalised peak demand. This has shown ongoing improvement in forecast accuracy since 2013/2014, with the most recent forecast error being less than 1% for 2016/2017.

Recent Summer Conditions

There have been two record breaking events of peak demands in 2017 summer when Western Sydney had the hottest summer on record for both maximum and mean temperatures. The majority of EE zone substations peaked on the two hottest working days being Monday 30th January 2017 (43.5 degrees) and Friday 10th February 2017 (43.8 degrees). Richmond recorded its highest daily maximum temperature of 46.4 °C on Saturday 11th February 2017. A full summary is provided in the Appendix.

2 METHODOLOGY

Peak demand forecasts are produced for both the summer and winter seasons. Summer is defined as the 5-month period between November and March while winter consists of the 4-month period from May to August. The forecast method is based on a bottom-up approach and provides maximum MVA, MW and MVA_r loads and Power Factor for summer and winter peak periods for the next ten years. The forecasts include loads on each zone substation and major customer zone substation, transmission substation, EE/TransGrid's Bulk Supply Points (BSPs) and the EE's total.

The forecasts consider planned load transfers, spot loads, land releases and re-development in the area under consideration. Embedded generation connected to the network is incorporated in the calculation of maximum demand forecasts.

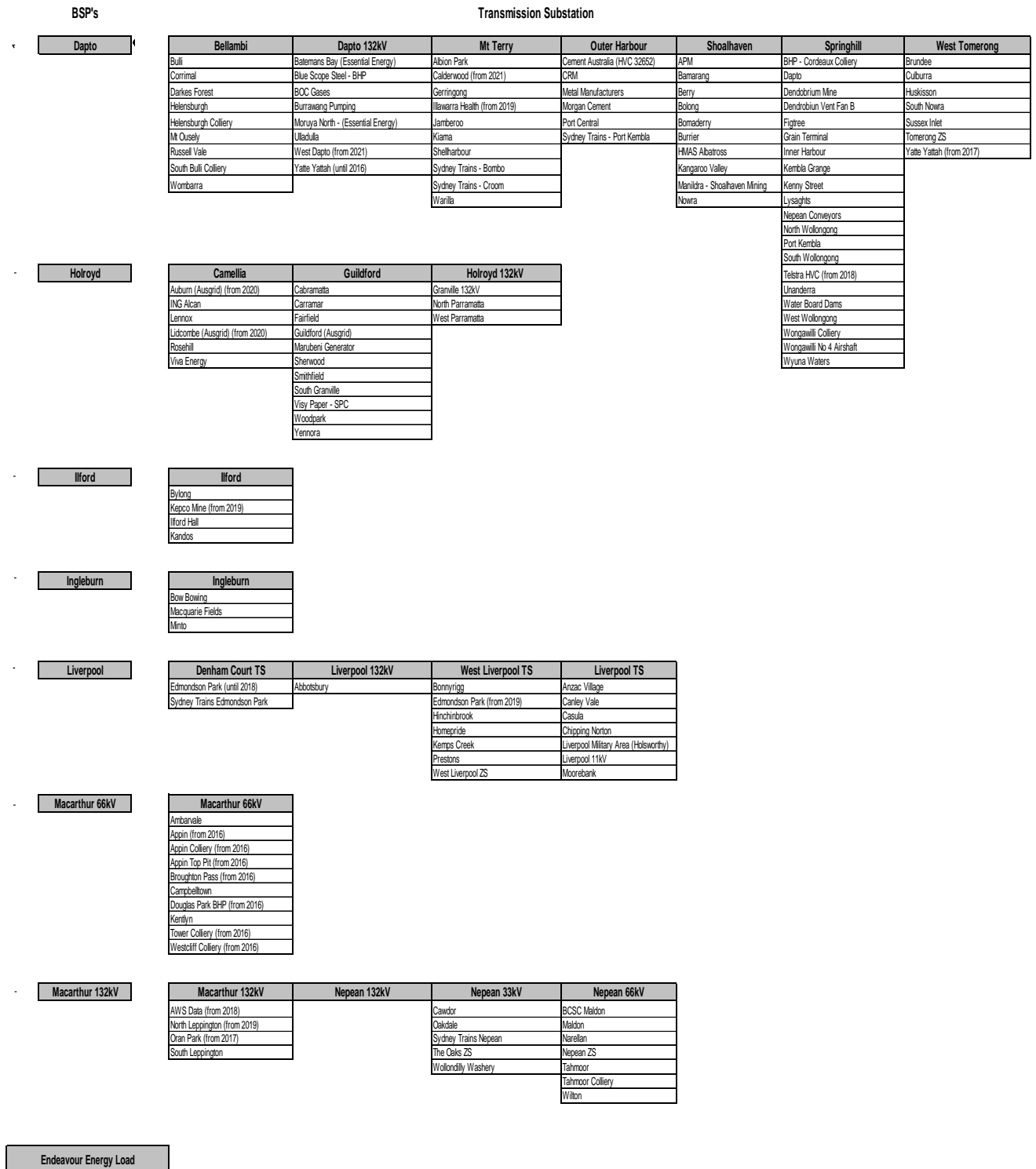
For forecasting purposes, the most important days are those with the highest demand. The summer demand is most likely to peak on weekdays with high maximum temperatures while the winter demand generally peaks on weekdays corresponding to low 6 pm temperatures.

Historical and forecast peak demands at the EE Total, Bulk Supply Point Transmission Load area, Transmission Substation and Zone Substation levels are corrected to 'normalised' figures that represent a specific weather condition. Temperature Corrected Maximum Demand (TCMD) is the estimate of the likely peak demand that could be expected in the reference conditions with 10% and 50% Probability of Exceedence (PoE). The forecasts provide both undiversified and diversified values where metering is available.

The block diagram shown in Section 3.1.1 illustrates the hierarchical structure of the forecast and the manner in which the metered loads are progressively aggregated to create an EE total. This forecast could be used to identify the system constraints at the zone substation level and above. The 10-year forecast sets the path for the 10-year capital and demand management expenditures for EE.

2.1 Endeavour Energy Network Structure

2.1.1 Block Diagram of Endeavour Energy's Network



...Continued next page...

Endeavour Energy Load

BSP's

Transmission Substation

Marulan

Fairfax Lane

Berrima Junction
Bowral
BSBC Berrima
Mittagong
Moss Vale
Ringwood
Robertson
Tyree
Water Board Dams

Mt Piper

Mt Piper 66kV

Airly Colliery (HVC27401)
Angus Place Colliery (HVC15934)
Angus Place East (HVC 32342)
Baal Bone (HVC16551)
Blackmans Flat
Charbon Coal (HVC15943)
Clarence Colliery (HVC15935)
Hartley Vale
Invincible Colliery (HVC29808)
Springvale Borehole (HVC18994)
Springvale No3 Shaft (HVC23163)
Unimin Mine (HVC20726)

Regentville

Penrith

Regentville

Warimoo

Cambridge Park	Glenmore Park	Blaxland
Cranebrook	Luddenham	Springwood
Emu Plains	North Warragamba	
Jordan Springs	Penrith 11kV	
Kingswood		
Test Australia		

Sydney North

Sydney North

Kellyville
Kenthurst

Sydney West

Baulkham Hills	Blacktown	Carlingford	Mt Druitt	Sydney West 132kV
Jasper Road	ABC Tissues	Carlingford (Ausgrid)	Claremont Meadows	Air Trunk Data (from 2021)
North Rocks	Bossley Park	Castle Hill	Horsley Park	Arndell Park
Northmead	Fujitsu Data (from 2017)	Dundas	LMS Co-Generation Plant	Baulkham Hills 11kV
Seven Hills	Greystanes	M1/M2 Tunnel (from 2019)	Plumpton	Bringelly
Westmead	Holroyd	Rydalmere	Simsmetal	Doonside
	Leabons Lane	West Pennant Hills	St Marys	Eastern Creek
	Marayong		Werrington	Huntingwood
	Newton		Whalan	Mamre
	Prospect			North Eastern Creek
	Prospect East			One steel Mill
	Prospect South			Oran Park (until 2016)
	Quarries			Quakers Hill
	Sydney Trains Blacktown North			Rooty Hill
	Sydney Trains Toongabbie			Sydney Science Park (from 2019)
				Southpipe Oakdale Industrial (from 2018)
				West Wetherill Park 11kV
				Wetherill Park

Vineyard

Hawkesbury

Vineyard

Cattai	Bella Vista
East Richmond	Box Hill (from 2021)
Glenorie	Cheriton Ave
Glossida	Darling St Data (from 2019)
Kurrajong	Marsden Park (from 2016)
North Richmond	Mungerie Park
Riverstone	NWRL Rouse Hill (from 2019)
South Windsor	Parklea
Sydney Trains Hawkesbury	Schofields
Windsor	South Marsden Park (from 2016)
Wisemans	West Castle Hill

Wallerawang 66kV

Wallerawang 66kV

Lithgow
Meadow Flat
Portland
Springvale Colliery
Sydney Trains Wallerawang

Wallerawang 132kV

Katoomba North

Lawson

Blackheath	Hazelbrook
Katoomba	Sydney Trains Lawson
Wentworth Falls	

2.2 Forecast Process

2.2.1 Endeavour Energy's Network

Weather correction is applied to the peak demands at substations where there is a strong relationship between demand and temperature. Summer demands at zone substations in the Blue Mountains and demands of all high voltage customers are not subject to any weather normalisation.

A new improved weather normalisation method based on a simulation approach has been developed and adopted. This is used to normalise peak demands for the EE network area. Two reference weather stations were employed for temperature correction of the maximum demand (TCMD) for summer. One weather station at Nowra is used for the South Coast area which covers the Dapto BSP Region while the Richmond weather station is used for the remaining EE areas. The temperature correction method is basically divided into the following steps:

- To develop/update a regression model for estimating the relationship of demand, weather and periodic patterns (calendar effects) of demand.
- To simulate the demand using multi-years of historical weather data to produce 10% and 50% normalised demand.

The regression model uses the most recent six years of daily maximum demand and temperature to determine the relationship between demand, weather and periodic patterns of demand. Various input parameters were employed for the model. Day of the week variables accounted for the difference between daily peak by day of the week and workday/non-workday. Monthly and bimonthly variables captured some of the seasonal demand variations. Year variables described the changes in base load level for each year. Previous hot/cold day effect variables were included to explain the impacts of the successive hot/cold days on daily peak demand. In addition, for summer, a set of holiday variables were included to describe the load reductions associated with holidays. Separate variables were used for the following days: New Year's Day, Australia Day, and Christmas. A school holiday variable was introduced to capture the reduced loads (increased loads in some south coast zone substations) occurring during the school holiday period in December and January.

From the regression model, daily demands were estimated using 24 years of daily weather data available at the reference weather stations. Annual seasonal maximum demands were derived from the calculated daily demands. The 10% and 50% demand values were computed from the distribution of annual seasonal maximum demands to give the 10% and 50% PoE TCMD values. The TCMD values for the latest year are the starting points of the peak demand forecasts.

Peak demand forecast considers the growth from the existing customers as well as the new customer connections. The forecasting process can be divided into two major steps. The first step is to estimate the organic growth at the zone substation which specifies the internal growth from its existing customers likely to be experienced over the forecast period. The organic growth for each zone substations was taken from the results of the NIEIR report² prepared for EE on post model adjustments for peak demand forecasts. The reports estimated the demand impacts from different state and national energy policies and programs, such as Minimum Energy Performance Standards (MEPS), NSW Energy Savings Scheme (ESS), change of building codes and NSW Solar Bonus Scheme (SBS) as well as the emerging solar battery storage and electric vehicles. This growth at the zone substation was used to establish the base level of the 10-year forecast.

The second part of the forecast process involves incorporating the planner's inputs to the base level forecast. The inputs include new developments planned to occur (lot releases), new load increases expected from customer applications (spot loads) and also information regarding the transfer of load from one zone or subtransmission substation to another (load transfers). The final forecast at a zone substation is derived from the base level forecast after adjustment for planned

²NIEIR (2016): Post-modelling adjustments of energy and peak demand forecasts for Endeavour Energy's long-term demand forecasts. National Institute of Economic and Industry Research

load transfers, spot loads, land releases and re-development within the zone substation load catchment area.

The final forecasts for all zone substations were presented to the Network Planners for review and confirmation of the expected demand growth. The Network Planners' local knowledge is vital in determining load transfer, embedded generation, proposed spot-loads and predicted lot release information. This feedback also provides an audit trail for quality purposes.

The forecast at transmission substations and bulk supply points is based on the rolled up zone substation forecast and calculated using the corresponding historical diversity factors.

2.2.2 Probability of Exceedence

The following Probability of Exceedence (PoE) parameters are adopted:

- 1 in 10 year event (corresponds to 10% PoE)
- 1 in 2 year event (corresponds to 50% PoE)

A 10% PoE figure is estimated to be exceeded only once in every ten seasons on average whilst a 50% PoE figure is likely to be exceeded once every two years on average.

2.2.3 Substation Ratings

Each transmission substation forecast contains a table of capacity rating details for each of the zone substations normally connected to that transmission substation and for the transmission substation itself. The details provided are as follows:

Transformer description:	Outlines the number and nameplate rating of transformers installed.
Installed Capacity:	The summation of maximum transformer rating installed.
Firm Capacity (N-1):	The summation of maximum transformer rating installed less the single largest transformer ³ .

These ratings are not intended to indicate the limit of any substation within the network. Other information on ratings for zone and transmission substations can be found in the Transmission Network Planning Review (TNPR) Report.

³ Assumed to be the maximum power able to be supplied in the event of 1 transformer failure

2.3 Glossary

Base Forecast	Represents the forecast before the impact of the expected Spot Loads, Load Transfers and Lot Releases. See also Modified Forecast.
Capacity	The rated continuous load-carrying ability, expressed in megawatts (MW) or megavolt-amperes (MVA) of generation, transmission, or other electrical equipment.
Circuit Breaker	A device designed to open a circuit either by manual action or by automatic action when current exceeds a value longer than permitted or for operational reasons. A circuit breaker can enable overcurrent protection.
Circuit Breaker Data	The monitored electricity flow (in amps) within the Circuit Breaker. This data is less accurate than Meter Data, it does not take account of the direction of the flow of electricity, and it can only derive MVA values and is not averaged over a 15 minute period. However, it may be the most accurate data source available for particular regions or feeders where other metering is not available. See also Meter Data and SCADA.
Coincidence	The level of demand at each loading point at exactly the same time as the system peak demand (can be expressed as a percentage, coincidence factor).
Diversified	The load recorded at a point of aggregation. For instance, the load measured at a Transmission Substation that is supplying several Zone Substations. See also Undiversified
Diversification Factor	The factor used to multiply the summated individual loading points at the lower level of the network to obtain the representative load at the aggregate level.
Diversified (Forecast)	Calculated amount determined by multiplying the undiversified demand by a diversification factor. This factor is determined from the historical data.
Diversified (Historical)	The direct load measurement at the substation.
Diversity	The tendency for customer's peak demand to occur at a different time to the load point it is connected to. See also Coincidence.
Exports	Electricity (energy and power) being sent out of a network or part of a network (such as an individual transformer) from the higher level down to the lower level.
Firm Capacity	A substation's maximum capacity from a planning standard's perspective. If a substation has more than one transformer then the firm capacity is defined as being its N – 1 Capacity.
Imports	Electricity (energy and power) being fed into a network or part of a network (such as an embedded generator) from the lower level (alternative energy source) to a higher level and dispersed into the network.
Load Transfers	<p>A reconfiguration of the network that changes the path of supply for particular customers within a defined network area. This results in a change of power flow from one loading point to another.</p> <p>From a peak demand perspective, the relevant load transfers are those which are sizable (eg: above 1MW) and which are undertaken either as a permanent change, or can be expected to be active at the time of peak demand in the future. Load transfers may occur at times of peak demand when the network is constrained.</p> <p>Load transfers are generally undertaken to reduce the net load at risk, – ie: a substation with load above capacity limits to one with spare capacity.</p>
Lot Releases	New development sites (residential, commercial & industrial) which have a defined period of release and number of development sites into load points on

	the network.
Meter Data	Highly accurate, revenue class metering of the electrical load at a Substation. Readings are taken as an average over a 15 minute period, and are filtered to remove 'spikes' or short term bursts of energy often associated with sudden or momentary surges in consumption resulting from changes being made to the network's configuration. See also SCADA and Circuit Breaker
Modified Forecast	The forecast after the incorporation of Spot Loads, Load Transfers and Lot Releases. See also Base Forecast
Monthly Peak Demand Data	The highest demand recorded at an individual load point during the month. Readings generally include MW, MVA and MVAR.
N – 1	One transmission circuit or transformer out of service.
N – 1 Capacity	The total output capacity of a substation assuming that the substation's (largest) transformer or feeder is not operational.
Peak Demand Forecast	The Summer Demand Forecast, or the Winter Demand Forecast.
Probability of Exceedence (PoE)	The likelihood of a figure being exceeded in any one season. Ie: a 10% PoE forecast figure is estimated to be exceeded by the actual figure only once every 10 seasons on average. A 50% PoE figure is likely to be exceeded once every two years on average.
Reactive Power	<p>The portion of electricity that establishes and sustains the continuous electric and magnetic fields of alternating-current equipment on transmission networks. Reactive power is energy which must be produced for maintenance of the system and is not produced for end-use consumption.</p> <p>Reactive power is provided by generators, synchronous condensers, or electrostatic equipment such as capacitors and directly influences electric system voltage. It is a derived value equal to the vector difference between the apparent power and the real power. Losses incurred in transmission from heat and electromagnetic emissions are included in total reactive power. It is usually expressed as kilovolt-amperes reactive (kVAR) or megavolt-ampere reactive (MVAR).</p>
SCADA	Supervisory Control and Data Acquisition - SCADA is used to monitor the electrical network and provide remote operation of substations and reconfiguration of the network through control over switchgear and transformers. It is also programmed with local control routines that facilitate substation voltage control and feeder and transformer change over. SCADA is the key tool for controlling the network and restoring supply after faults and incidents.
Spot Loads	New load connections which are expected to draw a defined amount of load, on a specified date at a particular point in the network. They are assumed to draw their total expected demand from the day of connection. Spot loads also incorporate expected capacitor installations which have the effect of lowering the MVA required for a given level of MW demand.
TCMD	Temperature Corrected Maximum Demand is the expected peak demand normalised by the temperature. A 10% PoE season is defined as a 1 in 10 year event. A 50% PoE season is defined as a 1 in 2 year event.
Undiversified	The direct summation of the individual peak loads of the lower level substations connected to a point of aggregation – eg: Summation of the substations' peak demand supplied from a loading point even though their individual peak demands occur at different times. See also Diversified.

2.4 Demand Management

Demand Management (DM) programs are targeted at specific constrained network elements (usually at the individual Zone Substation level) to reduce peak demand on that part of the network. Network DM initiatives take two forms, the first being a temporary reduction in peak demand (such as a load shedding program or Demand Side Response (DSR)) at a specific location for a specific period. The other form being a permanent reduction in demand and energy, carried out through methods such as energy efficiency, new technology and fuel substitution programs. While temporary load reduction is added back into the forecast to preserve the true peak demand, permanent reductions in load are not added back into the forecast as that demand should not return.

The demand forecast forms the basis in which network planners identify network limitations. These limitations are then screened for non-network (demand management) opportunities in accordance with the National Electricity Rules Chapter 5 Part B, and the associated Application Guidelines. EE prepares a demand management plan annually listing all network limitations where non-network alternatives are to be screened for non-network potential. If identified as being feasible, EE will then issues a Non-Network Options Report to commence the consultation process to obtain any proposal for non-network alternatives from the market place in accordance with Chapter 5 of National Electricity Rules, RIT-D process. A summary of this investigation and development is included in the Distribution Annual Planning Report.

2.5 Data Sources

All demand and temperature data were sourced from EE's Network Load History (NLH) database. SCADA data would be used as a substitute where gaps existed in the metering data. Where neither metering nor SCADA data was available, circuit breaker data would be used.

2.6 Total System Demand

The total system demand represents the combined demands of the BSP in EE's franchise network. Included in the forecast is the demand on EE's network that flows into adjacent distribution network systems and embedded generation. The total system maximum demand is not essential for network planning purposes but rather as an indicator of size, particularly when benchmarking against other utilities.

2.7 New and Proposed Substations

EE has a number of new and proposed substations in various stages of the approval and construction process. We have adopted the convention of only including substations into the forecasting process when the project has been 'Gate 2' approved with committed expenditure.

2.8 Total Generation on System

Table 1 lists the major generators installed within EE's franchise area. It is not intended to be a comprehensive list, as many customers within the area have small back-up generators to meet individual needs. This list of generators includes only those generators that EE is aware of and may have an effect on peak demand or network operation. Only the generators at Tallawarra, Appin, Tower and Marubeni are taken into account when calculating the forecast system demand. These generators are individually listed in the relevant Transmission Substation entries of the forecast.

Table 1. Embedded Generation within the Endeavour Energy Franchise Network Area.

Listed are those generators that are regarded as “embedded” basically connected to the network except for periods of maintenance or operational criteria limits generation capacity. Those units installed as discrete customer standby for “essential services” – which may be “non paralleling” with the network are not included.

NAME	ADDRESS	OPERATOR	SIZE (per unit)	TYPE	NORMAL ARRANGEMENT	COMMENTS
Methane Gas Fuel Based						
West Nowra	Flatrock Road, West Nowra	AGL	1x1MW	Waste Tip Methane	Export into 11kV Distribution network	Operational
Eastern Creek	Wallgrove Road, Eastern Creek	EDL	4x1.35MW	Waste Tip Methane	Export into 11kV Distribution network	Operational (Limited to 2.74 MW)
Smithfield Co-generation	McCredie Rd, Smithfield	Marubeni	3x38MW 1x62MW	Gas fire, steam Co-generation	Generates into 33kV busbar at Guildford TS	Operational – maximum output limited to 160MW
BlueScope Steel	Five Islands Rd, Port Kembla	BlueScope Steel	1x2.5MW 1x7.5MW 1x7.5MW 1x12MW 1x16MW 1x5MW 1x8.75MW	Processed Gas Steam	Capacity absorbed by customer	Operational
LMS Waste Management Centre	Wallgrove Road, Eastern Creek	LMS	8x1.2MW	Waste Tip Methane	Export into the 33kV network	Operational
Appin Colliery	Brooks Point Rd, Appin	Energy Developments Ltd (EDL)	54x1MW	Methane extraction from Coal Mine. Natural Gas Supplements	Export into the 66kV network	Operational
Tower Colliery	Mt Kiera Rd, Wilton	EDL	40x1MW	Methane extraction from Coal Mine. Natural Gas Supplements	Export into the 66kV network	Operational
Jack's Gully	Richardson Rd, Springs Farm	EDL	2MW	Waste Tip Methane	Export into 11kV distribution network	Operational
Camellia	Grand Avenue, Camellia	Earthpower	3x1.3MW	Methane from bio decomposition in Digesters	Export into 11kV distribution network	Operational
Eastern Creek	Wallgrove Road, Eastern Creek	Global Renewables	2x1MW	Methane from bio decomposition in Digesters	Normal absorbed by Customer – some export at night into 11kV network	Operational
Windsor	Macquarie St, Windsor	Hawkesbury CC	1x360kW	Natural Gas	Normal absorbed by Customer – some export at night into 11kV network	Operational
Westmead Hospital	Darcy Rd, Westmead	Westmead Hospital	2x1MW	Diesel	Customer Standby	Operational
Tahmoor Colliery	Tahmoor	EDL	1x7MW	Mine methane	Connected to 11kV busbar	Operational
Viva Energy	Camellia	Shell/Vitol	6.7+5.6+5.0 MW	natural gas	Absorbed by Customer	Operational

NAME	ADDRESS	OPERATOR	SIZE (per unit)	TYPE	NORMAL ARRANGEMENT	COMMENTS
Mount Druitt Hospital	Luxford Rd, Mount Druitt	Total Energy Solutions	1x250kW	Natural Gas	Capacity absorbed by customer	Operational
Blacktown Hospital	Marcel Crescent, Blacktown	Total Energy Solutions	1x550kW	Natural Gas	Capacity absorbed by customer	Operational
Parramatta Linen Services	O'Connell Street, Parramatta	Total Energy Solutions	1x700kW	Natural Gas	Capacity absorbed by customer	Operational
Westcliff Colliery	Appin Rd, Appin	Westcliff Colliery	1x6MW	Methane / Turbine	Capacity absorbed by customer	Operational
Ex Cathay Pacific	Norwest Bvd, West Castle Hill	Cathay Pacific	4x1875kW	Diesel	Customer Standby	Operational
Tallawarra	Yallah Bay Road, Dapto	Energy Australia	1x440MW	Natural Gas Steam Turbine	Export into 132KV network	Operational
UWS	Victoria Rd, Rydalmere	Command Energy	1MW	Co-Generation	Possible export into 11kV network	Operational
Grange Ave	Grange Ave, Riverstone	EDL	1.25MW	Waste Tip Methane	Export into 11kV network	Operational

Other Energy Forms

Wind Based						
Hampton	Rydal Road, Hampton	Hampton Wind Park	2x660kW	Wind	Export into 11kV Distribution network	Operational

Hydro Based						
Wyuna Water	Reddalls Rd, Kembla Grange	Wyuna Water	2x3.8MW + 1x.78MW	Hydro	Export into the 33kV network	Operational
BlueScope Steel	Reddalls Rd, Kembla Grange	BlueScope Steel	1x750kW	Hydro	Export into 11kV Distribution network	Operational
Nevel Hilton	23 Old cedar Track, Albion Park	Nevel Hilton	1x3kW	Micro hydro		

3 ENDEAVOUR ENERGY TRANSMISSION SUBSTATIONS

3.1 Baulkham Hills TS Demand Forecast

Discussion

There are four 132/33kV 60MVA transformers at Baulkham Hills TS. There is 65 MVar of capacitance installed on the 33kV busbar at Baulkham Hills TS. The historical and forecast MVar figures include the effects of this capacitance. Baulkham Hills Zone Substation contains two 132/11kV 45MVA transformers and is located within Baulkham Hills TS.

Baulkham Hills ZS is supplied by Sydney West Bulk Supply Point via Baulkham Hills TS 132kV busbar. The Baulkham Hills 132/11kV load is shown under the Sydney West TS 132kV load.

Major developments on Baulkham Hills are the upgrade to Westmead Hospital, the expansion of the University of Western Sydney at Westmead and various medium to high density developments.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Baulkham Hills	3 x 30/45/60 + 1 x 45/60	240
Jasper Road	3 x 15/20/25	75
North Rocks	2 x 15/19/25	50
Northmead	2 x 22/27/35	70
Seven Hills	3 x 15/19/25	75
Westmead	2 x 22/27/35	70

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVar	MVA
Jasper Road	UML5859 Medium density residential development	2017	0.7	0.3	0.8
Jasper Road	UML6042 147 apartments	2018	0.5	0.2	0.5
Jasper Road	UML6772 100 units Winston Hills Shops 180-192 Caroline Chisholm Drive	2018	0.3	0.2	0.4
Jasper Road	UML7004 233 apartments 15 shops 2 Seven Hills Rd Baulkham Hills	2019	1.4	0.7	1.5
Jasper Road	UML7695 - Meryll Ave Baulkham Hills	2019	0.1	0.1	0.1
Jasper Road	UML8297 Aged Care Facility	2020	0.8	0.4	0.9
North Rocks	ULL2378 Sporting complex Renown Rd Baulkham Hills	2018	0.3	0.1	0.3
North Rocks	UML7511 148 units 27-33 North Rocks Road North Rocks	2018	0.5	0.2	0.5
Northmead	UML7948 24 units 34-36 Briens Rd Northmead	2018	0.1	0.0	0.1
Seven Hills	UIL5002 - Warehouse Abbott Rd Seven Hills	2019	0.5	0.3	0.6
Seven Hills	UIL5137 - Abbott Rd	2018	2.6	1.2	2.8
Seven Hills	UIS0731 Abbott Road SEVEN HILLS	2018	2.4	1.2	2.7
Seven Hills	UML4598 103 Best Street Seven Hills	2018	0.3	0.2	0.4
Westmead	ULL2610 New Ronald Macdonald House	2018	1.5	0.7	1.7

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Jasper Road	Baulkham Hills Strategic Opportunities Site - 2000 Apartments	2017	8	0.6
Northmead	Medium Density Residential	2011	10	2.6
Westmead	Redevelopment to Medium Density Residential	2012	6	1.3
Westmead	UWS Redevelopment at Hawkesbury Road Westmead	2019	6	5.1
Westmead	Westmead Hospital Expansion	2017	8	15.0

Generation

Zone Substation	Name	Description	Date
Westmead	Westmead Hospital	2 x 1MW diesel	Installed

Baulkham Hills TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Jasper Road	Actual	MVA	31.0	36.5	31.1	31.0	34.4	41.3									
	MW		34.3	31.7	34.6	32.9	33.3	35.8	36.7	38.5	40.0	40.8	41.3	41.6	41.6	41.5	41.5
	MVAr		16.6	15.4	10.0	9.4	9.0	9.5	9.7	10.2	10.6	10.8	11.0	11.1	11.1	11.0	11.0
	10% POE	MVA	38.1	35.3	36.0	34.2	34.4	37.0	37.9	39.8	41.3	42.2	42.8	43.1	43.1	42.9	42.9
	PF		0.900	0.900	0.960	0.962	0.965	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
	MW		30.7	28.2	31.1	29.3	29.3	30.6	31.5	33.3	34.8	35.6	36.1	36.4	36.4	36.3	36.3
	MVAr		14.9	13.7	9.0	8.4	7.9	8.1	8.4	8.8	9.2	9.5	9.6	9.7	9.7	9.6	9.6
	50% POE	MVA	34.2	31.4	32.3	30.5	30.3	31.6	32.6	34.4	36.0	36.8	37.4	37.7	37.7	37.5	37.6
	PF		0.900	0.900	0.960	0.962	0.965	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
	Actual	MVA	19.7	23.5	21.1	20.5	22.9	24.7									
Northmead	MW		23.6	21.6	21.7	21.3	22.8	22.2	22.4	22.4	22.3	22.3	22.2	22.1	22.1	22.2	22.2
	MVAr		1.4	2.0	6.6	5.3	5.9	2.8	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	10% POE	MVA	23.6	21.6	22.6	22.0	23.5	22.4	22.9	22.9	22.8	22.8	22.7	22.7	22.6	22.6	22.7
	PF		0.998	0.996	0.957	0.971	0.968	0.992	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	MW		21.7	19.7	19.8	19.5	20.8	20.4	20.6	20.6	20.6	20.5	20.4	20.3	20.3	20.3	20.4
	MVAr		1.3	1.8	6.0	4.8	5.4	2.6	4.2	4.2	4.2	4.1	4.1	4.1	4.1	4.1	4.1
	50% POE	MVA	21.8	19.8	20.7	20.0	21.5	20.5	21.0	21.0	21.0	20.9	20.8	20.8	20.7	20.7	20.8
	PF		0.998	0.996	0.957	0.971	0.968	0.992	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	Actual	MVA	16.0	19.4	17.3	16.3	20.4	21.6									
North Rocks	MW		20.2	19.4	19.3	19.3	20.4	20.3	20.8	20.8	20.7	20.7	20.6	20.6	20.5	20.6	20.6
	MVAr		1.2	1.5	1.1	0.7	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	10% POE	MVA	20.2	19.5	19.4	19.3	20.4	20.3	20.9	20.8	20.8	20.7	20.7	20.6	20.6	20.6	20.7
	PF		0.998	0.997	0.998	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
	MW		18.4	17.6	17.5	17.5	18.5	18.1	18.7	18.6	18.6	18.5	18.5	18.4	18.4	18.5	18.5
	MVAr		1.1	1.3	1.0	0.6	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	50% POE	MVA	18.4	17.6	17.6	17.5	18.5	18.2	18.7	18.7	18.6	18.6	18.5	18.5	18.4	18.5	18.5
	PF		0.998	0.997	0.998	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
	Actual	MVA	28.4	31.3	27.1	27.1	23.9	27.2									
Seven Hills	MW		28.2	30.0	27.0	26.8	23.8	26.1	30.7	31.1	31.0	31.0	31.0	30.9	30.9	30.9	31.0
	MVAr		3.3	8.9	2.2	3.4	2.1	7.7	5.8	5.9	5.9	5.9	5.8	5.8	5.8	5.8	5.8
	10% POE	MVA	28.4	31.3	27.1	27.1	23.9	27.2	31.3	31.7	31.6	31.6	31.5	31.5	31.5	31.5	31.5
	PF		0.993	0.959	0.997	0.992	0.996	0.959	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
	MW		28.2	30.0	27.0	26.8	23.8	26.1	30.7	31.1	31.1	31.0	31.0	31.0	30.9	30.9	31.0
	MVAr		3.3	8.9	2.2	3.4	2.1	7.7	5.8	5.9	5.9	5.9	5.8	5.8	5.8	5.8	5.8
	50% POE	MVA	28.4	31.3	27.1	27.1	23.9	27.2	31.3	31.7	31.6	31.6	31.5	31.5	31.5	31.4	31.5
	PF		0.993	0.959	0.997	0.992	0.996	0.959	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
	Actual	MVA	23.0	23.7	22.4	23.2	25.3	25.1									
Westmead	MW		24.6	24.8	24.7	24.2	23.7	24.2	26.6	28.6	31.7	35.3	38.2	39.9	40.4	40.4	40.5
	MVAr		0.6	0.9	0.5	0.1	11.5	5.2	5.5	5.9	6.5	7.3	7.9	8.2	8.3	8.3	8.3
	10% POE	MVA	24.6	24.8	24.7	24.2	26.4	24.8	27.1	29.2	32.4	36.1	39.0	40.7	41.3	41.2	41.3
	PF		1.000	0.999	1.000	1.000	0.900	0.978	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	MW		23.5	23.7	23.6	23.1	22.7	23.1	25.5	27.4	30.6	34.2	37.1	38.8	39.3	39.3	39.4
	MVAr		0.6	0.8	0.5	0.1	11.0	5.0	5.3	5.7	6.3	7.1	7.6	8.0	8.1	8.1	8.1
	50% POE	MVA	23.5	23.7	23.6	23.1	25.2	23.6	26.0	28.0	31.2	34.9	37.9	39.6	40.2	40.1	40.2
	PF		1.000	0.999	1.000	1.000	0.900	0.978	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	Actual	MVA	118.2	134.4	119.1	118.1	126.9	139.9									
Undiversified	MW		130.8	127.5	127.2	124.5	123.9	128.6	137.2	141.4	145.9	150.1	153.4	155.3	155.6	155.4	155.8
	MVAr		23.1	28.6	20.5	18.9	29.9	26.6	26.9	27.8	28.9	29.8	30.5	30.9	31.0	30.9	31.0
	10% POE	MVA	134.9	132.5	129.8	126.7	128.6	131.7	140.1	144.3	148.9	153.3	156.7	158.6	159.0	158.7	159.1
	PF		0.970	0.962	0.980	0.983	0.963	0.976	0.980	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	MW		122.6	119.2	118.9	116.3	115.0	118.3	126.9	131.1	135.6	139.9	143.1	145.0	145.4	145.1	145.3
	MVAr		21.2	26.6	18.8	17.3	27.7	24.6	24.7	25.7	26.7	27.7	28.4	28.8	28.8	28.9	28.9
	50% POE	MVA	126.3	123.8	121.3	118.2	119.4	121.2	129.6	133.8	138.4	142.8	146.2	148.1	148.5	148.2	148.4
	PF		0.971	0.963	0.981	0.983	0.963	0.976	0.980	0.980	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	Actual	MVA	124.1	141.8	112.1	120.7	134.1	141.4									
Diversified# (Meter)	MW		137.9	138.9	128.9	126.2	123.1	132.9	133.8	137.9	142.3	146.4	149.6	151.4	151.8	151.6	151.9
	MVAr		67.5	34.3	12.5	52.1	38.0	28.4	42.2	43.5	44.9	46.2	47.2	47.8	47.9	47.9	47.9
	10% POE	MVA	153.5	143.0	129.5	136.6	128.9	135.9	140.3	144.6	149.2	153.6	156.9	158.8	159.2	159.0	159.3
	PF		0.898	0.971	0.995	0.924	0.955	0.978	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954
	MW		122.9	123.9	113.9	111.3	110.0	116.1	123.8	127.9	132.3	136.4	139.6	141.4	141.8	141.6	141.9
	MVAr		60.2	30.6	11.0	45.9	34.0	24.8	39.1	40.3	41.7	43.0	44.0	44.6	44.7	44.7	44.8
	50% POE	MVA	136.8	127.6	114.5	120.4	115.2	118.7	129.8	134.1	138.7	143.1	146.4	148.3	148.7	148.5	148.8
	PF		0.898	0.971	0.995	0.924	0.955	0.978	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954

Note: #Diversified values which are greater than undiversified values are due to abnormal switching.

3.2 Bellambi TS Demand Forecast

Discussion

Bellambi TS has three 60 MVA 132/33kV transformers providing a firm capacity of 120MVA and is supplied from Dapto BSP via two 132kV feeders 980 and 981.

The main load growth in the Bellambi TS supply area will be further development at the University of Wollongong in addition to high density residential and commercial redevelopment in north Wollongong.

The 33kV network at Helensburgh ZS was rearranged to accommodate the expansion of Helensburgh Colliery (HVC 29470) in April 2014 with some existing load transferred from the 11kV network to the new 33kV connection.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Bellambi	3 x 60	180
Bulli	2 x 15	30
Corrimal	2 x 19	38
Darkes Forest	2 x 5	10
Helensburgh	2 x 12.5	25
Mt Ousley	2 x 35	70
Russell Vale	2 x 25	50
Wombarra	2 x 5	10

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Corrimal	UCL7452 - Corrimal, Medical Centre	2018	0.3	0.2	0.3
Russell Vale	UCL8027 - Bulli Hospital Aged Care	2019	0.7	0.3	0.7
Russell Vale	UCL8389 - Bunnings Warehouse	2018	0.5	0.3	0.6
Wombarra	UML6925 / UCL7379 - Headlands Hotel Development Site	2019	0.7	0.3	0.7

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Bulli	URS12086 - Bulli Brickworks Stage 1 - 71 dwellings	2017	6	0.1
Bulli	URS16547 - Bulli Brick Works, Stage 2 - 69 Lots	2018	5	0.3
Bulli	URS17102 - Bulli Brick Works, Stage 3 - 32 Lots	2018	2	0.1
Mt Ousley	URS 10229 - 45 residential lot 90 strata unit subdivision	2011	6	0.3

Generation

No Generation known at this location

Bellambi TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Bulli	Actual MVA	11.1	10.6	8.3	7.8	10.2	11.5										
	MW	10.2	9.5	9.3	9.6	9.7	9.8	9.9	10.0	10.0	10.0	10.0	10.0	10.0	9.9	9.9	9.9
	MVA	1.9	2.8	2.5	0.9	1.8	1.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	10% POE MVA	10.3	10.0	9.6	9.7	9.9	10.0	10.1	10.2	10.2	10.3	10.2	10.2	10.2	10.1	10.2	10.2
	PF	0.983	0.958	0.966	0.996	0.984	0.986	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	MW	9.2	8.6	8.3	8.6	8.7	8.9	8.9	9.0	9.0	9.1	9.0	9.0	9.0	8.9	9.0	9.0
	MVA	1.7	2.6	2.2	0.8	1.6	1.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
	50% POE MVA	9.3	8.9	8.6	8.7	8.9	9.0	9.1	9.2	9.2	9.3	9.2	9.2	9.2	9.1	9.1	9.2
	PF	0.983	0.958	0.966	0.996	0.984	0.986	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	Actual MVA	16.3	17.8	14.6	13.1	16.1	18.7										
Corrimal	MW	16.6	15.9	15.7	16.1	16.5	16.8	17.0	17.0	16.9	16.8	16.7	16.7	16.6	16.6	16.6	16.6
	MVA	0.7	0.2	1.6	4.6	2.0	1.7	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
	10% POE MVA	16.6	15.9	15.7	16.8	16.6	16.9	17.1	17.0	16.9	16.8	16.8	16.7	16.6	16.6	16.6	16.6
	PF	0.999	1.000	0.995	0.962	0.993	0.995	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
	Actual MVA	15.0	14.2	14.0	14.5	14.7	14.9	15.1	15.0	14.9	14.8	14.7	14.7	14.6	14.6	14.6	14.6
	MW	15.0	14.2	14.1	15.0	14.8	14.9	15.1	15.0	14.9	14.8	14.8	14.7	14.6	14.6	14.6	14.6
	MVA	0.6	0.2	1.4	4.1	1.7	1.5	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	50% POE MVA	15.0	14.2	14.1	15.0	14.8	14.9	15.1	15.0	14.9	14.8	14.8	14.7	14.6	14.6	14.6	14.6
	PF	0.999	1.000	0.995	0.962	0.993	0.995	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
	Actual MVA	1.0	1.0	0.8	0.7	0.7	0.9										
Darkes Forest	MW	0.9	0.9	0.8	0.7	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	MVA	0.5	0.5	0.1	0.1	0.1	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	10% POE MVA	1.0	1.0	0.8	0.7	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	PF	0.903	0.888	0.995	0.988	0.987	1.000	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960
	Actual MVA	12.6	11.4	9.3	6.5	8.5	8.8										
	MW	12.6	11.3	9.2	6.4	8.2	8.8	8.8	8.7	8.7	8.7	8.6	8.6	8.6	8.6	8.6	8.6
	MVA	1.0	1.0	1.4	1.5	2.3	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	10% POE MVA	12.6	11.4	9.3	6.5	8.5	8.8	8.9	8.8	8.8	8.8	8.8	8.7	8.7	8.7	8.7	8.7
	PF	0.997	0.997	0.989	0.973	0.962	0.993	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	Actual MVA	12.6	11.3	9.2	6.4	8.2	8.8	8.8	8.7	8.7	8.7	8.6	8.6	8.6	8.6	8.6	8.6
	MW	12.6	11.3	9.2	6.4	8.2	8.8	8.8	8.7	8.7	8.7	8.6	8.6	8.6	8.6	8.6	8.6
	MVA	1.0	1.0	1.4	1.5	2.3	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	50% POE MVA	12.6	11.4	9.3	6.5	8.5	8.8	8.9	8.8	8.8	8.8	8.8	8.7	8.7	8.7	8.7	8.7
	PF	0.997	0.997	0.989	0.973	0.962	0.993	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	Actual MVA		2.7	2.9	7.9	8.1	8.6										
Helensburgh Colliery	MW		2.3	2.8	7.7	7.8	8.3	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	MVA		1.5	0.2	1.5	2.1	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	10% POE MVA		2.8	2.9	7.9	8.1	8.6	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	PF		0.834	0.999	0.981	0.965	0.957	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	Actual MVA		2.3	2.8	7.7	7.8	8.3	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Major customer	MW		2.3	2.8	7.7	7.8	8.3	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	MVA		1.5	0.2	1.5	2.1	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	50% POE MVA		2.8	2.9	7.9	8.1	8.6	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	PF		0.834	0.999	0.981	0.965	0.957	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	Actual MVA		17.3	18.8	16.8	15.8	18.8	20.8									
Mt Ousley	MW	17.8	17.3	17.5	17.5	18.2	19.0	19.0	18.9	18.9	18.9	18.8	18.8	18.8	18.8	18.8	18.9
	MVA	4.5	4.3	4.4	4.4	4.6	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	10% POE MVA	18.4	17.8	18.0	18.1	18.8	19.6	19.6	19.5	19.5	19.4	19.4	19.4	19.4	19.4	19.4	19.5
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	Actual MVA	12.4	16.2	11.2	10.6	13.2	13.8										
	MW	16.3	15.8	16.0	16.0	16.9	17.1	17.0	17.0	17.0	16.9	16.9	16.9	16.9	16.9	16.9	17.0
	MVA	4.1	3.9	4.0	4.0	4.2	4.3	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.2	4.2	4.3
	50% POE MVA	16.8	16.2	16.5	16.5	17.4	17.6	17.6	17.5	17.5	17.5	17.4	17.4	17.4	17.4	17.4	17.5
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	Actual MVA	12.4	16.2	11.2	10.6	13.2	13.8										
Russell Vale	MW	11.9	15.6	11.1	10.3	12.9	13.7	14.1	14.6	14.5	14.5	14.4	14.4	14.3	14.3	14.2	14.2
	MVA	3.6	4.1	1.5	2.3	2.9	1.9	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.1	3.1	3.1
	10% POE MVA	12.4	16.2	11.2	10.6	13.2	13.8	14.4	15.0	14.9	14.8	14.8	14.7	14.6	14.6	14.6	14.6
	PF	0.958	0.967	0.991	0.976	0.976	0.991	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
	Actual MVA	11.9	15.6	11.1	10.3	12.9	13.7	14.1	14.6	14.5	14.5	14.4	14.4	14.3	14.3	14.2	14.2
	MW	11.9	15.6	11.1	10.3	12.9	13.7	14.1	14.6	14.5	14.5	14.4	14.4	14.3	14.3	14.2	14.2
	MVA	3.6	4.1	1.5	2.3	2.9	1.9	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.1	3.1	3.1
	50% POE MVA	12.4	16.2	11.2	10.6	13.2	13.8	14.4	15.0	14.9	14.8	14.8	14.7	14.6	14.6	14.6	14.6
	PF	0.958	0.967	0.991	0.976	0.976	0.991	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
	Actual MVA	11.9	15.6	11.1	10.3	12.9	13.7	14.1	14.6	14.5	14.5	14.4	14.4	14.3	14.3	14.2	14.2

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		6.5	8.0	7.6	5.4	3.9	2.4										
South Bulli Colliery Major customer	MW	4.9	5.8	5.4	3.8	2.4	1.9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	MVA _r	4.3	5.6	5.3	4.0	3.1	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	10% POE MVA	6.5	8.0	7.6	5.5	3.9	2.4	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	PF	0.754	0.722	0.711	0.690	0.619	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778
	MW	4.9	5.8	5.4	3.8	2.4	1.9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	MVA _r	4.3	5.6	5.3	4.0	3.1	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	50% POE MVA	6.5	8.0	7.6	5.5	3.9	2.4	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	PF	0.754	0.722	0.711	0.690	0.619	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778
Actual MVA		4.9	4.4	4.5	3.4	3.9	4.2										
Wombarra	MW	4.7	4.3	4.4	3.3	3.8	4.1	4.1	4.7	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5
	MVA _r	1.0	1.0	0.9	0.5	0.8	0.5	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	10% POE MVA	4.9	4.4	4.5	3.4	3.9	4.2	4.2	4.8	4.7	4.7	4.7	4.7	4.6	4.6	4.6	4.6
	PF	0.976	0.972	0.980	0.987	0.977	0.992	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
	MW	4.7	4.3	4.4	3.3	3.8	4.1	4.1	4.7	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5
	MVA _r	1.0	1.0	0.9	0.5	0.8	0.5	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	10% POE MVA	4.9	4.4	4.5	3.4	3.9	4.2	4.2	4.8	4.7	4.7	4.7	4.7	4.6	4.6	4.6	4.6
	PF	0.976	0.972	0.980	0.987	0.977	0.992	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
Actual MVA		82.2	90.9	76.0	71.2	83.5	89.6										
Undiversified	MW	79.7	83.0	76.2	75.5	80.3	83.3	84.0	85.0	84.8	84.6	84.4	84.2	84.0	83.8	83.9	83.9
	MVA _r	17.4	21.1	17.8	19.7	19.6	15.6	17.8	18.1	18.0	18.0	18.0	17.9	17.9	17.9	17.9	17.9
	10% POE MVA	82.8	87.5	79.6	79.1	83.7	85.2	86.4	87.5	87.3	87.1	86.9	86.6	86.4	86.2	86.3	86.3
	PF	0.962	0.949	0.957	0.955	0.960	0.977	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972
	MW	75.5	78.8	72.0	71.3	76.2	78.4	79.1	80.1	79.9	79.7	79.5	79.3	79.1	78.9	79.0	79.0
	MVA _r	16.8	20.4	16.9	18.8	18.9	14.7	17.0	17.2	17.2	17.2	17.1	17.1	17.1	17.0	17.1	17.1
	50% POE MVA	78.5	83.2	75.3	74.8	79.5	80.2	81.4	82.5	82.3	82.1	81.9	81.6	81.4	81.3	81.3	81.4
	PF	0.961	0.947	0.956	0.954	0.959	0.977	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
Actual MVA		72.3	75.8	63.5	63.2	78.2	80.7										
Diversified (Meter)	MW	72.1	75.4	63.5	62.9	75.2	80.7	78.4	79.4	79.2	79.0	78.8	78.6	78.4	78.2	78.3	78.3
	MVA _r	5.2	8.4	1.0	6.4	24.8	16.4	15.9	16.1	16.1	16.0	16.0	16.0	15.9	15.9	15.9	15.9
	10% POE MVA	72.3	75.8	63.5	63.2	79.2	82.3	80.0	81.0	80.8	80.6	80.4	80.2	80.0	79.8	79.9	79.9
	PF	0.997	0.994	1.000	0.995	0.950	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	MW	72.1	75.4	63.5	62.9	75.2	80.7	73.8	74.8	74.6	74.4	74.2	74.0	73.8	73.7	73.7	73.8
	MVA _r	5.2	8.4	1.0	6.4	24.8	16.4	15.0	15.2	15.2	15.1	15.1	15.0	15.0	15.0	15.0	15.0
	50% POE MVA	72.3	75.8	63.5	63.2	79.2	82.3	75.4	76.3	76.1	76.0	75.7	75.5	75.3	75.2	75.2	75.3
	PF	0.997	0.994	1.000	0.995	0.950	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980

3.3 Blacktown TS Demand Forecast

Discussion

Blacktown TS has four 120 MVA 132/33kV transformers providing a firm capacity of 360MVA and is supplied from Sydney West BSP via two dual circuit steel towers lines forming 132kV feeders 93Z/93A and 9J1/9J2.

There is 20MVar of capacitance installed on the 33kV busbar at Blacktown. An expected load increase on Quarries ZS is attributable to the re-development of Boral land as part of the SEPP 59 Western Sydney Employment Hub development of the Greystanes area.

Load growth in the Blacktown region will be predominately driven by medium density development around Holroyd and Prospect Zone substations. Major developments in the Blacktown area include the upgrade of Blacktown hospital and the addition of Sydney Trains new substation at Toongabbie.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Blacktown	4 x 120	480
Bossley Park	2 x 22/26/35	70
Doonside	2 x 15 + 1 x 15/20	50
Greystanes	2 x 15/19/25	50
Holroyd	1 x 17.25 + 2 x 25	67.25
Leabons Lane	2 x 15/20/25	50
Marayong	3 x 15/19/25	75
Newton	3 x 15/19/25	75
Prospect	3 x 15	45
Prospect East	2 x 15/20/25	50
Prospect South	2 x 15/20/25	50
Quarries	2 x 35	70

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2018	Quarries	Blacktown	Fujitsu Data	Blacktown	9.5
2018	Prospect	Blacktown	Holroyd	Blacktown	1.1
2018	Greystanes	Blacktown	Holroyd	Blacktown	2.2

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA	MVA
Bossley Park	UCL 7055	2018	0.8	0.4	0.9
Bossley Park	UML 7747	2018	0.2	0.1	0.2
Fujitsu Data	Data Centre Load Increase	2018	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2019	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2020	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2021	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2022	4.3	2.1	4.8
Holroyd	UCL8427 - Wenty Leagues	2018	1.8	0.9	2.0
Holroyd	UML6663 - 62-64 Veron Street WENTWORTHVILLE	2018	0.1	0.0	0.1
Holroyd	UML6681 - 70-72 Essington Street WENTWORTHVILLE	2018	0.3	0.1	0.3
Holroyd	UML6810 - 1-9 Florence Street SOUTH WENTWORTHVILLE	2018	0.2	0.1	0.2
Holroyd	UML6866 - 23-25 Veron Street WENTWORTHVILLE	2018	0.2	0.1	0.2
Holroyd	UML6928 - 2-6 Fraser Street WESTMEAD	2018	0.2	0.1	0.2
Holroyd	UML7014 47 Villawood Place VILLAWOOD	2018	0.2	0.1	0.2
Holroyd	UML7046 84-86 Aurelia Street TOONGABBIE	2018	0.2	0.1	0.2
Holroyd	UML7093 - 53-55 Veron Street WENTWORTHVILLE	2018	0.3	0.1	0.3
Holroyd	UML7104 - 40-42 Addlestone Road MERRYLANDS	2018	0.1	0.1	0.1
Holroyd	UML7318 Peggy St, Mays Hill	2018	0.2	0.1	0.2
Holroyd	UML7365 - Veron St Wentworthville	2018	0.0	0.0	0.1
Holroyd	UML7393 Garfield Ste Wentworthville	2018	0.2	0.1	0.2
Holroyd	UML7438 Great Western Highway, Mays Hill	2018	0.5	0.2	0.5
Holroyd	UML7625 - Veron St Wentworthville	2019	0.1	0.0	0.1
Holroyd	UML7643 - Essington St Wentworthville	2019	0.1	0.0	0.1
Holroyd	UML7762 - Great Western Highway Westmead	2019	0.2	0.1	0.3
Leabons Lane	ULL2348 – Stage 2 Blacktown Hospital	2019	4.0	1.9	4.4
Leabons Lane	ULL2585 - Blacktown Hospital	2018	1.2	0.6	1.4
Newton	UCL7925 - Kildare Rd	2018	0.5	0.3	0.6
Newton	UML7329 - Balmoral St	2018	0.3	0.1	0.3
Newton	UML7526 - Second Ave Blacktown	2019	0.3	0.2	0.4
Newton	URS17250 - Stage 1 Riverstone Road and McCulloch Street BLACKTOWN	2018	0.2	0.1	0.2
Newton	URS17873 - Fairwater	2018	0.1	0.1	0.1

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Newton	URS18572 - Fairwater Blvd	2019	0.1	0.0	0.1
Newton	URS19208 - Stableford St	2019	0.5	0.2	0.5
Prospect	UCL8266 - Aurelia St Toongabbie	2019	0.2	0.1	0.2
Prospect	UIL4826 - 91A Mandoon Road GIRRAWEEEN	2018	0.1	0.1	0.1
Prospect	UIL4829 - 9 Amax Avenue GIRRAWEEEN	2018	0.1	0.0	0.1
Prospect	UIL4963 - Mandoon Rd	2019	0.9	0.4	1.0
Prospect	ULL2577 - Increase in load of Girraween High School	2019	0.2	0.1	0.2
Prospect	UML6386 8-10 Octavia Street TOONGABBIE	2017	0.2	0.1	0.2
Prospect	UML6591 - 166-170 Targo Road GIRRAWEEEN	2018	0.1	0.0	0.1
Prospect	UML6593 34-36 Girraween Street GIRRAWEEEN	2018	0.2	0.1	0.2
Prospect	UML6667 - 1-2 Harvey Place TOONGABBIE	2018	0.3	0.1	0.3
Prospect	UML6667 -Toongabbie Rd	2018	0.1	0.0	0.1
Prospect	UML6778 - 21-23 Lane Street WENTWORTHVILLE	2018	0.1	0.0	0.1
Prospect	UML6963 - Civic Ave	2018	0.5	0.2	0.5
Prospect	UML7046 Aurelia St	2018	0.3	0.1	0.3
Prospect	UML7134 - 12-14 Stimson Street GUILDFORD	2018	0.1	0.0	0.1
Prospect	UML7186 - 3-4 Harvey Place TOONGABBIE	2018	0.1	0.0	0.1
Prospect	UML7214 - 42 Toongabbie Road TOONGABBIE	2018	0.2	0.1	0.2
Prospect	UML7228 - Toongabbie Rd	2019	0.2	0.1	0.3
Prospect	UML7298 - 35-43 Toongabbie Road TOONGABBIE	2018	0.2	0.1	0.2
Prospect	UML7298 Toongabbie Rd	2018	0.3	0.1	0.3
Prospect	UML7523 - Toongabbie - residential development	2019	0.1	0.0	0.1
Prospect	UML7578 - Pendle Way	2019	0.1	0.0	0.1
Prospect	UML7908 - GWHWY Pendle Hill	2020	0.2	0.1	0.2
Quarries	UCL7237 - 11 Pastoral Cct PEMULWUY	2018	0.5	0.3	0.6
Quarries	UCL7590 - Basalt Road PEMULWUY	2018	0.2	0.1	0.2
Quarries	UCL7719 - 1 Butu Wargun Avenue & Reconciliation Road PEMULWUY	2018	1.4	0.7	1.5
Quarries	UCL8274 - DCI Data Centre	2018	1.9	0.6	2.0
Quarries	UCL8274 - DCI Data Centre	2019	4.8	1.6	5.0
Quarries	UCL8274 - DCI Data Centre	2020	2.9	0.9	3.0
Quarries	UCL8432 - Prospect Hwy Pemulwuy	2018	0.5	0.2	0.5
Quarries	UIL4977 - Pemulwuy	2019	0.1	0.1	0.1
Quarries	UIL5159 - Dolerite Way	2019	0.3	0.1	0.3
Quarries	UIL5183 - Dolerite Way	2019	3.2	1.5	3.5
Quarries	URS11509 - Butu Wargun Dr	2019	0.3	0.2	0.4

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Quarries	URS15117 Driftway Dr Pemulwuy	2015	3	0.2

Generation

No Generation known at this location

Configuration Changes

Year	Zone / HVC	From TS	To TS
2014	Doonside	Blacktown	Sydney West 132kV

Blacktown TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
ABC Tissues	Actual MVA	4.5	4.2	4.4	3.9	4.0	3.8										
	MW	4.4	4.1	4.3	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	MVAr	1.2	1.1	0.9	0.9	1.1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	10% POE MVA	4.5	4.2	4.4	4.0	4.0	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	PF	0.965	0.968	0.978	0.973	0.959	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
Major customer	MW	4.4	4.1	4.3	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	MVAr	1.2	1.1	0.9	0.9	1.1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	10% POE MVA	4.5	4.2	4.4	4.0	4.0	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	PF	0.965	0.968	0.978	0.973	0.959	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	50% POE MVA	4.5	4.2	4.4	4.0	4.0	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Sydney Trains North Blacktown	Actual MVA	17.2	14.8	16.6	19.9	16.3	7.2										
	MW	16.8	14.5	16.3	19.2	16.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
	MVAr	3.5	2.6	3.0	5.3	2.3		1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	10% POE MVA	17.2	14.8	16.6	19.9	16.3	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	PF	0.980	0.984	0.983	0.963	0.990	1.000	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
Major customer	MW	16.8	14.5	16.3	19.2	16.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
	MVAr	3.5	2.6	3.0	5.3	2.3		1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	10% POE MVA	17.2	14.8	16.6	19.9	16.3	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	PF	0.980	0.984	0.983	0.963	0.990	1.000	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
	50% POE MVA	17.2	14.8	16.6	19.9	16.3	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Bossley Park	Actual MVA	26.2	30.0	28.8	26.6	29.3	31.6										
	MW	34.4	32.7	32.8	32.2	33.2	31.2	32.0	31.9	31.8	31.7	31.7	31.6	31.6	31.6	31.7	31.8
	MVAr	2.6	3.4	2.4	3.4	4.2	4.0	3.5	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.5
	10% POE MVA	34.5	32.9	32.9	32.3	33.4	31.4	32.1	32.1	32.0	31.9	31.9	31.8	31.8	31.8	31.9	32.0
	PF	0.997	0.995	0.997	0.995	0.992	0.992	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
Doonside	MW	31.5	29.8	29.9	29.3	30.6	28.6	29.4	29.3	29.2	29.2	29.1	29.1	29.0	29.0	29.1	29.2
	MVAr	2.4	3.1	2.2	3.1	3.9	3.6	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	10% POE MVA	31.6	30.0	30.0	29.4	30.8	28.9	29.6	29.5	29.4	29.3	29.3	29.2	29.2	29.2	29.3	29.4
	PF	0.997	0.995	0.997	0.995	0.992	0.992	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
	50% POE MVA	31.6	30.0	30.0	29.4	30.8	28.9	29.6	29.5	29.4	29.3	29.3	29.2	29.2	29.2	29.3	29.4
Fujitsu Data	Actual MVA	20.4	28.2	22.7													
	MW	30.3	25.8	23.0													
	MVAr	9.9	6.9	2.6													
	10% POE MVA	31.9	26.7	23.2													
	PF	0.950	0.966	0.994													
Major Customer	MW	26.4	22.9	20.7													
	MVAr	8.7	6.1	2.3													
	10% POE MVA	27.8	23.7	20.9													
	PF	0.950	0.966	0.994													
	50% POE MVA	27.8	23.7	20.9													
Greystanes	Actual MVA	18.8	23.1	20.0	21.9	23.4	24.0										
	MW	24.4	23.5	23.0	23.8	24.5	22.0	19.8	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1
	MVAr	2.9	0.6	2.5	0.0	0.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	10% POE MVA	24.6	23.5	23.2	23.8	24.5	22.1	19.8	19.7	19.6	19.5	19.4	19.3	19.3	19.2	19.2	19.2
	PF	0.993	1.000	0.994	1.000	1.000	0.996	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
Holroyd	MW	22.0	21.0	20.6	21.4	21.9	19.8	17.5	17.4	17.3	17.2	17.1	17.0	16.9	16.9	16.9	16.9
	MVAr	2.6	0.5	2.2	0.0	0.0	1.8	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	10% POE MVA	22.1	21.0	20.7	21.4	21.9	19.9	17.6	17.5	17.4	17.3	17.2	17.1	17.0	16.9	16.9	16.9
	PF	0.993	1.000	0.994	1.000	1.000	0.996	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
	50% POE MVA	22.1	21.0	20.7	21.4	21.9	19.9	17.6	17.5	17.4	17.3	17.2	17.1	17.0	16.9	16.9	16.9
Leabons Lane	Actual MVA	16.8	20.1	19.4	20.2	21.9	22.6										
	MW	22.1	20.8	21.7	21.8	20.9	18.4	19.3	22.6	22.5	22.4	22.4	22.4	22.4	22.4	22.4	22.4
	MVAr	3.3	1.6	6.7	6.1	10.1	8.9	6.3	7.4	7.4	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	10% POE MVA	22.3	20.8	22.8	22.7	23.3	20.4	20.3	23.8	23.7	23.7	23.6	23.6	23.5	23.5	23.6	23.6
	PF	0.989	0.997	0.956	0.963	0.900	0.900	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
Major customer	MW	20.3	19.0	20.0	20.1	19.2	16.7	17.6	20.9	20.9	20.8	20.8	20.7	20.7	20.7	20.7	20.8
	MVAr	3.0	1.5	6.2	5.6	9.3	8.1	5.8	6.8	6.8	6.8	6.8	6.7	6.7	6.8	6.8	6.8
	10% POE MVA	20.6	19.1	20.9	20.9	21.3	18.5	18.6	22.0	21.9	21.9	21.8	21.8	21.8	21.7	21.8	21.8
	PF	0.989	0.997	0.956	0.963	0.900	0.900	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
	50% POE MVA	20.6	19.1	20.9	20.9	21.3	18.5	18.6	22.0	21.9	21.9	21.8	21.8	21.8	21.7	21.8	21.8

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Marayong	Actual MVA	39.9	38.1	38.0	38.9	39.9	40.1										
	MW	39.3	37.5	37.6	38.4	39.2	39.5	39.4	39.3	39.2	39.1	39.1	39.0	38.9	38.9	39.0	39.0
	MVA	6.8	6.8	5.6	6.3	7.6	7.3	6.9	6.9	6.9	6.8	6.8	6.8	6.8	6.8	6.8	6.8
	10% POE MVA	39.9	38.1	38.0	38.9	39.9	40.1	40.0	39.9	39.8	39.7	39.7	39.6	39.5	39.5	39.6	39.6
	PF	0.985	0.984	0.989	0.987	0.982	0.983	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	MW	39.3	37.5	37.6	38.4	39.2	39.5	39.4	39.3	39.2	39.1	39.1	39.0	38.9	38.9	39.0	39.0
	MVA	6.8	6.8	5.6	6.3	7.6	7.3	6.9	6.9	6.9	6.8	6.8	6.8	6.8	6.8	6.8	6.8
	50% POE MVA	39.9	38.1	38.0	38.9	39.9	40.1	40.0	39.9	39.8	39.7	39.7	39.6	39.5	39.5	39.6	39.6
	PF	0.985	0.984	0.989	0.987	0.982	0.983	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	Actual MVA	31.2	36.4	32.7	30.3	32.4	34.1										
Newton	MW	35.0	34.4	34.5	33.2	33.6	32.0	32.9	33.6	33.6	33.6	33.6	33.7	33.7	33.8	33.9	34.1
	MVA	11.8	11.0	10.7	10.6	9.8	9.3	10.8	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.2	11.2
	10% POE MVA	37.0	36.1	36.1	34.8	35.0	33.4	34.7	35.4	35.4	35.4	35.4	35.4	35.5	35.5	35.7	35.9
	PF	0.947	0.953	0.955	0.953	0.960	0.961	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	MW	32.9	32.3	32.4	31.1	31.7	30.3	31.2	31.9	31.9	31.9	31.9	31.9	32.0	32.0	32.2	32.3
	MVA	11.1	10.3	10.1	9.9	9.2	8.8	10.3	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.6	10.6
	50% POE MVA	34.7	33.9	33.9	32.6	33.0	31.5	32.8	33.6	33.6	33.6	33.6	33.6	33.6	33.7	33.9	34.0
	PF	0.947	0.953	0.955	0.953	0.960	0.961	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA	22.3	30.0	25.3	25.4	29.7	31.7										
Prospect	MW	28.4	28.7	28.2	27.9	28.7	28.6	29.6	31.0	31.1	31.0	30.9	30.9	30.8	30.8	30.8	30.9
	MVA	1.8	6.7	2.0	2.2	10.3	4.9	5.7	5.9	6.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	10% POE MVA	28.5	29.5	28.3	28.0	30.5	29.1	30.2	31.6	31.6	31.6	31.5	31.4	31.4	31.3	31.4	31.4
	PF	0.998	0.974	0.997	0.997	0.941	0.986	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
	MW	26.0	26.2	25.7	25.5	26.3	26.2	27.2	28.6	28.6	28.6	28.5	28.4	28.4	28.3	28.4	28.4
	MVA	1.6	6.1	1.8	2.0	9.5	4.5	5.2	5.5	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.5
	50% POE MVA	26.0	26.9	25.8	25.5	28.0	26.6	27.7	29.1	29.1	29.1	29.0	28.9	28.9	28.9	28.9	29.0
	PF	0.998	0.974	0.997	0.997	0.941	0.986	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
	Actual MVA	9.3	10.4	10.8	10.4	9.4	10.6										
Prospect East Major customer	MW	8.7	9.7	10.0	9.7	8.8	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
	MVA	3.3	3.8	3.9	3.8	3.3	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	10% POE MVA	9.3	10.4	10.8	10.4	9.4	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
	PF	0.936	0.932	0.931	0.931	0.935	0.931	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
	MW	8.7	9.7	10.0	9.7	8.8	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
	MVA	3.3	3.8	3.9	3.8	3.3	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	50% POE MVA	9.3	10.4	10.8	10.4	9.4	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
	PF	0.936	0.932	0.931	0.931	0.935	0.931	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
	Actual MVA	2.2	2.3	3.1	4.4	4.5	3.6										
Prospect South Major customer	MW	2.1	2.1	2.8	3.9	4.1	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	MVA	0.8	0.8	1.3	2.0	2.0	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	10% POE MVA	2.2	2.3	3.1	4.4	4.5	3.6	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	PF	0.931	0.929	0.899	0.886	0.901	0.936	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914
	MW	2.1	2.1	2.8	3.9	4.1	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	MVA	0.8	0.8	1.3	2.0	2.0	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	50% POE MVA	2.2	2.3	3.1	4.4	4.5	3.6	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	PF	0.931	0.929	0.899	0.886	0.901	0.936	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914
	Actual MVA	14.5	18.9	21.3	24.5	28.8	30.1										
Quarries	MW	17.0	18.0	21.7	24.6	27.1	27.7	22.1	29.2	31.5	31.4	31.3	31.3	31.2	31.2	31.2	31.3
	MVA	6.0	5.0	5.8	6.6	7.3	8.1	6.4	8.5	9.1	9.1	9.1	9.0	9.0	9.0	9.0	9.0
	10% POE MVA	18.1	18.7	22.5	25.5	28.1	28.8	23.1	30.4	32.8	32.7	32.6	32.6	32.5	32.5	32.5	32.6
	PF	0.943	0.964	0.966	0.966	0.966	0.960	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	MW	15.6	16.6	20.3	23.2	25.5	25.9	20.4	27.5	29.7	29.7	29.6	29.5	29.5	29.5	29.5	29.5
	MVA	5.5	4.6	5.4	6.2	6.9	7.6	5.9	8.0	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.5
	50% POE MVA	16.6	17.3	21.0	24.0	26.4	27.0	21.2	28.6	30.9	30.9	30.8	30.7	30.7	30.7	30.7	30.8
	PF	0.943	0.964	0.966	0.966	0.966	0.960	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	Actual MVA																
Sydney Trains Toongabbie	MW							13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
	MVA							4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	10% POE MVA							14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	MW							13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Major customer	MVA							4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	50% POE MVA							14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA	245.2	289.8	272.4	254.0	271.4	276.4										
	MW	291.6	283.2	287.6	270.3	272.6	257.0	284.7	300.5	305.7	308.6	311.6	311.1	310.7	310.5	311.0	311.5
Undiversified	MVA	64.2	60.1	56.9	50.2	61.8	58.1	68.8	74.1	76.3	77.9	79.5	79.4	79.3	79.3	79.4	79.5
	10% POE MVA	300.4	290.8	294.7	276.6	281.7	264.9	294.3	311.0	316.7	319.9	323.2	322.8	322.4	322.2	322.7	323.2
	PF	0.971	0.974	0.976	0.977	0.968	0.970	0.968	0.966	0.966	0.965	0.964	0.964	0.964	0.964	0.964	0.964
	MW	271.2	263.8	268.9	253.8	256.3	240.3	268.1	283.8	289.1	291.9	294.9	294.4	294.0	293.8	294.3	294.8
	MVA	59.5	56.1	53.4	47.9	58.4	54.4	65.2	70.5	72.7	74.3	75.8	75.7	75.7	75.6	75.8	75.9
	50% POE MVA	279.3	270.9	275.5	259.8	264.9	247.7	277.2	293.9	299.5	302.8	306.1	305.6	305.2	305.0	305.5	306.1
	PF	0.971	0.974	0.976	0.977	0.968	0.970	0.967	0.966	0.965	0.964	0.963	0.963	0.963	0.963	0.963	0.963

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		222.3	269.4	244.0	216.6	244.0	279.6										
Diversified (Meter)	MW	270.8	269.3	271.3	265.0	266.8	263.5	274.4	289.6	294.6	297.4	300.2	299.8	299.4	299.2	299.7	300.2
	MVAr	78.9	35.7	36.9	28.7	54.0	37.8	49.0	51.8	52.7	53.1	53.7	53.6	53.5	53.5	53.6	53.6
	10% POE MVA	282.1	271.7	273.8	266.5	272.2	266.2	278.7	294.2	299.3	302.1	305.0	304.6	304.2	304.0	304.5	305.0
	PF	0.960	0.991	0.991	0.994	0.980	0.990	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
50% POE	MW	248.1	246.7	248.7	242.3	244.9	242.4	254.0	269.0	273.9	276.6	279.4	279.0	278.6	278.4	278.9	279.4
	MVAr	72.3	32.7	33.8	26.2	49.6	34.8	45.4	48.1	48.9	49.4	49.9	49.9	49.8	49.8	49.8	49.9
	MVA	258.4	248.8	250.9	243.7	249.9	244.9	258.0	273.2	278.2	281.0	283.8	283.4	283.0	282.8	283.3	283.8
	PF	0.960	0.991	0.991	0.994	0.980	0.990	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984

3.4 Camellia TS Demand Forecast

Discussion

Camellia TS has 3 x 120 MVA 132/33kV transformers and is supplied at 132kV from the Holroyd Bulk Supply Point via Guildford Transmission Substation.

Camellia TS will be subject to Project TS616 Camellia TS Transformer replacement due to end of life issues. This project proposes to replace Transformer 1 with a new 120 MVA unit and then decommissioning and removing Transformer No.3. This approach will provide firm capacity of 120 MVA in the short term with the ability to increase that with the addition of a third transformer if required in the future. Completion is anticipated by 2018/19.

The Parramatta CBD has a number of developments that have commenced. The Parramatta Square Master plan could potentially produce up to 18 MVA of load.

Shell has ended its refining operations and now uses the existing Clyde site as a fuel import terminal. The Shell site has significantly reduced its electrical load and is now run by as a joint venture with Vitol called Viva Energy. Surplus land from the site has been included in the Department of Planning and Environment's Camellia Priority Precinct for development.

The Camellia precinct will also be the subject of a proposed residential rezoning which is scheduled for public exhibition in mid 2017 by the Department of Planning and Environment.

Endeavour Energy has been in discussions with Ausgrid regarding the supply of their Auburn and Lidcombe Zone Substations from Camellia. This strategy has been approved and the two Ausgrid zone substations will now be supplied from Camellia. It is expected that these zone substations will be transferred to Camellia from 2020.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Camellia	3 x 120	360
Lennox	3 x 15/19/25	75
Rosehill	3 x 25	75

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Lennox	UCL5604 522 units and Commercial 134 - 140 Marsden St Parramatta	2017	2.8	1.4	3.1
Lennox	UCL7998 - Good St Granville	2019	0.2	0.1	0.2
Lennox	UCL8128 Westfield	2017	0.4	0.2	0.4
Lennox	UML7460 - 366 Units	2018	1.0	0.5	1.1
Lennox	UML7522 - 398 Apartments	2018	1.3	0.6	1.4
Lennox	UML7524 84-88 Great Western Highway Westmead	2018	0.2	0.1	0.2
Lennox	UML7524 Great Western Highway, Westmead	2018	0.2	0.1	0.2
Lennox	UML7927 44 units 190-194 Burnett Street Mays Hill	2018	0.1	0.1	0.1
Lennox	UML7945 64 apartments 2 retail 114 - 116 GWH Parramatta	2018	0.4	0.2	0.4
Rosehill	UIL4793 - 33 Grand Avenue Rosehill additional load to HVC 3286	2018	0.3	0.2	0.4
Rosehill	UML6192 - 271 Apartments and retail area 2 - 8 River Road Parramatta	2018	1.3	0.6	1.4
Rosehill	UML6431 - 68 Apartments 9-11 Weston Street Rosehill	2018	0.2	0.1	0.3
Rosehill	UML7258 - 62 Apartments, Hope st	2018	0.2	0.1	0.2
Rosehill	UML7325 - 70 Apartments	2018	0.2	0.1	0.2
Rosehill	UML7325 70 units 125-129 Arthur Street Parramatta	2018	0.2	0.1	0.3

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Lennox	Auto Alley High Rise	2020	20	12.8
Rosehill	Camellia reactivation precinct 10,000 apartments	2020	20	37.5

Generation

Zone Substation	Name	Description	Date
Camellia	Viva Energy	6.7+5.6+5.0MW natural gas	Installed
Rosehill	Bio Mass	2.45 MW	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2013	Granville	Camellia	Sydney West 132kV
2014	Parramatta*	Camellia	Holroyd 132kV

**Parramatta has been decommissioned and West Parramatta has taken up the existing load on Parramatta*

Camellia TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
ING Alcan Major customer 10% POE	Actual MVA	1.6	1.5	1.3	1.6	1.9	1.8										
	MW	1.3	1.3	1.1	1.4	1.7	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	MVA _r	0.8	0.8	0.6	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	MVA	1.6	1.5	1.3	1.6	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
	PF	0.859	0.859	0.884	0.857	0.878	0.884	0.870	0.870	0.870	0.870	0.870	0.870	0.870	0.870	0.870	0.870
50% POE	MW	1.3	1.3	1.1	1.4	1.7	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	MVA _r	0.8	0.8	0.6	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	MVA	1.6	1.5	1.3	1.6	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
	PF	0.859	0.859	0.884	0.857	0.878	0.884	0.870	0.870	0.870	0.870	0.870	0.870	0.870	0.870	0.870	0.870
	Actual MVA	14.2															
Granville 10% POE	MW	14.7															
	MVA _r	3.2															
	MVA	15.1															
	PF	0.976															
	Actual MVA	14.2															
50% POE	MW	13.8															
	MVA _r	3.0															
	MVA	14.1															
	PF	0.976															
	Actual MVA	34.7	31.8	31.8	21.2	20.3	20.8										
Lennox 10% POE	MW	36.0	31.6	29.9	26.7	22.8	21.0	23.6	23.8	23.8	23.9	24.2	24.6	25.0	25.6	26.4	27.3
	MVA _r	10.2	11.8	10.2	2.1	3.5	0.5	5.7	5.8	5.8	5.8	5.9	6.0	6.1	6.2	6.4	6.6
	MVA	37.4	33.8	31.6	26.8	23.0	21.0	24.3	24.5	24.5	24.6	24.9	25.3	25.8	26.4	27.2	28.1
	PF	0.962	0.937	0.947	0.997	0.988	1.000	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972
	Actual MVA	37.9	36.9	42.3													
50% POE	MW	34.2	29.9	28.2	25.0	21.3	19.6	22.3	22.4	22.5	22.6	22.9	23.2	23.7	24.3	25.1	26.0
	MVA _r	9.7	11.2	9.6	2.0	3.3	0.5	5.4	5.4	5.5	5.5	5.6	5.6	5.8	5.9	6.1	6.3
	MVA	35.5	31.9	29.7	25.0	21.6	19.6	23.0	23.1	23.1	23.3	23.5	23.9	24.4	25.0	25.8	26.7
	PF	0.962	0.937	0.947	0.997	0.988	1.000	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972
	Actual MVA	37.9	36.9	42.3													
Parramatta 10% POE	MW	38.8	36.7	39.2													
	MVA _r	14.7	12.8	4.2													
	MVA	41.5	38.9	39.4													
	PF	0.935	0.944	0.994													
	Actual MVA	19.9	26.6	28.9	28.5	22.3	21.0										
50% POE	MW	36.8	34.7	37.2													
	MVA _r	14.0	12.1	4.0													
	MVA	39.4	36.8	37.4													
	PF	0.935	0.944	0.994													
	Actual MVA	19.9	26.6	28.9	28.5	22.3	21.0										
Rosehill 10% POE	MW	19.7	24.3	26.3	28.3	21.9	20.7	22.7	22.7	22.8	23.2	23.9	24.9	26.2	27.8	29.8	32.0
	MVA _r	2.2	10.8	12.0	3.3	7.4	3.5	7.3	7.3	7.4	7.5	7.7	8.0	8.5	9.0	9.6	10.3
	MVA	19.9	26.6	28.9	28.5	23.1	21.0	23.8	23.8	23.9	24.4	25.1	26.2	27.5	29.2	31.3	33.7
	PF	0.994	0.914	0.909	0.993	0.948	0.986	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
	Actual MVA	41.5	24.3	16.4	3.8	3.2	3.2										
50% POE	MW	19.7	24.3	26.3	28.3	21.9	20.7	22.7	22.7	22.8	23.2	23.9	24.9	26.2	27.8	29.8	32.0
	MVA _r	2.2	10.8	12.0	3.3	7.4	3.5	7.3	7.3	7.4	7.5	7.7	8.0	8.5	9.0	9.6	10.3
	MVA	19.9	26.6	28.9	28.5	23.1	21.0	23.8	23.8	23.9	24.4	25.1	26.2	27.5	29.2	31.3	33.7
	PF	0.994	0.914	0.909	0.993	0.948	0.986	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
	Actual MVA	41.5	24.3	16.4	3.8	3.2	3.2										
Viva Energy Major customer 10% POE	MW	37.8	20.7	14.0	3.5	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	MVA _r	17.1	12.7	8.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	MVA	41.5	24.3	16.4	3.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	PF	0.911	0.852	0.857	0.916	0.881	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884
	Actual MVA	41.5	24.3	16.4	3.8	3.2	3.2										
(former Shell site) 50% POE	MW	37.8	20.7	14.0	3.5	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	MVA _r	17.1	12.7	8.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	MVA	41.5	24.3	16.4	3.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	PF	0.911	0.852	0.857	0.916	0.881	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884
	Actual MVA	41.5	24.3	16.4	3.8	3.2	3.2										
Auburn (Ausgrid) 10% POE	MW									23.6	23.9	24.1	24.4	24.7	24.9	25.2	25.5
	MVA _r									11.4	11.6	11.7	11.8	11.9	12.1	12.2	12.3
	MVA									26.2	26.5	26.8	27.1	27.4	27.7	28.0	28.3
	PF									0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA									26.2	26.5	26.8	27.1	27.4	27.7	28.0	28.3
Major customer 50% POE	MW									23.6	23.9	24.1	24.4	24.7	24.9	25.2	25.5
	MVA _r									11.4	11.6	11.7	11.8	11.9	12.1	12.2	12.3
	MVA									26.2	26.5	26.8	27.1	27.4	27.7	28.0	28.3
	PF									0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA									26.2	26.5	26.8	27.1	27.4	27.7	28.0	28.3

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual	MVA																
Lidcombe (Ausgrid) 10% POE	MW									20.6	21.0	21.4	21.9	22.3	22.7	23.1	23.6
	MVA _r									10.0	10.2	10.4	10.6	10.8	11.0	11.2	11.4
	MVA									22.9	23.3	23.8	24.3	24.8	25.2	25.7	26.2
	PF									0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Major customer 50% POE	MW									20.6	21.0	21.4	21.9	22.3	22.7	23.1	23.6
	MVA _r									10.0	10.2	10.4	10.6	10.8	11.0	11.2	11.4
	MVA									22.9	23.3	23.8	24.3	24.8	25.2	25.7	26.2
	PF									0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Actual	MVA	149.6	121.1	120.6	55.0	47.6	46.9										
Undiversified 10% POE	MW	148.3	114.6	110.5	59.8	49.1	46.1	50.8	50.9	95.2	96.4	98.1	100.2	102.7	105.5	109.0	112.8
	MVA _r	48.2	48.9	35.4	7.7	13.3	6.4	15.5	15.5	37.0	37.4	38.1	38.8	39.7	40.7	41.9	43.1
	MVA	156.8	125.0	117.5	60.6	51.2	47.0	53.3	53.4	102.6	103.9	105.7	108.0	110.6	113.6	117.3	121.3
	PF	0.946	0.917	0.940	0.987	0.959	0.981	0.954	0.954	0.928	0.928	0.928	0.928	0.929	0.929	0.929	0.930
50% POE	MW	143.6	110.9	106.8	58.1	47.7	44.8	49.5	49.6	93.9	95.1	96.8	98.9	101.4	104.2	107.7	111.5
	MVA _r	46.7	47.6	34.6	7.5	13.1	6.4	15.2	15.2	36.6	37.1	37.8	38.5	39.4	40.4	41.5	42.8
	MVA	151.9	121.1	113.7	58.9	49.8	45.7	51.9	52.0	101.2	102.5	104.3	106.6	109.2	112.2	115.9	120.0
	PF	0.946	0.916	0.939	0.986	0.958	0.981	0.953	0.953	0.928	0.928	0.928	0.928	0.928	0.928	0.929	0.930
Actual	MVA	148.3	122.3	95.5	71.2	47.5	61.9										
Diversified 10% POE	MW	138.2	112.3	93.3	69.1	44.9	60.0	48.0	48.1	90.0	91.1	92.7	94.7	97.1	99.7	103.0	106.6
	MVA _r	53.6	48.4	20.5	17.3	15.6	15.1	15.4	15.5	28.9	29.3	29.8	30.4	31.2	32.0	33.1	34.3
	MVA	148.3	122.3	95.5	71.2	47.5	61.9	50.4	50.5	94.5	95.7	97.4	99.5	101.9	104.8	108.2	112.0
	PF	0.932	0.918	0.977	0.970	0.945	0.970	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
(Meter) 50% POE	MW	138.2	112.3	93.3	69.1	44.9	60.0	46.7	46.8	88.7	89.9	91.5	93.5	95.8	98.5	101.7	105.4
	MVA _r	53.6	48.4	20.5	17.3	15.6	15.1	15.0	15.1	28.5	28.9	29.4	30.0	30.8	31.6	32.7	33.9
	MVA	148.3	122.3	95.5	71.2	47.5	61.9	49.1	49.2	93.2	94.4	96.1	98.2	100.6	103.4	106.9	110.7
	PF	0.932	0.918	0.977	0.970	0.945	0.970	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952

3.5 Carlingford TS Demand Forecast

Discussion

Carlingford Transmission Substation has three 120 MVA 132/66kV double-wound transformers and one 120 MVA 132/66kV auto transformer.

