Jemena Electricity Networks (Vic) Ltd

Load Demand Forecasts 2019

Internal

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Jemena

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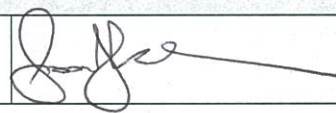
Load Demand Forecasts 2019
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Authorisation

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Owning Functional Area

Business Function Owner:	Customer and System Planning

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GLOSSARY

Term	Definition
Annualised average growth rate	The compound average growth rate, which is the year-over-year growth rate over a specified number of years
Probability of Exceedance (PoE)	The likelihood that a given level of maximum demand forecast will be met or exceeded in any given year:
	• 50 PoE maximum demand is the level of annual demand that is expected to be exceeded one year in two.
	• 10 PoE maximum demand is the level of annual demand that is expected to be exceeded one year in ten.
N-1 condition	Single credible contingency condition, i.e. one item of critical plant out of service.
Station transformer (N-1) cyclic rating	The permissible daily peak demand to which the transformer(s) may be subjected over summer or winter period following outage of a major plant item at the station.
Station transformer (N-1) 24-hour emergency rating	The permissible peak demand to which the transformer(s) may be subjected over one daily load cycle, after which the transformer load must be reduced to its station transformer (N-1) cyclic rating following outage of a major plant item at the station.
Urban growth boundary	The urban growth boundary (UGB) indicates the long-term limits of urban development and where non-urban values and land uses should prevail in metropolitan Melbourne
50% PoE ambient temperature (summer)	An average daily ambient temperature of 29.4ºC derived by NIEIR and adopted by JEN, with a typical maximum ambient temperature of 38.0ºC and an overnight ambient temperature of 20.8ºC
10% PoE ambient temperature (summer)	An average daily ambient temperature of 32.9ºC derived by NIEIR and adopted by JEN, with a typical maximum ambient temperature of 42ºC and an overnight ambient temperature of 23.8ºC
50% PoE and 10% PoE ambient temperature (winter)	Winter ambient temperature under 10% PoE and 50% PoE are treated the same, referring to an average daily ambient temperature of 7ºC, with a typical maximum ambient temperature of 10ºC and an overnight ambient temperature of 4ºC

ABBREVIATIONS

Abbreviation	Expanded Name
AEMO	Australian Energy Marker Operator
AER	Australian Energy Regulator
DNSP	Distribution Network Service Provider
EDPR	Electricity Distribution Price Review
GSP	Gross State Product
GWh	Giga Watt hour
HV	High Voltage
JEN	Jemena Electricity Network
MW	Mega Watt
MVAr	Mega Volt Ampere - reactive
MVA	Mega Volt Ampere
NER	Neutral Earthing Resistor
PoE	Probability of Exceedance
PV	Photovoltaic
Tx	Transformer
URD	Underground Residential Distribution

EXECUTIVE SUMMARY

Jemena is the licensed electricity distributor for the northwest of Melbourne's greater metropolitan area. The Jemena Electricity Networks (JEN) service area covers 950 square kilometres of northwest greater Melbourne and includes the Melbourne International Airport, which is located at the approximate physical centre of the network, and some major transport routes. The network comprises over 6,500[1] kilometres of electricity distribution lines and cables, delivering approximately 4,200 GWh of energy to over 344,000 homes and businesses for a number of energy retailers. The network service area ranges from Couangalt, Clarkefield and Mickleham in the north to Williamstown and Footscray in the south and from Hillside, Sydenham and Brooklyn in the west to Yallambie and Heidelberg in the east. A map of Jemena's service area, which also shows the zone substations supply area with different growth rates, is provided in Appendix A.

JEN has developed the 50% and 10% probability of exceedance (PoE) maximum demand forecasts at the network level (10-year forecast), transmission connection points or terminal stations (10-year forecast), zone substations (10-year forecast) and HV distribution feeders (7-year forecast), as part of its distribution annual planning review.

The methodology for preparing maximum demand forecasts calls for two independent sets of forecasts, spatial level (i.e. bottom-up) forecast and system level (i.e. top-down) forecast. The spatial level forecast is prepared by JEN, where historical data, local developments information and various Precinct Structure Plans conducted by Metropolitan Planning Authority[2] are used to build up the forecasts at the feeder level to zone substation level and then to terminal station level, whereas the system level forecast is prepared by an external (macro) economic forecaster (ACIL Allen Consulting[3]) using econometric techniques. The spatial level forecast is then reconciled to the system level forecast to produce the final set of maximum demand forecasts in which JEN adopts in planning its network.

Key Highlights

As a whole, the growth in demand across JEN's network is slowing, with the total network maximum demand forecast to grow at an average rate of just 0.79% per annum over the next five years (2020 to 2025).

Table ES–1 and Figure ES–1 show the historical observed actual and 10-year forecasts (50PoE and 10PoE) of JEN total network (i.e. all JEN network customers' maximum coincident load demand aggregated at the system level).

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[1]   Does not include low voltage services.

[2]   Refer to link, http://www.planmelbourne.vic.gov.au/Plan-Melbourne, for Plan Melbourne report.

[3]   Refer to "Electricity Demand Forecasts, 2019" report prepared by ACIL Allen Consulting for the system level forecast.

Table ES–1: JEN Total Network Maximum Demand Forecast

Demand (MW)	Actual		Forecast										Average annual growth	
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2020-2025	2020-2029
Summer (50PoE)	946.6	974.7	950	959	970	978	984	988	996	999	1006	1014	0.79%	0.73%
Winter (50PoE)	749.1	769	777	786	790	792	794	795	796	797	797		0.64%	0.40%
Summer (10PoE)	946.6	974.7	1053	1058	1072	1072	1082	1090	1096	1100	1106	1114	0.69%	0.63%
Winter (10PoE)	749.1	790	799	807	811	815	816	817	818	819	819		0.65%	0.40%

Maximum demand is forecast to grow over the forecast period largely driven by a projected return to trend GDP growth and a stabilisation of electricity prices. At 50% PoE level, peak demand on JEN network is projected to grow by 0.79% per annum.

Figure ES–1: JEN Total Network Maximum Demand Forecast

Despite the general slowing in demand growth at the network level, there are areas within the network where maximum demand growth is forecast well beyond the network average level while other parts of the network are forecast to experience reductions in maximum demand as a result of manufacturing closures.

In general, areas where JEN expects a strong growth is in the northern half of the network. This is largely due to new developments associated with urban sprawl towards the edge of the Urban Growth Boundary. As a result of this urban sprawl and the recent extension of the Urban Growth Boundary, JEN expects to see continued strong

growth in the areas currently supplied by Kalkallo (maximum demand forecast to grow at 11.1% per annum over the next five years), Somerton (1.3%), Sydenham (1.8%), and Coolaroo (1.5%) zone substations. Some pockets within established inner suburbs are also experiencing strong growth as a result of amendments to the planning schemes to high density living. The high growth is predominately driven by the development of high rise residential and office buildings, and the expansion of community facilities and services, such as around Footscray Central Activities Area and Essendon Airport. As a result, JEN is forecasting high growth in maximum demand for areas currently supplied by Fairfield (2.9%), Footscray East (2.9%), Yarraville (3.8%), and North Essendon (2.5%) zone substations.

Other parts of the network, generally in the south, are expecting to experience low growth to reductions in maximum demand. Table ES–2 below summarises supply areas with different growth rates expected over the next five years.

Table ES–2: Supply area average annual growth over the next five years (2020-2025)

Season	Supply Area Average Annual Growth (2019-2024)			
	Strong growth (> 5% pa)	High growth (3-5% pa)	Medium growth (1-3% pa)	Low growth or decline (<1% pa)
Summer	Kalkallo	Yarraville	Newport, Flemington, Somerton, Braybrook, Coolaroo, Coburg South, Sydenham, North Essendon, Footscray East, Watsonia and Fairfield	▇▇▇▇▇▇▇▇▇▇▇▇ Airport West, Broadmeadows, ▇▇▇▇▇▇▇ Preston, Broadmeadows South, Coburg North, Essendon, Footscray West, Heidelberg, ▇▇▇▇▇▇▇ North Heidelberg, East Preston, Tullamarine, Pascoe Vale, St. Albans, Sunbury, Thomastown, Tottenham, ▇▇▇▇

1. INTRODUCTION

1.1 PURPOSE

The purpose of this report is to inform the relevant JEN internal stakeholders of forecast maximum summer and winter load demands at each JEN owned and customer owned zone substation located within the JEN supply area, and on each individual distribution feeder including those supplied from substations owned by another distribution business. It also provides station configuration, capabilities and maximum prospective fault levels at each JEN owned zone substation and information on major network and load changes.

Some of the primary uses of this report include:

- Assessment of network adequacy to meet anticipated load demand to form the basis for development of the 6-year Network Capacity Capital Expenditure Budget for the Jemena Electricity Network. The forecasts are also used for the augmentation planning of terminal stations.

- Assessment of the network capability for new and/or additional customer initiated supply request by the Customer Initiated Capital Project Coordinators and Network Planning engineers;

- Planning of daily operation of the network, including summer contingency preparation works under both planned and unplanned outages by the JEN Control Centre;

- Assessment of the condition of zone substations circuit breakers and determine when maintenance is necessary for fault interruption duty by the Asset Engineering department. When a circuit breaker is required to trip as a result of protection operation, the circuit breaker deteriorates at a rate dependent on the magnitude of the fault current interrupted; and

- Review of protection settings by the Asset Engineering department. It should be noted that further fault studies are generally required.

1.2 SCOPE

This report presents 50% and 10% probability of exceedance forecasts as follows:

- Ten year system level forecasts

- Ten year terminal station forecasts (JEN load only)[4]

- Ten year zone substation forecasts (for both JEN owned and customer owned) within JEN distribution area

- Seven year feeder forecasts (all JEN load on feeders, including those feeders supplied by other DNSP zone substations).

The maximum load demand forecasts, grouped together on a zone substation basis, are listed alphabetically.

A summary of the forecasting process used to develop these forecasts, including key drivers of demand, is provided in Section 2.

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[4] Jemena has shared responsibility with AusNet Services and other DNSPs for terminal station planning. Please refer to *"Transmission Connection Planning Report"*, available from http://jemena.com.au/industry/electricity/network-planning, for terminal station forecasts.

1 — INTRODUCTION

In addition, prospective 2019/20 maximum fault levels for each JEN zone substation are provided. Please note that prospective maximum fault levels have been provided for use as a guide only and should be confirmed with the Customer and System Planning department prior to committing expenditure or technical investigations.

1.3   RESPONSIBILITIES

This report is produced annually by the Customer and System Planning department. For further information on this publication, please contact Tan Bui, on telephone (03) 9173 8283.

2. FORECASTING PROCESS OVERVIEW

2.1 BEST PRACTICE DISTRIBUTION LOAD FORECASTING

This section outlines the AER and its consultant's (ACIL Tasman Consulting, now known as ACIL Allen Consulting) view during the Price Review 2011-15, as the key features of best practice distribution load forecasting methodologies. The presence of such methodological features (as explained for each below) is an important factor in determining whether JEN has, pursuant to clauses 6.5.6(c)(3) and 6.5.7(c)(3) of the NER, produced forecasts that reasonably reflect a realistic expectation of the demand forecast and cost inputs to achieve the operating expenditure objectives and capital expenditure objectives, respectively.

AER's consultant (ACIL Tasman) considered the following features necessary to produce best practice maximum demand, energy and customer number forecasts:

- Accuracy and unbiasedness – careful management of data (removal of outliers, data normalisation) and forecasting model construction (choosing a parsimonious model based on sound theoretical grounds that closely fits the sample data).

- Transparency and repeatability – as evidenced by good documentation, including documentation of the use of judgment, which ensures consistency and minimises subjectivity in forecasts.

- Incorporation of key drivers—including economic growth, population growth, growth in the number of households, temperature and weather related data (where appropriate), and growth in the numbers of air conditioning and heating systems.

- Model validation and testing—including assessment of statistical significance of explanatory variables, goodness of fit, in-sample forecasting performance of the model against actual data, diagnostic checking of the old models, out of sample forecast performance.

AER's consultant (ACIL Tasman) also considered the following elements to be relevant to maximum demand forecasting:

- Spatial (bottom up) forecasts validated by independent system level (top down) forecasts – best practice forecasting requires these forecasts to be prepared independently of each other. The impact of macroeconomic, demographic and weather trends are better able to be identified and forecast in system level data, whereas spatial forecasts are needed to capture underlying characteristics of areas on the network. Generally, the spatial forecasts should be constrained (or reconciled) to system level forecasts.

- Weather normalisation – correcting historical loads for abnormal weather conditions is an important aspect of demand forecasting. Long time-series weather and demand data are required to establish a relationship between the two and conduct weather correction. Weather correction is relevant to both system and spatial level forecasts, and the system level weather correction processes are more sophisticated and robust.

- Adjusting for temporary transfers—spatial data must be adjusted for historical spot loads arising from peak load sharing and maintenance, before historical trends are determined.

- Adjusting for discrete block loads—large new developments (for example, shopping centres, housing developments) should be incorporated into the forecasts, taking into account of the probability that each development might not proceed. Only block loads exceeding a certain size threshold should be included in the forecasts, to avoid potential double counting, as historical demands incorporate block loads.

- Incorporation of maturity profile of service area in spatial time series – recognising the phase of growth of each zone substation, taking into account of the typical lifecycle of a zone substation, depending on its age, helps to inform likely future growth rates.

In addition to the features identified above, the AER considers that accuracy and consistency of forecasts at different levels of aggregation also affects the overall reasonableness of the forecasts, as accuracy at the total level may mask errors at lower levels (for example, at each zone substation or tariff class) that cancel each other out. The AER also considers that the use of the most recent input information is necessary in developing reasonable expectations of future conditions.

Following the AER Final Determination 2011-15, JEN reviewed its load demand forecast methodology and has incorporated the AER and its consultant's view of the features outlined above. JEN considers its current methodology adopted is in line with the AER's view of 'best practice methodology'. JEN's load forecast methodology is outlined in the next section.

2.2 FORECASTING METHODOLOGY

Load demand forecasting is critical to a network's operation as it is a principal driver of capital expenditure. However uncertainty always surrounds forecasts due to the inherent unpredictability of factors such as ambient temperatures, weather patterns and, in particular, loads. Load growth can vary from year to year and is not uniform across the whole network. It is not unusual to find parts of the network which grow at three or four times the average network growth rate, while other parts of the network could experience no growth at all.

The process for preparing peak demand forecasts calls for two independent sets of forecasts to be prepared annually, spatial level (i.e. bottom-up) forecast and system level (i.e. top-down) forecast. The spatial level forecast is prepared internally by JEN and the system level forecast is prepared by an independent external (macro) economic forecaster (ACIL Allen Consulting).

The spatial forecasts are built up from a feeder level to zone substation level and then to terminal station level, taking into account diversity at each level of aggregation. The forecasts are based on trends identified by looking backwards at historical data and looking forwards at drivers in the future that influence load growth. The forward looking drivers include known future loads, knowledge of local information such as proposed major industrial and commercial developments, predicted housing and industrial lot releases, proposed embedded generation and other items such as economic forecasting, council planning and various Precinct Structure Plans conducted by Metropolitan Planning Authority[5] are also taken into account. Two forecast scenarios are produced; one for summer, and one for winter peak demand conditions, each with a 10% and a 50% probability of exceedance (POE).

The system level forecasts were prepared by an independent external forecaster, ACIL Allen Consulting, using econometric techniques. These system level forecasts include a summer and winter demand forecast at the total network demand for the 10%, 50% and 90% PoE levels. The drivers of demand used in the model includes:

• Economic outlook for Victoria and Jemena supply area, as measured by Victorian Gross State Product (GSP) growth rate (%).

• Population growth and customer numbers

• Photovoltaic (PV) generation capacity and battery storage.

• Electricity prices.

• Variations in temperature pattern (weather).

• Electric Vehicles (EV)

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[5]   Refer to link, http://www.planmelbourne.vic.gov.au/Plan-Melbourne, for Plan Melbourne report.

In summary, the system level forecast methodology adopted by ACIL Allen Consulting includes:

• regression models were estimated to quantify the relationship between electricity demand and its drivers

• those models were used with projections of the drivers to produce baseline forecasts.

• A post model adjustment was made to the forecasts to account for the impact of ongoing take-up of solar PV systems, battery storage and electric vehicles.. The process was conducted separately for summer and winter to produce independent forecasts of maximum demand in these seasons. For further detail, please refer to ACIL Allen report "Electricity Demand Forecasts"[6].

JEN reconciles its spatial forecasts to the system level forecast at the total network level to produce the final set of maximum demand forecasts. As a result, the JEN internal spatial forecast is equal to the independent external system forecast at the total network level. JEN adopts its internal spatial forecast for planning its network due to the requirement for forecasts at the feeder and zone substations levels. For further detail of the load forecast methodology, refer to "JEN PR 0507 Load Demand Forecast Procedure"[7].

2.3   DRIVERS OF DEMAND

Key drivers of demand include economic activity, population growth and customer numbers, photovoltaic (PV) generation capacity, electricity prices, weather and electric vehicles (EV).

2.3.1   ECONOMIC ACTIVITY

Growth in economic activity is a major driver of rising incomes. Demand for electricity is, in part, driven by higher disposable incomes and subsequent demand for new electronic appliances and equipment, as well as increasing commercial and industrial activity. There is typically a strong relationship between economic activity and electricity demand given that electricity is an important input into many households and industries.

Victorian GSP growth slowed in the period following 2008-09. Over this period it averaged just 1.8 per cent per annum. This is compared to a long-term annual average of 2.9 per cent per annum from 1990-91 to 2017-18. Victorian GSP growth has exceeded the long-term average over the last three years, growing at 3.5 per cent in 2015-16, 4.0 per cent in 2016-17 and 3.5 per cent in 2017-18. This recent uptick in economic growth has helped underpin the resumption of growth in energy consumption and maximum demand within the JEN distribution network.

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6   ACIL Allen Consulting, *"Electricity Demand Forecasts"*,2019

7   Jemena, *"JEN PR 0507 Load Demand Forecast Procedure"*,2019

Figure 2–1: GSP Growth Victoria 1990-91 to 2017-18[8]
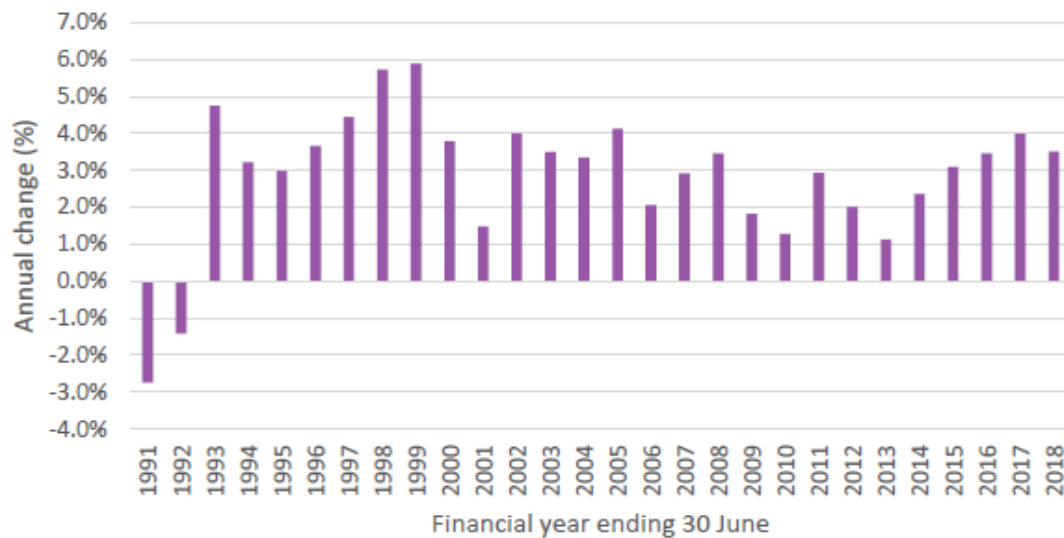
Figure 2–2 shows the Victorian government forecast for GSP which is used as the basis for forecasting maximum demand in Jemena electricity network.

Figure 2–2: Economic Growth Projections[9]

2.3.2 POPULATION GROWTH AND CUSTOMER NUMBERS

Growth in customer numbers is a key driver of electricity consumption. Increasing residential customer numbers are driven by household formation arising from population growth.

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8   Source: Australian National Accounts: State Accounts, 2017-18

9   Source: Victorian Budget Paper 2: Strategy and Outlook and ACIL ALLEN Consulting

As of June 2019, JEN has a total of 345,056 customers, of which 315,219 are residential. This means that approximately 91 per cent of JEN's customers are residential customers. Projections for population have been obtained from the Victoria in Future 2016 (ViF) produced by the Department of Environment, Land, Water and Planning. Figure 2-3 presents the projected annual population growth rate within the JEN region over the forecast horizon. While the average annual growth rate over the whole period is 2.1 per cent, it is considerably higher in the first three years of the forecast period, reflecting a continuation of the very strong population influx into Victoria that has taken place in recent years.

Figure 2–3: Projected Annual Population Growth of JEN Distribution Region
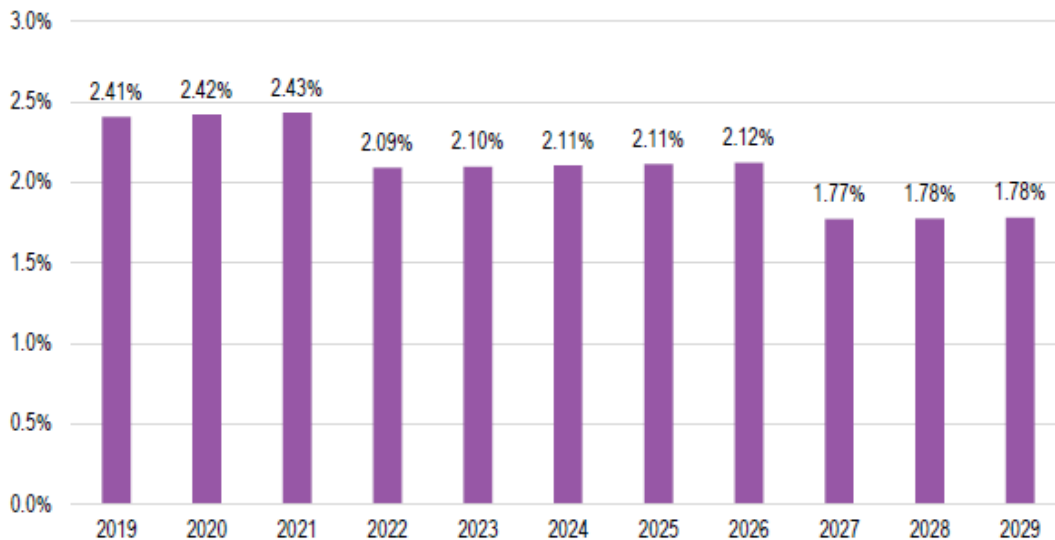
2.3.3 ROOFTOP PV AND BATTERY STORAGE

2.3.3.1 Rooftop PV uptake

The take-up and usage of rooftop PV systems has a negative impact on demand at the terminal station level. This is because energy generated from these systems is used to offset demand from the owner of the system. Excess energy generated from these systems is also exported to other households within JEN's distribution region without passing through a terminal station. Hence all generation from PV systems can be considered to offset demand.

In the 2017-18 financial year, there was a total of 13.5 MW installed in the JEN distribution network, of which 10.2 MW was installed by households and 3.3 MW by business customers. The highest volume of rooftop PV capacity was recorded in 2012-13, when 22.2 MW of rooftop PV capacity was installed. Installation of solar PV has been mainly driven by the reduction in solar panel and installation cost, an upward trend in electricity prices and incentives provided by government to install rooftop solar systems.

Victorian government has initiated the solar home package in 2018 which involves installing solar panels on approximately 650,000 Victorian homes by providing a 50% subsidy in installing solar system. The program is expected to benefit approximately 68,000[10] customers in the Jemena distribution network over the next ten years. This is significantly going to increase the number of solar installation on Jemena network.

Installed rooftop PV capacity is expected to reach 302 MW by 2029.

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[10]   Based on the assumption that Jemena serves approximately 10.4% of Victorian customers

Figure 2–4: Cumulative Capacity of Installed Solar PV Systems
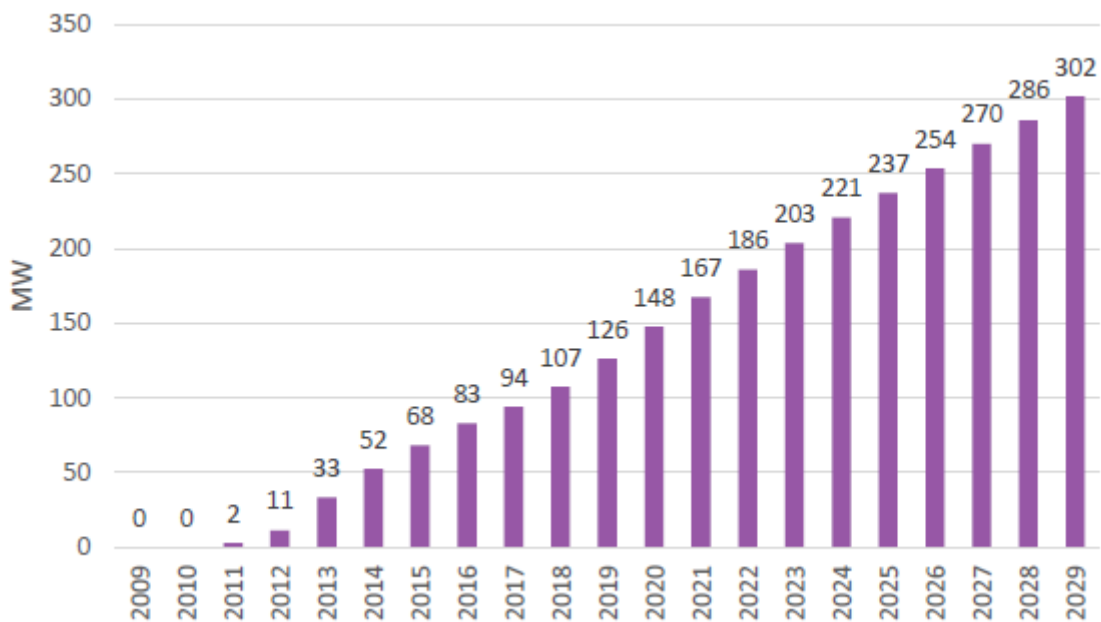
2.3.3.2 Battery Storage

To date the deployment of home energy storage systems in Australia has been negligible. However, prices for battery technology are widely expected to reduce in the future and this could have major implications for battery uptake and the level of maximum demand that is required to be met using network services. As with the reduction in cost of PV systems over the last decade, a reduction in cost of battery systems could be accelerated by a large scale, subsidy assisted, deployment of this technology as observed in Germany or other countries where there are currently subsidies for the installation of home energy storage systems.

The Victorian labour party has currently proposed a grant up to $4,838 for 10,000 customers who has already got a solar system installed. Currently, there are 372,000[11] households in Victoria who are eligible for this scheme i.e. 15% of household in Victoria. However, this current scheme will only be available to 2.6% of the total solar customers.

Jemena has 29,032 residential customers who have already installed solar panels. As the current scheme is going to benefit only 2.6% of existing solar customer, this represents less than 800 customers in the Jemena distribution network benefiting from the scheme. Hence, the scope of the current scheme does not have significant impact on the Jemena demand forecast. However, Jemena believes that the cost of energy storage will reduce in the future providing more incentive for customers to install battery systems. Based on the current forecast Jemena expects the installed capacity of energy storage systems to increase from 0 MWh in 2019 to 135MWh in 2028/29 as shown in Figure 2–5.

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[11]   Clean Energy Council

Figure 2–5: Cumulative Capacity of Installed Battery Storage System
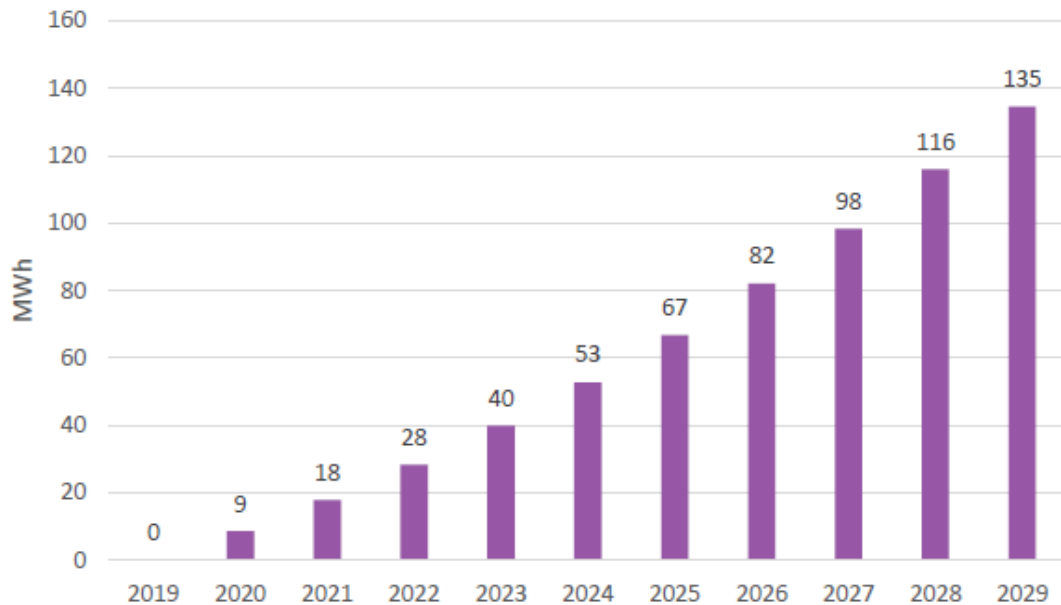
2.3.4 ELECTRICITY PRICES

Price is also a likely driver of electricity consumption and maximum demand. The responsiveness of consumption to changes in price is known as the price elasticity of demand. The degree of responsiveness is thought to differ considerably across customer classes. Residential customers are thought to be generally less responsive to price changes than non-residential customers. This is because energy costs comprise a significantly larger proportion of the total expenditures for non-residential customers. Significant price increases might lead to adaptive behaviour designed to reduce consumption/demand and hence costs. For example, higher electricity prices would be expected to reduce maximum demand and consumption by creating incentives for customers to become more energy efficient (through appliances and housing design).