Major projects on Carlingford TS include the M1-M2 tunnel supply and development around the North West Rail Link.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Carlingford	4 x 120 (132/66kV)	480
Castle Hill	3 x 25	75
Dundas	2 x 22/26/35 + 1 x 35	105
Rydalmere	1 x 20/25/27/33 + 1 x 15/19/25 + 1 x 22/27/35	93
West Pennant Hills	2 x 22/26/35	70

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Castle Hill	UML6693 378 units 299 - 309 Old Northern Rd Castle Hill	2018	1.1	0.5	1.2
Castle Hill	UML7129 - Stage 3 Retirement Village	2018	0.3	0.1	0.3
Dundas	UML6231 140 apartments James Street Carlingford	2018	0.5	0.2	0.5
Dundas	UML6506 408 apartments 2-12 Thallon Street Carlingford	2019	1.1	0.5	1.3
Dundas	UML6859 183 apartments Thallon Street Carlingford	2018	0.5	0.3	0.6
Dundas	UML6982 & UML6983 157 units Mobbs Lane Eastwood	2018	0.4	0.2	0.5
Dundas	UML7151 - 44 Apartments	2018	0.2	0.1	0.2
M1 M2 tunnel	UCL7388 M1 - M2 Tunnel Supply HVC - Carlingford	2019	6.3	3.1	7.0
Rydalmere	309 Apartments 64-72 River Road Ermington (AE2 Residential)	2017	0.9	0.4	1.0
Rydalmere	UML6504 121 Apartments 24-32 Koorine Street Ermington	2018	0.4	0.2	0.5
West Pennant Hills	ULL2146 NWRL Construction and fit out loads - Removal	2020	-1.2	0.6	-1.3

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Castle Hill	NWRL corridor Commercial Load - 4750 jobs	2012	24	8.1
Castle Hill	NWRL corridor Dwellings - 2200	2012	24	5.4
Dundas	Telopea Urban Renewal Project, 1900 dwellings over 10 years	2011	10	6.3
West Pennant Hills	NWRL corridor Dwellings Cherrybrook Precinct 1022 Apartments	2019	6	3.1

Generation

No Generation known at this location

Carlingford TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Castle Hill	Actual MVA	22.8	21.6	20.1	21.8	24.8	25.6										
	MW	28.5	24.0	24.1	24.6	23.6	23.2	24.7	25.2	25.7	26.3	27.0	27.8	28.6	29.4	30.2	30.9
	MVA _r	2.1	4.4	6.2	7.3	6.4	6.9	7.3	7.5	7.6	7.8	8.0	8.3	8.5	8.7	9.0	9.2
	10% POE MVA	28.5	24.4	24.8	25.7	24.4	24.2	25.8	26.2	26.8	27.5	28.2	29.0	29.9	30.7	31.5	32.2
	PF	0.997	0.984	0.968	0.959	0.965	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959
	MW	26.4	22.0	22.0	22.6	22.2	21.1	22.6	23.0	23.6	24.2	24.9	25.7	26.5	27.3	28.1	28.8
	MVA _r	2.0	4.0	5.7	6.7	6.0	6.3	6.7	6.8	7.0	7.2	7.4	7.6	7.9	8.1	8.3	8.6
	50% POE MVA	26.5	22.4	22.7	23.6	23.0	22.0	23.6	24.0	24.6	25.3	26.0	26.8	27.7	28.5	29.3	30.0
	PF	0.997	0.984	0.968	0.959	0.965	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959
Dundas	Actual MVA	31.0	41.1	36.6	37.2	42.2	49.0										
	MW	38.5	37.3	37.7	38.7	40.1	40.0	41.7	42.7	42.6	42.4	42.2	42.0	41.8	41.7	41.7	41.6
	MVA _r	5.9	4.6	11.8	11.0	10.8	8.9	9.9	10.1	10.1	10.0	10.0	9.9	9.9	9.9	9.9	9.9
	10% POE MVA	38.9	37.6	39.5	40.2	41.6	41.0	42.8	43.9	43.8	43.6	43.3	43.2	43.0	42.8	42.8	42.8
	PF	0.988	0.992	0.954	0.962	0.966	0.976	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973
	MW	33.9	32.7	33.1	34.1	35.0	35.0	36.7	37.7	37.6	37.4	37.2	37.0	36.8	36.7	36.6	36.6
	MVA _r	5.2	4.0	10.3	9.7	9.4	7.8	8.7	8.9	8.9	8.9	8.8	8.8	8.7	8.7	8.7	8.7
	50% POE MVA	34.3	33.0	34.6	35.5	36.2	35.9	37.7	38.8	38.6	38.4	38.2	38.0	37.8	37.7	37.7	37.7
	PF	0.988	0.992	0.954	0.962	0.966	0.976	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973
Rydalmere	Actual MVA	35.2	38.5	34.2	32.6	38.7	40.2										
	MW	39.2	38.4	38.3	37.2	38.6	37.3	37.6	37.5	37.4	37.3	37.3	37.2	37.2	37.2	37.3	37.3
	MVA _r	11.1	9.1	3.2	5.3	11.9	3.6	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	10% POE MVA	40.8	39.4	38.5	37.6	40.4	37.5	38.4	38.3	38.2	38.1	38.1	38.0	38.0	38.0	38.1	38.2
	PF	0.962	0.973	0.996	0.990	0.956	0.995	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	MW	36.2	35.3	35.3	34.1	35.7	34.7	35.0	34.9	34.8	34.8	34.7	34.6	34.6	34.6	34.7	34.8
	MVA _r	10.2	8.3	3.0	4.9	11.0	3.4	7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.3	7.3
	50% POE MVA	37.6	36.3	35.4	34.5	37.3	34.9	35.8	35.7	35.6	35.5	35.4	35.4	35.3	35.3	35.4	35.5
	PF	0.962	0.973	0.996	0.990	0.956	0.995	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
West Pennant Hills	Actual MVA	18.7	25.4	22.9	21.9	24.4	27.2										
	MW	24.9	24.1	24.4	25.1	25.0	23.8	23.6	23.6	22.8	23.3	23.8	24.0	24.0	23.8	23.8	23.7
	MVA _r	1.4	3.9	8.9	2.5	2.8	3.3	4.3	4.3	4.1	4.2	4.3	4.3	4.3	4.3	4.3	4.3
	10% POE MVA	25.0	24.4	26.0	25.2	25.1	24.0	24.0	23.9	23.1	23.6	24.1	24.4	24.4	24.2	24.1	24.1
	PF	0.998	0.987	0.939	0.995	0.994	0.991	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
	MW	21.8	21.0	21.3	22.0	21.8	20.8	20.6	20.6	19.8	20.3	20.8	21.0	21.0	20.9	20.8	20.7
	MVA _r	1.2	3.4	7.8	2.2	2.5	2.8	3.7	3.7	3.6	3.7	3.8	3.8	3.8	3.8	3.8	3.8
	50% POE MVA	21.9	21.3	22.6	22.1	21.9	21.0	20.9	20.9	20.1	20.6	21.1	21.4	21.3	21.2	21.1	21.1
	PF	0.998	0.987	0.939	0.995	0.994	0.991	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
M1 / M2 Tunnel Major customer	Actual MVA																
	MW								5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	MVA _r								1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	10% POE MVA								5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	PF								0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	MW								5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	MVA _r								1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	50% POE MVA								5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	PF								0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Carlingford (Ausgrid)	Actual MVA	115.9	109.6	99.1	94.2	110.5	107.3										
	MW	113.4	106.7	105.1	106.3	104.0	95.9	86.2	85.9	87.2	88.8	90.4	92.0	93.3	94.6	96.1	97.7
	MVA _r	57.1	55.1	46.1	36.3	36.3	29.0	35.6	35.5	36.0	36.7	37.3	38.0	38.5	39.1	39.7	40.4
	10% POE MVA	127.0	120.1	114.8	112.3	110.2	100.2	93.3	92.9	94.3	96.1	97.8	99.5	100.9	102.3	104.0	105.7
Major customer	PF	0.893	0.888	0.916	0.946	0.944	0.957	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924
	MW	105.8	99.0	97.5	98.7	96.9	87.4	86.2	85.9	87.2	88.8	90.4	92.0	93.3	94.6	96.1	97.7
	MVA _r	53.2	51.2	42.7	33.7	33.8	26.4	35.6	35.5	36.0	36.7	37.3	38.0	38.5	39.1	39.7	40.4
	50% POE MVA	118.4	111.5	106.5	104.2	102.6	91.3	93.3	92.9	94.3	96.1	97.8	99.5	100.9	102.3	104.0	105.7
	PF	0.893	0.888	0.916	0.946	0.944	0.957	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924
Undiversified	Actual MVA	223.6	236.2	212.9	207.6	240.7	249.4										
	MW	244.5	230.5	229.6	231.9	231.3	220.2	213.8	220.1	220.9	223.4	226.0	228.3	230.2	231.9	234.3	236.6
	MVA _r	77.6	77.1	76.2	62.4	68.2	51.7	65.0	66.9	67.4	68.3	69.2	70.1	70.8	71.5	72.4	73.3
	10% POE MVA	260.2	246.0	243.5	241.0	241.7	226.8	224.3	230.9	231.8	234.5	237.2	239.7	241.7	243.6	246.1	248.6
	PF	0.940	0.937	0.943	0.962	0.957	0.971	0.953	0.953	0.953	0.953	0.953	0.953	0.952	0.952	0.952	0.952
	MW	224.1	210.1	209.1	211.5	211.5	199.0	201.1	207.4	208.2	210.8	213.3	215.7	217.5	219.2	221.6	223.9
	MVA _r	71.9	71.0	69.5	57.1	62.7	46.7	62.1	64.0	64.5	65.4	66.3	67.2	67.9	68.6	69.5	70.4
	50% POE MVA	238.6	224.4	221.9	219.8	221.0	205.0	211.3	217.9	218.8	221.5	224.2	226.7	228.7	230.6	233.1	235.6
	PF	0.939	0.936	0.943	0.962	0.957	0.971	0.952	0.952	0.952	0.952	0.951	0.951	0.951	0.951	0.951	0.951
Diversified	Actual MVA	199.1	220.5	195.8	187.4	226.4	231.8										
	MW	243.2	224.6	227.7	223.9	220.9	217.3	209.1	215.3	216.1	218.6	221.0	223.3	225.1	226.9	229.2	231.4
	MVA _r	18.7	17.3	17.5	17.2	17.0	16.7	16.1	16.6	16.6	16.8	17.0	17.2	17.3	17.4	17.6	17.8
	10% POE MVA	244.0	225.2	228.4	224.5	221.6	217.9	209.7	215.9	216.7	219.2	221.7	224.0	225.8	227.5	229.9	232.1
	PF	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
	MW	220.5	201.8	205.0	201.1	200.2	192.0	194.0	200.1	200.9	203.3	205.7	208.0	209.8	211.5	213.8	216.0
	MVA _r	16.9	15.5	15.8	15.5	15.4	14.8	14.9	15.4	15.4	15.6	15.8	16.0	16.1	16.3	16.4	16.6
	50% POE MVA	221.1	202.4	205.6	201.7	200.8	192.6	194.6	200.7	201.5	203.9	206.3	208.6	210.4	212.1	214.4	216.6
	PF	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997

3.6 Dapto 132kV TS Demand Forecast

Discussion

The Dapto 132kV entry includes the loads supplied from the 132kV busbar at Dapto BSP. Batemans Bay and Moruya North are Essential Energy substations supplied out of Dapto by Endeavour Energy. New land releases proposed at Calderwood and West Dapto (part of the West Lake Illawarra greenfield development area) are included in the Mt Terry TS and Springhill TS forecasts.

The West Lake Illawarra development area is expected to create 26,000 lots over 30-35 years, and is expected to require three additional zone substations. One supplied from Mt Terry TS 33kV network to supply Claderwood and two supplied from the Dapto BSP 132kV network to supply the West Dapto area. The firm and future applications at Calderwood have been included in the Mt Terry TS Demand Forecast with the West Dapto applications included in the Springhill TS Demand Forecast.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Batemans Bay	2 x 45	90
Moruya North	1 x 30 + 1 x 45	75
Ulladulla	2 x 20/25/30	60
Yatte Yattah	1 x 6.5	6.5

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2021	Dapto	Springhill	West Dapto	Dapto 132kV	0.7
2021	Kembla Grange	Springhill	West Dapto	Dapto 132kV	1.9

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Ulladulla	NCL1372 - Equestrian Centre	2019	1.0	0.5	1.2
Ulladulla	NRL11103 - Equestrian Centre	2019	0.4	0.2	0.4
Ulladulla	NRL1154 - Equestrian Centre	2019	0.3	0.1	0.3

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Ulladulla	NRS3178 - Bawley Point, 6 x Large Residential Lots	2019	3	0.1
Ulladulla	URS10450 - Dolphin Point 264 lots	2010	10	0.5
Ulladulla	URS11410 - Narrawallee, 33 -Lots	2017	4.0	0.1
Ulladulla	URS11658 - Dolphin Point 100 lots	2017	5	0.2
Ulladulla	URS12534 - Milton 52 lots	2014	4	0.1
Ulladulla	URS16051 - Ulladulla, 21 lot subdivision	2017	4	0.1
Ulladulla	URS16749 - Mollymook Beach, Stage 3D - 5 Lots	2017	2	0.0
Ulladulla	URS16766 - Burrill Lake, Stages 3,4,5 & 6 - 40 Lots	2017	6	0.2
Ulladulla	URS17808 - Milton, Stage 3 - 25 Lots	2018	3.0	0.1
West Dapto	(WLI) West Dapto (Total = 20270 Lots plus Industrial and Commercial load)	2021	30	87.8

Generation

Zone Substation	Name	Description	Date
Blue Scope Steel	BHP Port Kembla	2.5+7.5+7.5+12+16+5+8.75MW processed gas	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2017	Yatte Yattah	Dapto 132kV	West Tomerong

Dapto 132kV TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	144.1	139.0	136.3	139.2	145.0	145.1									
BlueScope Steel Major customer	MW	123.9	119.5	117.2	119.7	124.7	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8
	MVA _r	73.5	70.9	69.5	71.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0
	10% POE	MVA	144.1	139.0	136.3	139.2	145.0	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1
	PF	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860
50% POE	MW	123.9	119.5	117.2	119.7	124.7	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8	124.8
	MVA _r	73.5	70.9	69.5	71.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0
	MVA	144.1	139.0	136.3	139.2	145.0	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1
	PF	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860
Actual		MVA	26.1	22.8	24.9	26.9	28.1	27.4									
BOC Gases Major customer	MW	25.8	22.5	24.8	26.9	28.1	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4
	MVA _r	4.2	3.3	1.2	0.9	0.6	0.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	10% POE	MVA	26.1	22.8	24.9	26.9	28.1	27.4	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
	PF	0.987	0.989	0.999	0.999	1.000	1.000	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
50% POE	MW	25.8	22.5	24.8	26.9	28.1	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4
	MVA _r	4.2	3.3	1.2	0.9	0.6	0.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	MVA	26.1	22.8	24.9	26.9	28.1	27.4	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
	PF	0.987	0.989	0.999	0.999	1.000	1.000	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
Actual		MVA	3.7	7.3	7.3	7.3	7.3	7.3									
Burrawang Major customer	MW	3.2	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	MVA _r	1.8	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	10% POE	MVA	3.7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	PF	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873
50% POE	MW	3.2	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	MVA _r	1.8	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	MVA	3.7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	PF	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873
Actual		MVA	36.0	46.5	33.7	37.7	43.6	50.4									
Batemans Bay & Moruya North Major customer	MW	43.1	46.2	33.7	37.0	43.6	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3
	MVA _r	0.6	5.0	0.1	7.2	0.7	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	10% POE	MVA	43.1	46.5	33.7	37.7	43.6	50.4	50.4	50.4	50.4	50.4	50.4	50.4	50.4	50.4	50.4
	PF	1.000	0.994	1.000	0.982	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
50% POE	MW	43.1	46.2	33.7	37.0	43.6	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3
	MVA _r	0.6	5.0	0.1	7.2	0.7	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	MVA	43.1	46.5	33.7	37.7	43.6	50.4	50.4	50.4	50.4	50.4	50.4	50.4	50.4	50.4	50.4	50.4
	PF	1.000	0.994	1.000	0.982	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Actual		MVA	20.2	26.6	19.6	21.3	21.1	28.6									
Ulladulla	MW	19.5	25.3	18.9	20.4	20.4	27.6	22.9	24.4	24.4	24.4	24.3	24.2	24.2	24.2	24.2	24.2
	MVA _r	5.4	8.2	5.0	5.9	5.4	7.6	8.5	9.0	9.0	9.0	9.0	9.0	8.9	8.9	8.9	9.0
	10% POE	MVA	20.2	26.6	19.6	21.3	21.1	28.6	24.4	26.0	26.0	26.0	25.9	25.8	25.8	25.7	25.8
	PF	0.964	0.951	0.966	0.961	0.967	0.964	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938
50% POE	MW	19.5	25.3	18.9	20.4	20.4	27.6	22.7	24.4	24.4	24.4	24.3	24.2	24.2	24.2	24.2	24.2
	MVA _r	5.4	8.2	5.0	5.9	5.4	7.6	8.4	9.0	9.0	9.0	9.0	9.0	8.9	8.9	8.9	9.0
	MVA	20.2	26.6	19.6	21.3	21.1	28.6	24.2	26.0	26.0	26.0	25.9	25.8	25.8	25.7	25.8	25.8
	PF	0.964	0.951	0.966	0.961	0.967	0.964	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938
Actual		MVA															
West Dapto	MW										2.6	3.0	3.8	4.8	6.1	7.8	9.7
	MVA _r										0.8	1.0	1.2	1.6	2.0	2.6	3.2
	10% POE	MVA									2.7	3.2	4.0	5.0	6.5	8.2	10.2
	PF										0.950	0.950	0.950	0.950	0.950	0.950	0.950
50% POE	MW										2.6	3.0	3.8	4.8	6.1	7.8	9.7
	MVA _r										0.8	1.0	1.2	1.6	2.0	2.6	3.2
	MVA										2.7	3.2	4.0	5.0	6.5	8.2	10.2
	PF										0.950	0.950	0.950	0.950	0.950	0.950	0.950
Actual		MVA	3.5	4.0	4.3	3.9	3.2										
Yatte Yattah	MW	3.3	3.7	4.1	3.7	3.1											
	MVA _r	1.2	1.4	1.4	1.2	0.8											
	10% POE	MVA	3.5	4.0	4.3	3.9	3.2										
	PF	0.942	0.935	0.946	0.949	0.972											
50% POE	MW	3.3	3.7	4.1	3.7	3.1											
	MVA _r	1.2	1.4	1.4	1.2	0.8											
	MVA	3.5	4.0	4.3	3.9	3.2											
	PF	0.942	0.935	0.946	0.949	0.972											
Actual		MVA	230.0	242.1	221.7	232.4	245.1	258.7									
Undiversified	MW	215.4	219.9	201.0	210.5	223.2	236.4	231.8	233.2	233.3	235.8	236.2	236.9	237.9	239.2	240.8	242.8
	MVA _r	85.6	91.0	79.5	88.5	84.3	87.3	90.0	90.6	90.6	91.4	91.5	91.8	92.1	92.5	93.1	93.7
	10% POE	MVA	237.2	242.1	221.7	232.4	245.1	258.7	256.2	256.3	258.9	259.3	260.1	261.1	262.5	264.2	266.3
	PF	0.908	0.908	0.907	0.906	0.910	0.914	0.910	0.910	0.910	0.911	0.911	0.911	0.911	0.911	0.911	0.912
50% POE	MW	215.4	219.9	201.0	210.5	223.2	236.4	231.6	233.2	233.3	235.8	236.2	236.9	237.9	239.2	240.8	242.8
	MVA _r	85.6	91.0	79.5	88.5	84.3	87.3	90.0	90.6	90.6	91.4	91.5	91.8	92.1	92.5	93.1	93.7
	MVA	237.2	242.1	221.7	232.4	245.1	258.7	254.5	256.2	256.3	258.9	259.3	260.1	261.1	262.5	264.2	266.3
	PF	0.908	0.908	0.907	0.906	0.910	0.914	0.910	0.910	0.910	0.911	0.911	0.911	0.911	0.911	0.911	0.912

Note: Batemans Bay & Moruya North have been combined due to the constant transfer of load between the two zone substations

3.7 Denham Court TS Demand Forecast

Discussion

Denham Court TS was established to supply Transport for NSW's South West Rail Link to service the South West Growth Centre and is supplied by feeder 93Y from Liverpool 132kV or alternately by feeder 9L5 from Nepean 132kV.

Denham Court TS also supplies Edmondson Park ZS Transformer No.1 at 33kV on change-over from West Liverpool TS. Edmondson Park forecast is shown on West Liverpool TS.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Denham Court	1 x 60	60
Edmondson Park	1 x 35	35

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

No Spot Load Proposed at this location

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Denham Court TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Edmondson Park	Actual MVA					2.6	3.8										
	MW					2.6	3.8	5.3									
	MVA _r					0.3	0.0	2.6									
	10% POE MVA					2.6	3.8	5.9									
	PF					0.994	1.000	0.900									
50% POE	MW					2.6	3.8	5.3									
	MVA _r					0.3	0.0	2.6									
	MVA					2.6	3.8	5.9									
	PF					0.994	1.000	0.900									
Sydney Trains Edmondson Park	Actual MVA					8.5	10.8										
	MW					5.4	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	MVA _r					6.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	10% POE MVA					8.5	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	PF					0.639	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619
Major customer	MW					5.4	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	MVA _r					6.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	50% POE MVA					8.5	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	PF					0.639	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619
Undiversified	Actual MVA					11.1	14.6										
	MW					8.0	10.5	12.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	MVA _r					6.8	8.5	11.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	10% POE MVA					11.1	14.6	16.7	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	PF					0.722	0.719	0.718	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619
50% POE	MW					8.0	10.5	12.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	MVA _r					6.8	8.5	11.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	MVA					11.1	14.6	16.7	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	PF					0.722	0.719	0.718	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619
Diversified	Actual MVA					10.1	12.4										
	MW					6.7	7.6	9.3	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	MVA _r					7.6	9.9	12.1	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	10% POE MVA					10.1	12.4	15.2	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	PF					0.658	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610
50% POE	MW					6.7	7.6	9.3	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	MVA _r					7.6	9.9	12.1	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	MVA					10.1	12.4	15.2	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	PF					0.658	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610

3.8 Fairfax Lane TS Demand Forecast

Discussion

Fairfax Lane Transmission Substation has three 60MVA 132/33kV transformers providing a firm capacity of 120MVA.

Wingecarribee Shire Council's (WSC) proposed 800ha Moss Vale Enterprise Zone is vying for the opportunity to become a major distribution centre and inland port for goods arriving at Port Kembla. The Moss Vale project is proposed to take approximately 25 years to develop and has the benefits of being located on the main transportation link of the Hume Highway. The area also benefits from a proposed rail link – which will circumvent the need to traverse a cumbersome arrangement of road patterns from Port Kembla to Moss Vale.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Fairfax Lane	3 x 60 (132/66kV)	180
Berrima junction	1 x 15/20 (33/11kV)	20
Bowral	2 x 10 + 1 x 12.5	32.5
Mittagong	2 x 12.5 + 1 x 15	40
Moss Vale	2 x 25	50
Ringwood	2 x 12.5	25
Robertson	2 x 3.75	7.5

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVAr	MVA
Mittagong	UML6563 Old Hume Highway Mittagong	2018	0.2682	0.1299	0.3

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Fairfax Lane TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
BCSC Berrima	Actual MVA	23.9	25.2	23.9	24.6	24.3	23.5										
	MW	22.6	23.6	22.6	22.6	22.3	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4
	MVA _r	7.9	8.9	7.7	9.8	9.6	6.8	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	10% POE MVA	23.9	25.2	23.9	24.6	24.3	23.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
	PF	0.944	0.936	0.947	0.918	0.919	0.957	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
50% POE	MW	22.6	23.6	22.6	22.6	22.3	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4
	MVA _r	7.9	8.9	7.7	9.8	9.6	6.8	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	MVA	23.9	25.2	23.9	24.6	24.3	23.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
	PF	0.944	0.936	0.947	0.918	0.919	0.957	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
Berrima Junction	Actual MVA	1.6	1.7	1.8	3.8	1.7	1.3										
	MW	1.4	1.6	1.7	3.6	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	MVA _r	0.7	0.5	0.6	1.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	10% POE MVA	1.6	1.7	1.8	3.8	1.7	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
50% POE	MW	1.4	1.6	1.7	3.6	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	MVA _r	0.7	0.5	0.6	1.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	MVA	1.6	1.7	1.8	3.8	1.7	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Bowral	Actual MVA	13.0	18.5	15.3	13.3	15.7	18.2										
	MW	15.2	14.9	14.9	14.4	14.7	15.3	15.3	15.2	15.1	15.1	15.0	15.0	14.9	14.9	14.9	14.9
	MVA _r	4.2	5.8	3.3	2.0	4.2	4.0	4.2	4.2	4.2	4.2	4.2	4.1	4.1	4.1	4.1	4.1
	10% POE MVA	15.8	16.0	15.3	14.5	15.3	15.8	15.8	15.8	15.7	15.6	15.6	15.5	15.5	15.4	15.5	15.5
	PF	0.964	0.932	0.977	0.990	0.961	0.967	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
50% POE	MW	13.7	13.3	13.4	12.8	13.1	13.7	13.7	13.6	13.5	13.5	13.4	13.4	13.3	13.3	13.3	13.3
	MVA _r	3.8	5.2	2.9	1.8	3.8	3.6	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	MVA	14.2	14.3	13.7	12.9	13.6	14.2	14.2	14.1	14.0	14.0	13.9	13.9	13.8	13.8	13.8	13.8
	PF	0.964	0.932	0.977	0.990	0.961	0.967	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
Mittagong	Actual MVA	11.4	13.8	12.8	12.5	14.6	19.1										
	MW	11.4	12.1	12.5	12.0	14.0	15.9	16.1	16.0	15.9	15.9	15.8	15.7	15.7	15.7	15.7	15.7
	MVA _r	2.4	3.5	4.0	0.0	1.7	1.8	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2	3.2
	10% POE MVA	11.6	12.6	13.1	12.0	14.1	16.0	16.4	16.3	16.3	16.2	16.1	16.1	16.0	16.0	16.0	16.0
	PF	0.978	0.961	0.951	1.000	0.993	0.994	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
50% POE	MW	10.8	11.2	11.4	11.0	12.6	14.5	14.7	14.6	14.5	14.5	14.4	14.4	14.3	14.3	14.3	14.3
	MVA _r	2.3	3.2	3.7	0.0	1.5	1.6	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9
	MVA	11.0	11.7	12.0	11.0	12.7	14.6	15.0	14.9	14.8	14.8	14.7	14.7	14.6	14.6	14.6	14.6
	PF	0.978	0.961	0.951	1.000	0.993	0.994	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
Moss Vale	Actual MVA	14.3	17.4	16.0	14.0	16.1	17.7										
	MW	15.0	14.7	14.7	14.2	14.6	14.8	14.7	14.6	14.6	14.5	14.4	14.4	14.3	14.3	14.3	14.3
	MVA _r	5.4	5.7	5.7	5.3	5.7	3.2	5.2	5.2	5.2	5.2	5.1	5.1	5.1	5.1	5.1	5.1
	10% POE MVA	16.0	15.8	15.8	15.1	15.6	15.1	15.6	15.5	15.5	15.4	15.3	15.2	15.2	15.1	15.2	15.2
	PF	0.941	0.933	0.931	0.937	0.930	0.978	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
50% POE	MW	13.9	13.6	13.6	13.1	13.5	13.9	13.8	13.8	13.7	13.6	13.6	13.5	13.4	13.4	13.4	13.4
	MVA _r	5.0	5.2	5.3	4.9	5.3	3.0	4.9	4.9	4.9	4.9	4.8	4.8	4.8	4.8	4.8	4.8
	MVA	14.8	14.6	14.6	14.0	14.5	14.2	14.7	14.6	14.5	14.5	14.4	14.3	14.3	14.2	14.2	14.2
	PF	0.941	0.933	0.931	0.937	0.930	0.978	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
Ringwood	Actual MVA	4.5	5.4	5.6	5.0	5.5	5.7										
	MW	4.4	4.4	4.7	4.3	4.5	4.7	4.7	4.7	4.7	4.6	4.6	4.6	4.6	4.5	4.5	4.5
	MVA _r	1.0	1.4	1.3	0.0	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
	10% POE MVA	4.5	4.6	4.9	4.3	4.6	4.9	4.8	4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.6
	PF	0.974	0.951	0.964	1.000	0.982	0.978	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
50% POE	MW	4.1	4.1	4.4	4.0	4.1	4.4	4.4	4.4	4.3	4.3	4.3	4.3	4.2	4.2	4.2	4.2
	MVA _r	1.0	1.3	1.2	0.0	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	MVA	4.2	4.3	4.5	4.0	4.2	4.5	4.5	4.5	4.5	4.4	4.4	4.4	4.4	4.3	4.3	4.3
	PF	0.974	0.951	0.964	1.000	0.982	0.978	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
Robertson	Actual MVA	4.1	3.5	3.6	3.2	3.5	3.9										
	MW	3.7	3.4	3.5	3.1	3.3	3.7	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	MVA _r	1.8	1.1	1.1	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	10% POE MVA	4.1	3.5	3.6	3.2	3.5	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
50% POE	MW	3.7	3.4	3.5	3.1	3.3	3.7	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	MVA _r	1.8	1.1	1.1	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	MVA	4.1	3.5	3.6	3.2	3.5	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	0.9	1.0	1.1												
Tycan* Major customer	MW	0.7	0.7	1.0													
	MVA _r	0.5	0.6	0.5													
	10% POE	MVA	0.9	1.0	1.1												
	PF	0.852	0.784	0.905													
50% POE	MW	0.7	0.7	1.0													
	MVA _r	0.5	0.6	0.5													
	MVA	0.9	1.0	1.1													
	PF	0.852	0.784	0.905													
Actual		MVA	0.2	0.2	1.0	0.7	0.7	1.2									
Tyree & Tycan Major customer	MW	0.2	0.2	0.9	0.7	0.7	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	MVA _r	0.1	0.0	0.4	0.2	0.4	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	10% POE	MVA	0.2	0.2	1.0	0.7	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	PF	0.783	0.971	0.897	0.942	0.878	0.956	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905
50% POE	MW	0.2	0.2	0.9	0.7	0.7	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	MVA _r	0.1	0.0	0.4	0.2	0.4	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	MVA	0.2	0.2	1.0	0.7	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	PF	0.783	0.971	0.897	0.942	0.878	0.956	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905
Actual		MVA	2.3	2.2	2.2	2.2	1.1	1.9									
Water Board Dams Major customer	MW	1.7	1.7	1.7	1.7	1.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	MVA _r	1.3	1.3	1.3	1.3	0.3	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	10% POE	MVA	2.2	2.2	2.2	2.2	1.1	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	PF	0.789	0.789	0.789	0.789	0.955	0.950	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843
50% POE	MW	1.7	1.7	1.7	1.7	1.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	MVA _r	1.3	1.3	1.3	1.3	0.3	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	MVA	2.2	2.2	2.2	2.2	1.1	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	PF	0.789	0.789	0.789	0.789	0.955	0.950	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843
Actual		MVA	76.1	88.9	83.3	79.5	83.2	92.4									
Undiversified	MW	76.4	77.3	78.1	76.5	76.7	81.0	81.0	80.7	80.4	80.2	80.0	79.8	79.6	79.5	79.5	79.5
	MVA _r	25.3	28.9	25.9	20.8	24.5	19.4	25.5	25.4	25.4	25.3	25.2	25.2	25.1	25.1	25.1	25.1
	10% POE	MVA	80.8	82.7	82.6	80.5	81.0	83.5	85.1	84.9	84.6	84.3	84.1	83.9	83.7	83.6	83.6
	PF	0.945	0.935	0.946	0.951	0.948	0.970	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
50% POE	MW	72.8	73.5	74.1	72.6	72.3	76.8	76.8	76.6	76.3	76.1	75.8	75.6	75.4	75.3	75.3	75.4
	MVA _r	24.3	27.5	24.7	20.2	23.3	18.5	24.4	24.3	24.3	24.2	24.1	24.1	24.0	24.0	24.0	24.0
	MVA	77.1	78.6	78.4	76.5	76.4	79.2	80.8	80.6	80.3	80.0	79.8	79.6	79.4	79.2	79.3	79.3
	PF	0.945	0.934	0.946	0.949	0.947	0.970	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Actual		MVA	84.4	78.8	74.1	67.8	76.2	71.9									
Diversified (Meter)	MW	80.1	75.9	72.9	66.0	75.6	71.8	75.7	75.5	75.2	75.0	74.8	74.6	74.4	74.3	74.3	74.3
	MVA _r	26.8	21.2	13.2	15.6	9.4	3.2	16.6	16.6	16.5	16.5	16.4	16.4	16.3	16.3	16.3	16.3
	10% POE	MVA	84.4	78.8	74.1	67.8	76.2	71.9	77.5	77.3	77.0	76.8	76.6	76.4	76.2	76.1	76.1
	PF	0.948	0.963	0.984	0.973	0.992	0.999	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
50% POE	MW	80.1	75.9	72.9	66.0	75.6	71.8	71.8	71.6	71.3	71.1	70.9	70.7	70.5	70.4	70.4	70.5
	MVA _r	26.8	21.2	13.2	15.6	9.4	3.2	15.8	15.7	15.7	15.6	15.6	15.5	15.5	15.5	15.5	15.5
	MVA	84.4	78.8	74.1	67.8	76.2	71.9	73.5	73.3	73.0	72.8	72.6	72.4	72.2	72.1	72.1	72.1
	PF	0.948	0.963	0.984	0.973	0.992	0.999	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977

Note: * Tycan's forecast load has been accounted for under Tyree

3.9 Guildford TS Demand Forecast

Discussion

Guildford TS has three 120MVA 132 / 33kV transformers providing a firm capacity of 240MVA.

Marubeni generation supplies 160 MW and 60 MVA_r to the 33kV busbar at Guildford. While there is 88 MVA_r of capacitors installed on the 33kV busbar, they are not normally used as the Marubeni generators generally supply the remaining MVA_r needs. Marubeni has reviewed its operations and had decided to cease operations from mid 2017.

Comalco (Alcoa) has now ceased operations at Yennora.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Guildford	3 x 120 (132/33kV)	360
Cabramatta	2 x 15/19/25	50
Carramar	2 x 15/19/25	50
Fairfield	3 x 25	75
Sherwood	2 x 25	50
Smithfield	3 x 15/20/25	75
South Granville	2 x 25	50
Woodpark	2 x 15/19/25	50
Yennora	2 x 25	50

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Carramar	UML5096 - 17 The Crescent St Fairfield	2018	0.3	0.2	0.4
Carramar	UML5802	2018	0.3	0.1	0.3
Fairfield	UCL7736 Fairfield Rd Yennora	2018	0.6	0.3	0.7
Fairfield	UIL 5131	2019	1.7	0.8	1.9
Fairfield	UIL4947 - Mc Credie Rd Guildford	2018	1.6	0.8	1.8
Fairfield	UIL4981 - Mc Credie Rd Guildford	2018	3.5	1.7	3.9
Fairfield	UML 6214	2019	0.4	0.2	0.5
Sherwood	UML 6747	2018	0.2	0.1	0.2
Sherwood	UML6920	2018	0.8	0.4	0.9
Sherwood	UML7029	2018	0.2	0.1	0.2
Sherwood	UML7104	2018	0.1	0.1	0.2
Sherwood	UML7444 & UML7697 - 115 Units in Mountford Ave Guildford	2018	0.4	0.2	0.4
Sherwood	UML8066 - Merrylands Rd	2020	0.2	0.1	0.2
Sherwood	UML8131 - Guildford Rd	2020	0.1	0.1	0.2
Sherwood	UML8151 - Wayman Pl	2020	0.2	0.1	0.2
South Granville	35 units 538-540 Woodville Road Guildford	2018	0.1	0.1	0.1
South Granville	UML7386 22-24 Rawson Rd	2018	0.1	0.0	0.1
Woodpark	UCL 7995 - 277 Woodpark Rd	2019	1.7	0.8	1.9
Woodpark	UIL4756 - 331-333 Woodpark Road SMITHFIELD	2018	0.3	0.1	0.3
Yennora	UCL8560 Aged Care	2019	0.2	0.1	0.3
Yennora	UIL4929	2017	0.2	0.1	0.3
Yennora	UML7066 117 Units Villawood Place Villawood - Sub 22086	2018	0.7	0.3	0.7
Yennora	UML8064 40 Units + 3 Retail	2018	0.5	0.2	0.5

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Fairfield	UIS0756 Redevelopment of ALCOA site	2018	3	3.4

Generation

Zone Substation	Name	Description	Date
Guildford	Marubeni	3 x 45.4 + 77.5MW (Generates into 33kV busbar)	Installed
Guildford	Southern Paper Converters	1 x 6MW (absorbed by customer)	Installed

Guildford TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Cabramatta	Actual	MVA	19.8	22.3	24.3	14.5	18.2	19.9									
	MW		23.2	22.9	23.8	20.0	19.1	18.7	18.6	18.6	18.5	18.5	18.5	18.4	18.4	18.5	18.5
	MVA		3.3	3.0	9.1	0.7	6.4	0.7	4.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	10% POE	MVA	23.4	23.1	25.5	20.1	20.2	18.8	19.1	19.1	19.0	19.0	18.9	18.9	18.8	18.9	19.0
	PF		0.990	0.992	0.934	0.999	0.949	0.999	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW		21.0	20.7	21.6	17.9	17.5	17.2	17.1	17.0	16.9	16.9	16.9	16.8	16.8	16.9	16.9
	MVA		3.0	2.7	8.3	0.7	5.8	0.6	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	50% POE	MVA	21.2	20.9	23.2	17.9	18.4	17.2	17.5	17.4	17.4	17.3	17.3	17.3	17.2	17.2	17.3
	PF		0.990	0.992	0.934	0.999	0.949	0.999	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
Carramar	Actual	MVA	13.9	17.0	16.8	15.0	16.9	16.4									
	MW		17.5	17.4	18.5	16.7	17.0	16.4	16.9	16.9	16.8	16.8	16.8	16.7	16.7	16.8	16.8
	MVA		3.4	0.5	3.1	5.4	2.8	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	10% POE	MVA	17.8	17.4	18.8	17.6	17.2	16.4	17.2	17.1	17.1	17.1	17.0	17.0	17.0	17.1	17.1
	PF		0.981	1.000	0.986	0.951	0.987	1.000	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
	MW		16.1	16.0	17.2	15.3	15.8	15.2	15.7	15.6	15.6	15.5	15.5	15.5	15.5	15.5	15.6
	MVA		3.1	0.5	2.9	5.0	2.6	0.0	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	50% POE	MVA	16.4	16.0	17.4	16.1	16.0	15.2	15.9	15.9	15.8	15.8	15.7	15.7	15.7	15.8	15.8
	PF		0.981	1.000	0.986	0.951	0.987	1.000	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
Comalco Major customer	Actual	MVA	14.4	13.6	21.1	14.7											
	MW		13.7	13.1	20.4	12.5											
	MVA		4.5	3.5	5.2	7.8											
	10% POE	MVA	14.4	13.6	21.1	14.7											
	PF		0.951	0.966	0.969	0.847											
	MW		13.7	13.1	20.4	12.5											
	MVA		4.5	3.5	5.2	7.8											
	50% POE	MVA	14.4	13.6	21.1	14.7											
	PF		0.951	0.966	0.969	0.847											
Fairfield	Actual	MVA	25.1	27.5	23.1	23.7	25.7	26.8									
	MW		23.1	27.4	23.1	23.6	25.7	26.6	32.9	36.1	36.0	36.0	36.0	35.9	35.9	36.0	36.1
	MVA		9.8	2.4	1.0	0.9	0.6	3.2	2.4	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	10% POE	MVA	25.1	27.5	23.1	23.7	25.7	26.8	33.0	36.2	36.1	36.1	36.1	36.0	36.0	36.1	36.2
	PF		0.921	0.996	0.999	0.999	1.000	0.993	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
	MW		23.1	27.4	23.1	23.6	25.7	26.6	32.9	36.1	36.0	36.0	36.0	35.9	35.9	36.0	36.1
	MVA		9.8	2.4	1.0	0.9	0.6	3.2	2.4	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	50% POE	MVA	25.1	27.5	23.1	23.7	25.7	26.8	33.0	36.2	36.1	36.1	36.1	36.0	36.0	36.1	36.2
	PF		0.921	0.996	0.999	0.999	1.000	0.993	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
Sherwood	Actual	MVA	24.5	27.2	26.0	23.5	27.2	30.4									
	MW		29.8	27.4	27.7	26.1	26.8	27.6	28.9	28.8	29.1	29.0	28.9	28.8	28.7	28.6	28.6
	MVA		0.4	1.2	0.8	0.7	2.9	0.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9
	10% POE	MVA	29.8	27.4	27.7	26.1	27.0	27.6	29.0	28.8	29.1	29.0	28.9	28.8	28.7	28.6	28.7
	PF		1.000	0.999	1.000	1.000	0.994	1.000	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
	MW		28.4	26.0	26.2	24.7	25.3	25.1	26.4	26.3	26.6	26.5	26.4	26.3	26.2	26.1	26.1
	MVA		0.4	1.2	0.7	0.7	2.8	0.0	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	50% POE	MVA	28.4	26.0	26.2	24.7	25.4	25.1	26.5	26.3	26.6	26.5	26.4	26.3	26.2	26.1	26.2
	PF		1.000	0.999	1.000	0.994	1.000	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Smithfield	Actual	MVA	25.4	35.6	28.8	32.7	36.6	39.3									
	MW		34.8	34.1	33.8	35.8	37.7	38.1	37.9	37.8	37.6	37.4	37.3	37.1	37.0	36.9	36.9
	MVA		4.2	2.8	1.9	3.2	2.4	2.8	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8
	10% POE	MVA	35.0	34.2	33.8	35.9	37.8	38.2	38.0	37.9	37.7	37.5	37.4	37.2	37.1	37.0	37.0
	PF		0.993	0.997	0.998	0.996	0.998	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
	MW		30.8	30.2	29.8	31.8	33.4	32.9	32.8	32.6	32.4	32.3	32.1	32.0	31.8	31.7	31.8
	MVA		3.7	2.4	1.7	2.8	2.1	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4
	50% POE	MVA	31.1	30.3	29.9	32.0	33.5	33.0	32.8	32.7	32.5	32.3	32.2	32.1	31.9	31.8	31.8
	PF		0.993	0.997	0.998	0.996	0.998	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
South Granville	Actual	MVA	15.6	18.9	15.6	16.7	19.6	19.6									
	MW		18.3	18.3	18.2	18.4	19.1	18.0	18.1	18.1	18.0	18.0	17.9	17.9	17.8	17.9	17.9
	MVA		6.7	6.1	5.5	5.5	5.2	4.6	5.6	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
	10% POE	MVA	19.5	19.2	19.0	19.2	19.8	18.6	19.0	18.9	18.9	18.8	18.8	18.7	18.7	18.6	18.7
	PF		0.939	0.949	0.957	0.958	0.964	0.970	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956
	MW		16.5	16.5	16.4	16.6	17.3	16.2	16.3	16.3	16.2	16.2	16.1	16.1	16.0	16.0	16.1
	MVA		6.1	5.5	4.9	5.0	4.8	4.1	5.0	5.0	5.0	5.0	4.9	4.9	4.9	4.9	4.9
	50% POE	MVA	17.6	17.3	17.1	17.3	18.0	16.7	17.1	17.0	17.0	16.9	16.9	16.8	16.8	16.7	16.8
	PF		0.939	0.949	0.957	0.958	0.964	0.970	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Visy Paper Major customer	Actual MVA	17.2	19.4	19.5	19.8	19.9	20.5										
	MW	16.3	18.1	18.4	18.5	18.5	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7
	MVA _r	5.3	7.3	6.6	7.6	7.4	8.4	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
	10% POE MVA	17.2	19.5	19.6	20.0	19.9	20.5	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2
	PF	0.951	0.926	0.942	0.925	0.928	0.913	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927
50% POE	MW	16.3	18.1	18.4	18.5	18.5	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7
	MVA _r	5.3	7.3	6.6	7.6	7.4	8.4	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
	MVA	17.2	19.5	19.6	20.0	19.9	20.5	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2
	PF	0.951	0.926	0.942	0.925	0.928	0.913	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927
	Actual MVA	23.3	24.7	22.3	21.3	21.4	22.6										
Woodpark	MW	22.7	24.1	21.9	21.0	21.1	21.0	21.2	22.7	22.7	22.6	22.6	22.6	22.6	22.6	22.6	22.6
	MVA _r	6.0	5.0	4.3	3.8	3.5	8.3	5.2	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.5	5.6
	10% POE MVA	23.4	24.7	22.3	21.3	21.4	22.6	21.9	23.4	23.3	23.3	23.3	23.3	23.2	23.2	23.3	23.3
	PF	0.967	0.979	0.981	0.984	0.986	0.930	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
	Actual MVA	21.9	17.9	16.4	17.1	20.6	20.6										
Yennora	MW	22.4	19.3	19.3	19.8	20.3	20.2	21.1	21.3	21.2	21.2	21.1	21.1	21.0	21.0	21.0	21.1
	MVA _r	5.7	1.6	1.9	1.5	2.7	1.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.8	2.9	2.9
	10% POE MVA	23.1	19.4	19.4	19.8	20.4	20.2	21.3	21.5	21.4	21.3	21.3	21.3	21.2	21.2	21.2	21.2
	PF	0.969	0.997	0.995	0.997	0.991	0.997	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	Actual MVA	21.3	23.6	21.8	38.8	24.1	25.7										
Guildford (Ausgrid)	MW	19.2	21.2	19.9	36.0	22.5	24.1	19.0	18.9	19.0	19.2	19.3	19.5	19.6	19.7	19.9	20.1
	MVA _r	9.2	10.4	8.9	14.7	8.7	9.1	8.2	8.2	8.2	8.3	8.3	8.4	8.5	8.5	8.6	8.7
	10% POE MVA	21.3	23.6	21.8	38.8	24.1	25.7	20.7	20.6	20.7	20.9	21.0	21.2	21.4	21.5	21.7	21.9
	PF	0.903	0.898	0.913	0.926	0.932	0.935	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918
	Actual MVA	222.3	247.6	235.7	237.8	230.4	241.9										
Undiversified	MW	240.9	243.3	244.9	248.3	227.7	229.4	233.6	237.7	237.7	237.3	237.0	236.7	236.5	236.3	236.8	237.3
	MVA _r	58.5	43.9	48.3	51.9	42.7	38.7	43.7	44.2	44.2	44.2	44.2	44.2	44.3	44.3	44.4	44.5
	10% POE MVA	250.0	249.6	251.9	257.2	233.5	235.4	239.4	243.6	243.5	243.2	242.8	242.6	242.4	242.2	242.7	243.3
	PF	0.964	0.975	0.972	0.965	0.975	0.975	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
	Actual MVA	208.5	231.3	207.3	238.0	218.9	211.0										
Diversified#	MW	220.3	213.9	215.9	230.5	220.0	207.4	208.1	211.8	211.7	211.4	211.1	210.9	210.7	210.5	211.0	211.4
	MVA _r	75.9	47.1	58.0	63.4	53.1	57.1	57.3	58.3	58.3	58.2	58.1	58.1	58.0	58.0	58.1	58.2
	10% POE MVA	233.0	219.0	223.6	239.1	226.3	215.1	215.8	219.7	219.6	219.3	218.9	218.7	218.5	218.4	218.8	219.3
	PF	0.945	0.977	0.966	0.964	0.972	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	Actual MVA	220.3	213.9	215.9	230.5	220.0	207.4	208.1	211.8	211.7	211.4	211.1	210.9	210.7	210.5	211.0	211.4
(Meter)	MW	207.9	201.5	203.6	218.2	202.9	191.9	195.6	199.3	199.3	199.0	198.6	198.4	198.2	198.1	198.5	199.0
	MVA _r	71.7	44.4	54.7	60.0	49.0	52.8	53.9	54.9	54.9	54.8	54.7	54.6	54.6	54.5	54.7	54.8
	50% POE MVA	220.0	206.4	210.8	226.3	208.7	199.1	202.9	206.8	206.7	206.4	206.0	205.8	205.6	205.5	205.9	206.4
	PF	0.945	0.977	0.966	0.964	0.972	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	Actual MVA	222.3	247.6	235.7	237.8	230.4	241.9										

Note: Diversified# Refers to the transformer metering values plus the generation output.

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Marubeni Generator	MW							-80.0	-80.0	-80.0	-80.0	-80.0	-80.0	-80.0	-80.0	-80.0	-80.0
	MVAr							-60.0	-60.0	-60.0	-60.0	-60.0	-60.0	-60.0	-60.0	-60.0	-60.0
	10% POE MVA							-85.4	-85.4	-85.4	-85.4	-85.4	-85.4	-85.4	-85.4	-85.4	-85.4
	PF							0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
Actual MVA																	
Undiversified+	MW							153.6	157.7	157.7	157.3	157.0	156.7	156.5	156.3	156.8	157.3
	MVAr							34.4	35.2	35.2	35.2	35.1	35.1	35.1	35.1	35.2	35.4
	10% POE MVA							157.4	161.6	161.5	161.2	160.8	160.6	160.4	160.2	160.7	161.3
	PF							0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
	MW							139.6	143.8	143.7	143.4	143.0	142.7	142.5	142.4	142.9	143.4
	MVAr							31.3	32.1	32.1	32.0	32.0	32.0	32.0	32.0	32.1	32.2
	50% POE MVA							143.1	147.3	147.2	146.9	146.5	146.3	146.1	145.9	146.4	147.0
	PF							0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
Actual MVA																	
Diversified+	MW							128.1	131.8	131.7	131.4	131.1	130.9	130.7	130.5	131.0	131.4
	MVAr							35.3	36.3	36.3	36.2	36.1	36.0	36.0	35.9	36.1	36.2
	10% POE MVA							132.8	136.7	136.6	136.3	136.0	135.7	135.5	135.4	135.8	136.3
	PF							0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	MW							115.6	119.3	119.3	119.0	118.6	118.4	118.2	118.1	118.5	119.0
	MVAr							31.8	32.9	32.8	32.8	32.7	32.6	32.6	32.5	32.6	32.8
	50% POE MVA							119.9	123.8	123.7	123.4	123.1	122.8	122.6	122.5	122.9	123.4
	PF							0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964

Note: Diversified+/Undiversified+ Refers to the generation output at Marubeni being subtracted from Undiversified or Diversified#

3.10 Hawkesbury TS Demand Forecast

Discussion

Hawkesbury TS has three 120 MVA 132 / 33kV transformers providing a firm capacity of 240MVA. It supplies North Richmond, Kurrajong, East Richmond, Glossodia, Riverstone, Wisemans, South Windsor, Windsor, Cattai and Glenorie zone substations.

There is 30 MVA of capacitor banks installed on the 33kV busbar to Hawkesbury. The historical and forecast loads have been adjusted to show this power factor correction. East Richmond zone substation has now replaced the existing Richmond ZS. East Richmond zone substation has addressed existing load at risk constraints in the Richmond area and has allowed load to be transferred from North Richmond ZS.

North Richmond ZS has a large development (Redbank Estate) which will be connected to over the next three years. There are also multiple industrial and residential developments, which will cause significant load growth in Windsor ZS area.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Hawkesbury	3 x 120	360
Cattai	1 x 10/12.5/15 + 1 x 15/25	40
East Richmond	2 x 35	70
Glossodia	2 x 25	50
Glenorie	1 x 10/12.5/15	15
Kurrajong	2 x 15	30
North Richmond	2 x 25	50
Riverstone	2 x 15/19/25	50
South Windsor	3 x 15/19/25	75
Windsor	2 x 22/27/35	70
Wisemans	1 x 12.5	12.5

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2018	Riverstone	Hawkesbury	Marsden Park	Vineyard	3.0
2018	Riverstone	Hawkesbury	Mungerie Park	Vineyard	4.0
2018	Kurrajong	Hawkesbury	North Richmond	Hawkesbury	1.0
2018	South Windsor	Hawkesbury	Windsor	Hawkesbury	0.9
2022	Riverstone	Hawkesbury	Box Hill	Vineyard	2.0

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA	MVA
Cattai	NRS2591	2018	0.2	0.1	0.2
Cattai	NRS2849	2018	0.1	0.1	0.1
Cattai	NRS2909	2018	0.5	0.3	0.6
Cattai	NRS3048	2018	0.2	0.1	0.2
Cattai	NRS3053 & NRS3021	2018	0.1	0.0	0.1
Cattai	NRS3120	2019	0.0	0.0	0.1
East Richmond	NCL1060	2018	0.1	0.1	0.1
East Richmond	NCL3207	2019	0.1	0.1	0.2
East Richmond	UCL7915	2018	0.5	0.2	0.5
East Richmond	URS12732	2018	0.1	0.1	0.1
Glossodia	NCL1346/1347/1348	2019	0.3	0.2	0.4
Kurrajong	NRL11849 & NRL11799	2018	0.1	0.0	0.1
Kurrajong	NRS3196	2019	0.1	0.1	0.1
North Richmond	NCL0981	2018	0.1	0.0	0.1
North Richmond	URS18564	2019	0.3	0.1	0.3
North Richmond	URS18621	2019	0.9	0.4	1.0
Riverstone	NUL0582 - Sydney Water - Increased load demand of HVC	2019	2.0	0.9	2.2
Riverstone	Riverstone East - 5900 residential dwellings	2019	0.1	0.0	0.1
Riverstone	Riverstone East - 5900 residential dwellings	2020	0.7	0.3	0.8
Riverstone	Riverstone East - 5900 residential dwellings	2021	1.0	0.5	1.1
Riverstone	Riverstone East - 5900 residential dwellings	2022	0.7	0.3	0.8
Riverstone	Riverstone East - 5900 residential dwellings	2023	0.7	0.3	0.8
Riverstone	Riverstone East - 5900 residential dwellings	2024	1.0	0.5	1.1
Riverstone	Riverstone East - 5900 residential dwellings	2025	1.1	0.5	1.2
Riverstone	Riverstone East - 5900 residential dwellings	2026	1.1	0.5	1.2
Riverstone	Riverstone East - 5900 residential dwellings	2027	1.1	0.5	1.2
Riverstone	Riverstone East - 5900 residential dwellings	2028	1.0	0.5	1.1

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2020	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2021	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2022	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2023	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2024	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2025	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2026	0.6	0.3	0.7
Riverstone	Riverstone West - 88 hectares of employment land	2021	2.2	1.0	2.4
Riverstone	Riverstone West - 88 hectares of employment land	2021	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2022	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2023	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2024	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2025	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2026	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2027	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2028	0.5	0.3	0.6
Riverstone	UCL8172 - Motel expansion Windsor Rd Vineyard	2019	0.3	0.1	0.3
Riverstone	UIL4983 - Bandon Rd	2018	0.1	0.0	0.1
Riverstone	URS12593	2018	0.1	0.0	0.1
Riverstone	URS16286 - 2 William Street Riverstone	2018	0.2	0.1	0.2
Riverstone	URS16363 - Stage 1 Hobart Street RIVERSTONE	2018	0.5	0.2	0.5
Riverstone	URS16839 - Crown St	2018	0.4	0.2	0.5
Riverstone	URS16839 123 Crown Street RIVERSTONE	2018	0.5	0.3	0.6
Riverstone	URS17002 - Stage 1 Garfield Road East RIVERSTONE	2018	0.5	0.3	0.6
Riverstone	URS17073 - Boundary Rd	2019	0.2	0.1	0.2
Riverstone	URS17074 - 22-32 William Street RIVERSTONE	2018	0.3	0.2	0.4
Riverstone	URS17080 - Garfield Rd East Stage 1	2019	0.2	0.1	0.3
Riverstone	URS17419 - 88 McCulloch Street RIVERSTONE	2018	0.1	0.0	0.1
Riverstone	URS17626 - Boundary Rd	2018	0.6	0.3	0.7
Riverstone	URS17629 - Boundary Rd	2018	0.5	0.2	0.6
Riverstone	URS17634 - Boundary Rd	2019	0.3	0.2	0.3
Riverstone	URS17634 - Boundary Rd	2019	0.3	0.2	0.3
Riverstone	URS17644 - Garfield Rd East Riverstone	2019	0.2	0.1	0.2
Riverstone	URS17848 - William St Riverstone	2019	0.1	0.1	0.2
Riverstone	URS17875 - William Street RIVERSTONE	2019	0.3	0.1	0.3
Riverstone	URS17876 - William Street RIVERSTONE	2019	0.3	0.2	0.4
Riverstone	URS17967 - Garfield Rd East Stage 2	2019	0.2	0.1	0.2
Riverstone	URS18044 - Hamilton St Riverstone	2019	0.1	0.0	0.1
Riverstone	URS18142 - William St	2019	0.3	0.2	0.4
Riverstone	URS18199 - Hamilton St	2019	0.2	0.1	0.2
Riverstone	URS18324 - Boundary Rd	2019	0.3	0.2	0.4
Riverstone	URS18356 - William St	2019	0.1	0.1	0.1
Riverstone	URS18892 - Edmund St Riverstone	2019	0.3	0.1	0.3
Riverstone	URS19293 - Off Windsor Rd	2019	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2020	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2021	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2022	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2023	0.5	0.2	0.5
Riverstone	Vineyard - 31 hectares of employment land	2024	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2025	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2026	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2027	0.4	0.2	0.4
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2020	0.4	0.2	0.4
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2021	0.5	0.3	0.6
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2022	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2023	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2024	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2025	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2026	0.7	0.3	0.8
South Windsor	NCL1144	2019	0.7	0.3	0.8
South Windsor	NCL1312	2020	0.7	0.3	0.7
South Windsor	NIL0232	2018	0.6	0.3	0.6
South Windsor	UCL5759	2018	0.2	0.1	0.3
South Windsor	UIL4359	2019	0.4	0.2	0.5
South Windsor	UIL4512	2018	1.4	0.7	1.5

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
South Windsor	UIL4653	2019	0.5	0.3	0.6
South Windsor	UIL4926	2020	1.1	0.5	1.2
South Windsor	UIL5043	2018	0.0	0.0	0.0
Windsor	NRS2833	2018	0.1	0.1	0.1
Windsor	NRS3015 Pitt Town	2018	0.1	0.0	0.1
Windsor	NRS3030 Pitt Town	2018	0.1	0.0	0.1
Windsor	UCL5637	2018	1.2	0.6	1.4
Windsor	UML6793	2019	0.1	0.1	0.1
Windsor	URS12125	2018	0.0	0.0	0.0
Windsor	URS16950 & URS16951 Pitt Town	2019	0.2	0.1	0.2
Windsor	URS18634 & URS18637	2019	0.2	0.1	0.3
Windsor	URS18719 & URS1872	2019	0.1	0.1	0.1

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
North Richmond	URS18621 Stage 11 Redbank Estate North Richmond	2019	2	0.8

Generation

No Generation known at this location

Configuration Changes

Year	Zone / HVC	From TS	To TS
2015	Richmond*	Hawkesbury	Hawkesbury

**Richmond has been decommissioned and East Richmond has taken up the existing load on Richmond.*

Hawkesbury TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Cattai	Actual MVA	9.1	11.7	10.9	11.1	11.9	14.2										
	MW	11.7	11.5	11.7	12.0	12.7	12.4	13.2	13.2	13.1	13.0	13.0	12.9	12.8	12.8	12.8	12.8
	MVA _r	4.9	4.6	4.8	5.8	4.8	4.3	5.4	5.4	5.3	5.3	5.3	5.2	5.2	5.2	5.2	5.2
	10% POE	MVA	12.7	12.4	12.7	13.3	13.5	13.1	14.3	14.2	14.1	14.1	14.0	13.9	13.9	13.8	13.8
50% POE	PF	0.924	0.930	0.927	0.899	0.936	0.943	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
	MW	10.5	10.2	10.5	10.7	11.3	11.1	11.9	11.9	11.8	11.7	11.7	11.6	11.5	11.5	11.5	11.4
	MVA _r	4.3	4.0	4.2	5.2	4.2	3.9	4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.6
	10% POE	MVA	11.3	11.0	11.3	11.9	12.1	11.7	12.9	12.8	12.7	12.7	12.6	12.5	12.4	12.4	12.4
50% POE	PF	0.924	0.930	0.927	0.899	0.936	0.943	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
	Actual MVA	11.5	17.3	17.8	16.9	17.7	21.3										
Glossodia	MW	18.2	15.5	16.5	18.9	19.1	18.1	18.0	18.1	18.0	17.9	17.8	17.7	17.6	17.5	17.4	17.4
	MVA _r	6.9	5.9	6.6	6.5	6.2	6.1	6.5	6.5	6.5	6.5	6.4	6.4	6.3	6.3	6.3	6.3
	10% POE	MVA	19.5	16.6	17.8	20.0	20.1	19.1	19.3	19.1	19.0	18.9	18.8	18.7	18.6	18.5	18.5
	PF	0.936	0.934	0.929	0.946	0.951	0.947	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941
50% POE	MW	15.8	13.7	14.7	16.5	16.7	15.9	15.8	16.0	15.8	15.7	15.6	15.5	15.4	15.3	15.3	15.2
	MVA _r	6.0	5.2	5.8	5.7	5.4	5.4	5.7	5.8	5.7	5.7	5.6	5.6	5.6	5.5	5.5	5.5
	10% POE	MVA	16.9	14.6	15.8	17.4	17.6	16.8	17.0	16.8	16.7	16.6	16.5	16.4	16.3	16.2	16.2
	PF	0.936	0.934	0.929	0.946	0.951	0.947	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941
50% POE	Actual MVA				5.1	6.0	7.1										
	MW				5.0	5.8	6.8	6.8	6.7	6.7	6.7	6.6	6.6	6.5	6.5	6.5	6.5
	MVA _r				1.1	1.6	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9
	10% POE	MVA			5.1	6.0	7.1	7.1	7.0	7.0	6.9	6.9	6.9	6.8	6.8	6.8	6.8
50% POE	PF				0.976	0.964	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959
	MW				5.0	5.8	6.8	6.8	6.7	6.7	6.7	6.6	6.6	6.5	6.5	6.5	6.5
	MVA _r				1.1	1.6	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9
	10% POE	MVA			5.1	6.0	7.1	7.1	7.0	7.0	6.9	6.9	6.9	6.8	6.8	6.8	6.8
50% POE	PF				0.976	0.964	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959
	Actual MVA				19.3	28.1	29.5										
East Richmond	MW				19.7	26.1	26.7	27.2	27.2	27.1	27.0	26.9	26.8	26.7	26.6	26.6	26.7
	MVA _r				3.7	8.0	6.5	5.1	5.1	5.0	5.0	5.0	5.0	5.0	4.9	4.9	4.9
	10% POE	MVA			20.1	27.3	27.5	27.7	27.7	27.6	27.4	27.3	27.2	27.2	27.1	27.1	27.1
	PF				0.983	0.957	0.972	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
50% POE	MW				18.1	24.6	24.9	25.4	25.4	25.3	25.2	25.1	25.0	24.9	24.8	24.8	24.8
	MVA _r				3.4	7.5	6.1	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.6	4.6	4.6
	10% POE	MVA			18.5	25.7	25.7	25.8	25.8	25.7	25.6	25.5	25.4	25.3	25.2	25.3	25.3
	PF				0.983	0.957	0.972	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
50% POE	Actual MVA	5.0	2.9	4.4	5.7	6.5	4.4										
	MW	5.0	2.9	4.4	5.7	6.5	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	MVA _r	0.6	0.4	0.1	0.4	0.4	1.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	10% POE	MVA	5.0	2.9	4.4	5.7	6.5	4.4	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
50% POE	PF	0.992	0.992	1.000	0.998	0.998	0.932	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	MW	5.0	2.9	4.4	5.7	6.5	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	MVA _r	0.6	0.4	0.1	0.4	0.4	1.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	10% POE	MVA	5.0	2.9	4.4	5.7	6.5	4.4	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
50% POE	PF	0.992	0.992	1.000	0.998	0.998	0.932	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	Actual MVA	8.9	13.2	11.4	12.6	13.2	15.2										
Kurrajong	MW	11.9	11.5	11.8	11.6	12.2	12.8	11.8	11.9	11.8	11.7	11.6	11.5	11.4	11.4	11.3	11.3
	MVA _r	4.3	4.3	4.4	4.0	3.9	4.0	4.1	4.1	4.1	4.1	4.0	4.0	4.0	3.9	3.9	3.9
	10% POE	MVA	12.7	12.3	12.5	12.3	12.8	13.4	12.5	12.6	12.5	12.4	12.3	12.2	12.1	12.0	12.0
	PF	0.940	0.936	0.938	0.945	0.953	0.955	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
50% POE	MW	10.6	10.2	10.4	10.3	10.8	11.1	10.2	10.2	10.1	10.0	9.9	9.8	9.8	9.7	9.7	9.6
	MVA _r	3.8	3.8	3.9	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.4
	10% POE	MVA	11.3	10.9	11.1	10.9	11.4	11.6	10.8	10.8	10.7	10.6	10.5	10.4	10.3	10.3	10.2
	PF	0.940	0.936	0.938	0.945	0.953	0.955	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
50% POE	Actual MVA	16.8	19.8	18.5	19.5	13.7	16.6										
	MW	19.5	19.4	20.0	19.2	16.6	15.1	16.0	17.3	17.5	17.5	17.4	17.4	17.3	17.3	17.3	17.3
	MVA _r	6.5	6.0	6.4	6.1	5.3	4.8	5.1	5.5	5.6	5.6	5.6	5.6	5.5	5.5	5.5	5.5
	10% POE	MVA	20.6	20.3	21.0	20.1	17.5	15.8	16.8	18.1	18.4	18.3	18.3	18.2	18.2	18.1	18.2
50% POE	PF	0.949	0.955	0.953	0.953	0.953	0.953	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
	MW	18.0	17.9	18.5	17.6	15.0	13.8	14.8	16.0	16.2	16.2	16.1	16.1	16.0	16.0	16.0	16.0
	MVA _r	6.0	5.5	5.9	5.6	4.8	4.4	4.7	5.1	5.2	5.2	5.2	5.1	5.1	5.1	5.1	5.1
	10% POE	MVA	19.0	18.7	19.4	18.5	15.8	14.5	15.5	16.8	17.0	17.0	16.9	16.8	16.8	16.8	16.8
50% POE	PF	0.949	0.955	0.953	0.953	0.953	0.953	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual	MVA	19.1	19.3	19.1													
Richmond	MW	22.9	21.7	21.8													
	MVA _r	1.3	1.9	2.5													
	10% POE MVA	22.9	21.7	22.0													
	PF	0.998	0.996	0.993													
	MW	21.3	20.1	20.2													
	MVA _r	1.2	1.8	2.3													
	50% POE MVA	21.3	20.2	20.4													
	PF	0.998	0.996	0.993													
Actual	MVA	19.0	13.8	13.9	14.2	15.8	21.2										
Riverstone	MW	23.8	13.9	14.5	15.9	17.2	18.0	14.4	19.8	21.6	26.2	26.7	29.4	32.2	35.1	38.1	39.9
	MVA _r	0.9	0.4	0.5	0.5	3.3	2.4	1.4	2.0	2.1	2.6	2.6	2.9	3.2	3.5	3.8	3.9
	10% POE MVA	23.8	13.9	14.5	15.9	17.5	18.2	14.5	19.9	21.7	26.3	26.9	29.5	32.4	35.3	38.3	40.0
	PF	0.999	1.000	0.999	1.000	0.982	0.991	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	MW	21.6	12.7	13.3	14.6	15.4	16.5	13.0	18.4	20.1	24.7	25.3	27.9	30.7	33.6	36.6	38.4
	MVA _r	0.8	0.4	0.5	0.5	2.9	2.2	1.3	1.8	2.0	2.4	2.5	2.8	3.0	3.3	3.6	3.8
	50% POE MVA	21.6	12.7	13.3	14.6	15.7	16.7	13.0	18.4	20.2	24.8	25.4	28.1	30.9	33.8	36.8	38.6
	PF	0.999	1.000	0.999	1.000	0.982	0.991	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
Actual	MVA	30.1	37.3	31.6	32.9	36.5	36.1										
South Windsor	MW	36.7	35.2	37.6	38.2	39.3	35.7	36.6	37.9	39.2	39.1	39.0	38.9	38.9	38.8	38.9	38.9
	MVA _r	17.0	13.4	6.6	5.9	6.3	5.1	9.9	10.2	10.6	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	10% POE MVA	40.5	37.6	38.1	38.6	39.8	36.0	37.9	39.2	40.6	40.5	40.4	40.3	40.3	40.2	40.3	40.3
	PF	0.908	0.935	0.985	0.988	0.987	0.990	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
	MW	33.4	31.9	34.3	34.8	35.8	32.8	33.7	35.0	36.4	36.3	36.2	36.1	36.0	35.9	36.0	36.0
	MVA _r	15.4	12.1	6.0	5.4	5.7	4.7	9.1	9.4	9.8	9.8	9.7	9.7	9.7	9.7	9.7	9.7
	50% POE MVA	36.8	34.1	34.8	35.3	36.2	33.1	34.9	36.2	37.7	37.6	37.5	37.4	37.3	37.2	37.3	37.3
	PF	0.908	0.935	0.985	0.988	0.987	0.990	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
Actual	MVA	15.3	19.0	19.3	18.2	21.9	23.4										
Windsor	MW	18.5	18.7	19.2	19.6	20.6	22.4	24.5	25.0	24.9	24.9	24.8	24.8	24.8	24.8	24.8	24.9
	MVA _r	7.7	6.2	6.9	5.6	5.9	6.7	8.2	8.3	8.3	8.3	8.3	8.3	8.2	8.2	8.3	8.3
	10% POE MVA	20.1	19.7	20.4	20.4	21.4	23.4	25.8	26.3	26.3	26.2	26.2	26.1	26.1	26.1	26.2	26.2
	PF	0.923	0.949	0.941	0.962	0.961	0.958	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949
	MW	17.1	17.3	17.8	18.1	19.3	22.4	24.5	25.0	24.9	24.9	24.8	24.8	24.8	24.8	24.8	24.9
	MVA _r	7.1	5.7	6.4	5.2	5.6	6.7	8.2	8.3	8.3	8.3	8.3	8.3	8.2	8.2	8.3	8.3
	50% POE MVA	18.5	18.2	18.9	18.9	20.1	23.4	25.8	26.3	26.3	26.2	26.2	26.1	26.1	26.1	26.2	26.2
	PF	0.923	0.949	0.941	0.962	0.961	0.958	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949
Actual	MVA	5.0	5.3	5.1	5.6	5.8	6.4										
Wisemans	MW	4.6	5.1	4.8	5.3	5.6	6.1	6.1	6.1	6.0	6.0	6.0	6.0	5.9	5.9	5.9	5.9
	MVA _r	1.8	1.6	1.7	1.9	1.8	1.9	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	10% POE MVA	5.0	5.3	5.1	5.6	5.8	6.4	6.4	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	PF	0.934	0.956	0.943	0.941	0.951	0.954	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946
	MW	4.6	5.1	4.8	5.3	5.6	6.1	6.1	6.1	6.0	6.0	6.0	6.0	5.9	5.9	5.9	5.9
	MVA _r	1.8	1.6	1.7	1.9	1.8	1.9	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	50% POE MVA	5.0	5.3	5.1	5.6	5.8	6.4	6.4	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	PF	0.934	0.956	0.943	0.941	0.951	0.954	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946
Actual	MVA	139.8	159.7	151.8	161.1	177.1	195.4										
Undiversified	MW	173.0	155.5	162.3	171.1	181.6	178.1	178.7	187.2	190.1	194.0	194.0	196.0	198.3	200.8	203.8	205.7
	MVA _r	51.9	44.7	40.4	41.5	47.4	45.5	50.4	51.8	52.3	52.5	52.4	52.5	52.6	52.7	53.1	53.2
	10% POE MVA	182.8	162.9	168.5	177.2	188.3	184.4	186.2	194.9	197.8	201.7	201.7	203.7	206.0	208.5	211.5	213.4
	PF	0.947	0.954	0.963	0.966	0.965	0.966	0.960	0.961	0.961	0.962	0.962	0.962	0.963	0.963	0.964	0.964
	MW	157.9	141.9	148.9	156.7	166.8	165.5	166.1	174.6	177.5	181.4	181.4	183.4	185.7	188.2	191.2	193.1
	MVA _r	47.1	40.6	36.8	37.8	43.5	42.4	46.8	48.3	48.7	49.0	48.8	48.9	49.0	49.2	49.5	49.7
	50% POE MVA	166.7	148.7	154.5	162.3	172.9	171.4	173.1	181.8	184.6	188.6	188.5	190.6	192.8	195.3	198.4	200.2
	PF	0.947	0.955	0.964	0.966	0.965	0.966	0.960	0.961	0.961	0.962	0.962	0.963	0.963	0.964	0.964	0.964
Actual	MVA	126.3	150.5	135.8	148.0	170.3	181.0										
Diversified (Meter)	MW	164.5	156.3	161.2	166.7	171.7	166.6	165.5	173.3	176.0	179.6	179.6	181.5	183.6	185.9	188.7	190.4
	MVA _r	9.5	27.1	16.8	21.3	43.1	36.6	36.3	38.1	38.7	39.5	39.4	39.9	40.3	40.8	41.5	41.8
	10% POE MVA	164.8	158.7	162.1	168.0	177.1	170.5	169.4	177.5	180.2	183.9	183.9	185.8	188.0	190.3	193.2	194.9
	PF	0.998	0.985	0.995	0.992	0.970	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW	150.8	142.6	147.5	153.0	158.3	153.3	153.8	161.7	164.3	167.9	167.9	169.8	171.9	174.2	177.0	178.7
	MVA _r	8.7	24.7	15.3	19.5	39.7	33.7	33.8	35.5	36.1	36.9	36.9	37.3	37.8	38.3	38.9	39.3
	50% POE MVA	151.1	144.8	148.3	154.2	163.2	156.9	157.4	165.5	168.2	171.9	171.9	173.9	176.0	178.4	181.3	183.0
	PF	0.998	0.985	0.995	0.992	0.970	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977

3.11 Holroyd 132kV Demand Forecast

Discussion

Holroyd Bulk Supply Point has been developed by TransGrid due to the demand on the Sydney West 132kV busbar having exceeded the current firm capacity. Holroyd's establishment has seen a number of loads that have been transferred from Sydney West BSP. These loads are Guildford 33kV load (net of Marubeni), Camellia, North Parramatta, West Parramatta and Granville 132kV.

The Parramatta region has significant planned development over the next 10 years. A large amount of commercial and high density residential around Parramatta Square has started construction and will add a significant amount of load on West Parramatta and North Parramatta zone substations.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Granville 132kV	2 x 30/45	90
North Parramatta	2 x 45/55	110
West Parramatta	3 x 30/45	135

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA	MVA
Granville 132kV	70 apartments 4 com 57 Cowper Street Granville	2017	0.3	0.1	0.3
Granville 132kV	UML7194 - 60 units Pitt St	2018	0.2	0.1	0.2
Granville 132kV	UML7326 - 43 units William St	2019	0.2	0.1	0.2
Granville 132kV	UML7476 - 474 units + retail/commercial, East St Granville	2020	2.4	1.2	2.7
Granville 132kV	UML7802 - High Density & Commercial (Stage 1)	2018	2.1	1.0	2.3
Granville 132kV	UML7802 - High Density & Commercial (Stage 2)	2019	2.1	1.0	2.3
Granville 132kV	UML7838 - Pitt St	2020	0.8	0.4	0.9
North Parramatta	198 units and 2 com Morton Street Parramatta	2018	0.6	0.3	0.6
North Parramatta	307 units and 2 com Morton Street Parramatta	2018	0.9	0.4	1.0
North Parramatta	UCL5931 - Commercial building 105 Phillip Street	2019	2.2	1.0	2.4
North Parramatta	ULL2613 Prince Alfred Park supply upgrade Church St Parramatta	2018	0.2	0.1	0.2
North Parramatta	ULL2621 Western Sydney Stadium O'Connell St Parramatta	2020	3.2	1.6	3.6
West Parramatta	4 new tower buildings Darcy St Parramatta Square	2020	16.7	8.1	18.5
West Parramatta	Parramatta RSL redevelopment Macquarie Street Parramatta	2020	0.9	0.4	1.0
West Parramatta	ULL2541 Parramatta Public School	2018	0.7	0.3	0.7
West Parramatta	ULL2542 Arthur Phillip High School	2019	2.7	1.3	3.0
West Parramatta	UML5507 - 644 apartments & retail Riverbank Parramatta	2018	2.6	1.3	2.9
West Parramatta	UML5706 450 Units and Retail space, 189 Macquarie Street Parramatta	2018	1.5	0.7	1.7
West Parramatta	UML6319 81 Apartments 4 retail shops 5 - 9 Hunter Street Parramatta	2018	0.3	0.2	0.4
West Parramatta	UML7499 - 200 Apartments	2020	0.7	0.3	0.8

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Granville 132kV	Granville / Merrylands Strategic Opportunities Site - 1175 Apartments	2017	8	3.5
North Parramatta	North Parramatta Urban Renewal 3000 apartments	2019	16	9.0
West Parramatta	Parramatta Square Development	2021	5	5.0

Generation

No Generation known at this location

Configuration Changes

Year	Zone / HVC	From TS	To TS
2015	North Parramatta	Sydney West 132kV	Holroyd 132kV
2015	West Parramatta	Sydney West 132kV	Holroyd 132kV
2016	Granville 132kV	Sydney West 132kV	Holroyd 132kV

Holroyd 132kV Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Granville 132kV	Actual MVA					29.3	28.4										
	MW					24.9	25.1	27.3	29.7	33.0	33.6	34.0	34.2	34.3	34.3	34.4	34.6
	MVA					2.0	1.6	5.4	5.9	6.5	6.6	6.7	6.8	6.8	6.8	6.8	6.8
	10% POE MVA					24.9	25.1	27.8	30.2	33.6	34.2	34.6	34.9	35.0	35.0	35.1	35.2
	PF					0.997	0.998	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
	MW					23.7	23.9	26.1	28.5	31.8	32.4	32.8	33.0	33.1	33.1	33.3	33.4
	MVA					1.9	1.5	5.2	5.6	6.3	6.4	6.5	6.5	6.6	6.6	6.6	6.6
	50% POE MVA					23.8	24.0	26.6	29.0	32.4	33.0	33.4	33.7	33.8	33.8	33.9	34.0
	PF					0.997	0.998	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
North Parramatta	Actual MVA				27.1	31.1	32.6										
	MW				32.8	33.0	32.1	33.4	35.3	38.3	38.5	38.9	39.4	40.0	40.8	41.8	42.8
	MVA				0.0	0.0	0.0	1.8	1.9	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.3
	10% POE MVA				32.8	33.0	32.1	33.5	35.4	38.3	38.6	39.0	39.5	40.1	40.8	41.8	42.9
	PF				1.000	1.000	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
	MW				30.0	30.2	29.1	30.4	32.3	35.3	35.5	35.9	36.4	37.0	37.8	38.8	39.8
	MVA				0.0	0.0	0.0	1.6	1.7	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1
	50% POE MVA				30.0	30.2	29.1	30.5	32.4	35.3	35.6	36.0	36.5	37.1	37.8	38.9	39.9
	PF				1.000	1.000	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
West Parramatta	Actual MVA				47.4	51.2	53.1										
	MW				43.7	48.3	49.7	54.0	56.3	72.1	72.4	73.5	75.1	76.1	76.7	77.2	77.7
	MVA				7.4	10.4	9.6	13.6	14.2	18.1	18.2	18.5	18.9	19.2	19.3	19.4	19.5
	10% POE MVA				44.3	49.4	50.6	55.7	58.1	74.3	74.7	75.8	77.4	78.5	79.1	79.6	80.1
	PF				0.986	0.977	0.982	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	MW				41.7	46.1	47.7	52.0	54.3	70.1	70.5	71.5	73.1	74.1	74.7	75.2	75.7
	MVA				7.1	10.0	9.2	13.1	13.7	17.6	17.7	18.0	18.4	18.7	18.8	18.9	19.0
	50% POE MVA				42.3	47.1	48.5	53.6	56.0	72.3	72.7	73.8	75.4	76.4	77.0	77.5	78.0
	PF				0.986	0.977	0.982	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Undiversified	Actual MVA				74.5	111.6	114.0										
	MW				76.6	106.2	106.8	114.7	121.3	143.3	144.5	146.4	148.7	150.4	151.8	153.4	155.0
	MVA				7.4	12.5	11.2	20.8	21.9	26.7	26.9	27.3	27.8	28.1	28.3	28.5	28.7
	10% POE MVA				77.2	107.4	107.8	117.0	123.7	146.3	147.5	149.4	151.7	153.5	154.9	156.5	158.2
	PF				0.992	0.989	0.991	0.981	0.981	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	MW				71.7	100.0	100.7	108.6	115.1	137.2	138.4	140.2	142.5	144.3	145.6	147.2	148.9
	MVA				7.1	11.9	10.7	19.9	21.0	25.8	26.0	26.4	26.9	27.2	27.4	27.6	27.8
	50% POE MVA				72.3	101.1	101.6	110.7	117.4	140.0	141.3	143.2	145.5	147.3	148.6	150.3	151.9
	PF				0.992	0.989	0.991	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980

3.12 Ilford TS Demand Forecast

Discussion

Ilford TS has a single 60MVA 132/66kV transformer. Ilford TS supplies Ilford Hall, Bylong and Kandos zone substations.

There is a load application in Ilford TS area being NIL0208 (Kepco Coal Mine, at 18MVA). The applicant's consultant is in the process of addressing the technical and environmental requirements, before the project can progress to delivery.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Ilford	1 x 40/60 (132/66kV)	60
Bylong	2 x 1.5	3
Ilford Hall	1 x 2.5	2.5
Kandos	2 x 5	10

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Bylong	NRL11387	2018	0.01	0.004	0.01
Kandos	NRL11335	2018	0.01	0.004	0.01
Kandos	NRL11388	2018	0.1	0.1	0.1
Kandos	NRL11685	2018	0.02	0.01	0.0
Kepco Mine	NIL0208 - Stage 1	2019	12.3	6.0	13.7
Kepco Mine	NIL0208 - Stage 2	2022	7.7	3.7	8.6

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Ilford TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
APC Kandos	Actual MVA	1.8															
	MW	1.3															
	MVA _r	1.2															
	10% POE MVA	1.8															
Major customer	PF	0.734															
	MW	1.3															
	MVA _r	1.2															
	50% POE MVA	1.8															
	PF	0.734															
	Actual MVA	0.4	0.4	0.4	0.3	0.3	0.4										
	MW	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	MVA _r	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bylong	10% POE MVA	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	PF	0.970	0.976	0.970	0.978	0.977	0.970	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973
	MW	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	MVA _r	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
50% POE	MVA	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	PF	0.970	0.976	0.970	0.978	0.977	0.970	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973
	Actual MVA																
	MW																
Kepco Mine	MVA _r																
	10% POE MVA																
	PF																
	Major customer																
50% POE	MW																
	MVA _r																
	MVA																
	PF																
Major customer	MW																
	MVA _r																
	MVA																
	PF																
Ilford Hall	Actual MVA	0.4	0.4	0.4	0.4	0.4	0.4										
	MW	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	MVA _r	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	10% POE MVA	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
50% POE	PF	0.890	0.884	0.846	0.896	0.864	0.900	0.880	0.880	0.880	0.880	0.880	0.880	0.880	0.880	0.880	0.880
	MW	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	MVA _r	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	MVA	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Kandos	PF	0.890	0.884	0.846	0.896	0.864	0.900	0.880	0.880	0.880	0.880	0.880	0.880	0.880	0.880	0.880	0.880
	Actual MVA	3.7	4.3	4.4	4.2	3.4	4.3										
	MW	3.4	3.8	4.0	3.7	3.1	3.9	4.0	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.8	3.8
	MVA _r	1.6	1.9	1.9	1.8	1.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
10% POE	MVA	3.7	4.3	4.4	4.2	3.4	4.3	4.4	4.4	4.4	4.4	4.3	4.3	4.3	4.3	4.3	4.3
	PF	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	MW	3.4	3.8	4.0	3.7	3.1	3.9	4.0	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.8	3.8
	MVA _r	1.6	1.9	1.9	1.8	1.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
50% POE	MVA	3.7	4.3	4.4	4.2	3.4	4.3	4.4	4.4	4.4	4.4	4.3	4.3	4.3	4.3	4.3	4.3
	PF	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA	6.3	5.0	5.2	4.9	4.2	5.2										
	MW	5.4	4.6	4.7	4.4	3.8	4.7	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
Undiversified	MVA _r	3.1	2.1	2.2	2.1	1.8	2.2	2.2	5.6	5.6	5.6	7.8	7.7	7.7	7.7	7.7	7.7
	10% POE MVA	6.3	5.0	5.2	4.9	4.2	5.2	5.3	16.2	16.2	16.2	23.0	23.0	23.0	22.9	22.9	22.9
	PF	0.856	0.905	0.901	0.905	0.903	0.906	0.904	0.935	0.935	0.935	0.940	0.940	0.940	0.940	0.940	0.940
	MW	5.4	4.6	4.7	4.4	3.8	4.7	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
50% POE	MVA _r	3.1	2.1	2.2	2.1	1.8	2.2	2.2	5.6	5.6	5.6	7.8	7.7	7.7	7.7	7.7	7.7
	MVA	6.3	5.0	5.2	4.9	4.2	5.2	5.3	16.2	16.2	16.2	23.0	23.0	23.0	22.9	22.9	22.9
	PF	0.856	0.905	0.901	0.905	0.903	0.906	0.904	0.935	0.935	0.935	0.940	0.940	0.940	0.940	0.940	0.940
	Actual MVA	6.8	5.4	6.0	5.8	4.5	5.3										
Diversified# (Meter)	MW	6.6	5.2	5.8	5.6	4.4	5.1	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
	MVA _r	1.6	1.3	1.5	1.4	1.1	1.3	1.2	3.8	3.8	3.8	5.4	5.4	5.4	5.4	5.4	5.4
	10% POE MVA	6.8	5.4	6.0	5.8	4.5	5.3	4.9	15.6	15.6	15.6	22.3	22.3	22.2	22.2	22.2	22.2
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
50% POE	MW	6.6	5.2	5.8	5.6	4.4	5.1	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
	MVA _r	1.6	1.3	1.5	1.4	1.1	1.3	1.2	3.8	3.8	3.8	5.4	5.4	5.4	5.4	5.4	5.4
	MVA	6.8	5.4	6.0	5.8	4.5	5.3	4.9	15.6	15.6	15.6	22.3	22.3	22.2	22.2	22.2	22.2
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970

Note: #Diversified values which are greater than undiversified values are due to abnormal switching.