ACIL Allen forecasts electricity prices using a bottom-up approach. Electricity prices are broken into three components:

1. network use of system (NUOS) charges: the costs involved in using JEN's network to supply electricity to its customers

2. wholesale electricity costs: projected using ACIL Allen's proprietary PowerMark model

3. other costs: these include retail margin, renewable energy schemes and other green schemes.

A strong decline in the projected electricity price is expected after 2019 in response to a significant increase in large scale solar and wind generation capacity which is expected to come online. These forecasts are summarised in Figure 2–6.

Figure 2–6: Forecast change in retail electricity prices[12]
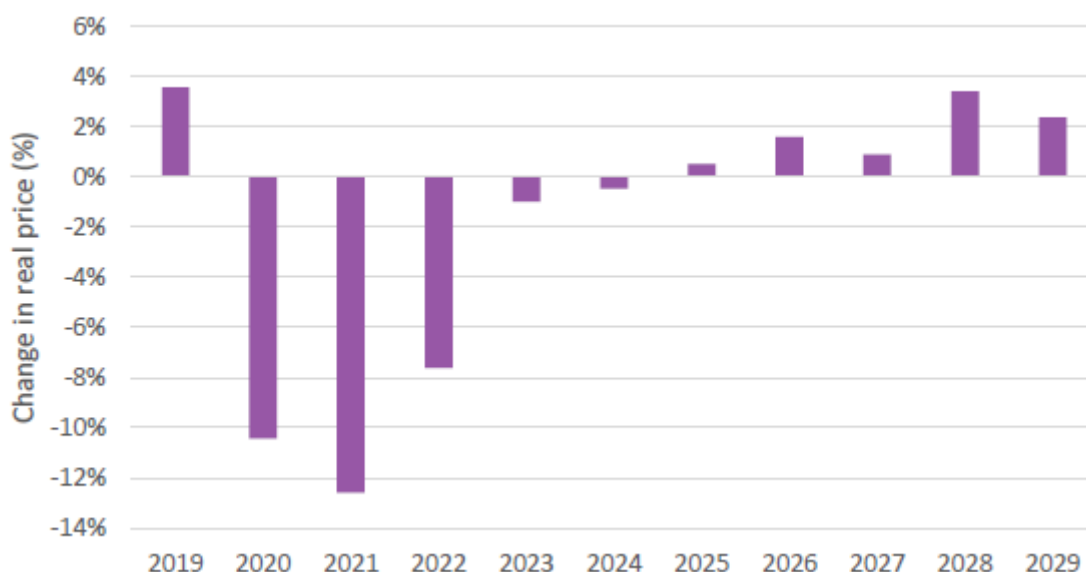
2.3.5 WEATHER

The weather is also a key driver of demand in both summer and winter.

In winter, demand that varies with weather conditions is driven primarily by the heating requirement. Generally, cooler seasons would be associated with a greater heating requirement, and therefore a greater maximum demand. In summer this pattern is reversed, with cooling becoming the driver of weather-related demand.

The impact of weather is strongly related to the availability of appliances, and hence economic activity. The impact of weather may also change depending on whether the day's conditions are at the end of a warm or cool streak. Forecasts of weather are not used within the maximum demand forecasting. Rather, historical weather conditions since 1980 are used to develop a confidence interval around maximum demand forecasts. Weather measurements were taken from the Melbourne Airport weather station, as reported to the Bureau of Meteorology website.

2.3.6 ELECTRIC VEHICLES (EV)

Electric vehicles are not expected to have any significant impact on maximum demand. It is anticipated that sufficient tariff incentives will be put in place to ensure that electric vehicles are mostly charged during off peak times. By 2028-29, energy consumption by EVs in the JEN region is forecast to be 89 GWh.

The main drivers that are likely to play a significant role in the future take up of electric vehicles are:

• Vehicle prices

• Petrol and Electricity prices

• Vehicle fuel efficiency

• Running costs

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[12] Source: ACIL Allen Consulting

- Range

- Charging convenience

- Emissions standards.

As upfront vehicle prices continue to decline and the range that the vehicles can travel before recharging increases, we can expect sales of electric vehicles to increase. Figure 2–7 shows the forecast annual consumption of electric vehicles to the end of the 2028-29 financial year.

Figure 2–7: Forecast annual consumption electric vehicle[13]

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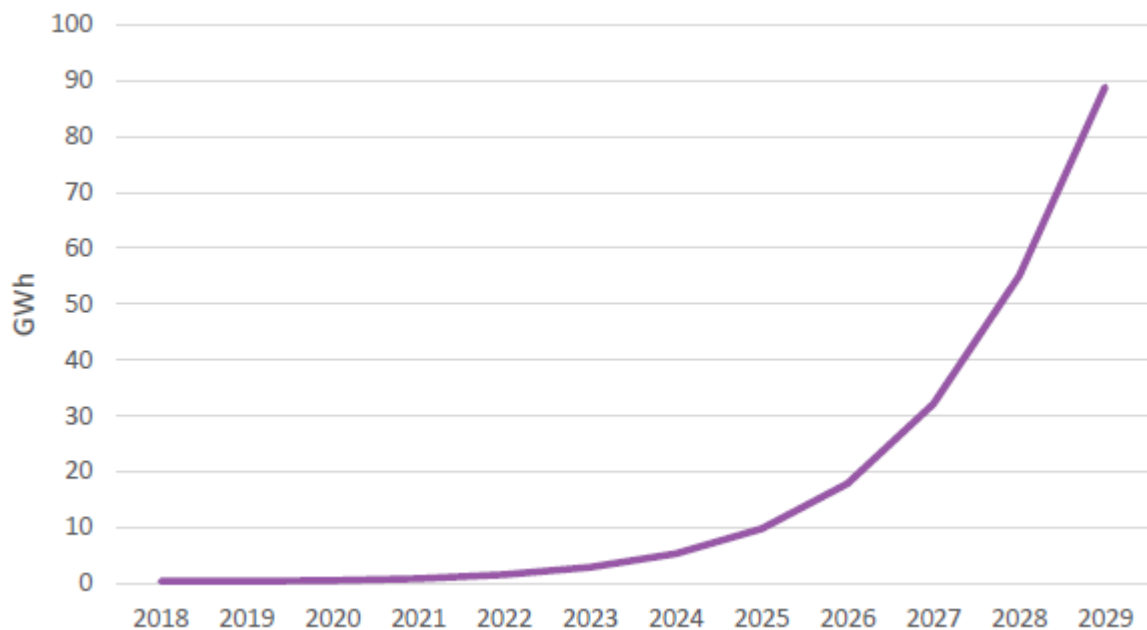
13   Source: ACIL Allen Consulting

3. LOAD FORECAST HIGHLIGHTS

As a whole, the growth in demand across JEN's network is slowing, with the total network maximum demand forecast to grow at an average rate of just 0.73% per annum over the next five years (2020 to 2025). Table 3–1 and Figure 3–1 show the historical observed actual and 10-year forecasts (50PoE and 10PoE) of JEN total network (i.e. all JEN network customers' maximum coincident load demand aggregated at the system level).

Table 3–1: JEN Total Network Maximum Demand Forecast

Demand (MW)	Actual		Forecast										Average annual growth	
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2020-2025	2020-2029
Summer (50PoE)	946.6	974.7	950	959	970	978	984	988	996	999	1006	1014	0.79%	0.73%
Winter (50PoE)	749.1	769	777	786	790	792	794	795	796	797	797		0.64%	0.40%
Summer (10PoE)	946.6	974.7	1053	1058	1072	1072	1082	1090	1096	1100	1106	1114	0.69%	0.63%
Winter (10PoE)	749.1	790	799	807	811	815	816	817	818	819	819		0.65%	0.40%

Maximum demand is forecast to grow over the forecast period largely driven by a projected return to trend GDP growth and a stabilisation of electricity prices. At 50% PoE level, peak demand on JEN network is projected to grow by 0.79% per annum.

Figure 3–1: JEN Total Network Maximum Demand Forecast

Despite the general slowing in demand growth at the network level, there are areas within the network where maximum demand growth is forecast well beyond the network average level while other parts of the network are forecast to experience reductions in maximum demand as a result of manufacturing closures.

In general, areas where JEN expects a strong growth is in the northern half of the network. This is largely due to new developments associated with urban sprawl towards the edge of the Urban Growth Boundary. As a result of this urban sprawl and the recent extension of the Urban Growth Boundary, JEN expects to see continued strong growth in the areas currently supplied by Kalkallo (maximum demand forecast to grow at 11.1% per annum over the next five years), Somerton (1.3%), Sydenham (1.8%), and Coolaroo (1.5%) zone substations. Some pockets within established inner suburbs are also experiencing strong growth as a result of amendments to the planning schemes to high density living. The high growth is predominately driven by the development of high rise residential and office buildings, and the expansion of community facilities and services, such as around Footscray Central Activities Area and ▇▇▇▇▇▇▇▇▇▇ As a result, JEN is forecasting high growth in maximum demand for areas currently supplied by Fairfield (2.9%), Footscray East (2.9%), Yarraville (3.8%), and North Essendon (2.5%) zone substations.

Other parts of the network, generally in the south, are expecting to experience low growth to reductions in maximum demand. Table 3–2: below summarises supply areas with different growth rates expected over the next five years.

Table 3–2: Supply area average annual growth over the next five years (2020-2025)

Season	Supply Area Average Annual Growth (2020-2025)			
	Strong growth (> 5% pa)	High growth (3-5% pa)	Medium growth (1-3% pa)	Low growth or decline (<1% pa)
Summer	Kalkallo	Yarraville	Newport, Flemington, Somerton, Braybrook, Coolaroo, Coburg South, Sydenham, North Essendon, Footscray East, Watsonia and Fairfield	▇▇▇▇▇▇▇▇ Airport West, Broadmeadow ▇▇▇▇ ▇▇▇ Preston, Broadmeadows South, Coburg North, Essendon, Footscray West, Heidelber ▇▇▇▇▇▇ North Heidelberg, East Preston, Tullamarine, Pascoe Vale, St. Albans, Sunbury, Thomastown, Tottenha ▇▇ ▇▇

3.1   MAJOR DEVELOPMENTS

New major developments anticipated over the forecast period in the northern part of the JEN supply area include:

•   URD and industrial estates development in the Kalkallo, Craigieburn and Mickleham areas covered by the Northern Growth Corridor, currently supplied from Somerton and Kalkallo zone substations;

•   Proposed new ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇ and continued URD estates developments within the Sydenham supply area;

•   Continued URD and commercial estates developments within the Sunbury supply area; and

- Continued URD estates expansion within the Greenvale area, currently supplied from Coolaroo zone substation.

Areas within the established inner suburbs are also experiencing high growth, and these include:

- ███████████████████ which will be supplied from Footscray West and Footscray East zone substations

- New metro rail supplies - various location (Sunbury, Footscray, Tottenham, Yarraville) along JEN network

- New high rise residential and office buildings within the Footscray Central Activities Area, currently supplied by Footscray East zone substation;

- ████████████████████████ in Fairfield to multiple high rise residential and office buildings, which will be supplied from Fairfield zone substation;

- ███████████████████ (NELP) which will be supplied from a new zone substation connected to TTS-NH-WT-TTS 66kV loop;

- ██████████████████████████ to high rise residential and commercial development, this new development will be supplied from North Essendon zone substation.

- Development of Josephs Road precinct in Footscray currently supplied from Yarraville zone substation.

- On-going URD and commercial developments within the Pentridge area, currently supplied from Coburg South zone substation;

- On-going developments a ██████ currently supplied from Broadmeadows South zone substation.

- ████████████████████ to multiple high rise residential and commercial buildings, which will be supplied from Footscray East zone substation.

In preparing the forecast, only loads associated with confirmed new developments or development proposals that have a high probability of proceeding are included.

4. LOAD FORECAST DATA
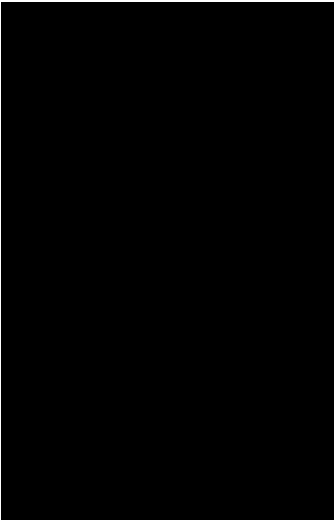
4.1 NOTES ON USE OF LOAD FORECAST

The forecast data presented in this report has the following assumptions.

4.1.1 EMBEDDED GENERATION

Table 4–1 shows the capacity and year of installation of the embedded generators inter-connected to the Jemena Electricity Network with a capacity of greater than 1 MW. In forecasting peak demand for zone substations and feeders with embedded generation, it was assumed that the generators are not running at peak load periods unless otherwise specified due to the absence of any contract requiring the generator to operate at particular times specified by JEN.

Table 4–1: Embedded generators inter-connected to the Jemena Electricity Network

Embedded Generator	Capacity (nominal)	Year Installed	Zone Substation
██████████████	17.5 MW	Installed in 1991 & decommissioned in early 2013	████
	3.8 MW	Installed in 1991 & decommissioned in late 2013	NH
	1.5 MW	2011	NH
	6.4 MW	1993	BMS
	3.0 MW	1st unit in 2002 2nd unit in 2004 3rd unit in 2007	TH
	6.0 MW	Early 1990s & decommissioned in early 2018	TT
	2.0MW	2008	CN
Somerton Power Station	150 MW	2002	Somerton Switching Station
██████	4.1 MW	2012	██████

4.1.2 CROSS BOUNDARY FLOWS

For zone substations Fairfield (FF) and North Essendon (NS) which provide supplies to customers of CitiPower Pty, the load forecasts shown are total station demand. For AusNet Services zone substations Kalkalo (KLO), Thomastown (TT) and Watsonia (WT), the load forecasts shown are JEN's demand only.

There are three 22kV feeders shared with Powercor, which are connected to Powercor's zone substation St Albans (SA). Load forecasts shown are an estimate of the JEN load supplied by these feeders.

4.1.3   SUMMER AND WINTER PERIOD

Summer refers to months of October to March in the following year inclusive. For an example, October 2018 - March 2019 would be shown as "summer 2019".

Winter refers to months of April to September inclusive. For an example, April 2018 – September 2018 would be shown as "winter 2018".

4.1.4   STATION & FEEDER RATINGS

Station Ratings

1. Zone substation capacitors are shown with their Mega-Volt-Ampere-reactive (MVAr) capacity at nominal voltage levels.

2. Station transformer load forecasts and station transformer (N-1) cyclic & 24-hour emergency ratings are shown in Mega-Volt-Amperes (MVA).

3. Station transformer (N-1) cyclic & 24-hour emergency summer ratings are calculated based on a maximum ambient temperature of 38⁰C, which is representing the 50% PoE ambient temperature. Ratings under 10% PoE ambient temperature have not been calculated and therefore not shown in this report.

4. Station transformer (N-1) cyclic rating is the permissible daily peak demand to which the transformer(s) may be subjected over summer or winter period following outage of a major plant item at the station.

5. Station transformer (N-1) 24-hour emergency rating (or N-1 limited cyclic rating) is the permissible peak demand to which the transformer(s) may be subjected over one daily load cycle, after which the transformer load must be reduced to its station transformer (N-1) cyclic rating following outage of a major plant item at the station.