3.13 Ingleburn TS Demand Forecast

Discussion

Planned land releases in the Glenfield area could see a large amount of growth around the Macquarie Fields Zone Substation catchment. However the majority will be supplied by Casula ZS (Liverpool TS) to avoid the need for major works at Macquarie Fields. Over the longer term, the area has been set aside for urban reactivation by the Department of Planning and Environment.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Ingleburn	2 x 250	500
Bow Bowing	3 x 22/26/35	105
Macquarie Fields	2 x 20/27/33	66
Minto	2 x 20/27/33 + 1 x 22/26/35	101

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Bow Bowing	UIL4598 Williamson Rd Ingleburn redevelop part of the old Viridian site	2018	5.6	2.7	6.2
Minto	UIL4853 increase load at a factory.	2018	0.8	0.4	0.9
Minto	UIL4992 industrial development off Pembroke Rd Minto	2018	0.4	0.2	0.5
Minto	UIL5100 12 Lincoln St Minto	2018	0.6	0.3	0.7

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Macquarie Fields	Glenfield Rd - 1098	2006	20	3.7
Minto	MINTO Dept. of Housing renewal area	2017	10	2.7

Generation

No Generation known at this location

Ingleburn TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Bow Bowing	Actual MVA	43.2	47.4	43.7	50.2	44.8	46.7										
	MW	42.9	46.2	43.1	50.2	44.5	46.2	51.0	50.9	50.8	50.7	50.6	50.5	50.4	50.3	50.4	50.4
	MVAr	5.2	10.6	7.0	0.6	4.3	6.6	7.3	7.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
	10% POE MVA	43.2	47.4	43.7	50.2	44.8	46.7	51.5	51.4	51.3	51.2	51.1	51.0	50.9	50.8	50.9	50.9
	PF	0.993	0.975	0.987	1.000	0.995	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
	MW	42.9	46.2	43.1	50.2	44.5	46.2	51.0	50.9	50.8	50.7	50.6	50.5	50.4	50.3	50.4	50.4
	MVAr	5.2	10.6	7.0	0.6	4.3	6.6	7.3	7.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
	50% POE MVA	43.2	47.4	43.7	50.2	44.8	46.7	51.5	51.4	51.3	51.2	51.1	51.0	50.9	50.8	50.9	50.9
	PF	0.993	0.975	0.987	1.000	0.995	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
	Actual MVA	22.7	29.2	25.4	22.2	26.6	28.3										
Macquarie Fields	MW	29.1	27.7	27.8	26.2	26.6	26.2	26.3	26.4	26.5	26.5	26.5	26.5	26.4	26.4	26.4	26.4
	MVAr	3.5	4.4	3.3	2.1	7.4	1.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	10% POE MVA	29.3	28.0	28.0	26.3	27.6	26.3	26.7	26.7	26.8	26.8	26.8	26.8	26.7	26.7	26.7	26.7
	PF	0.993	0.988	0.993	0.997	0.964	0.998	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
	MW	26.3	24.9	25.0	23.4	23.7	23.4	23.5	23.6	23.6	23.6	23.6	23.6	23.6	23.5	23.5	23.6
	MVAr	3.2	3.9	3.0	1.8	6.6	1.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	50% POE MVA	26.5	25.2	25.2	23.5	24.6	23.4	23.8	23.8	23.9	23.9	23.9	23.9	23.8	23.8	23.8	23.8
	PF	0.993	0.988	0.993	0.997	0.964	0.998	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
	Actual MVA	52.7	60.8	53.5	59.8	64.0	68.4										
Minto	MW	60.3	57.6	58.1	60.3	61.1	61.9	63.4	63.4	63.4	63.6	63.8	63.9	64.0	64.0	64.1	64.2
	MVAr	12.2	13.5	10.4	12.6	11.4	6.4	12.0	12.0	12.0	12.1	12.1	12.1	12.1	12.1	12.2	12.2
	10% POE MVA	61.5	59.2	59.1	61.6	62.2	62.2	64.5	64.5	64.6	64.8	65.0	65.1	65.1	65.1	65.2	65.3
	PF	0.980	0.974	0.984	0.979	0.983	0.995	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
	MW	55.5	52.8	53.3	55.5	56.2	56.6	58.1	58.1	58.1	58.3	58.5	58.6	58.7	58.7	58.8	58.9
	MVAr	11.3	12.4	9.5	11.6	10.4	5.8	11.0	11.0	11.0	11.1	11.1	11.1	11.1	11.1	11.2	11.2
	50% POE MVA	56.6	54.2	54.2	56.7	57.2	56.9	59.1	59.1	59.2	59.4	59.6	59.7	59.7	59.7	59.8	59.9
	PF	0.980	0.974	0.984	0.979	0.983	0.995	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
	Actual MVA	118.6	137.4	122.5	132.2	135.3	143.3										
Undiversified	MW	132.3	131.5	129.0	136.8	132.3	134.3	140.7	140.7	140.7	140.8	140.9	140.9	140.8	140.7	140.8	141.0
	MVAr	20.9	28.5	20.7	15.3	23.1	14.7	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.4	23.4
	10% POE MVA	134.0	134.6	130.7	138.1	134.6	135.2	142.7	142.6	142.6	142.7	142.8	142.8	142.7	142.6	142.8	142.9
	PF	0.987	0.977	0.987	0.990	0.983	0.994	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	MW	124.7	123.9	121.4	129.2	124.4	126.2	132.6	132.5	132.5	132.6	132.7	132.7	132.6	132.5	132.7	132.8
	MVAr	19.6	26.9	19.5	14.1	21.3	14.0	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9
	50% POE MVA	126.3	126.8	123.0	130.4	126.5	127.0	134.4	134.4	134.3	134.4	134.5	134.5	134.4	134.3	134.5	134.7
	PF	0.987	0.977	0.987	0.990	0.984	0.994	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	Actual MVA	160.5	137.7	118.0	159.7	136.3	170.5										
Diversified# (Meter)	MW	142.9	140.4	137.7	137.9	134.2	137.0	139.6	139.5	139.5	139.6	139.7	139.7	139.6	139.5	139.7	139.8
	MVAr	25.4	34.9	29.8	29.8	47.8	14.1	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
	10% POE MVA	145.2	144.7	140.9	141.1	142.5	137.7	143.2	143.2	143.2	143.3	143.3	143.3	143.3	143.1	143.3	143.5
	PF	0.985	0.970	0.977	0.977	0.942	0.995	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
	MW	130.7	128.2	125.5	125.7	123.1	124.6	131.5	131.4	131.4	131.5	131.6	131.6	131.5	131.4	131.6	131.7
	MVAr	23.2	31.9	27.1	27.2	43.9	12.9	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.4
	50% POE MVA	132.8	132.1	128.4	128.6	130.7	125.2	134.9	134.9	134.9	135.0	135.0	135.0	135.0	134.8	135.0	135.2
	PF	0.985	0.970	0.977	0.977	0.942	0.995	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974

Note #: Diversified values which are greater than undiversified values are due to abnormal switching

3.14 Katoomba North TS Demand Forecast

Discussion

Katoomba North TS has two tail ended 60MVA 132/66kV transformers, providing firm capacity of 60MVA. It supplies Blackheath, Katoomba and Wentworth Falls zone substations.

There are no significant developments in the foreseeable future that will affect the load growth of the Katoomba North TS supply area.

Rating Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Katoomba North	2 x 60 (132/66kV)	120
Blackheath	2 x 5/7	14
Katoomba	2 x 25	50
Wentworth Falls	1 x 8/10	10

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

No Spot Loads Proposed at this location

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Katoomba North TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Blackheath	Actual MVA	4.6	5.0	4.4	5.0	5.1	4.4										
	MW	4.5	4.8	4.3	5.0	5.0	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.1	4.1	4.1	4.1
	MVA _r	1.0	1.0	0.8	0.0	1.0	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
	10% POE MVA	4.6	5.0	4.4	5.0	5.1	4.4	4.3	4.3	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.2
	PF	0.976	0.978	0.984	1.000	0.981	0.987	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
	MW	4.5	4.8	4.3	5.0	5.0	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.1	4.1	4.1	4.1
	MVA _r	1.0	1.0	0.8	0.0	1.0	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
	50% POE MVA	4.6	5.0	4.4	5.0	5.1	4.4	4.3	4.3	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.2
	PF	0.976	0.978	0.984	1.000	0.981	0.987	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
	Actual MVA	16.9	14.2	14.5	12.6	14.3	13.9										
Katoomba	MW	16.5	13.6	14.1	12.3	14.3	13.4	13.4	13.3	13.3	13.3	13.3	13.2	13.2	13.2	13.3	13.3
	MVA _r	3.6	3.8	3.3	2.7	1.4	3.6	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	10% POE MVA	16.9	14.2	14.5	12.6	14.3	13.9	13.7	13.7	13.6	13.6	13.6	13.6	13.6	13.5	13.6	13.6
	PF	0.977	0.964	0.974	0.976	0.995	0.966	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
	Actual MVA	16.9	14.2	14.5	12.6	14.3	13.9	13.7	13.7	13.6	13.6	13.6	13.6	13.6	13.5	13.6	13.6
	MW	16.5	13.6	14.1	12.3	14.3	13.4	13.4	13.3	13.3	13.3	13.3	13.2	13.2	13.2	13.3	13.3
	MVA _r	3.6	3.8	3.3	2.7	1.4	3.6	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	50% POE MVA	16.9	14.2	14.5	12.6	14.3	13.9	13.7	13.7	13.6	13.6	13.6	13.6	13.6	13.5	13.6	13.6
	PF	0.977	0.964	0.974	0.976	0.995	0.966	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
	Actual MVA	6.0	5.6	6.4	4.7	4.9	4.8										
Wentworth Falls	MW	6.0	5.6	6.3	4.7	4.9	4.7	4.7	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5
	MVA _r	0.6	0.6	0.9	0.3	0.3	1.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	10% POE MVA	6.0	5.6	6.4	4.7	4.9	4.8	4.7	4.7	4.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	PF	0.994	0.994	0.990	0.998	0.998	0.978	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	Actual MVA	6.0	5.6	6.4	4.7	4.9	4.8	4.7	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5
	MW	6.0	5.6	6.3	4.7	4.9	4.7	4.7	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5
	MVA _r	0.6	0.6	0.9	0.3	0.3	1.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	50% POE MVA	6.0	5.6	6.4	4.7	4.9	4.8	4.7	4.7	4.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	PF	0.994	0.994	0.990	0.998	0.998	0.978	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	Actual MVA	27.5	24.7	25.2	22.3	24.3	23.1										
Undiversified	MW	27.0	24.0	24.7	22.0	24.1	22.4	22.3	22.2	22.2	22.1	22.0	22.0	21.9	21.9	21.9	21.9
	MVA _r	5.3	5.4	5.0	3.1	2.7	5.3	4.4	4.4	4.4	4.4	4.3	4.3	4.3	4.3	4.3	4.3
	10% POE MVA	27.5	24.7	25.2	22.3	24.3	23.1	22.8	22.7	22.6	22.5	22.5	22.4	22.3	22.3	22.3	22.4
	PF	0.980	0.973	0.980	0.986	0.993	0.972	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	Actual MVA	27.5	24.7	25.2	22.3	24.3	23.1	22.8	22.7	22.6	22.5	22.5	22.4	22.3	22.3	22.3	22.4
	MW	27.0	24.0	24.7	22.0	24.1	22.4	22.3	22.2	22.2	22.1	22.0	22.0	21.9	21.9	21.9	21.9
	MVA _r	5.3	5.4	5.0	3.1	2.7	5.3	4.4	4.4	4.4	4.4	4.3	4.3	4.3	4.3	4.3	4.3
	50% POE MVA	27.5	24.7	25.2	22.3	24.3	23.1	22.8	22.7	22.6	22.5	22.5	22.4	22.3	22.3	22.3	22.4
	PF	0.980	0.973	0.980	0.986	0.993	0.972	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	Actual MVA	22.9	23.3	21.4	20.2	21.2	23.3										
Diversified (Meter)	MW	22.5	22.5	20.7	19.9	20.7	22.5	20.0	19.9	19.8	19.8	19.7	19.6	19.6	19.6	19.6	19.6
	MVA _r	4.3	6.0	5.2	3.5	4.3	6.0	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	10% POE MVA	22.9	23.3	21.4	20.2	21.2	23.3	20.5	20.4	20.3	20.3	20.2	20.2	20.1	20.1	20.1	20.1
	PF	0.982	0.966	0.970	0.985	0.979	0.966	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
	Actual MVA	22.9	23.3	21.4	20.2	21.2	23.3	20.5	20.4	20.3	20.3	20.2	20.2	20.1	20.1	20.1	20.1
	MW	22.5	22.5	20.7	19.9	20.7	22.5	20.0	19.9	19.8	19.8	19.7	19.6	19.6	19.6	19.6	19.6
	MVA _r	4.3	6.0	5.2	3.5	4.3	6.0	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	50% POE MVA	22.9	23.3	21.4	20.2	21.2	23.3	20.5	20.4	20.3	20.3	20.2	20.2	20.1	20.1	20.1	20.1
	PF	0.982	0.966	0.970	0.985	0.979	0.966	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
	Actual MVA	22.9	23.3	21.4	20.2	21.2	23.3	20.5	20.4	20.3	20.3	20.2	20.2	20.1	20.1	20.1	20.1

3.15 Lawson TS Demand Forecast

Discussion

Lawson TS has two 52MVA 132/66kV transformers, providing firm capacity of 52MVA. It supplies Hazelbrook zone substation and rail network.

There are no significant developments in the foreseeable future that will affect the load growth of the Lawson TS supply area.

Rating Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Lawson	2 x 52	104
Hazelbrook	2 x 16/18.5/25	50

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

No Spot Loads Proposed at this location

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Lawson TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Hazelbrook	Actual	MVA	8.7	7.9	10.0	7.3	8.6	8.7									
	MW		8.5	7.9	9.9	7.3	8.5	8.7	8.6	8.6	8.6	8.5	8.5	8.4	8.3	8.3	8.3
	MVA _r		1.5	1.0	1.2	0.0	1.3	0.6	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	10% POE	MVA	8.7	7.9	10.0	7.3	8.6	8.7	8.7	8.7	8.6	8.6	8.5	8.5	8.4	8.4	8.4
	PF		0.986	0.992	0.992	1.000	0.988	0.998	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993
	MW		8.5	7.9	9.9	7.3	8.5	8.7	8.6	8.6	8.6	8.5	8.5	8.4	8.3	8.3	8.3
	MVA _r		1.5	1.0	1.2	0.0	1.3	0.6	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	50% POE	MVA	8.7	7.9	10.0	7.3	8.6	8.7	8.7	8.7	8.6	8.6	8.5	8.5	8.4	8.4	8.4
	PF		0.986	0.992	0.992	1.000	0.988	0.998	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993
	Actual	MVA	15.4	11.2	14.0	12.3	14.0	15.0									
Sydney Trains Lawson	MW		15.1	11.1	13.9	12.2	12.8	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
	MVA _r		2.8	1.6	1.7	1.7	1.3	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	10% POE	MVA	15.4	11.2	14.0	12.3	12.8	15.0	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
	PF		0.983	0.990	0.992	0.990	0.995	0.995	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	Major customer	MW		15.1	11.1	13.9	12.2	12.8	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
	MVA _r		2.8	1.6	1.7	1.7	1.3	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	50% POE	MVA	15.4	11.2	14.0	12.3	12.8	15.0	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
	PF		0.983	0.990	0.992	0.990	0.995	0.995	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	Actual	MVA	24.0	19.2	24.0	19.6	22.6	23.8									
Undiversified	MW		23.7	19.0	23.8	19.5	21.3	23.7	23.6	23.6	23.5	23.5	23.4	23.4	23.3	23.3	23.3
	MVA _r		4.3	2.6	3.0	1.7	2.6	2.1	3.1	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0
	10% POE	MVA	24.0	19.2	24.0	19.6	21.4	23.8	23.8	23.8	23.7	23.7	23.6	23.6	23.5	23.5	23.5
	PF		0.984	0.991	0.992	0.994	0.992	0.996	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	MW		23.7	19.0	23.8	19.5	21.3	23.7	23.6	23.6	23.5	23.5	23.4	23.4	23.3	23.3	23.3
	MVA _r		4.3	2.6	3.0	1.7	2.6	2.1	3.1	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0
	50% POE	MVA	24.0	19.2	24.0	19.6	21.4	23.8	23.8	23.8	23.7	23.7	23.6	23.6	23.5	23.5	23.5
	PF		0.984	0.991	0.992	0.994	0.992	0.996	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	Actual	MVA	14.5	23.7	26.5	25.5	19.1	27.3									
Diversified (Meter)	MW		14.3	23.4	26.1	25.1	18.8	26.9	22.7	22.7	22.6	22.6	22.5	22.5	22.4	22.4	22.4
	MVA _r		2.5	4.1	4.6	4.4	3.3	4.7	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.9	3.9
	10% POE	MVA	14.5	23.7	26.5	25.5	19.1	27.3	23.1	23.0	23.0	22.9	22.9	22.8	22.8	22.7	22.7
	PF		0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	MW		14.3	23.4	26.1	25.1	18.8	26.9	22.7	22.7	22.6	22.6	22.5	22.5	22.4	22.4	22.4
	MVA _r		2.5	4.1	4.6	4.4	3.3	4.7	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.9	3.9
	50% POE	MVA	14.5	23.7	26.5	25.5	19.1	27.3	23.1	23.0	23.0	22.9	22.9	22.8	22.8	22.7	22.7
	PF		0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985

3.16 Liverpool 132kV TS Demand Forecast

Discussion

Liverpool 132kV is supplied from TransGrid's Liverpool BSP and is the point from which Endeavour Energy takes 132kV bulk supply for the Liverpool area.

Denham Court TS is supplied by feeder 93Y from Liverpool 132kV and supplies the South West Rail Link - HVC and Endeavour Energy's Edmondson Park ZS at 33kV. Denham Court's forecast is shown on Denham Court TS.

Abbotsbury ZS is supplied by 93W from Liverpool 132kV with alternate supply from 93U Sydney West BSP.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Abbotsbury	2 x 45 (132/11)	90
Denham Court	1 x 60 (132/33)	60

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

No Spot Loads Proposed at this location

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Liverpool 132kV TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Abbotsbury	Actual MVA				25.6	38.9	42.7										
	MW				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
	MVA _r				7.9	12.0	12.4	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1	19.1
	10% POE MVA				25.6	38.9	42.7	45.2	45.0	44.7	44.5	44.3	44.1	43.9	43.8	43.8	43.8
	PF				0.951	0.951	0.957	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	50% POE MW				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
	MVA _r				7.9	12.0	12.4	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1	19.1
	10% POE MVA				25.6	38.9	42.7	45.2	45.0	44.7	44.5	44.3	44.1	43.9	43.8	43.8	43.8
	PF				0.951	0.951	0.957	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA				25.6	38.9	42.7										
Undiversified	MW				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
	MVA _r				7.9	12.0	12.4	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1	19.1
	10% POE MVA				25.6	38.9	42.7	45.2	45.0	44.7	44.5	44.3	44.1	43.9	43.8	43.8	43.8
	PF				0.951	0.951	0.957	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	50% POE MW				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
	MVA _r				7.9	12.0	12.4	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1	19.1
	10% POE MVA				25.6	38.9	42.7	45.2	45.0	44.7	44.5	44.3	44.1	43.9	43.8	43.8	43.8
	PF				0.951	0.951	0.957	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	50% POE MW				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
	MVA _r				7.9	12.0	12.4	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1	19.1
	10% POE MVA				25.6	38.9	42.7	45.2	45.0	44.7	44.5	44.3	44.1	43.9	43.8	43.8	43.8
	PF				0.951	0.951	0.957	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900

3.17 Liverpool TS Demand Forecast

Discussion

Endeavour Energy established Liverpool TS to improve supply security for the Liverpool region. It is supplied at 132kV from West Liverpool TS. It supplies 33kV to Anzac Village ZS, Canley Vale ZS, Casula ZS, Chipping Norton ZS, Liverpool ZS and Moorebank ZS. The Holsworthy Defence Base HVC is supplied from the Anzac Village ZS 33kV busbar.

Holsworthy ZS is proposed as future to cater for load growth resulting from the redevelopment of Defence land at Moorebank and will be supplied from Liverpool TS.

Redevelopment of the Liverpool CBD over the next 35 years will lead to the need to establish Collimore Park ZS. Collimore Park will mainly supply the core CBD area including the retail, commercial and health precincts. The high density residential and industrial sectors to the north and south of the CBD core and the urban areas beyond will continue to be serviced by Homepride ZS and Liverpool ZS.

An International Technology Park is proposed to be developed at the *Cable Makers* site adjacent to the Georges River on the Moorebank side of Liverpool CBD. This development will increase commercial and residential demand on Moorebank ZS.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Liverpool TS	3 x 120	360
Anzac Village	3 x 25	75
Casula	2 x 35	70
Canley Vale	3 x 25	75
Chipping Norton	2 x 35	70
Liverpool Zone	3 x 22/26/35	105
Moorebank	2 x 22/35 + 1 x 22/29/35	105

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Casula	UCL8553 Cross-Roads Hotel Expansion	2019	0.2	0.1	0.2
Casula	UML5167 188 Wonga Rd Lurnea	2018	0.1	0.1	0.2
Chipping Norton	UIL 4782	2019	1.8	0.9	2.0
Chipping Norton	UIL4848 Inglis Horse Centre	2018	2.6	1.3	2.9
Liverpool	UML7200 The Paper Mills Residential Towers 349 units + 2 commercial	2018	1.6	0.8	1.8
Moorebank	UIL5022	2018	0.6	0.3	0.6

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Anzac Village	Pleasure Point - 1234 Lot Release	2019	6	3.1
Anzac Village	UIL4692 - SIMTA - Moorebank Intermodal	2018	15	8.6
Anzac Village	UIL4834 - Moorebank Intermodal Company	2020	12	9.7
Casula	Glenfield Redevelopment Area of 470 Dwellings	2019	6	1.9
Casula	Glenfield Release Area of 500 lots	2014	5	2.0
Chipping Norton	URS 15696 New Brighton Gold Club Residential	2016	3	0.5
Chipping Norton	URS 15697 New Brighton Golf Club Residential	2016	3	0.3
Chipping Norton	URS 18382	2018	3	0.9
Chipping Norton	URS 6914 New Brighton Golf Club Residential	2015	3	0.8
Liverpool	Liverpool CBD South (City Centre Plan)	2011	35	50.0
Liverpool Military Area	Department of Defence - ULL2087	2017	10	7.0

Generation

No Generation known at this location

Configuration Changes

Year	Zone / HVC	From TS	To TS
2012	Liverpool	West Liverpool	Liverpool TS
2012	Moorebank	West Liverpool	Liverpool TS
2014	Anzac Village	West Liverpool	Liverpool TS
2015	Canley Vale	West Liverpool	Liverpool TS

Liverpool TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual				24.1	25.0	25.1	27.3										
Anzac Village	MVA																
	MW			27.4	27.8	25.3	23.9	23.9	24.1	24.7	26.0	27.6	29.3	31.1	33.0	34.9	36.5
	MVA			8.4	8.1	6.8	5.8	6.9	7.0	7.2	7.5	8.0	8.5	9.0	9.5	10.1	10.6
	10% POE			28.6	29.0	26.2	24.6	24.8	25.0	25.8	27.1	28.8	30.5	32.3	34.3	36.3	38.0
	PF			0.956	0.960	0.966	0.972	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	MW			24.6	25.1	22.4	20.9	20.8	21.0	21.7	23.0	24.6	26.3	28.1	30.0	31.9	33.5
	MVA			7.5	7.3	6.0	5.0	6.0	6.1	6.3	6.7	7.1	7.6	8.1	8.7	9.2	9.7
	50% POE			25.8	26.1	23.2	21.5	21.7	21.9	22.6	24.0	25.6	27.4	29.2	31.2	33.2	34.8
	PF			0.956	0.960	0.966	0.972	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
Actual					27.0	28.0	32.9										
Canley Vale	MVA																
	MW				27.5	27.6	28.3	28.1	28.0	27.8	27.7	27.6	27.5	27.4	27.3	27.3	27.3
	MVA				3.1	3.5	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.7	1.7
	10% POE				27.7	27.8	28.3	28.2	28.1	27.9	27.8	27.6	27.5	27.4	27.3	27.4	27.4
	PF				0.994	0.992	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
	MW				25.6	25.6	25.5	25.4	25.2	25.1	24.9	24.8	24.7	24.6	24.5	24.5	24.6
	MVA				2.9	3.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	50% POE				25.7	25.8	25.6	25.4	25.3	25.1	25.0	24.9	24.7	24.6	24.5	24.6	24.6
	PF				0.994	0.992	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Actual					18.9	23.7	30.2	33.1									
Casula	MVA																
	MW				18.1	22.5	29.2	32.1	32.2	32.3	32.4	32.7	32.9	33.1	33.0	33.0	33.0
	MVA				5.4	7.5	7.9	8.0	8.0	8.1	8.1	8.2	8.2	8.3	8.3	8.2	8.3
	10% POE				18.9	23.7	30.2	33.1	33.2	33.3	33.4	33.7	34.0	34.1	34.1	34.0	34.0
	PF				0.958	0.949	0.965	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	MW				18.1	22.5	29.2	32.1	32.2	32.3	32.4	32.7	32.9	33.1	33.0	33.0	33.0
	MVA				5.4	7.5	7.9	8.0	8.0	8.1	8.1	8.2	8.2	8.3	8.3	8.2	8.3
	50% POE				18.9	23.7	30.2	33.1	33.2	33.3	33.4	33.7	34.0	34.1	34.1	34.0	34.0
	PF				0.958	0.949	0.965	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Actual					6.5	16.8	19.9	21.2									
Chipping Norton	MVA																
	MW				6.3	16.1	19.0	20.5	22.9	24.8	24.9	24.8	24.8	24.7	24.7	24.7	24.7
	MVA				1.6	4.9	6.0	5.5	6.2	6.7	6.7	6.7	6.7	6.7	6.6	6.7	6.7
	10% POE				6.5	16.8	19.9	21.2	23.7	25.7	25.8	25.7	25.7	25.6	25.6	25.5	25.6
	PF				0.969	0.957	0.954	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
	MW				6.3	16.1	19.0	20.5	22.9	24.8	24.9	24.8	24.8	24.7	24.7	24.7	24.7
	MVA				1.6	4.9	6.0	5.5	6.2	6.7	6.7	6.7	6.7	6.7	6.6	6.7	6.7
	50% POE				6.5	16.8	19.9	21.2	23.7	25.7	25.8	25.7	25.7	25.6	25.6	25.5	25.6
	PF				0.969	0.957	0.954	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
Actual					0.9	7.9	8.0										
Liverpool Military Area	MVA																
	MW				0.9	7.6	8.0	8.3	8.8	9.5	10.4	11.3	12.0	12.5	12.8	12.9	12.9
	MVA				0.3	2.5	0.0	4.0	4.3	4.6	5.0	5.5	5.8	6.1	6.2	6.3	6.3
	10% POE				0.9	7.9	8.0	9.2	9.8	10.6	11.6	12.6	13.4	13.9	14.3	14.4	14.4
	PF				0.950	0.950	1.000	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Major customer	MW				0.9	7.6	8.0	8.3	8.8	9.5	10.4	11.3	12.0	12.5	12.8	12.9	12.9
	MVA				0.3	2.5	0.0	4.0	4.3	4.6	5.0	5.5	5.8	6.1	6.2	6.3	6.3
	50% POE				0.9	7.9	8.0	9.2	9.8	10.6	11.6	12.6	13.4	13.9	14.3	14.4	14.4
	PF				0.950	0.950	1.000	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Actual					43.0	50.9	34.5	34.7	37.5	38.0							
Liverpool	MVA																
	MW				51.2	49.9	36.2	40.2	37.2	39.5	40.4	41.5	42.8	44.1	45.7	47.3	53.4
	MVA				16.3	10.1	6.4	5.9	5.6	8.5	8.7	9.0	9.3	9.6	9.9	10.2	11.6
	10% POE				53.7	50.9	36.8	40.6	40.5	38.5	40.4	41.3	42.5	43.7	45.2	46.7	54.6
	PF				0.953	0.980	0.985	0.990	0.990	0.966	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW				47.2	45.4	33.8	36.6	37.3	36.3	37.3	38.4	39.6	41.0	42.5	44.2	50.3
	MVA				15.0	9.2	5.9	5.3	5.2	7.9	8.1	8.3	8.6	8.9	9.2	9.6	10.9
	50% POE				49.5	46.3	34.3	37.0	37.7	35.3	37.1	38.1	39.2	40.5	41.9	43.5	51.4
	PF				0.953	0.980	0.985	0.990	0.990	0.966	0.977	0.977	0.977	0.977	0.977	0.977	0.977
Actual					39.2	39.1	34.4	26.5	27.5	30.5							
Moorebank	MVA																
	MW				36.0	37.2	32.4	26.5	30.5	30.9	30.9	30.9	30.9	30.9	30.8	30.8	30.8
	MVA				15.5	12.1	14.2	1.5	0.2	8.6	8.6	8.6	8.6	8.6	8.5	8.5	8.5
	10% POE				39.2	39.1	35.4	26.5	27.5	30.5	32.1	32.1	32.1	32.1	32.0	32.0	32.0
	PF				0.918	0.951	0.916	0.998	0.998	1.000	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	MW				36.0	37.2	32.4	26.5	30.5	30.9	30.9	30.9	30.9	30.9	30.8	30.8	30.8
	MVA				15.5	12.1	14.2	1.5	0.2	8.6	8.6	8.6	8.6	8.6	8.5	8.5	8.5
	50% POE				39.2	39.1	35.4	26.5	27.5	30.5	32.1	32.1	32.1	32.1	32.0	32.0	32.0
	PF				0.918	0.951	0.916	0.998	0.998	1.000	0.964	0.964	0.964	0.964	0.964	0.964	0.964
Actual					82.2	90.0	118.5	154.7	176.3	191.0							
Undiversified	MVA																
	MW				87.2	87.0	120.5	161.5	176.2	185.5	189.3	191.8	195.3	199.3	203.1	206.9	218.7
	MVA				31.8	22.2	36.0	31.2	33.8	31.2	44.0	45.0	45.8	46.9	48.2	49.3	53.5
	10% POE				93.0	90.0	126.2	165.3	180.1	184.2	191.6	195.3	197.9	201.6	205.8	209.9	225.9
	PF				0.938	0.967	0.954	0.977	0.978	0.980	0.970	0.969	0.969	0.969	0.968	0.968	0.968
	MW				83.2	82.5	115.3	153.2	168.5	171.6	176.9	180.3	182.8	186.4	190.4	194.2	209.7
	MVA				30.5	21.3	34.7	29.6	32.4	29.4	42.2	43.3	44.1	45.2	46.5	47.6	51.8
	50% POE				88.8	85.4	120.9	156.8	172.3	175.1	182.5	186.1	188.8	192.5	196.7	200.7	216.8
	PF				0.938	0.967	0.954	0.977	0.978	0.980	0.969	0.969	0.969	0.968	0.968	0.967	0.967

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	75.3	86.4	107.7	145.2	169.5	177.6									
Diversified	MW	102.7	87.6	113.0	147.7	171.1	157.0	165.9	169.0	171.2	174.4	177.9	181.4	184.7	188.1	191.8	195.2
	MVA _r	30.3	0.6	30.2	38.2	29.7	23.9	25.2	25.7	26.0	26.5	27.1	27.6	28.1	28.6	29.2	29.7
	10% POE	MVA	107.1	87.6	116.9	152.6	173.6	158.8	167.8	170.9	173.2	176.4	180.0	183.5	186.8	190.3	194.0
	PF	0.959	1.000	0.966	0.968	0.985	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
50% POE	MW	83.9	77.3	102.8	137.7	157.6	146.0	157.9	161.0	163.3	166.4	170.0	173.4	176.7	180.2	183.9	187.3
	MVA _r	24.7	0.5	27.5	35.6	27.3	22.2	24.0	24.5	24.8	25.3	25.8	26.4	26.9	27.4	28.0	28.5
	MVA	87.5	77.3	106.4	142.2	159.9	147.7	159.8	162.9	165.1	168.3	171.9	175.4	178.8	182.2	186.0	189.4
	PF	0.959	1.000	0.966	0.968	0.985	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989

3.18 Macarthur 66kV Demand Forecast

Discussion

Macarthur BSP is a 330/132/66kV TransGrid substation which was established to supply Nepean TS at 132kV and 66kV. The existing 132kV lines into Nepean TS from Sydney West BSP 93X and West Liverpool TS 93Y will be used to provide supply into the future South West Sector development.

Major customer substations at Appin Top Pit, Appin Colliery, BHP Douglas Park, Tower Colliery, Westcliff Colliery, Appin and Broughton Pass ZSs are now being supplied from Macarthur 66kV.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Ambarvale	2 x 21/26/35	70
Appin	1 x 15	15
Broughton Pass	2 x 12.5/17.5	35
Campbelltown	2 x 22/26/35 + 1 x 22/35	105
Kentlyn	2 x 20/27/33	66

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Ambarvale	Mt Gilead Commercial Area	2025	0.1	0.3	0.3
Ambarvale	Mt Gilead Commercial Area	2026	0.1	0.3	0.3
Ambarvale	Mt Gilead Commercial Area	2028	0.1	0.3	0.3
Ambarvale	Mt Gilead initial development 1700 lots	2019	0.4	0.2	0.4
Ambarvale	Mt Gilead initial development 1700 lots	2020	1.3	0.6	1.4
Ambarvale	Mt Gilead initial development 1700 lots	2021	1.3	0.6	1.4
Ambarvale	Mt Gilead initial development 1700 lots	2023	1.3	0.6	1.4
Ambarvale	NUL0555 Fitzpatrick St Menangle Park	2017	0.5	0.3	0.6
Campbelltown	UCL8080 extensions to a car yard.	2018	0.5	0.2	0.6
Campbelltown	UIL5014 industrial development in Hephher St Campbelltown.	2018	0.9	0.4	1.0
Campbelltown	UML6889 92 unit & commercial shops in Broughton St Campbelltown.	2017	0.5	0.3	0.6
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2024	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2025	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2026	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2027	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2028	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2029	1.3	0.6	1.4

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Ambarvale	URS13950 & URS 13951 - 201 lots at Menangle Park	2020	2	0.8
Campbelltown	Claymore redevelopment - 247 lots	2019	3	0.8
Campbelltown	Macarthur Gardens residential development. 360 lots/dwellings	2020	5	1.2
Campbelltown	UWS residential development 850 residential lots	2020	5	2.8
Kentlyn	Airds renewal- 653 dwellings demolished, 982 lots in total net increase 339 lots	2017	10	1.1
SW Sector Macarthur 66	20 Ha commercial Menangle Park Development area	2019	15	1.5
SW Sector Macarthur 66	28 Ha industrial Menangle Park Development area	2019	15	2.5
SW Sector Macarthur 66	4,320 lots in the Menangle Park Development area	2019	15	31.3

Generation

Zone Substation	Name	Description	Date
Nepean 66kV	Appin Colliery (EDL)	54 x 1MW (methane extraction - export to 66kV network)	Installed
Nepean 66kV	WestCliff Colliery	1 x 6MW	Installed
Nepean 66kV	Tower Colliery	40 x 1MW (methane extraction - export to 66kV network)	Installed
Nepean 66kV	Tahmoor Colliery	1 x 7MW (methane extraction - export to 66kV network)	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2016	Appin	Nepean 66kV	Macarthur 66kV
2016	Appin Top Pit	Nepean 66kV	Macarthur 66kV
2016	Appin Colliery	Nepean 66kV	Macarthur 66kV
2016	BHP Douglas Park	Nepean 66kV	Macarthur 66kV
2016	Broughton Pass	Nepean 66kV	Macarthur 66kV
2016	Tower Colliery	Nepean 66kV	Macarthur 66kV
2016	Westcliff Colliery	Nepean 66kV	Macarthur 66kV

Macarthur 66kV Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Ambarvale	Actual	MVA	20.1	32.5	24.5	26.6	25.1	26.4									
	MW	29.9	29.0	29.3	29.8	28.6	26.0	25.8	26.0	27.3	28.6	28.5	29.5	29.3	29.5	29.7	29.7
	MVA _r	1.7	4.5	2.9	2.7	2.2	2.1	2.5	2.6	2.7	2.8	2.8	2.9	2.9	2.9	2.9	2.9
	10% POE	MVA	30.0	29.4	29.5	29.9	28.7	26.0	26.2	27.4	28.7	28.6	29.6	29.5	29.6	29.8	29.8
	PF	0.998	0.988	0.995	0.996	0.997	0.997	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	MW	25.6	24.7	25.0	25.5	24.4	22.2	22.0	22.2	23.5	24.8	24.7	25.7	25.5	25.7	25.9	25.8
	MVA _r	1.5	3.8	2.5	2.3	1.9	1.8	2.2	2.2	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.5
	50% POE	MVA	25.6	25.0	25.1	25.6	24.4	22.1	22.3	23.6	24.9	24.8	25.8	25.7	25.8	26.0	26.0
	PF	0.998	0.988	0.995	0.996	0.997	0.997	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
Appin	Actual	MVA				6.3	6.7										
	MW					4.7	5.1	5.0	5.0	5.0	4.9	4.9	4.9	4.8	4.8	4.8	4.8
	MVA _r					1.6	1.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8
	10% POE	MVA				4.9	5.3	5.4	5.4	5.3	5.3	5.2	5.2	5.2	5.1	5.1	5.1
	PF					0.946	0.957	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
	MW					4.1	4.4	4.4	4.4	4.3	4.3	4.2	4.2	4.2	4.2	4.1	4.1
	MVA _r					1.4	1.3	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	50% POE	MVA				4.4	4.6	4.7	4.7	4.6	4.6	4.6	4.5	4.5	4.5	4.4	4.4
	PF					0.946	0.957	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
Appin Top Pit Major customer – HVC 20488	Actual	MVA				4.7	4.5										
	MW					3.9	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	MVA _r					2.7	3.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	10% POE	MVA				4.7	4.7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	PF					0.828	0.766	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.822
	MW					3.9	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	MVA _r					2.7	3.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	50% POE	MVA				4.7	4.7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	PF					0.828	0.766	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.822
Appin Colliery Major customer – HVC 13308	Actual	MVA				6.5	7.1										
	MW					5.9	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	MVA _r					2.7	3.0	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	10% POE	MVA				6.5	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
	PF					0.907	0.904	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894
	MW					5.9	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	MVA _r					2.7	3.0	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	50% POE	MVA				6.5	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
	PF					0.907	0.904	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894
BHP Douglas Park Major customer – HVC 26553	Actual	MVA				11.6	12.0										
	MW					11.3	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	MVA _r					2.9	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	10% POE	MVA				11.6	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	PF					0.968	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
	MW					11.3	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	MVA _r					2.9	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	50% POE	MVA				11.6	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	PF					0.968	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
Broughton Pass Major customer	Actual	MVA				4.9	5.0										
	MW					4.7	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	MVA _r					1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	10% POE	MVA				4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	PF					0.956	0.953	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
	MW					4.7	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	MVA _r					1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	50% POE	MVA				4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	PF					0.956	0.953	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
Campbelltown	Actual	MVA	48.9	59.7	50.7	50.8	53.5	54.4									
	MW	53.1	56.5	56.1	54.6	56.1	54.0	55.1	55.2	55.7	56.6	57.7	58.5	58.8	58.9	59.3	59.7
	MVA _r	25.7	17.3	6.0	15.8	5.7	5.2	10.1	10.1	10.2	10.4	10.6	10.7	10.8	10.8	10.9	10.9
	10% POE	MVA	59.0	59.1	56.4	56.9	56.4	56.0	56.1	56.6	57.5	58.7	59.5	59.8	59.9	60.3	60.6
	PF	0.900	0.956	0.994	0.961	0.995	0.995	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
	MW	49.5	52.8	52.4	51.0	52.3	50.4	51.5	51.5	52.1	52.9	54.1	54.9	55.2	55.3	55.7	56.0
	MVA _r	24.0	16.2	5.6	14.7	5.3	4.9	9.4	9.4	9.5	9.7	9.9	10.0	10.1	10.1	10.2	10.3
	50% POE	MVA	55.0	55.3	52.7	53.1	52.5	52.3	52.4	52.9	53.8	55.0	55.8	56.1	56.2	56.6	57.0
	PF	0.900	0.956	0.994	0.961	0.995	0.995	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	22.5	29.0	24.7	28.0	33.1	38.8									
Kentlyn	MW	29.7	28.2	28.6	28.7	30.0	31.4	31.3	31.2	31.1	31.1	31.0	31.0	30.9	30.9	30.9	30.9
	MVAr	2.0	3.4	2.5	5.0	7.7	7.6	5.4	5.4	5.4	5.4	5.4	5.4	5.3	5.3	5.3	5.3
	10% POE	MVA	29.8	28.4	28.7	29.2	30.9	32.3	31.7	31.6	31.5	31.5	31.5	31.4	31.3	31.3	31.3
	PF	0.998	0.993	0.996	0.985	0.969	0.972	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
50% POE	MW	26.9	25.4	25.9	26.0	26.9	28.0	27.9	27.8	27.7	27.7	27.6	27.6	27.5	27.5	27.5	27.5
	MVAr	1.8	3.0	2.3	4.6	6.9	6.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.7	4.7	4.7
	MVA	27.0	25.6	26.0	26.4	27.8	28.8	28.3	28.2	28.1	28.1	28.1	28.0	27.9	27.9	27.9	27.9
	PF	0.998	0.993	0.996	0.985	0.969	0.972	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
Actual		MVA															
South West Sector	MW								0.2	0.9	2.0	3.6	5.6	9.1	13.1	17.3	21.3
	MVAr								0.1	0.4	1.0	1.7	2.7	4.4	6.3	8.4	10.3
	10% POE	MVA							0.3	1.0	2.3	4.0	6.3	10.1	14.5	19.3	23.7
	PF								0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
50% POE	MW								0.2	0.9	2.0	3.6	5.6	9.1	13.1	17.3	21.3
	MVAr								0.1	0.4	1.0	1.7	2.7	4.4	6.3	8.4	10.3
	MVA								0.3	1.0	2.3	4.0	6.3	10.1	14.5	19.3	23.7
	PF								0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Actual		MVA				5.2	5.0										
Tower Colliery Major customer – HVC 13367	MW					4.1	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	MVAr					3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	10% POE	MVA				5.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	PF					0.770	0.746	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744
50% POE	MW					4.1	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	MVAr					3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	MVA					5.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	PF					0.770	0.746	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744
Actual		MVA				18.3	15.3										
Westcliff Colliery Major customer – HVC 13368	MW					16.0	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2
	MVAr					8.8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	10% POE	MVA				18.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
	PF					0.877	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931
50% POE	MW					16.0	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2
	MVAr					8.8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	MVA					18.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
	PF					0.877	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931
Actual		MVA	91.6	121.2	99.9	105.4	169.2	175.0									
Undiversified	MW	112.8	113.7	114.0	113.2	165.2	160.6	161.4	161.5	164.1	167.4	169.9	173.6	177.2	181.3	186.1	190.4
	MVAr	29.4	25.2	11.5	23.6	39.1	36.3	39.5	39.5	40.1	40.9	41.8	43.1	44.8	46.7	48.8	50.8
	10% POE	MVA	118.8	116.8	114.6	116.0	172.3	166.9	167.9	168.0	170.7	174.1	176.8	180.8	184.7	189.3	194.6
	PF	0.949	0.973	0.995	0.976	0.959	0.962	0.962	0.962	0.961	0.961	0.961	0.961	0.959	0.958	0.957	0.955
50% POE	MW	102.0	102.9	103.2	102.4	153.5	149.1	149.9	150.0	152.6	155.9	158.4	162.1	165.7	169.8	174.7	178.9
	MVAr	27.2	23.1	10.4	21.6	37.4	34.6	37.6	37.6	38.2	39.0	40.0	41.2	42.9	44.8	47.0	48.9
	MVA	107.6	105.8	103.8	105.0	160.5	155.3	156.2	156.3	159.0	162.4	165.1	169.1	173.0	177.6	182.9	187.6
	PF	0.948	0.973	0.995	0.975	0.957	0.960	0.960	0.960	0.960	0.960	0.959	0.959	0.958	0.956	0.955	0.954
Actual		MVA	89.4	110.4	105.3	110.5	142.0	173.2									
Diversified	MW	124.3	105.7	104.1	141.6	138.0	152.5	150.3	150.4	152.8	155.8	158.2	161.7	165.0	168.8	173.3	177.3
	MVAr		0.0	0.0	0.1	0.0	39.9	15.7	15.7	16.0	16.3	16.5	16.9	17.2	17.6	18.1	18.5
	10% POE	MVA	124.3	105.7	104.1	141.6	138.0	151.1	151.2	153.6	156.7	159.0	162.5	165.9	169.7	174.3	178.2
	PF	1.000	1.000	1.000	1.000	1.000	0.968	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
50% POE	MW	110.2	95.5	95.4	125.3	120.1	142.0	139.6	139.7	142.1	145.1	147.5	151.0	154.3	158.1	162.6	166.6
	MVAr		0.0	0.0	0.1	0.0	37.1	14.6	14.6	14.8	15.2	15.4	15.8	16.1	16.5	17.0	17.4
	MVA	110.2	95.5	95.4	125.3	120.1	146.8	140.4	140.4	142.9	145.9	148.3	151.8	155.1	159.0	163.5	167.5
	PF	1.000	1.000	1.000	1.000	1.000	0.968	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
Generation*	MW							-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7
	MVAr							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10% POE	MVA						-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7
	PF							1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Max generation output		MVA						-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7
		PF						1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Note: * Generation is shared between Macarthur & Nepean it is assumed that 1/3 of the generation is consumed by Nepean with the remaining 2/3 of generation being consumed by Macarthur

3.19 Macarthur 132kV Demand Forecast

Discussion

Macarthur BSP is a 330/132/66kV TransGrid substation which was established to supply Nepean TS at 132kV and 66kV. Macarthur BSP will provide capacity for part of the South West Growth Sector including Oran Park, Catherine Field, Maryland, Bringelly, and Leppington.

Demand growth in the South West Sector will dictate the need for a 132kV busbar at Transgrid's Kemps Creek BSP to supply the northern half of the growth sector, the Broader Western Sydney Employment Area (BWSEA) and the Western Sydney Airport (WSA).

Catherine Field ZS is proposed to be established to supply the new Catherine Field precinct and will be supplied from Macarthur.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Catherine Field	Proposed	NA
Oran Park	2 x 45	90
North Leppington	2 x 45	90
South Leppington	1 x 45	45

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2019	South Leppington	Macarthur 132kV	North Leppington	Macarthur 132kV	3.90

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
AWS Data	UIL4375 AWS Data Centre	2018	4.1	2.0	4.5
AWS Data	UIL4375 AWS Data Centre	2019	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2020	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2021	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2022	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2023	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2024	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2025	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2026	4.2	2.0	4.7
Oran Park	NCL1277 Retirement village extension in Merrin Cl Cobbitty.	2019	0.5	0.2	0.6
Oran Park	ULL2642 New high school in Oran Park	2019	0.9	0.4	1.0
South Leppington	Leppington Precinct	2018	0.3	0.1	0.3
South Leppington	Leppington Precinct	2019	0.3	0.1	0.3
South Leppington	Leppington Precinct	2020	0.4	0.2	0.5
South Leppington	Leppington Precinct	2021	0.6	0.3	0.6
South Leppington	Leppington Precinct	2022	0.7	0.3	0.8
South Leppington	Leppington Precinct	2023	0.7	0.3	0.8
South Leppington	Leppington Precinct	2024	0.7	0.3	0.8
South Leppington	Leppington Precinct	2025	0.7	0.3	0.8
South Leppington	Leppington Precinct	2026	0.7	0.3	0.8
South Leppington	UCL8209 - Shopping Centre	2018	1.4	0.7	1.5
South Leppington	UML7687 - 673 Units (Leppington)	2019	2.8	1.4	3.1

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
North Leppington	Leppington Town Centre Commercial	2021	30	25.0
North Leppington	Leppington Town Centre Residential	2021	30	67.5
North Leppington	North Leppington Precinct Residential	2020	30	50.0
Oran Park	Bringelly, Lowes Creek, Maryland 7000 Lots. 1000 supplied from Oran Park ZS initially.	2021	5	5.0
Oran Park	Catherine Park Development 3229 lots	2017	10	16.2
Oran Park	Oran Park 7,500 lots	2010	15	30.0
South Leppington	Emerald Hills Estate 1390 lots	2016	5	5.6
South Leppington	Leppington Precinct - 1850 Lots	2017	10	7.4
South Leppington	North Leppington Release Area 800 units	2017	3	2.4
South Leppington	Willowdate Estate 4280 lots	2016	10	17.1
SW Sector Macarthur 132	Lowes Creek, Maryland Development - 2000 Lots	2021	5	8.0

Generation

No Generation known at this location

Configuration Changes

Year	Zone / HVC	From TS	To TS
2017	Oran Park	Sydney West 132kV	Macarthur 132kV

Macarthur 132kV Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
AWS Data	Actual MVA																
	MW							3.4	7.0	10.5	14.1	17.7	21.2	24.8	28.4	31.9	31.9
	MVA _r							1.1	2.3	3.5	4.6	5.8	7.0	8.1	9.3	10.5	10.5
	10% POE MVA							3.6	7.4	11.1	14.9	18.6	22.4	26.1	29.9	33.6	33.6
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
50% POE	MW							3.4	7.0	10.5	14.1	17.7	21.2	24.8	28.4	31.9	31.9
	MVA _r							1.1	2.3	3.5	4.6	5.8	7.0	8.1	9.3	10.5	10.5
	MVA							3.6	7.4	11.1	14.9	18.6	22.4	26.1	29.9	33.6	33.6
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA						11.9										
Oran Park	MW						11.8	15.1	19.6	23.1	27.0	31.1	34.7	37.0	38.0	38.3	38.2
	MVA _r						1.8	5.0	6.5	7.6	8.9	10.2	11.4	12.2	12.5	12.6	12.6
	10% POE MVA						11.9	15.9	20.7	24.3	28.4	32.7	36.6	39.0	40.0	40.3	40.2
	PF						0.989	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
50% POE	MW						11.8	15.1	19.6	23.1	27.0	31.1	34.7	37.0	38.0	38.3	38.2
	MVA _r						1.8	5.0	6.5	7.6	8.9	10.2	11.4	12.2	12.5	12.6	12.6
	MVA						11.9	15.9	20.7	24.3	28.4	32.7	36.6	39.0	40.0	40.3	40.2
	PF						0.989	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
North Leppington	MW							10.8	10.9	11.3	12.2	13.6	15.4	17.8	20.6	23.9	
	MVA _r							3.6	3.6	3.7	4.0	4.5	5.1	5.8	6.8	7.9	
	10% POE MVA							11.4	11.5	11.9	12.9	14.3	16.3	18.7	21.7	25.1	
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	
	Actual MVA																
50% POE	MW							10.8	10.9	11.3	12.2	13.6	15.4	17.8	20.6	23.9	
	MVA _r							3.6	3.6	3.7	4.0	4.5	5.1	5.8	6.8	7.9	
	MVA							11.4	11.5	11.9	12.9	14.3	16.3	18.7	21.7	25.1	
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	
	Actual MVA																
South Leppington	MW				3.7	4.2	6.0										
	MVA _r				1.6	1.1	1.4	11.5	14.3	18.2	22.1	25.7	28.4	30.4	31.6	32.3	32.3
	10% POE MVA				3.7	4.2	6.0	11.8	14.7	18.7	22.7	26.3	29.2	31.2	32.5	33.2	33.2
	PF				0.903	0.964	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
	Actual MVA																
50% POE	MW				3.7	4.2	6.0	11.5	14.3	18.2	22.1	25.7	28.4	30.4	31.6	32.3	32.3
	MVA _r				1.6	1.1	1.4	2.7	3.3	4.2	5.2	6.0	6.6	7.1	7.4	7.5	7.5
	MVA				3.7	4.2	6.0	11.8	14.7	18.7	22.7	26.3	29.2	31.2	32.5	33.2	33.2
	PF				0.903	0.964	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
	Actual MVA																
South West Sector	MW										0.5	1.8	3.9	5.3	5.8	5.8	5.8
	MVA _r										0.2	0.9	1.9	2.6	2.8	2.8	2.8
	10% POE MVA										0.5	2.0	4.4	5.9	6.4	6.4	6.4
	PF										0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA																
50% POE	MW										0.5	1.8	3.9	5.3	5.8	5.8	5.8
	MVA _r										0.2	0.9	1.9	2.6	2.8	2.8	2.8
	MVA										0.5	2.0	4.4	5.9	6.4	6.4	6.4
	PF										0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA																
Undiversified	MW				3.7	4.2	17.9										
	MVA _r				1.6	1.1	3.1	30.0	51.8	62.8	75.0	88.5	101.9	112.9	121.5	128.9	132.1
	10% POE MVA				3.7	4.2	17.9	31.3	54.1	65.7	78.5	92.6	106.7	118.4	127.4	135.1	138.6
	PF				0.903	0.964	0.984	0.959	0.957	0.957	0.957	0.956	0.955	0.954	0.954	0.954	0.953
	Actual MVA																
50% POE	MW				3.7	4.2	17.9	30.0	51.8	62.8	75.0	88.5	101.9	112.9	121.5	128.9	132.1
	MVA _r				1.6	1.1	3.1	8.8	15.6	18.9	22.6	26.9	31.4	35.0	37.8	40.1	41.2
	MVA				3.7	4.2	17.9	31.3	54.1	65.7	78.5	92.6	106.7	118.4	127.4	135.1	138.6
	PF				0.903	0.964	0.984	0.959	0.957	0.957	0.957	0.956	0.955	0.954	0.954	0.954	0.953
	Actual MVA																

3.20 Mount Druitt TS Demand Forecast

Discussion

Mount Druitt TS has three 120 MVA 132/33kV transformers providing a firm capacity of 240MVA. Mount Druitt TS supplies Plumpton, Werrington, Claremont Meadows, Whalan, St Marys and Horsley Park zone substations.

The main load growth within the Mount Druitt TS supply area is within the Caddens release area. The Caddens release area is to be supplied by Claremont Meadows ZS. Proposed industrial development in the Horsley Park and Oakdale precincts will see increasing demand on Horsley Park ZS.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Mt Druitt	3 x 120	360
Claremont Meadows	3 x 25	75
Horsley Park	2 x 15/17.5/25	50
Plumpton	3 x 15/19/25	75
St Marys	2 x 15/25 + 1 x 15/19	69
Werrington	3 x 22/35	105
Whalan	3 x 25	75

Proposed Load Transfers

There are no planned future spot loads at this location.

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Claremont Meadows	NCL1275	2019	0.1	0.1	0.2
Claremont Meadows	UML6444 - 22 Residential Apartments - Mamre, Rd St Marys	2019	0.1	0.04	0.1
Claremont Meadows	URS15582	2018	0.9	0.4	1.0
Claremont Meadows	URS16676	2018	0.1	0.04	0.1
Claremont Meadows	URS18021	2019	0.8	0.4	0.9
Claremont Meadows	URS18276	2018	0.6	0.3	0.6
Claremont Meadows	URS18310 - 51 Lot Subdivision - Caddens Rd, Claremont Meadows	2020	0.2	0.1	0.2
Claremont Meadows	URS18475	2020	0.6	0.3	0.7
Claremont Meadows	URS19116	2019	0.2	0.1	0.3
Horsley Park	NRS2563	2018	0.01	0.004	0.01
Horsley Park	UCL 5967	2018	0.8	0.4	0.9
St Marys	UML7508	2019	0.05	0.02	0.1
Werrington	UCL8260	2018	0.1	0.03	0.1
Werrington	UCL8334	2018	0.9	0.4	1.0
Werrington	UIL4527	2018	0.2	0.1	0.2
Werrington	UIL4640	2018	0.3	0.2	0.4
Werrington	UIL4768	2019	0.3	0.1	0.3
Werrington	UIL4830	2018	0.9	0.4	1.0
Werrington	UIL4918	2019	0.4	0.2	0.4
Werrington	UIL5064	2019	0.5	0.3	0.6
Werrington	UIL5122	2019	0.2	0.1	0.2
Werrington	UML6759	2019	0.2	0.1	0.2
Werrington	UML7570	2018	0.2	0.1	0.2
Whalan	UCL7714 - 48 Carlisle Avenue MOUNT DRUITT	2018	0.5	0.2	0.5
Whalan	UML5535 - Ayres Grove	2018	0.3	0.1	0.3
Whalan	UML6802	2017	0.3	0.1	0.3

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Claremont Meadows	Caddens Rd Release	2014	6	2.7
Claremont Meadows	Claremont Meadows Stage 2	2016	5	0.8
Werrington	UML5843-5	2017	3	0.3

Generation

Substation	Name	Description	Date
Mount Druitt	LMS Generation	8x1.35MW - East Wallgrove (Co-gen plant eastern creek waste management centre)	Installed

Mount Druitt TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Claremont Meadows	Actual MVA			24.0	22.9	28.8	30.3										
	MW	#N/A	#N/A	23.8	22.8	28.7	30.2	32.0	33.3	33.9	33.7	33.6	33.5	33.5	33.4	33.4	33.5
	MVAr			3.2	2.5	3.1	2.5	3.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	10% POE MVA			24.0	22.9	28.8	30.3	32.2	33.5	34.1	33.9	33.8	33.7	33.7	33.6	33.6	33.7
	PF	#N/A	#N/A	0.991	0.994	0.994	0.997	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
	MW	#N/A	#N/A	23.8	22.8	28.7	30.2	32.0	33.3	33.9	33.7	33.6	33.5	33.5	33.4	33.4	33.5
	MVAr			3.2	2.5	3.1	2.5	3.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	50% POE MVA			24.0	22.9	28.8	30.3	32.2	33.5	34.1	33.9	33.8	33.7	33.7	33.6	33.6	33.7
	PF	#N/A	#N/A	0.991	0.994	0.994	0.997	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
Horsley Park	Actual MVA	11.6	15.2	11.2	8.8	9.1	10.3										
	MW	11.8	10.2	10.6	9.5	10.1	9.0	9.6	9.6	9.6	9.5	9.5	9.4	9.4	9.4	9.3	9.3
	MVAr	3.2	2.0	1.9	3.3	1.2	1.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	10% POE MVA	12.3	10.4	10.8	10.1	10.1	9.1	9.9	9.8	9.8	9.7	9.7	9.7	9.6	9.6	9.6	9.6
	PF	0.964	0.982	0.984	0.945	0.993	0.990	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW	11.2	9.6	10.0	8.9	9.4	8.6	9.2	9.2	9.1	9.1	9.0	9.0	9.0	8.9	8.9	8.9
	MVAr	3.1	1.8	1.8	3.1	1.1	1.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	50% POE MVA	11.6	9.7	10.1	9.4	9.5	8.7	9.4	9.4	9.3	9.3	9.3	9.2	9.2	9.1	9.1	9.1
	PF	0.964	0.982	0.984	0.945	0.993	0.990	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
Plumpton	Actual MVA	24.5	30.8	29.5	31.1	32.7	36.1										
	MW	32.8	32.2	33.0	32.8	34.3	32.8	32.6	32.5	32.3	32.1	32.0	31.8	31.7	31.6	31.6	31.5
	MVAr	10.1	9.0	9.5	9.4	8.8	8.6	8.5	8.5	8.4	8.4	8.4	8.3	8.3	8.3	8.3	8.2
	10% POE MVA	34.3	33.5	34.3	34.1	35.4	33.9	33.7	33.5	33.4	33.2	33.0	32.9	32.8	32.6	32.6	32.6
	PF	0.956	0.963	0.961	0.962	0.969	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	MW	30.2	29.6	30.3	30.2	31.2	29.7	29.5	29.4	29.2	29.0	28.9	28.7	28.6	28.5	28.5	28.4
	MVAr	9.3	8.2	8.8	8.6	8.0	7.8	7.7	7.7	7.6	7.6	7.5	7.5	7.5	7.4	7.4	7.4
	50% POE MVA	31.6	30.7	31.6	31.4	32.2	30.7	30.5	30.3	30.2	30.0	29.8	29.7	29.5	29.4	29.4	29.4
	PF	0.956	0.963	0.961	0.962	0.969	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
Major customer	Actual MVA	7.0	7.4	7.1	7.2	7.5	7.3										
	MW	6.4	6.8	6.5	6.5	6.8	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
	MVAr	2.7	3.0	2.8	3.1	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	10% POE MVA	7.0	7.4	7.1	7.2	7.5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	PF	0.922	0.916	0.918	0.902	0.904	0.911	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912
	MW	6.4	6.8	6.5	6.5	6.8	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
	MVAr	2.7	3.0	2.8	3.1	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	50% POE MVA	7.0	7.4	7.1	7.2	7.5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	PF	0.922	0.916	0.918	0.902	0.904	0.911	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912
St Marys	Actual MVA	30.2	38.3	31.4	34.3	35.5	35.7										
	MW	38.7	37.9	37.0	36.4	38.8	33.7	33.5	33.4	33.3	33.2	33.0	32.9	32.8	32.7	32.7	32.7
	MVAr	5.1	11.5	10.9	10.0	4.2	3.3	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.2	7.2
	10% POE MVA	39.0	39.6	38.6	37.8	39.1	33.9	34.3	34.2	34.1	33.9	33.8	33.7	33.6	33.5	33.5	33.5
	PF	0.991	0.957	0.959	0.964	0.994	0.995	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW	35.6	34.8	33.9	33.3	35.4	30.7	30.5	30.4	30.3	30.1	30.0	29.9	29.8	29.7	29.7	29.7
	MVAr	4.7	10.6	10.0	9.1	3.8	3.0	6.7	6.7	6.6	6.6	6.5	6.5	6.5	6.5	6.5	6.5
	50% POE MVA	35.9	36.4	35.4	34.6	35.6	30.8	31.2	31.1	31.0	30.8	30.7	30.6	30.5	30.4	30.4	30.4
	PF	0.991	0.957	0.959	0.964	0.994	0.995	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
Werrington	Actual MVA	35.0	40.4	35.0	36.6	36.8	37.1										
	MW	38.9	39.1	38.7	37.5	38.2	37.1	39.3	40.6	40.5	40.4	40.3	40.3	40.2	40.1	40.2	40.3
	MVAr	5.9	5.1	0.3	14.8	7.9	2.9	8.6	8.9	8.9	8.9	8.9	8.9	8.8	8.8	8.9	8.9
	10% POE MVA	39.4	39.4	38.7	40.4	39.0	37.2	40.2	41.6	41.5	41.4	41.3	41.2	41.1	41.1	41.2	41.3
	PF	0.989	0.991	1.000	0.930	0.979	0.997	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW	36.5	36.7	36.3	35.1	35.8	34.5	36.7	38.0	37.9	37.8	37.7	37.7	37.6	37.5	37.6	37.7
	MVAr	5.6	4.8	0.2	13.9	7.4	2.7	8.1	8.4	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	50% POE MVA	36.9	37.0	36.3	37.8	36.6	34.6	37.5	38.9	38.8	38.7	38.6	38.6	38.5	38.4	38.5	38.6
	PF	0.989	0.991	1.000	0.930	0.979	0.997	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
Whalan	Actual MVA	28.1	36.5	32.8	32.7	32.9	32.8										
	MW	35.3	36.1	35.9	34.8	35.3	31.7	32.3	32.2	32.1	32.1	32.1	32.1	32.0	32.1	32.2	32.3
	MVAr	8.2	8.1	8.6	8.7	10.4	6.4	6.6	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.6
	10% POE MVA	36.2	37.0	36.9	35.9	36.8	32.4	32.9	32.8	32.8	32.7	32.7	32.7	32.7	32.7	32.8	33.0
	PF	0.974	0.976	0.973	0.970	0.959	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	MW	32.8	33.6	33.4	32.3	32.6	29.1	29.6	29.6	29.5	29.5	29.5	29.4	29.4	29.4	29.6	29.7
	MVAr	7.6	7.5	8.0	8.1	9.6	5.9	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	50% POE MVA	33.7	34.4	34.4	33.3	34.0	29.7	30.2	30.2	30.1	30.1	30.1	30.0	30.0	30.0	30.2	30.3
	PF	0.974	0.976	0.973	0.970	0.959	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Undiversified	Actual MVA	136.4	168.6	171.1	173.7	183.2	189.5										
	MW	164.0	162.3	185.6	180.4	192.1	181.1	186.0	188.2	188.2	187.7	187.1	186.6	186.2	185.9	186.1	186.3
	MVAr	35.3	38.7	37.2	51.8	38.8	28.0	39.7	40.0	40.0	39.9	39.8	39.7	39.6	39.5	39.5	39.6
	10% POE	MVA	168.2	167.3	190.5	188.4	196.7	183.9	190.6	192.7	192.8	192.2	191.7	191.2	190.7	190.4	190.9
50% POE	PF	0.975	0.970	0.974	0.958	0.977	0.984	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
	MW	152.7	151.0	174.3	169.1	179.8	169.3	174.2	176.4	176.4	175.9	175.3	174.9	174.4	174.1	174.3	174.6
	MVAr	33.0	36.0	34.8	48.4	36.2	26.1	37.0	37.4	37.3	37.2	37.1	37.0	36.9	36.8	36.9	36.9
	MVA	156.7	155.6	178.9	176.5	184.1	172.0	178.5	180.7	180.7	180.1	179.6	179.1	178.6	178.3	178.5	178.8
Diversified* (Meter)	PF	0.975	0.970	0.974	0.958	0.977	0.984	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
	Actual MVA	110.8	126.6	158.0	147.1	143.9	150.7										
	MW	157.0	157.2	171.5	161.7	156.6	149.7	153.8	155.6	155.7	155.2	154.8	154.4	154.0	153.7	153.9	154.1
	MVAr	8.1	15.8	28.9	40.7	10.9	5.6	20.7	20.9	20.9	20.9	20.8	20.8	20.7	20.7	20.7	20.7
50% POE	10% POE	MVA	157.2	157.9	173.9	166.7	157.0	149.9	155.2	157.0	157.1	156.6	156.2	155.8	155.4	155.1	155.5
	PF	0.999	0.995	0.986	0.970	0.998	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	MW	142.5	142.6	156.9	147.2	143.7	139.6	143.7	145.5	145.5	145.1	144.6	144.2	143.8	143.6	143.8	144.0
	MVAr	7.4	14.3	26.5	37.0	10.0	5.2	19.3	19.6	19.6	19.5	19.5	19.4	19.4	19.3	19.3	19.4
LMS East Wallgrove	50% POE	MVA	142.7	143.3	159.2	151.7	144.1	139.7	145.0	146.8	146.8	146.4	145.9	145.5	145.1	144.9	145.1
	PF	0.999	0.995	0.986	0.970	0.998	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	Actual MVA	7.7	7.8	7.8	7.8	7.8	7.7										
	MW	7.6	7.6	7.6	7.6	7.6	7.5										
Generation	MVAr	1.6	1.6	1.6	1.6	1.6	1.6										
	MVA	7.7	7.8	7.8	7.8	7.8	7.7										
	PF	0.977	0.978	0.978	0.978	0.978	0.978										

Note: * Diversified values which are greater than undiversified values are due to abnormal switching.

3.21 Mount Piper 66kV Demand Forecast

Discussion

Mount Piper BSP is owned by TransGrid and has two 120MVA 132/66/11kV transformers. Mount Piper supplies Blackmans Flat and Hartle Vale Endeavour Energy owned zone substations as well as number of customer substations serving mining operations.

Work at Angus Place Colliery HVC15934 is slowing down, and load is expected to reduce to 3 MVA. Baal Bone colliery HVC16551 is in caretaker mode. Invincible Colliery HVC29808 is also slowing down since 2013 and is expected to reduce load going forward. Charbon Colliery HVC15943 near Kandos has ceased underground mining activities.

Angus Place East Colliery is looking to expand its operations in the near future.

Rating Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Mt Piper 132/66	2 x 120	240
Blackmans Flat	2 x 10	20
Hartley Vale	2 x 2.5	5

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

No Spot Loads Proposed at this location

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Mount Piper 66kV Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Airly Colliery Major customer – HVC 27401	Actual MVA		2.1	1.1	1.8	2.3	2.3										
	MW		1.9	1.1	1.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	MVA		0.9	0.2	0.1	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	10% POE MVA		2.1	1.1	1.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	PF		0.912	0.975	0.997	0.990	0.986	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
50% POE	MW		1.9	1.1	1.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	MVA		0.9	0.2	0.1	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	MVA		2.1	1.1	1.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	PF		0.912	0.975	0.997	0.990	0.986	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
	Actual MVA	9.7	9.5	9.5	9.0	2.9	2.7										
Angus Place Colliery Major customer – HVC 32342	MW	8.8	8.6	8.6	8.7	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	MVA	4.1	4.4	4.2	2.3	1.2	1.5	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	10% POE MVA	9.7	9.6	9.5	9.0	2.9	2.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	PF	0.907	0.891	0.900	0.966	0.912	0.825	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	MW	8.8	8.6	8.6	8.7	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
50% POE	MVA	4.1	4.4	4.2	2.3	1.2	1.5	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	MVA	9.7	9.6	9.5	9.0	2.9	2.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	PF	0.907	0.891	0.900	0.966	0.912	0.825	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA				0.9	0.8	0.7										
	MW				0.5	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Angus Place East Major customer – HVC 32342	MVA				0.7	0.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	10% POE MVA				0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	PF				0.633	0.998	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230
	MW				0.5	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	MVA				0.7	0.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
50% POE	MVA				0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	PF				0.633	0.998	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230
	Actual MVA	6.8	1.6	1.1	1.1	1.2	1.1										
	MW	5.5	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	MVA	3.9	1.1	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Baal Bone Major customer – HVC 16551	10% POE MVA	6.8	1.6	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	PF	0.820	0.751	0.716	0.701	0.680	0.690	0.726	0.726	0.726	0.726	0.726	0.726	0.726	0.726	0.726	0.726
	MW	5.5	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	MVA	3.9	1.1	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	50% POE MVA	6.8	1.6	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
50% POE	PF	0.820	0.751	0.716	0.701	0.680	0.690	0.726	0.726	0.726	0.726	0.726	0.726	0.726	0.726	0.726	0.726
	Actual MVA	4.0	4.5	4.4	4.9	5.5	4.8										
	MW	3.8	4.4	4.3	4.7	5.3	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	MVA	1.1	1.1	1.2	1.4	1.7	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	10% POE MVA	4.0	4.5	4.4	4.9	5.5	4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.6
Blackmans Flat	PF	0.961	0.970	0.961	0.956	0.953	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
	MW	3.8	4.4	4.3	4.7	5.3	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	MVA	1.1	1.1	1.2	1.4	1.7	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	50% POE MVA	4.0	4.5	4.4	4.9	5.5	4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.6
	PF	0.961	0.970	0.961	0.956	0.953	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
Charbon Colliery Major customer – HVC 15943	Actual MVA	3.6	3.8	3.6	1.5	0.1	0.1										
	MW	2.7	2.9	2.6	1.2	0.1	0.0										
	MVA	2.8	2.5	2.6	0.9	0.1	0.0										
	10% POE MVA	3.9	3.8	3.7	1.5	0.1	0.1										
	PF	0.700	0.753	0.704	0.789	0.802	0.706										
50% POE	MW	2.7	2.9	2.6	1.2	0.1	0.0										
	MVA	2.8	2.5	2.6	0.9	0.1	0.0										
	MVA	3.9	3.8	3.7	1.5	0.1	0.1										
	PF	0.700	0.753	0.704	0.789	0.802	0.706										
	Actual MVA	7.7	8.9	11.9	10.4	10.9	10.1										
Clarence Colliery Major customer – HVC 15935	MW	7.3	8.3	8.8	9.6	10.4	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
	MVA	3.7	3.2	8.5	3.9	3.4	3.4	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	10% POE MVA	8.2	8.9	12.2	10.4	10.9	10.1	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7
	PF	0.891	0.933	0.719	0.925	0.949	0.944	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894
	MW	7.3	8.3	8.8	9.6	10.4	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
50% POE	MVA	3.7	3.2	8.5	3.9	3.4	3.4	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	MVA	8.2	8.9	12.2	10.4	10.9	10.1	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7
	PF	0.891	0.933	0.719	0.925	0.949	0.944	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Hartley Vale	Actual MVA	1.3	0.9	1.5	0.7	1.3	0.6										
	MW	1.2	0.9	1.5	0.7	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
	MVA _r	0.2	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	10% POE MVA	1.3	0.9	1.5	0.7	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	PF	0.981	0.972	0.995	0.977	0.993	0.998	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	MW	1.2	0.9	1.5	0.7	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
	MVA _r	0.2	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	50% POE MVA	1.3	0.9	1.5	0.7	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	PF	0.981	0.972	0.995	0.977	0.993	0.998	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	Actual MVA	1.1	0.8	0.1	0.1	0.1	0.1										
Invincible Colliery Major customer – HVC 29808	MW	0.9	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MVA _r	0.6	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	10% POE MVA	1.1	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PF	0.809	0.760	0.400	0.467	0.413	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488
	MW	0.9	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MVA _r	0.6	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	50% POE MVA	1.1	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PF	0.809	0.760	0.400	0.467	0.413	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488
	Actual MVA	2.5	4.1	2.2	2.0	1.9	1.7										
Springvale Borehole Major customer – HVC 18994	MW	3.2	3.3	1.9	1.8	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	MVA _r	1.3	2.4	1.0	0.9	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	10% POE MVA	3.5	4.1	2.2	2.0	1.9	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	PF	0.931	0.811	0.889	0.899	0.908	0.899	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889
	MW	3.2	3.3	1.9	1.8	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	MVA _r	1.3	2.4	1.0	0.9	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	50% POE MVA	3.5	4.1	2.2	2.0	1.9	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	PF	0.931	0.811	0.889	0.899	0.908	0.899	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889
	Actual MVA	5.1	6.3	7.8	8.4	9.3	10.2										
Springvale Shaft #3 Major customer – HVC 23163	MW	4.5	4.8	7.0	7.4	8.2	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
	MVA _r	2.3	4.3	4.6	3.9	4.4	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	10% POE MVA	5.1	6.5	8.4	8.4	9.3	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	PF	0.892	0.747	0.835	0.883	0.882	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828
	MW	4.5	4.8	7.0	7.4	8.2	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
	MVA _r	2.3	4.3	4.6	3.9	4.4	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	50% POE MVA	5.1	6.5	8.4	8.4	9.3	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	PF	0.892	0.747	0.835	0.883	0.882	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828	0.828
	Actual MVA	0.6	0.6	0.5	0.6	0.4											
Unimin Mine Major customer – HVC 20726	MW	0.5	0.6	0.5	0.5	0.3											
	MVA _r	0.3	0.4	0.2	0.3	0.3											
	10% POE MVA	0.6	0.7	0.5	0.6	0.4											
	PF	0.830	0.835	0.908	0.808	0.700											
	MW	0.5	0.6	0.5	0.5	0.3											
	MVA _r	0.3	0.4	0.2	0.3	0.3											
	50% POE MVA	0.6	0.7	0.5	0.6	0.4											
	PF	0.830	0.835	0.908	0.808	0.700											
	Actual MVA	42.2	43.2	43.8	41.4	36.7	34.4										
Undiversified	MW	38.6	37.4	37.1	37.9	33.8	30.5	30.5	30.4	30.4	30.4	30.4	30.3	30.3	30.3	30.3	30.3
	MVA _r	20.3	20.9	23.6	15.7	13.4	14.8	15.8	15.8	15.8	15.7	15.7	15.7	15.7	15.7	15.7	15.7
	10% POE MVA	44.0	43.5	44.9	41.5	36.8	34.7	34.9	34.9	34.9	34.8	34.8	34.8	34.8	34.7	34.7	34.7
	PF	0.876	0.861	0.827	0.912	0.920	0.880	0.873	0.873	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872
	MW	38.6	37.4	37.1	37.9	33.8	30.5	30.5	30.4	30.4	30.4	30.4	30.3	30.3	30.3	30.3	30.3
	MVA _r	20.3	20.9	23.6	15.7	13.4	14.8	15.8	15.8	15.8	15.7	15.7	15.7	15.7	15.7	15.7	15.7
	50% POE MVA	44.0	43.5	44.9	41.5	36.8	34.7	34.9	34.9	34.9	34.8	34.8	34.8	34.8	34.7	34.7	34.7
	PF	0.876	0.861	0.827	0.912	0.920	0.880	0.873	0.873	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872
	Actual MVA	33.4	31.8	37.3	31.7	28.5	28.4										
Diversified (Meter)	MW	29.2	29.3	33.3	29.6	27.1	26.7	24.9	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
	MVA _r	16.1	14.2	16.8	12.6	9.0	9.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.0
	10% POE MVA	33.4	32.5	37.3	32.2	28.6	28.4	27.2	27.2	27.2	27.2	27.1	27.1	27.1	27.1	27.1	27.1
	PF	0.876	0.900	0.893	0.920	0.949	0.940	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913
	MW	29.2	29.3	33.3	29.6	27.1	26.7	24.9	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
	MVA _r	16.1	14.2	16.8	12.6	9.0	9.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.0
	50% POE MVA	33.4	32.5	37.3	32.2	28.6	28.4	27.2	27.2	27.2	27.2	27.1	27.1	27.1	27.1	27.1	27.1
	PF	0.876	0.900	0.893	0.920	0.949	0.940	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913

3.22 Mount Terry TS Demand Forecast

Discussion

Mount Terry TS has two 120MVA 132/33kV transformers providing a firm capacity of 120 MVA.

The continuation of urban developments in the Albion Park and Calderwood areas (including Tullimbar and Calderwood Valley estates) in addition to developments at Shell Cove Boat Harbour will see a continuation of growth on Mount Terry TS.