   For further information in relation to station (N-1) cyclic & 24hr emergency ratings, refer to "JEN MA 0010 Jemena Planning Manual" document[14].

Feeder Ratings

All feeder summer ratings shown in this report are calculated based on a maximum ambient temperature of 35⁰C, which is lower than the 50% PoE ambient temperature. JEN is currently adopting this rating as the 50PoE summer rating. This is a conservative approach as the feeder rating could be much lower during a 10PoE maximum demand condition. Based on JEN calculation the feeder rating could be 10-15% lower when the ambient temperature is closer to the 10PoE demand condition.

4.1.5   PROJECT INFORMATION

Project details and dates where shown are tentative only. They are to be confirmed by Customer and System Planning Manager prior to committing expenditure.

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[14]   Jemena, *"JEN MA 0010 Jemena Planning Manual"*,2019

4.2   SYSTEM LEVEL FORECAST

The system level forecast has been developed by ACIL Allen Consulting using the system level (top-down) forecasting methodology described in section 2, above. The forecast shows that maximum demand for electricity supplied to customers through the Jemena Electricity Network is expected to grow at an average of 0.73% per annum over the next ten years. This growth is largely driven by a projected return to trend GDP growth and a stabilisation of electricity prices.

Table 4–2 below shows the historical observed actual and 10-year forecasts (50PoE and 10PoE) of JEN total network (i.e. all JEN network customers' maximum coincident load demand aggregated at the system level).

Table 4–2: JEN Total Network Maximum Demand Forecast

Demand (MW)	Actual		Forecast										Average annual growth	
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2020-2025	2020-2029
Summer (50PoE)	946.6	974.7	950	959	970	978	984	988	996	999	1006	1014	0.79%	0.73%
Winter (50PoE)	749.1	769	777	786	790	792	794	795	796	797	797		0.64%	0.40%
Summer (10PoE)	946.6	974.7	1053	1058	1072	1072	1082	1090	1096	1100	1106	1114	0.69%	0.63%
Winter (10PoE)	749.1	790	799	807	811	815	816	817	818	819	819		0.65%	0.40%

Maximum demand is forecast to grow over the forecast period largely driven by a projected return to trend GDP growth and a stabilisation of electricity prices. At 50% PoE level, peak demand on JEN network is projected to grow by 0.79% per annum.

4.3 TERMINAL STATION FORECASTS

Jemena Electricity Network is supplied by ten independent bus groups within seven terminal stations. 50PoE and 10PoE forecasts of JEN load supplied by each terminal station are provided in Table 4–3 and Table 4–4 below.

Table 4–3: Terminal Station Maximum Demand (MW, 50PoE forecasts, JEN load only)

Station	Season	Actual		50PoE Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BLTS22	Summer	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	Winter	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
BLTS66	Summer	121.9	129.1	134.5	135.1	136.0	129.2	129.7	128.9	128.4	127.5	127.0	126.6
	Winter	106.6	108.8	120.5	121.2	121.3	113.7	113.7	112.7	111.5	110.5	109.3	108.2
BTS	Summer	52.2	58.8	54.1	54.8	56.4	58.0	59.4	59.8	60.5	61.0	61.6	62.3
	Winter	40.7	41.5	41.9	42.7	43.9	45.1	46.2	46.4	46.6	46.9	47.0	47.2
KTS East	Summer	219.5	227.9	214.9	216.4	217.7	218.6	219.0	219.8	221.2	221.7	222.9	224.4
	Winter	161.8	164.9	166.5	168.3	168.5	168.4	168.2	168.2	168.2	168.2	167.9	167.8
KTS West	Summer	79.2	80.0	79.9	80.5	81.4	82.3	83.2	84.3	85.7	86.7	88.0	89.5
	Winter	56.7	57.9	58.5	59.2	59.6	60.1	60.7	61.3	61.9	62.5	63.1	63.7
SMTS	Summer	75.2	78.7	79.5	83.3	86.1	88.2	89.6	91.3	93.2	94.8	96.8	98.9
	Winter	64.5	65.9	69.4	73.0	75.1	76.4	77.3	78.5	79.6	80.8	81.9	83.0
TSTS	Summer	25.9	25.9	24.3	24.6	25.0	25.3	25.3	25.3	25.4	25.4	25.4	25.5
	Winter	17.3	17.7	17.8	18.1	18.4	18.6	18.6	18.5	18.4	18.4	18.3	18.2

Station	Season	Actual		50PoE Forecast									
		2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
TTS B1B2	**Summer**	98.7	107.6	102.7	119.9	119.5	118.6	118.0	118.3	118.9	119.1	119.6	120.3
	Winter	76.6	78.0	78.9	95.2	94.3	92.9	92.0	91.9	91.8	91.7	91.5	91.3
TTS B3B4	**Summer**	243.6	250.6	243.1	226.7	229.4	230.9	231.8	233.1	235.0	236.1	237.8	239.9
	Winter	204.0	209.8	211.5	196.4	197.4	197.5	197.3	197.8	198.1	198.5	198.6	198.9
WMTS	**Summer**	62.8	63.9	77.8	78.4	79.8	74.3	75.7	75.7	75.9	75.9	76.0	76.3
	Winter	56.1	57.9	70.3	70.9	71.7	65.7	66.6	66.4	66.2	66.0	65.7	65.5

Table 4–4: Terminal Station Maximum Demand (MW, 10PoE forecasts, JEN load only)

Station	Season	Actual		10PoE Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BLTS22	Summer	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	Winter	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
BLTS66	Summer	121.9	129.1	147.6	147.7	148.8	140.9	142.0	141.5	140.7	139.6	138.9	138.4
	Winter	106.6	111.5	123.3	123.9	123.8	116.5	116.3	115.2	114.2	113.1	111.9	110.9
BTS	Summer	52.2	58.8	61.5	62.1	64.0	65.3	67.1	67.8	68.4	68.9	69.6	70.3
	Winter	40.7	43.9	44.2	45.1	46.3	47.6	48.7	48.9	49.2	49.4	49.6	49.9
KTS East	Summer	219.5	227.9	240.1	240.7	242.5	241.5	242.9	244.4	245.4	245.9	247.1	248.5
	Winter	161.8	169.2	170.7	172.3	172.5	172.6	172.2	172.2	172.4	172.3	172.1	172.2
KTS West	Summer	79.2	80.0	91.8	92.0	93.2	93.5	94.8	96.4	97.8	98.9	100.4	101.9
	Winter	56.7	60.5	61.1	61.8	62.2	62.9	63.4	64.0	64.7	65.3	65.9	66.6
SMTS	Summer	75.2	78.7	86.1	89.9	93.0	94.5	96.4	98.4	100.3	102.0	104.0	106.2
	Winter	64.5	66.9	70.5	74.1	76.1	77.5	78.4	79.5	80.8	82.0	83.1	84.3
TSTS	Summer	25.9	25.9	27.3	27.5	28.1	28.1	28.2	28.3	28.4	28.3	28.4	28.6
	Winter	17.3	18.3	18.4	18.7	19.1	19.3	19.2	19.1	19.1	19.0	18.9	18.9
TTS B1B2	Summer	98.7	107.6	113.6	132.1	131.9	129.9	129.6	130.3	130.7	130.8	131.4	131.9
	Winter	76.6	80.8	81.7	98.4	97.4	96.2	95.1	95.0	95.0	94.9	94.7	94.6
TTS B3B4	Summer	243.6	250.6	264.9	245.9	249.2	248.9	250.8	252.8	254.4	255.4	257.2	259.1
	Winter	204.0	214.1	215.8	200.2	201.1	201.4	201.1	201.6	202.1	202.4	202.5	203.0
WMTS	Summer	62.8	63.9	85.2	85.5	87.2	81.2	83.0	83.2	83.3	83.2	83.4	83.5
	Winter	56.1	59.9	72.4	72.9	73.7	67.8	68.7	68.5	68.4	68.2	67.9	67.7

4.4   ZONE SUBSTATION AND FEEDER FORECASTS

50PoE and 10PoE forecasts of summer and winter maximum demand at the zone substation and feeder levels are presented in this section. The zone substation and feeder forecasts are grouped together on a zone substation basis and presented alphabetically.

Zone substation demand is presented as MW, load MVAr and transformer MVA, where load MVAr is the sum of MVAr at the feeder exits (i.e. does not account for the effect of any capacitor banks at the station), and transformer MVA is the demand measured at the secondary side of the station transformers (i.e. does account for the effect of cap banks). Where the station has cap banks, the capacitor MVAr (rating) has also been provided. Note that some capacitor banks may not be in service at the time of maximum demand.

Figure 4–1: Transformer MVAr and load MVAr

$$Transformer\ MW = Load\ MW$$

$$Transformer\ MVAr = Load\ MVAr + Capacitor\ MVAr$$
$$Transformer\ MVA = \sqrt{(MW^2 + Transformer\ MVAr^2)}$$
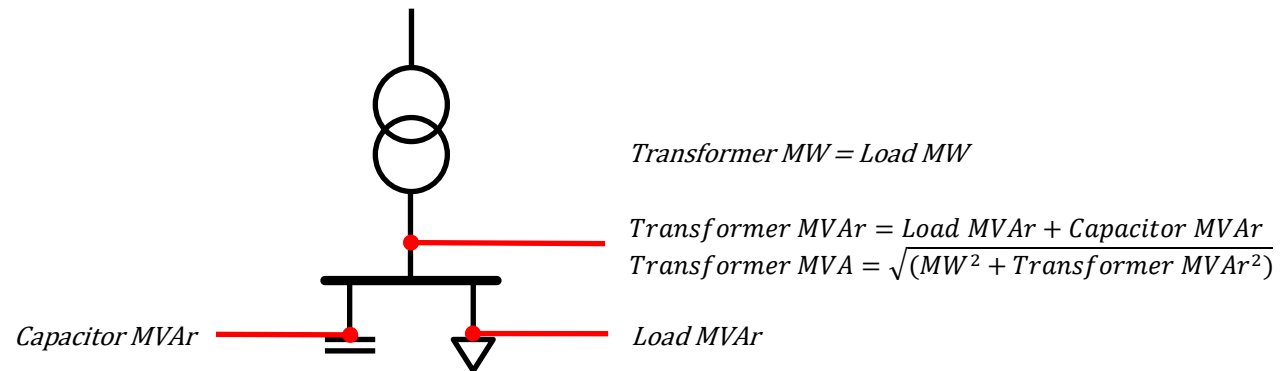
Feeder demand is presented in Amperes.

Point of Supply	███████████████		Address	█████████████████
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	42 B10
Terminal Station	BLTS			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	8.7	8.5	8.3	8.2	8.1	8.0	7.9	7.9	7.9	7.8	7.8	7.8
	Load MVAr	4.3	3.8	4.0	4.0	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8
	Tx MVA	9.7	9.3	9.3	9.1	9.0	8.9	8.8	8.8	8.7	8.7	8.7	8.7
50PoE Winter	MW	8.4	8.6	8.5	8.4	8.2	8.0	7.9	7.9	7.8	7.7	7.7	7.6
	Load MVAr	4.0	3.4	3.4	3.3	3.3	3.2	3.2	3.1	3.1	3.1	3.0	3.0
	Tx MVA	9.3	9.2	9.2	9.0	8.9	8.7	8.5	8.5	8.4	8.3	8.2	8.2
10PoE Summer	MW	8.7	8.5	8.8	8.7	8.6	8.4	8.3	8.3	8.3	8.2	8.2	8.2
	Load MVAr	4.3	3.8	4.3	4.2	4.2	4.1	4.0	4.0	4.0	4.0	4.0	4.0
	Tx MVA	9.7	9.3	9.8	9.6	9.5	9.3	9.3	9.2	9.2	9.1	9.1	9.1
10PoE Winter	MW	8.4	8.8	8.8	8.6	8.4	8.3	8.1	8.1	8.0	7.9	7.9	7.8
	Load MVAr	4.0	3.5	3.5	3.4	3.4	3.3	3.2	3.2	3.2	3.2	3.1	3.1
	Tx MVA	9.3	9.5	9.4	9.3	9.1	8.9	8.8	8.7	8.6	8.5	8.5	8.4

Station Configuration		
Power Transformers	Number	1
	Nameplate	10/16
Capacitor		0
No. of Distribution Feeders		1
Other		-

Cogeneration	
Remarks	████████████ r at YVE for ██████████

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	0.0	0.0	Transformer thermal limit
24-hour	20	30	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	14.3	13.3
LV 22 kV	2.9	3.6

Point of Supply	Airport West (AW)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	KTS B1-B2	

Address	Moore Road, Airport West
Melway Map Ref	16 A5

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	83.8	76.5	76.2	75.9	75.9	75.8	75.6	75.6	75.8	75.8	76.1	76.4
	Load MVAr	25.0	26.5	26.4	26.3	26.3	26.3	26.2	26.2	26.3	26.3	26.4	26.5
	Tx MVA	83.8	76.7	76.4	76.0	76.1	76.0	75.8	75.8	76.0	76.0	76.3	76.6
50PoE Winter	MW	56.1	57.3	57.3	57.0	56.8	56.4	56.1	55.9	55.6	55.5	55.3	55.1
	Load MVAr	17.8	19.4	19.4	19.3	19.3	19.1	19.0	19.0	18.9	18.8	18.8	18.7
	Tx MVA	56.4	57.8	57.8	57.5	57.2	56.9	56.5	56.3	56.1	55.9	55.7	55.5
10PoE Summer	MW	83.8	76.5	83.9	83.2	83.4	82.7	82.7	83.0	83.0	83.0	83.2	83.5
	Load MVAr	25.0	26.5	29.1	28.9	28.9	28.7	28.7	28.8	28.8	28.8	28.9	29.0
	Tx MVA	83.8	76.7	84.3	83.6	83.8	83.0	83.1	83.3	83.4	83.3	83.6	83.9
10PoE Winter	MW	56.1	59.0	58.9	58.6	58.3	58.0	57.6	57.4	57.2	57.0	56.8	56.7
	Load MVAr	17.8	20.0	20.0	19.9	19.8	19.7	19.5	19.5	19.4	19.3	19.3	19.2
	Tx MVA	56.4	59.5	59.4	59.1	58.8	58.5	58.1	57.8	57.7	57.5	57.3	57.2

Station Configuration		
Power Transformers	Number	4
	Nameplate	3-20/30 & 1-40
Capacitor		21.97
No. of Distribution Feeders		12
Other		NER

Cogeneration	
Remarks	Fault levels indicated are for 3 transformers in parallel

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	100.5	120.7	Transformer thermal limit
24-hour	110.5	132.8	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	13.7	9.6
LV 22 kV	12.4	2.5

4 — LOAD FORECAST DATA

Feeder Loading (Amps) - Airport West (AW)											
Feeder	**Season**	**Rating**	**Actual**		**50PoE Forecast**						**Comments**
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
AW1	**Summer**	285	253	230	247	250	258	268	273	279	
	Winter	285	199	203	205	207	211	218	221	225	
AW2	**Summer**	375	229	230	223	220	218	219	223	227	
	Winter	375	171	175	174	171	168	168	170	173	
AW3	**Summer**	375	157	147	144	143	141	140	138	138	
	Winter	375	141	144	143	141	139	136	134	133	
AW4	**Summer**	585	159	171	165	165	168	170	171	172	
	Winter	585	130	133	134	133	135	135	135	135	
AW5	**Summer**	345	163	190	160	159	159	159	158	159	
	Winter	345	150	153	153	151	150	149	147	147	
AW6	**Summer**	305	352	350	347	348	351	352	348	348	
	Winter	305	210	215	214	214	214	213	210	208	
AW7	**Summer**	305	347	335	332	329	330	332	334	338	
	Winter	305	211	216	215	212	212	211	211	213	
AW8	**Summer**	375	126	126	121	120	119	117	116	116	
	Winter	375	103	105	105	103	101	99	98	97	
AW9	**Summer**	305	209	225	214	214	214	212	210	210	
	Winter	305	146	149	150	150	148	146	144	143	
AW11	**Summer**	375	199	198	200	206	210	209	208	208	
	Winter	375	196	200	205	211	213	210	208	208	
AW12	**Summer**	375	237	226	232	232	236	238	239	241	
	Winter	375	211	216	215	214	216	217	216	217	
AW14	**Summer**	375	122	126	122	121	120	118	117	117	
	Winter	375	104	106	106	104	102	100	99	98	

			Feeder Loading (Amps) - Airport West (AW)									
Feeder	**Season**	**Rating**	**Actual**		**10PoE Forecast**							**Comments**
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
AW1	Summer	285	253	230	273	275	284	293	299	307	
	Winter	285	199	209	210	212	217	224	227	231	
AW2	Summer	375	229	230	239	235	233	233	237	243	
	Winter	375	171	180	179	176	173	173	174	178	
AW3	Summer	375	157	147	153	150	149	146	145	145	
	Winter	375	141	148	147	145	143	140	138	137	
AW4	Summer	585	159	171	180	179	183	183	184	186	
	Winter	585	130	137	137	137	138	139	138	139	
AW5	Summer	345	163	190	169	168	168	166	166	167	
	Winter	345	150	158	157	155	154	153	151	151	
AW6	Summer	305	352	350	392	391	395	393	391	391	
	Winter	305	210	221	220	219	219	218	215	214	
AW7	Summer	305	347	335	372	367	369	368	371	377	
	Winter	305	211	222	221	218	217	217	217	219	
AW8	Summer	375	126	126	131	129	128	125	125	125	
	Winter	375	103	108	108	106	104	102	101	100	
AW9	Summer	305	209	225	237	236	236	232	231	231	
	Winter	305	146	153	154	154	152	150	148	147	
AW11	Summer	375	199	198	212	217	222	218	218	219	
	Winter	375	196	206	211	216	219	216	214	213	
AW12	Summer	375	237	226	249	249	253	254	255	258	
	Winter	375	211	222	221	220	221	223	222	223	
AW14	Summer	375	122	126	131	129	128	125	124	124	
	Winter	375	104	109	109	107	105	103	102	101	

Airport West Zone Substation – Insights
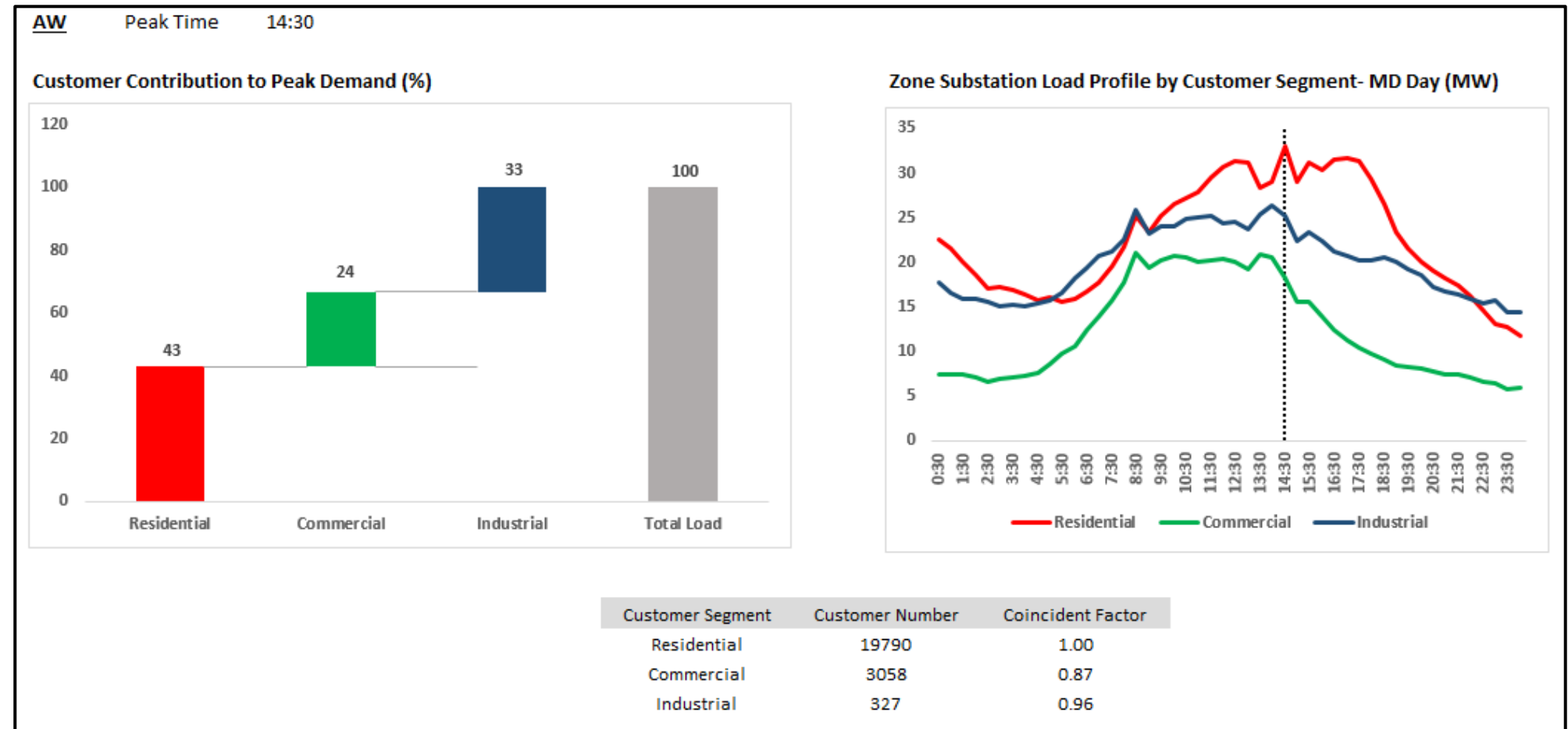
Point of Supply	Broadmeadows (BD)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B34)	

Address	Cnr Maffra Street & Barry Road, Broadmeadows
Melway Map Ref	7 C3

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	81.4	76.3	79.1	78.2	78.5	78.5	78.2	77.9	77.9	77.7	77.7	77.8
	Load MVAr	37.1	29.9	39.9	39.4	39.6	39.6	39.4	39.3	39.3	39.1	39.2	39.2
	Tx MVA	83.3	77.0	81.6	80.6	81.0	80.9	80.6	80.3	80.3	80.1	80.1	80.2
50PoE Winter	MW	68.8	71.9	72.5	71.5	71.3	70.7	70.1	69.6	69.1	68.7	68.3	67.9
	Load MVAr	23.4	30.1	30.3	29.9	29.8	29.6	29.3	29.1	28.9	28.7	28.5	28.4
	Tx MVA	68.9	72.7	73.3	72.3	72.0	71.4	70.7	70.3	69.7	69.3	68.9	68.5
10PoE Summer	MW	81.4	76.3	86.5	85.2	85.7	84.9	84.9	84.8	84.7	84.3	84.3	84.4
	Load MVAr	37.1	29.9	43.6	42.9	43.2	42.8	42.8	42.8	42.7	42.5	42.5	42.5
	Tx MVA	83.3	77.0	89.7	88.3	88.8	88.0	88.0	87.9	87.7	87.4	87.4	87.4
10PoE Winter	MW	68.8	74.0	74.5	73.5	73.2	72.7	72.0	71.5	71.1	70.6	70.2	69.9
	Load MVAr	23.4	30.9	31.2	30.7	30.6	30.4	30.1	29.9	29.7	29.5	29.3	29.2
	Tx MVA	68.9	74.8	75.4	74.3	74.0	73.5	72.7	72.2	71.8	71.3	70.8	70.5

Station Configuration		
Power Transformers	Number	4
	Nameplate	3-20/30 & 1-20/33
Capacitor		19.7
No. of Distribution Feeders		14
Other		NER

Cogeneration	
Remarks	Fault levels indicated are for 3 transformers in parallel

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	123.7	125.1	Transformer thermal limit
24-hour	123.7	125.1	Transformer thermal limit

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	13.7	8.5
LV 22 kV	12.2	2.2

4 — LOAD FORECAST DATA

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
BD1	**Summer**	375	159	153	164	165	177	193	203	215	
	Winter	375	145	148	161	161	172	186	195	206	
BD2	**Summer**	590	40	45	44	43	43	42	42	42	████████
	Winter	590	37	38	37	37	36	35	35	35	
BD3	**Summer**	305	291	286	282	280	278	275	273	273	
	Winter	305	257	263	262	260	256	252	249	247	
BD4	**Summer**	305	296	96	128	127	126	125	123	123	
	Winter	305	69	114	114	112	111	108	107	106	
BD6	**Summer**	590	39	38	38	37	37	36	36	36	████████
	Winter	590	32	33	33	32	31	31	30	30	
BD7	**Summer**	305	210	209	217	218	218	215	213	212	
	Winter	305	134	137	143	143	142	139	137	136	
BD8	**Summer**	305	268	229	230	233	235	233	231	231	
	Winter	305	287	232	236	239	238	235	232	230	
BD9	**Summer**	345	125	139	146	145	145	144	143	142	
	Winter	345	139	142	151	150	148	146	144	143	
BD10	**Summer**	305	240	248	238	235	233	233	235	238	
	Winter	305	184	188	187	184	181	180	180	181	
BD11	**Summer**	305	135	146	144	145	149	153	154	155	
	Winter	305	128	131	130	131	134	136	136	137	
BD13	**Summer**	315	233	214	222	213	235	245	246	250	
	Winter	315	248	233	245	234	257	265	266	268	
BD14	**Summer**	315	213	200	196	194	191	189	187	186	
	Winter	315	202	207	205	202	199	195	192	190	
BD15	**Summer**	590	275	275	274	277	281	280	280	281	
	Winter	590	256	262	264	266	268	265	263	263	
BD16	**Summer**	375	176	239	236	239	244	247	247	248	
	Winter	375	171	175	175	177	179	180	179	179	

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
BD1	Summer	375	159	153	173	174	187	202	213	226	
	Winter	375	145	152	165	166	176	191	200	211	
BD2	Summer	590	40	45	46	46	45	44	44	44	███████
	Winter	590	37	39	38	38	37	36	36	36	
BD3	Summer	305	291	286	298	294	293	288	287	287	
	Winter	305	257	270	270	267	263	259	255	254	
BD4	Summer	305	296	96	135	134	133	130	129	129	
	Winter	305	69	117	117	116	114	112	110	109	
BD6	Summer	590	39	38	40	39	39	38	38	38	███████
	Winter	590	32	34	33	33	32	32	31	31	
BD7	Summer	305	210	209	242	242	242	237	235	235	
	Winter	305	134	141	147	147	146	143	141	140	
BD8	Summer	305	268	229	243	246	247	244	243	243	
	Winter	305	287	238	242	245	245	242	238	237	
BD9	Summer	345	125	139	155	153	153	151	150	149	
	Winter	345	139	146	155	154	152	150	148	147	
BD10	Summer	305	240	248	258	254	251	250	252	256	
	Winter	305	184	193	192	189	186	185	185	186	
BD11	Summer	305	135	146	152	152	157	160	161	163	
	Winter	305	128	135	134	135	138	140	140	141	
BD13	Summer	315	233	214	235	224	248	256	259	263	
	Winter	315	248	240	252	240	264	273	273	275	
BD14	Summer	315	213	200	207	204	202	198	196	196	
	Winter	315	202	212	211	208	204	200	197	195	
BD15	Summer	590	275	275	290	292	296	293	293	295	
	Winter	590	256	269	272	273	275	272	270	270	
BD16	Summer	375	176	239	250	252	257	259	259	261	
	Winter	375	171	180	180	182	183	185	183	184	

Feeder Loading (Amps) - Broadmeadows (BD)

Broadmeadows Zone Substation – Insights

Customer Segment	Customer Number	Coincident Factor
Residential	12998	0.75
Commercial	2151	0.99
Industrial	221	1.00
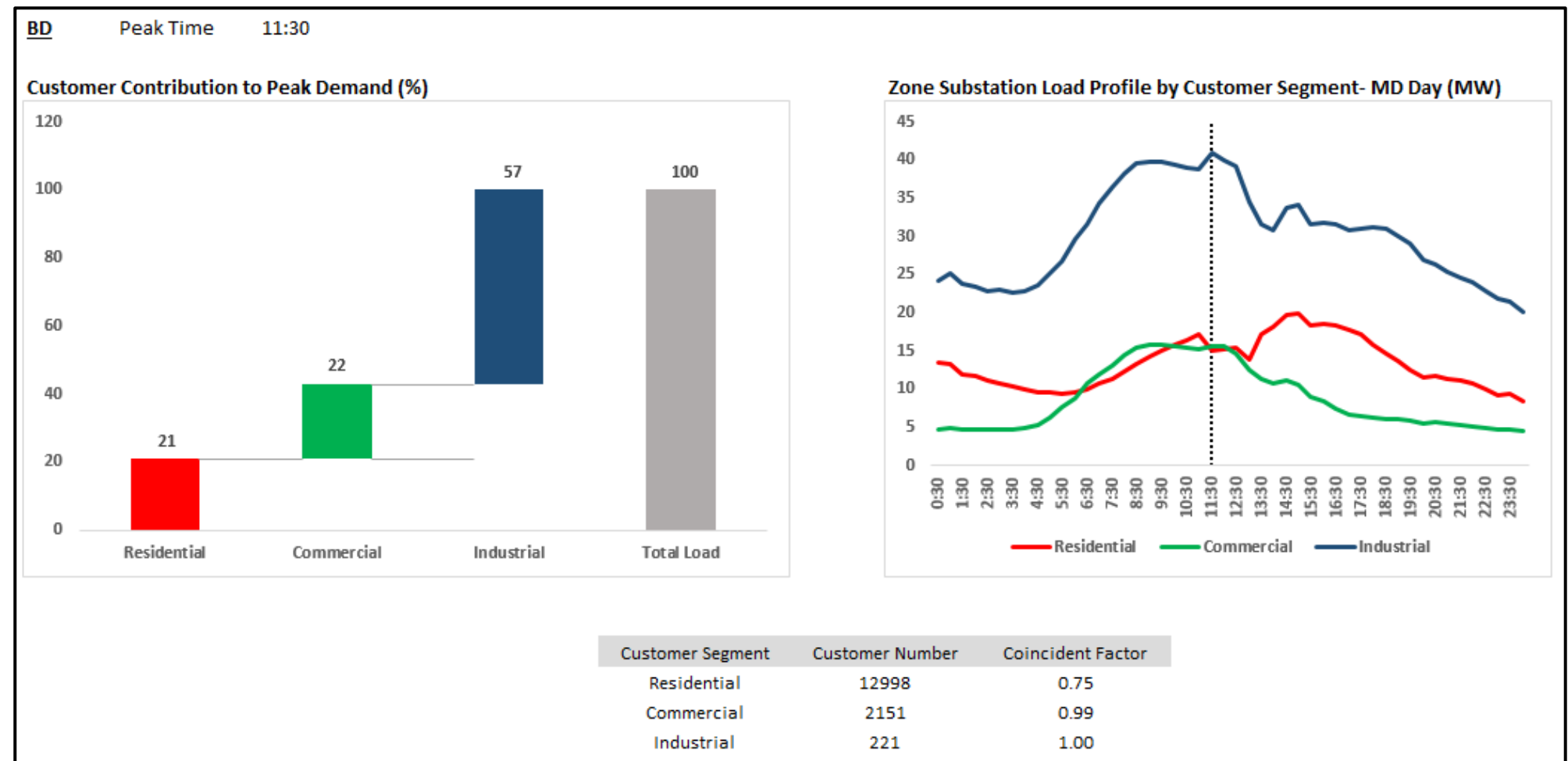
Point of Supply	Broadmeadows South (BMS)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B34)	