The development of Calderwood is proposed to create 5,500 lots over 30 years, with initial development connecting to Albion Park zone substation. Ultimately, Calderwood is expected to require an additional zone substation supplied from the Mt Terry 33kV network. Therefore, the remainder of the development has been included in the Mt Terry TS Forecast.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Albion Park	3 x 12.5	37.5
Gerringong	2 x 5	10
Jamberoo	1 x 3.75	3.75
Kiama	2 x 12.5 + 1 x 15	40
Mount Terry	2 x 120	240
Shellharbour	2 x 20 + 1 x 25	65
Warilla	2 x 10 + 1 x 12.5	32.5

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2021	Albion Park	Mount Terry	Calderwood	Mount Terry	3.80

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Albion Park	Calderwood Residential Development	2017	0.2	0.1	0.2
Albion Park	Calderwood Residential Development	2018	1.1	0.5	1.2
Albion Park	Calderwood Residential Development	2019	1.4	0.7	1.6
Albion Park	Calderwood Residential Development	2020	0.7	0.3	0.8
Albion Park	UCL8307 - Helicopter Facility NSW Ambulance	2019	0.2	0.1	0.2
Albion Park	UIL4891 - Oak Flats, Industrial Load	2019	0.9	0.4	1.0
Albion Park	URS17748 - Calderwood, Pumping Station	2019	0.2	0.1	0.2
Calderwood	Calderwood Residential Development	2021	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2022	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2023	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2024	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2025	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2026	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2027	0.7	0.3	0.8
Gerringong	NRL11053 - Gerringong, Private Residential	2018	0.1	0.03	0.1
Gerringong	UCL8117 - Mayflower Carehouse	2019	0.6	0.3	0.7
Kiama	ULL2449 - Kiama, Aged Care Facility	2018	1.0	0.5	1.1
Kiama	ULL2499 - Aged Care & Community Health Centre	2020	1.6	0.8	1.7
Kiama	UML6656 - Kiama, 51 units	2019	0.4	0.2	0.4
Kiama	UML7376 - 18 Units, Kiama	2018	0.1	0.05	0.1
Kiama	UML7405 - 71 Units & Commercial Load Kiama	2019	0.7	0.3	0.8
Shellharbour	NIL0212 - Dunmore Resource Recovery Redevelopment	2019	0.5	0.2	0.5
Shellharbour	NIL0233 - Hanson Quarry	2018	4.5	2.2	5.0
Shellharbour	NLL0212 - Dunmore Resource Recovery Redevelopment	2019	0.5	0.2	0.5
Shellharbour	UCL6486	2019	0.7	0.3	0.8
Shellharbour	UCL6919 Warrigal Care	2019	0.4	0.2	0.4
Shellharbour	UCL8233 - Woolworths & Retail Stores (Precinct D), Shell Cove Boat Harbour	2018	1.2	0.6	1.3
Shellharbour	ULL2245 - Shellharbour Hospital	2018	0.9	0.4	1.0
Shellharbour	ULL2339 - Council Building	2018	0.8	0.4	0.9
Warilla	UCS0478 - Car Wash, Office Works, Spot Light & Takeaway	2018	0.8	0.4	0.9
Warilla	ULL2245 - Shellharbour Hospital	2018	0.9	0.4	1.0
Warilla	ULL2607 - Gov. Load	2018	0.2	0.1	0.2

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Albion Park	URS12931 - Whistlers Run 60 Lot Subdivision	2016	3	0.1
Albion Park	URS15509 - Tullimbar Heights - 22 Lots	2019	2	0.1
Albion Park	URS15679 - Tullimbar Village Stage 2B, 42 lot subdivision	2015	4	0.1
Albion Park	URS15995 - (WLI) Calderwood Stage 1A, 75 lot subdivision	2016	5	0.2
Albion Park	URS16579 - Tullimbar Heights - 36 Lots	2019	3	0.1
Albion Park	URS16589 - Albion Park, Stage 1 - 37 Lots	2017	5	0.1
Albion Park	URS17053 - Tullimbar Village, Stage 1 - 37 Lots	2019	3	0.1
Kiama	UCL 5687 - Old Saddleback Rd 29 dwelling subdivision	2015	2	0.1
Shellharbour	FLINDERS Estate	2003	18	2.6
Shellharbour	Shell Cove Estate	2003	15	5.8
Shellharbour	Stage 1 - 38 Lots Shell Cove (Boat Harbour)	2016	2	0.1
Shellharbour	Stage 3 - 35 Lots Shell Cove (Boat Harbour)	2017	2	0.1
Shellharbour	UML 5753 - Wattle Rd 71 units and villas	2016	2	0.1
Shellharbour	UML5853 - Flinders, Residential 12 x townhouses	2017	2	0.03
Shellharbour	URS15883 - Shell Cove, 8 lot subdivision	2017	2	0.02
Shellharbour	URS18399 - South Flinders Dunmore - Stage 1A - 33 Lots	2018	3.0	0.02
Shellharbour	URS19157 - South Flinders Dumore - Stage 1B, 47 lots	2020	3	0.2
Shellharbour	URS19259 - South Flinders Dunmore - Stage 2, 48 lots	2020	3	0.2
Shellharbour	URS19298 - South Flinders Dunmore - Stage 3, 36 lots	2021	2	0.1

Generation

No Generation known at this location

Configuration Changes

Year	Zone / HVC	From TS	To TS
2012	Dapto	Mount Terry	Springhill

Mount Terry TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Albion Park	Actual MVA	21.3	25.0	19.0	17.5	21.7	24.0										
	MW	22.0	21.3	21.1	21.5	22.3	22.6	23.6	26.0	26.7	23.0	22.9	22.8	22.7	22.7	22.7	22.7
	MVA _r	11.2	10.3	7.0	5.7	3.5	4.1	4.3	4.7	4.9	4.2	4.2	4.1	4.1	4.1	4.1	4.1
	10% POE	MVA	24.7	23.6	22.3	22.2	22.6	23.0	24.0	26.4	27.2	23.3	23.3	23.2	23.1	23.1	23.1
	PF	0.890	0.900	0.949	0.967	0.988	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
	MW	19.3	18.6	18.4	18.8	19.8	19.8	20.8	23.2	24.0	20.2	20.1	20.0	20.0	19.9	19.9	19.9
	MVA _r	9.8	9.0	6.1	4.9	3.1	3.6	3.8	4.2	4.4	3.7	3.7	3.6	3.6	3.6	3.6	3.6
	50% POE	MVA	21.6	20.6	19.4	19.5	20.0	21.1	23.6	24.3	20.5	20.4	20.4	20.3	20.2	20.2	20.2
	PF	0.890	0.900	0.949	0.967	0.988	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
Calderwood	Actual MVA																
	MW										4.2	4.8	5.4	6.0	6.7	7.3	7.9
	MVA _r										1.4	1.6	1.8	2.0	2.2	2.4	2.6
	10% POE	MVA									4.4	5.1	5.7	6.4	7.0	7.6	8.3
	PF										0.950	0.950	0.950	0.950	0.950	0.950	0.950
	MW										4.2	4.8	5.4	6.0	6.7	7.3	7.9
	MVA _r										1.4	1.6	1.8	2.0	2.2	2.4	2.6
	50% POE	MVA									4.4	5.1	5.7	6.4	7.0	7.6	8.3
	PF										0.950	0.950	0.950	0.950	0.950	0.950	0.950
Dapto	Actual MVA																
	MW																
	MVA _r																
	10% POE	MVA															
	PF																
	MW																
	MVA _r																
	50% POE	MVA															
	PF																
Gerringong	Actual MVA	4.2	5.9	4.2	4.9	4.7	5.7										
	MW	4.1	5.7	4.1	4.8	4.6	5.6	5.6	6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	MVA _r	1.0	1.4	1.0	1.1	1.1	1.3	1.3	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	10% POE	MVA	4.2	5.9	4.2	4.9	4.7	5.7	6.3	6.2	6.2	6.2	6.2	6.1	6.1	6.1	6.1
	PF	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973
	MW	4.1	5.7	4.1	4.8	4.6	5.6	5.6	6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	MVA _r	1.0	1.4	1.0	1.1	1.1	1.3	1.3	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	50% POE	MVA	4.2	5.9	4.2	4.9	4.7	5.7	6.3	6.2	6.2	6.2	6.2	6.1	6.1	6.1	6.1
	PF	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973
Illawarra Health Precinct	Actual MVA																
	MW										0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MVA _r										0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10% POE	MVA									0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PF										0.900	0.900	0.900	0.900	0.900	0.900	0.900
	MW										0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MVA _r										0.0	0.0	0.0	0.0	0.0	0.0	0.0
	50% POE	MVA									0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PF										0.900	0.900	0.900	0.900	0.900	0.900	0.900
Jamberoo	Actual MVA	2.6	3.5	2.6	2.7	2.8	3.2										
	MW	2.9	3.0	2.7	2.7	2.8	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7
	MVA _r	1.2	1.1	1.1	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	10% POE	MVA	3.2	3.2	2.9	2.8	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9
	PF	0.923	0.935	0.928	0.945	0.939	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953
	MW	2.7	2.7	2.4	2.4	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4
	MVA _r	1.1	1.0	1.0	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	50% POE	MVA	2.9	2.9	2.6	2.5	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5
	PF	0.923	0.935	0.928	0.945	0.939	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953
Kiama	Actual MVA	11.3	12.9	9.8	9.6	10.5	11.4										
	MW	10.7	10.4	10.4	10.4	10.5	10.8	11.7	12.6	13.9	13.8	13.8	13.8	13.7	13.7	13.7	13.7
	MVA _r	1.7	2.7	2.0	2.1	2.3	2.4	2.5	2.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	10% POE	MVA	10.8	10.8	10.6	10.6	10.7	12.0	12.9	14.2	14.2	14.1	14.1	14.0	14.0	14.0	14.0
	PF	0.988	0.968	0.981	0.980	0.977	0.976	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
	MW	9.7	9.5	9.4	9.4	9.6	9.7	10.6	11.5	12.8	12.8	12.7	12.7	12.6	12.6	12.6	12.6
	MVA _r	1.5	2.4	1.8	1.9	2.1	2.2	2.2	2.4	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	50% POE	MVA	9.8	9.8	9.6	9.6	9.8	10.9	11.8	13.1	13.0	13.0	12.9	12.9	12.9	12.9	12.9
	PF	0.988	0.968	0.981	0.980	0.977	0.976	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
Sydney Trains Mount Terry	Actual MVA	2.8	2.8	3.4	6.2	5.0	3.9										
	MW	2.7	2.7	3.2	5.9	4.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	MVA _r	0.6	0.9	1.1	1.9	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	10% POE	MVA	2.8	2.8	3.4	6.2	5.0	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Major customer	PF	0.979	0.950	0.950	0.950	0.950	0.950	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
	MW	2.7	2.7	3.2	5.9	4.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	MVA _r	0.6	0.9	1.1	1.9	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	50% POE	MVA	2.8	2.8	3.4	6.2	5.0	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
	PF	0.979	0.950	0.950	0.950	0.950	0.950	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Sydney Trains Bombo Major customer	Actual MVA	1.0	1.0	1.0	1.0	0.8	0.8										
	MW	1.0	1.0	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	MVA _r	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	10% POE MVA	1.0	1.0	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	PF	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	MW	1.0	1.0	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	MVA _r	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	50% POE MVA	1.0	1.0	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	PF	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Shellharbour	Actual MVA	23.7	28.7	21.8	21.8	27.5	29.6										
	MW	23.5	28.7	21.5	21.8	27.5	29.6	36.2	37.9	37.9	38.0	38.1	38.0	38.0	38.0	38.0	38.1
	MVA _r	2.8	0.4	3.3	0.7	0.0	0.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	10% POE MVA	23.7	28.7	21.8	21.8	27.5	29.6	36.3	38.0	38.0	38.2	38.2	38.2	38.1	38.1	38.1	38.2
	PF	0.993	1.000	0.989	0.999	1.000	1.000	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
	MW	23.5	28.7	21.5	21.8	27.5	29.6	36.2	37.9	37.9	38.0	38.1	38.0	38.0	38.0	38.0	38.1
	MVA _r	2.8	0.4	3.3	0.7	0.0	0.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	50% POE MVA	23.7	28.7	21.8	21.8	27.5	29.6	36.3	38.0	38.0	38.2	38.2	38.2	38.1	38.1	38.1	38.2
	PF	0.993	1.000	0.989	0.999	1.000	1.000	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
Warilla	Actual MVA	16.5	19.6	15.2	15.2	17.7	19.2										
	MW	16.9	17.2	17.1	17.4	17.5	18.8	20.3	20.3	20.2	20.1	20.1	20.0	20.0	19.9	19.9	19.9
	MVA _r	5.7	5.2	5.2	4.7	4.1	3.9	5.7	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	10% POE MVA	17.9	17.9	17.9	18.0	17.9	19.2	21.1	21.0	21.0	20.9	20.8	20.8	20.7	20.7	20.7	20.7
	PF	0.948	0.958	0.956	0.965	0.974	0.979	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
	MW	15.3	15.6	15.5	15.8	15.9	18.8	20.3	20.3	20.2	20.1	20.1	20.0	20.0	19.9	19.9	19.9
	MVA _r	5.2	4.7	4.8	4.3	3.7	3.9	5.7	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	50% POE MVA	16.2	16.3	16.3	16.3	16.3	19.2	21.1	21.0	21.0	20.9	20.8	20.8	20.7	20.7	20.7	20.7
	PF	0.948	0.958	0.956	0.965	0.974	0.979	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
Undiversified	Actual MVA	83.5	99.4	77.1	79.0	90.7	97.8										
	MW	83.8	90.0	81.2	85.4	90.7	94.7	104.7	110.2	112.1	112.6	113.0	113.3	113.7	114.1	114.8	115.4
	MVA _r	24.5	22.3	21.0	17.5	13.9	14.1	19.0	19.8	20.2	20.9	21.0	21.2	21.3	21.5	21.7	21.9
	10% POE MVA	88.2	94.0	84.1	87.7	92.3	96.2	106.8	112.3	114.3	114.9	115.3	115.7	116.1	116.5	117.2	117.9
	PF	0.950	0.957	0.965	0.974	0.983	0.984	0.981	0.981	0.981	0.980	0.980	0.980	0.979	0.979	0.979	0.979
	MW	78.3	84.4	75.6	79.9	85.3	90.5	100.5	106.0	107.9	108.4	108.8	109.1	109.5	109.9	110.6	111.2
	MVA _r	22.3	20.1	19.3	16.1	12.8	13.2	18.1	19.0	19.4	20.0	20.2	20.3	20.5	20.6	20.8	21.0
	50% POE MVA	82.2	88.0	78.3	81.9	86.8	92.0	102.5	108.1	110.0	110.6	111.1	111.4	111.8	112.3	113.0	113.6
	PF	0.952	0.959	0.966	0.975	0.983	0.984	0.981	0.981	0.981	0.980	0.980	0.979	0.979	0.979	0.979	0.979
Diversified# (Meter)	Actual MVA	102.0	124.9	78.1	65.6	103.4	110.4										
	MW	106.7	101.2	101.3	100.5	96.2	99.2	103.2	108.6	110.5	110.9	111.3	111.7	112.0	112.4	113.1	113.7
	MVA _r	35.9	34.0	34.1	33.8	32.3	33.4	34.7	36.5	37.2	37.3	37.4	37.6	37.7	37.8	38.0	38.2
	10% POE MVA	112.5	106.7	106.8	106.0	101.4	104.7	108.9	114.6	116.6	117.0	117.4	117.8	118.2	118.6	119.3	120.0
	PF	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
	MW	91.6	86.1	86.2	85.4	83.7	84.2	99.0	104.5	106.3	106.8	107.2	107.5	107.9	108.3	108.9	109.6
	MVA _r	30.8	28.9	29.0	28.7	28.1	28.3	33.3	35.1	35.8	35.9	36.0	36.2	36.3	36.4	36.6	36.9
	50% POE MVA	96.6	90.8	90.9	90.1	88.3	88.9	104.5	110.2	112.2	112.6	113.1	113.4	113.8	114.3	114.9	115.6
	PF	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948

Note: #Diversified values which are greater than undiversified values are due to abnormal switching.

3.23 Nepean 33kV TS Demand Forecast

Discussion

Nepean 33kV has three 60 MVA 132/33kV transformers providing a firm capacity of 120 MVA. The No.3 132/33kV transformer is planned to be removed leaving the firm rating at 60MVA.

Cawdor 33/11kV ZS has been established to supply the area to the West of the Nepean River and will offload Nepean ZS which will supply the local new developments at Spring Farm and Elderslie.

Rating Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Nepean 33kV	3 x 60	180
Oakdale	2 x 10	20
Cawdor	2 x 25	50
The Oaks	1 x 15	15

Proposed Load Transfers

No proposed load transfers at this location

Future Spot Loads

No Spot Loads Proposed at this location

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

Refer to Nepean 66kV

Configuration Changes

Year	Zone / HVC	From TS	To TS
2013	Camden/Nepean ZS	Nepean 33kV	Nepean 66kV

Nepean 33kV TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Camden	Actual MVA	30.9															
	MW	30.1															
	MVA _r	1.7															
	10% POE MVA	30.2															
	PF	0.998															
	MW	29.0															
	MVA _r	1.7															
	50% POE MVA	29.0															
	PF	0.998															
Cawdor	Actual MVA		14.4	24.6	25.2	25.0	27.7										
	MW		13.7	23.2	24.1	23.8	26.5	26.4	26.3	26.1	26.0	25.9	25.8	25.7	25.7	25.7	25.7
	MVA _r		4.3	8.2	7.4	7.5	8.2	8.2	8.2	8.2	8.1	8.1	8.1	8.0	8.0	8.0	8.0
	10% POE MVA		14.4	24.6	25.2	25.0	27.7	27.6	27.5	27.4	27.3	27.2	27.1	27.0	26.9	26.9	26.9
	PF		0.954	0.943	0.956	0.954	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
	MW		13.7	23.2	24.1	23.8	26.5	26.4	26.3	26.1	26.0	25.9	25.8	25.7	25.7	25.7	25.7
	MVA _r		4.3	8.2	7.4	7.5	8.2	8.2	8.2	8.2	8.1	8.1	8.1	8.0	8.0	8.0	8.0
	50% POE MVA		14.4	24.6	25.2	25.0	27.7	27.6	27.5	27.4	27.3	27.2	27.1	27.0	26.9	26.9	26.9
	PF		0.954	0.943	0.956	0.954	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
Sydney Trains Nepean	Actual MVA	5.6	5.2	5.7	4.5	0.9	0.9										
	MW	5.5	5.0	5.6	4.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	MVA _r	0.4	1.4	0.6	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	10% POE MVA	5.6	5.2	5.7	4.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	PF	0.997	0.962	0.993	0.997	0.983	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	MW	5.5	5.0	5.6	4.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	MVA _r	0.4	1.4	0.6	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	50% POE MVA	5.6	5.2	5.7	4.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	PF	0.997	0.962	0.993	0.997	0.983	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
Oakdale	Actual MVA	5.7	9.1	1.5	1.8	1.7	2.5										
	MW	6.2	7.2	2.0	2.0	1.9	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	MVA _r	2.3	2.6	0.5	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	10% POE MVA	6.6	7.7	2.1	2.0	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0
	PF	0.936	0.940	0.970	0.988	0.976	0.989	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
	MW	5.6	6.4	1.6	1.6	1.4	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	MVA _r	2.1	2.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	50% POE MVA	5.9	6.8	1.7	1.6	1.5	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6
	PF	0.936	0.940	0.970	0.988	0.976	0.989	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
The Oaks	Actual MVA			6.1	5.0	7.4	8.7										
	MW			5.8	5.0	7.0	8.3	8.3	8.2	8.2	8.1	8.1	8.0	8.0	7.9	7.9	7.9
	MVA _r			2.1	0.0	2.3	2.5	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	10% POE MVA			6.1	5.0	7.4	8.7	8.7	8.6	8.6	8.5	8.5	8.4	8.4	8.3	8.3	8.3
	PF			0.940	1.000	0.951	0.958	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954
	MW			5.8	5.0	7.0	8.3	8.3	8.2	8.2	8.1	8.1	8.0	8.0	7.9	7.9	7.9
	MVA _r			2.1	0.0	2.3	2.5	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	50% POE MVA			6.1	5.0	7.4	8.7	8.7	8.6	8.6	8.5	8.5	8.4	8.4	8.3	8.3	8.3
	PF			0.940	1.000	0.951	0.958	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954
Wollondilly Wash	Actual MVA	1.7	1.3	1.8	1.8	1.8	1.8										
	MW	1.4	1.3	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	MVA _r	1.1	0.1	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	10% POE MVA	1.7	1.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	PF	0.799	0.999	0.962	0.975	0.973	0.976	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
	MW	1.4	1.3	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	MVA _r	1.1	0.1	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	50% POE MVA	1.7	1.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	PF	0.799	0.999	0.962	0.975	0.973	0.976	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
Undiversified	Actual MVA	43.9	30.0	39.7	38.3	36.8	41.6										
	MW	43.3	27.2	38.3	37.4	35.3	39.6	39.4	39.2	39.0	38.8	38.7	38.5	38.3	38.2	38.2	38.2
	MVA _r	5.6	8.4	11.9	8.5	10.8	11.5	11.8	11.7	11.7	11.6	11.6	11.5	11.5	11.4	11.4	11.4
	10% POE MVA	44.1	28.6	40.2	38.5	37.0	41.2	41.1	40.9	40.7	40.6	40.4	40.2	40.0	39.9	39.9	39.9
	PF	0.981	0.954	0.952	0.969	0.956	0.959	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
	MW	41.5	26.5	37.9	36.9	34.9	39.2	39.0	38.8	38.6	38.5	38.3	38.1	38.0	37.8	37.8	37.8
	MVA _r	5.2	8.1	11.8	8.4	10.7	11.5	11.7	11.6	11.6	11.5	11.5	11.4	11.4	11.4	11.3	11.3
	50% POE MVA	42.3	27.7	39.8	38.1	36.5	40.9	40.7	40.6	40.4	40.2	40.0	39.8	39.7	39.5	39.5	39.5
	PF	0.981	0.954	0.952	0.969	0.956	0.959	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957
Diversified (Meter)	Actual MVA	47.9	49.0	34.5	24.1	30.7	52.9										
	MW	41.0	45.4	33.3	23.3	29.2	50.3	34.6	34.4	34.2	34.1	33.9	33.8	33.7	33.5	33.5	33.5
	MVA _r	24.6	18.6	9.1	5.9	9.6	16.5	13.3	13.2	13.2	13.1	13.0	13.0	12.9	12.9	12.9	12.9
	10% POE MVA	47.9	49.0	34.5	24.1	30.7	52.9	37.0	36.9	36.7	36.5	36.4	36.2	36.1	35.9	35.9	35.9
	PF	0.857	0.925	0.965	0.969	0.950	0.950	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
	MW	41.0	45.4	33.3	23.3	29.2	50.3	34.2	34.1	33.9	33.8	33.6	33.5	33.3	33.2	33.2	33.2
	MVA _r	24.6	18.6	9.1	5.9	9.6	16.5	13.2	13.1	13.0	13.0	12.9	12.9	12.8	12.8	12.8	12.7
	50% POE MVA	47.9	49.0	34.5	24.1	30.7	52.9	36.7	36.5	36.3	36.2	36.0	35.8	35.7	35.6	35.6	35.5
	PF	0.857	0.925	0.965	0.969	0.950	0.950	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933

Note: 15 MVA_r of capacitance installed at the Nepean 33kV busbar.

3.24 Nepean 66kV TS Demand Forecast

Discussion

Nepean 66kV has two 120MVA 132/66kV auto-transformers providing a firm rating of 120MVA.

The main feature of the Nepean 66kV supply area is the extensive availability of methane extraction embedded generation. Wilton Zone is currently being used to supply the Bingara Gorge development and will be used to supply developments at Wilton Junction.

Major customer substations at BHP Douglas Park, BCSC Maldon, Tower Colliery, Westcliff Colliery, Appin, Appin Top Pit, Appin Colliery and Broughton Pass ZSs are now being supplied from Macarthur 66kV.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Nepean 66kV	2 x 120	240
Appin	1 x 5	5
Maldon	2 x 22/35	70
Narellan	3 x 22/35	105
Nepean ZS	2 x 35	70
Tahmoor	2 x 15/25	50
Wilton	2 x 20	40

Proposed Load Transfers

No proposed load transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Maldon	NIL0253	2019	3.6000	1.7436	4.0
Narellan	UCL7398 Industrial development in Lasso Rd Gregory Hills	2018	0.4860	0.2354	0.5
Narellan	UCL7634 new private hospital in Gregory Hills	2019	0.9162	0.4437	1.0
Narellan	UCL8316 New school in Gregory Hills	2019	0.5301	0.2567	0.6

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Narellan	Gregory Hills 2402 lots	2011	15	9.6
Narellan	The Hermitage & Narellan Country Club 1,800 lots	2011	15	7.2
Nepean ZS	Elderslie residential development 2,000 lots	2005	17	8.0
Nepean ZS	Spring Farm residential development 4,000 lots	2008	17	16.0
Wilton	1000 Lots at Wilton for Brad Corp	2008	16	3.3
Wilton	Development South of Picton Road - 3,000 Lots	2020	10	12.0

Generation

Zone Substation	Name	Description	Date
Nepean 66kV	Appin Colliery (EDL)	54 x 1MW (methane extraction - export to 66kV network)	Installed
Nepean 66kV	WestCliff Colliery	1 x 6MW	Installed
Nepean 66kV	Tower Colliery	40 x 1MW (methane extraction - export to 66kV network)	Installed
Nepean 66kV	Tahmoor Colliery	1 x 7MW Gas Generator connected to 11kV Bus	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2013	Camden/Nepean ZS	Nepean 33kV	Nepean 66kV
2016	Appin	Nepean 66kV	Macarthur 66kV
2016	Appin Top Pit	Nepean 66kV	Macarthur 66kV
2016	Appin Colliery	Nepean 66kV	Macarthur 66kV
2016	BHP Douglas Park	Nepean 66kV	Macarthur 66kV
2016	Broughton Pass	Nepean 66kV	Macarthur 66kV
2016	Tower Colliery	Nepean 66kV	Macarthur 66kV
2016	Westcliff Colliery	Nepean 66kV	Macarthur 66kV

Nepean 66kV TS Demand Forecast

Location		Actual							Forecast								
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Actual	MVA	4.2	5.2	3.8	4.4											
Appin	MW	4.2	3.9	3.8	3.9												
	MVAr	1.9	1.6	1.6	1.5												
	10% POE	MVA	4.6	4.2	4.2	4.2											
	PF	0.915	0.927	0.921	0.936												
	MW	3.8	3.5	3.4	3.4												
	MVAr	1.7	1.4	1.4	1.3												
	50% POE	MVA	4.1	3.8	3.7	3.7											
	PF	0.915	0.927	0.921	0.936												
	Actual	MVA	4.7	4.5	4.8	5.1											
Appin Top Pit Major customer	MW	3.9	3.9	4.0	4.2												
	MVAr	2.6	2.4	2.6	2.9												
	10% POE	MVA	4.7	4.5	4.8	5.1											
	PF	0.832	0.849	0.832	0.827												
	MW	3.9	3.9	4.0	4.2												
	MVAr	2.6	2.4	2.6	2.9												
	50% POE	MVA	4.7	4.5	4.8	5.1											
	PF	0.832	0.849	0.832	0.827												
	Actual	MVA	6.5	6.2	6.9	6.1											
Appin Colliery Major customer	MW	5.7	5.5	6.1	5.6												
	MVAr	3.2	2.9	3.2	2.5												
	10% POE	MVA	6.5	6.2	6.9	6.1											
	PF	0.873	0.882	0.886	0.912												
	MW	5.7	5.5	6.1	5.6												
	MVAr	3.2	2.9	3.2	2.5												
	50% POE	MVA	6.5	6.2	6.9	6.1											
	PF	0.873	0.882	0.886	0.912												
	Actual	MVA	10.4	11.0	10.9	8.8	8.6	8.8									
BCSC Maldon Major customer	MW	9.4	10.0	9.9	8.2	8.0	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	MVAr	4.5	4.7	4.5	3.3	3.0	3.3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	10% POE	MVA	10.5	11.1	10.9	8.8	8.6	8.8	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	PF	0.902	0.904	0.909	0.928	0.937	0.927	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918
	MW	9.4	10.0	9.9	8.2	8.0	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	MVAr	4.5	4.7	4.5	3.3	3.0	3.3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	50% POE	MVA	10.5	11.1	10.9	8.8	8.6	8.8	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	PF	0.902	0.904	0.909	0.928	0.937	0.927	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918
	Actual	MVA	4.1	4.4	4.7	6.3											
BHP Douglas Park Major customer	MW	4.0	4.0	4.4	5.9												
	MVAr	2.2	2.3	2.5	2.2												
	10% POE	MVA	4.6	4.6	5.0	6.3											
	PF	0.874	0.863	0.870	0.935												
	MW	4.0	4.0	4.4	5.9												
	MVAr	2.2	2.3	2.5	2.2												
	50% POE	MVA	4.6	4.6	5.0	6.3											
	PF	0.874	0.863	0.870	0.935												
	Actual	MVA	2.8	2.6	2.6	2.9											
Brooks Point# Major customer	MW	2.2	2.3	2.3	2.3												
	MVAr	1.7	1.3	1.3	1.7												
	10% POE	MVA	2.8	2.6	2.6	2.9											
	PF	0.789	0.868	0.864	0.791												
	MW	2.2	2.3	2.3	2.3												
	MVAr	1.7	1.3	1.3	1.7												
	50% POE	MVA	2.8	2.6	2.6	2.9											
	PF	0.789	0.868	0.864	0.791												
	Actual	MVA	2.8	5.0	5.1	4.8											
Broughton Pass Major customer	MW	2.7	4.8	4.9	4.6												
	MVAr	0.8	1.5	1.5	1.4												
	10% POE	MVA	2.8	5.0	5.1	4.8											
	PF	0.954	0.955	0.955	0.956												
	MW	2.7	4.8	4.9	4.6												
	MVAr	0.8	1.5	1.5	1.4												
	50% POE	MVA	2.8	5.0	5.1	4.8											
	PF	0.954	0.955	0.955	0.956												

Note #: Brooks Point has been decommissioned

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Maldon	Actual MVA	16.4	22.1	17.5	16.4	19.1	22.9										
	MW	20.0	19.6	18.9	18.8	19.6	19.5	19.4	22.4	22.3	22.3	22.2	22.1	22.0	21.9	21.9	21.9
	MVAr	3.5	7.4	1.1	1.2	1.2	1.7	3.4	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8
	10% POE MVA	20.3	20.9	19.0	18.8	19.6	19.6	19.7	22.8	22.7	22.6	22.5	22.4	22.3	22.3	22.2	22.2
	PF	0.985	0.936	0.998	0.998	0.998	0.996	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	MW	18.0	17.6	17.0	16.8	17.3	17.4	17.3	20.4	20.3	20.2	20.1	20.0	19.9	19.9	19.9	19.9
	MVAr	3.1	6.6	1.0	1.0	1.1	1.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.4	3.4	3.4
	50% POE MVA	18.3	18.8	17.0	16.9	17.4	17.5	17.6	20.7	20.6	20.5	20.4	20.3	20.2	20.2	20.2	20.2
	PF	0.985	0.936	0.998	0.998	0.998	0.996	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
Narellan	Actual MVA	39.0	50.6	47.4	52.2	63.8	75.8										
	MW	53.4	53.1	54.3	55.9	61.9	68.5	70.4	72.9	73.9	74.7	75.4	75.8	76.0	76.0	76.2	76.4
	MVAr	12.8	14.1	16.4	17.5	14.3	14.4	17.9	18.6	18.8	19.0	19.2	19.3	19.4	19.4	19.4	19.4
	10% POE MVA	54.9	55.0	56.7	58.6	63.6	70.0	72.6	75.2	76.3	77.1	77.8	78.2	78.4	78.5	78.6	78.8
	PF	0.972	0.967	0.957	0.954	0.974	0.979	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
	MW	48.7	48.5	49.6	51.3	57.1	62.1	63.9	66.4	67.5	68.3	68.9	69.4	69.6	69.6	69.8	69.9
	MVAr	11.7	12.8	15.0	16.0	13.2	13.1	16.3	16.9	17.2	17.4	17.6	17.7	17.7	17.7	17.8	17.8
	50% POE MVA	50.1	50.1	51.8	53.7	58.6	63.4	66.0	68.6	69.6	70.5	71.1	71.6	71.8	71.8	72.0	72.2
	PF	0.972	0.967	0.957	0.954	0.974	0.979	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
Nepean Zone#	Actual MVA		35.3	22.8	24.5	35.8	42.8										
	MW		35.9	31.4	32.3	35.4	37.2	38.5	39.4	40.1	40.6	40.9	41.0	40.9	40.8	40.8	40.8
	MVAr		12.0	8.2	8.8	9.4	9.4	9.7	10.0	10.2	10.3	10.3	10.4	10.4	10.3	10.3	10.3
	10% POE MVA		37.8	32.5	33.5	36.6	38.4	39.7	40.7	41.4	41.9	42.2	42.3	42.2	42.1	42.1	42.1
	PF		0.948	0.968	0.965	0.966	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
	MW		31.7	27.2	28.1	31.4	31.8	33.0	34.0	34.7	35.2	35.4	35.5	35.5	35.4	35.4	35.4
	MVAr		10.6	7.1	7.6	8.3	8.0	8.4	8.6	8.8	8.9	9.0	9.0	9.0	8.9	8.9	8.9
	50% POE MVA		33.4	28.1	29.1	32.4	32.8	34.1	35.1	35.8	36.3	36.6	36.7	36.6	36.5	36.5	36.5
	PF		0.948	0.968	0.965	0.966	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
Tahmoor	Actual MVA	11.2	16.1	14.4	14.2	18.3	18.2										
	MW	15.3	15.0	15.1	14.9	16.0	16.2	16.1	16.0	15.9	15.9	15.8	15.7	15.6	15.6	15.6	15.5
	MVAr	2.3	0.9	3.1	2.8	0.8	0.4	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	10% POE MVA	15.5	15.0	15.4	15.2	16.1	16.2	16.3	16.2	16.1	16.0	15.9	15.8	15.8	15.7	15.7	15.7
	PF	0.989	0.998	0.980	0.982	0.999	1.000	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	MW	13.7	13.4	13.5	13.3	14.3	14.3	14.2	14.2	14.1	14.0	13.9	13.8	13.7	13.7	13.7	13.7
	MVAr	2.1	0.8	2.7	2.5	0.8	0.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	50% POE MVA	13.9	13.4	13.7	13.5	14.4	14.3	14.4	14.3	14.2	14.1	14.0	13.9	13.9	13.8	13.8	13.8
	PF	0.989	0.998	0.980	0.982	0.999	1.000	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
Tahmoor Colliery Major customer	Actual MVA	19.2	18.6	19.6	19.8	19.4	19.3										
	MW	11.0	17.0	18.2	18.0	17.4	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
	MVAr	5.5	7.8	7.4	8.3	8.6	8.7	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	10% POE MVA	12.4	18.7	19.6	19.8	19.4	19.3	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1
	PF	0.894	0.909	0.925	0.907	0.896	0.894	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904
	MW	11.0	17.0	18.2	18.0	17.4	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
	MVAr	5.5	7.8	7.4	8.3	8.6	8.7	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	50% POE MVA	12.4	18.7	19.6	19.8	19.4	19.3	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1
	PF	0.894	0.909	0.925	0.907	0.896	0.894	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904
Tower Colliery Major customer	Actual MVA	5.3	6.5	4.6	5.2												
	MW	3.9	4.2	3.7	4.1												
	MVAr	3.8	5.0	2.8	3.2												
	10% POE MVA	5.4	6.5	4.6	5.2												
	PF	0.720	0.640	0.804	0.785												
	MW	3.9	4.2	3.7	4.1												
	MVAr	3.8	5.0	2.8	3.2												
	50% POE MVA	5.4	6.5	4.6	5.2												
	PF	0.720	0.640	0.804	0.785												
Westcliff Colliery Major customer	Actual MVA	23.1	21.2	25.1	20.2												
	MW	19.5	17.3	21.2	17.2												
	MVAr	12.4	12.8	13.4	11.0												
	10% POE MVA	23.1	21.5	25.1	20.4												
	PF	0.843	0.803	0.845	0.842												
	MW	19.5	17.3	21.2	17.2												
	MVAr	12.4	12.8	13.4	11.0												
	50% POE MVA	23.1	21.5	25.1	20.4												
	PF	0.843	0.803	0.845	0.842												

Note: # Nepean Zone load has been combined with Camden zone (Nepean 33kV) load for 2013.

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Wilton	Actual MVA			2.2	2.3	3.6	2.5										
	MW			2.2	2.3	3.5	2.5	2.7	2.9	3.2	3.8	4.8	6.2	7.9	9.6	10.9	11.9
	MVAr			0.1	0.1	0.7	0.1	0.4	0.4	0.4	0.5	0.6	0.8	1.0	1.3	1.4	1.6
	10% POE MVA			2.2	2.3	3.6	2.5	2.7	2.9	3.2	3.9	4.9	6.2	8.0	9.7	11.0	12.0
	PF			1.000	1.000	0.983	1.000	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	MW			2.2	2.3	3.5	2.5	2.7	2.9	3.2	3.8	4.8	6.2	7.9	9.6	10.9	11.9
	MVAr			0.1	0.1	0.7	0.1	0.4	0.4	0.4	0.5	0.6	0.8	1.0	1.3	1.4	1.6
	50% POE MVA			2.2	2.3	3.6	2.5	2.7	2.9	3.2	3.9	4.9	6.2	8.0	9.7	11.0	12.0
	PF			1.000	1.000	0.983	1.000	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	Actual MVA	149.8	209.5	192.4	193.1	168.5	190.3										
	MW	155.3	196.4	200.2	198.1	161.9	169.3	172.5	179.1	180.9	182.7	184.5	186.2	187.9	189.3	190.8	191.9
	MVAr	57.4	76.7	69.6	68.4	38.1	38.0	45.1	46.6	47.0	47.4	47.7	48.0	48.3	48.4	48.7	48.8
Undiversified	10% POE MVA	168.1	213.8	214.4	212.0	167.4	174.8	178.9	185.7	187.6	189.5	191.2	193.0	194.7	196.2	197.6	198.8
	PF	0.924	0.919	0.934	0.935	0.967	0.969	0.964	0.964	0.964	0.965	0.965	0.965	0.965	0.965	0.965	0.966
	MW	146.6	183.5	187.3	185.2	149.1	153.5	156.7	163.3	165.1	166.9	168.7	170.4	172.1	173.6	175.0	176.1
	MVAr	55.4	73.0	66.5	65.2	35.7	35.0	41.5	42.9	43.4	43.8	44.1	44.4	44.7	44.8	45.1	45.2
	50% POE MVA	159.2	200.3	201.1	198.6	154.3	158.7	162.7	169.5	171.4	173.2	175.0	176.7	178.4	179.9	181.4	182.5
	PF	0.921	0.916	0.932	0.932	0.966	0.968	0.963	0.963	0.964	0.964	0.964	0.964	0.964	0.964	0.965	0.965
	Actual MVA	116.9	140.7	147.6	136.3	152.6	129.8										
	MW	138.6	134.8	146.1	135.8	138.6	102.6	123.5	128.2	129.5	130.8	132.1	133.3	134.5	135.6	136.6	137.4
Diversified#	MVAr	2.3	46.7	30.6	3.0	38.5	16.4	25.7	26.7	27.0	27.2	27.5	27.7	28.0	28.2	28.4	28.6
	10% POE MVA	138.6	142.7	149.2	135.8	143.8	103.9	126.1	131.0	132.3	133.6	134.9	136.1	137.4	138.5	139.5	140.3
	PF	1.000	0.945	0.979	1.000	0.963	0.987	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	MW	131.0	127.2	138.4	128.2	131.1	93.6	113.9	118.7	120.1	121.4	122.7	123.9	125.1	126.2	127.3	128.1
	MVAr	2.2	44.1	29.0	2.8	36.5	15.0	23.7	24.7	25.0	25.3	25.5	25.8	26.0	26.3	26.5	26.7
	50% POE MVA	131.0	134.6	141.4	128.2	136.1	94.8	116.4	121.3	122.7	124.0	125.3	126.6	127.8	128.9	130.0	130.8
	PF	1.000	0.945	0.979	1.000	0.963	0.987	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
	Generation*							-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3
max generation output	MVAr							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MVA							-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3
	PF							1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Note: # Refers to the 66kV transformer metering values plus the generation output

Note: * Generation is shared between Macarthur & Nepean it is assumed that 1/3 of the generation is consumed by Nepean with the remaining 2/3 of generation being consumed by Macarthur

3.25 Outer Harbour TS Demand Forecast

Discussion

Outer Harbour TS has one 30/45/60 MVA and one 30/60 MVA 132/33kV transformer providing a firm rating of 60MVA.

The Port Kembla Port Corporation was planning to redevelop Outer Harbour with additional berths and export facilities though recently these plans have been deferred indefinitely. The ultimate supply to the Port Kembla Outer Harbour development is outlined in UCL5528 (PD T-1265). Cement Australia (HVC 32652) a cement grinding mill was commissioned in February 2014 as part of this redevelopment.

Rating Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Outer Harbour	2 x 60	120
Port Central	2 x 19	38

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Port Central	UCL8542 - Commercial Load	2018	0.1494	0.0724	0.2

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Outer Harbour TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Cement Australia	Actual	MVA		2.9	3.0	2.8	9.8										
	Major customer	MW		2.7	2.8	2.7	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
		MVA		0.9	0.9	0.9	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	10% POE	MVA		2.9	3.0	2.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
		PF		0.950	0.950	0.950	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
		MW		2.7	2.8	2.7	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
		MVA		0.9	0.9	0.9	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	50% POE	MVA		2.9	3.0	2.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
		PF		0.950	0.950	0.950	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
CRM	Actual	MVA	1.7	1.7	1.5	1.3	1.0	1.0									
	Major customer	MW	1.5	1.6	1.4	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		MVA	0.7	0.5	0.5	0.4	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	10% POE	MVA	1.7	1.7	1.5	1.3	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		PF	0.900	0.950	0.950	0.951	0.567	0.604	0.586	0.586	0.586	0.586	0.586	0.586	0.586	0.586	0.586
		MW	1.5	1.6	1.4	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		MVA	0.7	0.5	0.5	0.4	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	50% POE	MVA	1.7	1.7	1.5	1.3	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		PF	0.900	0.950	0.950	0.951	0.567	0.604	0.586	0.586	0.586	0.586	0.586	0.586	0.586	0.586	0.586
Metal Manufacturers	Actual	MVA	11.0	11.3	10.8	7.3	7.4	4.6									
	Major customer	MW	9.9	10.8	10.2	6.9	7.0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
		MVA	4.8	3.5	3.4	2.3	2.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	10% POE	MVA	11.0	11.3	10.8	7.3	7.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
		PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
		MW	9.9	10.8	10.2	6.9	7.0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
		MVA	4.8	3.5	3.4	2.3	2.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	50% POE	MVA	11.0	11.3	10.8	7.3	7.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
		PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Morgan Cement	Actual	MVA	6.0	3.1	3.8	4.7	4.6	6.8									
	Major customer	MW	5.4	2.9	3.6	4.5	4.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
		MVA	2.6	1.0	1.2	1.5	1.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	10% POE	MVA	6.0	3.1	3.8	4.7	4.6	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
		PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
		MW	5.4	2.9	3.6	4.5	4.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
		MVA	2.6	1.0	1.2	1.5	1.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	50% POE	MVA	6.0	3.1	3.8	4.7	4.6	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
		PF	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Port Central	Actual	MVA	12.5	12.5	10.6	10.5	12.4	10.4									
	Major customer	MW	12.1	12.1	10.5	10.3	11.1	10.4	10.5	10.5	10.5	10.4	10.4	10.4	10.5	10.5	10.6
		MVA	3.1	2.9	2.0	2.0	5.4	1.2	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	10% POE	MVA	12.5	12.5	10.6	10.5	12.4	10.4	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.9	10.9
		PF	0.968	0.973	0.983	0.981	0.899	0.993	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
		MW	12.1	12.1	10.5	10.3	11.1	10.4	10.5	10.5	10.5	10.4	10.4	10.4	10.5	10.5	10.6
		MVA	3.1	2.9	2.0	2.0	5.4	1.2	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	50% POE	MVA	12.5	12.5	10.6	10.5	12.4	10.4	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.9	10.9
		PF	0.968	0.973	0.983	0.981	0.899	0.993	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
Sydney Trains Port Kembla	Actual	MVA	5.4	5.2	4.7	5.3	4.9	5.0									
	Major customer	MW	4.9	5.0	4.5	5.0	4.8	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		MVA	2.3	1.6	1.5	1.7	0.7	0.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	10% POE	MVA	5.4	5.2	4.7	5.3	4.9	5.0	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
		PF	0.900	0.950	0.950	0.950	0.991	0.998	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956
		MW	4.9	5.0	4.5	5.0	4.8	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		MVA	2.3	1.6	1.5	1.7	0.7	0.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	50% POE	MVA	5.4	5.2	4.7	5.3	4.9	5.0	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
		PF	0.900	0.950	0.950	0.950	0.991	0.998	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956
Undiversified	Actual	MVA	36.6	33.8	34.3	32.1	33.1	37.6									
	Major customer	MW	33.8	32.4	33.0	30.8	30.6	36.1	36.2	36.2	36.1	36.1	36.1	36.1	36.2	36.2	36.2
		MVA	13.6	9.5	9.3	8.8	11.6	9.0	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
	10% POE	MVA	36.6	33.8	34.3	32.1	33.1	37.6	38.3	38.2	38.2	38.2	38.2	38.2	38.2	38.3	38.3
		PF	0.923	0.959	0.960	0.960	0.925	0.959	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945
		MW	33.8	32.4	33.0	30.8	30.6	36.1	36.2	36.2	36.1	36.1	36.1	36.1	36.2	36.2	36.2
		MVA	13.6	9.5	8.4	8.8	11.6	9.0	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
	50% POE	MVA	36.6	33.8	31.4	32.1	33.1	37.6	38.3	38.2	38.2	38.2	38.2	38.2	38.2	38.3	38.3
		PF	0.923	0.959	1.049	0.960	0.925	0.959	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	37.0	29.4	23.7	30.0	24.5	23.7									
Diversified (Meter)#	MW	35.8	28.4	23.6	29.8	23.9	23.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.5	30.5
	MVA	9.4	7.5	2.1	3.0	5.2	3.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	10% POE	MVA	37.0	29.4	23.7	30.0	24.5	23.7	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.1
	PF	0.967	0.967	0.996	0.995	0.977	0.990	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
50% POE	MW	35.8	28.4	23.6	29.8	23.9	23.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.5	30.5
	MVA	9.4	7.5	2.1	3.0	5.2	3.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	MVA	37.0	29.4	23.7	30.0	24.5	23.7	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.1
	PF	0.967	0.967	0.996	0.995	0.977	0.990	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982

Note: # Diversified values which are greater than undiversified values are due to abnormal switching.
There is 20 MVA of capacitors installed at the Outer Harbour 33 kV busbar.

3.26 Penrith TS Demand Forecast

Discussion

There is 60 MVA of capacitance proposed to be installed on the 33kV busbar at Penrith Substation. Penrith TS has three 60MVA 132/33kV transformers, providing a firm capacity of 120MVA. Penrith TS supplies Emu Plains, Kingswood, Cranebrook, Jordan Springs ZS and Cambridge Park zone substations.

The Jordan Springs residential development will form the main load growth in the Penrith TS supply area. It is supplied by a new zone substation, Jordan Springs ZS. There is large subdivision Central Precinct development, which will be supplied from both Jordan Springs ZS and Cambridge Park ZS.

The renewal and augmentation project at Penrith TS has been completed. Penrith TS now has 3 x 60/120 MVA transformers with a provision for a fourth transformer.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Penrith TS	3 x 60/120	360
Cambridge Park	2 x 15/19/25	50
Cranebrook	3 x 15/19/25	75
Emu Plains	3 x 15/19/25	75
Jordan Springs	2 x 25	50
Kingswood	3 x 15/19/25	75

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA	MVA
Cambridge Park	URS16973	2018	0.2	0.1	0.2
Cambridge Park	URS17361	2019	0.1	0.1	0.1
Cambridge Park	URS18065	2018	0.2	0.1	0.3
Cranebrook	UCL6767	2019	0.4	0.2	0.4
Cranebrook	UCL7214	2018	1.4	0.7	1.5
Cranebrook	ULL0724	2019	2.0	1.0	2.2
Emu Plains	NRS3194	2018	0.03	0.01	0.03
Emu Plains	UCL 8288	2019	0.9	0.4	1.0
Jordan Springs	NILO204	2018	0.3	0.1	0.3
Jordan Springs	NLL0213	2018	0.2	0.1	0.2
Jordan Springs	UML7825/UML7827	2019	0.2	0.1	0.2
Jordan Springs	URS 16662	2018	0.5	0.3	0.6
Jordan Springs	URS 16663	2018	0.3	0.1	0.3
Jordan Springs	URS18326	2019	0.3	0.1	0.3
Kingswood	UCL6532	2018	0.1	0.04	0.1
Kingswood	UCL7837	2019	0.2	0.1	0.2
Kingswood	ULL2663 - Nepean Hospital	2020	3.3	1.6	3.6
Kingswood	UML7017	2018	0.6	0.3	0.7
Kingswood	UML7140	2019	0.2	0.1	0.2
Kingswood	UML7157	2018	0.5	0.2	0.5
Kingswood	UML7162	2018	0.1	0.04	0.1
Kingswood	UML7378 & UML7737	2019	0.2	0.1	0.2
Kingswood	UML7472	2018	0.1	0.04	0.1
Kingswood	UML8004	2018	0.2	0.1	0.3

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Jordan Springs	Residential Lots	2016	5	2.0
Jordan Springs	Stage 3C1,2 - URS14513, URS14511	2016	3	1.0
Jordan Springs	Stage 4 URS13641-13645	2016	3	0.8
Jordan Springs	URS15573	2017	2	0.1
Jordan Springs	URS15575	2017	3	0.4

Generation

No Generation known at this location

Penrith TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Cambridge Park	Actual MVA	18.9	24.0	19.5	17.0	17.5	21.8										
	MW	24.5	24.0	21.5	20.4	20.4	20.0	20.3	20.2	20.1	20.0	19.9	19.8	19.7	19.6	19.5	19.5
	MVA _r	1.2	1.2	0.6	5.8	2.1	4.6	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.0	3.0	3.0
	10% POE MVA	24.6	24.0	21.5	21.2	20.5	20.5	20.5	20.5	20.4	20.2	20.1	20.0	19.9	19.8	19.8	19.7
	PF	0.999	0.999	1.000	0.963	0.995	0.974	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
	MW	22.0	21.4	19.0	17.9	17.8	17.4	17.6	17.6	17.5	17.4	17.3	17.2	17.0	17.0	16.9	16.9
	MVA _r	1.1	1.1	0.5	5.0	1.8	4.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6
	50% POE MVA	22.0	21.5	19.0	18.6	17.9	17.8	17.9	17.8	17.7	17.6	17.5	17.4	17.3	17.2	17.1	17.1
	PF	0.999	0.999	1.000	0.963	0.995	0.974	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
Cranebrook	Actual MVA	35.9	39.8	32.7	31.2	29.7	26.5										
	MW	42.6	43.9	38.0	34.9	33.8	27.6	28.6	30.6	30.5	30.5	30.4	30.3	30.2	30.2	30.2	30.3
	MVA _r	0.7	2.1	6.8	7.5	4.4	2.7	3.8	4.1	4.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	10% POE MVA	42.6	43.9	38.6	35.7	34.1	27.7	28.9	30.9	30.8	30.7	30.6	30.6	30.5	30.5	30.5	30.5
	PF	1.000	0.999	0.984	0.978	0.992	0.995	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	MW	40.7	42.0	36.2	33.0	31.8	26.2	27.3	29.3	29.2	29.1	29.0	28.9	28.9	28.8	28.8	28.9
	MVA _r	0.7	2.0	6.5	7.1	4.1	2.5	3.6	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8
	50% POE MVA	40.7	42.1	36.8	33.8	32.1	26.3	27.5	29.5	29.4	29.3	29.2	29.2	29.1	29.1	29.1	29.1
	PF	1.000	0.999	0.984	0.978	0.992	0.995	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
Emu Plains	Actual MVA	25.4	28.5	30.2	31.5	32.1	35.5										
	MW	31.0	30.6	33.4	33.0	33.1	32.4	32.3	32.9	32.8	32.7	32.6	32.5	32.4	32.3	32.3	32.4
	MVA _r	0.5	0.2	0.3	0.0	3.6	0.0	1.4	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4
	10% POE MVA	31.0	30.6	33.4	33.0	33.3	32.4	32.3	33.0	32.8	32.7	32.6	32.5	32.4	32.3	32.4	32.4
	PF	1.000	1.000	1.000	1.000	0.994	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
	MW	28.2	27.8	30.7	30.3	30.4	29.7	29.6	30.3	30.1	30.0	29.9	29.8	29.7	29.6	29.7	29.7
	MVA _r	0.5	0.2	0.3	0.0	3.3	0.0	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	50% POE MVA	28.2	27.8	30.7	30.3	30.5	29.7	29.6	30.3	30.2	30.1	29.9	29.8	29.7	29.7	29.7	29.7
	PF	1.000	1.000	1.000	1.000	0.994	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
Jordan Springs	Actual MVA		6.4	10.4	13.0	18.4	23.4										
	MW		5.8	9.4	12.7	18.0	22.9	24.9	25.6	25.6	25.5	25.4	25.4	25.3	25.2	25.2	25.2
	MVA _r		2.8	4.5	2.8	3.8	4.8	12.0	12.4	12.4	12.4	12.3	12.3	12.2	12.2	12.2	12.2
	10% POE MVA		6.4	10.4	13.0	18.4	23.4	27.6	28.4	28.4	28.4	28.3	28.2	28.1	28.0	28.0	28.0
	PF		0.900	0.900	0.977	0.978	0.979	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	MW		5.8	9.4	12.7	18.0	22.9	24.9	25.6	25.6	25.5	25.4	25.4	25.3	25.2	25.2	25.2
	MVA _r		2.8	4.5	2.8	3.8	4.8	12.0	12.4	12.4	12.4	12.3	12.3	12.2	12.2	12.2	12.2
	50% POE MVA		6.4	10.4	13.0	18.4	23.4	27.6	28.4	28.4	28.4	28.3	28.2	28.1	28.0	28.0	28.0
	PF		0.900	0.900	0.977	0.978	0.979	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Kingswood	Actual MVA	44.0	57.8	40.6	41.5	45.8	47.0										
	MW	55.5	55.0	49.4	49.6	50.2	45.5	46.7	47.0	49.6	49.5	49.4	49.3	49.2	49.1	49.2	49.3
	MVA _r	15.9	17.7	17.1	17.4	16.0	14.6	15.2	15.3	16.1	16.1	16.0	16.0	15.9	16.0	16.0	16.0
	10% POE MVA	57.8	57.8	52.3	52.5	52.7	47.8	49.1	49.4	52.2	52.0	51.9	51.8	51.7	51.6	51.7	51.8
	PF	0.961	0.952	0.945	0.944	0.953	0.952	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
	MW	51.2	50.7	45.1	45.2	46.2	41.7	42.8	43.2	45.8	45.6	45.5	45.4	45.3	45.3	45.3	45.4
	MVA _r	14.7	16.3	15.6	15.9	14.8	13.4	13.9	14.0	14.9	14.8	14.8	14.7	14.7	14.7	14.7	14.7
	50% POE MVA	53.3	53.3	47.7	47.9	48.5	43.8	45.1	45.4	48.1	48.0	47.9	47.8	47.6	47.6	47.7	47.8
	PF	0.961	0.952	0.945	0.944	0.953	0.952	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
Test Australia [^]	Actual MVA	0.3	0.3	0.3	0.3	0.3	0.3										
	MW	0.2	0.3	0.3	0.2	0.3	0.3										
	MVA _r	0.2	0.2	0.2	0.2	0.2	0.2										
	10% POE MVA	0.3	0.3	0.3	0.3	0.3	0.3										
	PF	0.786	0.807	0.767	0.801	0.801	0.867										
Undiversified	MW	124.6	156.7	133.7	134.6	143.8	154.4										
	MVA _r	153.8	159.4	152.0	150.8	155.9	148.6	152.7	156.4	158.7	158.1	157.6	157.2	156.7	156.4	156.5	156.5
	10% POE MVA	156.2	163.0	156.6	155.7	159.4	152.1	158.4	162.2	164.6	164.1	163.5	163.0	162.6	162.2	162.3	162.4
	PF	0.985	0.978	0.971	0.968	0.978	0.977	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	MW	142.4	148.0	140.6	139.4	144.5	138.1	142.2	145.9	148.2	147.6	147.1	146.7	146.2	145.9	146.0	146.0
	MVA _r	17.1	19.8	27.7	31.0	28.0	24.9	33.6	34.4	35.2	35.1	35.0	34.9	34.8	34.7	34.7	34.7
	50% POE MVA	144.6	144.9	144.9	143.9	147.8	141.3	147.7	151.5	153.9	153.3	152.8	152.3	151.8	151.5	151.6	151.7
	PF	0.985	1.021	0.970	0.969	0.978	0.977	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963

Note: ^ Test Australia is planned to be supplied from Jordan Springs

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		107.4	135.6	105.4	81.1	132.3	148.9										
Diversified+ (Meter)	MW	115.7	120.1	119.7	102.5	127.4	130.0	133.3	136.5	138.5	138.0	137.6	137.2	136.8	136.5	136.5	136.6
	MVA _r	39.3	5.4	4.3	36.1	41.9	41.6	42.6	43.7	44.3	44.1	44.0	43.9	43.7	43.6	43.7	43.7
	10% POE MVA	122.2	120.3	119.8	108.7	134.1	136.5	139.9	143.3	145.4	144.9	144.4	144.0	143.6	143.3	143.4	143.4
	PF	0.947	0.999	0.999	0.943	0.950	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
50% POE	MW	106.4	110.8	110.4	93.2	117.4	120.5	124.1	127.3	129.3	128.8	128.4	128.0	127.6	127.3	127.4	127.5
	MVA _r	36.2	5.0	4.0	32.9	38.6	38.5	39.7	40.7	41.4	41.2	41.1	40.9	40.8	40.7	40.7	40.8
	MVA	112.4	110.9	110.5	98.8	123.5	126.5	130.3	133.7	135.8	135.3	134.8	134.4	134.0	133.7	133.7	133.8
	PF	0.947	0.999	0.999	0.943	0.950	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952

Note: + Diversified values which are greater than undiversified values are due to abnormal switching.
There is 60 MVA_r of capacitors installed on the 33kV busbar.

3.27 Regentville TS Demand Forecast

Discussion

Regentville BSP is owned by TransGrid and has two 375MVA 330/132kV transformers installed, providing a firm capacity of 375MVA. Regentville BSP supplies Penrith transmission substation (TS) and Glenmore Park, Penrith, North Warragamba and Luddenham zone substations.

The development of the second stage of Glenmore Park and the development of the North Penrith Defence site are the main sources of load growth at Regentville. However, there is significant load growth caused by multiple commercial and multi-unit development applications in Penrith ZS area.

The Penrith Panthers development is gathering pace and after their recreational facility got connected, they intend to continue with other developments within their site.

There is also a large Science Park development, in which the first stage will be supplied of Luddenham ZS.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Glenmore Park	2 x 45	90
Penrith 11KV	2 x 34/44/52/65	130
North Warragamba	1 x 25 + 1x15	40
Luddenham	2 x 15	30

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Glenmore Park	UCL5470	2020	1.8	0.9	2.0
Glenmore Park	ULL2439	2018	0.5	0.2	0.5
Glenmore Park	UML6845	2018	0.2	0.1	0.2
Glenmore Park	URS17727	2018	0.2	0.1	0.2
Glenmore Park	URS17728	2018	0.1	0.1	0.2
Glenmore Park	URS18643	2019	0.4	0.2	0.5
Luddenham	NCL 1399	2020	0.6	0.3	0.6
Luddenham	NLL0221 - RAAF Base	2019	1.4	0.7	1.5
Luddenham	UIS0744 Science Park, Luddenham	2018	0.8	0.4	0.9
Luddenham	URS19094	2018	0.1	0.1	0.1
Penrith 11kV	ENL2443 Belmore St	2021	0.5	0.2	0.6
Penrith 11kV	ENL2548 High St – Phrase 1	2022	1.1	0.5	1.3
Penrith 11kV	ENL2548 High St – Phrase 2	2023	1.1	0.5	1.3
Penrith 11kV	ENL2548 High St – Phrase 3	2024	1.1	0.5	1.3
Penrith 11kV	ENL2548 High St – Phrase 4	2022	0.3	0.2	0.4
Penrith 11kV	ENL2601 Mulgoa Rd – Phrase 1	2021	1.0	0.5	1.1
Penrith 11kV	ENL2601 Mulgoa Rd – Phrase 2	2022	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 1	2022	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 2	2023	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 3	2024	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 4	2025	0.4	0.2	0.5
Penrith 11kV	ENL2684 Station St – Phrase 5	2026	1.1	0.5	1.3
Penrith 11kV	ENL2728 Union Rd – Phrase 1	2022	1.1	0.5	1.3
Penrith 11kV	ENL2728 Union Rd – Phrase 2	2023	0.3	0.1	0.3
Penrith 11kV	ENL2728 Union Rd – Phrase 3	2024	1.1	0.5	1.3
Penrith 11kV	Penrith multi-use Development	2020	0.9	0.4	1.0
Penrith 11kV	Penrith multi-use Development	2021	0.9	0.4	1.0
Penrith 11kV	Penrith multi-use Development	2022	1.1	0.5	1.2
Penrith 11kV	UCL6577	2019	1.8	0.9	2.0
Penrith 11kV	UCL7561	2019	1.2	0.6	1.3
Penrith 11kV	UCL7891	2019	0.2	0.1	0.3
Penrith 11kV	UCL8562	2018	0.6	0.3	0.7
Penrith 11kV	UCL8594 - Retirement village, Penrith	2019	1.2	0.6	1.3
Penrith 11kV	UCL8744	2019	0.6	0.3	0.7
Penrith 11kV	UIL4429	2018	0.6	0.3	0.6
Penrith 11kV	UIL5062	2019	0.3	0.2	0.4
Penrith 11kV	UML6687	2018	0.2	0.1	0.2
Penrith 11kV	UML6908	2018	0.5	0.3	0.6
Penrith 11kV	UML6985	2019	0.1	0.04	0.1
Penrith 11kV	UML7277	2018	1.0	0.5	1.1

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Penrith 11kV	UML7372	2018	0.2	0.1	0.2
Penrith 11kV	UML7506 - 40-50 Union Rd Penrith	2019	0.4	0.2	0.4
Penrith 11kV	UML8043	2019	0.3	0.1	0.3

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Luddenham	ENL2652 - Science Park	2018	3	7.5
Penrith 11kV	North Penrith – Urban Growth (UCS0432)	2017	4	5.7

Generation

No Generation known at this location

Regentville TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Glenmore Park	Actual MVA	29.8	38.3	36.9	36.6	38.3	44.8										
	MW	40.8	40.6	41.5	41.2	42.7	40.6	41.2	41.4	42.8	42.6	42.4	42.2	42.0	41.9	41.9	41.8
	MVAr	9.8	10.7	10.1	9.3	8.8	8.8	8.9	9.0	9.3	9.2	9.2	9.1	9.1	9.1	9.1	9.1
	10% POE MVA	41.9	42.0	42.7	42.2	43.6	41.5	42.2	42.4	43.7	43.5	43.4	43.2	43.0	42.9	42.8	42.8
	PF	0.972	0.967	0.972	0.975	0.979	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW	37.4	37.2	38.2	37.8	39.1	36.5	37.1	37.3	38.6	38.4	38.3	38.1	37.9	37.8	37.7	37.7
	MVAr	9.0	9.8	9.3	8.6	8.1	7.9	8.0	8.1	8.4	8.3	8.3	8.2	8.2	8.2	8.2	8.2
	50% POE MVA	38.5	38.5	39.3	38.8	39.9	37.3	38.0	38.2	39.5	39.3	39.1	39.0	38.8	38.6	38.6	38.6
	PF	0.972	0.967	0.972	0.975	0.979	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	Actual MVA	6.7	8.9	8.6	8.8	12.1	10.9										
Luddenham	MW	8.4	8.3	8.6	8.4	8.9	8.8	8.9	13.0	14.7	14.6	14.6	14.5	14.5	14.4	14.4	14.4
	MVAr	3.7	3.7	3.8	3.7	3.7	3.6	3.6	5.3	6.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	10% POE MVA	9.2	9.1	9.4	9.2	9.7	9.5	9.6	14.1	15.8	15.8	15.7	15.7	15.6	15.6	15.5	15.5
	PF	0.916	0.915	0.912	0.915	0.923	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
	MW	7.6	7.5	7.7	7.6	8.1	7.9	8.0	12.1	13.8	13.7	13.6	13.6	13.5	13.5	13.5	13.5
	MVAr	3.3	3.3	3.5	3.4	3.4	3.2	3.2	4.9	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.5
	50% POE MVA	8.3	8.2	8.5	8.3	8.7	8.5	8.6	13.1	14.8	14.8	14.7	14.7	14.6	14.6	14.6	14.5
	PF	0.916	0.915	0.912	0.915	0.923	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
	Actual MVA	7.5	9.5	9.2	8.5	10.5	12.0										
North Warragamba	MW	9.3	9.1	9.2	9.3	9.7	10.3	10.3	10.2	10.2	10.1	10.1	10.0	10.0	9.9	9.9	9.9
	MVAr	4.0	3.9	3.5	3.6	1.6	3.8	4.4	4.4	4.4	4.4	4.3	4.3	4.3	4.3	4.3	4.3
	10% POE MVA	10.1	9.9	9.9	10.0	9.9	11.0	11.2	11.1	11.1	11.0	11.0	10.9	10.9	10.8	10.8	10.8
	PF	0.917	0.920	0.935	0.932	0.987	0.940	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918
	MW	8.2	8.1	8.2	8.2	8.8	9.5	9.4	9.4	9.3	9.3	9.2	9.2	9.1	9.1	9.1	9.1
	MVAr	3.6	3.4	3.1	3.2	1.4	3.4	4.1	4.0	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.9
	50% POE MVA	9.0	8.8	8.7	8.8	8.9	10.1	10.3	10.2	10.1	10.1	10.0	10.0	9.9	9.9	9.9	9.9
	PF	0.917	0.920	0.935	0.932	0.987	0.940	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918
	Actual MVA	45.1	47.2	42.9	42.1	46.2	46.7										
Penrith 11kV	MW	49.0	48.2	46.4	46.2	46.0	44.5	48.8	55.6	56.9	58.9	63.7	66.0	68.9	69.6	70.8	71.0
	MVAr	9.3	8.4	13.0	5.3	16.9	12.5	12.0	13.7	14.0	14.5	15.7	16.3	17.0	17.2	17.5	17.5
	10% POE MVA	49.9	48.9	48.2	46.5	49.0	46.2	50.2	57.3	58.6	60.7	65.7	67.9	71.0	71.7	72.9	73.2
	PF	0.982	0.985	0.963	0.993	0.939	0.962	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
	MW	46.4	45.6	43.8	43.6	43.4	42.1	46.4	53.2	54.5	56.5	61.4	63.6	66.5	67.2	68.4	68.6
	MVAr	8.8	7.9	12.2	5.0	15.9	11.9	11.4	13.1	13.4	13.9	15.1	15.7	16.4	16.6	16.9	16.9
	50% POE MVA	47.2	46.3	45.5	43.9	46.2	43.7	47.7	54.8	56.1	58.2	63.2	65.5	68.5	69.2	70.5	70.7
	PF	0.982	0.985	0.963	0.993	0.939	0.962	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
	Actual MVA	89.2	103.9	97.5	96.0	107.1	114.4										
Undiversified	MW	107.4	106.3	105.7	105.1	107.3	104.1	109.1	120.2	124.5	126.2	130.7	132.7	135.3	135.8	137.0	137.2
	MVAr	26.8	26.6	30.4	21.9	31.1	28.7	29.0	32.4	33.6	34.1	35.2	35.6	36.3	36.4	36.7	36.7
	10% POE MVA	111.1	109.9	110.2	107.9	112.1	108.2	113.2	124.8	129.2	131.0	135.7	137.7	140.4	140.9	142.1	142.3
	PF	0.967	0.967	0.960	0.974	0.957	0.963	0.964	0.963	0.963	0.963	0.964	0.964	0.964	0.964	0.964	0.964
	MW	99.6	98.5	97.9	97.3	99.3	95.9	100.9	112.0	116.2	117.9	122.5	124.4	127.1	127.6	128.7	128.9
	MVAr	24.7	24.5	28.1	20.1	28.9	26.4	26.8	30.2	31.4	31.8	33.0	33.4	34.1	34.2	34.5	34.5
	50% POE MVA	103.0	101.8	102.0	99.8	103.8	99.6	104.6	116.2	120.6	122.4	127.1	129.1	131.8	132.4	133.5	133.7
	PF	0.968	0.967	0.960	0.975	0.957	0.963	0.964	0.963	0.963	0.963	0.964	0.964	0.964	0.964	0.964	0.964

3.28 Shoalhaven TS Demand Forecast

Discussion

Shoalhaven TS has three 60 MVA 132/33kV transformers providing a firm rating of 120 MVA.

Shoalhaven City Council (SCC) released their structure plan for the strategic direction of the Nowra / Bomaderry area in October 2006. This strategic plan was endorsed by the NSW Department of Planning and Infrastructure in February 2008. SCC is intending to have all release areas rezoned in the Draft Shoalhaven Local Environment Plan (SLEP) 2013, pending approval. The main green field expansion area is expected to be the West Bomaderry area with up to 4000 residential lots to be released over the next 20-30 years. SCC expects the initial release areas to be Mundamia (approx. 59ha; 890 dwellings), Worrigee (approx. 38ha; 500 dwellings) and Moss Vale Road South (approx. 104ha; 1,170 dwellings).

Burrier pumping station may operate during peak periods. Bamarang is also a pumping station with similar operating characteristics.

Zone substations Culburra, Huskisson, South Nowra and Sussex Inlet have now moved onto West Tomerong TS.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Shoalhaven	3 x 60	180
Berry	2 x 15	30
Bolong	1 x 12.5	12.5
Bomaderry	3 x 10/12.5/15	45
Kangaroo Valley	1 x 5 + 1 x 2.5	7.5
Nowra	2 x 22/29/35	70

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
APM	Factory Closure	2018	-0.2	0.1	-0.2
Berry	NLL0205	2019	0.1	0.03	0.1
Berry	UCL8332 - Bupa Health Services	2018	0.5	0.2	0.6
Bomaderry	NLL0187 - Shoalhaven Water	2019	2.2	1.0	2.4
Bomaderry	ULL2345 - Shoalhaven Water (Waste Water Treatment Plant)	2018	1.3	0.6	1.4
Bomaderry	ULL2533 - Bomaderry, Indoor Sports Centre	2018	0.4	0.2	0.4
Bomaderry	URS17845 - Nowra, 36 Units	2018	0.3	0.1	0.3
HMAS Albatross	ULL2036 - HMAS Albatross	2025	10.3	5.0	11.4
Manildra	UIL4489 - Manildra (Stage 2 Load Increase) to 39MVA	2019	5.7	2.7	6.3
Nowra	ULL2548 - Local Gov. Load	2018	0.6	0.3	0.7
Nowra	URS13057 - South Nowra, 22 Units	2019	0.1	0.05	0.1
South Nowra	UIL5078 - Air Affairs Australia	2018	0.6	0.3	0.7

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Berry	URS16750 - Huntingdale Berry, Stage 3B - 29 lots	2016	5	0.1
Bomaderry	North Bomaderry & Nowra Release Area	2020	20	25.0
Bomaderry	URS11890 - Bomaderry 48 lots	2013	5	0.1
Bomaderry	URS12298 - North Nowra 32 lots	2015	3	0.1
Bomaderry	URS14235 - Cambewarra Stage 1, 15 of 48 Lots	2015	5	0.1
Huskisson	URS17961 - Bayswood Vincentia, Stage 9A	2018	3	0.1
Nowra	URS16882 - Nowra, Stage 7 - 26 Lots	2017	5	0.1
South Nowra	URS18522 - Old Southern Rd, 25 lots	2019	4	0.1

Generation

Zone Substation	Name	Description	Date
Nowra	Nowra Generator	1 x 1MVA (Unity power factor) - connected to 11kV network	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2015	Brundee	Shoalhaven	West Tomerong
2015	Culburra	Shoalhaven	West Tomerong
2015	Huskisson	Shoalhaven	West Tomerong
2015	South Nowra	Shoalhaven	West Tomerong
2015	Sussex Inlet	Shoalhaven	West Tomerong

Shoalhaven TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
APM Major customer	Actual MVA	2.8	2.8	2.7	2.7	0.4	0.3										
	MW	2.7	2.7	2.7	2.6	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	MVAr	0.8	0.7	0.6	0.8	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	10% POE MVA	2.8	2.8	2.7	2.7	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PF	0.963	0.971	0.972	0.959	0.722	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832
50% POE	MW	2.7	2.7	2.7	2.6	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	MVAr	0.8	0.7	0.6	0.8	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	MVA	2.8	2.8	2.7	2.7	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PF	0.963	0.971	0.972	0.959	0.722	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832
Bamarang Major customer	Actual MVA	0.4	0.4	0.4	0.4	0.2	0.2										
	MW	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	MVAr	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	10% POE MVA	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	PF	0.796	0.796	0.796	0.796	0.806	0.806	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
50% POE	MW	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	MVAr	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	MVA	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	PF	0.796	0.796	0.796	0.796	0.806	0.806	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
Berry	Actual MVA	6.5	9.1	6.6	6.9	8.2	9.0										
	MW	8.3	8.3	8.3	8.3	8.7	9.1	9.5	9.5	9.5	9.5	9.4	9.4	9.3	9.3	9.3	9.3
	MVAr	2.5	2.4	2.4	2.3	2.1	1.9	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	10% POE MVA	8.7	8.6	8.6	8.6	9.0	9.3	9.9	9.9	9.8	9.8	9.7	9.7	9.7	9.6	9.6	9.6
	PF	0.959	0.960	0.960	0.965	0.971	0.978	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
50% POE	MW	6.8	6.8	6.7	6.7	7.1	7.5	7.9	8.0	7.9	7.9	7.8	7.8	7.7	7.7	7.7	7.7
	MVAr	2.0	2.0	2.0	1.8	1.7	1.6	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	MVA	7.1	7.0	7.0	7.0	7.3	7.7	8.2	8.2	8.2	8.1	8.1	8.0	8.0	8.0	8.0	7.9
	PF	0.959	0.960	0.960	0.965	0.971	0.978	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
Bolong	Actual MVA	1.8	2.8	1.8	2.2	2.3	3.0										
	MW	1.8	2.6	1.8	2.0	2.2	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.7
	MVAr	0.5	1.1	0.4	0.8	0.8	0.8	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	10% POE MVA	1.8	2.8	1.8	2.2	2.3	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9
	PF	0.964	0.927	0.970	0.928	0.935	0.967	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
50% POE	MW	1.8	2.6	1.8	2.0	2.2	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.7
	MVAr	0.5	1.1	0.4	0.8	0.8	0.8	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	MVA	1.8	2.8	1.8	2.2	2.3	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9
	PF	0.964	0.927	0.970	0.928	0.935	0.967	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
Bomaderry	Actual MVA	17.3	21.2	17.6	16.6	21.1	21.0										
	MW	21.9	21.2	21.6	21.7	22.5	19.5	21.0	22.8	22.8	23.0	23.4	24.0	24.8	25.8	27.0	28.4
	MVAr	7.0	6.2	6.6	6.6	6.0	4.6	6.1	6.6	6.6	6.7	6.8	6.9	7.2	7.5	7.8	8.2
	10% POE MVA	23.0	22.1	22.6	22.6	23.2	20.0	21.9	23.7	23.7	23.9	24.4	25.0	25.8	26.8	28.1	29.6
	PF	0.952	0.959	0.957	0.956	0.966	0.973	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
50% POE	MW	18.0	17.3	17.7	17.7	18.4	17.5	19.1	20.8	20.8	21.0	21.4	22.0	22.8	23.8	25.0	26.5
	MVAr	5.8	5.1	5.4	5.4	4.9	4.2	5.5	6.0	6.0	6.1	6.2	6.4	6.6	6.9	7.2	7.7
	MVA	18.9	18.0	18.5	18.5	19.0	18.0	19.8	21.7	21.7	21.9	22.3	22.9	23.7	24.8	26.1	27.5
	PF	0.952	0.959	0.957	0.956	0.966	0.973	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
Brundee Major customer	Actual MVA	0.4	0.4	0.4													
	MW	0.3	0.3	0.3													
	MVAr	0.2	0.2	0.2													
	10% POE MVA	0.4	0.4	0.4													
	PF	0.854	0.823	0.828													
50% POE	MW	0.3	0.3	0.3													
	MVAr	0.2	0.2	0.2													
	MVA	0.4	0.4	0.4													
	PF	0.854	0.823	0.828													
Burrier Major customer	Actual MVA	2.1	2.2	2.2	2.1	2.2	2.2										
	MW	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	MVAr	0.8	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	10% POE MVA	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	PF	0.920	0.919	0.918	0.921	0.912	0.913	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917
50% POE	MW	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	MVAr	0.8	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	MVA	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	PF	0.920	0.919	0.918	0.921	0.912	0.913	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Culburra	Actual MVA	8.5	11.3	8.9													
	MW	8.2	10.7	8.6													
	MVAr	2.4	3.7	2.4													
	10% POE MVA	8.5	11.3	8.9													
	PF	0.958	0.945	0.963													
	MW	8.2	10.7	8.6													
	MVAr	2.4	3.7	2.4													
	50% POE MVA	8.5	11.3	8.9													
	PF	0.958	0.945	0.963													
	Actual MVA				4.0	4.0	5.1										
HMAS Albatross	MW				3.8	3.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	13.5	13.5	13.5
	MVAr				1.2	1.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	4.4	4.4	4.4
	10% POE MVA				4.0	4.0	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	14.2	14.2	14.2
	PF				0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	MW				3.8	3.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	13.5	13.5	13.5
	MVAr				1.2	1.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	4.4	4.4	4.4
	50% POE MVA				4.0	4.0	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	14.2	14.2	14.2
	PF				0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA	16.1	23.0	15.6													
Huskisson	MW	14.5	22.0	15.1													
	MVAr	7.0	6.6	4.1													
	10% POE MVA	16.1	23.0	15.6													
	PF	0.900	0.958	0.965													
	MW	14.5	22.0	15.1													
	MVAr	7.0	6.6	4.1													
	50% POE MVA	16.1	23.0	15.6													
	PF	0.900	0.958	0.965													
	Actual MVA	2.2	2.7	2.4	2.4	2.5	3.1										
Kangaroo Valley	MW	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5
	MVAr	1.2	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	10% POE MVA	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
	MW	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	MVAr	1.0	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	50% POE MVA	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
	Actual MVA	32.0	32.4	32.0	31.4	33.4	35.5										
Manildra Major customer	MW	29.5	29.9	29.5	28.5	30.3	32.6	32.6	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
	MVAr	12.4	12.6	12.5	13.2	14.1	13.9	13.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
	10% POE MVA	32.0	32.4	32.0	31.4	33.4	35.5	35.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
	PF	0.922	0.921	0.921	0.907	0.907	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
	MW	29.5	29.9	29.5	28.5	30.3	32.6	32.6	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
(Shoalhaven Milling)	MVAr	12.4	12.6	12.5	13.2	14.1	13.9	13.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
	50% POE MVA	32.0	32.4	32.0	31.4	33.4	35.5	35.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
	PF	0.922	0.921	0.921	0.907	0.907	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
	Actual MVA	23.4	25.4	21.1	21.5	23.5	26.2										
	MW	26.2	25.8	25.0	25.1	24.8	28.4	28.9	28.9	28.9	28.8	28.8	28.7	28.6	28.6	28.7	28.7
Nowra	MVAr	6.6	2.7	2.5	3.4	2.8	1.6	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	10% POE MVA	27.0	26.0	25.1	25.4	25.0	28.5	29.2	29.2	29.2	29.1	29.0	29.0	28.9	28.9	29.0	29.0
	PF	0.970	0.995	0.995	0.991	0.994	0.998	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
	MW	23.0	22.7	21.8	22.0	22.1	22.9	23.4	23.5	23.4	23.3	23.3	23.2	23.2	23.1	23.2	23.2
	MVAr	5.8	2.3	2.2	3.0	2.5	1.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	50% POE MVA	23.7	22.8	21.9	22.2	22.2	23.0	23.7	23.7	23.6	23.6	23.5	23.4	23.4	23.4	23.4	23.5
	PF	0.970	0.995	0.995	0.991	0.994	0.998	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
	Actual MVA	11.1	11.0	10.6													
South Nowra	MW	9.1	10.3	10.2													
	MVAr	4.5	4.9	4.9													
	10% POE MVA	10.2	11.4	11.3													
	PF	0.899	0.905	0.900													
	MW	8.3	9.5	9.4													
	MVAr	4.1	4.5	4.5													
	50% POE MVA	9.3	10.6	10.4													
	PF	0.899	0.905	0.900													
	Actual MVA	5.0	6.5	4.8													
Sussex Inlet	MW	4.7	6.2	4.7													
	MVAr	1.7	2.1	1.2													
	10% POE MVA	5.0	6.5	4.8													
	PF	0.942	0.948	0.966													
	MW	4.7	6.2	4.7													
	MVAr	1.7	2.1	1.2													
	50% POE MVA	5.0	6.5	4.8													
	PF	0.942	0.948	0.966													

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Undiversified	Actual MVA	129.7	151.3	127.2	90.1	98.0	105.6										
	MW	131.9	144.9	132.5	96.8	97.4	102.4	104.7	111.2	111.0	111.1	111.4	111.8	112.5	122.1	123.3	124.8
	MVAr	47.8	45.0	39.9	30.2	29.3	26.6	31.2	33.7	33.6	33.7	33.8	33.9	34.1	37.2	37.6	38.0
	10% POE MVA	140.7	152.6	139.2	102.1	102.6	106.9	109.9	116.8	116.7	116.7	117.0	117.5	118.2	128.3	129.6	131.1
	PF	0.937	0.950	0.952	0.948	0.950	0.959	0.953	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
	MW	122.1	135.1	122.7	87.8	88.7	93.0	95.3	101.7	101.6	101.7	101.9	102.4	103.1	112.6	113.9	115.4
	MVAr	44.7	42.6	37.4	28.1	27.4	25.3	29.3	31.8	31.8	31.8	31.9	32.0	32.2	35.3	35.7	36.1
	50% POE MVA	130.4	142.5	129.1	92.8	93.7	97.3	100.2	107.2	107.0	107.1	107.4	107.9	108.6	118.6	120.0	121.5
	PF	0.936	0.949	0.951	0.946	0.947	0.956	0.951	0.949	0.949	0.949	0.949	0.949	0.949	0.950	0.950	0.950
	Actual MVA	112.5	136.7	109.2	78.0	89.3	92.9										
Diversified (Meter)	MW	128.9	129.5	128.8	103.2	100.5	100.1	99.4	105.5	105.4	105.4	105.7	106.1	106.8	115.9	117.1	118.5
	MVAr	28.9	34.3	28.2	17.4	19.3	17.0	16.9	17.9	17.9	17.9	17.9	18.0	18.1	19.7	19.9	20.1
	10% POE MVA	132.1	133.9	131.8	104.6	102.4	101.5	100.8	107.0	106.9	106.9	107.2	107.6	108.3	117.5	118.7	120.2
	PF	0.976	0.967	0.977	0.986	0.982	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	Actual MVA	112.5	136.7	109.2	78.0	89.3	92.9										
	MW	113.2	113.7	113.0	87.4	86.2	88.3	90.4	96.5	96.4	96.5	96.7	97.2	97.8	106.9	108.1	109.5
	MVAr	25.4	30.1	24.7	14.7	16.6	15.0	15.4	16.4	16.4	16.4	16.4	16.5	16.6	18.2	18.4	18.6
	50% POE MVA	116.0	117.6	115.7	88.6	87.8	89.5	91.7	97.9	97.8	97.9	98.1	98.6	99.2	108.4	109.7	111.1
	PF	0.976	0.967	0.977	0.986	0.982	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	Actual MVA	112.5	136.7	109.2	78.0	89.3	92.9										

3.29 Springhill TS Demand Forecast

Discussion

Springhill TS has three 120 MVA transformers to supply the Endeavour Energy load. Wongawilli Colliery is expected to recommence operations in July 2016. The Nan Tien Campus is planned to be established in Unanderra and development is expected to continue at the University of Wollongong Innovation Campus, both developments are included in this load forecast. Further residential and commercial developments are expected to result in load growth in and around the Wollongong CBD.

Dapto ZS was transferred to Springhill TS when the augmentation of Dapto ZS was completed in late 2011. The development of West Dapto is proposed to create 20,000 lots over 30-35 years, with initial development connecting to Dapto and Kembla Grange zone substations. Ultimately, West Dapto is expected to require two additional zone substations supplied from the Dapto BSP 132kV network. Therefore, the remainder of the development has been included in the Dapto 132kV TS Forecast. In addition to West Dapto, the land surrounding the Tallawarra generator has the potential to yield 1200 dwellings as well as 67ha of industrial/commercial land. The load for the Tallawarra development is proposed to be supplied from Dapto ZS.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Springhill	3 x 120	360
Dapto	3 x 15/19/25	75
Figtree	2 x 25	50
Inner Harbour	2 x 12.5	25
Kembla Grange	2 x 10	20
Kenny Street	2 x 25	50
North Wollongong	2 x 19	38
Port Kembla	2 x 25	50
South Wollongong	2 x 19	38
Unanderra	3 x 12	36
West Wollongong	1 x 10 + 2 x 12.5	35

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2021	Dapto	Springhill	West Dapto	Dapto 132kV	0.7
2021	Kembla Grange	Springhill	West Dapto	Dapto 132kV	1.9

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Dapto	UCL 5915 - Illawarra International Health Precinct Stage 1	2021	1.8	0.9	2.0
Dapto	UCL7329 - Retirement Village (IRT)	2019	0.5	0.3	0.6
Dapto	UCL8253 - 5 x Commercial Units	2019	0.2	0.1	0.2
Dapto	UIL5112 - Industrial Units	2019	0.2	0.1	0.2
Dapto	UML7160 - 34 Units, Dapto	2019	0.1	0.1	0.2
Dapto	UML7160 - Dapto, 34 Units	2018	0.1	0.1	0.2
Dapto	UML7394 - Avondale, 44 Residential Units	2018	0.2	0.1	0.2
Dapto	URS16548 - Kanahooka, 29 Townhouses	2017	0.2	0.1	0.2
Figtree	NIL0221 - Dendrobium Portal	2018	0.9	0.4	1.0
Figtree	UCL6885 - Greenhill Nursing Home	2018	0.4	0.2	0.5
Kembla Grange	Prysmian Cables Relocation	2021	8.4	4.1	9.4
Kenny Street	UCL8097 - Commercial Building	2019	0.6	0.3	0.7
Kenny Street	UML6788 - Wollongong, 85 Residential Units	2019	0.4	0.2	0.4
Kenny Street	UML7114 - Wollongong, 72 Units & Commercial Premises	2019	1.4	0.7	1.5
North Wollongong	UCL6816 - Admin Building UOW Campus East	2018	0.8	0.4	0.9
North Wollongong	UCL8561 - Illawarra Master Builders Club (Multi-story car park)	2019	0.05	0.02	0.1
North Wollongong	UML6571 - Residential 66 Units	2018	0.2	0.1	0.2
North Wollongong	UML6819 - Wollongong, 20 Units	2018	0.1	0.1	0.1
North Wollongong	UML7117 - 34 Units, North Wollongong	2019	0.2	0.1	0.2
Port Kembla	UIL4649 - Unanderra, Industrial Load	2019	1.0	0.5	1.1
South Wollongong	UCL7334 - Wollongong, IRT Seniors Living	2018	0.5	0.2	0.6
South Wollongong	UML6849 & UML7285 - Wollongong, 56 Units	2018	0.3	0.1	0.3
South Wollongong	UML7114 - Wollongong, 144 Units & 9 Shops	2018	1.6	0.8	1.7
South Wollongong	UML7114 - Wollongong, 72 Units & Commercial Premises	2019	1.4	0.7	1.5
Telstra HVC	NUL0583 - Telstra Mobile Site	2018	0.05	0.02	0.1
Unanderra	UIL5216 - Metronode Data Warehouse	2019	1.1	0.5	1.3
Unanderra	UIL5216 - Metronode Data Warehouse	2021	4.5	2.2	5.0
Unanderra	UIL5216 - Metronode Data Warehouse	2023	3.4	1.6	3.8

Unanderra	UIL5216 - Metronode Data Warehouse	2025	3.4	1.6	3.8
Unanderra	UIL5216 - Metronode Data Warehouse	2027	3.4	1.6	3.8

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Unanderra	UIL5216 - Metronode Data Warehouse	2029	2.3	1.1	2.5
West Wollongong	UCL6306 - Wollongong Day Surgery	2018	0.5	0.3	0.6
West Wollongong	UML6902 - Wollongong, 23 Units	2018	0.2	0.1	0.2

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Dapto	ENL2835 - 1200 Lots Bong Rd Huntley	2020	5	6.0
Dapto	URS10175 and URS12346 - (WLI) West Dapto (The Pinnacle) - 82 lot subdivision	2012	7	0.2
Dapto	URS10177 - (WLI) West Dapto (Brooks Reach) Stage 1, 37	2013	5	1.0
Dapto	URS11557 - Kanahooka, 81 lot subdivision	2013	5	0.2
Dapto	URS17353 - (WLI) West Dapto (Brooks Reach), Stage 14C - 51 Lots	2018	4	0.2
Dapto	URS17551 - (WLI) West Dapto (Brooks Reach), Stage 14E - 7 Lots	2018	1	0.03
Dapto	URS17552 - (WLI) West Dapto (Brooks Reach), Stage 15A - 46 Lots	2019	4	0.2
Dapto	URS17553 - (WLI) West Dapto (Brooks Reach), Stage 15B - 8 Lots	2019	1	0.0
Dapto	URS17554 - (WLI) West Dapto (Brooks Reach), Stage 16 - 48 Lots	2019	4	0.2
Dapto	URS17740 - 177 units/townhouses (6 stages)	2018	4.0	0.6
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 1A - 105 Lots	2019	4	0.4
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 1B - 22 Lots	2023	1	0.1
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 1C - 11 Lots	2023	1	0.04
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 2A - 129 Lots	2024	5	0.5
Figtree	UIS 0379 - 6 lot Edney Lane commercial subdivision	2017	5	0.2
Figtree	URS10119 - Redgum Ridge Estate - 178 lot subdivision	2012	7	0.3
Kembla Grange	URS13084 - (WLI) West Dapto (Sheargold) Smiths Ln Wongawilli Stage 3 of 5, 17 lot subdivision	2017	2	0.1
Kembla Grange	URS13086 - (WLI) West Dapto (Sheargold) Smiths Ln Wongawilli Stage 5 of 5, 13 lot subdivision	2016	3	0.03
Kembla Grange	URS13336 - (WLI) West Dapto (Alkira Estate) Shone Ave, 117 lot subdivision	2016	5	0.5
Kembla Grange	URS15808 - (WLI) West Dapto (Lynden View) West Dapto Rd 82 lot subdivision	2016	6	0.3
Kembla Grange	URS15845 & URS15848 - (WLI) West Dapto (Vista Park), 129 Lots	2016	6	0.5
South Wollongong	UML 6121 - 317 units plus commercial space	2016	2	0.8
Unanderra	UIS0660- Berkeley Rd 17 lot industrial subdivision	2017	4	0.8

Generation

Zone Substation	Name	Description	Date
Springhill	Wyuna Waters	2 x 3.25 + 750kW hydro (net effect to system is zero)	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2012	Dapto	Mount Terry TS	Springhill TS

Springhill TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
BHP Cordeaux Colliery	Actual MVA					0.1	0.1										
	MW					0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	MVA _r					0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	10% POE MVA					0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Major customer –HVC93002	PF					0.608	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539
	MW					0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	MVA _r					0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	50% POE MVA					0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PF					0.608	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539
Dendrobium Mine	Actual MVA	8.7	9.3	10.9	9.4	11.0	10.3										
	MW	8.0	8.9	9.5	9.1	9.7	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
	MVA _r	3.8	2.6	5.3	2.3	6.8	2.8	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	10% POE MVA	8.9	9.3	10.9	9.4	11.9	10.3	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
Major customer –HVC21436	PF	0.906	0.961	0.874	0.971	0.817	0.961	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906
	MW	8.0	8.9	9.5	9.1	9.7	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
	MVA _r	3.8	2.6	5.3	2.3	6.8	2.8	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	50% POE MVA	8.9	9.3	10.9	9.4	11.9	10.3	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
	PF	0.906	0.961	0.874	0.971	0.817	0.961	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906
Dendrobium Vent Fan B	Actual MVA					0.6	0.6										
	MW					0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	MVA _r					0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	10% POE MVA					0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Major customer –HVC25413	PF					0.967	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	MW					0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	MVA _r					0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	50% POE MVA					0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	PF					0.967	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
Dapto	Actual MVA	28.1	33.4	26.6	25.1	32.9	34.7										
	MW	33.8	33.1	33.1	33.8	34.9	34.9	35.2	36.3	37.0	39.2	40.9	42.0	42.3	42.3	42.5	42.6
	MVA _r	4.0	4.0	3.2	2.3	5.9	2.7	4.6	4.8	4.8	5.1	5.4	5.5	5.5	5.5	5.6	5.6
	10% POE MVA	34.0	33.3	33.3	33.9	35.4	35.0	35.5	36.6	37.3	39.5	41.2	42.4	42.7	42.7	42.8	43.0
Major customer –HVC93008	PF	0.993	0.993	0.995	0.998	0.986	0.997	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	MW	28.4	27.7	27.8	28.4	29.7	30.0	30.3	31.4	32.1	34.3	36.0	37.1	37.4	37.4	37.6	37.7
	MVA _r	3.3	3.4	2.7	1.9	5.0	2.3	4.0	4.1	4.2	4.5	4.7	4.9	4.9	4.9	4.9	4.9
	50% POE MVA	28.6	27.9	27.9	28.5	30.1	30.1	30.5	31.6	32.3	34.6	36.3	37.4	37.7	37.7	37.9	38.0
	PF	0.993	0.993	0.995	0.998	0.986	0.997	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
Grain Terminal	Actual MVA	4.3	4.5	4.4	3.8	3.7	4.2										
	MW	3.8	4.0	3.9	3.6	3.4	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
	MVA _r	2.0	2.1	1.9	1.3	1.3	1.5	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	10% POE MVA	4.3	4.5	4.4	3.8	3.7	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Major customer –HVC93008	PF	0.879	0.884	0.902	0.937	0.934	0.934	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912
	MW	3.8	4.0	3.9	3.6	3.4	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
	MVA _r	2.0	2.1	1.9	1.3	1.3	1.5	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	50% POE MVA	4.3	4.5	4.4	3.8	3.7	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	PF	0.879	0.884	0.902	0.937	0.934	0.934	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912
Figtree	Actual MVA		11.5	20.4	18.5	21.8	24.8										
	MW		11.2	19.5	18.1	21.0	24.1	25.2	25.2	25.1	25.1	25.0	24.9	24.9	24.8	24.9	24.9
	MVA _r		2.8	6.0	3.7	5.7	5.7	6.4	6.4	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.3
	10% POE MVA		11.5	20.4	18.5	21.8	24.8	26.0	26.0	25.9	25.9	25.8	25.7	25.7	25.6	25.7	25.7
Major customer –HVC93008	PF		0.970	0.956	0.980	0.965	0.973	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
	MW		11.2	19.5	18.1	21.0	24.1	25.2	25.2	25.1	25.1	25.0	24.9	24.9	24.8	24.9	24.9
	MVA _r		2.8	6.0	3.7	5.7	5.7	6.4	6.4	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.3
	50% POE MVA		11.5	20.4	18.5	21.8	24.8	26.0	26.0	25.9	25.9	25.8	25.7	25.7	25.6	25.7	25.7
	PF		0.970	0.956	0.980	0.965	0.973	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
Inner Harbour	Actual MVA	9.7	9.1	9.1	9.5	9.6	8.9										
	MW	8.8	8.2	8.2	8.5	8.5	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	MVA _r	4.2	3.9	3.8	4.3	4.5	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	10% POE MVA	9.7	9.1	9.1	9.5	9.6	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Major customer –HVC93008	PF	0.903	0.905	0.906	0.892	0.886	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874
	MW	8.8	8.2	8.2	8.5	8.5	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	MVA _r	4.2	3.9	3.8	4.3	4.5	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	50% POE MVA	9.7	9.1	9.1	9.5	9.6	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	PF	0.903	0.905	0.906	0.892	0.886	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874
Kenny Street	Actual MVA	21.3	19.4	17.6	17.7	19.2	19.4										
	MW	18.8	17.9	17.1	18.1	18.3	18.7	18.7	20.6	20.6	20.6	20.7	20.7	20.7	20.8	21.0	21.1
	MVA _r	8.9	8.0	7.3	6.3	6.0		6.9	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.8
	10% POE MVA	20.8	19.6	18.6	19.1	19.2	18.7	19.9	21.9	21.9	22.0	22.0	22.1	22.1	22.2	22.4	22.5
Major customer –HVC93008	PF	0.905	0.913	0.919	0.944	0.950	1.000	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
	MW	17.7	16.8	16.0	17.0	17.2	17.4	17.3	19.3	19.3	19.3	19.3	19.4	19.4	19.5	19.7	19.8
	MVA _r	8.4	7.5	6.9	5.9	5.6		6.4	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.3
	50% POE MVA	19.6	18.4	17.4	18.0	18.1	17.4	18.5	20.5	20.5	20.6	20.6	20.6	20.7	20.8	20.9	21.1
	PF	0.905	0.913	0.919	0.944	0.950	1.000	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Kembla Grange	Actual MVA	7.2	4.2	4.4	3.4	4.1	4.4										
	MW	7.0	3.9	3.8	3.0	3.9	4.2	4.5	4.8	4.9	10.4	10.4	10.4	10.4	10.4	10.4	10.4
	MVAr	1.6	1.5	2.2	1.6	1.2	1.1	1.2	1.2	1.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	10% POE MVA	7.2	4.2	4.4	3.4	4.1	4.4	4.7	5.0	5.1	10.7	10.7	10.7	10.7	10.7	10.7	10.7
	PF	0.975	0.932	0.863	0.881	0.954	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968
	MW	7.0	3.9	3.8	3.0	3.9	4.2	4.5	4.8	4.9	10.4	10.4	10.4	10.4	10.4	10.4	10.4
	MVAr	1.6	1.5	2.2	1.6	1.2	1.1	1.2	1.2	1.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	50% POE MVA	7.2	4.2	4.4	3.4	4.1	4.4	4.7	5.0	5.1	10.7	10.7	10.7	10.7	10.7	10.7	10.7
	PF	0.975	0.932	0.863	0.881	0.954	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968
Lysaghts	Actual MVA	32.5	33.1	32.5	36.4	30.9	32.0										
	MW	29.3	31.5	30.9	34.5	29.3	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4
	MVAr	14.2	10.3	10.2	11.4	9.6	10.0	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
	10% POE MVA	32.5	33.1	32.5	36.4	30.9	32.0	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
Major customer- HVC93013	MW	29.3	31.5	30.9	34.5	29.3	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4
	MVAr	14.2	10.3	10.2	11.4	9.6	10.0	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
	50% POE MVA	32.5	33.1	32.5	36.4	30.9	32.0	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
	PF	0.900	0.950	0.950	0.950	0.950	0.950	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
Nepean Conveyors	Actual MVA					0.2	0.3										
	MW					0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	MVAr					0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10% POE MVA					0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	PF					0.905	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
Major customer- HVC22436	MW					0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	MVAr					0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	50% POE MVA					0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	PF					0.905	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
North Wollongong	Actual MVA	10.2	12.9	10.8	11.8	13.4	13.5										
	MW	10.1	12.8	10.8	11.3	13.4	13.4	14.4	14.6	14.6	14.5	14.5	14.5	14.5	14.5	14.6	14.6
	MVAr	1.0	1.6	0.8	3.6	1.1	1.0	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3
	10% POE MVA	10.2	12.9	10.8	11.8	13.4	13.5	14.6	14.8	14.7	14.7	14.7	14.7	14.7	14.7	14.8	14.8
	PF	0.995	0.992	0.997	0.952	0.997	0.997	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
	MW	10.1	12.8	10.8	11.3	13.4	13.4	14.4	14.6	14.6	14.5	14.5	14.5	14.5	14.5	14.6	14.6
	MVAr	1.0	1.6	0.8	3.6	1.1	1.0	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3
	50% POE MVA	10.2	12.9	10.8	11.8	13.4	13.5	14.6	14.8	14.7	14.7	14.7	14.7	14.7	14.7	14.8	14.8
	PF	0.995	0.992	0.997	0.952	0.997	0.997	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
Port Kembla	Actual MVA	13.0	12.9	9.9	10.9	11.9	13.1										
	MW	12.8	12.3	11.8	12.2	12.0	12.8	12.8	13.6	13.5	13.5	13.5	13.4	13.4	13.4	13.4	13.4
	MVAr	4.7	3.5	2.9	4.0	3.7	2.9	2.9	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	3.0
	10% POE MVA	13.7	12.7	12.1	12.8	12.5	13.1	13.1	13.9	13.9	13.9	13.8	13.8	13.7	13.7	13.7	13.7
	PF	0.940	0.962	0.971	0.950	0.956	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
	MW	11.4	10.8	10.3	10.7	10.8	12.8	12.8	13.6	13.5	13.5	13.5	13.4	13.4	13.4	13.4	13.4
	MVAr	4.1	3.1	2.6	3.5	3.3	2.9	2.9	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	3.0
	50% POE MVA	12.1	11.2	10.7	11.3	11.3	13.1	13.1	13.9	13.9	13.9	13.8	13.8	13.7	13.7	13.7	13.7
	PF	0.940	0.962	0.971	0.950	0.956	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
South Wollongong	Actual MVA	14.4	15.7	13.2	14.1	14.8	15.0										
	MW	14.2	14.1	13.7	14.0	14.1	14.9	17.0	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.2
	MVAr	1.1	0.7	2.9	2.4	2.2	1.9	2.4	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	10% POE MVA	14.2	14.2	14.0	14.2	14.3	15.0	17.1	18.3	18.3	18.3	18.3	18.2	18.2	18.2	18.3	18.4
	PF	0.997	0.999	0.979	0.985	0.988	0.992	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
	MW	13.2	13.2	12.8	13.0	13.0	14.9	17.0	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.2
	MVAr	1.1	0.7	2.7	2.3	2.0	1.9	2.4	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	50% POE MVA	13.3	13.2	13.0	13.2	13.2	15.0	17.1	18.3	18.3	18.3	18.3	18.2	18.2	18.2	18.3	18.4
	PF	0.997	0.999	0.979	0.985	0.988	0.992	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
Telstra HVC	Actual MVA																
	MW							0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	MVAr							0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	10% POE MVA							0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	PF							0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	MW							0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	MVAr							0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	50% POE MVA							0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	PF							0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	24.0	23.6	13.0	16.1	13.0	17.1									
Unanderra	MW	28.3	22.6	11.7	13.3	12.2	14.2	14.4	15.6	15.7	19.6	19.6	22.5	22.5	25.4	25.4	28.4
	MVA _r	1.0	2.6	5.7	2.1	0.3	0.7	2.9	3.2	3.2	4.0	4.0	4.6	4.6	5.2	5.2	5.8
	10% POE	MVA	28.3	22.8	13.0	13.5	12.2	14.3	14.7	16.0	16.0	20.0	20.0	22.9	22.9	25.9	26.0
	PF	0.999	0.993	0.900	0.988	1.000	0.999	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	MW	22.9	20.1	11.0	12.8	11.3	12.6	12.8	13.9	14.0	17.9	17.9	20.8	20.8	23.7	23.8	26.7
	MVA _r	0.8	2.3	5.3	2.0	0.3	0.6	2.6	2.8	2.9	3.6	3.6	4.2	4.2	4.8	4.8	5.5
	50% POE	MVA	22.9	20.2	12.3	13.0	11.3	12.6	13.0	14.2	14.3	18.3	18.2	21.2	21.2	24.2	24.2
	PF	0.999	0.993	0.900	0.988	1.000	0.999	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
Actual		MVA	2.3	2.3	2.3	2.3	2.3	1.9									
Water Board Dams	MW	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	MVA _r	1.3	1.3	1.3	1.3	1.3	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	10% POE	MVA	2.3	2.3	2.3	2.3	2.3	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	PF	0.826	0.826	0.826	0.826	0.826	0.950	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847
Major customer	MW	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	MVA _r	1.3	1.3	1.3	1.3	1.3	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	50% POE	MVA	2.3	2.3	2.3	2.3	2.3	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	PF	0.826	0.826	0.826	0.826	0.826	0.950	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847
Actual		MVA	18.5	20.2	9.4	8.9	12.7	13.9									
West Wollongong	MW	19.3	16.6	9.4	11.6	12.4	13.2	13.8	13.8	13.7	13.7	13.6	13.6	13.6	13.5	13.5	13.5
	MVA _r	6.5	5.5	3.4	2.5	2.6	2.3	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	10% POE	MVA	20.3	17.4	10.0	11.9	12.7	13.4	14.4	14.3	14.3	14.2	14.2	14.1	14.1	14.0	14.0
	PF	0.947	0.949	0.939	0.978	0.979	0.985	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
	MW	17.2	13.9	8.5	9.8	11.2	11.4	12.0	12.0	11.9	11.9	11.8	11.8	11.7	11.7	11.7	11.7
	MVA _r	5.8	4.6	3.1	2.1	2.3	2.0	3.4	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	50% POE	MVA	18.2	14.6	9.0	10.1	11.4	11.6	12.5	12.4	12.4	12.3	12.3	12.2	12.2	12.2	12.1
	PF	0.947	0.949	0.939	0.978	0.979	0.985	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
Actual		MVA	2.8	2.6	2.4	0.6	1.3	2.1									
Wongawilli Colliery Major customer –HVC28295	MW	2.0	1.7	1.6	0.4	0.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	MVA _r	2.2	1.9	1.8	0.4	1.0	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	10% POE	MVA	3.0	2.6	2.4	0.6	1.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	PF	0.668	0.648	0.661	0.707	0.610	0.657	0.633	0.633	0.633	0.633	0.633	0.633	0.633	0.633	0.633	0.633
	MW	2.0	1.7	1.6	0.4	0.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	MVA _r	2.2	1.9	1.8	0.4	1.0	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	50% POE	MVA	3.0	2.6	2.4	0.6	1.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	PF	0.668	0.648	0.661	0.707	0.610	0.657	0.633	0.633	0.633	0.633	0.633	0.633	0.633	0.633	0.633	0.633
Actual		MVA	5.3	4.8	4.7	0.8	1.3	3.1									
Wongawilli No4 Airshaft	MW	3.3	3.8	3.6	0.5	0.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	MVA _r	4.1	2.9	2.8	0.6	0.9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	10% POE	MVA	5.3	4.8	4.6	0.8	1.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	PF	0.629	0.795	0.797	0.640	0.721	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646
Major customer –HVC28777	MW	3.3	3.8	3.6	0.5	0.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	MVA _r	4.1	2.9	2.8	0.6	0.9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	50% POE	MVA	5.3	4.8	4.6	0.8	1.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	PF	0.629	0.795	0.797	0.640	0.721	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646
Actual		MVA	202.3	219.3	191.5	189.3	204.9	219.2									
Undiversified	MW	201.3	204.3	190.7	193.9	197.7	208.6	214.0	220.6	221.3	232.7	234.3	238.2	238.4	241.3	241.8	245.3
	MVA _r	60.6	55.3	61.5	50.1	54.5	41.8	60.5	62.0	62.1	64.6	64.8	65.5	65.5	66.1	66.2	66.9
	10% POE	MVA	214.7	214.2	202.8	201.9	207.5	215.6	224.7	231.5	232.2	243.9	245.4	249.5	249.6	252.6	253.2
	PF	0.938	0.954	0.940	0.960	0.953	0.967	0.952	0.953	0.953	0.954	0.954	0.955	0.955	0.955	0.955	0.956
	MW	185.0	190.2	180.2	182.7	187.0	198.9	204.3	210.9	211.6	223.0	224.5	228.5	228.6	231.6	232.1	235.5
	MVA _r	57.9	52.5	59.3	48.3	52.4	41.1	58.5	60.0	62.6	62.8	63.5	63.5	64.1	64.3	65.0	65.0
	50% POE	MVA	198.0	199.7	192.0	190.5	196.6	205.9	214.8	221.6	222.2	234.0	235.5	239.5	239.7	242.7	246.7
	PF	0.935	0.952	0.938	0.959	0.951	0.966	0.951	0.952	0.952	0.953	0.953	0.954	0.954	0.954	0.954	0.955
Actual		MVA	167.5	166.5	153.5	149.9	172.8	179.8									
Diversified (Meter)	MW	154.1	151.6	154.9	154.6	162.5	166.4	169.0	174.2	174.7	183.8	185.0	188.1	188.2	190.5	190.9	193.6
	MVA _r	42.1	47.2	44.9	38.1	43.5	41.8	46.3	47.7	47.9	50.3	50.7	51.5	51.6	52.2	52.3	53.0
	10% POE	MVA	159.7	158.8	161.3	159.2	168.2	175.2	180.6	181.2	190.5	191.8	195.0	195.1	197.6	198.0	200.8
	PF	0.965	0.955	0.960	0.971	0.966	0.970	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	MW	139.9	137.4	140.7	140.4	150.5	154.7	158.9	164.0	164.5	173.4	174.6	177.7	177.8	180.1	180.5	183.1
	MVA _r	38.2	42.8	40.8	34.6	40.3	38.8	43.5	44.9	45.1	47.5	47.8	48.7	48.7	49.3	49.4	50.2
	50% POE	MVA	145.0	143.9	146.5	144.6	155.8	159.5	164.7	170.0	170.6	179.8	181.0	184.2	184.3	186.7	189.9
	PF	0.965	0.955	0.960	0.971	0.966	0.970	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
Actual		MVA	1.8	1.7	2.5	1.0	2.6	1.3									
Wyuna Waters	MW	1.4	1.6	2.4	0.9	2.0	1.2										
	MVA _r	1.1	0.5	0.6	0.5	2.1	0.5										
	Generation	MVA	1.8	1.7	2.5	1.0	2.9	1.3									
	Actual	PF	0.797	0.953	0.971	0.880	0.680	0.915									

Note: There is 39 MVA_r of capacitors installed at the Springhill 33 kV busbar.

3.30 Sydney North TS Demand Forecast

Discussion

There are no significant developments in the foreseeable future that will affect the load growth of the Sydney North supply area.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Kellyville	2 x 15/19/25	50
Kenthurst	1 x 60 (132/33kV) + 1 x 25 (33/11kV) + 1 x 25 (66/11kV)	50
Sydney North	5 x 375	1875

Proposed Load Transfers

No Proposed Load Transfers at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Kellyville	UCL8341 Retirement Village Lot 301 Old Glenhaven Road Glenhaven	2018	0.5	0.2	0.5
Kellyville	UML6520 - Samantha Riley Dr	2019	0.1	0.1	0.2
Kellyville	URS16392 - Foxall Rd Kellyville	2019	0.1	0.1	0.1
Kellyville	URS18120 - Foxall Rd Kellyville	2019	0.04	0.02	0.04
Kellyville	URS18380 - Samantha Riley Dr	2019	0.05	0.02	0.1
Kenthurst	NRS3155	2019	0.04	0.02	0.04
Kenthurst	UIL4541 Old Northern Rd Dural Industrial load	2018	0.3	0.2	0.4

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Sydney North TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Actual	MVA	15.6	22.2	19.1	20.4	19.9	20.0									
Kellyville	MW	24.4	23.7	23.8	23.2	22.7	19.9	20.2	20.3	20.2	20.1	20.0	19.9	19.8	19.7	19.7	19.6
	MVA _r	2.5	3.8	1.1	7.8	0.7	3.3	3.4	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.3	3.3
	MVA	24.5	24.0	23.9	24.5	22.7	20.1	20.4	20.6	20.5	20.4	20.3	20.2	20.1	20.0	19.9	19.9
	PF	0.995	0.987	0.999	0.948	1.000	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	MW	21.3	20.6	20.7	20.1	19.5	17.1	17.4	17.6	17.4	17.3	17.2	17.1	17.0	16.9	16.9	16.8
	MVA _r	2.2	3.3	0.9	6.8	0.6	2.8	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	MVA	21.4	20.9	20.8	21.2	19.5	17.3	17.6	17.8	17.7	17.6	17.5	17.3	17.2	17.2	17.1	17.1
	PF	0.995	0.987	0.999	0.948	1.000	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	Actual	MVA	15.6	22.2	21.4	17.9	20.3	23.3									
Kenthurst	MW	22.0	21.1	22.6	20.2	20.5	19.8	20.0	19.9	19.8	19.7	19.6	19.5	19.4	19.3	19.3	19.3
	MVA _r	2.0	3.9	4.4	2.8	8.4	8.0	5.2	5.2	5.2	5.2	5.1	5.1	5.1	5.1	5.1	5.1
	MVA	22.1	21.4	23.0	20.3	22.2	21.3	20.6	20.6	20.4	20.3	20.2	20.1	20.1	20.0	20.0	20.0
	PF	0.996	0.984	0.981	0.990	0.925	0.927	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	MW	19.4	18.5	20.0	17.6	18.1	17.3	17.5	17.4	17.3	17.2	17.1	17.0	16.9	16.9	16.8	16.8
	MVA _r	1.8	3.4	3.9	2.5	7.4	7.0	4.6	4.6	4.5	4.5	4.5	4.4	4.4	4.4	4.4	4.4
	MVA	19.5	18.8	20.4	17.8	19.5	18.7	18.1	18.0	17.9	17.8	17.7	17.6	17.5	17.4	17.4	17.4
	PF	0.996	0.984	0.981	0.990	0.925	0.927	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual	MVA	31.3	44.4	40.4	38.2	40.2	43.3									
Undiversified	MW	46.4	44.8	46.4	43.4	43.2	39.7	40.1	40.2	40.0	39.8	39.6	39.4	39.2	39.0	39.0	39.0
	MVA _r	4.5	7.7	5.5	10.6	9.1	11.3	8.7	8.7	8.6	8.6	8.5	8.5	8.5	8.4	8.4	8.4
	MVA	46.6	45.5	46.9	44.8	44.9	41.5	41.1	41.2	41.0	40.7	40.5	40.3	40.1	40.0	39.9	39.9
	PF	0.995	0.986	0.990	0.967	0.963	0.956	0.976	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW	40.7	39.2	40.8	37.7	37.6	34.4	34.8	35.0	34.7	34.5	34.3	34.1	33.9	33.8	33.7	33.7
	MVA _r	4.0	6.7	4.9	9.2	8.0	9.8	7.5	7.6	7.5	7.5	7.4	7.4	7.3	7.3	7.3	7.3
	MVA	40.9	39.7	41.2	39.0	39.1	36.0	35.7	35.8	35.6	35.3	35.1	34.9	34.7	34.6	34.5	34.5
	PF	0.995	0.986	0.990	0.967	0.962	0.956	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
	Actual	MVA	32.0	30.5	41.3	35.7	37.8	38.2									
Diversified# (Meter)	MW	36.0	34.3	38.8	36.4	38.5	34.4	36.2	36.3	36.1	35.9	35.7	35.5	35.4	35.2	35.2	35.2
	MVA _r	3.6	3.4	3.9	3.6	3.9	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.5
	MVA	36.1	34.4	39.0	36.5	38.7	34.6	36.4	36.5	36.3	36.1	35.9	35.7	35.5	35.4	35.4	35.3
	PF	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	MW	32.4	30.6	35.2	32.7	34.6	31.6	31.4	31.6	31.3	31.2	31.0	30.8	30.6	30.5	30.4	30.4
	MVA _r	3.2	3.1	3.5	3.3	3.5	3.2	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	MVA	32.5	30.8	35.4	32.9	34.7	31.8	31.6	31.7	31.5	31.3	31.1	30.9	30.8	30.6	30.6	30.6
	PF	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995

Note: #Diversified values which are greater than undiversified values are due to abnormal switching.

3.31 Sydney West 132kV TS Demand Forecast

Discussion

Sydney West 132 kV TS forecast entry represents a consolidation of the zone substations supplied directly out of the 132 kV busbar at Sydney West Bulk Supply point.

Development has commenced within the South West Growth Sector including the precincts of Austral, Leppington, Oran Park and Catherine Field. The growth sector is expected to take 30 years to complete and will increase network load by 650MVA. Sydney West BSP will supply part of the initial stages of development via feeder 93X, but ultimately the South West Sector will be supplied from Macarthur BSP, Liverpool BSP and the future Kemps Creek BSP 132kV busbar.

The Eastern Creek industrial lands located near the intersection of the M4 and M7 motorways form part of the greater Western Sydney Employment Hub SEPP 59 development area. These include Interchange Park, Ropes Creek and Oakdale business park developments and are all supplied from Sydney West BSP.

There is also significant load growth expected in Mamre ZS area, due to number of large industrial applications.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Arndell Park	2 x 33/39/45	90
Baulkham Hills 11kV	2 x 45	90
Doonside	3 x 45	135
Bringelly	1 x 19 + 1 x 25	44
Eastern Creek	2 x 30/45	90
Granville 132kV	2 x 45	90
Huntingwood	2 x 45	90
Mamre	3 x 45	135
North Eastern Creek	2 x 45	90
North Parramatta	2 x 45/55	110
Oran Park	2 x 45	90
Quakers Hill	2x25 (33/11) + 1x45 (132/11) + 1x60(132/33)	155
Rooty Hill	2 x 33/45	90
Wetherill Park	2 x 33/35/45	90
West Wetherill Park	2 x 45	90

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2019	Bringelly	Sydney West 132kV	North Leppington	Macarthur 132kV	0.9
2021	Huntingwood	Sydney West 132kV	Airtrunk Data	Sydney West 132kV	11.0

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2021	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2022	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2023	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2024	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2025	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2026	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2027	4.5	2.2	5.0
Arndell Park	UCL7563 - 170 Reservoir Rd ARNDELL PARK	2018	0.7	0.3	0.8
Arndell Park	UCL8062	2019	1.0	0.5	1.1
Arndell Park	UIL4698 - 20 Holbeche Rd ARNDELL PARK	2018	1.8	0.9	2.0
Arndell Park	UIL4919 - Schweppes ARNDELL PARK	2018	1.0	0.5	1.1
Arndell Park	UIL5061 - Huntingwood warehouse extension	2019	2.7	1.3	3.0
Arndell Park	UML7069 - Spoonbill Ave ARNDELL PARK	2018	0.2	0.1	0.2
Baulkham Hills 11kV	Anglican Retirement Villages	2018	0.3	0.1	0.3
Bringelly	NUL 0566	2018	0.1	0.1	0.1
Bringelly	UIL 5035	2018	0.7	0.3	0.8
Doonside	ULL2549 - Off Eastern Rd	2018	0.5	0.3	0.6
Doonside	UML7072 - Rooty Hill Rd Sth	2018	0.1	0.1	0.2
Eastern Creek	UCL6838 - 2 Southridge Street EASTERN CREEK	2018	0.2	0.1	0.2
Eastern Creek	UCL8289 - Honeycombe Dr	2019	1.1	0.5	1.2
Eastern Creek	UIL 4988 - Site 3B Millner Rd	2018	1.1	0.5	1.2
Eastern Creek	UIL 5026 - Toyota Parts	2018	1.9	0.9	2.1
Eastern Creek	UIL4772 - 400 Burley Road HORSLEY PARK	2018	0.5	0.2	0.5
Eastern Creek	UIL4773 - Site 1C 400 Burley Road HORSLEY PARK	2018	0.5	0.2	0.5
Eastern Creek	UIL4840 - Link Rd	2018	0.5	0.3	0.6
Eastern Creek	UIL4920 - 339 Wallgrove Rd	2018	0.9	0.4	1.0
Eastern Creek	UIL4927 - Eastern Creek Dr (Part of ENL2651)	2018	0.5	0.3	0.6
Eastern Creek	UIL5026 - Toyota Parts Warehouse	2018	1.5	0.7	1.7
Eastern Creek	UIS0559 - Lot 100 Burley Rd - Jackfin	2018	0.4	0.2	0.5
Eastern Creek	UIS0700 - Burley Rd (Stage 1 of ENL2627)	2018	1.4	0.7	1.6
Eastern Creek	UML4885 Site 3A Millner Rd	2018	1.0	0.5	1.1
Eastern Creek	UML4988 Site 3B Millner Rd	2018	1.4	0.7	1.5
Eastern Creek	UML5018 Site 3C1 Millner Rd	2018	0.4	0.2	0.4
Eastern Creek	UML5019 Site 3C2 & 3C3 Millner Rd	2018	1.3	0.6	1.5
Huntingwood	UCL4468 - 863 Great Western Highway MINCHINBURY	2018	0.2	0.1	0.2
Huntingwood	UCL7898 - Sydney Zoo	2018	2.0	1.0	2.2
Huntingwood	UCS0463 - Rooty Hill Road South EASTERN CREEK	2018	1.8	0.9	2.0
Huntingwood	UIL4364 - SYD51 Data	2019	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2020	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2021	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2022	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2023	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2024	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2025	3.0	1.0	3.2
Huntingwood	UIL4912 - Airtrunk Data	2018	3.6	1.2	3.8
Huntingwood	UIL4912 - Airtrunk Data	2019	4.8	1.6	5.0
Huntingwood	UIL4912 - Airtrunk Data	2020	4.8	1.6	5.0
Huntingwood	UIS0672 - 60 Wallgrove Road EASTERN CREEK	2018	0.5	0.2	0.5
Mamre	UIL4868	2018	0.3	0.1	0.3
Mamre	UIL4889	2018	0.4	0.2	0.4
Mamre	UIL4989	2019	0.8	0.4	0.9
Mamre	UIL5036	2019	0.3	0.1	0.3
Mamre	UIL5042	2019	0.7	0.3	0.7

Zone Substation	Customer Name / Description	Year	MW	MVA	MVA
Mamre	UIL5055	2018	1.1	0.5	1.3
Mamre	ULL2605	2018	0.1	0.1	0.2
North Eastern Creek	UCL7689 - Old Wallgrove & Wallgrove Road EASTERN CREEK	2018	0.1	0.04	0.1
North Eastern Creek	UCL8166 - Wonderland Dr	2019	0.3	0.1	0.3
North Eastern Creek	UIL4502 Archbold Road Suburb: EASTERN CREEK	2018	0.7	0.3	0.8
North Eastern Creek	UIL4817 - 8 Kangaroo Avenue EASTERN CREEK	2018	0.5	0.2	0.5
North Eastern Creek	UIL4984 - Alspeg Pl	2018	3.2	1.6	3.6
North Eastern Creek	UIS0793 - Honeycomb Dr	2019	1.7	0.8	1.9
Quakers Hill	UCL7889 - Alderton Dr COLEBEE	2018	1.6	0.8	1.8
Quakers Hill	UCL8254 - Stonecutters Ridge	2019	0.3	0.1	0.3
Quakers Hill	UML5206 - 9 Nirimba Drive QUAKERS HILL	2018	0.6	0.3	0.7
Quakers Hill	UML7528 - Quakers Hill Pkwy	2019	0.4	0.2	0.5
Quakers Hill	URS15037 - Symonds Rd COLEBEE	2018	0.3	0.1	0.3
Quakers Hill	URS15633 - Stage 5 Colebee	2018	0.3	0.1	0.3
Quakers Hill	URS15761 - Voysey Cl	2018	0.2	0.1	0.2
Quakers Hill	URS15962 336 Quakers Road	2018	0.3	0.1	0.3
Quakers Hill	URS17069 - Alderton Drive COLEBEE	2018	0.3	0.1	0.3
Quakers Hill	URS17297 - 112 Symonds Road COLEBEE	2018	0.5	0.2	0.5
Rooty Hill	UCL6954 - Rooty Hill Rd Sth	2019	1.4	0.7	1.6
Rooty Hill	UIL5077 - Rayben St Glendenning	2018	0.1	0.1	0.1
Rooty Hill	UIL5133 - Pecks Kellogs Rd HVC 8073	2018	0.9	0.4	1.0
Rooty Hill	UML7072 - Rooty Hill Rd Sth	2019	0.1	0.1	0.1
Rooty Hill	URS15725 - 266 Rooty Hill Road North PLUMPTON	2018	0.4	0.2	0.4
Science Park	Science Park	2019	0.8	0.4	0.8
Science Park	Science Park	2020	3.6	1.7	4.0
Science Park	Science Park	2021	3.8	1.8	4.2
Science Park	Science Park	2022	3.8	1.8	4.2
Science Park	Science Park	2023	2.6	1.2	2.9
Science Park	Science Park	2024	3.4	1.7	3.8
Science Park	Science Park	2025	5.0	2.4	5.6
Science Park	Science Park	2026	5.0	2.4	5.6
Science Park	Science Park	2027	4.1	2.0	4.6
Science Park	Science Park	2028	3.8	1.9	4.3
Southpipe Oakdale Industrial	Oakdale Industrial Development	2018	1.8	0.9	2.0
Southpipe Oakdale Industrial	Oakdale Industrial Development	2019	3.3	1.6	3.7
Southpipe Oakdale Industrial	Oakdale Industrial Development	2020	4.3	2.1	4.8
Southpipe Oakdale Industrial	Oakdale Industrial Development	2021	5.8	2.8	6.5
Southpipe Oakdale Industrial	Oakdale Industrial Development	2022	5.8	2.8	6.5
Southpipe Oakdale Industrial	Oakdale Industrial Development	2023	6.1	3.0	6.8
Southpipe Oakdale Industrial	Oakdale Industrial Development	2024	4.7	2.3	5.2
Southpipe Oakdale Industrial	Oakdale Industrial Development	2025	3.5	1.7	3.9
Southpipe Oakdale Industrial	Oakdale Industrial Development	2026	2.0	1.0	2.3
West Wetherill Park	UIL4779 - Cowpasture Road, Wetherill Park	2017	2.3	1.1	2.6
West Wetherill Park	UIL5051	2018	0.3	0.2	0.4
West Wetherill Park	UIL5059	2018	0.8	0.4	0.9
West Wetherill Park	UIL5063	2018	1.1	0.5	1.2
Wetherill Park	NCL1330 Six Factories	2018	0.6	0.3	0.7
Wetherill Park	UCL8485 - 122-130 Newton Rd WETHERILL PARK	2018	0.5	0.2	0.5
Wetherill Park	UIL4740 - 84 Hassall St Wetherill Park	2018	0.5	0.2	0.5
Wetherill Park	UIL4823 Sims Metal Recycling Facility	2018	1.4	0.7	1.6

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Eastern Creek	UIS0755 - Lenore Dr EASTERN CREEK	2018	5	17.0
Huntingwood	UIS0672 60 Wallgrove Rd	2016	2	1.3
Mamre	UIL5143	2018	6	25.0
Mamre	UIS0628	2016	2	0.6
North Eastern Creek	UIS0672 - 60 Wallgrove Rd	2018	3	4.9
Rooty Hill	URS10439 - 1155 Aquilina Drive	2012	10	0.5
West Wetherill Park	UIS0650 Cowpasture Rd	2017	2	6.1
West Wetherill Park	UIS0753 - Horsley Drive	2017	2	0.9

Generation

Zone Substation	Name	Description	Date
West Castle Hill	Cathay Pacific	4 x 1.875MW diesel	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2012	Bella Vista	Sydney West 132kV	Vineyard TS
2012	West Castle Hill	Sydney West 132kV	Vineyard TS
2013	Granville*	Camellia	Sydney West 132kV
2014	Doonside	Blacktown	Sydney West 132kV
2015	North Parramatta	Sydney West 132kV	Holroyd 132kV
2015	West Parramatta	Sydney West 132kV	Holroyd 132kV
2016	Granville 132kV	Sydney West 132kV	Holroyd 132kV
2017	Oran Park	Sydney West 132kV	Macarthur 132kV

**Granville was decommissioned and Granville 132kV has taken up the existing load on Granville.*

Sydney West 132kV TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Airtrunk Data Major customer	Actual MVA																
	MW										14.3	18.1	21.9	25.7	29.5	33.3	37.1
	MVA _r										4.7	5.9	7.2	8.4	9.7	10.9	12.2
	10% POE MVA										15.0	19.0	23.0	27.0	31.0	35.0	39.0
	PF										0.950	0.950	0.950	0.950	0.950	0.950	0.950
	MW										14.3	18.1	21.9	25.7	29.5	33.3	37.1
	MVA _r										4.7	5.9	7.2	8.4	9.7	10.9	12.2
	50% POE MVA										15.0	19.0	23.0	27.0	31.0	35.0	39.0
	PF										0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA	41.3	44.3	38.9	24.7	28.0	32.1										
Arndell Park	MW	44.3	43.0	41.2	31.1	31.1	30.9	34.1	37.3	37.2	37.2	37.1	37.1	37.0	37.0	37.1	37.1
	MVA _r	8.2	5.0	4.4	0.0	3.5	0.0	3.7	4.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	10% POE MVA	45.0	43.3	41.4	31.1	31.3	30.9	34.3	37.5	37.4	37.4	37.3	37.3	37.2	37.2	37.3	37.3
	PF	0.983	0.993	0.994	1.000	0.994	1.000	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
	Actual MVA	42.0	40.7	38.9	28.9	28.9	28.7	31.9	35.1	35.0	34.9	34.9	34.8	34.8	34.8	34.9	34.9
	MW	42.0	40.7	38.9	28.9	28.9	28.7	31.9	35.1	35.0	34.9	34.9	34.8	34.8	34.8	34.9	34.9
	MVA _r	7.7	4.7	4.2	0.0	3.3	0.0	3.5	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	50% POE MVA	42.7	41.0	39.1	28.9	29.0	28.7	32.1	35.3	35.2	35.1	35.1	35.1	35.0	35.0	35.1	35.1
	PF	0.983	0.993	0.994	1.000	0.994	1.000	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
	Actual MVA	29.7	33.7	30.4	29.0	34.0	35.7										
Baulkham Hills 11kV	MW	35.1	32.9	33.1	32.7	33.8	34.1	34.3	34.1	34.0	33.9	33.9	33.8	33.7	33.7	33.7	33.8
	MVA _r	12.3	10.4	10.6	9.5	14.3	14.1	14.2	14.1	14.1	14.0	14.0	14.0	14.0	13.9	14.0	14.0
	10% POE MVA	37.2	34.5	34.8	34.1	36.7	37.0	37.1	37.0	36.8	36.7	36.6	36.6	36.5	36.4	36.5	36.6
	PF	0.944	0.954	0.953	0.960	0.921	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924
	Actual MVA	32.0	29.8	30.0	29.6	30.8	30.2	30.3	30.2	30.1	30.0	29.9	29.8	29.8	29.7	29.8	29.9
	MW	32.0	29.8	30.0	29.6	30.8	30.2	30.3	30.2	30.1	30.0	29.9	29.8	29.8	29.7	29.8	29.9
	MVA _r	11.2	9.4	9.6	8.6	13.0	12.5	12.5	12.5	12.5	12.4	12.4	12.3	12.3	12.3	12.3	12.4
	50% POE MVA	33.9	31.2	31.5	30.8	33.4	32.7	32.8	32.7	32.6	32.5	32.4	32.3	32.2	32.2	32.3	32.3
	PF	0.944	0.954	0.953	0.960	0.921	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924
	Actual MVA	79.4	81.1	81.5	80.2	82.2	80.6										
One Steel Mini Mill Major customer	MW	73.4	76.3	76.4	73.7	76.1	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6
	MVA _r	33.4	27.5	28.4	32.5	31.1	30.6	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5
	10% POE MVA	80.6	81.1	81.5	80.6	82.2	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6
	PF	0.910	0.941	0.937	0.915	0.926	0.925	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
	Actual MVA	73.4	76.3	76.4	73.7	76.1	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6
	MW	73.4	76.3	76.4	73.7	76.1	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6
	MVA _r	33.4	27.5	28.4	32.5	31.1	30.6	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5
	50% POE MVA	80.6	81.1	81.5	80.6	82.2	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6
	PF	0.910	0.941	0.937	0.915	0.926	0.925	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
	Actual MVA	10.9	13.2	13.5	14.5	13.3	14.6										
Bringelly	MW	14.1	14.0	14.7	14.2	13.9	13.1	13.8	12.8	12.7	12.7	12.6	12.6	12.5	12.5	12.5	12.4
	MVA _r	3.2	0.6	0.9	0.0	0.0	2.9	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
	10% POE MVA	14.4	14.0	14.7	14.2	13.9	13.4	13.9	12.9	12.8	12.8	12.7	12.7	12.6	12.6	12.6	12.6
	PF	0.976	0.999	0.998	1.000	1.000	0.976	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	Actual MVA	12.8	12.7	13.4	12.9	12.7	11.9	12.5	11.5	11.5	11.4	11.3	11.3	11.2	11.2	11.2	11.2
	MW	12.8	12.7	13.4	12.9	12.7	11.9	12.5	11.5	11.5	11.4	11.3	11.3	11.2	11.2	11.2	11.2
	MVA _r	2.9	0.6	0.8	0.0	0.0	2.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	50% POE MVA	13.1	12.7	13.4	12.9	12.7	12.1	12.6	11.6	11.6	11.5	11.4	11.4	11.3	11.3	11.3	11.3
	PF	0.976	0.999	0.998	1.000	1.000	0.976	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
	Actual MVA				37.9	41.8	49.4										
Doonside	MW				49.5	47.8	45.1	45.5	45.3	45.0	44.8	44.6	44.4	44.2	44.0	44.0	43.9
	MVA _r				12.0	11.3	10.6	11.1	11.1	11.0	10.9	10.9	10.8	10.8	10.7	10.7	10.7
	10% POE MVA				50.9	49.1	46.3	46.8	46.6	46.3	46.1	45.9	45.7	45.5	45.3	45.2	45.2
	PF				0.972	0.973	0.973	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
	Actual MVA				42.1	40.8	38.5	38.8	38.6	38.4	38.1	37.9	37.7	37.5	37.3	37.3	37.2
	MW				42.1	40.8	38.5	38.8	38.6	38.4	38.1	37.9	37.7	37.5	37.3	37.3	37.2
	MVA _r				10.2	9.6	9.0	9.5	9.4	9.4	9.3	9.3	9.2	9.2	9.1	9.1	9.1
	50% POE MVA				43.3	41.9	39.5	40.0	39.7	39.5	39.3	39.0	38.8	38.6	38.4	38.4	38.3
	PF				0.972	0.973	0.973	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
	Actual MVA	17.2	17.0	15.6	17.5	18.7	19.7										
Eastern Creek	MW	16.8	16.5	15.3	17.1	18.3	19.2	32.0	36.1	40.9	44.0	45.1	45.1	45.1	45.1	45.1	45.2
	MVA _r	3.6	3.9	3.0	3.6	3.6	4.5	6.9	7.7	8.8	9.4	9.7	9.7	9.7	9.7	9.7	9.7
	10% POE MVA	17.2	17.0	15.6	17.5	18.7	19.7	32.7	36.9	41.8	45.0	46.1	46.1	46.1	46.1	46.2	46.2
	PF	0.978	0.973	0.981	0.979	0.981	0.974	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
	Actual MVA	16.8	16.5	15.3	17.1	18.3	19.2	32.0	36.1	40.9	44.0	45.1	45.1	45.1	45.1	45.1	45.2
	MW	16.8	16.5	15.3	17.1	18.3	19.2	32.0	36.1	40.9	44.0	45.1	45.1	45.1	45.1	45.1	45.2
	MVA _r	3.6	3.9	3.0	3.6	3.6	4.5	6.9	7.7	8.8	9.4	9.7	9.7	9.7	9.7	9.7	9.7
	50% POE MVA	17.2	17.0	15.6	17.5	18.7	19.7	32.7	36.9	41.8	45.0	46.1	46.1	46.1	46.1	46.2	46.2
	PF	0.978	0.973	0.981	0.979	0.981	0.974	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
	Actual MVA																

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Granville 132kV	Actual MVA		27.4	23.8	24.9												
	MW		21.3	22.4	23.9												
	MVA _r		4.9	5.7	6.1												
	10% POE MVA		21.8	23.1	24.7												
	PF		0.974	0.969	0.968												
	MW		20.2	21.3	22.8												
	MVA _r		4.7	5.4	5.9												
	50% POE MVA		20.7	22.0	23.5												
	PF		0.974	0.969	0.968												
Huntingwood	Actual MVA			8.9	22.1	22.9	27.0										
	MW			8.6	21.5	22.1	26.4	33.1	39.5	45.9	37.6	40.1	42.6	45.1	47.6	47.7	47.8
	MVA _r			2.2	5.3	6.0	5.8	7.3	8.7	10.1	8.3	8.8	9.4	9.9	10.5	10.5	10.5
	10% POE MVA			8.9	22.1	22.9	27.0	33.9	40.4	47.0	38.5	41.1	43.6	46.2	48.8	48.8	48.9
	PF			0.969	0.971	0.965	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW			8.6	21.5	22.1	26.4	33.1	39.5	45.9	37.6	40.1	42.6	45.1	47.6	47.7	47.8
	MVA _r			2.2	5.3	6.0	5.8	7.3	8.7	10.1	8.3	8.8	9.4	9.9	10.5	10.5	10.5
	50% POE MVA			8.9	22.1	22.9	27.0	33.9	40.4	47.0	38.5	41.1	43.6	46.2	48.8	48.8	48.9
	PF			0.969	0.971	0.965	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
Mamre	Actual MVA	28.7	33.0	32.3	40.2	48.2	57.2										
	MW	39.7	33.7	26.7	48.7	49.6	49.0	51.6	56.2	61.5	66.9	70.0	71.0	70.8	70.7	70.8	70.8
	MVA _r	4.2	4.3	7.2	13.4	6.2	6.8	7.2	7.8	8.5	9.3	9.7	9.8	9.8	9.8	9.8	9.8
	10% POE MVA	39.9	34.0	27.6	50.5	50.0	49.5	52.1	56.8	62.1	67.5	70.7	71.6	71.5	71.4	71.4	71.5
	PF	0.995	0.992	0.966	0.964	0.992	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
	MW	36.0	31.3	23.6	44.5	46.0	46.1	48.7	53.3	58.6	63.9	67.1	68.0	67.9	67.8	67.8	67.9
	MVA _r	3.8	4.0	6.4	12.2	5.8	6.4	6.7	7.4	8.1	8.9	9.3	9.4	9.4	9.4	9.4	9.4
	50% POE MVA	36.2	31.6	24.4	46.2	46.3	46.5	49.1	53.8	59.2	64.5	67.7	68.7	68.5	68.4	68.5	68.5
	PF	0.995	0.992	0.966	0.964	0.992	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
North Eastern Creek	Actual MVA	2.9	11.8	9.1	9.2	10.6	10.6										
	MW	2.6	10.2	9.0	9.0	10.2	10.2	14.8	18.6	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
	MVA _r	1.3	5.9	2.8	1.8	2.7	3.0	4.4	5.5	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	10% POE MVA	2.9	11.8	9.4	9.2	10.6	10.6	15.5	19.4	20.3	20.2	20.2	20.2	20.2	20.2	20.2	20.3
	PF	0.900	0.863	0.955	0.981	0.967	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959
	MW	2.6	10.2	9.0	9.0	10.2	10.2	14.8	18.6	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
	MVA _r	1.3	5.9	2.8	1.8	2.7	3.0	4.4	5.5	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	50% POE MVA	2.9	11.8	9.4	9.2	10.6	10.6	15.5	19.4	20.3	20.2	20.2	20.2	20.2	20.2	20.2	20.3
	PF	0.900	0.863	0.955	0.981	0.967	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959
North Parramatta	Actual MVA	35.1	37.9	33.9													
	MW	39.0	37.1	35.1													
	MVA _r	3.5	1.7	2.9													
	10% POE MVA	39.2	37.2	35.2													
	PF	0.996	0.999	0.997													
	MW	36.1	34.3	32.2													
	MVA _r	3.3	1.6	2.6													
	50% POE MVA	36.3	34.3	32.3													
	PF	0.996	0.999	0.997													
Oran Park#	Actual MVA	3.3	1.6	5.6	5.5	8.6	11.9										
	MW	2.9	1.4	5.0	5.0	8.5	11.8										
	MVA _r	1.4	0.7	2.4	2.4	1.6	1.8										
	10% POE MVA	3.3	1.6	5.6	5.5	8.6	11.9										
	PF	0.900	0.900	0.900	0.900	0.983	0.989										
	MW	2.9	1.4	5.0	5.0	8.5	11.8										
	MVA _r	1.4	0.7	2.4	2.4	1.6	1.8										
	50% POE MVA	3.3	1.6	5.6	5.5	8.6	11.9										
	PF	0.900	0.900	0.900	0.900	0.983	0.989										
Quakers Hill	Actual MVA	36.0	42.1	35.4	30.2	37.5	44.2										
	MW	47.1	43.4	43.7	40.9	41.4	40.0	43.2	43.7	43.5	43.4	43.2	43.1	42.9	42.8	42.8	42.9
	MVA _r	7.6	8.3	7.0	4.1	14.2	9.6	9.1	9.2	9.2	9.2	9.1	9.1	9.1	9.1	9.1	9.1
	10% POE MVA	47.7	44.2	44.3	41.1	43.8	41.1	44.2	44.6	44.5	44.3	44.2	44.0	43.9	43.8	43.8	43.8
	PF	0.987	0.982	0.987	0.995	0.946	0.973	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
	MW	42.8	39.1	39.4	36.6	37.0	35.4	38.7	39.1	38.9	38.8	38.6	38.5	38.4	38.3	38.3	38.3
	MVA _r	6.9	7.5	6.3	3.7	12.7	8.5	8.2	8.3	8.2	8.2	8.2	8.1	8.1	8.1	8.1	8.1
	50% POE MVA	43.4	39.8	39.9	36.7	39.1	36.4	39.5	40.0	39.8	39.6	39.5	39.3	39.2	39.1	39.1	39.1
	PF	0.987	0.982	0.987	0.995	0.946	0.973	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978

Note: # Oran Park is being supplied from a mobile substation prior to the zone substation being built.

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		33.8	40.2	35.1	31.6	37.6	42.6										
Rooty Hill	MW	42.4	40.8	41.0	38.5	38.2	37.0	38.2	39.5	39.4	39.3	39.3	39.2	39.2	39.1	39.2	39.2
	MVAr	2.4	7.9	5.9	0.0	18.5	17.9	10.9	11.3	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
	10% POE MVA	42.5	41.6	41.4	38.5	42.4	41.2	39.7	41.0	41.0	40.9	40.8	40.8	40.7	40.7	40.7	40.8
	PF	0.998	0.982	0.990	1.000	0.900	0.900	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962
50% POE	MW	39.1	37.5	37.6	35.2	34.7	33.9	35.0	36.3	36.2	36.2	36.1	36.0	36.0	35.9	36.0	36.1
	MVAr	2.3	7.2	5.4	0.0	16.8	16.4	10.0	10.3	10.3	10.3	10.3	10.3	10.3	10.2	10.3	10.3
	10% POE MVA	39.2	38.2	38.0	35.2	38.5	37.6	36.4	37.7	37.7	37.6	37.5	37.5	37.4	37.4	37.4	37.5
	PF	0.998	0.982	0.990	1.000	0.900	0.900	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962
Actual MVA																	
Science Park	MW								0.5	2.8	5.2	7.6	9.2	11.4	14.7	17.9	20.5
	MVAr								0.2	1.3	2.5	3.7	4.5	5.5	7.1	8.7	9.9
	10% POE MVA								0.5	3.1	5.8	8.4	10.3	12.7	16.3	19.9	22.8
	PF								0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
50% POE	MW								0.5	2.8	5.2	7.6	9.2	11.4	14.7	17.9	20.5
	MVAr								0.2	1.3	2.5	3.7	4.5	5.5	7.1	8.7	9.9
	10% POE MVA								0.5	3.1	5.8	8.4	10.3	12.7	16.3	19.9	22.8
	PF								0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Actual MVA																	
Southpipe Oakdale Industrial	MW							1.4	4.1	7.5	12.2	16.8	21.7	25.5	28.3	29.9	29.9
	MVAr							0.7	2.0	3.6	5.9	8.2	10.5	12.3	13.7	14.5	14.5
	10% POE MVA							1.6	4.5	8.4	13.5	18.7	24.1	28.3	31.4	33.2	33.2
	PF							0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
50% POE	MW							1.4	4.1	7.5	12.2	16.8	21.7	25.5	28.3	29.9	29.9
	MVAr							0.7	2.0	3.6	5.9	8.2	10.5	12.3	13.7	14.5	14.5
	10% POE MVA							1.6	4.5	8.4	13.5	18.7	24.1	28.3	31.4	33.2	33.2
	PF							0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Actual MVA		35.4	33.8	32.0	30.4	29.3	32.7										
West Wetherill Park	MW	31.9	30.4	29.4	29.1	26.7	29.9	34.3	34.2	34.2	34.1	34.1	34.1	34.0	34.0	34.1	34.1
	MVAr	15.4	14.7	13.3	8.7	12.0	13.2	15.0	15.0	15.0	15.0	14.9	14.9	14.9	14.9	14.9	15.0
	10% POE MVA	35.4	33.8	32.3	30.4	29.3	32.7	37.4	37.4	37.3	37.3	37.2	37.2	37.2	37.2	37.2	37.3
	PF	0.900	0.900	0.911	0.958	0.912	0.915	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916
50% POE	MW	31.9	30.4	29.4	29.1	26.7	29.9	34.3	34.2	34.2	34.1	34.1	34.1	34.0	34.0	34.1	34.1
	MVAr	15.4	14.7	13.3	8.7	12.0	13.2	15.0	15.0	15.0	15.0	14.9	14.9	14.9	14.9	14.9	15.0
	10% POE MVA	35.4	33.8	32.3	30.4	29.3	32.7	37.4	37.4	37.3	37.3	37.2	37.2	37.2	37.2	37.2	37.3
	PF	0.900	0.900	0.911	0.958	0.912	0.915	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916
Actual MVA		33.4	30.7	29.2	29.5	38.4	29.1										
Wetherill Park	MW	31.7	29.2	27.7	28.0	36.5	27.7	30.2	30.2	30.1	30.1	30.1	30.1	30.1	30.0	30.1	30.2
	MVAr	10.4	9.6	9.1	9.2	12.0	9.1	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	10% POE MVA	33.4	30.7	29.2	29.5	38.4	29.1	30.9	30.8	30.8	30.8	30.7	30.7	30.7	30.7	30.8	30.8
	PF	0.950	0.950	0.950	0.950	0.950	0.950	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
50% POE	MW	31.7	29.2	27.7	28.0	36.5	27.7	30.2	30.2	30.1	30.1	30.1	30.1	30.1	30.0	30.1	30.2
	MVAr	10.4	9.6	9.1	9.2	12.0	9.1	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	10% POE MVA	33.4	30.7	29.2	29.5	38.4	29.1	30.9	30.8	30.8	30.8	30.7	30.7	30.7	30.7	30.8	30.8
	PF	0.950	0.950	0.950	0.950	0.950	0.950	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
Actual MVA		387.0	447.8	425.2	427.3	451.1	487.6										
Undiversified	MW	421.0	409.0	429.4	462.9	454.2	449.0	481.0	506.5	528.8	549.7	566.5	579.7	591.2	603.0	612.1	618.9
	MVAr	106.9	100.6	105.7	108.6	137.0	129.9	128.9	135.0	141.0	148.6	154.3	159.2	163.7	168.3	172.0	174.7
	10% POE MVA	438.7	424.7	445.0	479.8	477.9	471.1	500.5	526.9	550.1	572.4	590.4	604.5	616.9	629.6	639.5	646.8
	PF	0.960	0.963	0.965	0.965	0.950	0.953	0.961	0.961	0.961	0.960	0.960	0.959	0.958	0.958	0.957	0.957
50% POE	MW	400.1	389.3	408.0	435.9	429.2	424.3	456.2	481.8	504.0	524.9	541.8	554.9	566.4	578.2	587.3	594.2
	MVAr	103.6	97.4	101.9	104.1	130.1	123.3	123.0	129.1	135.1	142.6	148.3	153.3	157.8	162.4	166.1	168.7
	10% POE MVA	417.4	404.7	423.2	452.3	451.8	445.3	474.9	501.3	524.5	546.8	564.8	578.9	591.3	604.0	613.9	621.3
	PF	0.958	0.962	0.964	0.964	0.950	0.953	0.961	0.961	0.961	0.960	0.959	0.959	0.958	0.957	0.957	0.956

3.32 Vineyard TS Demand Forecast

Discussion

The development of Schofields ZS has been completed to provide for new land releases in the area and offload Riverstone ZS and Quakers Hill ZS. Currently, plans have been approved for the establishment of South Marsden Park and Marsden Park ZS to cater for Industrial load and Residential precincts within the Northwest sector. Demand is expected to be up to 90-120MVA in the area over the next 20 - 30 years.

The Castle Towers expansion has commenced with demolition and asset relocation of indoor substations. The final loading of the revamped shopping centre has been estimated at 38MVA by the applicant. There is ongoing discussions and analysis to determine a suitable arrangement to supply this load.

As part of the North West Rail project a North West Rail Link traction supply at 132kV will be supplied from the Rouse Hill Switching Station.

As part of the North West sector future load growth, Endeavour Energy has recently secured a site for the proposed Box Hill Zone at Mount Carmel Road North at Box Hill.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Bella Vista	3 x 45	135
Cheriton Avenue	2 x 45	90
Marsden Park	Approved (1x45)	(45)
Mungerie Park	3 x 45	135
Parklea	3 x 45	135
Schofields	2 x 45	90
South Marsden Park	Approved (1 x 15)	(15)
West Castle Hill	2 x 35/44/52/65	130

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2022	Mungerie Park	Vineyard	Box Hill	Vineyard	13.4
2018	Parklea	Vineyard	Mungerie Park	Vineyard	2.0

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Bella Vista	UCL7451 219 units and commercial Solent Circuit Baulkham Hills	2018	1.4	0.7	1.6
Bella Vista	UCL8210 Building Hillsong 100 Solent Circuit Baulkham Hills	2018	0.6	0.3	0.7
Bella Vista	ULL2145 NWRL Construction and fit out loads - Removal	2020	-1.4	0.7	-1.6
Bella Vista	ULL2576 Kellyville South Public School 23 Fairway Drive Kellyville	2019	0.2	0.1	0.2
Bella Vista	UML7008 133 units 30 Norbrik Drive Bella Vista	2018	0.4	0.2	0.4
Bella Vista	UML7884 40 units 93 Windsor Road Baulkham Hills	2018	0.1	0.1	0.1
Box Hill	Box Hill - 10,000 dwellings	2023	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2024	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2025	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2026	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2027	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2028	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2029	1.7	0.8	1.9
Box Hill	Box Hill Industrial 60 hectares of employment land	2023	1.0	0.5	1.1
Box Hill	Box Hill Industrial 60 hectares of employment land	2024	1.0	0.5	1.1
Box Hill	Box Hill Industrial 60 hectares of employment land	2025	0.8	0.4	0.9
Box Hill	Box Hill Industrial 60 hectares of employment land	2026	0.6	0.3	0.7
Box Hill	Box Hill Industrial 60 hectares of employment land	2027	0.5	0.2	0.5
Box Hill	Box Hill Industrial 60 hectares of employment land	2028	0.3	0.1	0.3
Box Hill	Box Hill Industrial 60 hectares of employment land	2029	0.1	0.04	0.1
Box Hill	Box Hill North - 4000 dwellings	2023	1.6	0.8	1.8
Box Hill	Box Hill North - 4000 dwellings	2024	1.9	0.9	2.1
Box Hill	Box Hill North - 4000 dwellings	2025	1.9	0.9	2.1
Box Hill	Box Hill North - 4000 dwellings	2026	1.6	0.8	1.8
Box Hill	Box Hill North - 4000 dwellings	2027	1.3	0.6	1.5
Box Hill	Box Hill North - 4000 dwellings	2028	1.0	0.5	1.1
Box Hill	Box Hill North - 4000 dwellings	2029	0.7	0.4	0.8
Cheriton Avenue	ENL 2791 Castle Tower Zone 3	2020	5.2	2.5	5.8

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Cheriton Avenue	ENL 2791 Castle Tower Zone 4	2024	6.5	3.1	7.2
Cheriton Avenue	UCL7731 Castle Towers	2018	2.9	1.4	3.2
Cheriton Avenue	ULL2144 NWRL Construction and fit out loads - Removal	2020	-1.4	0.7	-1.5
Marsden Park	Marsden Park - 8,600 residential dwellings	2021	2.4	1.1	2.6
Marsden Park	Marsden Park - 8,600 residential dwellings	2022	2.4	1.1	2.6
Marsden Park	Marsden Park - 8,600 residential dwellings	2023	2.4	1.1	2.6
Marsden Park	Marsden Park - 8,600 residential dwellings	2024	2.0	1.0	2.3
Marsden Park	Marsden Park - 8,600 residential dwellings	2025	1.7	0.8	1.9
Marsden Park	Marsden Park - 8,600 residential dwellings	2026	1.7	0.8	1.9
Marsden Park	Marsden Park North - 5,843 residential dwellings	2025	0.2	0.1	0.2
Marsden Park	Marsden Park North - 5,843 residential dwellings	2026	0.5	0.2	0.5
Marsden Park	NUL0572 - Water Marsden Park	2018	0.7	0.4	0.8
Marsden Park	UCL7293 - Richmond Road MARS DEN PARK (WTP)	2018	0.6	0.3	0.7
Marsden Park	UML17982 - Marsden Park Stages MD1 & MD2	2019	0.1	0.0	0.1
Marsden Park	UML7939 - Retirement Living Marsden Park	2019	0.5	0.2	0.5
Marsden Park	URS16040 - Stage 12 Richmond Rd Marsden Park	2018	0.5	0.2	0.5
Marsden Park	URS16140 - Stage 13 Richmond Rd Marsden Park	2018	0.5	0.3	0.6
Marsden Park	URS16141 - Stage 14 Richmond Rd Marsden park	2018	0.3	0.1	0.3
Marsden Park	URS17164 - 210 Grange Road MARS DEN PARK	2018	0.5	0.2	0.5
Marsden Park	URS17422 - Stg 15 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17423 - Stg 16 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17424 - Stg 17 Richmond Road MARS DEN PARK	2018	0.2	0.1	0.2
Marsden Park	URS17425 - Stg 18 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17426 - Stg 19 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17427 - Stg 20 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17428 - Stg 21 Richmond Road MARS DEN PARK	2018	0.1	0.0	0.1
Marsden Park	URS17429 - Stg 22 Richmond Road MARS DEN PARK	2018	0.1	0.0	0.1
Marsden Park	URS17430 - Stg 23 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17462 - Marsden Park	2019	0.1	0.05	0.1
Marsden Park	URS17462 - Richmond Rd	2019	0.6	0.3	0.7
Marsden Park	URS17463 - Marsden Park	2019	0.1	0.1	0.2
Marsden Park	URS17464 - Richmond Rd	2019	0.1	0.04	0.1
Marsden Park	URS17599 - Stage 12B Marsden Park	2018	0.1	0.03	0.1
Marsden Park	URS17838 - Richmond Rd Stage A1	2019	1.7	0.8	1.9
Marsden Park	URS17838 - Richmond Rd Stage A2	2020	1.2	0.6	1.4
Marsden Park	URS17838 - Woorong Park Stage 39	2019	0.6	0.3	0.6
Marsden Park	URS17952 - Stg 25 Richmond Road MARS DEN PARK	2018	0.6	0.3	0.7
Marsden Park	URS18495 - Marsden Park Stage 25	2019	0.5	0.3	0.6
Marsden Park	URS18495 - Stg 24 Richmond Road MARS DEN PARK	2019	0.4	0.2	0.5
Marsden Park	URS18807 - Grange Ave	2019	0.6	0.3	0.7
Marsden Park	URS18824 - Woorong Park Stage 40	2019	0.5	0.3	0.6
Marsden Park	URS18947 - Richmond Rd	2019	0.6	0.3	0.7
Marsden Park	URS18953 - Marsden Park Stage 27	2019	0.2	0.1	0.2
Marsden Park	URS18954 - Marsden Park Stages 28-29	2020	0.7	0.3	0.8
Marsden Park	URS18956 - Marsden Park Stages 30-32	2020	0.6	0.3	0.7
Mungerie Park	URS18552 13 lots, 50 units 21-23 Terry Road Box Hill	2018	0.3	0.1	0.3
Mungerie Park	Box Hill 10,000 Dwellings	2020	1.4	0.7	1.5
Mungerie Park	Box Hill 10,000 Dwellings	2021	1.4	0.7	1.5
Mungerie Park	Box Hill 10,000 Dwellings	2022	1.4	0.7	1.5
Mungerie Park	Box Hill Employment Precinct	2020	0.8	0.4	0.9
Mungerie Park	Box Hill Employment Precinct	2021	0.8	0.4	0.9
Mungerie Park	Box Hill Employment Precinct	2022	0.8	0.4	0.9
Mungerie Park	Box Hill North - 4000 dwellings	2020	1.4	0.7	1.5
Mungerie Park	Box Hill North - 4000 dwellings	2021	1.4	0.7	1.5
Mungerie Park	Box Hill North - 4000 dwellings	2022	1.4	0.7	1.5
Mungerie Park	Cudgegong Road - 4,600 dwellings	2021	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2022	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2023	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2024	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2025	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2026	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2027	0.8	0.4	0.9
Mungerie Park	UCL7049 209 units and retail 133-149 Samantha Riley Drive Kellyville	2018	0.9	0.4	1.0
Mungerie Park	UCL7573 Commercial	2018	0.9	0.4	1.0
Mungerie Park	UCL8268 Commercial load 6 Edward Road Nelson	2018	0.2	0.1	0.2
Mungerie Park	UCL8743 Local Water Centre Red Gales rd Box hill (Celestino)	2019	0.6	0.3	0.7
Mungerie Park	UML6906 - Hezlett Rd Kellyville	2019	0.5	0.2	0.5
Mungerie Park	UML7490 - Windsor Rd	2019	0.8	0.4	0.9
Mungerie Park	UML7787 58 units 98 Caddies Blvd Rouse Hill	2018	0.2	0.1	0.2
Mungerie Park	UML7789 94 units 104-106 Caddies Boulevard Rouse Hill	2018	0.3	0.1	0.3
Mungerie Park	UML7998 52 units and retail space 14 Merryville Rd Kellyville Ridge	2018	0.2	0.1	0.2
Mungerie Park	URS 17916 units 60 Cudgegong Road Rouse Hill	2018	0.8	0.4	0.9
Mungerie Park	URS16867 - Terry Rd Box Hill	2019	0.2	0.1	0.2

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Mungerie Park	URS17310 14 lots 33 Stringer Road North Kellyville	2018	0.1	0.04	0.1
Mungerie Park	URS17575 23 lots Barry Road North Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS17603 23lots Stage 1 23 Nelson Road Box Hill	2018	0.1	0.1	0.2
Mungerie Park	URS17693 - Terry Rd	2019	0.2	0.1	0.2
Mungerie Park	URS17694 - Terry Rd	2019	0.2	0.1	0.2
Mungerie Park	URS17867 - Terry Rd	2019	0.1	0.1	0.1
Mungerie Park	URS17904 20 lots 18-22 Barry Road North Kellyville	2018	0.1	0.1	0.2
Mungerie Park	URS17916 36 dwellings Old Pitt Town Road Box Hill	2018	0.2	0.1	0.2
Mungerie Park	URS18137 - Terry Rd	2019	0.1	0.1	0.1
Mungerie Park	URS18217 - Foxall Rd	2019	0.05	0.0	0.1
Mungerie Park	URS18441 - Terry Rd	2019	0.1	0.1	0.2
Mungerie Park	URS18547 40 lots 22 Foxall Road Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS18553 18 lots, 40 units 21-23 Terry Road Box Hill	2018	0.2	0.1	0.3
Mungerie Park	URS18554 13 lots 36 units 43 Hynds Road Box Hill	2018	0.2	0.1	0.2
Mungerie Park	URS18629 29 lots 33-34 Foxall Road Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS18643 44 lots 33-34 Foxall Road Kellyville	2018	0.3	0.1	0.3
Mungerie Park	URS18670 - Terry Rd	2019	0.1	0.1	0.2
Mungerie Park	URS18697 29 lots 15-17 Foxall Road Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS18836 50 lots 116 Cudgegon Road Rouse Hill	2018	0.2	0.1	0.3
Mungerie Park	URS19130 58 multi residential housing 122 Windsor Road Kellyville	2018	0.1	0.1	0.2
NWRL Rouse Hill	UUL1554 NWRL Traction Supply (Tallawong)	2019	27.0	13.1	30.0
Parklea	ULL2525 Parklea Prison Expansion	2019	1.4	0.7	1.5
Parklea	ULL2629 Arnold Ave Sporting Complex Kellyville	2018	0.2	0.1	0.2
Parklea	URS 18360 30 lots 58 Arnold Avenue Kellyville	2018	0.2	0.1	0.2
Parklea	URS 18853 101 lots Perfection Ave Stanhope Gardens	2018	0.5	0.3	0.6
Parklea	URS15952 36 units Samantha Riley Drive Kellyville	2018	0.1	0.1	0.2
Parklea	URS18153 - 170 Lots Perfection Avenue	2018	0.8	0.4	0.9
Parklea	URS18360 50 lots 101 Windsor Road Kellyville	2018	0.3	0.1	0.3
Schofields	Alex Avenue Release - 4,250 Lots	2021	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2022	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2023	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2024	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2025	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2026	1.8	0.9	2.0
Schofields	Riverstone East - 5900 residential dwellings	2019	0.1	0.0	0.1
Schofields	Riverstone East - 5900 residential dwellings	2020	0.4	0.2	0.5
Schofields	Riverstone East - 5900 residential dwellings	2020	0.7	0.3	0.8
Schofields	Riverstone East - 5900 residential dwellings	2021	0.8	0.4	0.9
Schofields	Riverstone East - 5900 residential dwellings	2022	0.7	0.3	0.8
Schofields	Riverstone East - 5900 residential dwellings	2023	0.7	0.3	0.8
Schofields	Riverstone East - 5900 residential dwellings	2024	1.0	0.5	1.1
Schofields	Riverstone East - 5900 residential dwellings	2025	1.1	0.5	1.2
Schofields	Riverstone East - 5900 residential dwellings	2026	1.1	0.5	1.2
Schofields	Riverstone East - 5900 residential dwellings	2027	1.1	0.5	1.2
Schofields	Riverstone East - 5900 residential dwellings	2028	1.0	0.5	1.1
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2021	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2022	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2023	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2024	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2025	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2026	0.6	0.3	0.7
Schofields	Schofields - 3,301 residential dwellings	2021	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2022	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2023	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2024	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2025	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2026	1.8	0.9	2.0
Schofields	UML7782 - Burdekin Rd	2019	0.4	0.2	0.4
Schofields	UML7783 - Pelican Rd	2019	0.6	0.3	0.7
Schofields	URS13215 - Bridge St Stage 1 SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS13557 - Stage 1 Off Railway Terrace SCHOFIELDS	2018	1.6	0.8	1.8
Schofields	URS15086 - Bridge St Stage 2 SCHOFIELDS	2019	0.1	0.1	0.1
Schofields	URS15241 - Boundary Rd SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS15398 Stage 2 Road No. 4 Schofields	2018	0.8	0.4	0.9
Schofields	URS15486 - Hambeldon Rd SCHOFIELDS	2018	0.1	0.1	0.1
Schofields	URS15490 Burdekin Rd Schofields	2018	0.1	0.1	0.1
Schofields	URS16178 - 47 Veron Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16179 - 47 Veron Rd	2019	0.3	0.1	0.3

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Schofields	URS16180 - 47 Veron Rd	2020	0.3	0.1	0.3
Schofields	URS16197 Schofields Farm Road SCHOFIELDS	2018	0.6	0.3	0.7
Schofields	URS16198 - Gordon Road SCHOFIELDS	2018	0.7	0.3	0.8
Schofields	URS16199 - Alex Av SCHOFIELDS	2018	0.3	0.2	0.4
Schofields	URS16202 - Argowan Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16232 - 121 Boundary Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16237 - 112 Hambledon Road SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS16313 - 59 Westminster Street SCHOFIELDS	2018	0.1	0.05	0.1
Schofields	URS16434 - Hambledon Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16455 - 34-38 Schofields Road SCHOFIELDS	2018	0.9	0.4	1.0
Schofields	URS16456 - 59 Westminster Street	2018	0.3	0.1	0.3
Schofields	URS16457 - 59 Westminster Street	2019	0.1	0.1	0.2
Schofields	URS16458 - 59 Westminster Street	2020	0.1	0.1	0.1
Schofields	URS16459 - 59 Westminster Street	2021	0.1	0.03	0.1
Schofields	URS16488 - 78 Westminster Street SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16798 - Brighton St SCHOFIELDS	2019	0.4	0.2	0.5
Schofields	URS16805 - Stage 2 Schofields Road SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS16884 - Stage 1 Govetts Street THE PONDS	2018	0.1	0.1	0.1
Schofields	URS16885 - Stage 2 Govetts St	2019	0.1	0.03	0.1
Schofields	URS17002 - Garfield Rd East	2019	0.4	0.2	0.4
Schofields	URS17046 - Stage 2 Brighton Street RIVERSTONE	2018	0.3	0.1	0.3
Schofields	URS17094 - Hambledon Road SCHOFIELDS	2018	0.5	0.2	0.5
Schofields	URS17097 - 45-57 Gordon Street SCHOFIELDS	2019	0.2	0.1	0.2
Schofields	URS17142 70-74 Schofields Road SCHOFIELDS	2018	0.3	0.2	0.4
Schofields	URS17159 - Alex Avenue SCHOFIELDS	2018	0.1	0.04	0.1
Schofields	URS17160 - Alex Avenue SCHOFIELDS	2018	0.1	0.04	0.1
Schofields	URS17161 - Alex Avenue SCHOFIELDS	2018	0.1	0.04	0.1
Schofields	URS17190 - Gordon Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS17219 - 32 Riverstone Road RIVERSTONE	2018	0.1	0.1	0.1
Schofields	URS17231 - Schofields Farm Road SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS17248 - Alex Av SCHOFIELDS	2019	0.1	0.1	0.2
Schofields	URS17250 - Stage 1 Riverstone Rd	2019	0.1	0.1	0.2
Schofields	URS17251 - Stage 2 Riverstone Rd	2019	0.1	0.1	0.2
Schofields	URS17285 - Alex Av SCHOFIELDS	2019	0.2	0.1	0.3
Schofields	URS17286 - Alex Av SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS17328 - Boundary Rd Schofields	2019	0.1	0.1	0.1
Schofields	URS17342 - 279 Railway Terrace SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS17413 - 87-93 Boundary Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS17419 - McColloch St SCHOFIELDS	2019	0.1	0.03	0.1
Schofields	URS17438 - Alex Av SCHOFIELDS	2018	0.1	0.1	0.1
Schofields	URS17480 - 97 & 99 Hambledon Road SCHOFIELDS	2018	0.5	0.2	0.5
Schofields	URS17577 - Stage 6A Boundary Road SCHOFIELDS	2018	0.3	0.2	0.4
Schofields	URS17579 - Boundary Rd	2019	0.1	0.03	0.1
Schofields	URS17633 - Westminster St	2019	0.1	0.05	0.1
Schofields	URS17697 - 22 Boundary Road SCHOFIELDS	2018	1.1	0.5	1.2
Schofields	URS17814 - Hambledon Rd SCHOFIELDS	2020	1.8	0.9	2.0
Schofields	URS18224 - Argowan Rd	2019	0.1	0.1	0.1
Schofields	URS18231 - McCulloch St	2019	0.1	0.05	0.1
Schofields	URS18278 - Hambledon Rd	2019	0.2	0.1	0.2
Schofields	URS18367 - Boundary Rd	2019	0.1	0.05	0.1
Schofields	URS18418 - Boundary Rd	2020	0.6	0.3	0.7
Schofields	URS18506 - Brighton St	2020	0.1	0.04	0.1
Schofields	URS18649 - Garfield Rd East	2020	0.1	0.03	0.1
Schofields	URS18672 - Hambledon Rd	2020	0.2	0.1	0.2
Schofields	URS18695 - Garfield Rd East	2020	0.2	0.1	0.2
Schofields	URS18743 - Riverstone Rd Riverstone	2020	0.3	0.2	0.4
Schofields	URS18744 - Gordon Rd Schofields	2020	0.1	0.1	0.2
Schofields	URS18765 - Boundary Rd	2020	0.2	0.1	0.2
Schofields	URS18860 - Tallawong Rd	2020	0.2	0.1	0.2
Schofields	URS18890 - Hambledon Rd	2019	0.2	0.1	0.3
Schofields	URS18891 - Hambledon Rd	2020	0.4	0.2	0.4
Schofields	URS18893 - Hambledon Rd	2020	0.5	0.3	0.6
Schofields	URS19184 - Schofields Rd	2020	0.1	0.1	0.1
Schofields	URS19241 - Railway Terrace	2020	0.2	0.1	0.3
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2022	0.7	0.3	0.8
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2023	0.7	0.3	0.8
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2024	0.8	0.4	0.9
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2025	0.8	0.4	0.9
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2026	0.6	0.3	0.7

South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2020	0.9	0.4	1.0
Zone Substation	Customer Name / Description	Year	MW	MVA_r	MVA
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2021	1.0	0.5	1.1
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2022	0.9	0.4	1.0
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2023	1.0	0.5	1.1
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2024	0.9	0.4	1.0
South Marsden Park	Marsden Park Industrial - 1,328 residential dwellings	2022	0.5	0.3	0.6
South Marsden Park	Marsden Park Industrial - 1,328 residential dwellings	2023	0.5	0.3	0.6
South Marsden Park	Marsden Park Industrial - 205 hectares of employment land	2024	2.2	1.0	2.4
South Marsden Park	Marsden Park Industrial - 205 hectares of employment land	2025	2.2	1.0	2.4
South Marsden Park	Marsden Park Industrial - 205 hectares of employment land	2026	2.2	1.0	2.4
South Marsden Park	UCL7497 IKEA - South Street MARSDEN PARK	2018	2.0	1.0	2.2
South Marsden Park	UCL8096 - Costco	2018	1.1	0.6	1.3
South Marsden Park	UCL8408 - Richmond Rd	2019	0.4	0.2	0.5
South Marsden Park	UIL4948 - Medline	2018	1.0	0.5	1.1
South Marsden Park	UIL5056 - Actron Air	2018	2.1	1.0	2.4
South Marsden Park	UIS0745 - Quarry Road MARSDEN PARK	2018	1.5	0.7	1.7
South Marsden Park	URS18730 - South St Units	2020	0.7	0.3	0.7
South Marsden Park	UUL1765 - Sydney Water SP1173	2018	0.2	0.1	0.3
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2022	0.7	0.3	0.8
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2023	0.7	0.3	0.8
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2024	0.8	0.4	0.9
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2025	0.8	0.4	0.9
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2026	0.6	0.3	0.7
South Marsden Park	West Schofields Part (Townson Rd) - 400 residential dwellings	2020	0.4	0.2	0.4
South Marsden Park	West Schofields Part (Townson Rd) - 400 residential dwellings	2021	0.4	0.2	0.4
West Castle Hill	UCL8046	2018	0.3	0.1	0.3

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Bella Vista	NWRL corridor Commercial Load - 10290 jobs	2012	24	17.5
Bella Vista	NWRL corridor Dwellings - 3485	2012	24	9.9
Cheriton Avenue	NWRL corridor Commercial Load - 5520 jobs	2012	24	9.4
Cheriton Avenue	NWRL corridor Dwellings - 2560	2012	24	6.3
Marsden Park	URS18071	2019	8	14.0
Mungerie Park	North Kellyville - 4500 residential dwellings	2010	21	17.8
Mungerie Park	NWRL corridor Commercial Load - 7950 jobs	2012	24	13.6
Mungerie Park	NWRL corridor Dwellings - 7250	2012	24	23.5
Parklea	ENL2701 - 6000 Apartments Parklea Markets site	2019	10	22.5
Parklea	NWRL corridor Commercial Load - 10050 jobs	2012	24	17.1
Parklea	NWRL corridor Dwellings - 7260	2012	24	19.0
Schofields	URS16623 Pelican Road SCHOFIELDS (High Density Alex Ave)	2019	5	9.0
South Marsden Park	URS14039 "The Grange" Marsden Park	2017	3	1.3
South Marsden Park	URS18015 - South St Residential	2018	2	0.7
South Marsden Park	URS18742 - South St Units	2018	3	1.9
West Castle Hill	NWRL corridor Commercial Load - 10890 jobs	2012	24	18.6
West Castle Hill	NWRL corridor Dwellings - 4545	2012	24	11.9

Generation

Zone Substation	Name	Description	Date
West Castle Hill	Cathay Pacific	4 x 1.875MW diesel	Installed

Configuration Changes

Year	Zone / HVC	From TS	To TS
2012	Bella Vista	Sydney West 132kV	Vineyard TS
2012	West Castle Hill	Sydney West 132kV	Vineyard TS

Vineyard TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Bella Vista	Actual MVA	43.7	55.7	37.5	40.5	40.5	52.7										
	MW	53.9	52.9	45.9	47.3	45.6	48.8	51.8	53.0	53.0	54.3	55.8	57.5	59.2	60.7	62.3	63.8
	MVA _r	10.0	14.2	5.9	11.5	12.3	12.8	13.6	13.9	13.9	14.3	14.7	15.1	15.5	16.0	16.4	16.8
	10% POE MVA	54.8	54.8	46.3	48.7	47.3	50.5	53.6	54.8	54.7	56.1	57.7	59.4	61.2	62.8	64.4	65.9
	PF	0.983	0.966	0.992	0.972	0.965	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	MW	49.0	48.0	41.0	42.4	40.9	44.4	47.4	48.6	48.5	49.8	51.4	53.0	54.7	56.3	57.9	59.3
	MVA _r	9.1	12.9	5.3	10.3	11.1	11.7	12.4	12.8	12.7	13.1	13.5	13.9	14.4	14.8	15.2	15.6
	50% POE MVA	49.9	49.7	41.4	43.6	42.4	45.9	49.0	50.2	50.1	51.5	53.1	54.8	56.6	58.2	59.8	61.3
	PF	0.983	0.966	0.992	0.972	0.965	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual MVA																
Box Hill	MW											14.7	18.3	22.2	26.0	29.4	32.3
	MVA _r											4.8	6.0	7.3	8.5	9.6	10.6
	10% POE MVA											15.4	19.3	23.4	27.4	30.9	34.0
	PF											0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
	MW											14.7	18.3	22.2	26.0	29.4	32.3
	MVA _r											4.8	6.0	7.3	8.5	9.6	10.6
	50% POE MVA											15.4	19.3	23.4	27.4	30.9	34.0
	PF											0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
Cheriton Avenue	MW		30.4	24.4	26.8	29.2	33.8										
	MVA _r		27.6	27.3	27.1	29.8	29.3	32.2	32.7	36.6	37.3	38.1	39.0	45.5	46.4	47.2	48.0
	10% POE MVA		27.9	27.4	27.6	30.2	30.3	33.3	33.8	37.9	38.6	39.4	40.3	47.0	47.9	48.8	49.6
	PF		0.989	0.996	0.982	0.989	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968
	Actual MVA																
	MW		24.2	24.0	23.8	26.2	26.1	28.9	29.5	33.4	34.1	34.9	35.8	42.2	43.1	44.0	44.8
	MVA _r		3.7	2.2	4.5	4.0	6.8	7.5	7.7	8.7	8.9	9.1	9.3	11.0	11.2	11.4	11.6
	50% POE MVA		24.5	24.1	24.2	26.5	26.9	29.9	30.4	34.5	35.2	36.0	37.0	43.6	44.5	45.4	46.3
	PF		0.989	0.996	0.982	0.989	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968
	Actual MVA																
Marsden Park	MW							7.3	13.0	16.0	19.4	23.5	27.6	30.8	33.3	35.4	35.4
	MVA _r							3.5	6.3	7.7	9.4	11.4	13.4	14.9	16.1	17.1	17.1
	10% POE MVA							8.1	14.4	17.8	21.6	26.2	30.7	34.3	37.0	39.3	39.3
	PF							0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA																
	MW							7.3	13.0	16.0	19.4	23.5	27.6	30.8	33.3	35.4	35.4
	MVA _r							3.5	6.3	7.7	9.4	11.4	13.4	14.9	16.1	17.1	17.1
	50% POE MVA							8.1	14.4	17.8	21.6	26.2	30.7	34.3	37.0	39.3	39.3
	PF							0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA																
Mungerie Park	MW	29.6	44.6	38.4	41.6	53.2	58.5										
	MVA _r	43.7	44.8	45.3	47.2	51.6	54.0	66.9	71.8	77.5	84.1	78.0	81.7	85.3	88.7	91.9	94.9
	10% POE MVA	46.0	47.2	47.7	49.6	54.3	56.9	70.4	75.6	81.6	88.5	82.1	86.0	89.8	93.3	96.8	99.8
	PF	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
	MW	38.5	39.6	40.1	42.0	46.2	48.2	61.0	66.0	71.7	78.2	72.1	75.8	79.4	82.8	86.1	89.0
	MVA _r	12.7	13.0	13.2	13.8	15.2	15.8	20.1	21.7	23.6	25.7	23.7	24.9	26.1	27.2	28.3	29.3
	50% POE MVA	40.6	41.7	42.2	44.2	48.6	50.7	64.3	69.4	75.5	82.3	75.9	79.8	83.6	87.2	90.6	93.7
	PF	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
North West Rail Rouse Hill	MW							22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8
	MVA _r							7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	10% POE MVA							24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
Major customer	MW							22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8
	MVA _r							7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	50% POE MVA							24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
	PF							0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
Schofields	MW		17.6	15.4	15.3	22.4	19.6										
	MVA _r		17.5	16.9	18.0	21.6	18.1	27.7	31.7	38.4	44.7	50.7	55.7	60.4	65.3	70.0	70.8
	10% POE MVA		19.5	18.8	20.0	24.0	20.1	30.8	35.2	42.7	49.7	56.4	61.9	67.2	72.5	77.7	78.7
	PF		0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA																
	MW		15.7	15.1	16.1	19.7	16.4	26.0	30.0	36.7	43.0	49.0	54.0	58.7	63.6	68.3	69.1
	MVA _r		7.6	7.3	7.8	9.5	7.9	12.6	14.5	17.8	20.8	23.7	26.1	28.4	30.8	33.1	33.5
	50% POE MVA		17.4	16.7	17.9	21.8	18.2	28.9	33.3	40.8	47.8	54.5	60.0	65.3	70.6	75.8	76.8
	PF		0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA						4.7										
South Marsden Park	MW						4.6	12.7	14.4	16.3	17.5	19.4	21.3	24.6	27.2	29.5	29.5
	MVA _r						1.2	3.3	3.8	4.3	4.6	5.1	5.6	6.5	7.1	7.8	7.8
	10% POE MVA						4.7	13.1	14.8	16.9	18.1	20.0	22.0	25.4	28.1	30.5	30.5
	PF						0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual MVA																
	MW						4.6	12.7	14.4	16.3	17.5	19.4	21.3	24.6	27.2	29.5	29.5
	MVA _r						1.2	3.3	3.8	4.3	4.6	5.1	5.6	6.5	7.1	7.8	7.8
	50% POE MVA						4.7	13.1	14.8	16.9	18.1	20.0	22.0	25.4	28.1	30.5	30.5
	PF						0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual MVA																

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Parklea	Actual MVA	62.4	88.2	70.7	76.1	94.6	106.8										
	MW	88.1	86.7	87.0	88.1	91.8	94.5	95.2	97.7	99.9	103.0	107.1	112.0	117.0	121.2	124.8	127.6
	MVAr	20.0	27.0	19.7	20.8	29.8	28.2	28.4	29.1	29.8	30.7	31.9	33.4	34.9	36.1	37.2	38.0
	10% POE MVA	90.4	90.8	89.2	90.5	96.5	98.6	99.3	101.9	104.2	107.5	111.7	116.9	122.1	126.5	130.3	133.1
	PF	0.975	0.955	0.975	0.973	0.951	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
	MW	79.7	78.2	78.6	79.6	83.2	83.0	83.7	86.2	88.4	91.5	95.6	100.6	105.5	109.7	113.4	116.1
	MVAr	18.1	24.4	17.8	18.8	27.0	24.8	25.0	25.7	26.4	27.3	28.5	30.0	31.5	32.7	33.8	34.6
	50% POE MVA	81.7	82.0	80.6	81.8	87.5	86.7	87.4	90.0	92.2	95.5	99.8	104.9	110.1	114.5	118.3	121.2
	PF	0.975	0.955	0.975	0.973	0.951	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
	Actual MVA	43.8	38.9	36.6	34.5	44.1	47.5										
	MW	50.3	42.1	42.2	41.7	43.0	43.3	44.5	45.5	46.7	48.1	49.7	51.4	53.1	54.7	56.3	57.8
	MVAr	21.3	17.0	16.9	16.7	16.5	11.1	16.9	17.3	17.8	18.3	18.9	19.6	20.2	20.8	21.4	22.0
West Castle Hill	10% POE MVA	54.6	45.4	45.4	44.9	46.0	44.7	47.6	48.7	50.0	51.5	53.2	55.0	56.9	58.6	60.3	61.8
	PF	0.921	0.927	0.929	0.929	0.933	0.969	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
	MW	45.9	37.7	37.7	37.3	39.4	39.2	40.4	41.4	42.6	44.0	45.6	47.3	49.0	50.6	52.2	53.7
	MVAr	19.4	15.2	15.1	14.9	15.1	10.0	15.4	15.8	16.2	16.7	17.3	18.0	18.7	19.3	19.9	20.4
	50% POE MVA	49.8	40.6	40.6	40.1	42.2	40.5	43.2	44.3	45.6	47.1	48.8	50.6	52.5	54.2	55.9	57.4
	PF	0.921	0.927	0.929	0.929	0.933	0.969	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
	Actual MVA	179.5	275.3	223.1	234.7	284.1	323.5										
	MW	236.1	271.5	264.7	269.3	283.4	292.7	338.2	382.6	407.3	431.3	459.7	487.4	521.0	546.2	569.7	582.8
Undiversified	MVAr	65.7	85.6	68.0	78.4	90.6	87.4	109.5	125.4	134.6	143.8	154.4	164.5	176.0	185.0	193.4	197.7
	10% POE MVA	245.9	285.4	274.9	281.3	298.3	305.8	356.1	403.3	429.8	455.6	486.0	515.5	551.2	578.0	603.0	616.9
	PF	0.960	0.951	0.963	0.957	0.950	0.957	0.950	0.949	0.948	0.947	0.946	0.945	0.945	0.945	0.945	0.945
	MW	213.1	243.4	236.6	241.2	255.6	261.8	307.4	351.7	376.4	400.4	428.9	456.5	490.2	515.4	538.8	552.0
	MVAr	59.3	76.7	60.8	70.2	81.9	78.2	99.8	115.6	124.9	134.0	144.6	154.8	166.2	175.3	183.7	188.0
	50% POE MVA	222.0	255.9	245.7	251.9	269.0	273.6	323.7	370.9	397.4	423.2	453.6	483.1	518.8	545.6	570.6	584.5
	PF	0.960	0.951	0.963	0.957	0.950	0.957	0.949	0.948	0.947	0.946	0.945	0.945	0.945	0.945	0.944	0.944

3.33 Wallerawang TS Demand Forecast

Discussion

Wallerawang TS has two of 60MVA 132/66/11kV auto-transformers, providing firm capacity of 60MVA. Wallerawang supplies Lithgow, Portland and Meadow Flat zone substations.