Address	Maygar Blvd, Broadmeadows
Melway Map Ref	7 C9

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	30.0	29.0	30.0	29.9	29.8	29.5	29.4	29.3	29.3	29.1	29.1	29.1
	Load MVAr	9.9	9.6	9.5	9.5	9.5	9.4	9.4	9.3	9.3	9.3	9.3	9.3
	Tx MVA	30.3	29.2	30.2	30.1	30.0	29.7	29.6	29.5	29.4	29.3	29.3	29.3
50PoE Winter	MW	27.0	27.6	27.7	27.5	27.2	26.8	26.5	26.3	26.1	26.0	25.8	25.6
	Load MVAr	7.0	4.7	4.7	4.7	4.6	4.5	4.5	4.5	4.4	4.4	4.4	4.3
	Tx MVA	27.0	28.0	28.1	27.9	27.6	27.1	26.9	26.7	26.5	26.3	26.1	26.0
10PoE Summer	MW	30.0	29.0	32.8	32.6	32.5	31.9	31.9	31.9	31.8	31.6	31.6	31.6
	Load MVAr	9.9	9.6	10.4	10.4	10.4	10.2	10.2	10.2	10.1	10.1	10.1	10.1
	Tx MVA	30.3	29.2	33.1	32.9	32.8	32.2	32.2	32.2	32.1	31.9	31.9	31.9
10PoE Winter	MW	27.0	28.4	28.5	28.3	28.0	27.5	27.3	27.0	26.9	26.7	26.5	26.3
	Load MVAr	7.0	4.8	4.8	4.8	4.7	4.7	4.6	4.6	4.5	4.5	4.5	4.5
	Tx MVA	27.0	28.8	28.9	28.7	28.4	27.9	27.6	27.4	27.2	27.1	26.9	26.7

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/33
Capacitor		6
No. of Distribution Feeders		5
Other		NER

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	38.0	39.6	Transformer thermal limit
24-hour	47.6	47.6	Transformer circuit breaker limit

Cogeneration	███████████████
Remarks	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	12.8	7.9
LV 22 kV	8.9	1.7

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
BMS11	**Summer**	375	190	206	207	209	211	212	214	217	
	Winter	375	169	173	176	177	177	177	178	181	
BMS12	**Summer**	375	290	297	293	290	288	284	285	287	
	Winter	375	271	277	276	274	269	264	263	264	
BMS21	**Summer**	315	245	245	243	242	239	236	237	239	
	Winter	315	247	254	254	252	247	242	242	243	
BMS23	**Summer**	285	230	223	220	218	217	214	211	210	
	Winter	285	196	200	200	198	195	191	188	186	
BMS24	**Summer**	375	0	0	0	0	0	0	0	0	
	Winter	375	0	0	0	0	0	0	0	0	
BMS25	**Summer**	375	70	68	71	76	81	82	81	81	
	Winter	375	72	74	77	84	88	88	87	86	

Feeder Loading (Amps) - Broadmeadows South (BMS)

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
BMS11	**Summer**	315	190	206	219	220	222	222	225	229	
	Winter	315	169	178	181	182	182	182	183	185	
BMS12	**Summer**	375	290	297	309	306	304	297	299	302	
	Winter	375	271	285	284	281	277	271	270	271	
BMS21	**Summer**	315	245	245	257	255	252	247	249	252	
	Winter	315	247	261	261	258	253	248	248	250	
BMS23	**Summer**	285	230	223	232	230	228	223	222	221	
	Winter	285	196	206	206	203	200	196	193	191	
BMS24	**Summer**	375	0	0	0	0	0	0	0	0	
	Winter	375	0	0	0	0	0	0	0	0	
BMS25	**Summer**	375	70	68	75	80	86	86	85	85	
	Winter	375	72	76	80	86	91	91	89	88	

Broadmeadows South Zone Substation – Insights

Customer Segment	Customer Number	Coincident Factor
Residential	220	0.14
Commercial	18	0.06
Industrial	0	0.93
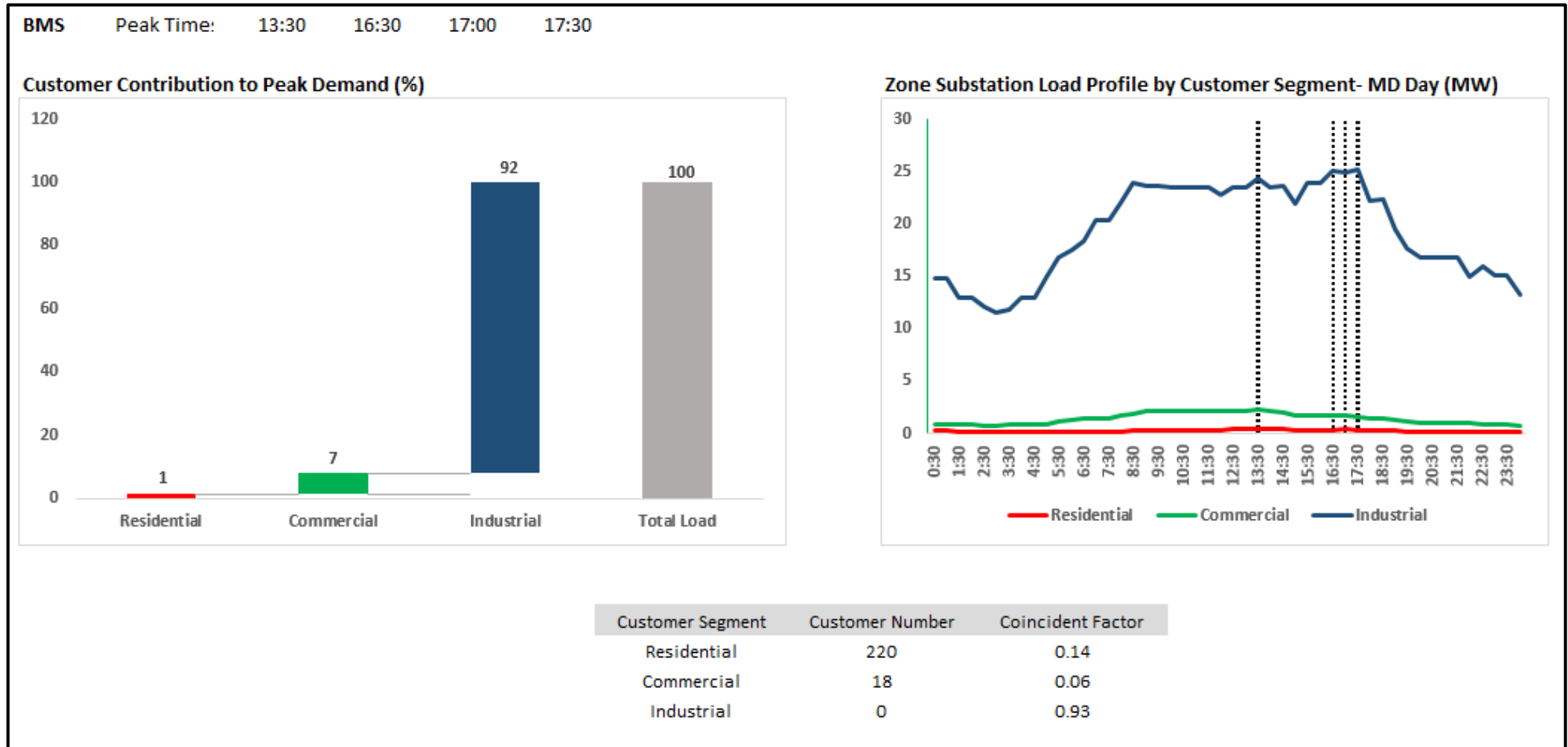
Point of Supply	Braybrook (BY)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	KTS B1-B2	

Address	Cnr Basquet Mitchell Streets, Braybrook
Melway Map Ref	27 H11

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	37.0	37.5	35.3	35.6	36.5	37.4	37.8	38.0	38.3	38.5	38.8	39.2
	Load MVAr	14.9	12.4	13.0	13.1	13.4	13.7	13.9	14.0	14.1	14.1	14.3	14.4
	Tx MVA	39.9	39.5	37.6	37.9	38.9	39.8	40.3	40.5	40.8	41.0	41.3	41.7
50PoE Winter	MW	25.8	26.3	26.4	26.7	27.3	28.0	28.3	28.3	28.4	28.4	28.5	28.5
	Load MVAr	6.2	6.5	6.5	6.6	6.7	6.9	7.0	7.0	7.0	7.0	7.0	7.0
	Tx MVA	26.5	27.1	27.2	27.5	28.2	28.8	29.1	29.2	29.2	29.3	29.3	29.4
10PoE Summer	MW	37.0	37.5	39.4	39.6	40.6	41.3	41.9	42.2	42.5	42.6	43.0	43.4
	Load MVAr	14.9	12.4	14.5	14.6	14.9	15.2	15.4	15.5	15.6	15.7	15.8	15.9
	Tx MVA	39.9	39.5	42.0	42.2	43.3	44.0	44.7	45.0	45.2	45.4	45.8	46.2
10PoE Winter	MW	25.8	27.1	27.2	27.4	28.1	28.8	29.1	29.1	29.2	29.2	29.3	29.3
	Load MVAr	6.2	6.7	6.7	6.7	6.9	7.1	7.2	7.2	7.2	7.2	7.2	7.2
	Tx MVA	26.5	27.9	28.0	28.2	28.9	29.7	29.9	30.0	30.0	30.1	30.1	30.2

Station Configuration		
Power Transformers	Number	2
	Nameplate	1-20/30 & 1-20/33
Capacitor		0
No. of Distribution Feeders		5
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	32.0	39.6	Transformer thermal limit
24-hour	39.3	44.8	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	10.5	6.6
LV 22 kV	8.6	1.6

Feeder Loading (Amps) - Braybrook (BY)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
BY11	Summer	445	266	281	284	306	333	353	357	364	
	Winter	445	184	188	191	205	221	233	234	238	
BY12	Summer	445	80	72	71	76	85	95	99	104	
	Winter	445	60	61	61	65	73	80	83	87	
BY13	Summer	445	272	271	266	263	274	289	300	313	
	Winter	445	202	207	206	203	210	219	226	235	
BY14	Summer	445	294	231	223	222	226	235	242	251	
	Winter	445	235	240	245	244	246	253	260	269	
BY15	Summer	445	176	181	178	176	174	173	172	172	
	Winter	445	183	187	186	184	181	178	176	175	

Feeder Loading (Amps) - Braybrook (BY)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
BY11	Summer	445	266	281	325	348	379	399	406	414	
	Winter	445	184	193	196	210	227	239	241	244	
BY12	Summer	445	80	72	75	80	90	99	104	109	
	Winter	445	60	63	63	67	75	83	86	90	
BY13	Summer	445	272	271	281	277	289	302	315	329	
	Winter	445	202	212	211	208	215	225	232	242	
BY14	Summer	445	294	231	247	245	250	257	266	277	
	Winter	445	235	247	252	250	253	260	267	276	
BY15	Summer	445	176	181	188	185	184	181	180	181	
	Winter	445	183	193	192	189	186	183	181	180	

Braybrook Zone Substation – Insights

BY	Peak Time	14:30

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Factor
Residential	8744	1.00
Commercial	518	0.99
Industrial	41	1.00
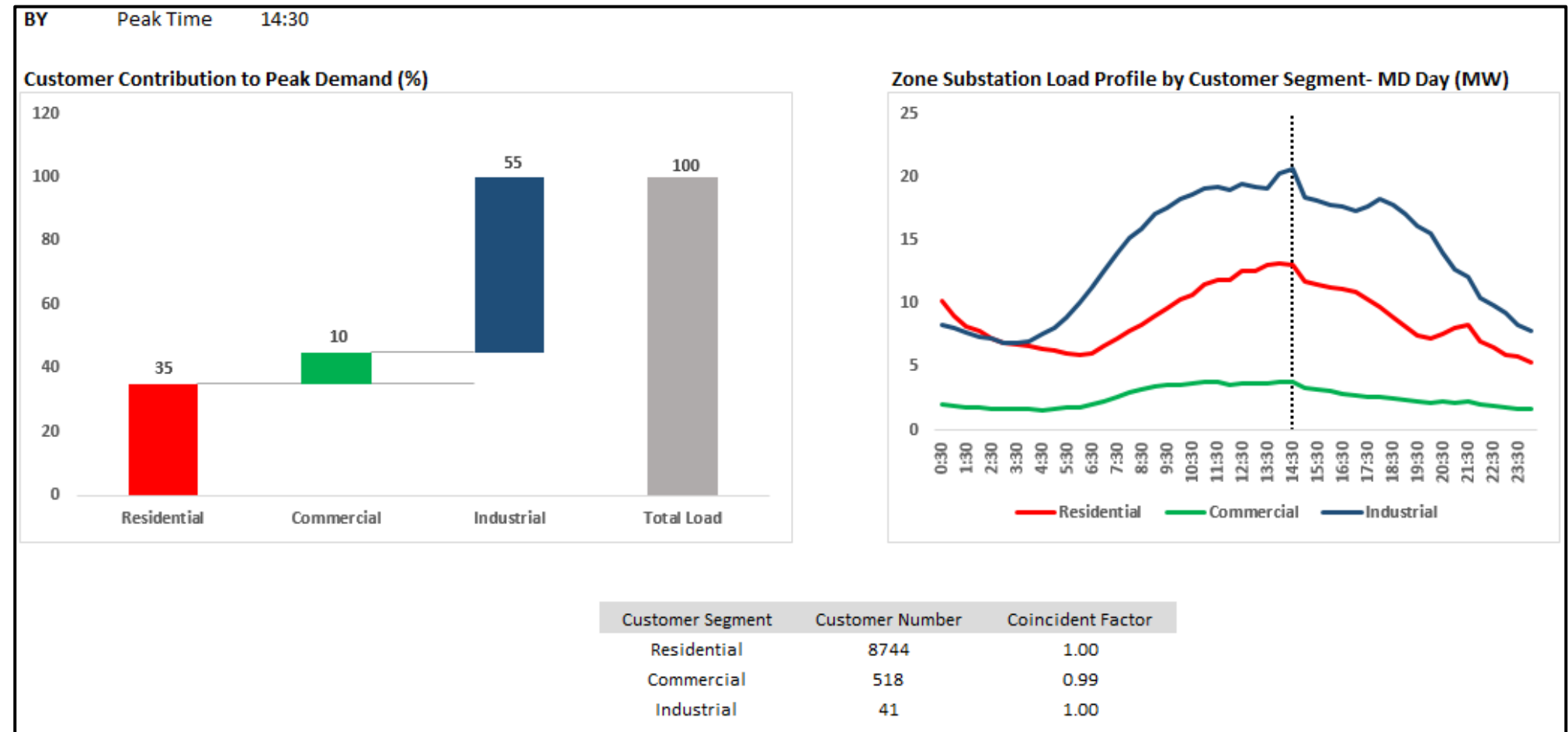
Point of Supply	Coburg North (CN)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B34)	