There are no significant developments in the foreseeable future that will affect the load growth of the Wallerawang 66kV TS supply area.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Wallerawang 132 / 66	2 x 60	120
Lithgow	2 x 15/30	60
Meadow Flat	1 x 2.5	2.5
Portland	2 x 10	20

Proposed Load Transfers

No Load Transfers Proposed at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Lithgow	NRS3099	2018	0.1	0.04	0.1
Lithgow	NRS3161	2018	0.1	0.1	0.2
Lithgow	NRS3205	2018	0.1	0.1	0.1
Lithgow	UCL7502	2018	0.3	0.1	0.3
Lithgow	URS9146	2019	0.1	0.1	0.1
Springwood	NRS3200	2018	0.1	0.1	0.1
Springwood	UCL8344	2019	0.1	0.1	0.1

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Wallerawang TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Lithgow	Actual	MVA	15.9	15.9	12.5	12.0	13.3	14.1									
		MW	15.6	15.7	12.1	11.3	12.5	13.7	14.1	14.2	14.1	14.1	14.0	14.0	13.9	13.9	13.9
		MVAr	3.4	2.3	3.3	4.1	4.4	3.6	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	10% POE	MVA	15.9	15.9	12.5	12.0	13.3	14.1	14.3	14.3	14.3	14.2	14.2	14.1	14.0	14.0	14.0
		PF	0.977	0.989	0.964	0.940	0.943	0.966	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
		MW	15.6	15.7	12.1	11.3	12.5	13.7	14.1	14.2	14.1	14.1	14.0	14.0	13.9	13.9	13.9
		MVAr	3.4	2.3	3.3	4.1	4.4	3.6	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	50% POE	MVA	15.9	15.9	12.5	12.0	13.3	14.1	14.3	14.3	14.3	14.2	14.2	14.1	14.0	14.0	14.0
Meadow Flat		PF	0.977	0.989	0.964	0.940	0.943	0.966	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
	Actual	MVA	1.2	0.7	0.7	0.7	0.8	0.9									
		MW	1.2	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
		MVAr	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10% POE	MVA	1.2	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
		PF	0.994	0.995	0.999	0.998	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		MW	1.2	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	50% POE	MVA	1.2	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Portland		PF	0.994	0.995	0.999	0.998	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Actual	MVA	3.3	2.8	3.1	2.3	2.4	2.8									
		MW	3.3	2.8	3.1	2.3	2.4	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
		MVAr	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	10% POE	MVA	3.3	2.8	3.1	2.3	2.4	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
		PF	0.998	0.999	1.000	1.000	1.000	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
		MW	3.3	2.8	3.1	2.3	2.4	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	50% POE	MVA	3.3	2.8	3.1	2.3	2.4	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Springvale Colliery Major customer—HVC12740		PF	0.998	0.999	1.000	1.000	1.000	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
	Actual	MVA	3.5	4.1	4.6	4.9	5.6	5.6									
		MW	3.2	3.3	4.2	4.3	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
		MVAr	1.3	2.4	1.9	2.9	3.1	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	10% POE	MVA	3.5	4.1	4.6	5.2	5.6	5.7	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
		PF	0.931	0.811	0.915	0.829	0.837	0.827	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832
		MW	3.2	3.3	4.2	4.3	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	50% POE	MVA	3.5	4.1	4.6	5.2	5.6	5.7	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Sydney Trains Wallerawang		PF	0.931	0.811	0.915	0.829	0.837	0.827	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832
	Actual	MVA	2.1	2.1	2.1	2.1	3.4	2.9									
		MW	2.1	2.1	2.1	2.1	3.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
		MVAr	0.1	0.2	0.2	0.2	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	10% POE	MVA	2.1	2.1	2.1	2.1	3.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
		PF	0.998	0.996	0.996	0.996	1.000	1.000	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
		MW	2.1	2.1	2.1	2.1	3.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	50% POE	MVA	2.1	2.1	2.1	2.1	3.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Undiversified		PF	0.998	0.996	0.996	0.996	1.000	1.000	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
	Actual	MVA	26.0	25.6	23.0	22.0	25.5	26.3									
		MW	25.4	24.6	22.2	20.7	23.9	25.0	25.4	25.5	25.4	25.3	25.2	25.2	25.1	25.0	25.0
		MVAr	5.1	5.1	5.5	7.2	7.6	6.8	5.5	5.6	5.5	5.5	5.5	5.5	5.5	5.5	5.5
	10% POE	MVA	26.0	25.6	23.0	22.3	25.5	26.4	26.5	26.6	26.5	26.4	26.3	26.3	26.2	26.2	26.1
		PF	0.976	0.962	0.963	0.927	0.934	0.945	0.958	0.958	0.958	0.958	0.958	0.958	0.957	0.957	0.957
		MW	25.4	24.6	22.2	20.7	23.9	25.0	25.4	25.5	25.4	25.3	25.2	25.2	25.1	25.0	25.0
	50% POE	MVA	26.0	25.6	23.0	22.3	25.5	26.4	26.5	26.6	26.5	26.4	26.3	26.3	26.2	26.2	26.1
Diversified (Meter)		PF	0.976	0.962	0.963	0.927	0.934	0.945	0.958	0.958	0.958	0.958	0.958	0.958	0.957	0.957	0.957
	Actual	MVA	21.0	19.6	18.5	20.6	19.0	36.3									
		MW	19.6	18.3	17.3	19.2	17.7	33.9	22.6	22.7	22.6	22.5	22.5	22.4	22.4	22.3	22.3
		MVAr	7.4	7.0	6.5	7.3	6.7	12.9	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.5	8.5
	10% POE	MVA	21.0	19.6	18.5	20.6	19.0	36.3	24.2	24.3	24.2	24.1	24.0	24.0	23.9	23.9	23.8
		PF	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
		MW	19.6	18.3	17.3	19.2	17.7	33.9	22.6	22.7	22.6	22.5	22.5	22.4	22.4	22.3	22.3
	50% POE	MVA	21.0	19.6	18.5	20.6	19.0	36.3	24.2	24.3	24.2	24.1	24.0	24.0	23.9	23.9	23.8
		PF	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935

3.34 Warrimoo TS Demand Forecast

Discussion

Warrimoo TS has two 60MVA 132/66/11kV auto-transformers, providing a firm capacity of 60MVA. Warrimoo supplies Springwood and Blaxland zone substations.

There are no significant developments in the foreseeable future that will affect the load growth of the Warrimoo TS supply area.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
Warrimoo	2 x 60	120
Blaxland	2 x 22/26/35	70
Springwood	2 x 25/35	70

Proposed Load Transfers

No Load Transfers proposed at this location

Future Spot Loads

No Spot Loads Proposed at this location

Planned Lot Releases & Redevelopment

No Lot Releases Proposed at this location

Generation

No Generation known at this location

Warrimoo TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Blaxland	Actual MVA	20.2	25.7	22.8	24.0	25.3	29.7										
	MW	23.9	23.1	23.1	22.6	23.2	22.9	22.7	22.6	22.4	22.3	22.1	22.0	21.9	21.8	21.7	21.7
	MVA _r	2.9	8.3	8.0	6.8	6.9	6.6	6.5	6.5	6.5	6.4	6.4	6.3	6.3	6.3	6.3	6.2
	10% POE MVA	24.1	24.5	24.4	23.6	24.2	23.8	23.7	23.5	23.3	23.2	23.0	22.9	22.8	22.6	22.6	22.6
	PF	0.993	0.941	0.945	0.957	0.959	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	MW	21.3	20.5	20.5	20.0	20.5	20.2	20.1	19.9	19.8	19.6	19.5	19.3	19.2	19.1	19.1	19.0
	MVA _r	2.6	7.4	7.1	6.0	6.1	5.8	5.8	5.7	5.7	5.6	5.6	5.6	5.5	5.5	5.5	5.5
	50% POE MVA	21.5	21.8	21.7	20.9	21.3	21.0	20.9	20.7	20.6	20.4	20.3	20.1	20.0	19.9	19.8	19.8
	PF	0.993	0.941	0.945	0.957	0.959	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	Actual MVA	18.1	26.4	22.6	24.8	26.3	33.3										
Springwood	MW	24.1	23.7	24.2	24.0	24.5	25.0	24.8	24.7	24.5	24.4	24.2	24.1	24.0	23.8	23.8	23.8
	MVA _r	7.0	7.7	6.8	5.9	5.8	6.1	6.0	6.0	5.9	5.9	5.9	5.8	5.8	5.8	5.8	5.8
	10% POE MVA	25.1	24.9	25.1	24.7	25.2	25.7	25.6	25.4	25.2	25.1	24.9	24.8	24.6	24.5	24.5	24.5
	PF	0.961	0.951	0.962	0.971	0.973	0.971	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972
	MW	21.1	20.6	21.1	20.9	21.2	22.1	21.9	21.8	21.6	21.5	21.3	21.2	21.0	20.9	20.9	20.9
	MVA _r	6.1	6.7	6.0	5.1	5.1	5.4	5.3	5.3	5.2	5.2	5.2	5.1	5.1	5.1	5.1	5.1
	50% POE MVA	21.9	21.6	21.9	21.6	21.8	22.7	22.6	22.4	22.2	22.1	21.9	21.8	21.6	21.5	21.5	21.5
	PF	0.961	0.951	0.962	0.971	0.973	0.971	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972
	Actual MVA	38.3	52.1	45.4	48.8	51.6	62.9										
Undiversified	MW	48.0	46.7	47.3	46.6	47.6	47.9	47.6	47.3	46.9	46.6	46.4	46.1	45.8	45.6	45.5	45.5
	MVA _r	9.8	16.0	14.8	12.7	12.7	12.7	12.6	12.5	12.4	12.3	12.2	12.2	12.1	12.0	12.0	12.0
	10% POE MVA	49.2	49.4	49.6	48.3	49.3	49.5	49.2	48.9	48.6	48.3	48.0	47.7	47.4	47.2	47.1	47.1
	PF	0.976	0.946	0.954	0.965	0.966	0.966	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	MW	42.4	41.1	41.7	40.9	41.7	42.3	42.0	41.7	41.4	41.1	40.8	40.5	40.2	40.0	40.0	39.9
	MVA _r	8.7	14.1	13.0	11.1	11.1	11.2	11.1	11.0	10.9	10.8	10.8	10.7	10.6	10.6	10.6	10.5
	50% POE MVA	43.4	43.4	43.7	42.4	43.2	43.8	43.5	43.1	42.8	42.5	42.2	41.9	41.6	41.4	41.4	41.3
	PF	0.977	0.946	0.954	0.965	0.966	0.966	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual MVA	42.6	53.8	46.9	50.7	53.3	61.1										
Diversified# (Meter)	MW	55.7	47.8	46.5	48.0	48.0	48.7	47.4	47.1	46.8	46.5	46.2	45.9	45.6	45.4	45.4	45.3
	MVA _r	19.8	20.0	18.4	17.8	17.6	16.3	17.7	17.6	17.5	17.4	17.3	17.2	17.1	17.0	17.0	17.0
	10% POE MVA	59.1	51.8	50.0	51.2	51.1	51.4	50.6	50.3	49.9	49.6	49.3	49.0	48.7	48.5	48.4	48.4
	PF	0.942	0.923	0.930	0.937	0.939	0.948	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
	MW	49.9	42.0	40.7	42.2	42.1	42.7	41.8	41.5	41.2	40.9	40.6	40.4	40.1	39.9	39.8	39.8
	MVA _r	17.7	17.5	16.1	15.7	15.4	14.3	15.7	15.5	15.4	15.3	15.2	15.1	15.0	14.9	14.9	14.9
	50% POE MVA	52.9	45.5	43.8	45.0	44.8	45.1	44.7	44.4	44.0	43.7	43.4	43.1	42.8	42.6	42.5	42.5
	PF	0.942	0.923	0.930	0.937	0.939	0.948	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937

Note: #Diversified values which are greater than undiversified values are due to abnormal switching.

3.35 West Liverpool TS Demand Forecast

Discussion

West Liverpool TS has four 120MVA 132/33kV transformers providing a firm capacity of 360MVA.

Major residential development areas will progressively add to the demand of West Liverpool TS. These include Edmondson Park, Carnes Hill, Middleton Grange and the Bonnyrigg Living Communities Redevelopment Project.

The development of the Yarrunga Employment Lands adjacent to West Liverpool TS is progressing with an estimated forecast load of 20MVA over the next 15 years. Proposed high density development in Warwick Farm north of Liverpool CBD will increase load on Homepride ZS and subsequently on West Liverpool TS. This development represents a combined load increase of 90MVA for West Liverpool TS over the next 15 years.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
West Liverpool	4 x 120	480
Anzac Village	3 x 25 (33/11kV)	75
Bonnyrigg	3 x 35	105
Canley Vale	3 x 25	75
Casula	2 x 35	70
Edmondson Park	2 x 35	70
Homepride	3 x 15/19/25	75
Hoxton Park	Decommissioned	NA
Hinchinbrook	3 x 25	75
Kemps Creek	2 x 25	50
Moorebank	2 x 22/35 + 1 x 22/29/35	105
Prestons	3 x 25	75
West Liverpool ZS	3 x 35	105

Proposed Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2019	Hinchinbrook	West Liverpool	North Leppington	Macarthur 132kV	1.0
2019	Kemps Creek	West Liverpool	North Leppington	Macarthur 132kV	1.9
2019	Prestons	West Liverpool	North Leppington	Macarthur 132kV	3.7

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA	MVA
Bonnyrigg	UCL7444 - Marian St Guildford	2018	0.2	0.1	0.3
Bonnyrigg	UCL7974 Mounties Club Mt Pritchard - Stage 1	2018	2.0	0.9	2.2
Bonnyrigg	UCL7974 Mounties Club Mt Pritchard - Stage 2	2019	2.0	0.9	2.2
Bringelly	UIL5035 Dairy Farm Expansion - Bringelly	2019	0.5	0.3	0.6
Hinchinbrook	Austral Precinct	2018	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2019	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2020	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2021	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2022	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2023	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2024	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2025	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2026	0.7	0.3	0.8
Hinchinbrook	UCL8139 Thomas Hassall Anglican School - Middleton Grange	2018	0.6	0.3	0.7
Hinchinbrook	UCS0464	2018	0.9	0.4	1.0
Homepride	UCL7769 Bigge St Private Hospital - Liverpool	2018	0.7	0.3	0.8
Kemps Creek	Austral Precinct	2018	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2019	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2020	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2021	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2022	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2023	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2024	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2025	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2026	0.3	0.1	0.3

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Kemps Creek	NIL0262 - 210 Martins Rd Badgerys Creek	2018	0.6	0.3	0.6
Prestons	Southern Business Hub - UCL5899	2019	3.2	1.5	3.5
Prestons	UIL 5198 - Beech Rd, Casula	2018	1.0	0.5	1.1
Prestons	UIL4185 - Beech Rd, Casula	2018	1.5	0.7	1.7
Prestons	UIS 0798 – Kurrajong Rd, Prestons	2018	0.6	0.3	0.6
West Liverpool ZS	UCL7300 Liverpool Catholic Club - 11 Storey Hotel	2018	0.6	0.3	0.7
West Liverpool ZS	UCL7862 No.5 Progress Circuit Prestons	2018	0.6	0.3	0.7
West Liverpool ZS	UIL4723	2018	0.4	0.2	0.5
West Liverpool ZS	UIL4976 Yarrunga St Prestons - 3 x Warehouses	2018	3.3	1.6	3.7
West Liverpool ZS	UIL4999 - Kurrajong Rd Prestons (Yato Rd access)	2018	0.6	0.3	0.7

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Bonnyrigg	Bonnyrigg Housing Redevelopment	2012	8	5.1
Edmondson Park	Edmondson Park Release Area South - 3200 lots	2016	10	12.8
Edmondson Park	Edmondson Park Town Centre Precinct 2 & Precinct 3 = 545 Dwellings	2023	2	1.9
Edmondson Park	URS19165 Edmondson Park Town Centre Precinct 1 & TCC = 1339 Dwellings + 37000m2 Retail	2018	5	9.9
Hinchinbrook	Ingham's Farms Redevelopment into 861 dwellings	2011	8	3.4
Hinchinbrook	Middleton Grange Release Area - 2850 lots	2008	13	11.4
Hinchinbrook	South Cecil Hills Part 2 with 252 dwellings	2013	5	1.0
Hinchinbrook	URS15855 Rodeo Dr Green Valley	2015	3	0.1
Homepride	Liverpool CBD North (City Centre Plan)	2011	35	39.0
Kemps Creek	Broader Western Sydney Employment Area	2020	5	18.8
Kemps Creek	URS17335 Residential Subdivision 50 Kelly St Austral for 150 lots	2016	3	0.6
Prestons	Edmondson Park Release Area North - 2700 Lots	2011	10	10.8
Prestons	North Leppington Release Area 780 units + 5000m2 Commercial	2017	3	3.0
Prestons	North Leppington Release Area 800 units	2017	3	2.4
Prestons	URS15666 & URS 15667 Retirement Village Leppington	2016	3	0.7
West Liverpool ZS	Yarrunga Employment Land Release Area	2009	15	15.3

Generation

Zone Substation	Name	Description	Date
Liverpool	Alcatel	3 x 660kW (not available at this stage)	Installed
Liverpool	Liverpool Hospital	1 x 1.5MVA diesel	Installed
Kemps Creek	SITA Generation	1 x 2.8MW Waste Generator	Oct-16

Configuration Changes

Year	Zone / HVC	From TS	To TS
2012	Liverpool	West Liverpool TS	Liverpool TS
2012	Moorebank	West Liverpool TS	Liverpool TS
2013	Hoxton Park/West Liverpool Zone	West Liverpool TS	West Liverpool TS
2014	Canley Vale	West Liverpool TS	Liverpool TS
2014	Anzac Village	West Liverpool TS	Liverpool TS

**Hoxton Park has been decommissioned and West Liverpool Zone has taken up the existing load on Hoxton Park.*

West Liverpool TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Anzac Village	Actual MVA	24.7	29.1														
	MW	28.2	27.9														
	MVA _r	9.5	7.9														
	10% POE MVA	29.8	29.0														
	PF	0.947	0.962														
	MW	25.4	25.2														
	MVA _r	8.6	7.1														
	50% POE MVA	26.9	26.2														
	PF	0.947	0.962														
	Actual MVA	48.5	51.0	46.1	29.7	30.3	38.2										
Bonnyrigg	MW	59.0	47.5	42.1	37.6	35.2	35.0	37.1	38.7	38.5	38.4	38.2	38.1	37.9	37.8	37.8	37.8
	MVA _r	6.6	11.0	10.9	3.7	2.9	8.8	9.4	9.8	9.7	9.7	9.6	9.6	9.6	9.5	9.5	9.5
	10% POE MVA	59.4	48.7	43.5	37.8	35.3	36.1	38.3	40.0	39.8	39.6	39.4	39.3	39.1	39.0	39.0	39.0
	PF	0.994	0.974	0.968	0.995	0.997	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	MW	52.1	42.1	38.2	32.9	31.0	30.4	32.5	34.1	33.9	33.7	33.6	33.4	33.3	33.2	33.2	33.2
	MVA _r	5.8	9.8	9.9	3.2	2.6	7.7	8.2	8.6	8.6	8.5	8.5	8.4	8.4	8.4	8.4	8.4
	50% POE MVA	52.4	43.3	39.5	33.1	31.1	31.4	33.5	35.2	35.0	34.8	34.6	34.5	34.3	34.2	34.2	34.2
	PF	0.994	0.974	0.968	0.995	0.997	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	Actual MVA	22.0	25.8	26.4													
Canley Vale	MW	27.3	22.3	26.9													
	MVA _r	2.3	2.6	7.5													
	10% POE MVA	27.4	22.4	28.0													
	PF	0.997	0.993	0.964													
	MW	25.4	20.3	25.0													
	MVA _r	2.1	2.4	6.9													
	50% POE MVA	25.4	20.5	25.9													
	PF	0.997	0.993	0.964													
	Actual MVA																
Edmondson Park	MW								8.3	12.5	15.9	17.8	19.4	20.6	20.8	20.8	20.8
	MVA _r								4.0	6.1	7.7	8.6	9.4	10.0	10.1	10.1	10.1
	10% POE MVA								9.2	13.9	17.7	19.8	21.5	22.9	23.1	23.1	23.1
	PF								0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	MW								8.3	12.5	15.9	17.8	19.4	20.6	20.8	20.8	20.8
	MVA _r								4.0	6.1	7.7	8.6	9.4	10.0	10.1	10.1	10.1
	50% POE MVA								9.2	13.9	17.7	19.8	21.5	22.9	23.1	23.1	23.1
	PF								0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA	32.2	40.7	38.4	33.8	42.5	50.2										
Hinchinbrook	MW	45.0	40.1	38.2	45.2	46.3	50.7	53.0	52.8	53.3	53.7	54.1	54.5	55.0	55.4	56.1	56.1
	MVA _r	12.6	11.3	10.7	12.7	13.0	14.2	14.9	14.8	15.0	15.1	15.2	15.3	15.4	15.6	15.7	15.7
	10% POE MVA	46.7	41.6	39.6	46.9	48.1	52.7	55.1	54.8	55.3	55.8	56.2	56.6	57.1	57.6	58.2	58.2
	PF	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
	MW	39.4	34.5	34.9	39.5	41.2	44.5	46.8	46.5	47.0	47.4	47.8	48.3	48.7	49.2	49.8	49.8
	MVA _r	11.1	9.7	9.8	11.1	11.6	12.4	13.1	13.1	13.2	13.3	13.4	13.6	13.7	13.8	14.0	14.0
	50% POE MVA	40.9	35.8	36.3	41.1	42.8	46.2	48.6	48.3	48.8	49.3	49.7	50.1	50.6	51.1	51.7	51.8
	PF	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963	0.963
	Actual MVA	28.1	32.9	33.4	35.9	34.5	36.6										
Homepride	MW	27.6	32.2	33.4	35.6	34.2	36.3	37.6	38.4	39.2	40.3	41.4	42.6	44.0	45.5	47.2	49.0
	MVA _r	5.3	6.8	1.0	5.0	4.3	5.2	5.7	5.8	5.9	6.1	6.3	6.5	6.7	6.9	7.1	7.4
	10% POE MVA	28.1	32.9	33.4	35.9	34.5	36.6	38.0	38.8	39.7	40.7	41.9	43.1	44.5	46.0	47.7	49.5
	PF	0.982	0.979	1.000	0.990	0.992	0.990	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
	MW	27.6	32.2	33.4	35.6	34.2	36.3	37.6	38.4	39.2	40.3	41.4	42.6	44.0	45.5	47.2	49.0
	MVA _r	5.3	6.8	1.0	5.0	4.3	5.2	5.7	5.8	5.9	6.1	6.3	6.5	6.7	6.9	7.1	7.4
	50% POE MVA	28.1	32.9	33.4	35.9	34.5	36.6	38.0	38.8	39.7	40.7	41.9	43.1	44.5	46.0	47.7	49.5
	PF	0.982	0.979	1.000	0.990	0.992	0.990	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
	Actual MVA	29.6															
Hoxton Park	MW	34.9															
	MVA _r	9.0															
	10% POE MVA	36.0															
	PF	0.968															
	MW	32.4															
	MVA _r	8.3															
	50% POE MVA	33.4															
	PF	0.968															

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	10.4	13.8	12.0	11.6	12.8	14.2									
Kemps Creek	MW	11.9	11.5	11.4	11.8	12.3	13.1	13.8	12.1	13.5	17.1	22.6	26.2	27.6	27.8	28.0	28.0
	MVAr	2.2	0.7	3.8	4.0	1.4	1.9	3.0	2.6	2.9	3.7	4.9	5.7	6.0	6.0	6.1	6.1
	10% POE	MVA	12.1	11.5	12.1	12.4	12.4	14.2	12.4	13.8	17.5	23.1	26.9	28.2	28.4	28.6	28.6
	PF	0.984	0.998	0.949	0.948	0.994	0.990	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
50% POE	MW	11.4	10.9	10.9	11.2	11.7	11.5	12.2	10.5	11.8	15.5	20.9	24.6	25.9	26.1	26.3	26.3
	MVAr	2.1	0.7	3.6	3.8	1.3	1.6	2.7	2.3	2.6	3.4	4.6	5.4	5.7	5.7	5.7	5.7
	MVA	11.6	10.9	11.5	11.8	11.8	11.6	12.5	10.8	12.1	15.9	21.4	25.2	26.6	26.7	26.9	26.9
	PF	0.984	0.998	0.949	0.948	0.994	0.990	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
Actual		MVA	26.1	34.4	23.7	20.2	28.0	30.8									
Prestons	MW	37.5	31.8	22.1	24.8	30.5	27.5	33.2	33.5	33.5	33.4	33.2	33.0	32.9	32.8	32.7	32.7
	MVAr	14.8	11.3	7.9	9.1	9.9	8.3	11.6	11.8	11.8	11.7	11.6	11.6	11.5	11.5	11.5	11.5
	10% POE	MVA	40.3	33.8	23.5	26.4	32.1	28.7	35.1	35.5	35.5	35.4	35.2	35.0	34.9	34.7	34.6
	PF	0.930	0.942	0.942	0.939	0.951	0.958	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
50% POE	MW	32.4	27.4	19.9	21.8	26.2	23.2	28.8	29.2	29.2	29.1	28.9	28.7	28.6	28.5	28.4	28.4
	MVAr	12.8	9.8	7.1	8.0	8.5	7.0	10.1	10.2	10.2	10.2	10.1	10.1	10.0	10.0	10.0	10.0
	MVA	34.8	29.1	21.1	23.2	27.5	24.2	30.6	31.0	31.0	30.8	30.6	30.5	30.3	30.2	30.1	30.1
	PF	0.930	0.942	0.942	0.939	0.951	0.958	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
Actual		MVA	33.2	31.5	33.5	37.4	37.9										
West Liverpool ZS	MW		34.7	34.7	35.3	36.8	35.8	41.7	42.5	43.2	43.6	43.8	43.9	43.8	43.7	43.8	43.9
	MVAr		10.2	7.6	9.6	7.2	9.1	10.4	10.6	10.8	10.9	11.0	11.0	11.0	10.9	11.0	11.0
	10% POE	MVA		36.1	35.5	36.6	37.5	36.9	43.0	43.8	44.5	44.9	45.2	45.1	45.1	45.2	45.2
	PF		0.960	0.977	0.965	0.981	0.969	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Major customer	MW		32.1	32.2	32.8	34.4	33.8	39.7	40.6	41.2	41.6	41.9	41.9	41.8	41.8	41.8	41.9
	MVAr		9.4	7.0	8.9	6.7	8.6	9.9	10.1	10.3	10.4	10.5	10.5	10.5	10.5	10.5	10.5
	50% POE	MVA		33.5	33.0	34.0	35.0	34.9	40.9	41.8	42.5	42.9	43.2	43.2	43.1	43.1	43.2
	PF		0.960	0.977	0.965	0.981	0.969	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Actual		MVA	221.6	260.9	211.5	164.6	185.5	208.0									
Undiversified	MW	271.4	247.9	208.9	190.2	195.3	198.4	216.4	226.4	233.8	242.3	251.1	257.8	261.8	263.8	266.4	268.2
	MVAr	62.4	61.8	49.3	44.0	38.8	47.4	55.0	59.5	62.2	64.9	67.2	69.0	70.2	70.6	71.0	71.3
	10% POE	MVA	279.8	256.1	215.6	196.0	199.9	204.3	223.6	234.6	242.5	251.6	260.7	267.7	271.8	273.9	276.5
	PF	0.970	0.968	0.969	0.970	0.977	0.971	0.968	0.965	0.964	0.963	0.963	0.963	0.963	0.963	0.963	0.963
50% POE	MW	246.0	224.8	194.5	173.8	178.7	179.6	197.6	207.6	215.0	223.5	232.3	239.0	243.0	245.0	247.6	249.4
	MVAr	56.2	55.6	45.3	40.0	35.0	42.5	49.7	54.2	56.9	59.6	62.0	63.8	64.9	65.3	65.8	66.0
	MVA	253.5	232.1	200.6	179.0	182.8	184.8	204.1	215.1	223.0	232.0	241.1	248.1	252.3	254.4	257.0	258.8
	PF	0.970	0.968	0.970	0.971	0.978	0.972	0.968	0.965	0.964	0.963	0.963	0.963	0.963	0.963	0.963	0.964
Actual		MVA	264.1	251.5	198.9	169.5	192.4	194.0									
Diversified# (Meter)	MW	343.2	260.6	211.8	221.8	203.3	196.3	215.6	225.5	232.8	241.4	250.1	256.8	260.7	262.8	265.3	267.1
	MVAr	9.7	23.7	21.6	68.4	55.6	1.5	37.7	39.4	40.7	42.2	43.7	44.9	45.6	45.9	46.4	46.7
	10% POE	MVA	343.3	261.7	212.9	232.1	210.8	196.3	218.8	228.9	236.4	245.0	253.9	260.7	264.7	266.7	269.3
	PF	1.000	0.996	0.995	0.956	0.965	1.000	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
50% POE	MW	308.9	233.0	197.6	199.2	188.7	175.4	196.8	206.8	214.1	222.7	231.4	238.0	242.0	244.0	246.6	248.4
	MVAr	8.8	21.2	20.2	61.4	51.6	1.4	34.4	36.1	37.4	38.9	40.4	41.6	42.3	42.6	43.1	43.4
	MVA	309.0	234.0	198.6	208.5	195.6	175.4	199.8	209.9	217.4	226.0	234.9	241.6	245.7	247.7	250.3	252.2
	PF	1.000	0.996	0.995	0.956	0.965	1.000	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985

Note: #Diversified values which are greater than undiversified values are due to abnormal switching.

Note: There are 62 MVAr if capacitors installed at the 33kV busbar.

3.36 West Tomerong TS Demand Forecast

Discussion

West Tomerong TS has two 60 MVA 132/33kV transformers providing a firm rating of 60 MVA.

West Tomerong TS was commissioned in 2014. The need for West Tomerong TS was driven by significant sub transmission voltage and capacity constraints.

The current major land development area within the proposed West Tomerong TS supply catchment is a 600 lot residential subdivision and retail/commercial development at "Bayswood", Vincentia located north of Huskisson ZS where initial residential stages and retail shops are now taking load.

Another potential residential land release area of up to 800 lots is being planned for West Culburra with a master concept plan approval being sought from the NSW Department of Planning and Infrastructure.

Shoalhaven City Council (SCC) released a settlement strategy for the Sussex Inlet area in August 2007. A substantial lot release area for up to 3000 residential lots is proposed over the next 20-30 years.

Substation Details

Zone Substation	Transformer Description (MVA)	Installed Capacity (MVA)
West Tomerong	2 x 60	120
Culburra	2 x 10	20
Huskisson	2 x 20	40
South Nowra	2 x 25	50
Sussex Inlet	2 x 15	30
Tomerong ZS	2 x 15	30
Yatte Yattah	1 x 6.5	6.5

Proposed Load Transfers

No Load Transfers proposed at this location

Future Spot Loads

Zone Substation	Customer Name / Description	Year	MW	MVA _r	MVA
Huskisson	UCL5044 - Stage 2 Coles and Specialty Shops	2024	2.1	1.0	2.3
South Nowra	NLL0214 - South Nowra Correctional centre	2020	0.6	0.3	0.7
South Nowra	UIL4443 - Sikorsky Helitech Warehouse	2018	0.9	0.4	1.0
South Nowra	UIL4446 - Sikorsky TLS Facility	2018	0.2	0.1	0.2
South Nowra	ULL1924 - Albatross Aviation Technology Park	2018	0.9	0.4	1.0
Sussex Inlet	NCL1143 - NBN communication site	2018	0.01	0.01	0.01
Sussex Inlet	UCL7367 - Supermarket & Retail Development	2018	0.4	0.2	0.5

Planned Lot Releases & Redevelopment

Zone Substation	Description	Forecast Year	Years	MVA
Huskisson	URS13031 & URS15182 - Bayswood Estate Stages 7 & 8, 70 lots	2016	8	0.1
Huskisson	URS19307 - Bayswood Vincentia -Stage 14, 50 lots	2019	3	0.2
South Nowra	UCL5378 - Industrial Subdivision (7 x Lots) AATP, Yerrilyong	2013	6	0.6
South Nowra	UIS0599 - Industrial Subdivision (5 x Lots), South Nowra	2013	6	0.3
South Nowra	URS13314 - South Nowra 70 lots	2015	3	0.1
South Nowra	URS14304 - South Nowra (Stage 4, Twin Waters Estate) 50 lots	2014	5	0.1
South Nowra	URS14894 - South Nowra Stage 3, 25 lot subdivision	2017	4	0.1
South Nowra	URS15764 & URS15765 - Twin Waters Estate Stages 5 & 6, 55 lot subdivision	2016	6	0.2
Sussex Inlet	URS11952 - Sussex inlet 157 lots	2014	10	0.3
Tomerong ZS	ARP2644 - Jerberra Estate, 87 rural residential lots	2019	8	0.2

Generation

No Generation known at this location

Configuration Changes

Year	Zone / HVC	From TS	To TS
2015	Brundee	Shoalhaven	West Tomerong
2015	Culburra	Shoalhaven	West Tomerong
2015	Huskisson	Shoalhaven	West Tomerong
2015	South Nowra	Shoalhaven	West Tomerong
2015	Sussex Inlet	Shoalhaven	West Tomerong
2017	Yatte Yattah	Dapto 132kV	West Tomerong

West Tomerong TS Demand Forecast

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Brundee Major customer 10% POE	Actual MVA				0.4	0.4	0.4										
	MW				0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	MVA _r				0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	MVA				0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	PF				0.824	0.828	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831
50% POE	MW				0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	MVA _r				0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	MVA				0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	PF				0.824	0.828	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831	0.831
	Actual MVA				9.3	8.7	11.5										
Culburra 10% POE	MW				8.9	8.5	11.1	11.0	11.0	10.9	10.9	10.8	10.8	10.7	10.7	10.7	10.7
	MVA _r				2.5	2.0	3.1	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	MVA				9.3	8.7	11.5	11.5	11.4	11.4	11.3	11.3	11.2	11.2	11.1	11.1	11.1
	PF				0.964	0.972	0.964	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	Actual MVA				9.3	8.7	11.5	11.5	11.4	11.4	11.3	11.3	11.2	11.2	11.1	11.1	11.1
50% POE	MW				8.9	8.5	11.1	11.0	11.0	10.9	10.9	10.8	10.8	10.7	10.7	10.7	10.7
	MVA _r				2.5	2.0	3.1	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	MVA				9.3	8.7	11.5	11.5	11.4	11.4	11.3	11.3	11.2	11.2	11.1	11.1	11.1
	PF				0.964	0.972	0.964	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961	0.961
	Actual MVA				13.4	15.0	15.5										
Huskinson 10% POE	MW				13.3	14.8	15.3	15.2	15.2	15.3	15.2	15.2	15.1	16.8	16.8	16.8	16.8
	MVA _r				1.7	2.5	2.5	4.2	4.2	4.2	4.2	4.1	4.1	4.6	4.6	4.6	4.6
	MVA				13.4	15.0	15.5	15.8	15.8	15.8	15.8	15.7	15.7	17.5	17.4	17.4	17.4
	PF				0.992	0.986	0.987	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965
	Actual MVA				13.3	14.8	15.3	15.2	15.2	15.3	15.2	15.2	15.1	16.8	16.8	16.8	16.8
50% POE	MW				13.3	14.8	15.3	15.2	15.2	15.3	15.2	15.2	15.1	16.8	16.8	16.8	16.8
	MVA _r				1.7	2.5	2.5	4.2	4.2	4.2	4.2	4.1	4.1	4.6	4.6	4.6	4.6
	MVA				13.4	15.0	15.5	15.8	15.8	15.8	15.8	15.7	15.7	17.5	17.4	17.4	17.4
	PF				0.992	0.986	0.987	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965
	Actual MVA				10.2	11.1	10.5										
South Nowra 10% POE	MW				9.7	9.8	9.8	11.4	11.5	12.0	12.0	12.0	11.9	11.9	11.9	12.0	12.0
	MVA _r				4.9	4.1	3.2	5.2	5.2	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
	MVA				10.9	10.7	10.3	12.6	12.6	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1
	PF				0.892	0.921	0.950	0.911	0.911	0.911	0.911	0.911	0.911	0.911	0.911	0.911	0.911
	Actual MVA				9.7	9.8	9.8	11.4	11.5	12.0	12.0	12.0	11.9	11.9	11.9	12.0	12.0
50% POE	MW				8.9	9.1	8.7	10.4	10.5	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
	MVA _r				4.5	3.8	2.9	4.7	4.7	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
	MVA				10.0	9.9	9.2	11.4	11.5	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	PF				0.892	0.921	0.950	0.911	0.911	0.911	0.911	0.911	0.911	0.911	0.911	0.911	0.911
	Actual MVA				4.9	5.2	7.5										
Sussex Inlet 10% POE	MW				4.7	4.9	7.3	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
	MVA _r				1.5	1.5	1.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	MVA				4.9	5.2	7.5	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9
	PF				0.950	0.959	0.974	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957
	Actual MVA				4.7	4.9	7.3	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
50% POE	MW				4.7	4.9	7.3	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
	MVA _r				1.5	1.5	1.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	MVA				4.9	5.2	7.5	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9
	PF				0.950	0.959	0.974	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957
	Actual MVA				6.4	8.5	11.0										
Tomerong ZS 10% POE	MW				6.3	8.3	10.6	10.6	10.6	10.6	10.6	10.6	10.5	10.5	10.5	10.5	10.5
	MVA _r				1.0	2.2	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	MVA				6.4	8.5	11.0	11.0	11.0	11.0	10.9	10.9	10.9	10.9	10.8	10.8	10.8
	PF				0.987	0.966	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual MVA				6.3	8.3	10.6	10.6	10.6	10.6	10.6	10.6	10.5	10.5	10.5	10.5	10.5
50% POE	MW				6.3	8.3	10.6	10.6	10.6	10.6	10.6	10.6	10.5	10.5	10.5	10.5	10.5
	MVA _r				1.0	2.2	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	MVA				6.4	8.5	11.0	11.0	11.0	11.0	10.9	10.9	10.9	10.9	10.8	10.8	10.8
	PF				0.987	0.966	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual MVA						5.1										
Yatte Yattah 10% POE	MW						4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	MVA _r						1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	MVA						5.1	5.0	5.0	5.0	5.0	4.9	4.9	4.9	4.9	4.9	4.9
	PF						0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
	Actual MVA						4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
50% POE	MW						4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	MVA _r						1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	MVA						5.1	5.0	5.0	5.0	5.0	4.9	4.9	4.9	4.9	4.9	4.9
	PF						0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
	Actual MVA						5.1	5.0	5.0	5.0	5.0	4.9	4.9	4.9	4.9	4.9	4.9

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual	MVA				44.6	48.9	61.4										
Undiversified	MW				43.2	46.6	59.2	61.1	61.0	61.4	61.3	61.1	60.9	62.5	62.4	62.4	62.3
	MVA _r				11.9	12.6	15.0	19.4	19.4	19.6	19.5	19.5	19.4	19.9	19.8	19.8	19.8
	10% POE MVA				45.3	48.5	61.2	64.2	64.2	64.6	64.5	64.3	64.1	65.8	65.6	65.6	65.6
	PF				0.955	0.962	0.967	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
50% POE	MW				42.5	45.9	58.2	60.1	60.0	60.4	60.3	60.1	59.9	61.5	61.4	61.3	61.3
	MVA _r				11.5	12.3	14.7	18.9	18.9	19.1	19.1	19.0	19.0	19.4	19.4	19.4	19.4
	MVA				44.4	47.7	60.1	63.1	63.1	63.5	63.3	63.2	63.0	64.6	64.5	64.4	64.4
	PF				0.957	0.962	0.968	0.952	0.952	0.951	0.951	0.951	0.951	0.952	0.952	0.952	0.952
Actual	MVA				33.8	40.2	50.4										
Diversified	MW				31.4	39.8	42.3	39.4	39.4	39.7	39.6	39.4	39.3	40.4	40.3	40.3	40.2
	MVA _r				8.3	8.5	9.3	8.7	8.6	8.7	8.7	8.7	8.6	8.9	8.8	8.8	8.8
	10% POE MVA				32.4	40.7	43.4	40.4	40.3	40.6	40.5	40.4	40.3	41.3	41.2	41.2	41.2
	PF				0.967	0.978	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
50% POE	MW				30.0	35.6	37.5	38.8	38.7	39.0	38.9	38.8	38.7	39.7	39.6	39.6	39.6
	MVA _r				7.9	7.6	8.2	8.5	8.5	8.6	8.5	8.5	8.5	8.7	8.7	8.7	8.7
	MVA				31.0	36.4	38.4	39.7	39.7	39.9	39.8	39.7	39.6	40.7	40.5	40.5	40.5
	PF				0.967	0.978	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977

4 ENDEAVOUR ENERGY TOTAL AND BULK SUPPLY POINTS

4.1 Endeavour Energy Total

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
BSP Dapto ⁴	Actual MVA	604.9	650.0	549.5	520.5	651.7	681.5										
	MW	603.6	650.0	549.5	517.5	648.9	671.4	642.3	658.6	660.7	670.7	672.4	676.0	678.5	689.6	693.0	698.8
	MVAr	39.1	0.8	1.2	74.8	60.5	246.2	104.5	107.1	107.5	109.1	109.4	110.0	110.4	112.2	112.7	113.7
	10% POE MVA	604.9	650.0	549.5	522.9	651.7	715.1	650.7	667.3	669.3	679.5	681.2	684.9	687.5	698.6	702.1	707.9
	PF	0.998	1.000	1.000	0.990	0.996	0.939	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
50% POE	MW	603.6	650.0	549.5	517.5	648.9	671.4	617.9	634.3	636.3	646.2	647.9	651.5	654.0	665.0	668.4	674.1
	MVAr	39.1	0.8	1.2	74.8	60.5	246.2	100.5	103.2	103.5	105.1	105.4	106.0	106.4	108.2	108.7	109.7
	MVA	604.9	650.0	549.5	522.9	651.7	715.1	626.0	642.6	644.7	654.7	656.4	660.0	662.6	673.7	677.2	683.0
	PF	0.998	1.000	1.000	0.990	0.996	0.939	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
	Actual MVA				382.6	407.7	362.7										
BSP Holroyd	MW				256.0	388.5	357.0	380.3	391.0	456.5	458.6	461.8	466.0	470.0	473.9	479.4	485.3
	MVAr				25.9	44.2	5.9	6.3	6.5	7.6	7.6	7.7	7.7	7.8	7.9	8.0	8.1
	10% POE MVA				257.3	391.0	357.1	380.4	391.0	456.6	458.7	461.9	466.0	470.0	474.0	479.5	485.4
	PF				0.995	0.994	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Actual MVA																
50% POE	MW				217.2	356.7	329.8	360.0	370.6	436.2	438.3	441.5	445.6	449.6	453.6	459.1	465.0
	MVAr				22.0	40.6	5.5	6.0	6.2	7.2	7.3	7.3	7.4	7.5	7.5	7.6	7.7
	MVA				218.3	359.0	329.8	360.0	370.7	436.2	438.3	441.5	445.7	449.7	453.6	459.1	465.0
	PF				0.995	0.994	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Actual MVA	6.8	5.4	6.0	5.8	4.5	5.3										
BSP Ilford	MW	6.6	5.2	5.8	5.6	4.4	5.1	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
	MVAr	1.6	1.3	1.5	1.4	1.1	1.3	1.2	3.8	3.8	3.8	5.4	5.4	5.4	5.4	5.4	5.4
	10% POE MVA	6.8	5.4	6.0	5.8	4.5	5.3	4.9	15.6	15.6	15.6	22.3	22.3	22.2	22.2	22.2	22.2
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	Actual MVA																
50% POE	MW	6.6	5.2	5.8	5.6	4.4	5.1	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
	MVAr	1.6	1.3	1.5	1.4	1.1	1.3	1.2	3.8	3.8	3.8	5.4	5.4	5.4	5.4	5.4	5.4
	MVA	6.8	5.4	6.0	5.8	4.5	5.3	4.9	15.6	15.6	15.6	22.3	22.3	22.2	22.2	22.2	22.2
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	Actual MVA	160.5	137.7	118.0	159.7	136.3	170.5										
BSP Ingleburn	MW	142.9	140.4	137.7	137.9	134.2	137.0	139.6	139.5	139.5	139.6	139.7	139.7	139.6	139.5	139.7	139.8
	MVAr	25.4	34.9	29.8	29.8	47.8	14.1	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
	10% POE MVA	145.2	144.7	140.9	141.1	142.5	137.7	143.2	143.2	143.2	143.3	143.3	143.3	143.3	143.1	143.3	143.5
	PF	0.985	0.970	0.977	0.977	0.942	0.995	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
	Actual MVA																
50% POE	MW	130.7	128.2	125.5	125.7	123.1	124.6	131.5	131.4	131.4	131.5	131.6	131.6	131.5	131.4	131.6	131.7
	MVAr	23.2	31.9	27.1	27.2	43.9	12.9	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.4
	MVA	132.8	132.1	128.4	128.6	130.7	125.2	134.9	134.9	134.9	135.0	135.0	135.0	135.0	134.8	135.0	135.2
	PF	0.985	0.970	0.977	0.977	0.942	0.995	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
	Actual MVA	381.0	463.6	422.0	417.6	409.3	491.7										
BSP Liverpool	MW	485.2	460.7	469.8	439.5	437.8	409.9	421.9	430.4	439.5	450.8	462.6	472.3	479.3	484.5	490.6	495.7
	MVAr	13.1	80.6	93.4	81.2	89.3	46.3	68.6	69.9	71.4	73.3	75.2	76.8	77.9	78.7	79.7	80.6
	10% POE MVA	485.4	467.7	479.0	446.9	446.8	412.5	427.4	436.1	445.3	456.7	468.7	478.5	485.6	490.8	497.0	502.2
	PF	1.000	0.985	0.981	0.983	0.980	0.994	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
	Actual MVA																
50% POE	MW	443.8	419.3	428.4	398.0	397.7	365.4	395.8	404.3	413.4	424.7	436.5	446.2	453.2	458.4	464.5	469.6
	MVAr	12.0	73.4	85.2	73.5	81.1	41.3	64.3	65.7	67.2	69.0	70.9	72.5	73.6	74.5	75.5	76.3
	MVA	443.9	425.7	436.7	404.7	405.9	367.7	401.0	409.6	418.9	430.2	442.2	452.1	459.1	464.4	470.5	475.7
	PF	1.000	0.985	0.981	0.983	0.980	0.994	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
	Actual MVA	89.4	110.4	105.3	110.5	142.0	173.2										
BSP Macarthur 66kV	MW	124.3	105.7	104.1	141.6	138.0	152.5	150.3	150.4	152.8	155.8	158.2	161.7	165.0	168.8	173.3	177.3
	MVAr	0.0	0.0	0.0	0.1	0.0	39.9	15.7	15.7	16.0	16.3	16.5	16.9	17.2	17.6	18.1	18.5
	10% POE MVA	124.3	105.7	104.1	141.6	138.0	157.6	151.1	151.2	153.6	156.7	159.0	162.5	165.9	169.7	174.3	178.2
	PF	1.000	1.000	1.000	1.000	1.000	0.968	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	Actual MVA																
50% POE	MW	110.2	95.5	95.4	125.3	120.1	142.0	139.6	139.7	142.1	145.1	147.5	151.0	154.3	158.1	162.6	166.6
	MVAr	0.0	0.0	0.0	0.1	0.0	37.1	14.6	14.6	14.8	15.2	15.4	15.8	16.1	16.5	17.0	17.4
	MVA	110.2	95.5	95.4	125.3	120.1	146.8	140.4	140.4	142.9	145.9	148.3	151.8	155.1	159.0	163.5	167.5
	PF	1.000	1.000	1.000	1.000	1.000	0.968	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	Actual MVA				186.4	191.7	233.5										
BSP Macarthur 132kV	MW				160.0	181.6	181.1	186.9	213.1	225.3	238.7	253.2	267.6	279.8	289.3	297.6	301.7
	MVAr				22.6	86.3	16.4	61.7	70.4	74.4	78.8	83.6	88.4	92.4	95.6	98.3	99.7
	10% POE MVA				161.6	201.1	181.8	196.8	224.5	237.3	251.4	266.6	281.9	294.6	304.7	313.5	317.7
	PF				0.990	0.903	0.996	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																
50% POE	MW				150.4	172.0	171.5	178.0	204.4	216.6	230.0	244.5	259.0	271.2	280.7	289.1	293.1
	MVAr				21.2	81.8	15.5	58.8	67.5	71.6	76.0	80.8	85.6	89.6	92.7	95.5	96.8
	MVA				151.9	190.4	172.2	187.5	215.3	228.1	242.2	257.5	272.8	285.6	295.6	304.5	308.7
	PF				0.990	0.903	0.996	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
	Actual MVA																

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⁴The variation in VArS at Dapto BSP is attributable to Tallawarra power station. Production of VArS at Tallawarra is not within the control of Endeavour Energy. The forecast of VArS is based on an average of previous years.

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Actual	MVA	73.5	83.7	73.6	70.8	78.0	79.0									
BSP Marulan	MW	67.4	78.0	71.1	67.3	77.4	73.8	73.4	73.2	72.9	72.7	72.5	72.3	72.2	72.0	72.1	72.1
	MVA _r	30.6	30.6	19.0	22.0	9.6	28.2	24.8	24.7	24.6	24.5	24.5	24.4	24.3	24.3	24.3	
	10% POE	MVA	74.0	83.7	73.6	70.8	78.0	79.0	77.5	77.2	77.0	76.8	76.5	76.3	76.2	76.0	76.1
	PF	0.911	0.931	0.966	0.950	0.992	0.934	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947
	MW	67.4	78.0	71.1	67.3	77.4	73.8	69.6	69.4	69.2	69.0	68.8	68.6	68.4	68.3	68.3	68.3
	MVA _r	30.6	30.6	19.0	22.0	9.6	28.2	23.5	23.4	23.3	23.3	23.2	23.1	23.1	23.0	23.0	23.1
	50% POE	MVA	74.0	83.7	73.6	70.8	78.0	79.0	73.5	73.2	73.0	72.8	72.6	72.4	72.2	72.0	72.1
	PF	0.911	0.931	0.966	0.950	0.992	0.934	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947
	Actual	MVA	33.4	31.8	37.3	31.7	28.5	28.4									
BSP Mount Piper	MW	29.2	29.3	33.3	29.6	27.1	26.7	24.9	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
	MVA _r	16.1	14.2	16.8	12.6	9.0	9.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.0
	10% POE	MVA	33.4	32.5	37.3	32.2	28.6	28.4	27.2	27.2	27.2	27.2	27.1	27.1	27.1	27.1	27.1
	PF	0.876	0.900	0.893	0.920	0.949	0.940	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913
	MW	29.2	29.3	33.3	29.6	27.1	26.7	24.9	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
	MVA _r	16.1	14.2	16.8	12.6	9.0	9.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.0
	50% POE	MVA	33.4	32.5	37.3	32.2	28.6	28.4	27.2	27.2	27.2	27.2	27.1	27.1	27.1	27.1	27.1
	PF	0.876	0.900	0.893	0.920	0.949	0.940	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913
	Actual	MVA	238.6	290.6	243.6	263.0	413.4	353.0									
BSP Regentville	MW	280.3	265.5	265.0	268.4	314.4	296.0	289.8	303.8	309.7	310.7	314.5	315.7	317.7	317.7	318.9	319.1
	MVA _r	73.8	70.0	69.8	70.7	82.8	78.0	76.4	80.1	81.6	81.9	82.9	83.2	83.7	83.7	84.0	84.1
	10% POE	MVA	289.9	274.6	274.0	277.6	325.2	306.1	299.7	314.2	320.3	321.3	325.2	326.5	328.6	328.6	329.8
	PF	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	MW	263.3	248.6	248.0	251.4	293.8	273.3	266.8	280.9	286.7	287.7	291.5	292.7	294.8	294.8	295.9	296.1
	MVA _r	69.4	65.5	65.3	66.2	77.4	72.0	70.3	74.0	75.5	75.8	76.8	77.1	77.7	77.7	78.0	78.0
	50% POE	MVA	272.3	257.1	256.5	260.0	303.8	282.6	275.9	290.4	296.5	297.5	301.4	302.7	304.8	304.8	306.0
	PF	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual	MVA	32.0	30.5	41.3	35.7	37.8	38.2									
BSP Sydney North	MW	36.0	34.3	38.8	36.4	38.5	34.4	36.2	36.3	36.1	35.9	35.7	35.5	35.4	35.2	35.2	35.2
	MVA _r	3.6	3.4	3.9	3.6	3.9	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.5
	10% POE	MVA	36.1	34.4	39.0	36.5	38.7	34.6	36.4	36.5	36.3	36.1	35.9	35.7	35.5	35.4	35.3
	PF	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	MW	32.4	30.6	35.2	32.7	34.6	31.6	31.4	31.6	31.3	31.2	31.0	30.8	30.6	30.5	30.4	30.4
	MVA _r	3.2	3.1	3.5	3.3	3.5	3.2	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	50% POE	MVA	32.5	30.8	35.4	32.9	34.7	31.8	31.6	31.7	31.5	31.3	31.1	30.9	30.8	30.6	30.6
	PF	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	Actual	MVA	1306	1523	1391	1082	1105	1236									
BSP Sydney West	MW	1601	1542	1550	1440	1233	1190	1237	1289	1322	1351	1376	1392	1405	1417	1429	1439
	MVA _r	70.4	58.1	464.4	358.8	98.1	135.5	121.5	126.7	129.8	132.7	135.1	136.7	138.0	139.2	140.4	141.4
	10% POE	MVA	1603	1543	1618	1484	1237	1197	1243	1296	1328	1357	1382	1399	1411	1424	1436
	PF	0.999	0.999	0.958	0.970	0.997	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	MW	1476	1417	1425	1315	1120	1082	1158	1210	1242	1271	1296	1312	1324	1337	1349	1359
	MVA _r	64.9	53.4	427.0	327.7	89.1	123.3	113.7	118.8	122.0	124.8	127.2	128.8	130.1	131.3	132.5	133.5
	50% POE	MVA	1478	1418	1488	1355	1124	1089	1163	1215	1248	1277	1302	1318	1331	1344	1356
	PF	0.999	0.999	0.958	0.970	0.997	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	Actual	MVA	292.1	418.9	373.6	388.9	470.2	500.8									
BSP Vineyard	MW	404.7	415.0	422.7	433.5	458.7	462.8	496.6	548.0	575.0	602.3	630.3	659.4	694.7	721.8	747.7	762.3
	MVA _r	100.5	103.1	94.2	106.0	153.4	79.4	123.6	136.4	143.1	149.9	156.8	164.1	172.9	179.6	186.1	189.7
	10% POE	MVA	417.0	427.6	433.0	446.2	483.7	469.5	511.7	564.8	592.5	620.7	649.5	679.5	715.9	743.8	770.5
	PF	0.970	0.970	0.976	0.971	0.948	0.986	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	MW	359.7	370.0	377.6	388.4	417.0	417.3	454.6	506.1	533.0	560.3	588.3	617.5	652.8	679.9	705.7	720.4
	MVA _r	89.4	91.9	84.1	95.0	139.4	71.6	113.1	125.9	132.7	139.4	146.4	153.7	162.4	169.2	175.6	179.3
	50% POE	MVA	370.6	381.2	386.9	399.8	439.7	423.4	468.5	521.5	549.3	577.4	606.3	636.3	672.7	700.6	727.3
	PF	0.970	0.970	0.976	0.971	0.948	0.986	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	Actual	MVA	21.0	19.6	18.5	20.6	19.0	36.3									
BSP Wallerawang 66kV	MW	19.6	18.3	17.3	19.2	17.7	33.9	22.6	22.7	22.6	22.5	22.5	22.4	22.4	22.3	22.3	22.3
	MVA _r	7.4	7.0	6.5	7.3	6.7	12.9	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	10% POE	MVA	21.0	19.6	18.5	20.6	19.0	36.3	24.2	24.3	24.2	24.1	24.0	24.0	23.9	23.9	23.9
	PF	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
	MW	19.6	18.3	17.3	19.2	17.7	33.9	22.6	22.7	22.6	22.5	22.5	22.4	22.4	22.3	22.3	22.3
	MVA _r	7.4	7.0	6.5	7.3	6.7	12.9	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	50% POE	MVA	21.0	19.6	18.5	20.6	19.0	36.3	24.2	24.3	24.2	24.1	24.0	24.0	23.9	23.9	23.9
	PF	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
	Actual	MVA	59.6	85.0	66.7	58.4	68.3	51.0									

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		3298	3850	3446	3734	4164	4442										
Undiversified	MW	3859	3828	3730	4010	4167	4081	4149	4339	4495	4592	4688	4769	4847	4920	4987	5037
	MVAr	394	421	814	829	707	728	669	706	724	742	761	778	794	808	821	829
	10% POE MVA	3900	3874	3840	4104	4254	4169	4218	4412	4570	4669	4767	4850	4931	5005	5074	5124
	PF	0.990	0.988	0.972	0.977	0.980	0.979	0.984	0.983	0.984	0.984	0.983	0.983	0.983	0.983	0.983	0.983
50% POE	MW	3601	3574	3478	3701	3878	3799	3898	4087	4243	4340	4436	4517	4595	4668	4735	4785
	MVAr	369	390	751	766	658	691	628	665	684	702	721	737	754	768	781	789
	50% POE MVA	3640	3617	3579	3788	3958	3884	3963	4156	4314	4413	4511	4594	4674	4749	4818	4868
	PF	0.989	0.988	0.972	0.977	0.980	0.978	0.984	0.983	0.984	0.983	0.983	0.983	0.983	0.983	0.983	0.983
Actual MVA		3157	3760	3311	3349	3877	4112										
Diversified	MW	3759	3659	3693	3698	3846	3865	3862	4039	4184	4274	4363	4439	4512	4580	4642	4689
	MVAr	493	616	698	386	419	193	513	537	556	568	580	590	600	609	617	623
	10% POE MVA	3792	3711	3758	3718	3869	3870	3896	4074	4221	4312	4402	4478	4552	4620	4683	4730
	PF	0.992	0.986	0.983	0.995	0.994	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
50% POE	MW	3467	3367	3401	3406	3567	3556	3628	3805	3949	4039	4129	4205	4278	4345	4408	4454
	MVAr	454	567	643	355	389	177	482	506	525	537	549	559	568	577	586	592
	50% POE MVA	3497	3414	3461	3424	3588	3561	3660	3838	3984	4075	4165	4242	4315	4383	4447	4493
	PF	0.992	0.986	0.983	0.995	0.994	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991

Summary EE Total		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		3157	3760	3311	3349	3877	4112										
Diversified	MW	3759	3659	3693	3698	3846	3865	3862	4039	4184	4274	4363	4439	4512	4580	4642	4689
	MVAr	493	616	698	386	419	193	513	537	556	568	580	590	600	609	617	623
	10% POE MVA	3792	3711	3758	3718	3869	3870	3896	4074	4221	4312	4402	4478	4552	4620	4683	4730
	PF	0.992	0.986	0.983	0.995	0.994	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
50% POE	MW	3467	3367	3401	3406	3567	3556	3628	3805	3949	4039	4129	4205	4278	4345	4408	4454
	MVAr	454	567	643	355	389	177	482	506	525	537	549	559	568	577	586	592
	50% POE MVA	3497	3414	3461	3424	3588	3561	3660	3838	3984	4075	4165	4242	4315	4383	4447	4493
	PF	0.992	0.986	0.983	0.995	0.994	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
Growth (p.a.) (50% PoE)	MW	-174	-100	34	5	161	-10	72	176	145	90	89	76	73	68	63	46
	%	-4.8%	-2.9%	1.0%	0.2%	4.7%	-0.3%	2.0%	4.9%	3.8%	2.3%	2.2%	1.8%	1.7%	1.6%	1.4%	1.0%

Diversified Actual History for 12-17	MW	3130	3708	3253	3331	3855	4107
	MVAr	410	625	615	348	420	205
	MVA	3157	3760	3311	3349	3877	4112
	PF	0.992	0.986	0.983	0.995	0.994	0.999
	Date	30-Jan	18-Jan	20-Dec	21-Nov	25-Feb	30-Jan
	Time	16:15	15:00	15:45	15:45	16:45	17:15
	Day	Mon	Fri	Fri	Fri	Thu	Mon
Growth (p.a.) (Actual)	MW	-873	578	-454	78	523	252
	%	-21.8%	18.5%	-12.3%	2.4%	15.7%	6.5%

4.2 Dapto Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Bellambi	Actual MVA	72.3	75.8	63.5	63.2	78.2	80.7										
	MW	72.1	75.4	63.5	62.9	75.2	80.7	78.4	79.4	79.2	79.0	78.8	78.6	78.4	78.2	78.3	78.3
	MVA _r	5.2	8.4	1.0	6.4	24.8	16.4	15.9	16.1	16.1	16.0	16.0	16.0	15.9	15.9	15.9	15.9
	10% POE MVA	72.3	75.8	63.5	63.2	79.2	82.3	80.0	81.0	80.8	80.6	80.4	80.2	80.0	79.8	79.9	79.9
	PF	0.997	0.994	1.000	0.995	0.950	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	MW	72.1	75.4	63.5	62.9	75.2	80.7	73.8	74.8	74.6	74.4	74.2	74.0	73.8	73.7	73.7	73.8
	MVA _r	5.2	8.4	1.0	6.4	24.8	16.4	15.0	15.2	15.2	15.1	15.1	15.0	15.0	15.0	15.0	15.0
	50% POE MVA	72.3	75.8	63.5	63.2	79.2	82.3	75.4	76.3	76.1	76.0	75.7	75.5	75.3	75.2	75.2	75.3
	PF	0.997	0.994	1.000	0.995	0.950	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	Actual MVA	230.0	242.1	221.7	232.4	245.1	258.7										
Dapto 132kV	MW	215.4	219.9	201.0	210.5	223.2	236.4	231.8	233.2	233.3	235.8	236.2	236.9	237.9	239.2	240.8	242.8
	MVA _r	85.6	91.0	79.5	88.5	84.3	87.3	90.0	90.6	90.6	91.4	91.5	91.8	92.1	92.5	93.1	93.7
	10% POE MVA	237.2	242.1	221.7	232.4	245.1	258.7	254.6	256.2	256.3	258.9	259.3	260.1	261.1	262.5	264.2	266.3
	PF	0.908	0.908	0.907	0.906	0.910	0.914	0.910	0.910	0.910	0.911	0.911	0.911	0.911	0.911	0.911	0.912
	MW	215.4	219.9	201.0	210.5	223.2	236.4	231.6	233.2	233.3	235.8	236.2	236.9	237.9	239.2	240.8	242.8
	MVA _r	85.6	91.0	79.5	88.5	84.3	87.3	90.0	90.6	90.6	91.4	91.5	91.8	92.1	92.5	93.1	93.7
	50% POE MVA	237.2	242.1	221.7	232.4	245.1	258.7	254.5	256.2	256.3	258.9	259.3	260.1	261.1	262.5	264.2	266.3
	PF	0.908	0.908	0.907	0.906	0.910	0.914	0.910	0.910	0.910	0.911	0.911	0.911	0.911	0.911	0.911	0.912
	Actual MVA	102.0	124.9	78.1	65.6	103.4	110.4										
Mount Terry	MW	106.7	101.2	101.3	100.5	96.2	99.2	103.2	108.6	110.5	110.9	111.3	111.7	112.0	112.4	113.1	113.7
	MVA _r	35.9	34.0	34.1	33.8	32.3	33.4	34.7	36.5	37.2	37.3	37.4	37.6	37.7	37.8	38.0	38.2
	10% POE MVA	112.5	106.7	106.8	106.0	101.4	104.7	108.9	114.6	116.6	117.0	117.4	117.8	118.2	118.6	119.3	120.0
	PF	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
	MW	91.6	86.1	86.2	85.4	83.7	84.2	99.0	104.5	106.3	106.8	107.2	107.5	107.9	108.3	108.9	109.6
	MVA _r	30.8	28.9	29.0	28.7	28.1	28.3	33.3	35.1	35.8	35.9	36.0	36.2	36.3	36.4	36.6	36.9
	50% POE MVA	96.6	90.8	90.9	90.1	88.3	88.9	104.5	110.2	112.2	112.6	113.1	113.4	113.8	114.3	114.9	115.6
	PF	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
	Actual MVA	37.0	29.4	23.7	30.0	24.5	23.7										
Outer Harbour	MW	35.8	28.4	23.6	29.8	23.9	23.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.5	30.5
	MVA _r	9.4	7.5	2.1	3.0	5.2	3.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	10% POE MVA	37.0	29.4	23.7	30.0	24.5	23.7	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.1
	PF	0.967	0.967	0.996	0.995	0.977	0.990	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
	MW	35.8	28.4	23.6	29.8	23.9	23.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.5	30.5
	MVA _r	9.4	7.5	2.1	3.0	5.2	3.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	50% POE MVA	37.0	29.4	23.7	30.0	24.5	23.7	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.1
	PF	0.967	0.967	0.996	0.995	0.977	0.990	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
	Actual MVA	112.5	136.7	109.2	78.0	89.3	92.9										
Shoalhaven	MW	128.9	129.5	128.8	103.2	100.5	100.1	99.4	105.5	105.4	105.4	105.7	106.1	106.8	115.9	117.1	118.5
	MVA _r	28.9	34.3	28.2	17.4	19.3	17.0	16.9	17.9	17.9	17.9	17.9	18.0	18.1	19.7	19.9	20.1
	10% POE MVA	132.1	133.9	131.8	104.6	102.4	101.5	100.8	107.0	106.9	106.9	107.2	107.6	108.3	117.5	118.7	120.2
	PF	0.976	0.967	0.977	0.986	0.982	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	MW	113.2	113.7	113.0	87.4	86.2	88.3	90.4	96.5	96.4	96.5	96.7	97.2	97.8	106.9	108.1	109.5
	MVA _r	25.4	30.1	24.7	14.7	16.6	15.0	15.4	16.4	16.4	16.4	16.4	16.5	16.6	18.2	18.4	18.6
	50% POE MVA	116.0	117.6	115.7	88.6	87.8	89.5	91.7	97.9	97.8	97.9	98.1	98.6	99.2	108.4	109.7	111.1
	PF	0.976	0.967	0.977	0.986	0.982	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
	Actual MVA	167.5	166.5	153.5	149.9	172.8	179.8										
Springhill	MW	154.1	151.6	154.9	154.6	162.5	166.4	169.0	174.2	174.7	183.8	185.0	188.1	188.2	190.5	190.9	193.6
	MVA _r	42.1	47.2	44.9	38.1	43.5	41.8	46.3	47.7	47.9	50.3	50.7	51.5	51.6	52.2	52.3	53.0
	10% POE MVA	159.7	158.8	161.3	159.2	168.2	171.6	175.2	180.6	181.2	190.5	191.8	195.0	195.1	197.6	198.0	200.8
	PF	0.965	0.955	0.960	0.971	0.966	0.970	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	MW	139.9	137.4	140.7	140.4	150.5	154.7	158.9	164.0	164.5	173.4	174.6	177.7	177.8	180.1	180.5	183.1
	MVA _r	38.2	42.8	40.8	34.6	40.3	38.8	43.5	44.9	45.1	47.5	47.8	48.7	48.7	49.3	49.4	50.2
	50% POE MVA	145.0	143.9	146.5	144.6	155.8	159.5	164.7	170.0	170.6	179.8	181.0	184.2	184.3	186.7	187.1	189.9
	PF	0.965	0.955	0.960	0.971	0.966	0.970	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	Actual MVA				33.8	40.2	50.4										
West Tomerong	MW				31.4	39.8	42.3	39.4	39.4	39.7	39.6	39.4	39.3	40.4	40.3	40.3	40.2
	MVA _r				8.3	8.5	9.3	8.7	8.6	8.7	8.7	8.7	8.6	8.9	8.8	8.8	8.8
	10% POE MVA				32.4	40.7	43.4	40.4	40.3	40.6	40.5	40.4	40.3	41.3	41.2	41.2	41.2
	PF				0.967	0.978	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW				30.0	35.6	37.5	38.8	38.7	39.0	38.9	38.8	38.7	39.7	39.6	39.6	39.6
	MVA _r				7.9	7.6	8.2	8.5	8.5	8.6	8.5	8.5	8.5	8.7	8.7	8.7	8.7
	50% POE MVA				31.0	36.4	38.4	39.7	39.7	39.9	39.8	39.7	39.6	40.7	40.5	40.5	40.5
	PF				0.967	0.978	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977

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Location		Actual						Forecast										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
	Actual	MVA	721.3	775.4	649.7	652.8	753.5	796.5										
Undiversified	MW		713.0	705.9	673.0	692.8	721.3	748.6	751.6	770.7	773.1	784.9	786.8	791.1	794.0	806.9	810.9	817.7
	MVAr		207.1	222.4	189.8	195.5	217.9	208.4	218.3	223.3	224.1	227.5	228.1	229.3	230.1	232.8	233.9	235.7
	10% POE	MVA	750.8	746.7	708.8	727.9	761.5	785.8	790.9	810.7	813.2	825.5	827.5	831.9	835.0	848.2	852.4	859.4
	PF		0.950	0.945	0.949	0.952	0.947	0.953	0.950	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
	MW		667.9	660.8	628.0	646.4	678.4	705.2	723.0	742.2	744.6	756.2	758.2	762.4	765.3	778.2	782.2	788.9
	MVAr		194.6	208.7	177.1	183.9	206.8	197.3	211.5	216.6	217.3	220.7	221.3	222.5	223.2	225.9	227.0	228.9
	50% POE	MVA	704.1	699.6	662.0	680.0	717.1	741.0	761.5	781.4	783.9	796.0	798.0	802.4	805.4	818.6	822.7	829.7
	PF		0.949	0.945	0.949	0.951	0.946	0.952	0.949	0.950	0.950	0.950	0.950	0.950	0.950	0.951	0.951	0.951
	Actual	MVA	604.9	650.0	549.5	520.5	651.7	681.5										
Diversified# ⁵	MW		603.6	650.0	549.5	517.5	648.9	671.4	642.3	658.6	660.7	670.7	672.4	676.0	678.5	689.6	693.0	698.8
	MVAr		39.1	0.8	1.2	74.8	60.5	246.2	104.5	107.1	107.5	109.1	109.4	110.0	110.4	112.2	112.7	113.7
	10% POE	MVA	604.9	650.0	549.5	522.9	651.7	715.1	650.7	667.3	669.3	679.5	681.2	684.9	687.5	698.6	702.1	707.9
	PF		0.998	1.000	1.000	0.990	0.996	0.939	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
	MW		603.6	650.0	549.5	517.5	648.9	671.4	617.9	634.3	636.3	646.2	647.9	651.5	654.0	665.0	668.4	674.1
	MVAr		39.1	0.8	1.2	74.8	60.5	246.2	100.5	103.2	103.5	105.1	105.4	106.0	106.4	108.2	108.7	109.7
	50% POE	MVA	604.9	650.0	549.5	522.9	651.7	715.1	626.0	642.6	644.7	654.7	656.4	660.0	662.6	673.7	677.2	683.0
	PF		0.998	1.000	1.000	0.990	0.996	0.939	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
Tallawarra Generator	MW								-422.0	-422.0	-422.0	-422.0	-422.0	-422.0	-422.0	-422.0	-422.0	-422.0
	MVAr								-82.6	-82.6	-82.6	-82.6	-82.6	-82.6	-82.6	-82.6	-82.6	-82.6
	MVA								-430.0	-430.0	-430.0	-430.0	-430.0	-430.0	-430.0	-430.0	-430.0	-430.0
	PF								0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	Actual	MVA																
Undiversified+	MW								329.6	348.7	351.1	362.9	364.8	369.1	372.0	384.9	388.9	395.7
	MVAr								147.1	152.8	153.6	157.3	157.9	159.2	160.1	163.5	164.7	166.7
	10% POE	MVA							360.9	380.7	383.2	395.5	397.5	401.9	405.0	418.2	422.4	429.4
	PF								0.913	0.916	0.916	0.918	0.918	0.918	0.919	0.920	0.921	0.922
	MW								301.0	320.2	322.6	334.2	336.2	340.4	343.3	356.2	360.2	366.9
	MVAr								138.8	144.7	145.5	149.2	149.8	151.1	152.0	155.4	156.6	158.7
	50% POE	MVA							331.5	351.4	353.9	366.0	368.0	372.4	375.4	388.6	392.7	399.7
	PF								0.908	0.911	0.912	0.913	0.913	0.914	0.914	0.917	0.917	0.918
	Actual	MVA																
Diversified+	MW								210.8	226.9	228.9	238.8	240.4	244.0	246.5	257.3	260.7	266.4
	MVAr								41.5	44.7	45.1	47.1	47.4	48.1	48.6	50.7	51.4	52.5
	10% POE	MVA							214.8	231.2	233.3	243.4	245.1	248.7	251.2	262.3	265.7	271.5
	PF								0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
	MW								186.7	202.9	204.9	214.7	216.3	219.8	222.3	233.1	236.5	242.2
	MVAr								36.8	40.0	40.4	42.3	42.6	43.3	43.8	45.9	46.6	47.7
	50% POE	MVA							190.3	206.8	208.8	218.8	220.5	224.1	226.6	237.6	241.1	246.8
	PF								0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981

Note:Diversified# Refers to the Dapto transformer metering values plus the generation output at Tallawarra
Diversified+/Undiversified+ Refers to the generation output at Tallawarra being subtracted from Undiversified or Diversified#

⁵The variation in VArS at Dapto BSP is attributable to Tallawarra power station. Production of VArS at Tallawarra is not within the control of Endeavour Energy. The forecast of VArS is based on an average of previous years.

4.3 Holroyd Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Camellia	Actual MVA				71.2	47.5	61.9										
	MW				69.1	44.9	60.0	48.0	48.1	90.0	91.1	92.7	94.7	97.1	99.7	103.0	106.6
	MVAr				17.3	15.6	15.1	15.4	15.5	28.9	29.3	29.8	30.4	31.2	32.0	33.1	34.3
	10% POE MVA				71.2	47.5	61.9	50.4	50.5	94.5	95.7	97.4	99.5	101.9	104.8	108.2	112.0
	PF				0.970	0.945	0.970	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
50% POE	MW				69.1	44.9	60.0	46.7	46.8	88.7	89.9	91.5	93.5	95.8	98.5	101.7	105.4
	MVAr				17.3	15.6	15.1	15.0	15.1	28.5	28.9	29.4	30.0	30.8	31.6	32.7	33.9
	MVA				71.2	47.5	61.9	49.1	49.2	93.2	94.4	96.1	98.2	100.6	103.4	106.9	110.7
	PF				0.970	0.945	0.970	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
	Actual MVA				238.0	218.9	211.0										
Guildford#	MW				230.5	220.0	207.4	208.1	211.8	211.7	211.4	211.1	210.9	210.7	210.5	211.0	211.4
	MVAr				63.4	53.1	57.1	57.3	58.3	58.3	58.2	58.1	58.1	58.0	58.0	58.1	58.2
	10% POE MVA				239.1	226.3	215.1	215.8	219.7	219.6	219.3	218.9	218.7	218.5	218.4	218.8	219.3
	PF				0.964	0.972	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	Actual MVA				218.2	202.9	191.9	195.6	199.3	199.3	199.0	198.6	198.4	198.2	198.1	198.5	199.0
50% POE	MW				60.0	49.0	52.8	53.9	54.9	54.9	54.8	54.7	54.6	54.6	54.5	54.7	54.8
	MVAr				17.3	15.6	15.1	15.0	15.1	28.5	28.9	29.4	30.0	30.8	31.6	32.7	33.9
	MVA				226.3	208.7	199.1	202.9	206.8	206.7	206.4	206.0	205.8	205.6	205.5	205.9	206.4
	PF				0.964	0.972	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	Actual MVA				74.5	111.6	114.0										
Holroyd 132kV	MW				76.6	106.2	106.8	114.7	121.3	143.3	144.5	146.4	148.7	150.4	151.8	153.4	155.0
	MVAr				7.4	12.5	11.2	20.8	21.9	26.7	26.9	27.3	27.8	28.1	28.3	28.5	28.7
	10% POE MVA				77.2	107.4	107.8	117.0	123.7	146.3	147.5	149.4	151.7	153.5	154.9	156.5	158.2
	PF				0.992	0.989	0.991	0.981	0.981	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	Actual MVA				71.7	100.0	100.7	108.6	115.1	137.2	138.4	140.2	142.5	144.3	145.6	147.2	148.9
50% POE	MW				7.1	11.9	10.7	19.9	21.0	25.8	26.0	26.4	26.9	27.2	27.4	27.6	27.8
	MVAr				7.1	11.9	10.7	19.9	21.0	25.8	26.0	26.4	26.9	27.2	27.4	27.6	27.8
	MVA				72.3	101.1	101.6	110.7	117.4	140.0	141.3	143.2	145.5	147.3	148.6	150.3	151.9
	PF				0.992	0.989	0.991	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
	Actual MVA				383.8	378.1	386.9										
Undiversified	MW				376.2	371.1	374.3	370.8	381.2	445.1	447.1	450.2	454.3	458.1	462.0	467.4	473.1
	MVAr				88.0	81.2	83.4	93.5	95.7	113.9	114.4	115.2	116.2	117.3	118.3	119.6	121.1
	10% POE MVA				387.5	381.2	384.8	383.2	393.8	460.4	462.5	465.7	469.9	474.0	478.0	483.5	489.5
	PF				0.971	0.973	0.973	0.968	0.968	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
	Actual MVA				359.0	347.8	352.6	350.9	361.3	425.2	427.2	430.4	434.4	438.3	442.2	447.5	453.3
50% POE	MW				84.3	76.4	78.7	88.8	91.0	109.2	109.7	110.5	111.5	112.5	113.5	114.9	116.4
	MVAr				84.3	76.4	78.7	88.8	91.0	109.2	109.7	110.5	111.5	112.5	113.5	114.9	116.4
	MVA				369.9	357.4	362.6	362.7	373.4	439.9	442.0	445.3	449.5	453.5	457.5	463.1	469.0
	PF				0.971	0.973	0.973	0.967	0.968	0.967	0.967	0.967	0.966	0.966	0.966	0.966	0.966
	Actual MVA				382.6	407.7	362.7										
Diversified#	MW				256.0	388.5	357.0	380.3	391.0	456.5	458.6	461.8	466.0	470.0	473.9	479.4	485.3
	MVAr				25.9	44.2	5.9	6.3	6.5	7.6	7.6	7.7	7.7	7.8	7.9	8.0	8.1
	10% POE MVA				257.3	391.0	357.1	380.4	391.0	456.6	458.7	461.9	466.0	470.0	474.0	479.5	485.4
	PF				0.995	0.994	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Actual MVA				217.2	356.7	329.8	360.0	370.6	436.2	438.3	441.5	445.7	449.7	453.6	459.1	465.0
50% POE	MW				22.0	40.6	5.5	6.0	6.2	7.2	7.3	7.3	7.4	7.5	7.5	7.6	7.7
	MVAr				22.0	40.6	5.5	6.0	6.2	7.2	7.3	7.3	7.4	7.5	7.5	7.6	7.7
	MVA				218.3	359.0	329.8	360.0	370.7	436.2	438.3	441.5	445.7	449.7	453.6	459.1	465.0
	PF				0.995	0.994	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Actual MVA																
Guildford^	MW							128.1	131.8	131.7	131.4	131.1	130.9	130.7	130.5	131.0	131.4
	MVAr							35.3	36.3	36.3	36.2	36.1	36.0	36.0	35.9	36.1	36.2
	10% POE MVA							132.8	136.7	136.6	136.3	136.0	135.7	135.5	135.4	135.8	136.3
	PF							0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	Actual MVA							115.6	119.3	119.3	119.0	118.6	118.4	118.2	118.1	118.5	119.0
50% POE	MW							31.8	32.9	32.8	32.8	32.7	32.6	32.6	32.5	32.6	32.8
	MVAr							31.8	32.9	32.8	32.8	32.7	32.6	32.6	32.5	32.6	32.8
	MVA							119.9	123.8	123.7	123.4	123.1	122.8	122.6	122.5	122.9	123.4
	PF							0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
	Actual MVA																

Note: # Refers to the transformer metering plus the generation output

^Refers to the Guildford# less assumed Marubeni generation

4.4 Ilford Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Ilford	Actual MVA	6.8	5.4	6.0	5.8	4.5	5.3										
	MW	6.6	5.2	5.8	5.6	4.4	5.1	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
	MVAr	1.6	1.3	1.5	1.4	1.1	1.3	1.2	3.8	3.8	3.8	5.4	5.4	5.4	5.4	5.4	5.4
	10% POE MVA	6.8	5.4	6.0	5.8	4.5	5.3	4.9	15.6	15.6	15.6	22.3	22.3	22.2	22.2	22.2	22.2
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
50% POE	MW	6.6	5.2	5.8	5.6	4.4	5.1	4.8	15.2	15.1	15.1	21.6	21.6	21.6	21.5	21.5	21.5
	MVAr	1.6	1.3	1.5	1.4	1.1	1.3	1.2	3.8	3.8	3.8	5.4	5.4	5.4	5.4	5.4	5.4
	MVA	6.8	5.4	6.0	5.8	4.5	5.3	4.9	15.6	15.6	15.6	22.3	22.3	22.2	22.2	22.2	22.2
	PF	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970

4.5 Ingleburn Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Ingleburn	Actual MVA	160.5	137.7	118.0	159.7	136.3	170.5										
	MW	142.9	140.4	137.7	137.9	134.2	137.0	139.6	139.5	139.5	139.6	139.7	139.7	139.6	139.5	139.7	139.8
	MVAr	25.4	34.9	29.8	29.8	47.8	14.1	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
	10% POE MVA	145.2	144.7	140.9	141.1	142.5	137.7	143.2	143.2	143.2	143.3	143.3	143.3	143.3	143.1	143.3	143.5
	PF	0.985	0.970	0.977	0.977	0.942	0.995	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974
50% POE	MW	130.7	128.2	125.5	125.7	123.1	124.6	131.5	131.4	131.4	131.5	131.6	131.6	131.5	131.4	131.6	131.7
	MVAr	23.2	31.9	27.1	27.2	43.9	12.9	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.4
	MVA	132.8	132.1	128.4	128.6	130.7	125.2	134.9	134.9	134.9	135.0	135.0	135.0	135.0	134.8	135.0	135.2
	PF	0.985	0.970	0.977	0.977	0.942	0.995	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974	0.974

4.6 Liverpool Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Denham Court	Actual MVA					10.1	12.4										
	MW					6.7	7.6	9.3	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	MVA _r					7.6	9.9	12.1	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	10% POE MVA					10.1	12.4	15.2	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	PF					0.658	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610
50% POE	MW					6.7	7.6	9.3	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	MVA _r					7.6	9.9	12.1	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	MVA					10.1	12.4	15.2	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	PF					0.658	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610	0.610
	Actual MVA	105.4	121.4	116.6													
Nepean	MW	115.0	115.3	114.8													
	MVA _r	17.2	41.8	25.4													
	10% POE MVA	119.3	122.7	117.6													
	PF	0.963	0.940	0.976													
	Actual MVA	110.1	110.4	109.9													
50% POE	MW	110.1	110.4	109.9													
	MVA _r	17.2	40.1	24.3													
	MVA	114.5	117.5	112.6													
	PF	0.962	0.940	0.976													
	Actual MVA				25.6	38.9	42.7										
Liverpool 132kV	MW				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
	MVA _r				7.9	12.0	12.4	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1	19.1
	10% POE MVA				25.6	38.9	42.7	45.2	45.0	44.7	44.5	44.3	44.1	43.9	43.8	43.8	43.8
	PF				0.951	0.951	0.957	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
50% POE	MW				24.4	37.0	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.4	39.4	39.4
	MVA _r				7.9	12.0	12.4	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19.1	19.1
	MVA				25.6	38.9	42.7	45.2	45.0	44.7	44.5	44.3	44.1	43.9	43.8	43.8	43.8
	PF				0.951	0.951	0.957	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	Actual MVA	75.3	86.4	107.7	145.2	169.5	177.6										
Liverpool TS	MW	102.7	87.6	113.0	147.7	171.1	157.0	165.9	169.0	171.2	174.4	177.9	181.4	184.7	188.1	191.8	195.2
	MVA _r	30.3	0.6	30.2	38.2	29.7	23.9	25.2	25.7	26.0	26.5	27.1	27.6	28.1	28.6	29.2	29.7
	10% POE MVA	107.1	87.6	116.9	152.6	173.6	158.8	167.8	170.9	173.2	176.4	180.0	183.5	186.8	190.3	194.0	197.5
	PF	0.959	1.000	0.966	0.968	0.985	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
	Actual MVA	83.9	77.3	102.8	137.7	157.6	146.0	157.9	161.0	163.3	166.4	170.0	173.4	176.7	180.2	183.9	187.3
50% POE	MW	83.9	77.3	102.8	137.7	157.6	146.0	157.9	161.0	163.3	166.4	170.0	173.4	176.7	180.2	183.9	187.3
	MVA _r	24.7	0.5	27.5	35.6	27.3	22.2	24.0	24.5	24.8	25.3	25.8	26.4	26.9	27.4	28.0	28.5
	MVA	87.5	77.3	106.4	142.2	159.9	147.7	159.8	162.9	165.1	168.3	171.9	175.4	178.8	182.2	186.0	189.4
	PF	0.959	1.000	0.966	0.968	0.985	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
	Actual MVA	264.1	251.5	198.9	169.5	192.4	194.0										
West Liverpool	MW	343.2	260.6	211.8	221.8	203.3	196.3	215.6	225.5	232.8	241.4	250.1	256.8	260.7	262.8	265.3	267.1
	MVA _r	9.7	23.7	21.6	68.4	55.6	1.5	37.7	39.4	40.7	42.2	43.7	44.9	45.6	45.9	46.4	46.7
	10% POE MVA	343.3	261.7	212.9	232.1	210.8	196.3	218.8	228.9	236.4	245.0	253.9	260.7	264.7	266.7	269.3	271.2
	PF	1.000	0.996	0.995	0.956	0.965	1.000	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	Actual MVA	308.9	233.0	197.6	199.2	188.7	175.4	196.8	206.8	214.1	222.7	231.4	238.0	242.0	244.0	246.6	248.4
50% POE	MW	308.9	233.0	197.6	199.2	188.7	175.4	196.8	206.8	214.1	222.7	231.4	238.0	242.0	244.0	246.6	248.4
	MVA _r	8.8	21.2	20.2	61.4	51.6	1.4	34.4	36.1	37.4	38.9	40.4	41.6	42.3	42.6	43.1	43.4
	MVA	309.0	234.0	198.6	208.5	195.6	175.4	199.8	209.9	217.4	226.0	234.9	241.6	245.7	247.7	250.3	252.2
	PF	1.000	0.996	0.995	0.956	0.965	1.000	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
	Actual MVA	444.8	459.3	423.2	340.4	411.0	426.8										
Undiversified	MW	560.9	463.6	439.5	393.9	418.0	401.7	431.5	440.2	449.5	461.0	473.1	483.0	490.2	495.5	501.7	506.9
	MVA _r	57.3	66.1	77.2	114.4	104.9	47.6	94.7	91.4	92.9	94.8	96.8	98.4	99.5	100.3	101.3	102.1
	10% POE MVA	569.8	472.0	447.4	410.3	433.4	410.2	447.1	453.3	462.8	474.4	486.7	496.7	503.9	509.3	515.6	520.9
	PF	0.984	0.982	0.982	0.960	0.964	0.979	0.965	0.971	0.971	0.972	0.972	0.972	0.973	0.973	0.973	0.973
	Actual MVA	502.9	420.8	410.3	361.3	389.9	369.9	404.8	413.5	422.8	434.3	446.4	456.3	463.5	468.8	475.0	480.2
50% POE	MW	502.9	420.8	410.3	361.3	389.9	369.9	404.8	413.5	422.8	434.3	446.4	456.3	463.5	468.8	475.0	480.2
	MVA _r	50.7	61.8	72.0	104.9	98.6	45.8	90.2	86.9	88.4	90.3	92.3	93.9	95.0	95.8	96.8	97.7
	MVA	511.0	428.8	417.6	376.3	404.5	378.2	420.0	426.3	435.7	447.3	459.6	469.6	476.8	482.2	488.5	493.8
	PF	0.984	0.981	0.982	0.960	0.964	0.978	0.964	0.970	0.970	0.971	0.971	0.972	0.972	0.972	0.972	0.972
	Actual MVA	381.0	463.6	422.0	417.6	409.3	491.7										
Diversified (Meter)	MW	485.2	460.7	469.8	439.5	437.8	409.9	421.9	430.4	439.5	450.8	462.6	472.3	479.3	484.5	490.6	495.7
	MVA _r	13.1	80.6	93.4	81.2	89.3	46.3	68.6	69.9	71.4	73.3	75.2	76.8	77.9	78.7	79.7	80.6
	10% POE MVA	485.4	467.7	479.0	446.9	446.8	412.5	427.4	436.1	445.3	456.7	468.7	478.5	485.6	490.8	497.0	502.2
	PF	1.000	0.985	0.981	0.983	0.980	0.994	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
	Actual MVA	443.8	419.3	428.4	398.0	397.7	365.4	395.8	404.3	413.4	424.7	436.5	446.2	453.2	458.4	464.5	469.6
50% POE	MW	443.8	419.3	428.4	398.0	397.7	365.4	395.8	404.3	413.4	424.7	436.5	446.2	453.2	458.4	464.5	469.6
	MVA _r	12.0	73.4	85.2	73.5	81.1	41.3	64.3	65.7	67.2	69.0	70.9	72.5	73.6	74.5	75.5	76.3
	MVA	443.9	425.7	436.7	404.7	405.9	367.7	401.0	409.6	418.9	430.2	442.2	452.1	459.1	464.4	470.5	475.7
	PF	1.000	0.985	0.981	0.983	0.980	0.994	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
	Actual MVA																

4.7 Macarthur 66kV Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Macarthur 66kV	MVA	89.4	110.4	105.3	110.5	142.0	173.2										
	MW	124.3	105.7	104.1	141.6	138.0	152.5	150.3	150.4	152.8	155.8	158.2	161.7	165.0	168.8	173.3	177.3
	MVAr	0.0	0.0	0.0	0.1	0.0	39.9	15.7	15.7	16.0	16.3	16.5	16.9	17.2	17.6	18.1	18.5
	10% POE MVA	124.3	105.7	104.1	141.6	138.0	157.6	151.1	151.2	153.6	156.7	159.0	162.5	165.9	169.7	174.3	178.2
50% POE	PF	1.000	1.000	1.000	1.000	1.000	0.968	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
	MW	110.2	95.5	95.4	125.3	120.1	142.0	139.6	139.7	142.1	145.1	147.5	151.0	154.3	158.1	162.6	166.6
	MVAr	0.0	0.0	0.0	0.1	0.0	37.1	14.6	14.6	14.8	15.2	15.4	15.8	16.1	16.5	17.0	17.4
	50% POE MVA	110.2	95.5	95.4	125.3	120.1	146.8	140.4	140.4	142.9	145.9	148.3	151.8	155.1	159.0	163.5	167.5
	PF	1.000	1.000	1.000	1.000	1.000	0.968	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995

4.8 Macarthur 132kV Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Macarthur 132kV	Actual MVA				3.7	4.2	17.9										
	MW				3.4	4.1	17.6	30.0	51.8	62.8	75.0	88.5	101.9	112.9	121.5	128.9	132.1
	MVAr				1.6	1.1	3.1	8.8	15.6	18.9	22.6	26.9	31.4	35.0	37.8	40.1	41.2
	10% POE MVA				3.7	4.2	17.9	31.3	54.1	65.7	78.5	92.6	106.7	118.4	127.4	135.1	138.6
50% POE	PF				0.903	0.964	0.984	0.959	0.957	0.957	0.957	0.956	0.955	0.954	0.954	0.954	0.953
	MW				3.4	4.1	17.6	30.0	51.8	62.8	75.0	88.5	101.9	112.9	121.5	128.9	132.1
	MVAr				1.6	1.1	3.1	8.8	15.6	18.9	22.6	26.9	31.4	35.0	37.8	40.1	41.2
	50% POE MVA				3.7	4.2	17.9	31.3	54.1	65.7	78.5	92.6	106.7	118.4	127.4	135.1	138.6
Nepean#	PF				0.903	0.964	0.984	0.959	0.957	0.957	0.957	0.956	0.955	0.954	0.954	0.954	0.953
	Actual MVA				160.3	183.3	182.7										
	MW				159.1	167.7	152.9	158.0	162.6	163.8	164.9	166.0	167.1	168.1	169.1	170.1	170.9
	MVAr				8.9	48.1	33.0	39.0	39.9	40.1	40.3	40.5	40.7	40.9	41.1	41.3	41.5
Undiversified	10% POE MVA				159.9	174.5	156.8	163.1	167.8	169.0	170.2	171.3	172.3	173.4	174.4	175.5	176.2
	PF				0.995	0.961	0.975	0.969	0.969	0.969	0.969	0.969	0.969	0.970	0.970	0.970	0.970
	MW				151.5	160.3	143.9	148.2	152.8	154.0	155.2	156.3	157.4	158.5	159.4	160.5	161.2
	MVAr				8.7	46.1	31.5	36.9	37.8	38.0	38.2	38.5	38.7	38.9	39.0	39.3	39.4
Diversified	50% POE MVA				152.3	166.8	147.7	153.1	157.8	159.0	160.2	161.3	162.4	163.5	164.5	165.6	166.4
	PF				0.995	0.961	0.974	0.968	0.968	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
	Actual MVA				186.4	191.7	233.5										
	MW				162.5	171.8	166.9	186.9	213.1	225.3	238.7	253.2	267.6	279.8	289.3	297.6	301.7
Nepean Generation	MVAr				10.5	49.2	40.2	48.4	56.2	59.7	63.6	68.1	72.7	76.6	79.6	82.1	83.4
	10% POE MVA				163.6	178.7	172.0	193.4	220.8	233.5	247.5	262.7	277.9	290.7	300.7	309.4	313.6
	PF				0.993	0.961	0.971	0.966	0.965	0.965	0.964	0.964	0.963	0.962	0.962	0.962	0.962
	MW				154.9	164.3	160.9	178.0	204.4	216.6	230.0	244.5	259.0	271.2	280.7	289.1	293.1
Nepean	MVAr				10.4	47.2	39.0	46.4	54.2	57.7	61.7	66.2	70.8	74.7	77.7	80.2	81.5
	50% POE MVA				156.0	171.0	165.8	184.3	211.9	224.6	238.6	253.8	269.1	281.9	291.9	300.7	304.9
	PF				0.993	0.961	0.970	0.966	0.965	0.964	0.964	0.963	0.963	0.962	0.962	0.962	0.961
	Actual MVA				186.4	191.7	233.5										
Diversified	MW				160.0	181.6	181.1	186.9	213.1	225.3	238.7	253.2	267.6	279.8	289.3	297.6	301.7
	MVAr				22.6	86.3	16.4	61.7	70.4	74.4	78.8	83.6	88.4	92.4	95.6	98.3	99.7
	10% POE MVA				161.6	201.1	181.8	196.8	224.5	237.3	251.4	266.6	281.9	294.6	304.7	313.5	317.7
	PF				0.990	0.903	0.996	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Nepean	MW				150.4	172.0	171.5	178.0	204.4	216.6	230.0	244.5	259.0	271.2	280.7	289.1	293.1
	MVAr				21.2	81.8	15.5	58.8	67.5	71.6	76.0	80.8	85.6	89.6	92.7	95.5	96.8
	50% POE MVA				151.9	190.4	172.2	187.5	215.3	228.1	242.2	257.5	272.8	285.6	295.6	304.5	308.7
	PF				0.990	0.903	0.996	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Nepean	MW							-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0
	MVAr							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Generation MVA							-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0	-43.0
	PF							1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Note: # Nepean Values are calculated from the summation of the transformer output from the 33kV, 66kV busbar and Generation

4.9 Marulan Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Actual	MVA	84.4	78.8	74.1	67.8	76.2	71.9									
Fairfax Lane	MW		80.1	75.9	72.9	66.0	75.6	71.8	75.7	75.5	75.2	75.0	74.8	74.6	74.4	74.3	74.3
	MVAr		26.8	21.2	13.2	15.6	9.4	3.2	16.6	16.6	16.5	16.5	16.4	16.4	16.3	16.3	16.3
	MVA	10% POE	84.4	78.8	74.1	67.8	76.2	71.9	77.5	77.3	77.0	76.8	76.6	76.4	76.2	76.1	76.1
	PF		0.948	0.963	0.984	0.973	0.992	0.999	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW		80.1	75.9	72.9	66.0	75.6	71.8	71.8	71.6	71.3	71.1	70.9	70.7	70.5	70.4	70.4
	MVAr		26.8	21.2	13.2	15.6	9.4	3.2	15.8	15.7	15.7	15.6	15.6	15.5	15.5	15.5	15.5
	MVA	50% POE	84.4	78.8	74.1	67.8	76.2	71.9	73.5	73.3	73.0	72.8	72.6	72.4	72.2	72.1	72.1
	PF		0.948	0.963	0.984	0.973	0.992	0.999	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	Actual	MVA	73.5	83.7	73.6	70.8	78.0	79.0									
Diversified	MW		67.4	78.0	71.1	67.3	77.4	73.8	73.4	73.2	72.9	72.7	72.5	72.3	72.2	72.0	72.1
	MVAr		30.6	30.6	19.0	22.0	9.6	28.2	24.8	24.7	24.6	24.5	24.5	24.4	24.4	24.3	24.3
	MVA	10% POE	74.0	83.7	73.6	70.8	78.0	79.0	77.5	77.2	77.0	76.8	76.5	76.3	76.2	76.0	76.1
	PF		0.911	0.931	0.966	0.950	0.992	0.934	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947
	MW		67.4	78.0	71.1	67.3	77.4	73.8	69.6	69.4	69.2	69.0	68.8	68.6	68.4	68.3	68.3
	MVAr		30.6	30.6	19.0	22.0	9.6	28.2	23.5	23.4	23.3	23.3	23.2	23.1	23.1	23.0	23.1
	MVA	50% POE	74.0	83.7	73.6	70.8	78.0	79.0	73.5	73.2	73.0	72.8	72.6	72.4	72.2	72.0	72.1
	PF		0.911	0.931	0.966	0.950	0.992	0.934	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947

Note: The combination of having only one Transmission Substation connected to a Bulk Supply Point in an environment of transmission losses, results in a higher load at the Bulk Supply Point than at the Transmission Substation.

4.10 Mount Piper Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Actual MVA	33.4	31.8	37.3	31.7	28.5	28.4										
Mount Piper	MW	29.2	29.3	33.3	29.6	27.1	26.7	24.9	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
	MVAr	16.1	14.2	16.8	12.6	9.0	9.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.0
	10% POE MVA	33.4	32.5	37.3	32.2	28.6	28.4	27.2	27.2	27.2	27.2	27.1	27.1	27.1	27.1	27.1	27.1
	PF	0.876	0.900	0.893	0.920	0.949	0.940	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913
50% POE	MW	29.2	29.3	33.3	29.6	27.1	26.7	24.9	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
	MVAr	16.1	14.2	16.8	12.6	9.0	9.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.0
	50% POE MVA	33.4	32.5	37.3	32.2	28.6	28.4	27.2	27.2	27.2	27.2	27.1	27.1	27.1	27.1	27.1	27.1
	PF	0.876	0.900	0.893	0.920	0.949	0.940	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913

4.11 Nepean 132kV Transmission Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	47.9	49.0	34.5	24.1	30.7	52.9									
Nepean 33kV Diversified	MW	41.0	45.4	33.3	23.3	29.2	50.3	34.6	34.4	34.2	34.1	33.9	33.8	33.7	33.5	33.5	33.5
	MVA _r	24.6	18.6	9.1	5.9	9.6	16.5	13.3	13.2	13.2	13.1	13.0	13.0	12.9	12.9	12.9	12.9
	10% POE	MVA	47.9	49.0	34.5	24.1	30.7	52.9	37.0	36.9	36.7	36.5	36.4	36.2	36.1	35.9	35.9
	PF	0.857	0.925	0.965	0.969	0.950	0.950	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
50% POE	MW	41.0	45.4	33.3	23.3	29.2	50.3	34.2	34.1	33.9	33.8	33.6	33.5	33.3	33.2	33.2	33.2
	MVA _r	24.6	18.6	9.1	5.9	9.6	16.5	13.2	13.1	13.0	13.0	12.9	12.9	12.8	12.8	12.8	12.7
	MVA	47.9	49.0	34.5	24.1	30.7	52.9	36.7	36.5	36.3	36.2	36.0	35.8	35.7	35.6	35.6	35.5
	PF	0.857	0.925	0.965	0.969	0.950	0.950	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
Actual		MVA	116.9	140.7	147.6	136.3	152.6	129.8									
Nepean 66kV Diversified#	MW	138.6	134.8	146.1	135.8	138.6	102.6	123.5	128.2	129.5	130.8	132.1	133.3	134.5	135.6	136.6	137.4
	MVA _r	2.3	46.7	30.6	3.0	38.5	16.4	25.7	26.7	27.0	27.2	27.5	27.7	28.0	28.2	28.4	28.6
	10% POE	MVA	138.6	142.7	149.2	135.8	143.8	103.9	126.1	131.0	132.3	133.6	134.9	136.1	137.4	138.5	139.5
	PF	1.000	0.945	0.979	1.000	0.963	0.987	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
50% POE	MW	131.0	127.2	138.4	128.2	131.1	93.6	113.9	118.7	120.1	121.4	122.7	123.9	125.1	126.2	127.3	128.1
	MVA _r	2.2	44.1	29.0	2.8	36.5	15.0	23.7	24.7	25.0	25.3	25.5	25.8	26.0	26.3	26.5	26.7
	MVA	131.0	134.6	141.4	128.2	136.1	94.8	116.4	121.3	122.7	124.0	125.3	126.6	127.8	128.9	130.0	130.8
	PF	1.000	0.945	0.979	1.000	0.963	0.987	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
Actual		MVA	164.7	189.7	182.1	160.3	183.3	182.7									
Nepean 33 + 66 Undiversified	MW	179.6	180.2	179.3	159.1	167.7	152.9	158.0	162.6	163.8	164.9	166.0	167.1	168.1	169.1	170.1	170.9
	MVA _r	26.9	65.3	39.6	8.9	48.1	33.0	39.0	39.9	40.1	40.3	40.5	40.7	40.9	41.1	41.3	41.5
	10% POE	MVA	186.5	191.7	183.7	159.9	174.5	156.8	163.1	167.8	169.0	170.2	171.3	172.3	173.4	174.4	175.5
	PF	0.963	0.940	0.976	0.995	0.961	0.975	0.969	0.969	0.969	0.969	0.969	0.969	0.970	0.970	0.970	0.970
50% POE	MW	172.0	172.5	171.7	151.5	160.3	143.9	148.2	152.8	154.0	155.2	156.3	157.4	158.5	159.4	160.5	161.2
	MVA _r	26.8	62.7	38.0	8.7	46.1	31.5	36.9	37.8	38.0	38.2	38.5	38.7	38.9	39.0	39.3	39.4
	MVA	178.8	183.6	175.9	152.3	166.8	147.7	153.1	157.8	159.0	160.2	161.3	162.4	163.5	164.5	165.6	166.4
	PF	0.962	0.940	0.976	0.995	0.961	0.974	0.968	0.968	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969

Note: # Refers to the metering values plus the generation output

4.12 Regentville Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	107.4	135.6	105.4	81.1	132.3	148.9									
Penrith	MW	115.7	120.1	119.7	102.5	127.4	130.0	133.3	136.5	138.5	138.0	137.6	137.2	136.8	136.5	136.5	136.6
	MVA _r	39.3	5.4	4.3	36.1	41.9	41.6	42.6	43.7	44.3	44.1	44.0	43.9	43.7	43.6	43.7	43.7
	10% POE	MVA	122.2	120.3	119.8	108.7	134.1	136.5	139.9	143.3	145.4	144.9	144.4	144.0	143.6	143.3	143.4
	PF	0.947	0.999	0.999	0.943	0.950	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
50% POE	MW	106.4	110.8	110.4	93.2	117.4	120.5	124.1	127.3	129.3	128.8	128.4	128.0	127.6	127.3	127.4	127.5
	MVA _r	36.2	5.0	4.0	32.9	38.6	38.5	39.7	40.7	41.4	41.2	41.1	40.9	40.8	40.7	40.7	40.8
	MVA	112.4	110.9	110.5	98.8	123.5	126.5	130.3	133.7	135.8	135.3	134.8	134.4	134.0	133.7	133.7	133.8
	PF	0.947	0.999	0.999	0.943	0.950	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
Actual		MVA	89.2	103.9	97.5	96.0	107.1	114.4									
Regentville 132kV	MW	107.4	106.3	105.7	105.1	107.3	104.1	109.1	120.2	124.5	126.2	130.7	132.7	135.3	135.8	137.0	137.2
	MVA _r	26.8	26.6	30.4	21.9	31.1	28.7	29.0	32.4	33.6	34.1	35.2	35.6	36.3	36.4	36.7	36.7
	10% POE	MVA	111.1	109.9	110.2	107.9	112.1	108.2	113.2	124.8	129.2	131.0	135.7	137.7	140.4	140.9	142.1
	PF	0.967	0.967	0.960	0.974	0.957	0.963	0.964	0.963	0.963	0.963	0.964	0.964	0.964	0.964	0.964	0.964
50% POE	MW	99.6	98.5	97.9	97.3	99.3	95.9	100.9	112.0	116.2	117.9	122.5	124.4	127.1	127.6	128.7	128.9
	MVA _r	24.7	24.5	28.1	20.1	28.9	26.4	26.8	30.2	31.4	31.8	33.0	33.4	34.1	34.2	34.5	34.5
	MVA	103.0	101.8	102.0	99.8	103.8	99.6	104.6	116.2	120.6	122.4	127.1	129.1	131.8	132.4	133.5	133.7
	PF	0.968	0.967	0.960	0.975	0.957	0.963	0.964	0.963	0.963	0.963	0.964	0.964	0.964	0.964	0.964	0.964
Actual		MVA	42.6	53.8	46.9	50.7	53.3	61.1									
Warrimoo	MW	55.7	47.8	46.5	48.0	48.0	48.7	47.4	47.1	46.8	46.5	46.2	45.9	45.6	45.4	45.4	45.3
	MVA _r	19.8	20.0	18.4	17.8	17.6	16.3	17.7	17.6	17.5	17.4	17.3	17.2	17.1	17.0	17.0	17.0
	10% POE	MVA	59.1	51.8	50.0	51.2	51.1	50.6	50.3	49.9	49.6	49.3	49.0	48.7	48.5	48.4	48.4
	PF	0.942	0.923	0.930	0.937	0.939	0.948	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
50% POE	MW	49.9	42.0	40.7	42.2	42.1	42.7	41.8	41.5	41.2	40.9	40.6	40.4	40.1	39.9	39.8	39.8
	MVA _r	17.7	17.5	16.1	15.7	15.4	14.3	15.7	15.5	15.4	15.3	15.2	15.1	15.0	14.9	14.9	14.9
	MVA	52.9	45.5	43.8	45.0	44.8	45.1	44.7	44.4	44.0	43.7	43.4	43.1	42.8	42.6	42.5	42.5
	PF	0.942	0.923	0.930	0.937	0.939	0.948	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
Actual		MVA	239.2	293.3	249.9	227.7	292.7	324.4									
Undiversified	MW	278.8	274.2	271.9	255.6	282.7	282.9	289.8	303.8	309.7	310.7	314.5	315.7	317.7	317.7	318.9	319.1
	MVA _r	85.9	51.9	53.1	75.9	90.5	86.6	89.4	93.7	95.4	95.6	96.4	96.7	97.1	97.0	97.3	97.4
	10% POE	MVA	292.4	282.0	280.0	267.8	297.3	303.7	318.4	324.5	325.5	329.4	330.7	332.7	332.7	333.9	334.1
	PF	0.954	0.972	0.971	0.955	0.951	0.955	0.954	0.954	0.954	0.954	0.955	0.955	0.955	0.955	0.955	0.955
50% POE	MW	255.9	251.3	249.0	232.7	258.8	259.1	266.8	280.9	286.7	287.7	291.5	292.7	294.8	294.8	295.9	296.1
	MVA _r	78.6	47.0	48.2	68.6	82.9	79.3	82.1	86.4	88.2	88.4	89.2	89.4	89.9	89.8	90.1	90.1
	MVA	268.3	258.3	256.3	243.7	272.2	271.2	279.6	294.3	300.4	301.4	305.3	306.5	308.6	308.6	309.8	310.0
	PF	0.954	0.973	0.972	0.955	0.951	0.955	0.954	0.954	0.954	0.955	0.955	0.955	0.955	0.955	0.955	0.955
Actual		MVA	238.6	290.6	243.6	263.0	413.4	353.0									
Diversified* (Meter)	MW	280.3	265.5	265.0	268.4	314.4	296.0	289.8	303.8	309.7	310.7	314.5	315.7	317.7	317.7	318.9	319.1
	MVA _r	73.8	70.0	69.8	70.7	82.8	78.0	76.4	80.1	81.6	81.9	82.9	83.2	83.7	83.7	84.0	84.1
	10% POE	MVA	289.9	274.6	274.0	277.6	325.2	306.1	299.7	314.2	320.3	321.3	325.2	326.5	328.6	329.8	330.0
	PF	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967
50% POE	MW	263.3	248.6	248.0	251.4	293.8	273.3	266.8	280.9	286.7	287.7	291.5	292.7	294.8	294.8	295.9	296.1
	MVA _r	69.4	65.5	65.3	66.2	77.4	72.0	70.3	74.0	75.5	75.8	76.8	77.1	77.7	77.7	78.0	78.0
	MVA	272.3	257.1	256.5	260.0	303.8	282.6	275.9	290.4	296.5	297.5	301.4	302.7	304.8	304.8	306.0	306.2
	PF	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967	0.967

Note: * Regentville large diversified values are due to contributions from Mt Druitt

4.13 Sydney North Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		32.0	30.5	41.3	35.7	37.8	38.2	36.2	36.3	36.1	35.9	35.7	35.5	35.4	35.2	35.2	35.2
Sydney North	MW	36.0	34.3	38.8	36.4	38.5	34.4	36.2	36.3	36.1	35.9	35.7	35.5	35.4	35.2	35.2	35.2
	MVA _r	3.6	3.4	3.9	3.6	3.9	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.5
	10% POE MVA	36.1	34.4	39.0	36.5	38.7	34.6	36.4	36.5	36.3	36.1	35.9	35.7	35.5	35.4	35.4	35.3
	PF	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
50% POE	MW	32.4	30.6	35.2	32.7	34.6	31.6	31.4	31.6	31.3	31.2	31.0	30.8	30.6	30.5	30.4	30.4
	MVA _r	3.2	3.1	3.5	3.3	3.5	3.2	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	50% POE MVA	32.5	30.8	35.4	32.9	34.7	31.8	31.6	31.7	31.5	31.3	31.1	30.9	30.8	30.6	30.6	30.6
	PF	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995

4.14 Sydney West Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual MVA		124.1	141.8	112.1	120.7	134.1	141.4	133.8	137.9	142.3	146.4	149.6	151.4	151.8	151.6	151.8	151.9
Baulkham Hills	MW	137.9	138.9	128.9	126.2	123.1	132.9	133.8	137.9	142.3	146.4	149.6	151.4	151.8	151.6	151.8	151.9
	MVA _r	67.5	34.3	12.5	52.1	38.0	28.4	42.2	43.5	44.9	46.2	47.2	47.8	47.9	47.8	47.9	47.9
	10% POE MVA	153.5	143.0	129.5	136.6	128.9	135.9	140.3	144.6	149.2	153.6	156.9	158.8	159.2	159.0	159.1	159.3
	PF	0.898	0.971	0.995	0.924	0.955	0.978	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954
50% POE	MW	122.9	123.9	113.9	111.3	110.0	116.1	123.8	127.9	132.3	136.4	139.6	141.4	141.8	141.6	141.8	141.9
	MVA _r	60.2	30.6	11.0	45.9	34.0	24.8	39.1	40.3	41.7	43.0	44.0	44.6	44.7	44.7	44.7	44.8
	50% POE MVA	136.8	127.6	114.5	120.4	115.2	118.7	129.8	134.1	138.7	143.1	146.4	148.3	148.7	148.5	148.6	148.8
	PF	0.898	0.971	0.995	0.924	0.955	0.978	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954
Actual MVA		222.3	269.4	244.0	216.6	244.0	279.6	274.4	289.6	294.6	297.4	300.2	299.8	299.4	299.2	299.7	300.2
Blacktown	MW	270.8	269.3	271.3	265.0	266.8	263.5	274.4	289.6	294.6	297.4	300.2	299.8	299.4	299.2	299.7	300.2
	MVA _r	78.9	35.7	36.9	28.7	54.0	37.8	49.0	51.8	52.7	53.1	53.7	53.6	53.5	53.5	53.6	53.6
	10% POE MVA	282.1	271.7	273.8	266.5	272.2	266.2	278.7	294.2	299.3	302.1	305.0	304.6	304.2	304.0	304.5	305.0
	PF	0.960	0.991	0.991	0.994	0.980	0.990	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
50% POE	MW	248.1	246.7	248.7	242.3	244.9	242.4	254.0	269.0	273.9	276.6	279.4	279.0	278.6	278.4	278.9	279.4
	MVA _r	72.3	32.7	33.8	26.2	49.6	34.8	45.4	48.1	48.9	49.4	49.9	49.9	49.8	49.8	49.8	49.9
	50% POE MVA	258.4	248.8	250.9	243.7	249.9	244.9	258.0	273.2	278.2	281.0	283.8	283.4	283.0	282.8	283.3	283.8
	PF	0.960	0.991	0.991	0.994	0.980	0.990	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
Actual MVA		148.3	122.3	95.5													
Camellia	MW	138.2	112.3	93.3			60.0										
	MVA _r	53.6	48.4	20.5			15.1										
	10% POE MVA	148.3	122.3	95.5													
	PF	0.932	0.918	0.977			0.970										
50% POE	MW	138.2	112.3	93.3			60.0										
	MVA _r	53.6	48.4	20.5			15.1										
	50% POE MVA	148.3	122.3	95.5													
	PF	0.932	0.918	0.977			0.970										
Actual MVA		199.1	220.5	195.8	187.4	226.4	231.8										
Carlingford	MW	243.2	224.6	227.7	223.9	220.9	217.3	209.1	215.3	216.1	218.6	221.0	223.3	225.1	226.9	229.2	231.4
	MVA _r	18.7	17.3	17.5	17.2	17.0	16.7	16.1	16.6	16.6	16.8	17.0	17.2	17.3	17.4	17.6	17.8
	10% POE MVA	244.0	225.2	228.4	224.5	221.6	217.9	209.7	215.9	216.7	219.2	221.7	224.0	225.8	227.5	229.9	232.1
	PF	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
50% POE	MW	220.5	201.8	205.0	201.1	200.2	192.0	194.0	200.1	200.9	203.3	205.7	208.0	209.8	211.5	213.8	216.0
	MVA _r	16.9	15.5	15.8	15.5	15.4	14.8	14.9	15.4	15.4	15.6	15.8	16.0	16.1	16.3	16.4	16.6
	50% POE MVA	221.1	202.4	205.6	201.7	200.8	192.6	194.6	200.7	201.5	203.9	206.3	208.6	210.4	212.1	214.4	216.6
	PF	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
Actual MVA		208.5	231.3	207.3													
Guildford#	MW	220.3	213.9	215.9			207.4										
	MVA _r	75.9	47.1	58.0			57.1										
	10% POE MVA	233.0	219.0	223.6													
	PF	0.945	0.977	0.966			0.964										
50% POE	MW	207.9	201.5	203.6			191.9										
	MVA _r	71.7	44.4	54.7			52.8										
	50% POE MVA	220.0	206.4	210.8													
	PF	0.945	0.977	0.966			0.964										

Note: # Refers to the transformer metering plus the generation output

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Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual		MVA	110.8	126.6	158.0	147.1	143.9	150.7									
Mount Druitt	MW	157.0	157.2	171.5	161.7	156.6	149.7	153.8	155.6	155.7	155.2	154.8	154.4	154.0	153.7	153.9	154.1
	MVAr	8.1	15.8	28.9	40.7	10.9	5.6	20.7	20.9	20.9	20.9	20.8	20.8	20.7	20.7	20.7	20.7
	10% POE	MVA	157.2	157.9	173.9	166.7	157.0	149.9	155.2	157.0	157.1	156.6	156.2	155.8	155.4	155.1	155.5
	PF	0.999	0.995	0.986	0.970	0.998	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
50% POE	MW	142.5	142.6	156.9	147.2	143.7	139.6	143.7	145.5	145.5	145.1	144.6	144.2	143.8	143.6	143.8	144.0
	MVAr	7.4	14.3	26.5	37.0	10.0	5.2	19.3	19.6	19.6	19.5	19.5	19.4	19.4	19.3	19.3	19.4
	MVA	142.7	143.3	159.2	151.7	144.1	139.7	145.0	146.8	146.8	146.4	145.9	145.5	145.1	144.9	145.1	145.3
	PF	0.999	0.995	0.986	0.970	0.998	0.999	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
Actual		MVA	59.3	68.3	65.6												
Nepean	MW	64.7	64.9	64.6													
	MVAr	9.7	23.5	14.3													
	10% POE	MVA	67.1	69.0	66.1												
	PF	0.963	0.940	0.976													
50% POE	MW	61.9	62.1	61.8													
	MVAr	9.6	22.6	13.7													
	MVA	64.4	66.1	63.3													
	PF	0.962	0.940	0.976													
Actual		MVA	387.0	447.8	425.2	427.3	451.1	487.6									
Sydney West 132kV	MW	421.0	409.0	429.4	462.9	454.2	449.0	481.0	506.5	528.8	549.7	566.5	579.7	591.2	603.0	612.1	618.9
	MVAr	106.9	100.6	105.7	108.6	137.0	129.9	128.9	135.0	141.0	148.6	154.3	159.2	163.7	168.3	172.0	174.7
	10% POE	MVA	438.7	424.7	445.0	479.8	477.9	471.1	500.5	526.9	550.1	572.4	590.4	604.5	616.9	629.6	646.8
	PF	0.960	0.963	0.965	0.965	0.950	0.953	0.961	0.961	0.961	0.960	0.960	0.959	0.958	0.958	0.957	0.957
50% POE	MW	400.1	389.3	408.0	435.9	429.2	424.3	456.2	481.8	504.0	524.9	541.8	554.9	566.4	578.2	587.3	594.2
	MVAr	103.6	97.4	101.9	104.1	130.1	123.3	123.0	129.1	135.1	142.6	148.3	153.3	157.8	162.4	166.1	168.7
	MVA	417.4	404.7	423.2	452.3	451.8	445.3	474.9	501.3	524.5	546.8	564.8	578.9	591.3	604.0	613.9	621.3
	PF	0.958	0.962	0.964	0.964	0.950	0.953	0.961	0.961	0.961	0.960	0.959	0.959	0.958	0.957	0.957	0.956
Actual		MVA	1459	1628	1503	1099	1200	1291									
Undiversified	MW	1653	1590	1603	1239.7	1221.7	1212	1252	1305	1337	1367	1392	1409	1422	1434	1447	1457
	MVAr	419	323	294	247.4	256.9	218	257	268	276	286	293	299	303	308	312	315
	10% POE	MVA	1724	1633	1636	1274.2	1257.5	1241	1285	1339	1372	1404	1430	1448	1461	1475	1499
	PF	0.959	0.974	0.980	0.973	0.971	0.977	0.975	0.975	0.975	0.974	0.973	0.973	0.973	0.972	0.972	0.972
50% POE	MW	1542	1480	1491	1137.7	1128.1	1114	1172	1224	1257	1286	1311	1328	1340	1353	1366	1375
	MVAr	395	306	278	228.8	239.1	203	242	252	261	270	278	283	288	292	296	299
	MVA	1609	1522	1523	1169.8	1161.7	1141	1202	1256	1290	1321	1347	1365	1379	1392	1405	1416
	PF	0.958	0.973	0.979	0.973	0.971	0.977	0.975	0.975	0.974	0.974	0.973	0.973	0.972	0.972	0.972	0.971
Actual		MVA	1306	1523	1391	1082	1105	1236									
Diversified# (Meter)	MW	1601	1542	1550	1440	1233	1190	1237	1289	1322	1351	1376	1392	1405	1417	1429	1439
	MVAr	70	58	464	359	98	136	122	127	130	133	135	137	138	139	140	141
	10% POE	MVA	1603	1543	1618	1484	1237	1197	1243	1296	1328	1357	1382	1399	1411	1424	1446
	PF	0.999	0.999	0.958	0.970	0.997	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
50% POE	MW	1476	1417	1425	1315	1120	1082	1158	1210	1242	1271	1296	1312	1324	1337	1349	1359
	MVAr	65	53	427	328	89	123	114	119	122	125	127	129	130	131	133	133
	MVA	1478	1418	1488	1355	1124	1089	1163	1215	1248	1277	1302	1318	1331	1344	1356	1366
	PF	0.999	0.999	0.958	0.970	0.997	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995

Note: #Refers to the transformer metering values plus the generation output

4.15 Vineyard Bulk Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Hawkesbury	Actual MVA	126.3	150.5	135.8	148.0	170.3	181.0										
	MW	164.5	156.3	161.2	166.7	171.7	166.6	165.5	173.3	176.0	179.6	179.6	181.5	183.6	185.9	188.7	190.4
	MVAr	9.5	27.1	16.8	21.3	43.1	36.6	36.3	38.1	38.7	39.5	39.4	39.9	40.3	40.8	41.5	41.8
	10% POE MVA	164.8	158.7	162.1	168.0	177.1	170.5	169.4	177.5	180.2	183.9	183.9	185.8	188.0	190.3	193.2	194.9
	PF	0.998	0.985	0.995	0.992	0.970	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	MW	150.8	142.6	147.5	153.0	158.3	153.3	153.8	161.7	164.3	167.9	167.9	169.8	171.9	174.2	177.0	178.7
	MVAr	8.7	24.7	15.3	19.5	39.7	33.7	33.8	35.5	36.1	36.9	36.9	37.3	37.8	38.3	38.9	39.3
	50% POE MVA	151.1	144.8	148.3	154.2	163.2	156.9	157.4	165.5	168.2	171.9	171.9	173.9	176.0	178.4	181.3	183.0
	PF	0.998	0.985	0.995	0.992	0.970	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.977
	Actual MVA	179.5	275.3	223.1	234.7	284.1	323.5										
Vineyard 132kV	MW	236.1	271.5	264.7	269.3	283.4	292.7	338.2	382.6	407.3	431.3	459.7	487.4	521.0	546.2	569.7	582.8
	MVAr	65.7	85.6	68.0	78.4	90.6	87.4	109.5	125.4	134.6	143.8	154.4	164.5	176.0	185.0	193.4	197.7
	10% POE MVA	245.9	285.4	274.9	281.3	298.3	305.8	356.1	403.3	429.8	455.6	486.0	515.5	551.2	578.0	603.0	616.9
	PF	0.960	0.951	0.963	0.957	0.950	0.957	0.950	0.949	0.948	0.947	0.946	0.945	0.945	0.945	0.945	0.945
	MW	213.1	243.4	236.6	241.2	255.6	261.8	307.4	351.7	376.4	400.4	428.9	456.5	490.2	515.4	538.8	552.0
	MVAr	59.3	76.7	60.8	70.2	81.9	78.2	99.8	115.6	124.9	134.0	144.6	154.8	166.2	175.3	183.7	188.0
	50% POE MVA	222.0	255.9	245.7	251.9	269.0	273.6	323.7	370.9	397.4	423.2	453.6	483.1	518.8	545.6	570.6	584.5
	PF	0.960	0.951	0.963	0.957	0.950	0.957	0.949	0.948	0.947	0.946	0.945	0.945	0.945	0.945	0.944	0.944
	Actual MVA	305.8	425.8	358.9	382.7	454.4	504.5										
Undiversified	MW	400.6	427.9	426.0	436.0	455.2	459.2	503.7	555.9	583.2	610.9	639.3	668.9	704.6	732.1	758.4	773.2
	MVAr	75.3	112.7	84.8	99.6	133.7	124.0	145.9	163.5	173.3	183.2	193.8	204.4	216.3	225.9	234.9	239.6
	10% POE MVA	410.7	444.1	437.0	449.3	475.4	476.4	525.5	580.8	609.9	639.5	669.9	701.4	739.2	768.4	796.2	811.8
	PF	0.975	0.963	0.975	0.970	0.958	0.964	0.958	0.957	0.956	0.955	0.954	0.954	0.953	0.953	0.952	0.952
	MW	363.9	386.1	384.2	394.2	413.8	415.1	461.1	513.4	540.7	568.4	596.8	626.3	662.1	689.6	715.8	730.7
	MVAr	68.1	101.5	76.1	89.7	121.6	111.9	133.6	151.1	160.9	170.9	181.5	192.1	204.0	213.5	222.6	227.2
	50% POE MVA	373.0	400.6	394.1	406.2	432.2	430.5	481.2	536.4	565.6	595.1	625.5	657.0	694.8	724.0	751.9	767.5
	PF	0.976	0.964	0.975	0.971	0.957	0.964	0.958	0.957	0.956	0.955	0.954	0.953	0.953	0.952	0.952	0.952
	Actual MVA	292.1	418.9	373.6	388.9	470.2	500.8										
Diversified (Meter)	MW	404.7	415.0	422.7	433.5	458.7	462.8	496.6	548.0	575.0	602.3	630.3	659.4	694.7	721.8	747.7	762.3
	MVAr	100.5	103.1	94.2	106.0	153.4	79.4	123.6	136.4	143.1	149.9	156.8	164.1	172.9	179.6	186.1	189.7
	10% POE MVA	417.0	427.6	433.0	446.2	483.7	469.5	511.7	564.8	592.5	620.7	649.5	679.5	715.9	743.8	770.5	785.6
	PF	0.970	0.970	0.976	0.971	0.948	0.986	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
	MW	359.7	370.0	377.6	388.4	417.0	417.3	454.6	506.1	533.0	560.3	588.3	617.5	652.8	679.9	705.7	720.4
	MVAr	89.4	91.9	84.1	95.0	139.4	71.6	113.1	125.9	132.7	139.4	146.4	153.7	162.4	169.2	175.6	179.3
	50% POE MVA	370.6	381.2	386.9	399.8	439.7	423.4	468.5	521.5	549.3	577.4	606.3	636.3	672.7	700.6	727.3	742.3
	PF	0.970	0.970	0.976	0.971	0.948	0.986	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970

4.16 Wallerawang 66kV Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Wallerawang 66kV	Actual MVA	21.0	19.6	18.5	20.6	19.0	36.3										
	MW	19.6	18.3	17.3	19.2	17.7	33.9	22.6	22.7	22.6	22.5	22.4	22.4	22.3	22.3	22.3	22.3
	MVAr	7.4	7.0	6.5	7.3	6.7	12.9	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	10% POE MVA	21.0	19.6	18.5	20.6	19.0	36.3	24.2	24.3	24.2	24.1	24.0	24.0	23.9	23.9	23.9	23.8
	PF	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
50% POE	MW	19.6	18.3	17.3	19.2	17.7	33.9	22.6	22.7	22.6	22.5	22.4	22.4	22.3	22.3	22.3	22.3
	MVAr	7.4	7.0	6.5	7.3	6.7	12.9	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	MVA	21.0	19.6	18.5	20.6	19.0	36.3	24.2	24.3	24.2	24.1	24.0	24.0	23.9	23.9	23.9	23.8
	PF	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935

4.17 Wallerawang 132kV Supply Point

Location		Actual						Forecast									
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Katoomba North	Actual MVA	22.9	23.3	21.4	20.2	21.2	23.3										
	MW	22.5	22.5	20.7	19.9	20.7	22.5	20.0	19.9	19.8	19.8	19.7	19.6	19.6	19.6	19.6	19.6
	MVAr	4.3	6.0	5.2	3.5	4.3	6.0	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	10% POE MVA	22.9	23.3	21.4	20.2	21.2	23.3	20.5	20.4	20.3	20.3	20.2	20.2	20.1	20.1	20.1	20.1
	PF	0.982	0.966	0.970	0.985	0.979	0.966	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
50% POE	MW	22.5	22.5	20.7	19.9	20.7	22.5	20.0	19.9	19.8	19.8	19.7	19.6	19.6	19.6	19.6	19.6
	MVAr	4.3	6.0	5.2	3.5	4.3	6.0	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	MVA	22.9	23.3	21.4	20.2	21.2	23.3	20.5	20.4	20.3	20.3	20.2	20.2	20.1	20.1	20.1	20.1
	PF	0.982	0.966	0.970	0.985	0.979	0.966	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
Lawson	Actual MVA	14.5	23.7	26.5	25.5	19.1	27.3										
	MW	14.3	23.4	26.1	25.1	18.8	26.9	22.7	22.7	22.6	22.6	22.5	22.5	22.4	22.4	22.4	22.4
	MVAr	2.5	4.1	4.6	4.4	3.3	4.7	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.9
	10% POE MVA	14.5	23.7	26.5	25.5	19.1	27.3	23.1	23.0	23.0	22.9	22.9	22.8	22.8	22.8	22.7	22.7
	PF	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
50% POE	MW	14.3	23.4	26.1	25.1	18.8	26.9	22.7	22.7	22.6	22.6	22.5	22.5	22.4	22.4	22.4	22.4
	MVAr	2.5	4.1	4.6	4.4	3.3	4.7	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.9
	MVA	14.5	23.7	26.5	25.5	19.1	27.3	23.1	23.0	23.0	22.9	22.9	22.8	22.8	22.8	22.7	22.7
	PF	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
Undiversified	Actual MVA	37.4	47.0	47.8	45.6	40.3	50.6										
	MW	36.7	45.9	46.8	45.0	39.6	49.4	42.7	42.6	42.4	42.3	42.2	42.1	42.0	42.0	42.0	42.0
	MVAr	6.8	10.1	9.7	7.9	7.6	10.8	8.6	8.5	8.5	8.5	8.5	8.5	8.4	8.4	8.4	8.4
	10% POE MVA	37.4	47.0	47.8	45.6	40.3	50.6	43.6	43.4	43.3	43.2	43.1	43.0	42.9	42.8	42.8	42.9
	PF	0.983	0.975	0.978	0.985	0.982	0.976	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
50% POE	MW	36.7	45.9	46.8	45.0	39.6	49.4	42.7	42.6	42.4	42.3	42.2	42.1	42.0	42.0	42.0	42.0
	MVAr	6.8	10.1	9.7	7.9	7.6	10.8	8.6	8.5	8.5	8.5	8.5	8.5	8.4	8.4	8.4	8.4
	MVA	37.4	47.0	47.8	45.6	40.3	50.6	43.6	43.4	43.3	43.2	43.1	43.0	42.9	42.8	42.8	42.9
	PF	0.983	0.975	0.978	0.985	0.982	0.976	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
Diversified# (Meter)	Actual MVA	59.6	85.0	66.7	58.4	68.3	51.0										
	MW	58.4	83.2	65.3	57.2	66.8	49.9	42.7	42.6	42.4	42.3	42.2	42.1	42.0	42.0	42.0	42.0
	MVAr	12.2	17.3	13.6	11.9	13.9	10.4	8.9	8.9	8.8	8.8	8.8	8.8	8.8	8.7	8.7	8.7
	10% POE MVA	59.6	85.0	66.7	58.4	68.3	51.0	43.6	43.5	43.4	43.2	43.1	43.0	42.9	42.9	42.9	42.9
	PF	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979
50% POE	MW	58.4	83.2	65.3	57.2	66.8	49.9	42.7	42.6	42.4	42.3	42.2	42.1	42.0	42.0	42.0	42.0
	MVAr	12.2	17.3	13.6	11.9	13.9	10.4	8.9	8.9	8.8	8.8	8.8	8.8	8.8	8.7	8.7	8.7
	MVA	59.6	85.0	66.7	58.4	68.3	51.0	43.6	43.5	43.4	43.2	43.1	43.0	42.9	42.9	42.9	42.9
	PF	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979

Note: # Wallerawang large diversified values are due to contributions from Warrimoo and/or Mt Piper

5 Lists of Projects

5.1 Spotloads

Zone Substation	Description	Year	MW	MVAR	MVA
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2021	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2022	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2023	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2024	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2025	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2026	4.5	2.2	5.0
Airtrunk Data	UIL4911 - 132kV Supply Data Centre - Huntingwood Dr	2027	4.5	2.2	5.0
Albion Park	Calderwood Residential Development	2017	0.2	0.1	0.2
Albion Park	Calderwood Residential Development	2018	1.1	0.5	1.2
Albion Park	Calderwood Residential Development	2019	1.4	0.7	1.6
Albion Park	Calderwood Residential Development	2020	0.7	0.3	0.8
Albion Park	UCL8307 - Helicopter Facility NSW Ambulance	2019	0.2	0.1	0.2
Albion Park	UIL4891 - Oak Flats, Industrial Load	2019	0.9	0.4	1.0
Albion Park	URS17748 - Calderwood, Pumping Station	2019	0.2	0.1	0.2
Ambarvale	Mt Gilead Commercial Area	2025	0.1	0.3	0.3
Ambarvale	Mt Gilead Commercial Area	2026	0.1	0.3	0.3
Ambarvale	Mt Gilead Commercial Area	2028	0.1	0.3	0.3
Ambarvale	Mt Gilead initial development 1700 lots	2019	0.4	0.2	0.4
Ambarvale	Mt Gilead initial development 1700 lots	2020	1.3	0.6	1.4
Ambarvale	Mt Gilead initial development 1700 lots	2021	1.3	0.6	1.4
Ambarvale	Mt Gilead initial development 1700 lots	2023	1.3	0.6	1.4
Ambarvale	NUL0555 Fitzpatrick St Menangle Park	2017	0.5	0.3	0.6
APM	Factory Closure	2018	-0.2	0.1	-0.2
Arndell Park	UCL7563 - 170 Reservoir Rd ARNDELL PARK	2018	0.7	0.3	0.8
Arndell Park	UCL8062	2019	1.0	0.5	1.1
Arndell Park	UIL4698 - 20 Holbeche Rd ARNDELL PARK	2018	1.8	0.9	2.0
Arndell Park	UIL4919 - Schweppes ARNDELL PARK	2018	1.0	0.5	1.1
Arndell Park	UIL5061 - Huntingwood warehouse extension	2019	2.7	1.3	3.0
Arndell Park	UML7069 - Spoonbill Ave ARNDELL PARK	2018	0.2	0.1	0.2
AWS Data	UIL4375 AWS Data Centre	2018	4.1	2.0	4.5
AWS Data	UIL4375 AWS Data Centre	2019	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2020	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2021	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2022	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2023	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2024	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2025	4.2	2.0	4.7
AWS Data	UIL4375 AWS Data Centre	2026	4.2	2.0	4.7
Baulkham Hills 11kV	Anglican Retirement Villages	2018	0.3	0.1	0.3
Bella Vista	UCL7451 219 units and commercial Solent Circuit Baulkham Hills	2018	1.4	0.7	1.6
Bella Vista	UCL8210 Building Hillsong 100 Solent Circuit Baulkham Hills	2018	0.6	0.3	0.7
Bella Vista	ULL2145 NWRL Construction and fit out loads - Removal	2020	-1.4	0.7	-1.6
Bella Vista	ULL2576 Kellyville South Public School 23 Fairway Drive Kellyville	2019	0.2	0.1	0.2
Bella Vista	UML7008 133 units 30 Norbrik Drive Bella Vista	2018	0.4	0.2	0.4
Bella Vista	UML7884 40 units 93 Windsor Road Baulkham Hills	2018	0.1	0.1	0.1
Berry	NLL0205	2019	0.1	0.03	0.1
Berry	UCL8332 - Bupa Health Services	2018	0.5	0.2	0.6
Bomaderry	NLL0187 - Shoalhaven Water	2019	2.2	1.0	2.4
Bomaderry	ULL2345 - Shoalhaven Water (Waste Water Treatment Plant)	2018	1.3	0.6	1.4
Bomaderry	ULL2533 - Bomaderry, Indoor Sports Centre	2018	0.4	0.2	0.4
Bomaderry	URS17845 - Nowra, 36 Units	2018	0.3	0.1	0.3
Bonnyrigg	UCL7444 - Marian St Guildford	2018	0.2	0.1	0.3
Bonnyrigg	UCL7974 Mounties Club Mt Pritchard - Stage 1	2018	2.0	0.9	2.2
Bonnyrigg	UCL7974 Mounties Club Mt Pritchard - Stage 2	2019	2.0	0.9	2.2
Bossley Park	UCL 7055	2018	0.8	0.4	0.9
Bossley Park	UML 7747	2018	0.2	0.1	0.2
Bow Bowling	UIL4598 Williamson Rd Ingleburn redevelop part of the old Viridian site	2018	5.6	2.7	6.2
Box Hill	Box Hill - 10,000 dwellings	2023	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2024	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2025	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2026	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2027	1.7	0.8	1.9

Zone Substation	Description	Year	MW	MVAR	MVA
Box Hill	Box Hill - 10,000 dwellings	2028	1.7	0.8	1.9
Box Hill	Box Hill - 10,000 dwellings	2029	1.7	0.8	1.9
Box Hill	Box Hill Industrial 60 hectares of employment land	2023	1.0	0.5	1.1
Box Hill	Box Hill Industrial 60 hectares of employment land	2024	1.0	0.5	1.1
Box Hill	Box Hill Industrial 60 hectares of employment land	2025	0.8	0.4	0.9
Box Hill	Box Hill Industrial 60 hectares of employment land	2026	0.6	0.3	0.7
Box Hill	Box Hill Industrial 60 hectares of employment land	2027	0.5	0.2	0.5
Box Hill	Box Hill Industrial 60 hectares of employment land	2028	0.3	0.1	0.3
Box Hill	Box Hill Industrial 60 hectares of employment land	2029	0.1	0.04	0.1
Box Hill	Box Hill North - 4000 dwellings	2023	1.6	0.8	1.8
Box Hill	Box Hill North - 4000 dwellings	2024	1.9	0.9	2.1
Box Hill	Box Hill North - 4000 dwellings	2025	1.9	0.9	2.1
Box Hill	Box Hill North - 4000 dwellings	2026	1.6	0.8	1.8
Box Hill	Box Hill North - 4000 dwellings	2027	1.3	0.6	1.5
Box Hill	Box Hill North - 4000 dwellings	2028	1.0	0.5	1.1
Box Hill	Box Hill North - 4000 dwellings	2029	0.7	0.4	0.8
Bringelly	NUL 0566	2018	0.1	0.1	0.1
Bringelly	UIL 5035	2018	0.7	0.3	0.8
Bringelly	UIL5035 Dairy Farm Expansion - Bringelly	2019	0.5	0.3	0.6
Bylong	NRL11387	2018	0.01	0.004	0.01
Calderwood	Calderwood Residential Development	2021	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2022	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2023	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2024	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2025	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2026	0.7	0.3	0.8
Calderwood	Calderwood Residential Development	2027	0.7	0.3	0.8
Cambridge Park	URS16973	2018	0.2	0.1	0.2
Cambridge Park	URS17361	2019	0.1	0.1	0.1
Cambridge Park	URS18065	2018	0.2	0.1	0.3
Campbelltown	UCL8080 extensions to a car yard.	2018	0.5	0.2	0.6
Campbelltown	UIL5014 industrial development in Hephher St Campbelltown.	2018	0.9	0.4	1.0
Campbelltown	UML6889 92 unit & commercial shops in Broughton St Campbelltown.	2017	0.5	0.3	0.6
Carramar	UML5096 - 17 The Crescent St Fairfield	2018	0.3	0.2	0.4
Carramar	UML5802	2018	0.3	0.1	0.3
Castle Hill	UML6693 378 units 299 - 309 Old Northern Rd Castle Hill	2018	1.1	0.5	1.2
Castle Hill	UML7129 - Stage 3 Retirement Village	2018	0.3	0.1	0.3
Casula	UCL8553 Cross-Roads Hotel Expansion	2019	0.2	0.1	0.2
Casula	UML5167 188 Wonga Rd Lurnea	2018	0.1	0.1	0.2
Cattai	NRS2591	2018	0.2	0.1	0.2
Cattai	NRS2849	2018	0.1	0.1	0.1
Cattai	NRS2909	2018	0.5	0.3	0.6
Cattai	NRS3048	2018	0.2	0.1	0.2
Cattai	NRS3053 & NRS3021	2018	0.1	0.0	0.1
Cattai	NRS3120	2019	0.0	0.0	0.1
Cheriton Avenue	ENL 2791 Castle Tower Zone 3	2020	5.2	2.5	5.8
Cheriton Avenue	ENL 2791 Castle Tower Zone 4	2024	6.5	3.1	7.2
Cheriton Avenue	UCL7731 Castle Towers	2018	2.9	1.4	3.2
Cheriton Avenue	ULL2144 NWRL Construction and fit out loads - Removal	2020	-1.4	0.7	-1.5
Chipping Norton	UIL 4782	2019	1.8	0.9	2.0
Chipping Norton	UIL4848 Inglis Horse Centre	2018	2.6	1.3	2.9
Claremont Meadows	NCL1275	2019	0.1	0.1	0.2
Claremont Meadows	UML6444 - 22 Residential Apartments - Mamre, Rd St Marys	2019	0.1	0.04	0.1
Claremont Meadows	URS15582	2018	0.9	0.4	1.0
Claremont Meadows	URS16676	2018	0.1	0.04	0.1
Claremont Meadows	URS18021	2019	0.8	0.4	0.9
Claremont Meadows	URS18276	2018	0.6	0.3	0.6
Claremont Meadows	URS18310 - 51 Lot Subdivision - Caddens Rd, Claremont Meadows	2020	0.2	0.1	0.2
Claremont Meadows	URS18475	2020	0.6	0.3	0.7
Claremont Meadows	URS19116	2019	0.2	0.1	0.3
Corrimal	UCL7452 - Corrimal, Medical Centre	2018	0.3	0.2	0.3
Cranebrook	UCL6767	2019	0.4	0.2	0.4
Cranebrook	UCL7214	2018	1.4	0.7	1.5
Cranebrook	ULL0724	2019	2.0	1.0	2.2
Dapto	UCL 5915 - Illawarra International Health Precinct Stage 1	2021	1.8	0.9	2.0

Zone Substation	Description	Year	MW	MVAR	MVA
Dapto	UCL7329 - Retirement Village (IRT)	2019	0.5	0.3	0.6
Dapto	UCL8253 - 5 x Commercial Units	2019	0.2	0.1	0.2
Dapto	UIL5112 - Industrial Units	2019	0.2	0.1	0.2
Dapto	UML7160 - 34 Units, Dapto	2019	0.1	0.1	0.2
Dapto	UML7160 - Dapto, 34 Units	2018	0.1	0.1	0.2
Dapto	UML7394 - Avondale, 44 Residential Units	2018	0.2	0.1	0.2
Dapto	URS16548 - Kanahooka, 29 Townhouses	2017	0.2	0.1	0.2
Doonside	ULL2549 - Off Eastern Rd	2018	0.5	0.3	0.6
Doonside	UML7072 - Rooty Hill Rd Sth	2018	0.1	0.1	0.2
Dundas	UML6231 140 apartments James Street Carlingford	2018	0.5	0.2	0.5
Dundas	UML6506 408 apartments 2-12 Thallon Street Carlingford	2019	1.1	0.5	1.3
Dundas	UML6859 183 apartments Thallon Street Carlingford	2018	0.5	0.3	0.6
Dundas	UML6982 & UML6983 157 units Mobbs Lane Eastwood	2018	0.4	0.2	0.5
Dundas	UML7151 - 44 Apartments	2018	0.2	0.1	0.2
East Richmond	NCL1060	2018	0.1	0.1	0.1
East Richmond	NCL3207	2019	0.1	0.1	0.2
East Richmond	UCL7915	2018	0.5	0.2	0.5
East Richmond	URS12732	2018	0.1	0.1	0.1
Eastern Creek	UCL6838 - 2 Southridge Street EASTERN CREEK	2018	0.2	0.1	0.2
Eastern Creek	UCL8289 - Honeycombe Dr	2019	1.1	0.5	1.2
Eastern Creek	UIL 4988 - Site 3B Millner Rd	2018	1.1	0.5	1.2
Eastern Creek	UIL 5026 - Toyota Parts	2018	1.9	0.9	2.1
Eastern Creek	UIL4772 - 400 Burley Road HORSLEY PARK	2018	0.5	0.2	0.5
Eastern Creek	UIL4773 - Site 1C 400 Burley Road HORSLEY PARK	2018	0.5	0.2	0.5
Eastern Creek	UIL4840 - Link Rd	2018	0.5	0.3	0.6
Eastern Creek	UIL4920 - 339 Wallgrove Rd	2018	0.9	0.4	1.0
Eastern Creek	UIL4927 - Eastern Creek Dr (Part of ENL2651)	2018	0.5	0.3	0.6
Eastern Creek	UIL5026 - Toyota Parts Warehouse	2018	1.5	0.7	1.7
Eastern Creek	UIS0559 - Lot 100 Burley Rd - Jackfin	2018	0.4	0.2	0.5
Eastern Creek	UIS0700 - Burley Rd (Stage 1 of ENL2627)	2018	1.4	0.7	1.6
Eastern Creek	UML4885 Site 3A Millner Rd	2018	1.0	0.5	1.1
Eastern Creek	UML4988 Site 3B Millner Rd	2018	1.4	0.7	1.5
Eastern Creek	UML5018 Site 3C1 Millner Rd	2018	0.4	0.2	0.4
Eastern Creek	UML5019 Site 3C2 & 3C3 Millner Rd	2018	1.3	0.6	1.5
Emu Plains	NRS3194	2018	0.03	0.01	0.03
Emu Plains	UCL 8288	2019	0.9	0.4	1.0
Fairfield	UCL7736 Fairfield Rd Yennora	2018	0.6	0.3	0.7
Fairfield	UIL 5131	2019	1.7	0.8	1.9
Fairfield	UIL4947 - Mc Credie Rd Guildford	2018	1.6	0.8	1.8
Fairfield	UIL4981 - Mc Credie Rd Guildford	2018	3.5	1.7	3.9
Fairfield	UML 6214	2019	0.4	0.2	0.5
Figtree	NIL0221 - Dendrobium Portal	2018	0.9	0.4	1.0
Figtree	UCL6885 - Greenhill Nursing Home	2018	0.4	0.2	0.5
Fujitsu Data	Data Centre Load Increase	2018	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2019	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2020	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2021	4.3	2.1	4.8
Fujitsu Data	Data Centre Load Increase	2022	4.3	2.1	4.8
Gerringong	NRL11053 - Gerringong, Private Residential	2018	0.1	0.03	0.1
Gerringong	UCL8117 - Mayflower Carehouse	2019	0.6	0.3	0.7
Glenmore Park	UCL5470	2020	1.8	0.9	2.0
Glenmore Park	ULL2439	2018	0.5	0.2	0.5
Glenmore Park	UML6845	2018	0.2	0.1	0.2
Glenmore Park	URS17727	2018	0.2	0.1	0.2
Glenmore Park	URS17728	2018	0.1	0.1	0.2
Glenmore Park	URS18643	2019	0.4	0.2	0.5
Glossodia	NCL1346/1347/1348	2019	0.3	0.2	0.4
Granville 132kV	70 apartments 4 com 57 Cowper Street Granville	2017	0.3	0.1	0.3
Granville 132kV	UML7194 - 60 units Pitt St	2018	0.2	0.1	0.2
Granville 132kV	UML7326 - 43 units William St	2019	0.2	0.1	0.2
Granville 132kV	UML7476 - 474 units + retail/commercial, East St Granville	2020	2.4	1.2	2.7
Granville 132kV	UML7802 - High Density & Commercial (Stage 1)	2018	2.1	1.0	2.3
Granville 132kV	UML7802 - High Density & Commercial (Stage 2)	2019	2.1	1.0	2.3
Granville 132kV	UML7838 - Pitt St	2020	0.8	0.4	0.9

Zone Substation	Description	Year	MW	MVAR	MVA
Hinchinbrook	Austral Precinct	2018	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2019	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2020	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2021	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2022	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2023	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2024	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2025	0.7	0.3	0.8
Hinchinbrook	Austral Precinct	2026	0.7	0.3	0.8
Hinchinbrook	UCL8139 Thomas Hassall Anglican School - Middleton Grange	2018	0.6	0.3	0.7
Hinchinbrook	UCS0464	2018	0.9	0.4	1.0
HMAS Albatross	ULL2036 - HMAS Albatross	2025	10.3	5.0	11.4
Holroyd	UCL8427 - Wenty Leagues	2018	1.8	0.9	2.0
Holroyd	UML6663 - 62-64 Veron Street WENTWORTHVILLE	2018	0.1	0.0	0.1
Holroyd	UML6681 - 70-72 Essington Street WENTWORTHVILLE	2018	0.3	0.1	0.3
Holroyd	UML6810 - 1-9 Florence Street SOUTH WENTWORTHVILLE	2018	0.2	0.1	0.2
Holroyd	UML6866 - 23-25 Veron Street WENTWORTHVILLE	2018	0.2	0.1	0.2
Holroyd	UML6928 - 2-6 Fraser Street WESTMEAD	2018	0.2	0.1	0.2
Holroyd	UML7014 47 Villawood Place VILLAWOOD	2018	0.2	0.1	0.2
Holroyd	UML7046 84-86 Aurelia Street TOONGABBIE	2018	0.2	0.1	0.2
Holroyd	UML7093 - 53-55 Veron Street WENTWORTHVILLE	2018	0.3	0.1	0.3
Holroyd	UML7104 - 40-42 Addlestone Road MERRYLANDS	2018	0.1	0.1	0.1
Holroyd	UML7318 Peggy St, Mays Hill	2018	0.2	0.1	0.2
Holroyd	UML7365 - Veron St Wentworthville	2018	0.0	0.0	0.1
Holroyd	UML7393 Garfield Ste Wentworthville	2018	0.2	0.1	0.2
Holroyd	UML7438 Great Western Highway, Mays Hill	2018	0.5	0.2	0.5
Holroyd	UML7625 - Veron St Wentworthville	2019	0.1	0.0	0.1
Holroyd	UML7643 - Essington St Wentworthville	2019	0.1	0.0	0.1
Holroyd	UML7762 - Great Western Highway Westmead	2019	0.2	0.1	0.3
Homepride	UCL7769 Bigge St Private Hospital - Liverpool	2018	0.7	0.3	0.8
Horsley Park	NRS2563	2018	0.01	0.004	0.01
Horsley Park	UCL 5967	2018	0.8	0.4	0.9
Huntingwood	UCL4468 - 863 Great Western Highway MINCHINBURY	2018	0.2	0.1	0.2
Huntingwood	UCL7898 - Sydney Zoo	2018	2.0	1.0	2.2
Huntingwood	UCS0463 - Rooty Hill Road South EASTERN CREEK	2018	1.8	0.9	2.0
Huntingwood	UIL4364 - SYD51 Data	2019	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2020	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2021	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2022	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2023	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2024	3.0	1.0	3.2
Huntingwood	UIL4364 - SYD51 Data	2025	3.0	1.0	3.2
Huntingwood	UIL4912 - Airtrunk Data	2018	3.6	1.2	3.8
Huntingwood	UIL4912 - Airtrunk Data	2019	4.8	1.6	5.0
Huntingwood	UIL4912 - Airtrunk Data	2020	4.8	1.6	5.0
Huntingwood	UIS0672 - 60 Wallgrove Road EASTERN CREEK	2018	0.5	0.2	0.5
Huskisson	UCL5044 - Stage 2 Coles and Specialty Shops	2024	2.1	1.0	2.3
Jasper Road	UML5859 Medium density residential development	2017	0.7	0.3	0.8
Jasper Road	UML6042 147 apartments	2018	0.5	0.2	0.5
Jasper Road	UML6772 100 units Winston Hills Shops 180-192 Caroline Chisholm Drive	2018	0.3	0.2	0.4
Jasper Road	UML7004 233 apartments 15 shops 2 Seven Hills Rd Baulkham Hills	2019	1.4	0.7	1.5
Jasper Road	UML7695 - Meryll Ave Baulkham Hills	2019	0.1	0.1	0.1
Jasper Road	UML8297 Aged Care Facility	2020	0.8	0.4	0.9
Jordan Springs	NIL0204	2018	0.3	0.1	0.3
Jordan Springs	NLL0213	2018	0.2	0.1	0.2
Jordan Springs	UML7825/UML7827	2019	0.2	0.1	0.2
Jordan Springs	URS 16662	2018	0.5	0.3	0.6
Jordan Springs	URS 16663	2018	0.3	0.1	0.3
Jordan Springs	URS18326	2019	0.3	0.1	0.3
Kandos	NRL11335	2018	0.01	0.004	0.01
Kandos	NRL11388	2018	0.1	0.1	0.1
Kandos	NRL11685	2018	0.02	0.01	0.0
Kellyville	UCL8341 Retirement Village Lot 301 Old Glenhaven Road Glenhaven	2018	0.5	0.2	0.5
Kellyville	UML6520 - Samantha Riley Dr	2019	0.1	0.1	0.2
Kellyville	URS16392 - Foxall Rd Kellyville	2019	0.1	0.1	0.1

Zone Substation	Description	Year	MW	MVAR	MVA
Kellyville	URS18120 - Foxall Rd Kellyville	2019	0.04	0.02	0.04
Kellyville	URS18380 - Samantha Riley Dr	2019	0.05	0.02	0.1
Kembla Grange	Prysmian Cables Relocation	2021	8.4	4.1	9.4
Kemps Creek	Austral Precinct	2018	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2019	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2020	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2021	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2022	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2023	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2024	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2025	0.3	0.1	0.3
Kemps Creek	Austral Precinct	2026	0.3	0.1	0.3
Kemps Creek	NIL0262 - 210 Martins Rd Badgerys Creek	2018	0.6	0.3	0.6
Kenny Street	UCL8097 - Commercial Building	2019	0.6	0.3	0.7
Kenny Street	UML6788 - Wollongong, 85 Residential Units	2019	0.4	0.2	0.4
Kenny Street	UML7114 - Wollongong, 72 Units & Commercial Premises	2019	1.4	0.7	1.5
Kenthurst	NRS3155	2019	0.04	0.02	0.04
Kenthurst	UIL4541 Old Northern Rd Dural Industrial load	2018	0.3	0.2	0.4
Kepco Mine	NIL0208 - Stage 1	2019	12.3	6.0	13.7
Kepco Mine	NIL0208 - Stage 2	2022	7.7	3.7	8.6
Kiama	ULL2449 - Kiama, Aged Care Facility	2018	1.0	0.5	1.1
Kiama	ULL2499 - Aged Care & Community Health Centre	2020	1.6	0.8	1.7
Kiama	UML6656 - Kiama, 51 units	2019	0.4	0.2	0.4
Kiama	UML7376 - 18 Units, Kiama	2018	0.1	0.05	0.1
Kiama	UML7405 - 71 Units & Commercial Load Kiama	2019	0.7	0.3	0.8
Kingswood	UCL6532	2018	0.1	0.04	0.1
Kingswood	UCL7837	2019	0.2	0.1	0.2
Kingswood	ULL2663 - Nepean Hospital	2020	3.3	1.6	3.6
Kingswood	UML7017	2018	0.6	0.3	0.7
Kingswood	UML7140	2019	0.2	0.1	0.2
Kingswood	UML7157	2018	0.5	0.2	0.5
Kingswood	UML7162	2018	0.1	0.04	0.1
Kingswood	UML7378 & UML7737	2019	0.2	0.1	0.2
Kingswood	UML7472	2018	0.1	0.04	0.1
Kingswood	UML8004	2018	0.2	0.1	0.3
Kurrajong	NRL11849 & NRL11799	2018	0.1	0.0	0.1
Kurrajong	NRS3196	2019	0.1	0.1	0.1
Leabons Lane	ULL2348 – Stage 2 Blacktown Hospital	2019	4.0	1.9	4.4
Leabons Lane	ULL2585 - Blacktown Hospital	2018	1.2	0.6	1.4
Lennox	UCL5604 522 units and Commercial 134 - 140 Marsden St Parramatta	2017	2.8	1.4	3.1
Lennox	UCL7998 - Good St Granville	2019	0.2	0.1	0.2
Lennox	UCL8128 Westfield	2017	0.4	0.2	0.4
Lennox	UML7460 - 366 Units	2018	1.0	0.5	1.1
Lennox	UML7522 - 398 Apartments	2018	1.3	0.6	1.4
Lennox	UML7524 84-88 Great Western Highway Westmead	2018	0.2	0.1	0.2
Lennox	UML7524 Great Western Highway, Westmead	2018	0.2	0.1	0.2
Lennox	UML7927 44 units 190-194 Burnett Street Mays Hill	2018	0.1	0.1	0.1
Lennox	UML7945 64 apartments 2 retail 114 - 116 GWH Parramatta	2018	0.4	0.2	0.4
Lithgow	NRS3099	2018	0.1	0.04	0.1
Lithgow	NRS3161	2018	0.1	0.1	0.2
Lithgow	NRS3205	2018	0.1	0.1	0.1
Lithgow	UCL7502	2018	0.3	0.1	0.3
Lithgow	URS9146	2019	0.1	0.1	0.1
Liverpool	UML7200 The Paper Mills Residential Towers 349 units + 2 commercial	2018	1.6	0.8	1.8
Luddenham	NCL 1399	2020	0.6	0.3	0.6
Luddenham	NLL0221 - RAAF Base	2019	1.4	0.7	1.5
Luddenham	UIS0744 Science Park, Luddenham	2018	0.8	0.4	0.9
Luddenham	URS19094	2018	0.1	0.1	0.1
M1 M2 tunnel	UCL7388 M1 - M2 Tunnel Supply HVC - Carlingford	2019	6.3	3.1	7.0
Maldon	NIL0253	2019	3.6	1.7	4.0
Mamre	UIL4868	2018	0.3	0.1	0.3
Mamre	UIL4889	2018	0.4	0.2	0.4