Address	Newlands Road, North Coburg
Melway Map Ref	18 A6

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	56.6	65.0	55.5	46.3	46.4	46.3	46.0	45.8	45.7	45.5	45.5	45.6
	Load MVAr	18.3	18.2	17.1	14.3	14.3	14.3	14.2	14.1	14.1	14.0	14.0	14.0
	Tx MVA	56.6	65.0	55.6	46.3	46.4	46.3	46.0	45.8	45.8	45.6	45.5	45.6
50PoE Winter	MW	48.4	49.5	49.9	41.3	41.1	40.7	40.2	39.9	39.6	39.3	39.0	38.8
	Load MVAr	14.5	12.8	12.9	10.7	10.6	10.5	10.4	10.3	10.2	10.1	10.1	10.0
	Tx MVA	48.4	49.6	49.9	41.3	41.1	40.7	40.2	39.9	39.6	39.3	39.0	38.8
10PoE Summer	MW	56.6	65.0	62.0	51.6	51.8	51.2	51.1	51.0	50.8	50.6	50.5	50.5
	Load MVAr	18.3	18.2	19.1	15.9	16.0	15.8	15.7	15.7	15.7	15.6	15.6	15.6
	Tx MVA	56.6	65.0	62.0	51.7	51.9	51.3	51.1	51.1	50.9	50.7	50.6	50.6
10PoE Winter	MW	48.4	50.9	51.3	42.4	42.2	41.8	41.3	41.0	40.7	40.4	40.1	39.9
	Load MVAr	14.5	13.1	13.2	10.9	10.9	10.8	10.7	10.6	10.5	10.4	10.4	10.3
	Tx MVA	48.4	50.9	51.3	42.4	42.2	41.8	41.3	41.0	40.7	40.4	40.1	39.9

Station Configuration		
Power Transformers	Number	3
	Nameplate	20/30
Capacitor		21.9
No. of Distribution Feeders		11
Other		NER

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	72.5	83.6	Transformer thermal limit
24-hour	80.6	92.5	

Cogeneration	████████████
Remarks	Fault levels are based on three transformers operating in parallel.

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	12.3	7.6
LV 22 kV	11.7	2.5

4 — LOAD FORECAST DATA

Feeder Loading (Amps) - Coburg North (CN)											
Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
CN1	Summer	325	190	179	175	173	171	169	167	166	
	Winter	325	179	183	182	179	176	172	170	168	
CN2	Summer	590	151	236	135	134	135	135	136	137	
	Winter	590	135	138	139	138	137	137	136	137	
CN3	Summer	325	91	101	99	90	97	101	100	100	
	Winter	325	97	99	99	90	96	100	98	97	
CN4	Summer	345	110	120	117	117	118	118	118	119	
	Winter	345	92	94	95	94	95	94	94	94	
CN5	Summer	375	206	220	219	219	218	217	216	216	
	Winter	375	141	144	144	144	143	141	139	139	
CN6	Summer	345	194	204	200	198	195	193	191	190	███████████████
	Winter	345	171	174	173	171	168	164	161	160	
CN7	Summer	310	212	237	255	149	156	159	161	164	
	Winter	310	162	165	167	98	101	102	103	104	
CN8	Summer	375	174	271	222	76	76	77	77	78	
	Winter	375	183	187	210	72	71	72	72	72	
CN9	Summer	325	114	114	112	114	117	118	117	116	
	Winter	325	112	114	114	115	117	117	115	115	
CN10	Summer	375	171	153	146	145	143	141	140	139	
	Winter	375	132	135	134	132	130	127	125	124	
CN11	Summer	375	171	192	244	244	244	244	242	241	████████████████████████
	Winter	375	186	190	190	190	189	187	184	183	██████████

Feeder Loading (Amps) - Coburg North (CN)										
Feeder	**Season**	**Rating**	**Actual**		**10PoE Forecast**						**Comments**
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
CN1	**Summer**	325	190	179	185	182	180	177	175	175	
	Winter	325	179	188	187	184	181	177	174	173	
CN2	**Summer**	590	151	236	143	141	142	142	142	144	
	Winter	590	135	142	143	142	141	141	140	141	
CN3	**Summer**	325	91	101	104	95	102	106	105	105	
	Winter	325	97	102	102	93	99	102	101	100	
CN4	**Summer**	345	110	120	127	126	128	127	128	129	
	Winter	345	92	96	97	97	97	97	97	97	
CN5	**Summer**	375	206	220	243	241	241	238	237	238	
	Winter	375	141	148	149	148	147	145	143	143	
CN6	**Summer**	345	194	204	211	208	206	202	200	200	██████████
	Winter	345	171	179	178	175	172	169	166	164	
CN7	**Summer**	310	212	237	285	166	173	176	178	182	
	Winter	310	162	170	172	100	104	105	106	107	
CN8	**Summer**	375	174	271	245	84	84	84	85	86	
	Winter	375	183	193	216	74	73	74	73	74	
CN9	**Summer**	325	114	114	118	120	123	123	122	122	
	Winter	325	112	117	117	118	120	121	119	118	
CN10	**Summer**	375	171	153	160	157	156	152	151	151	
	Winter	375	132	139	138	136	133	131	128	127	
CN11	**Summer**	375	171	192	269	269	269	266	265	265	████████████████
	Winter	375	186	195	195	195	194	192	189	188	████████

Coburg North Zone Substation – Insights

Customer Segment	Customer Number	Coincident Demand
Residential	20172	1.00
Commercial	1839	0.91
Industrial	102	0.80
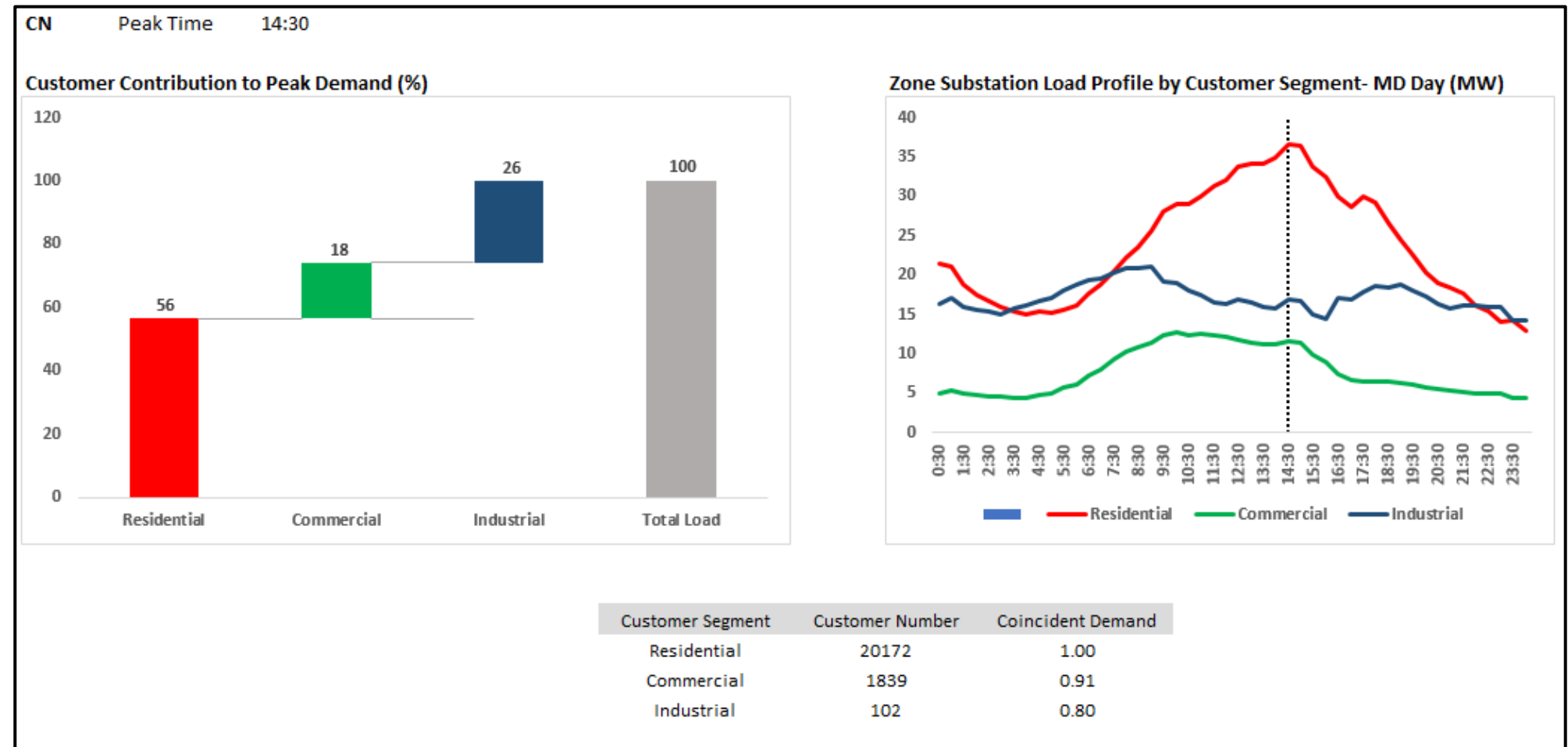
LOAD FORECAST DATA — 4

Point of Supply	Coolaroo (COO)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B34)	

Address	Cnr Somerton Road & Pascoe Vale Rd, Coolaroo
Melway Map Ref	179 K9

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	41.4	42.3	40.8	41.4	42.4	43.2	43.7	43.9	44.3	44.5	44.9	45.3
	Load MVAr	11.9	11.4	10.6	10.8	11.0	11.2	11.4	11.4	11.5	11.6	11.7	11.8
	Tx MVA	41.6	42.4	40.9	41.5	42.5	43.3	43.9	44.1	44.4	44.6	45.0	45.5
50PoE Winter	MW	33.6	34.4	35.0	35.6	36.2	36.7	37.0	37.1	37.1	37.2	37.2	37.3
	Load MVAr	6.7	5.1	5.2	5.3	5.4	5.4	5.5	5.5	5.5	5.5	5.5	5.5
	Tx MVA	33.7	34.4	35.1	35.6	36.3	36.7	37.0	37.1	37.1	37.2	37.3	37.4
10PoE Summer	MW	41.4	42.3	46.5	47.1	48.3	48.7	49.5	49.9	50.2	50.4	50.8	51.3
	Load MVAr	11.9	11.4	12.1	12.2	12.5	12.7	12.9	13.0	13.0	13.1	13.2	13.3
	Tx MVA	41.6	42.4	46.7	47.3	48.5	48.9	49.8	50.2	50.5	50.7	51.1	51.5
10PoE Winter	MW	33.6	35.3	36.0	36.5	37.2	37.7	38.0	38.1	38.1	38.2	38.3	38.4
	Load MVAr	6.7	5.2	5.3	5.4	5.5	5.6	5.6	5.6	5.6	5.6	5.7	5.7
	Tx MVA	33.7	35.3	36.0	36.6	37.2	37.7	38.1	38.1	38.2	38.2	38.3	38.4

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/33
Capacitor		8
No. of Distribution Feeders		6
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	38.0	39.6	Transformer thermal limit
24-hour	47.6	47.6	Transformer circuit breaker limit

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	12.4	7.3
LV 22 kV	8.8	1.7

Feeder Loading (Amps) - Coolaroo (COO)											
Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
COO11	Summer	310	267	264	288	322	364	399	431	470	
	Winter	310	258	234	257	286	321	349	375	407	
COO12	Summer	375	141	128	126	124	123	121	120	119	▬▬▬▬▬
	Winter	375	124	127	126	124	122	119	117	116	
COO13	Summer	315	167	191	187	189	188	186	185	185	
	Winter	315	117	120	123	124	122	120	118	118	
COO14	Summer	315	190	188	182	183	183	182	182	183	
	Winter	315	41	134	137	137	137	135	134	134	
COO21	Summer	375	260	234	222	223	230	239	246	255	
	Winter	375	193	167	168	168	172	178	182	188	
COO22	Summer	260	249	209	204	213	227	240	247	256	
	Winter	260	242	186	192	200	212	223	228	235	

Feeder Loading (Amps) - Coolaroo (COO)											
Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
COO11	Summer	310	267	264	320	356	404	439	476	520	
	Winter	310	258	241	264	294	330	359	385	418	
COO12	Summer	375	141	128	133	131	129	126	125	125	▬▬▬▬▬
	Winter	375	124	130	129	127	125	122	120	119	
COO13	Summer	315	167	191	205	206	205	201	200	201	
	Winter	315	117	123	126	127	125	123	121	121	
COO14	Summer	315	190	188	202	203	203	200	201	202	
	Winter	315	41	138	141	141	140	139	138	138	
COO21	Summer	375	260	234	247	247	255	263	272	282	
	Winter	375	193	172	173	173	177	183	187	193	
COO22	Summer	260	249	209	227	235	252	264	273	284	
	Winter	260	242	191	198	205	217	229	234	241	

Coolaroo Zone Substation – Insights

| COO | Peak Time | 15:00 |

Customer Contribution to Peak Demand (%)

Residential: 71
Commercial: 8
Industrial: 21
Total Load: 100

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Legend: Residential, Commercial, Industrial