Zone Substation	Description	Year	MW	MVAR	MVA
Mamre	UIL4989	2019	0.8	0.4	0.9
Mamre	UIL5036	2019	0.3	0.1	0.3
Mamre	UIL5042	2019	0.7	0.3	0.7
Mamre	UIL5055	2018	1.1	0.5	1.3
Mamre	ULL2605	2018	0.1	0.1	0.2
Manildra	UIL4489 - Manildra (Stage 2 Load Increase) to 39MVA	2019	5.7	2.7	6.3
Marsden Park	Marsden Park - 8,600 residential dwellings	2021	2.4	1.1	2.6
Marsden Park	Marsden Park - 8,600 residential dwellings	2022	2.4	1.1	2.6
Marsden Park	Marsden Park - 8,600 residential dwellings	2023	2.4	1.1	2.6
Marsden Park	Marsden Park - 8,600 residential dwellings	2024	2.0	1.0	2.3
Marsden Park	Marsden Park - 8,600 residential dwellings	2025	1.7	0.8	1.9
Marsden Park	Marsden Park - 8,600 residential dwellings	2026	1.7	0.8	1.9
Marsden Park	Marsden Park North - 5,843 residential dwellings	2025	0.2	0.1	0.2
Marsden Park	Marsden Park North - 5,843 residential dwellings	2026	0.5	0.2	0.5
Marsden Park	NUL0572 - Water Marsden Park	2018	0.7	0.4	0.8
Marsden Park	UCL7293 - Richmond Road MARS DEN PARK (WTP)	2018	0.6	0.3	0.7
Marsden Park	UML17982 - Marsden Park Stages MD1 & MD2	2019	0.1	0.0	0.1
Marsden Park	UML7939 - Retirement Living Marsden Park	2019	0.5	0.2	0.5
Marsden Park	URS16040 - Stage 12 Richmond Rd Marsden Park	2018	0.5	0.2	0.5
Marsden Park	URS16140 - Stage 13 Richmond Rd Marsden Park	2018	0.5	0.3	0.6
Marsden Park	URS16141 - Stage 14 Richmond Rd Marsden park	2018	0.3	0.1	0.3
Marsden Park	URS17164 - 210 Grange Road MARS DEN PARK	2018	0.5	0.2	0.5
Marsden Park	URS17422 - Stg 15 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17423 - Stg 16 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17424 - Stg 17 Richmond Road MARS DEN PARK	2018	0.2	0.1	0.2
Marsden Park	URS17425 - Stg 18 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17426 - Stg 19 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17427 - Stg 20 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17428 - Stg 21 Richmond Road MARS DEN PARK	2018	0.1	0.0	0.1
Marsden Park	URS17429 - Stg 22 Richmond Road MARS DEN PARK	2018	0.1	0.0	0.1
Marsden Park	URS17430 - Stg 23 Richmond Road MARS DEN PARK	2018	0.3	0.1	0.3
Marsden Park	URS17462 - Marsden Park	2019	0.1	0.05	0.1
Marsden Park	URS17462 - Richmond Rd	2019	0.6	0.3	0.7
Marsden Park	URS17463 - Marsden Park	2019	0.1	0.1	0.2
Marsden Park	URS17464 - Richmond Rd	2019	0.1	0.04	0.1
Marsden Park	URS17599 - Stage 12B Marsden Park	2018	0.1	0.03	0.1
Marsden Park	URS17838 - Richmond Rd Stage A1	2019	1.7	0.8	1.9
Marsden Park	URS17838 - Richmond Rd Stage A2	2020	1.2	0.6	1.4
Marsden Park	URS17838 - Woorong Park Stage 39	2019	0.6	0.3	0.6
Marsden Park	URS17952 - Stg 25 Richmond Road MARS DEN PARK	2018	0.6	0.3	0.7
Marsden Park	URS18495 - Marden Park Stage 25	2019	0.5	0.3	0.6
Marsden Park	URS18495 - Stg 24 Richmond Road MARS DEN PARK	2019	0.4	0.2	0.5
Marsden Park	URS18807 - Grange Ave	2019	0.6	0.3	0.7
Marsden Park	URS18824 - Woorong Park Stage 40	2019	0.5	0.3	0.6
Marsden Park	URS18947 - Richmond Rd	2019	0.6	0.3	0.7
Marsden Park	URS18953 - Marsden Park Stage 27	2019	0.2	0.1	0.2
Marsden Park	URS18954 - Marsden Park Stages 28-29	2020	0.7	0.3	0.8
Marsden Park	URS18956 - Marsden Park Stages 30-32	2020	0.6	0.3	0.7
Minto	UIL4853 increase load at a factory.	2018	0.8	0.4	0.9
Minto	UIL4992 industrial development off Pembroke Rd Minto	2018	0.4	0.2	0.5
Minto	UIL5100 12 Lincoln St Minto	2018	0.6	0.3	0.7
Mittagong	UML6563 Old Hume Highway Mittagong	2018	0.3	0.1	0.3
Moorebank	UIL5022	2018	0.6	0.3	0.6
Mungerie Park	URS18552 13 lots, 50 units 21-23 Terry Road Box Hill	2018	0.3	0.1	0.3
Mungerie Park	Box Hill 10,000 Dwellings	2020	1.4	0.7	1.5
Mungerie Park	Box Hill 10,000 Dwellings	2021	1.4	0.7	1.5
Mungerie Park	Box Hill 10,000 Dwellings	2022	1.4	0.7	1.5
Mungerie Park	Box Hill Employment Precinct	2020	0.8	0.4	0.9
Mungerie Park	Box Hill Employment Precinct	2021	0.8	0.4	0.9
Mungerie Park	Box Hill Employment Precinct	2022	0.8	0.4	0.9
Mungerie Park	Box Hill North - 4000 dwellings	2020	1.4	0.7	1.5
Mungerie Park	Box Hill North - 4000 dwellings	2021	1.4	0.7	1.5
Mungerie Park	Box Hill North - 4000 dwellings	2022	1.4	0.7	1.5

Zone Substation	Description	Year	MW	MVAR	MVA
Mungerie Park	Cudgegong Road - 4,600 dwellings	2021	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2022	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2023	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2024	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2025	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2026	0.8	0.4	0.9
Mungerie Park	Cudgegong Road - 4,600 dwellings	2027	0.8	0.4	0.9
Mungerie Park	UCL7049 209 units and retail 133-149 Samantha Riley Drive Kellyville	2018	0.9	0.4	1.0
Mungerie Park	UCL7573 Commercial	2018	0.9	0.4	1.0
Mungerie Park	UCL8268 Commercial load 6 Edward Road Nelson	2018	0.2	0.1	0.2
Mungerie Park	UCL8743 Local Water Centre Red Gales rd Box hill (Celestino)	2019	0.6	0.3	0.7
Mungerie Park	UML6906 - Hezlett Rd Kellyville	2019	0.5	0.2	0.5
Mungerie Park	UML7490 - Windsor Rd	2019	0.8	0.4	0.9
Mungerie Park	UML7787 58 units 98 Caddies Blvd Rouse Hill	2018	0.2	0.1	0.2
Mungerie Park	UML7789 94 units 104-106 Caddies Boulevard Rouse Hill	2018	0.3	0.1	0.3
Mungerie Park	UML7998 52 units and retail space 14 Merriville Rd Kellyville Ridge	2018	0.2	0.1	0.2
Mungerie Park	URS 17916 units 60 Cudgegong Road Rouse Hill	2018	0.8	0.4	0.9
Mungerie Park	URS16867 - Terry Rd Box Hill	2019	0.2	0.1	0.2
Mungerie Park	URS17310 14 lots 33 Stringer Road North Kellyville	2018	0.1	0.04	0.1
Mungerie Park	URS17575 23 lots Barry Road North Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS17603 23lots Stage 1 23 Nelson Road Box Hill	2018	0.1	0.1	0.2
Mungerie Park	URS17693 - Terry Rd	2019	0.2	0.1	0.2
Mungerie Park	URS17694 - Terry Rd	2019	0.2	0.1	0.2
Mungerie Park	URS17867 - Terry Rd	2019	0.1	0.1	0.1
Mungerie Park	URS17904 20 lots 18-22 Barry Road North Kellyville	2018	0.1	0.1	0.2
Mungerie Park	URS17916 36 dwellings Old Pitt Town Road Box Hill	2018	0.2	0.1	0.2
Mungerie Park	URS18137 - Terry Rd	2019	0.1	0.1	0.1
Mungerie Park	URS18217 - Foxall Rd	2019	0.05	0.0	0.1
Mungerie Park	URS18441 - Terry Rd	2019	0.1	0.1	0.2
Mungerie Park	URS18547 40 lots 22 Foxall Road Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS18553 18 lots, 40 units 21-23 Terry Road Box Hill	2018	0.2	0.1	0.3
Mungerie Park	URS18554 13 lots 36 units 43 Hynds Road Box Hill	2018	0.2	0.1	0.2
Mungerie Park	URS18629 29 lots 33-34 Foxall Road Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS18643 44 lots 33-34 Foxall Road Kellyville	2018	0.3	0.1	0.3
Mungerie Park	URS18670 - Terry Rd	2019	0.1	0.1	0.2
Mungerie Park	URS18697 29 lots 15-17 Foxall Road Kellyville	2018	0.2	0.1	0.2
Mungerie Park	URS18836 50 lots 116 Cudgegong Road Rouse Hill	2018	0.2	0.1	0.3
Mungerie Park	URS19130 58 multi residential housing 122 Windsor Road Kellyville	2018	0.1	0.1	0.2
Narellan	UCL7398 Industrial development in Lasso Rd Gregory Hills	2018	0.5	0.2	0.5
Narellan	UCL7634 new private hospital in Gregory Hills	2019	0.9	0.4	1.0
Narellan	UCL8316 New school in Gregory Hills	2019	0.5	0.3	0.6
Newton	UCL7925 - Kildare Rd	2018	0.5	0.3	0.6
Newton	UML7329 - Balmoral St	2018	0.3	0.1	0.3
Newton	UML7526 - Second Ave Blacktown	2019	0.3	0.2	0.4
Newton	URS17250 - Stage 1 Riverstone Road and McCulloch Street BLACKTOWN	2018	0.2	0.1	0.2
Newton	URS17873 - Fairwater	2018	0.1	0.1	0.1
Newton	URS18572 - Fairwater Blvd	2019	0.1	0.0	0.1
Newton	URS19208 - Stableford St	2019	0.5	0.2	0.5
North Eastern Creek	UCL7689 - Old Wallgrove & Wallgrove Road EASTERN CREEK	2018	0.1	0.04	0.1
North Eastern Creek	UCL8166 - Wonderland Dr	2019	0.3	0.1	0.3
North Eastern Creek	UIL4502 Archbold Road Suburb: EASTERN CREEK	2018	0.7	0.3	0.8
North Eastern Creek	UIL4817 - 8 Kangaroo Avenue EASTERN CREEK	2018	0.5	0.2	0.5
North Eastern Creek	UIL4984 - Alspey PI	2018	3.2	1.6	3.6
North Eastern Creek	UIS0793 - Honeycomb Dr	2019	1.7	0.8	1.9
North Parramatta	198 units and 2 com Morton Street Parramatta	2018	0.6	0.3	0.6
North Parramatta	307 units and 2 com Morton Street Parramatta	2018	0.9	0.4	1.0
North Parramatta	UCL5931 - Commercial building 105 Phillip Street	2019	2.2	1.0	2.4
North Parramatta	ULL2613 Prince Alfred Park supply upgrade Church St Parramatta	2018	0.2	0.1	0.2
North Parramatta	ULL2621 Western Sydney Stadium O'Connell St Parramatta	2020	3.2	1.6	3.6
North Richmond	NCL0981	2018	0.1	0.0	0.1

Zone Substation	Description	Year	MW	MVAR	MVA
North Richmond	URS18564	2019	0.3	0.1	0.3
North Richmond	URS18621	2019	0.9	0.4	1.0
North Rocks	ULL2378 Sporting complex Renown Rd Baulkham Hills	2018	0.3	0.1	0.3
North Rocks	UML7511 148 units 27-33 North Rocks Road North Rocks	2018	0.5	0.2	0.5
North Wollongong	UCL6816 - Admin Building UOW Campus East	2018	0.8	0.4	0.9
North Wollongong	UCL8561 - Illawarra Master Builders Club (Multi-story car park)	2019	0.05	0.02	0.1
North Wollongong	UML6571 - Residential 66 Units	2018	0.2	0.1	0.2
North Wollongong	UML6819 - Wollongong, 20 Units	2018	0.1	0.1	0.1
North Wollongong	UML7117 - 34 Units, North Wollongong	2019	0.2	0.1	0.2
Northmead	UML7948 24 units 34-36 Briens Rd Northmead	2018	0.1	0.0	0.1
Nowra	ULL2548 - Local Gov. Load	2018	0.6	0.3	0.7
Nowra	URS13057 - South Nowra, 22 Units	2019	0.1	0.05	0.1
NWRL Rouse Hill	UUL1554 NWRL Traction Supply (Tallawong)	2019	27.0	13.1	30.0
Oran Park	NCL1277 Retirement village extension in Meryn Cl Cobbitty.	2019	0.5	0.2	0.6
Oran Park	ULL2642 New high school in Oran Park	2019	0.9	0.4	1.0
Parklea	ULL2525 Parklea Prison Expansion	2019	1.4	0.7	1.5
Parklea	ULL2629 Arnold Ave Sporting Complex Kellyville	2018	0.2	0.1	0.2
Parklea	URS 18360 30 lots 58 Arnold Avenue Kellyville	2018	0.2	0.1	0.2
Parklea	URS 18853 101 lots Perfection Ave Stanhope Gardens	2018	0.5	0.3	0.6
Parklea	URS15952 36 units Samantha Riley Drive Kellyville	2018	0.1	0.1	0.2
Parklea	URS18153 - 170 Lots Perfection Avenue	2018	0.8	0.4	0.9
Parklea	URS18360 50 lots 101 Windsor Road Kellyville	2018	0.3	0.1	0.3
Penrith 11kV	ENL2443 Belmore St	2021	0.5	0.2	0.6
Penrith 11kV	ENL2548 High St – Phrase 1	2022	1.1	0.5	1.3
Penrith 11kV	ENL2548 High St – Phrase 2	2023	1.1	0.5	1.3
Penrith 11kV	ENL2548 High St – Phrase 3	2024	1.1	0.5	1.3
Penrith 11kV	ENL2601 Mulgoa Rd – Phrase 1	2021	1.1	0.5	1.3
Penrith 11kV	ENL2601 Mulgoa Rd – Phrase 2	2022	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 1	2022	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 2	2023	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 3	2024	1.1	0.5	1.3
Penrith 11kV	ENL2684 Station St – Phrase 4	2025	0.4	0.2	0.5
Penrith 11kV	ENL2684 Station St – Phrase 5	2026	1.1	0.5	1.3
Penrith 11kV	ENL2728 Union Rd – Phrase 1	2022	1.1	0.5	1.3
Penrith 11kV	ENL2728 Union Rd – Phrase 2	2023	0.3	0.1	0.3
Penrith 11kV	ENL2728 Union Rd – Phrase 3	2024	1.1	0.5	1.3
Penrith 11kV	Penrith multi-use Development	2020	0.9	0.4	1.0
Penrith 11kV	Penrith multi-use Development	2021	0.9	0.4	1.0
Penrith 11kV	Penrith multi-use Development	2022	1.1	0.5	1.2
Penrith 11kV	UCL6577	2019	1.8	0.9	2.0
Penrith 11kV	UCL7561	2019	1.2	0.6	1.3
Penrith 11kV	UCL7891	2019	0.2	0.1	0.3
Penrith 11kV	UCL8562	2018	0.6	0.3	0.7
Penrith 11kV	UCL8594 - Retirement village, Penrith Panthers	2019	1.2	0.6	1.3
Penrith 11kV	UCL8744	2019	0.6	0.3	0.7
Penrith 11kV	UIL4429	2018	0.6	0.3	0.6
Penrith 11kV	UIL5062	2019	0.3	0.2	0.4
Penrith 11kV	UML6687	2018	0.2	0.1	0.2
Penrith 11kV	UML6908	2018	0.5	0.3	0.6
Penrith 11kV	UML6985	2019	0.1	0.04	0.1
Penrith 11kV	UML7277	2018	1.0	0.5	1.1
Penrith 11kV	UML7372	2018	0.2	0.1	0.2
Penrith 11kV	UML7506 - 40-50 Union Rd Penrith	2019	0.4	0.2	0.4
Penrith 11kV	UML8043	2019	0.3	0.1	0.3
Port Central	UCL8542 - Commercial Load	2018	0.15	0.07	0.2
Port Kembla	UIL4649 - Unanderra, Industrial Load	2019	1.0	0.5	1.1
Prestons	Southern Business Hub - UCL5899	2019	3.2	1.5	3.5
Prestons	UIL 5198 - Beech Rd, Casula	2018	1.0	0.5	1.1
Prestons	UIL4185 - Beech Rd, Casula	2018	1.5	0.7	1.7
Prestons	UIS 0798 – Kurrajong Rd, Prestons	2018	0.6	0.3	0.6
Prospect	UCL8266 - Aurelia St Toongabbie	2019	0.2	0.1	0.2
Prospect	UIL4826 - 91A Mandoon Road GIRRAWEEEN	2018	0.1	0.1	0.1
Prospect	UIL4829 - 9 Amax Avenue GIRRAWEEEN	2018	0.1	0.0	0.1
Prospect	UIL4963 - Mandoon Rd	2019	0.9	0.4	1.0
Prospect	ULL2577 - Increase in load of Girraween High School	2019	0.2	0.1	0.2
Prospect	UML6386 8-10 Octavia Street TOONGABBIE	2017	0.2	0.1	0.2
Prospect	UML6591 - 166-170 Targo Road GIRRAWEEEN	2018	0.1	0.0	0.1
Prospect	UML6593 34-36 Girraween Street GIRRAWEEEN	2018	0.2	0.1	0.2
Prospect	UML6667 - 1-2 Harvey Place TOONGABBIE	2018	0.3	0.1	0.3
Prospect	UML6667 -Toongabbie Rd	2018	0.1	0.0	0.1
Prospect	UML6778 - 21-23 Lane Street WENTWORTHVILLE	2018	0.1	0.0	0.1

Zone Substation	Description	Year	MW	MVAR	MVA
Prospect	UML6963 - Civic Ave	2018	0.5	0.2	0.5
Prospect	UML7046 Aurelia St	2018	0.3	0.1	0.3
Prospect	UML7134 - 12-14 Stimson Street GUILDFORD	2018	0.1	0.0	0.1
Prospect	UML7186 - 3-4 Harvey Place TOONGABBIE	2018	0.1	0.0	0.1
Prospect	UML7214 - 42 Toongabbie Road TOONGABBIE	2018	0.2	0.1	0.2
Prospect	UML7228 - Toongabbie Rd	2019	0.2	0.1	0.3
Prospect	UML7298 - 35-43 Toongabbie Road TOONGABBIE	2018	0.2	0.1	0.2
Prospect	UML7298 Toongabbie Rd	2018	0.3	0.1	0.3
Prospect	UML7523 - Toongabbie - residential development	2019	0.1	0.0	0.1
Prospect	UML7578 - Pendle Way	2019	0.1	0.0	0.1
Prospect	UML7908 - GWHWY Pendle Hill	2020	0.2	0.1	0.2
Quakers Hill	UCL7889 - Alderton Dr COLEBEE	2018	1.6	0.8	1.8
Quakers Hill	UCL8254 - Stonecutters Ridge	2019	0.3	0.1	0.3
Quakers Hill	UML5206 - 9 Nirimba Drive QUAKERS HILL	2018	0.6	0.3	0.7
Quakers Hill	UML7528 - Quakers Hill Pkwy	2019	0.4	0.2	0.5
Quakers Hill	URS15037 - Symonds Rd COLEBEE	2018	0.3	0.1	0.3
Quakers Hill	URS15633 - Stage 5 Colebee	2018	0.3	0.1	0.3
Quakers Hill	URS15761 - Voysey Cl	2018	0.2	0.1	0.2
Quakers Hill	URS15962 336 Quakers Road	2018	0.3	0.1	0.3
Quakers Hill	URS17069 - Alderton Drive COLEBEE	2018	0.3	0.1	0.3
Quakers Hill	URS17297 - 112 Symonds Road COLEBEE	2018	0.5	0.2	0.5
Quarries	UCL7237 - 11 Pastoral Cct PEMULWUY	2018	0.5	0.3	0.6
Quarries	UCL7590 - Basalt Road PEMULWUY	2018	0.2	0.1	0.2
Quarries	UCL7719 - 1 Butu Wargun Avenue & Reconciliation Road PEMULWUY	2018	1.4	0.7	1.5
Quarries	UCL8274 - DCI Data Centre	2018	1.9	0.6	2.0
Quarries	UCL8274 - DCI Data Centre	2019	4.8	1.6	5.0
Quarries	UCL8274 - DCI Data Centre	2020	2.9	0.9	3.0
Quarries	UCL8432 - Prospect Hwy Pemulwuy	2018	0.5	0.2	0.5
Quarries	UIL4977 - Pemulwuy	2019	0.1	0.1	0.1
Quarries	UIL5159 - Dolerite Way	2019	0.3	0.1	0.3
Quarries	UIL5183 - Dolerite Way	2019	3.2	1.5	3.5
Quarries	URS11509 - Butu Wargun Dr	2019	0.3	0.2	0.4
Riverstone	NUL0582 - Sydney Water - Increased load demand of HVC	2019	2.0	0.9	2.2
Riverstone	Riverstone East - 5900 residential dwellings	2019	0.1	0.0	0.1
Riverstone	Riverstone East - 5900 residential dwellings	2020	0.7	0.3	0.8
Riverstone	Riverstone East - 5900 residential dwellings	2021	1.0	0.5	1.1
Riverstone	Riverstone East - 5900 residential dwellings	2022	0.7	0.3	0.8
Riverstone	Riverstone East - 5900 residential dwellings	2023	0.7	0.3	0.8
Riverstone	Riverstone East - 5900 residential dwellings	2024	1.0	0.5	1.1
Riverstone	Riverstone East - 5900 residential dwellings	2025	1.1	0.5	1.2
Riverstone	Riverstone East - 5900 residential dwellings	2026	1.1	0.5	1.2
Riverstone	Riverstone East - 5900 residential dwellings	2027	1.1	0.5	1.2
Riverstone	Riverstone East - 5900 residential dwellings	2028	1.0	0.5	1.1
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2020	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2021	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2022	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2023	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2024	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2025	0.6	0.3	0.7
Riverstone	Riverstone Precinct - 3,992 of 7,983 residential dwellings (remaining lots on Schofields)	2026	0.6	0.3	0.7
Riverstone	Riverstone West - 88 hectares of employment land	2021	2.2	1.0	2.4
Riverstone	Riverstone West - 88 hectares of employment land	2021	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2022	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2023	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2024	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2025	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2026	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2027	0.5	0.3	0.6
Riverstone	Riverstone West - 88 hectares of employment land	2028	0.5	0.3	0.6
Riverstone	UCL8172 - Motel expansion Windsor Rd Vineyard	2019	0.3	0.1	0.3
Riverstone	UIL4983 - Bandon Rd	2018	0.1	0.0	0.1
Riverstone	URS12593	2018	0.1	0.0	0.1
Riverstone	URS16286 - 2 William Street Riverstone	2018	0.2	0.1	0.2
Riverstone	URS16363 - Stage 1 Hobart Street RIVERSTONE	2018	0.5	0.2	0.5

Zone Substation	Description	Year	MW	MVAR	MVA
Riverstone	URS16839 - Crown St	2018	0.4	0.2	0.5
Riverstone	URS16839 123 Crown Street RIVERSTONE	2018	0.5	0.3	0.6
Riverstone	URS17002 - Stage 1 Garfield Road East RIVERSTONE	2018	0.5	0.3	0.6
Riverstone	URS17073 - Boundary Rd	2019	0.2	0.1	0.2
Riverstone	URS17074 - 22-32 William Street RIVERSTONE	2018	0.3	0.2	0.4
Riverstone	URS17080 - Garfield Rd East Stage 1	2019	0.2	0.1	0.3
Riverstone	URS17419 - 88 McCulloch Street RIVERSTONE	2018	0.1	0.0	0.1
Riverstone	URS17626 - Boundary Rd	2018	0.6	0.3	0.7
Riverstone	URS17629 - Boundary Rd	2018	0.5	0.2	0.6
Riverstone	URS17634 - Boundary Rd	2019	0.3	0.2	0.3
Riverstone	URS17634 - Boundary Rd	2019	0.3	0.2	0.3
Riverstone	URS17644 - Garfield Rd East Riverstone	2019	0.2	0.1	0.2
Riverstone	URS17848 - William St Riverstone	2019	0.1	0.1	0.2
Riverstone	URS17875 - William Street RIVERSTONE	2019	0.3	0.1	0.3
Riverstone	URS17876 - William Street RIVERSTONE	2019	0.3	0.2	0.4
Riverstone	URS17967 - Garfield Rd East Stage 2	2019	0.2	0.1	0.2
Riverstone	URS18044 - Hamilton St Riverstone	2019	0.1	0.0	0.1
Riverstone	URS18142 - William St	2019	0.3	0.2	0.4
Riverstone	URS18199 - Hamilton St	2019	0.2	0.1	0.2
Riverstone	URS18324 - Boundary Rd	2019	0.3	0.2	0.4
Riverstone	URS18356 - William St	2019	0.1	0.1	0.1
Riverstone	URS18892 - Edmund St Riverstone	2019	0.3	0.1	0.3
Riverstone	URS19293 - Off Windsor Rd	2019	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2020	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2021	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2022	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2023	0.5	0.2	0.5
Riverstone	Vineyard - 31 hectares of employment land	2024	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2025	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2026	0.4	0.2	0.4
Riverstone	Vineyard - 31 hectares of employment land	2027	0.4	0.2	0.4
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2020	0.4	0.2	0.4
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2021	0.5	0.3	0.6
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2022	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2023	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2024	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2025	0.7	0.3	0.8
Riverstone	Vineyard Precinct - 3,429 residential dwellings	2026	0.7	0.3	0.8
Rooty Hill	UCL6954 - Rooty Hill Rd Sth	2019	1.4	0.7	1.6
Rooty Hill	UIL5077 - Rayben St Glendenning	2018	0.1	0.1	0.1
Rooty Hill	UIL5133 - Pecks Kellogs Rd HVC 8073	2018	0.9	0.4	1.0
Rooty Hill	UML7072 - Rooty Hill Rd Sth	2019	0.1	0.1	0.1
Rooty Hill	URS15725 - 266 Rooty Hill Road North PLUMPTON	2018	0.4	0.2	0.4
Rosehill	UIL4793 - 33 Grand Avenue Rosehill additional load to HVC 3286	2018	0.3	0.2	0.4
Rosehill	UML6192 - 271 Apartments and retail area 2 - 8 River Road Parramatta	2018	1.3	0.6	1.4
Rosehill	UML6431 - 68 Apartments 9-11 Weston Street Rosehill	2018	0.2	0.1	0.3
Rosehill	UML7258 - 62 Apartments, Hope st	2018	0.2	0.1	0.2
Rosehill	UML7325 - 70 Apartments	2018	0.2	0.1	0.2
Rosehill	UML7325 70 units 125-129 Arthur Street Parramatta	2018	0.2	0.1	0.3
Russell Vale	UCL8027 - Bulli Hospital Aged Care	2019	0.7	0.3	0.7
Russell Vale	UCL8389 - Bunnings Warehouse	2018	0.5	0.3	0.6
Rydalmere	309 Apartments 64-72 River Road Ermington (AE2 Residential)	2017	0.9	0.4	1.0
Rydalmere	UML6504 121 Apartments 24-32 Koorine Street Ermington	2018	0.4	0.2	0.5
Schofields	Alex Avenue Release - 4,250 Lots	2021	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2022	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2023	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2024	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2025	1.8	0.9	2.0
Schofields	Alex Avenue Release - 4,250 Lots	2026	1.8	0.9	2.0
Schofields	Riverstone East - 5900 residential dwellings	2019	0.1	0.0	0.1
Schofields	Riverstone East - 5900 residential dwellings	2020	0.4	0.2	0.5
Schofields	Riverstone East - 5900 residential dwellings	2020	0.7	0.3	0.8
Schofields	Riverstone East - 5900 residential dwellings	2021	0.8	0.4	0.9

Zone Substation	Description	Year	MW	MVAR	MVA
Schofields	Riverstone East - 5900 residential dwellings	2022	0.7	0.3	0.8
Schofields	Riverstone East - 5900 residential dwellings	2023	0.7	0.3	0.8
Schofields	Riverstone East - 5900 residential dwellings	2024	1.0	0.5	1.1
Schofields	Riverstone East - 5900 residential dwellings	2025	1.1	0.5	1.2
Schofields	Riverstone East - 5900 residential dwellings	2026	1.1	0.5	1.2
Schofields	Riverstone East - 5900 residential dwellings	2027	1.1	0.5	1.2
Schofields	Riverstone East - 5900 residential dwellings	2028	1.0	0.5	1.1
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2021	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2022	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2023	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2024	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2025	0.6	0.3	0.7
Schofields	Riverstone Precinct (Southern) - 3,991 of 7,983 residential dwellings (remaining lots on Riverstone)	2026	0.6	0.3	0.7
Schofields	Schofields - 3,301 residential dwellings	2021	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2022	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2023	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2024	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2025	1.8	0.9	2.0
Schofields	Schofields - 3,301 residential dwellings	2026	1.8	0.9	2.0
Schofields	UML7782 - Burdekin Rd	2019	0.4	0.2	0.4
Schofields	UML7783 - Pelican Rd	2019	0.6	0.3	0.7
Schofields	URS13215 - Bridge St Stage 1 SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS13557 - Stage 1 Off Railway Terrace SCHOFIELDS	2018	1.6	0.8	1.8
Schofields	URS15086 - Bridge St Stage 2 SCHOFIELDS	2019	0.1	0.1	0.1
Schofields	URS15241 - Boundary Rd SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS15398 Stage 2 Road No. 4 Schofields	2018	0.8	0.4	0.9
Schofields	URS15486 - Hambledon Rd SCHOFIELDS	2018	0.1	0.1	0.1
Schofields	URS15490 Burdekin Rd Schofields	2018	0.1	0.1	0.1
Schofields	URS16178 - 47 Veron Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16179 - 47 Veron Rd	2019	0.3	0.1	0.3
Schofields	URS16180 - 47 Veron Rd	2020	0.3	0.1	0.3
Schofields	URS16197 Schofields Farm Road SCHOFIELDS	2018	0.6	0.3	0.7
Schofields	URS16198 - Gordon Road SCHOFIELDS	2018	0.7	0.3	0.8
Schofields	URS16199 - Alex Av SCHOFIELDS	2018	0.3	0.2	0.4
Schofields	URS16202 - Argowan Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16232 - 121 Boundary Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16237 - 112 Hambledon Road SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS16313 - 59 Westminster Street SCHOFIELDS	2018	0.1	0.05	0.1
Schofields	URS16434 - Hambledon Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16455 - 34-38 Schofields Road SCHOFIELDS	2018	0.9	0.4	1.0
Schofields	URS16456 - 59 Westminster Street	2018	0.3	0.1	0.3
Schofields	URS16457 - 59 Westminster Street	2019	0.1	0.1	0.2
Schofields	URS16458 - 59 Westminster Street	2020	0.1	0.1	0.1
Schofields	URS16459 - 59 Westminster Street	2021	0.1	0.03	0.1
Schofields	URS16488 - 78 Westminster Street SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS16798 - Brighton St SCHOFIELDS	2019	0.4	0.2	0.5
Schofields	URS16805 - Stage 2 Schofields Road SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS16884 - Stage 1 Govetts Street THE PONDS	2018	0.1	0.1	0.1
Schofields	URS16885 - Stage 2 Govetts St	2019	0.1	0.03	0.1
Schofields	URS17002 - Garfield Rd East	2019	0.4	0.2	0.4
Schofields	URS17046 - Stage 2 Brighton Street RIVERSTONE	2018	0.3	0.1	0.3
Schofields	URS17094 - Hambledon Road SCHOFIELDS	2018	0.5	0.2	0.5
Schofields	URS17097 - 45-57 Gordon Street SCHOFIELDS	2019	0.2	0.1	0.2
Schofields	URS17142 70-74 Schofields Road SCHOFIELDS	2018	0.3	0.2	0.4
Schofields	URS17159 - Alex Avenue SCHOFIELDS	2018	0.1	0.04	0.1
Schofields	URS17160 - Alex Avenue SCHOFIELDS	2018	0.1	0.04	0.1
Schofields	URS17161 - Alex Avenue SCHOFIELDS	2018	0.1	0.04	0.1
Schofields	URS17190 - Gordon Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS17219 - 32 Riverstone Road RIVERSTONE	2018	0.1	0.1	0.1
Schofields	URS17231 - Schofields Farm Road SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS17248 - Alex Av SCHOFIELDS	2019	0.1	0.1	0.2
Schofields	URS17250 - Stage 1 Riverstone Rd	2019	0.1	0.1	0.2
Schofields	URS17251 - Stage 2 Riverstone Rd	2019	0.1	0.1	0.2

Zone Substation	Description	Year	MW	MVAR	MVA
Schofields	URS17285 - Alex Av SCHOFIELDS	2019	0.2	0.1	0.3
Schofields	URS17286 - Alex Av SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS17328 - Boundary Rd Schofields	2019	0.1	0.1	0.1
Schofields	URS17342 - 279 Railway Terrace SCHOFIELDS	2018	0.3	0.1	0.3
Schofields	URS17413 - 87-93 Boundary Road SCHOFIELDS	2018	0.2	0.1	0.2
Schofields	URS17419 - McCulloch St SCHOFIELDS	2019	0.1	0.03	0.1
Schofields	URS17438 - Alex Av SCHOFIELDS	2018	0.1	0.1	0.1
Schofields	URS17480 - 97 & 99 Hambledon Road SCHOFIELDS	2018	0.5	0.2	0.5
Schofields	URS17577 - Stage 6A Boundary Road SCHOFIELDS	2018	0.3	0.2	0.4
Schofields	URS17579 - Boundary Rd	2019	0.1	0.03	0.1
Schofields	URS17633 - Westminster St	2019	0.1	0.05	0.1
Schofields	URS17697 - 22 Boundary Road SCHOFIELDS	2018	1.1	0.5	1.2
Schofields	URS17814 - Hambledon Rd SCHOFIELDS	2020	1.8	0.9	2.0
Schofields	URS18224 - Argowan Rd	2019	0.1	0.1	0.1
Schofields	URS18231 - McCulloch St	2019	0.1	0.05	0.1
Schofields	URS18278 - Hambledon Rd	2019	0.2	0.1	0.2
Schofields	URS18367 - Boundary Rd	2019	0.1	0.05	0.1
Schofields	URS18418 - Boundary Rd	2020	0.6	0.3	0.7
Schofields	URS18506 - Brighton St	2020	0.1	0.04	0.1
Schofields	URS18649 - Garfield Rd East	2020	0.1	0.03	0.1
Schofields	URS18672 - Hambledon Rd	2020	0.2	0.1	0.2
Schofields	URS18695 - Garfield Rd East	2020	0.2	0.1	0.2
Schofields	URS18743 - Riverstone Rd Riverstone	2020	0.3	0.2	0.4
Schofields	URS18744 - Gordon Rd Schofields	2020	0.1	0.1	0.2
Schofields	URS18765 - Boundary Rd	2020	0.2	0.1	0.2
Schofields	URS18860 - Tallawong Rd	2020	0.2	0.1	0.2
Schofields	URS18890 - Hambledon Rd	2019	0.2	0.1	0.3
Schofields	URS18891 - Hambledon Rd	2020	0.4	0.2	0.4
Schofields	URS18893 - Hambledon Rd	2020	0.5	0.3	0.6
Schofields	URS19184 - Schofields Rd	2020	0.1	0.1	0.1
Schofields	URS19241 - Railway Terrace	2020	0.2	0.1	0.3
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2022	0.7	0.3	0.8
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2023	0.7	0.3	0.8
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2024	0.8	0.4	0.9
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2025	0.8	0.4	0.9
Schofields	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Sth Marsden Park)	2026	0.6	0.3	0.7
Science Park	Science Park	2019	0.8	0.4	0.8
Science Park	Science Park	2020	3.6	1.7	4.0
Science Park	Science Park	2021	3.8	1.8	4.2
Science Park	Science Park	2022	3.8	1.8	4.2
Science Park	Science Park	2023	2.6	1.2	2.9
Science Park	Science Park	2024	3.4	1.7	3.8
Science Park	Science Park	2025	5.0	2.4	5.6
Science Park	Science Park	2026	5.0	2.4	5.6
Science Park	Science Park	2027	4.1	2.0	4.6
Science Park	Science Park	2028	3.8	1.9	4.3
Seven Hills	UIL5002 - Warehouse Abbott Rd Seven Hills	2019	0.5	0.3	0.6
Seven Hills	UIL5137 - Abbott Rd	2018	2.6	1.2	2.8
Seven Hills	UIS0731 Abbott Road SEVEN HILLS	2018	2.4	1.2	2.7
Seven Hills	UML4598 103 Best Street Seven Hills	2018	0.3	0.2	0.4
Shellharbour	NIL0212 - Dunmore Resource Recovery Redevelopment	2019	0.5	0.2	0.5
Shellharbour	NIL0233 - Hanson Quarry	2018	4.5	2.2	5.0
Shellharbour	NLL0212 - Dunmore Resource Recovery Redevelopment	2019	0.5	0.2	0.5
Shellharbour	UCL6486	2019	0.7	0.3	0.8
Shellharbour	UCL6919 Warrigal Care	2019	0.4	0.2	0.4
Shellharbour	UCL8233 - Woolworths & Retail Stores (Precinct D), Shell Cove Boat Harbour	2018	1.2	0.6	1.3
Shellharbour	ULL2245 - Shellharbour Hospital	2018	0.9	0.4	1.0
Shellharbour	ULL2339 - Council Building	2018	0.8	0.4	0.9
Sherwood	UML 6747	2018	0.2	0.1	0.2
Sherwood	UML6920	2018	0.8	0.4	0.9
Sherwood	UML7029	2018	0.2	0.1	0.2
Sherwood	UML7104	2018	0.1	0.1	0.2
Sherwood	UML7444 & UML7697 - 115 Units in Mountford Ave Guildford	2018	0.4	0.2	0.4

Zone Substation	Description	Year	MW	MVAR	MVA
Sherwood	UML8066 - Merrylands Rd	2020	0.2	0.1	0.2
Sherwood	UML8131 - Guildford Rd	2020	0.1	0.1	0.2
Sherwood	UML8151 - Wayman Pl	2020	0.2	0.1	0.2
South Granville	35 units 538-540 Woodville Road Guildford	2018	0.1	0.1	0.1
South Granville	UML7386 22-24 Rawson Rd	2018	0.1	0.0	0.1
South Leppington	Leppington Precinct	2018	0.3	0.1	0.3
South Leppington	Leppington Precinct	2019	0.3	0.1	0.3
South Leppington	Leppington Precinct	2020	0.4	0.2	0.5
South Leppington	Leppington Precinct	2021	0.6	0.3	0.6
South Leppington	Leppington Precinct	2022	0.7	0.3	0.8
South Leppington	Leppington Precinct	2023	0.7	0.3	0.8
South Leppington	Leppington Precinct	2024	0.7	0.3	0.8
South Leppington	Leppington Precinct	2025	0.7	0.3	0.8
South Leppington	Leppington Precinct	2026	0.7	0.3	0.8
South Leppington	UCL8209 - Shopping Centre	2018	1.4	0.7	1.5
South Leppington	UML7687 - 673 Units (Leppington)	2019	2.8	1.4	3.1
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2020	0.9	0.4	1.0
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2021	1.0	0.5	1.1
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2022	0.9	0.4	1.0
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2023	1.0	0.5	1.1
South Marsden Park	Industrial Development (Based on Sydney Business Park Forecast)	2024	0.9	0.4	1.0
South Marsden Park	Marsden Park Industrial - 1,328 residential dwellings	2022	0.5	0.3	0.6
South Marsden Park	Marsden Park Industrial - 1,328 residential dwellings	2023	0.5	0.3	0.6
South Marsden Park	Marsden Park Industrial - 205 hectares of employment land	2024	2.2	1.0	2.4
South Marsden Park	Marsden Park Industrial - 205 hectares of employment land	2025	2.2	1.0	2.4
South Marsden Park	Marsden Park Industrial - 205 hectares of employment land	2026	2.2	1.0	2.4
South Marsden Park	UCL7497 IKEA - South Street MARS DEN PARK	2018	2.0	1.0	2.2
South Marsden Park	UCL8096 - Costco	2018	1.1	0.6	1.3
South Marsden Park	UCL8408 - Richmond Rd	2019	0.4	0.2	0.5
South Marsden Park	UIL4948 - Medline	2018	1.0	0.5	1.1
South Marsden Park	UIL5056 - Actron Air	2018	2.1	1.0	2.4
South Marsden Park	UIS0745 - Quarry Road MARS DEN PARK	2018	1.5	0.7	1.7
South Marsden Park	URS18730 - South St Units	2020	0.7	0.3	0.7
South Marsden Park	UUL1765 - Sydney Water SP1173	2018	0.2	0.1	0.3
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2022	0.7	0.3	0.8
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2023	0.7	0.3	0.8
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2024	0.8	0.4	0.9
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2025	0.8	0.4	0.9
South Marsden Park	West Schofields (balance) - 2,450 of 4,900 residential dwellings (remaining lots on Schofields)	2026	0.6	0.3	0.7
South Marsden Park	West Schofields Part (Townson Rd) - 400 residential dwellings	2020	0.4	0.2	0.4
South Marsden Park	West Schofields Part (Townson Rd) - 400 residential dwellings	2021	0.4	0.2	0.4
South Nowra	UIL5078 - Air Affairs Australia	2018	0.6	0.3	0.7
South Nowra	NLL0214 - South Nowra Correctional centre	2020	0.6	0.3	0.7
South Nowra	UIL4443 - Sikorsky Helitech Warehouse	2018	0.9	0.4	1.0
South Nowra	UIL4446 - Sikorsky TLS Facility	2018	0.2	0.1	0.2
South Nowra	ULL1924 - Albatross Aviation Technology Park	2018	0.9	0.4	1.0
South Windsor	NCL1144	2019	0.7	0.3	0.8
South Windsor	NCL1312	2020	0.7	0.3	0.7
South Windsor	NIL0232	2018	0.6	0.3	0.6
South Windsor	UCL5759	2018	0.2	0.1	0.3
South Windsor	UIL4359	2019	0.4	0.2	0.5
South Windsor	UIL4512	2018	1.4	0.7	1.5
South Windsor	UIL4653	2019	0.5	0.3	0.6
South Windsor	UIL4926	2020	1.1	0.5	1.2
South Windsor	UIL5043	2018	0.0	0.0	0.0
South Wollongong	UCL7334 - Wollongong, IRT Seniors Living	2018	0.5	0.2	0.6
South Wollongong	UML6849 & UML7285 - Wollongong, 56 Units	2018	0.3	0.1	0.3
South Wollongong	UML7114 - Wollongong, 144 Units & 9 Shops	2018	1.6	0.8	1.7
South Wollongong	UML7114 - Wollongong, 72 Units & Commercial Premises	2019	1.4	0.7	1.5
Southpipe Oakdale Industrial	Oakdale Industrial Development	2018	1.8	0.9	2.0
Southpipe Oakdale Industrial	Oakdale Industrial Development	2019	3.3	1.6	3.7
Southpipe Oakdale Industrial	Oakdale Industrial Development	2020	4.3	2.1	4.8
Southpipe Oakdale Industrial	Oakdale Industrial Development	2021	5.8	2.8	6.5

Zone Substation	Description	Year	MW	MVAR	MVA
Southpipe Oakdale Industrial	Oakdale Industrial Development	2022	5.8	2.8	6.5
Southpipe Oakdale Industrial	Oakdale Industrial Development	2023	6.1	3.0	6.8
Southpipe Oakdale Industrial	Oakdale Industrial Development	2024	4.7	2.3	5.2
Southpipe Oakdale Industrial	Oakdale Industrial Development	2025	3.5	1.7	3.9
Southpipe Oakdale Industrial	Oakdale Industrial Development	2026	2.0	1.0	2.3
Springwood	NRS3200	2018	0.1	0.1	0.1
Springwood	UCL8344	2019	0.1	0.1	0.1
St Marys	UML7508	2019	0.05	0.02	0.1
Sussex Inlet	NCL1143 - NBN communication site	2018	0.01	0.01	0.01
Sussex Inlet	UCL7367 - Supermarket & Retail Development	2018	0.4	0.2	0.5
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2024	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2025	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2026	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2027	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2028	1.3	0.6	1.4
SW Sector Macarthur 66	Mt Gilead PAP lots - remaining development 4500 lots	2029	1.3	0.6	1.4
Telstra HVC	NUL0583 - Telstra Mobile Site	2018	0.05	0.02	0.1
Ulladulla	NCL1372 - Equestrian Centre	2019	1.0	0.5	1.2
Ulladulla	NRL11103 - Equestrian Centre	2019	0.4	0.2	0.4
Ulladulla	NRL1154 - Equestrian Centre	2019	0.3	0.1	0.3
Unanderra	UIL5216 - Metronode Data Warehouse	2019	1.1	0.5	1.3
Unanderra	UIL5216 - Metronode Data Warehouse	2021	4.5	2.2	5.0
Unanderra	UIL5216 - Metronode Data Warehouse	2023	3.4	1.6	3.8
Unanderra	UIL5216 - Metronode Data Warehouse	2025	3.4	1.6	3.8
Unanderra	UIL5216 - Metronode Data Warehouse	2027	3.4	1.6	3.8
Unanderra	UIL5216 - Metronode Data Warehouse	2029	2.3	1.1	2.5
Warilla	UCS0478 - Car Wash, Office Works, Spot Light & Takeaway	2018	0.8	0.4	0.9
Warilla	ULL2245 - Shellharbour Hospital	2018	0.9	0.4	1.0
Warilla	ULL2607 - Gov. Load	2018	0.2	0.1	0.2
Werrington	UCL8260	2018	0.1	0.03	0.1
Werrington	UCL8334	2018	0.9	0.4	1.0
Werrington	UIL4527	2018	0.2	0.1	0.2
Werrington	UIL4640	2018	0.3	0.2	0.4
Werrington	UIL4768	2019	0.3	0.1	0.3
Werrington	UIL4830	2018	0.9	0.4	1.0
Werrington	UIL4918	2019	0.4	0.2	0.4
Werrington	UIL5064	2019	0.5	0.3	0.6
Werrington	UIL5122	2019	0.2	0.1	0.2
Werrington	UML6759	2019	0.2	0.1	0.2
Werrington	UML7570	2018	0.2	0.1	0.2
West Castle Hill	UCL8046	2018	0.3	0.1	0.3
West Liverpool ZS	UCL7300 Liverpool Catholic Club - 11 Storey Hotel	2018	0.6	0.3	0.7
West Liverpool ZS	UCL7862 No.5 Progress Circuit Prestons	2018	0.6	0.3	0.7
West Liverpool ZS	UIL4723	2018	0.4	0.2	0.5
West Liverpool ZS	UIL4976 Yarrunga St Prestons - 3 x Warehouses	2018	3.3	1.6	3.7
West Liverpool ZS	UIL4999 - Kurrajong Rd Prestons (Yato Rd access)	2018	0.6	0.3	0.7
West Parramatta	4 new tower buildings Darcy St Parramatta Square	2020	16.7	8.1	18.5
West Parramatta	Parramatta RSL redevelopment Macquarie Street Parramatta	2020	0.9	0.4	1.0
West Parramatta	ULL2541 Parramatta Public School	2018	0.7	0.3	0.7
West Parramatta	ULL2542 Arthur Phillip High School	2019	2.7	1.3	3.0
West Parramatta	UML5507 - 644 apartments & retail Riverbank Parramatta	2018	2.6	1.3	2.9
West Parramatta	UML5706 450 Units and Retail space, 189 Macquarie Street Parramatta	2018	1.5	0.7	1.7
West Parramatta	UML6319 81 Apartments 4 retail shops 5 - 9 Hunter Street Parramatta	2018	0.3	0.2	0.4
West Parramatta	UML7499 - 200 Apartments	2020	0.7	0.3	0.8
West Pennant Hills	ULL2146 NWRL Construction and fit out loads - Removal	2020	-1.2	0.6	-1.3
West Wetherill Park	UIL4779 - Cowpasture Road, Wetherill Park	2017	2.3	1.1	2.6
West Wetherill Park	UIL5051	2018	0.3	0.2	0.4
West Wetherill Park	UIL5059	2018	0.8	0.4	0.9
West Wetherill Park	UIL5063	2018	1.1	0.5	1.2
West Wollongong	UCL6306 - Wollongong Day Surgery	2018	0.5	0.3	0.6
West Wollongong	UML6902 - Wollongong, 23 Units	2018	0.2	0.1	0.2
Westmead	ULL2610 New Ronald Macdonald House	2018	1.5	0.7	1.7
Wetherill Park	NCL1330 Six Factories	2018	0.6	0.3	0.7

Zone Substation	Description	Year	MW	MVAR	MVA
Wetherill Park	UCL8485 - 122-130 Newton Rd WETHERILL PARK	2018	0.5	0.2	0.5
Wetherill Park	UIL4740 - 84 Hassall St Wetherill Park	2018	0.5	0.2	0.5
Wetherill Park	UIL4823 Sims Metal Recycling Facility	2018	1.4	0.7	1.6
Whalan	UCL7714 - 48 Carlisle Avenue MOUNT DRUITT	2018	0.5	0.2	0.5
Whalan	UML5535 - Ayres Grove	2018	0.3	0.1	0.3
Whalan	UML6802	2017	0.3	0.1	0.3
Windsor	NRS2833	2018	0.1	0.1	0.1
Windsor	NRS3015 Pitt Town	2018	0.1	0.0	0.1
Windsor	NRS3030 Pitt Town	2018	0.1	0.0	0.1
Windsor	UCL5637	2018	1.2	0.6	1.4
Windsor	UML6793	2019	0.1	0.1	0.1
Windsor	URS12125	2018	0.0	0.0	0.0
Windsor	URS16950 & URS16951 Pitt Town	2019	0.2	0.1	0.2
Windsor	URS18634 & URS18637	2019	0.2	0.1	0.3
Windsor	URS18719 & URS1872	2019	0.1	0.1	0.1
Wombarra	UML6925 / UCL7379 - Headlands Hotel Development Site	2019	0.7	0.3	0.7
Woodpark	UCL 7995 - 277 Woodpark Rd	2019	1.7	0.8	1.9
Woodpark	UIL4756 - 331-333 Woodpark Road SMITHFIELD	2018	0.3	0.1	0.3
Yennora	UCL8560 Aged Care	2019	0.2	0.1	0.3
Yennora	UIL4929	2017	0.2	0.1	0.3
Yennora	UML7066 117 Units Villawood Place Villawood - Sub 22086	2018	0.7	0.3	0.7

5.2 Load Transfers

Year	From ZS	From TS	To ZS	To TS	MVA
2018	Quarries	Blacktown	Fujitsu Data	Blacktown	9.5
2018	Prospect	Blacktown	Holroyd	Blacktown	1.1
2018	Greystanes	Blacktown	Holroyd	Blacktown	2.2
2018	Riverstone	Hawkesbury	Marsden Park	Vineyard	3.0
2018	Riverstone	Hawkesbury	Mungerie Park	Vineyard	4.0
2018	Kurrajong	Hawkesbury	North Richmond	Hawkesbury	1.0
2018	South Windsor	Hawkesbury	Windsor	Hawkesbury	0.9
2022	Riverstone	Hawkesbury	Box Hill	Vineyard	2.0
2019	South Leppington	Macarthur 132kV	North Leppington	Macarthur 132kV	3.9
2021	Albion Park	Mount Terry	Calderwood	Mount Terry	3.8
2018	Luddenham	Regentville	North Warragamba	Regentville	2.0
2021	Dapto	Springhill	West Dapto	Dapto 132kV	0.7
2021	Kembla Grange	Springhill	West Dapto	Dapto 132kV	1.9
2019	Bringelly	Sydney West 132kV	North Leppington	Macarthur 132kV	0.9
2021	Huntingwood	Sydney West 132kV	Airtrunk Data	Sydney West 132kV	11.0
2022	Mungerie Park	Vineyard	Box Hill	Vineyard	13.4
2018	Parklea	Vineyard	Mungerie Park	Vineyard	2.0
2019	Hinchinbrook	West Liverpool	North Leppington	Macarthur 132kV	1.0
2019	Kemps Creek	West Liverpool	North Leppington	Macarthur 132kV	1.9
2019	Prestons	West Liverpool	North Leppington	Macarthur 132kV	3.7
2018	Quarries	Blacktown	Fujitsu Data	Blacktown	9.5
2018	Prospect	Blacktown	Holroyd	Blacktown	1.1

5.3 Lot Releases

Zone Substation	Description	F'cast Yr	Years	MVA
Albion Park	URS12931 - Whistlers Run 60 Lot Subdivision	2016	3	0.1
Albion Park	URS15509 - Tullimbar Heights - 22 Lots	2019	2	0.1
Albion Park	URS15679 - Tullimbar Village Stage 2B, 42 lot subdivision	2015	4	0.1
Albion Park	URS15995 - (WLI) Calderwood Stage 1A, 75 lot subdivision	2016	5	0.2
Albion Park	URS16579 - Tullimbar Heights - 36 Lots	2019	3	0.1
Albion Park	URS16589 - Albion Park, Stage 1 - 37 Lots	2017	5	0.1
Albion Park	URS17053 - Tullimbar Village, Stage 1 - 37 Lots	2019	3	0.1
Ambarvale	URS13950 & URS 13951 - 201 lots at Menangle Park	2020	2	0.8
Anzac Village	Pleasure Point - 1234 Lot Release	2019	6	3.1
Anzac Village	UIL4692 - SIMTA - Moorebank Intermodal	2018	15	8.6
Anzac Village	UIL4834 - Moorebank Intermodal Company	2020	12	9.7
Bella Vista	NWRL corridor Commercial Load - 10290 jobs	2012	24	17.5
Bella Vista	NWRL corridor Dwellings - 3485	2012	24	9.9
Berry	URS16750 - Huntingdale Berry, Stage 3B - 29 lots	2016	5	0.1
Bomaderry	North Bomaderry & Nowra Release Area	2020	20	25.0
Bomaderry	URS11890 - Bomaderry 48 lots	2013	5	0.1
Bomaderry	URS12298 - North Nowra 32 lots	2015	3	0.1
Bomaderry	URS14235 - Cambewarra Stage 1, 15 of 48 Lots	2015	5	0.1
Bonnyrigg	Bonnyrigg Housing Redevelopment	2012	8	5.1
Bulli	URS12086 - Bulli Brickworks Stage 1 - 71 dwellings	2017	6	0.1
Bulli	URS16547 - Bulli Brick Works, Stage 2 - 69 Lots	2018	5	0.3
Bulli	URS17102 - Bulli Brick Works, Stage 3 - 32 Lots	2018	2	0.1
Campbelltown	Claymore redevelopment - 247 lots	2019	3	0.8
Campbelltown	Macarthur Gardens residential development. 360 lots/dwellings	2020	5	1.2
Campbelltown	UWS residential development 850 residential lots	2020	5	2.8
Castle Hill	NWRL corridor Commercial Load - 4750 jobs	2012	24	8.1
Castle Hill	NWRL corridor Dwellings - 2200	2012	24	5.4
Casula	Glenfield Redevelopment Area of 470 Dwellings	2019	6	1.9
Casula	Glenfield Release Area of 500 lots	2014	5	2.0
Cheriton Avenue	NWRL corridor Commercial Load - 5520 jobs	2012	24	9.4
Cheriton Avenue	NWRL corridor Dwellings - 2560	2012	24	6.3
Chipping Norton	URS 15696 New Brighton Gold Club Residential	2016	3	0.5
Chipping Norton	URS 15697 New Brighton Golf Club Residential	2016	3	0.3
Chipping Norton	URS 18382	2018	3	0.9
Chipping Norton	URS 6914 New Brighton Golf Club Residential	2015	3	0.8
Claremont Meadows	Caddens Rd Release	2014	6	2.7
Claremont Meadows	Claremont Meadows Stage 2	2016	5	0.8
Dapto	ENL2835 - 1200 Lots Bong Rd Huntley	2020	5	6.0
Dapto	URS10175 and URS12346 - (WLI) West Dapto (The Pinnacle) - 82 lot subdivision	2012	7	0.2
Dapto	URS10177 - (WLI) West Dapto (Brooks Reach) Stage 1, 37	2013	5	1.0
Dapto	URS11557 - Kanahooka, 81 lot subdivision	2013	5	0.2
Dapto	URS17353 - (WLI) West Dapto (Brooks Reach), Stage 14C - 51 Lots	2018	4	0.2
Dapto	URS17551 - (WLI) West Dapto (Brooks Reach), Stage 14E - 7 Lots	2018	1	0.03
Dapto	URS17552 - (WLI) West Dapto (Brooks Reach), Stage 15A - 46 Lots	2019	4	0.2
Dapto	URS17553 - (WLI) West Dapto (Brooks Reach), Stage 15B - 8 Lots	2019	1	0.0
Dapto	URS17554 - (WLI) West Dapto (Brooks Reach), Stage 16 - 48 Lots	2019	4	0.2
Dapto	URS17740 - 177 units/townhouses (6 stages)	2018	4.0	0.6
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 1A - 105 Lots	2019	4	0.4
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 1B - 22 Lots	2023	1	0.1
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 1C - 11 Lots	2023	1	0.04
Dapto	URS18738 - (WLI) West Dapto (Huntley Heritage), Stage 2A - 129 Lots	2024	5	0.5
Dundas	Telopea Urban Renewal Project, 1900 dwellings over 10 years	2011	10	6.3
Eastern Creek	UIS0755 - Lenore Dr EASTERN CREEK	2018	5	17.0
Edmondson Park	Edmondson Park Release Area South - 3200 lots	2016	10	12.8
Edmondson Park	Edmondson Park Town Centre Precinct 2 & Precinct 3 = 545 Dwellings	2023	2	1.9
Edmondson Park	URS19165 Edmondson Park Town Centre Precinct 1 & TCC = 1339 Dwellings + 37000m2 Retail	2018	5	9.9
Fairfield	UIS0756 Redevelopment of ALCOA site	2018	3	3.4
Figtree	UIS 0379 - 6 lot Edney Lane commercial subdivision	2017	5	0.2
Figtree	URS10119 - Redgum Ridge Estate - 178 lot subdivision	2012	7	0.3
Granville 132kV	Granville / Merrylands Strategic Opportunities Site - 1175 Apartments	2017	8	3.5

Zone Substation	Description	F'cast Yr	Years	MVA
Hinchinbrook	Ingham's Farms Redevelopment into 861 dwellings	2011	8	3.4
Hinchinbrook	Middleton Grange Release Area - 2850 lots	2008	13	11.4
Hinchinbrook	South Cecil Hills Part 2 with 252 dwellings	2013	5	1.0
Hinchinbrook	URS15855 Rodeo Dr Green Valley	2015	3	0.1
Homepride	Liverpool CBD North (City Centre Plan)	2011	35	39.0
Huntingwood	UIS0672 60 Wallgrove Rd	2016	2	1.3
Huskisson	URS17961 - Bayswood Vincentia, Stage 9A	2018	3	0.1
Huskisson	URS13031 & URS15182 - Bayswood Estate Stages 7 & 8, 70 lots	2016	8	0.1
Huskisson	URS19307 - Bayswood Vincentia -Stage 14, 50 lots	2019	3	0.2
Jasper Road	Baulkham Hills Strategic Opportunities Site - 2000 Apartments	2017	8	0.6
Jordan Springs	Residential Lots	2016	5	2.0
Jordan Springs	Stage 3C1,2 - URS14513, URS14511	2016	3	1.0
Jordan Springs	Stage 4 URS13641-13645	2016	3	0.8
Jordan Springs	URS15573	2017	2	0.1
Jordan Springs	URS15575	2017	3	0.4
Kembla Grange	URS13084 - (WLI) West Dapto (Sheargold) Smiths Ln Wongawilli Stage 3 of 5, 17 lot subdivision	2017	2	0.1
Kembla Grange	URS13086 - (WLI) West Dapto (Sheargold) Smiths Ln Wongawilli Stage 5 of 5, 13 lot subdivision	2016	3	0.03
Kembla Grange	URS13336 - (WLI) West Dapto (Alkira Estate) Shone Ave, 117 lot subdivision	2016	5	0.5
Kembla Grange	URS15808 - (WLI) West Dapto (Lynden View) West Dapto Rd 82 lot subdivision	2016	6	0.3
Kembla Grange	URS15845 & URS15848 - (WLI) West Dapto (Vista Park), 129 Lots	2016	6	0.5
Kemps Creek	Broader Western Sydney Employment Area	2020	5	18.8
Kemps Creek	URS17335 Residential Subdivision 50 Kelly St Austral for 150 lots	2016	3	0.6
Kentlyn	Airds renewal- 653 dwellings demolished, 982 lots in total net increase 339 lots	2017	10	1.1
Kiama	UCL 5687 - Old Saddleback Rd 29 dwelling subdivision	2015	2	0.1
Lennox	Auto Alley High Rise	2020	20	12.8
Liverpool	Liverpool CBD South (City Centre Plan)	2011	35	50.0
Liverpool Military Area	Department of Defence - ULL2087	2017	10	7.0
Luddenham	ENL2652 - Science Park	2018	3	7.5
Macquarie Fields	Glenfield Rd - 1098	2006	20	3.7
Mamre	UIL5143	2018	6	25.0
Mamre	UIS0628	2016	2	0.6
Marsden Park	URS18071	2019	8	14.0
Minto	MINTO Dept. of Housing renewal area	2017	10	2.7
Mt Ousley	URS 10229 - 45 residential lot 90 strata unit subdivision	2011	6	0.3
Mungerie Park	North Kellyville - 4500 residential dwellings	2010	21	17.8
Mungerie Park	NWRL corridor Commercial Load - 7950 jobs	2012	24	13.6
Mungerie Park	NWRL corridor Dwellings - 7250	2012	24	23.5
Narellan	Gregory Hills 2402 lots	2011	15	9.6
Narellan	The Hermitage & Narellan Country Club 1,800 lots	2011	15	7.2
Nepean ZS	Elderslie residential development 2,000 lots	2005	17	8.0
Nepean ZS	Spring Farm residential development 4,000 lots	2008	17	16.0
North Eastern Creek	UIS0672 - 60 Wallgrove Rd	2018	3	4.9
North Leppington	Leppington Town Centre Commercial	2021	30	25.0
North Leppington	Leppington Town Centre Residential	2021	30	67.5
North Leppington	North Leppington Precinct Residential	2020	30	50.0
North Parramatta	North Parramatta Urban Renewal 3000 apartments	2019	16	9.0
North Richmond	URS18621 Stage 11 Redbank Estate North Richmond	2019	2	0.8
Northmead	Medium Density Residential	2011	10	2.6
Nowra	URS16882 - Nowra, Stage 7 - 26 Lots	2017	5	0.1
Oran Park	Bringelly, Lowes Creek, Maryland 7000 Lots. 1000 supplied from Oran Park ZS initially.	2021	5	5.0
Oran Park	Catherine Park Development 3229 lots	2017	10	16.2
Oran Park	Oran Park 7,500 lots	2010	15	30.0
Parklea	ENL2701 - 6000 Apartments Parklea Markets site	2019	10	22.5
Parklea	NWRL corridor Commercial Load - 10050 jobs	2012	24	17.1
Parklea	NWRL corridor Dwellings - 7260	2012	24	19.0
Penrith 11kV	North Penrith – Urban Growth (UCS0432)	2017	4	5.7
Prestons	Edmondson Park Release Area North - 2700 Lots	2011	10	10.8
Prestons	North Leppington Release Area 780 units + 5000m2 Commercial	2017	3	3.0
Prestons	North Leppington Release Area 800 units	2017	3	2.4
Prestons	URS15666 & URS 15667 Retirement Village Leppington	2016	3	0.7
Quarries	URS15117 Driftway Dr Pemulwuy	2015	3	0.2
Rooty Hill	URS10439 - 1155 Aquilina Drive	2012	10	0.5
Rosehill	Camellia reactivation precinct 10,000 apartments	2020	20	37.5

Zone Substation	Description	F'cast Yr	Years	MVA
Schofields	URS16623 Pelican Road SCHOFIELDS (High Density Alex Ave)	2019	5	9.0
Shellharbour	FLINDERS Estate	2003	18	2.6
Shellharbour	Shell Cove Estate	2003	15	5.8
Shellharbour	Stage 1 - 38 Lots Shell Cove (Boat Harbour)	2016	2	0.1
Shellharbour	Stage 3 - 35 Lots Shell Cove (Boat Harbour)	2017	2	0.1
Shellharbour	UML 5753 - Wattle Rd 71 units and villas	2016	2	0.1
Shellharbour	UML5853 - Flinders, Residential 12 x townhouses	2017	2	0.03
Shellharbour	URS15883 - Shell Cove, 8 lot subdivision	2017	2	0.02
Shellharbour	URS18399 - South Flinders Dunmore -Stage 1A - 33 Lots	2018	3.0	0.02
Shellharbour	URS19157 - South Flinders Dunmore - Stage 1B, 47 lots	2020	3	0.2
Shellharbour	URS19259 - South Flinders Dunmore - Stage 2, 48 lots	2020	3	0.2
Shellharbour	URS19298 - South Flinders Dunmore - Stage 3, 36 lots	2021	2	0.1
South Leppington	Emerald Hills Estate 1390 lots	2016	5	5.6
South Leppington	Leppington Precinct - 1850 Lots	2017	10	7.4
South Leppington	North Leppington Release Area 800 units	2017	3	2.4
South Leppington	Willowdate Estate 4280 lots	2016	10	17.1
South Marsden Park	URS14039 "The Grange" Marsden Park	2017	3	1.3
South Marsden Park	URS18015 - South St Residential	2018	2	0.7
South Marsden Park	URS18742 - South St Units	2018	3	1.9
South Nowra	URS18522 - Old Southern Rd, 25 lots	2019	4	0.1
South Nowra	UCL5378 - Industrial Subdivision (7 x Lots) AATP, Yerrilyong	2013	6	0.6
South Nowra	UIS0599 - Industrial Subdivision (5 x Lots), South Nowra	2013	6	0.3
South Nowra	URS13314 - South Nowra 70 lots	2015	3	0.1
South Nowra	URS14304 - South Nowra (Stage 4, Twin Waters Estate) 50 lots	2014	5	0.1
South Nowra	URS14894 - South Nowra Stage 3, 25 lot subdivision	2017	4	0.1
South Nowra	URS15764 & URS15765 - Twin Waters Estate Stages 5 & 6, 55 lot subdivision	2016	6	0.2
South Wollongong	UML 6121 - 317 units plus commercial space	2016	2	0.8
Sussex Inlet	URS11952 - Sussex inlet 157 lots	2014	10	0.3
SW Sector Macarthur 132	Lowes Creek, Maryland Development - 2000 Lots	2021	5	8.0
SW Sector Macarthur 66	20 Ha commercial Menangle Park Development area	2019	15	1.5
SW Sector Macarthur 66	28 Ha industrial Menangle Park Development area	2019	15	2.5
SW Sector Macarthur 66	4,320 lots in the Menangle Park Development area	2019	15	31.3
Tomerong ZS	ARP2644 - Jerberra Estate, 87 rural residential lots	2019	8	0.2
Tomerong ZS	URS18127 - Worrigea, 31 Lots	2018	2.0	0.1
Ulladulla	NRS3178 - Bawley Point, 6 x Large Residential Lots	2019	3	0.1
Ulladulla	URS10450 - Dolphin Point 264 lots	2010	10	0.5
Ulladulla	URS11410 - Narrawallee, 33 -Lots	2017	4.0	0.1
Ulladulla	URS11658 - Dolphin Point 100 lots	2017	5	0.2
Ulladulla	URS12534 - Milton 52 lots	2014	4	0.1
Ulladulla	URS16051 - Ulladulla, 21 lot subdivision	2017	4	0.1
Ulladulla	URS16749 - Mollymook Beach, Stage 3D - 5 Lots	2017	2	0.0
Ulladulla	URS16766 - Burrill Lake, Stages 3,4,5 & 6 - 40 Lots	2017	6	0.2
Ulladulla	URS17808 - Milton, Stage 3 - 25 Lots	2018	3.0	0.1
Unanderra	UIS0660- Berkeley Rd 17 lot industrial subdivision	2017	4	0.8
Werrington	UML5843-5	2017	3	0.3
West Castle Hill	NWRL corridor Commercial Load - 10890 jobs	2012	24	18.6
West Castle Hill	NWRL corridor Dwellings - 4545	2012	24	11.9
West Dapto	(WLI) West Dapto (Total = 20270 Lots plus Industrial and Commercial load)	2021	30	87.8
West Liverpool ZS	Yarrunga Employment Land Release Area	2009	15	15.3
West Parramatta	Parramatta Square Development	2021	5	5.0
West Pennant Hills	NWRL corridor Dwellings Cherrybrook Precinct 1022 Apartments	2019	6	3.1
West Wetherill Park	UIS0650 Cowpasture Rd	2017	2	6.1
West Wetherill Park	UIS0753 - Horsley Drive	2017	2	0.9
Westmead	Redevelopment to Medium Density Residential	2012	6	1.3
Westmead	UWS Redevelopment at Hawkesbury Road Westmead	2019	6	5.1
Westmead	Westmead Hospital Expansion	2017	8	15.0
Wilton	1000 Lots at Wilton for Brad Corp	2008	16	3.3
Wilton	Development South of Picton Road - 3,000 Lots	2020	10	12.0

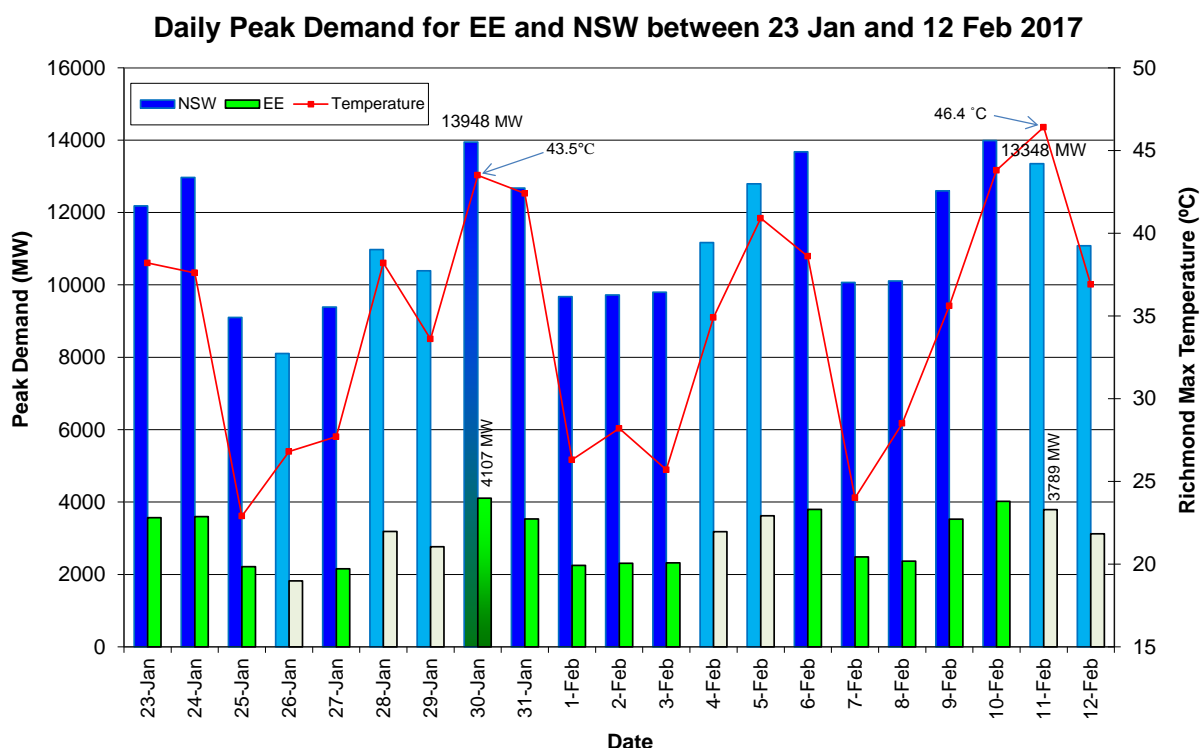
Appendix - Review of 2017 Summer

There have been two record breaking events of peak demands in 2016/2017 summer. The EE Network total demands for the 2017 summer peaked at 4,107⁶ megawatts (MW) at 5:15 pm on 30 Jan 2017 (Mon) while the maximum temperature at Richmond recorded 43.5 °C on that day. This set a new record of maximum peak demand at EE total network and exceeded by a margin of 105 MW on the previous highest peak demand of 4,002 MW made on 1 Feb 2011. The 2016/17 figure was an increase of 252 MW on the 2015/16 summer peak demand of 3,855 MW. The peak demand of 3,789 MW on 11 Feb 2017 (Sat) set another new record for the highest demand for a non-working day when the maximum temperature at Richmond was 46.4 °C on that day. The previous highest peak demand for a non-working day was 3,676 MW made on 5 Feb 2011 (Sat).

These record breaking peak demands were attributed to the heatwaves during January/February 2017 when Western Sydney had the hottest summer on record for both maximum and mean temperatures. Richmond recorded its highest daily maximum temperature of 46.4 °C on 11 February 2017.

Figure A.1 shows the time series of the daily maximum temperatures at Richmond and the peak demands on the EE network and NSW during the 2017 summer peak demand period. EE peak demand and maximum NSW daily peak demand for the 2017 summer occurred on the same day of 30 Jan 2017.

Figure A.1. EE and NSW Peak Demands and Temperatures at Richmond during the 2017 summer peak period.



Note: Non-workday peak demands are in lighter colours.

Sources: Endeavour Energy Network Load History (NLH) Database.
NSW demand from the AEMO web site.

⁶ Including Tallawarra generation.

In general, the EE and NSW state peak demands in summer follow the variations of daily maximum temperature. However, the day of hottest temperature does not always result in maximum demand on the same day as in 2017 summer. While temperature has a highly significant influence on the peak demand, a number of other factors can make an impact including: day of the week (weekend/weekday), time of day, public and school holidays, wind (speed, direction and timing), persistent hot or cold spells, user behaviours and economic conditions.

Figure A.2 depicts the percentage of EE to NSW daily peak demand with daily maximum temperature at Richmond for 2017 summer. The increasing percentage of EE to NSW daily peak demand with temperature suggests that the temperature has more impacts on the loads within EE network (greater proportion of total NSW load) than those in other network areas and highlights the volatility of the EE network demand.

Figure A.2. Percentage of EE and NSW Daily Peak Demand with Daily Maximum Temperature for 2017 Summer.

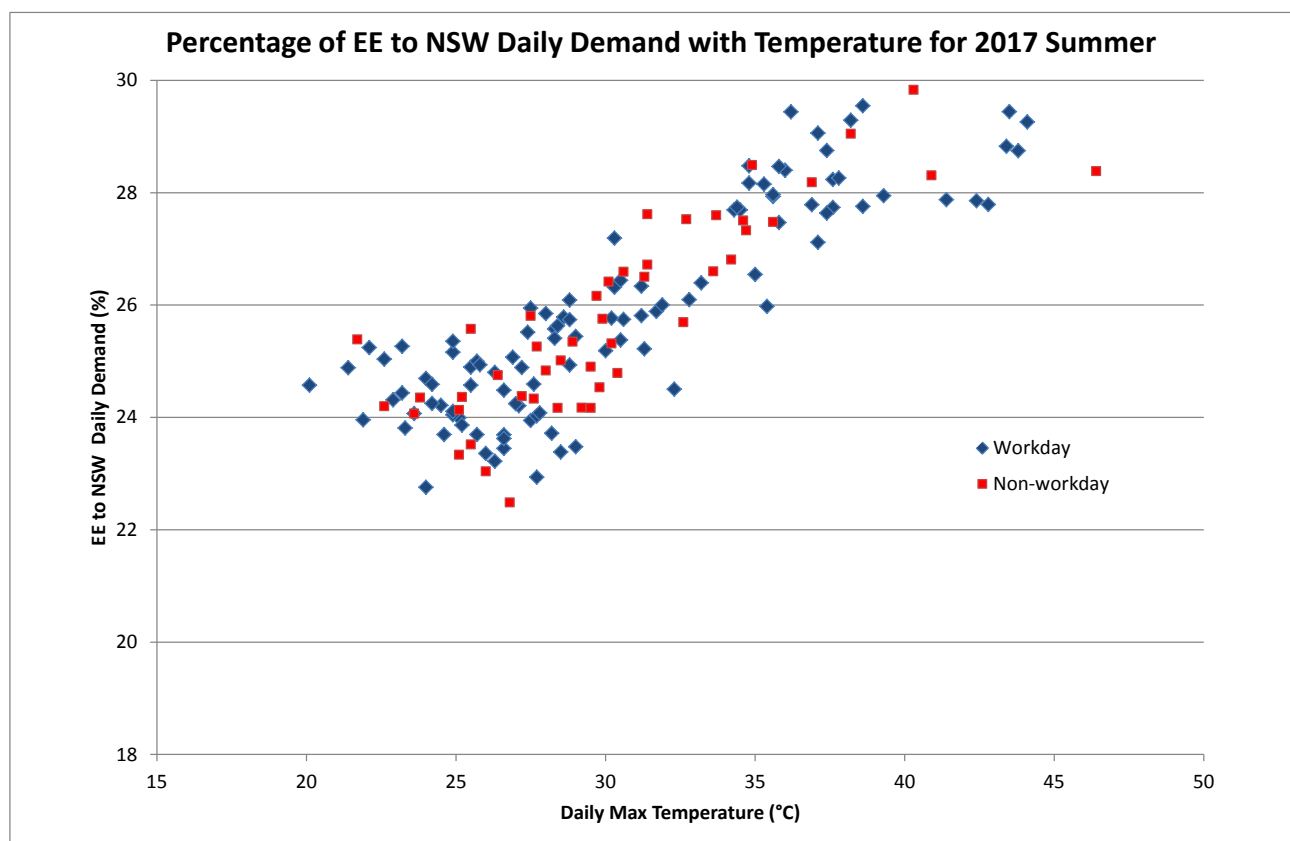


Table A.1 provides a summary of the top five peak demand days over the 2017 summer. Table A.2 summarises the weekday maximum temperatures over the past 6 summers.

Table A.1. Top 5 EE Demand Peaks and Daily Maximum Temperatures at Richmond for 2017 Summer.

Date	Peak Demand (MW)	Time of Peak Demand (EST)	Daily Max Richmond Temperature (°C)
30-Jan-17 (Mon)	4,107	17:15	43.5
10-Feb-17 (Fri)	4,020	15:45	43.8
17-Jan-17 (Tue)	3,943	16:15	43.4
06-Feb-17 (Mon)	3,797	15:45	38.6
11-Feb-17 (Sat)	3,789	15:45	46.4

Source: Endeavour Energy Network Load History (NLH) Database.

Table A.2. Historical Summer Weekday Maximum Temperatures at Richmond.

Summer	2012	2013	2014	2015	2016	2017
Max Weekday Temp (°C)	36.5	46.0	39.1	40.6	39.7	44.1
Date	14 Nov 11	18 Jan 13	20 Dec 13	14 Nov 15	14 Jan 16	13 Jan 17
Day of the Week	Monday	Friday	Friday	Friday	Thursday	Friday

Source: Endeavour Energy Network Load History (NLH) Database.

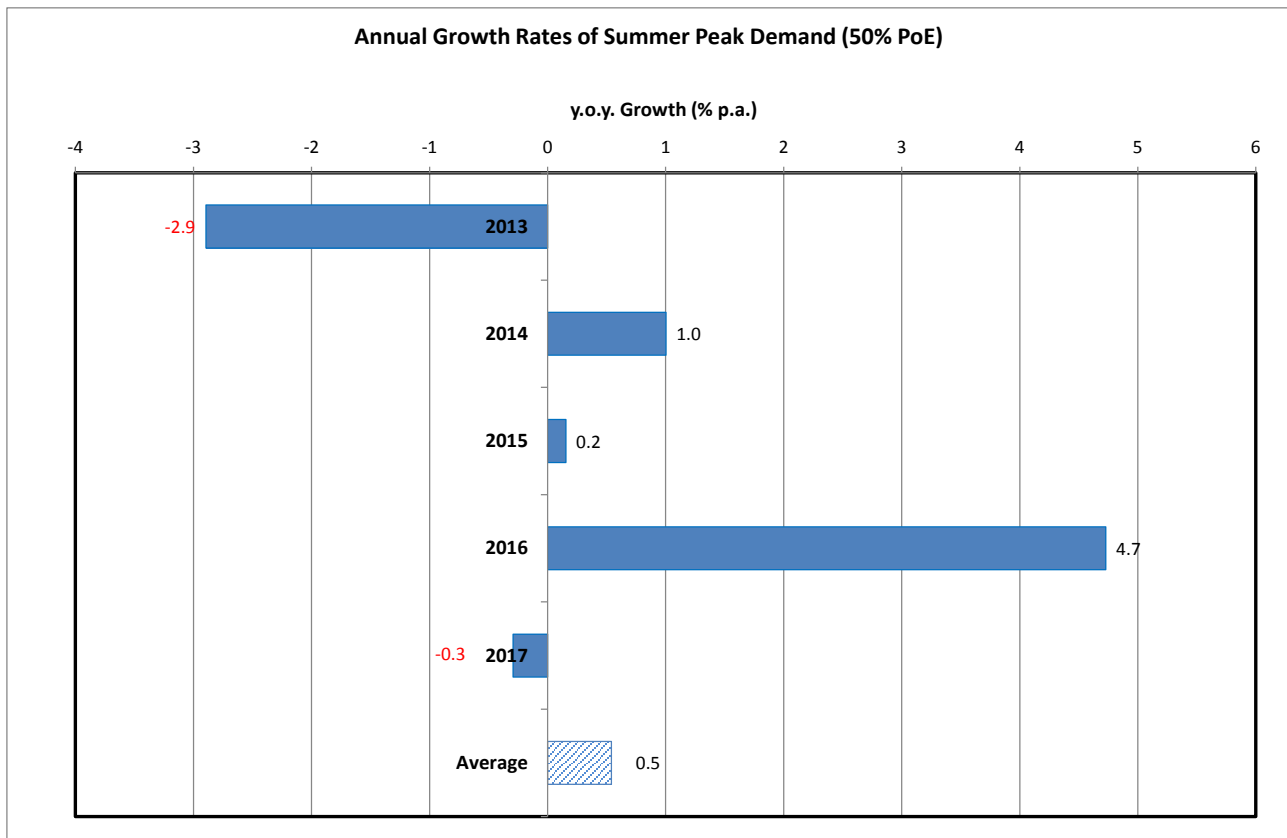
The annual growth rates of temperature corrected peak demand⁷ for the past five summers are plotted in Figure A.3. After the temperature corrected peak demands decreased by 2.9% in 2013, the peak demands have stabilised in the subsequent years with an increase of 1.0%, 0.2% and 4.7% p.a. for the period between 2014 – 2016. Over the past five summers, the temperature corrected peak demand showed an increase of about 0.5% p.a.

The last four summer normalised demands suggest that the peak demand has reverted to an increasing trend after the recent decline during 2011 – 2013. There may be a slowing in two or more of the following three major drivers of the negative demand growth being:

- Decline in the industrial sector activity
- Electricity price increases
- Government sponsored energy efficiency programs

⁷ Annual peak demands that have been corrected to a set of standard weather conditions enable a valid comparison of annual changes in demand.

Figure A.3. Annual Growth Rate of 50% PoE Temperature Corrected Maximum Demand (TCMD) for the past five summers.



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