Customer Segment	Customer Number	Coincident Demand
Residential	12224	1.00
Commercial	316	0.92
Industrial	12	0.97
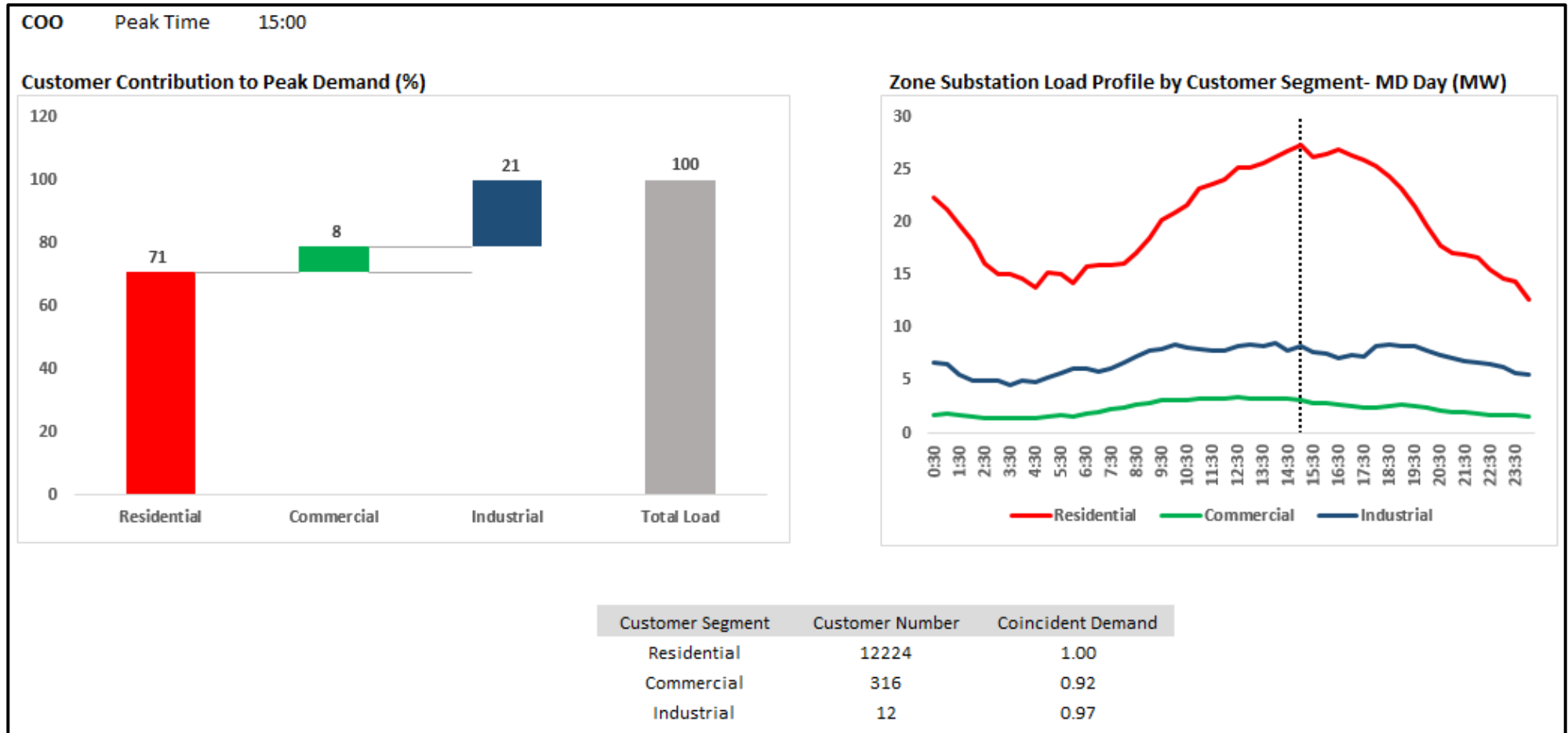
4 — LOAD FORECAST DATA

Point of Supply	Coburg South (CS)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B34)	

Address	Cnr Hudson & Victoria Streets, Coburg
Melway Map Ref	17 G12

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	52.7	44.4	50.4	42.6	44.1	45.5	46.3	46.4	46.6	46.7	46.9	47.2
	Load MVAr	12.7	10.7	12.6	10.7	11.1	11.4	11.6	11.6	11.7	11.7	11.8	11.9
	Tx MVA	53.3	44.7	51.0	43.0	44.6	45.9	46.8	46.9	47.1	47.2	47.4	47.7
50PoE Winter	MW	39.4	40.3	40.7	33.4	34.6	35.7	36.3	36.2	36.1	36.1	36.1	36.0
	Load MVAr	10.5	8.3	8.4	6.9	7.1	7.3	7.5	7.5	7.4	7.4	7.4	7.4
	Tx MVA	39.8	40.5	40.8	33.5	34.7	35.8	36.4	36.3	36.2	36.2	36.2	36.1
10PoE Summer	MW	52.7	44.4	56.8	47.8	49.6	50.7	51.8	52.1	52.2	52.3	52.5	52.8
	Load MVAr	12.7	10.7	14.3	12.0	12.5	12.7	13.0	13.1	13.1	13.1	13.2	13.3
	Tx MVA	53.3	44.7	57.6	48.4	50.2	51.4	52.5	52.7	52.9	52.9	53.2	53.5
10PoE Winter	MW	39.4	41.5	41.8	34.3	35.6	36.7	37.3	37.2	37.2	37.1	37.1	37.1
	Load MVAr	10.5	8.5	8.6	7.1	7.3	7.5	7.7	7.6	7.6	7.6	7.6	7.6
	Tx MVA	39.8	41.6	42.0	34.4	35.6	36.8	37.4	37.3	37.3	37.2	37.2	37.2

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/30
Capacitor		5.2
No. of Distribution Feeders		7
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	42.2	47.3	Transformer thermal limit
24-hour	46.5	47.3	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	11.2	6.7
LV 22 kV	8.5	1.6

Feeder Loading (Amps) - Coburg South (CS)											
Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
CS2	Summer	355	294	282	284	286	287	285	283	283	
	Winter	355	188	192	195	195	194	192	190	189	
CS3	Summer	325	223	141	215	119	137	149	153	159	
	Winter	325	179	183	193	106	121	131	134	138	
CS5	Summer	325	252	252	233	232	242	254	263	274	
	Winter	325	175	179	178	177	183	191	197	204	
CS8	Summer	330	243	182	217	112	127	136	137	139	
	Winter	330	170	174	180	92	104	110	111	112	
CS9	Summer	325	120	107	105	104	103	102	101	101	
	Winter	325	99	101	101	99	98	96	95	94	
CS12	Summer	325	213	76	203	203	203	205	208	212	
	Winter	325	160	164	164	163	161	162	163	166	
CS13	Summer	325	79	90	92	100	135	174	203	238	
	Winter	325	79	82	83	90	121	155	179	210	

Feeder Loading (Amps) - Coburg South (CS)											
Feeder	**Season**	**Rating**	**Actual**		**10PoE Forecast**						**Comments**
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
CS2	**Summer**	355	294	282	323	324	325	320	320	320	
	Winter	355	188	198	200	201	199	197	195	194	
CS3	**Summer**	325	223	141	234	129	149	160	166	172	
	Winter	325	179	188	198	109	125	135	138	142	
CS5	**Summer**	325	252	252	264	261	273	285	296	309	
	Winter	325	175	184	183	182	188	197	202	209	
CS8	**Summer**	330	243	182	239	122	140	147	149	152	
	Winter	330	170	179	185	95	107	113	114	115	
CS9	**Summer**	325	120	107	111	109	109	106	106	106	
	Winter	325	99	104	104	102	100	98	97	97	
CS12	**Summer**	325	213	76	215	214	214	214	218	223	
	Winter	325	160	168	168	167	166	167	168	170	
CS13	**Summer**	325	79	90	100	109	148	188	220	259	
	Winter	325	79	85	85	93	124	159	184	215	

Coburg South Zone Substation – Insights

Customer Segment	Customer Number	Coincident Demand
Residential	20174	1.00
Commercial	1637	1.00
Industrial	45	1.00
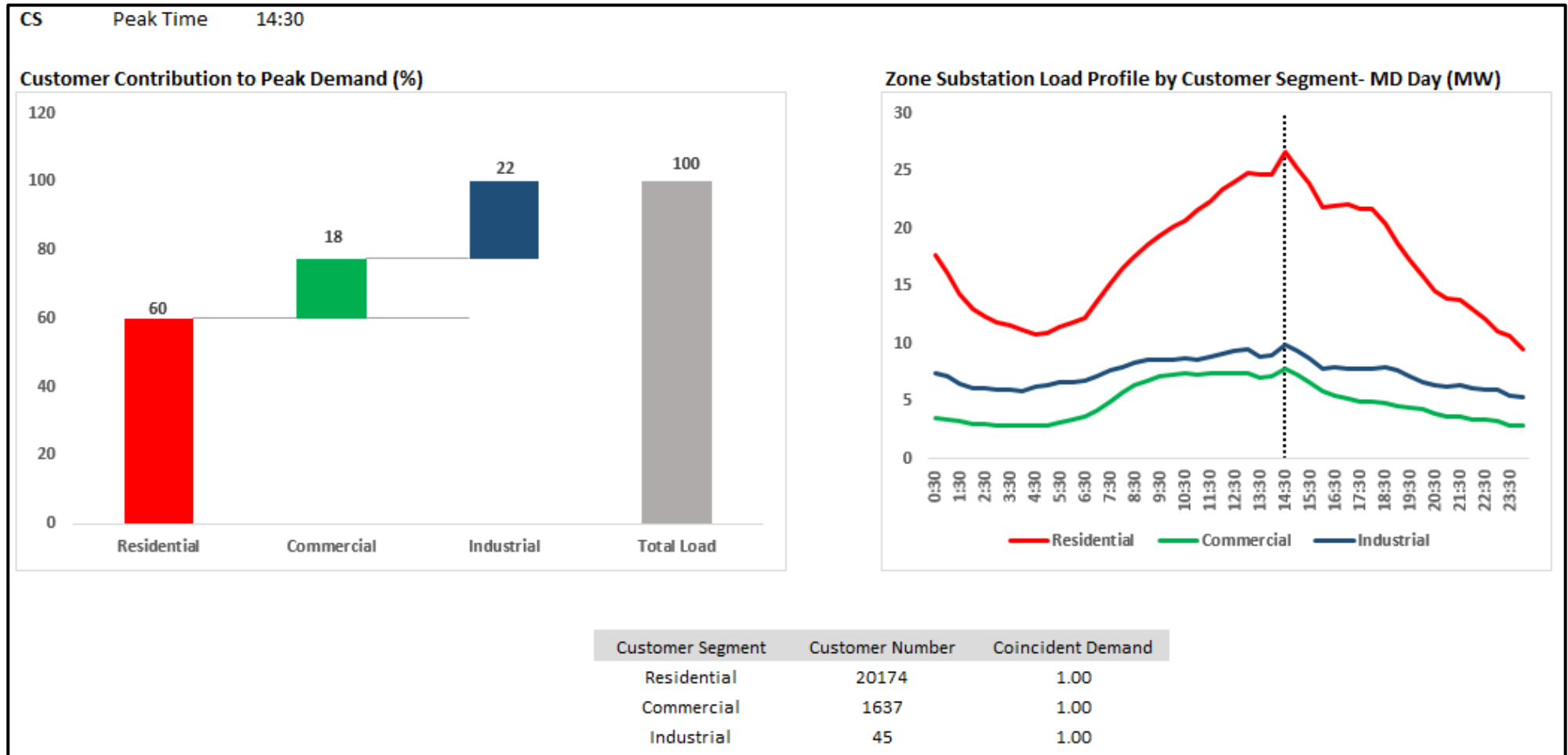
4 — LOAD FORECAST DATA

Point of Supply	East Preston - Switch House A (EP A)	
Nominal Voltage	HV 66 kV	LV 6.6 kV
Terminal Station	TTS (B12)	

Address	Cnr Quinn & Swanston Streets, Preston
Melway Map Ref	31 C1

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	8.9	9.6	9.7	9.9	10.0	10.1	10.0	10.0	10.0	9.9	9.9	9.9
	Load MVAr	4.9	8.9	6.7	6.9	6.9	7.0	6.9	6.9	6.9	6.9	6.9	6.9
	Tx MVA	8.9	10.6	10.0	10.2	10.3	10.4	10.3	10.3	10.3	10.2	10.2	10.2
50PoE Winter	MW	8.7	8.9	9.1	9.3	9.3	9.3	9.2	9.1	9.1	9.0	8.9	8.9
	Load MVAr	8.1	5.9	6.0	6.2	6.2	6.1	6.1	6.0	6.0	6.0	5.9	5.9
	Tx MVA	9.5	9.0	9.3	9.5	9.5	9.5	9.4	9.3	9.2	9.1	9.1	9.0
10PoE Summer	MW	8.9	9.6	10.3	10.4	10.6	10.5	10.5	10.5	10.5	10.4	10.4	10.4
	Load MVAr	4.9	8.9	7.1	7.2	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2
	Tx MVA	8.9	10.6	10.6	10.8	11.0	10.9	10.9	10.9	10.9	10.8	10.8	10.8
10PoE Winter	MW	8.7	9.2	9.4	9.5	9.6	9.5	9.4	9.4	9.3	9.2	9.2	9.1
	Load MVAr	8.1	6.1	6.2	6.3	6.3	6.3	6.3	6.2	6.2	6.1	6.1	6.0
	Tx MVA	9.5	9.3	9.5	9.7	9.8	9.7	9.6	9.5	9.5	9.4	9.3	9.3

Station Configuration		
Power Transformers	Number	2
	Nameplate	1-20/22.5 & 1-10/13.5
Capacitor		4.38
No. of Distribution Feeders		10
Other		-

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	22.5	22.5	Transformer thermal limit
24-hour	22.5	22.5	

Cogeneration	
Remarks	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	10.5	8.8
LV 6.6 kV	15.9	15.8

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
EP2	Summer	445	0	0	0	0	0	0	0	0	
	Winter	445	0	0	0	0	0	0	0	0	
EP3	Summer	375	67	110	108	107	105	104	103	102	
	Winter	375	66	67	67	66	65	63	62	62	
EP4	Summer	360	111	106	123	136	135	133	131	131	
	Winter	360	90	92	108	119	117	115	113	112	
EP7	Summer	375	144	137	147	154	153	150	149	148	
	Winter	375	134	137	149	156	153	150	147	146	
EP9	Summer	345	205	253	258	282	305	320	316	315	
	Winter	345	275	281	291	317	339	353	348	345	
EP11	Summer	375	0	0	0	0	0	0	0	0	
	Winter	375	0	0	0	0	0	0	0	0	
EP16	Summer	360	199	196	192	190	188	191	196	201	
	Winter	360	224	229	228	224	220	223	226	232	
EP17	Summer	375	0	0	0	0	0	0	0	0	
	Winter	375	0	0	0	0	0	0	0	0	
EP18	Summer	375	32	24	31	30	30	30	29	29	
	Winter	375	27	28	27	27	27	26	26	25	
EP20	Summer	360	219	225	227	232	240	244	246	251	
	Winter	360	189	193	197	201	206	208	209	212	

Feeder Loading (Amps) - East Preston - Switch House A (EP A)

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
EP2	Summer	445	0	0	0	0	0	0	0	0	
	Winter	445	0	0	0	0	0	0	0	0	
EP3	Summer	375	67	110	114	112	111	109	108	108	
	Winter	375	66	69	69	68	67	65	64	64	
EP4	Summer	360	111	106	131	144	142	139	138	138	
	Winter	360	90	95	112	123	120	118	116	115	
EP7	Summer	375	144	137	155	162	161	157	156	156	
	Winter	375	134	141	153	160	157	154	151	150	
EP9	Summer	345	205	253	273	297	321	334	332	331	
	Winter	345	275	289	299	325	348	363	357	354	
EP11	Summer	375	0	0	0	0	0	0	0	0	
	Winter	375	0	0	0	0	0	0	0	0	
EP16	Summer	360	199	196	203	200	198	200	205	212	
	Winter	360	224	235	234	230	226	229	232	238	
EP17	Summer	375	0	0	0	0	0	0	0	0	
	Winter	375	0	0	0	0	0	0	0	0	
EP18	Summer	375	32	24	33	32	32	31	31	31	
	Winter	375	27	28	28	28	27	27	26	26	
EP20	Summer	360	219	225	240	244	253	255	259	264	
	Winter	360	189	199	203	206	212	214	215	218	

Feeder Loading (Amps) - East Preston - Switch House A (EP A)

East Preston Switch House A – Insights

EP A   Peak Time   11:00

Customer Contribution to Peak Demand (%)
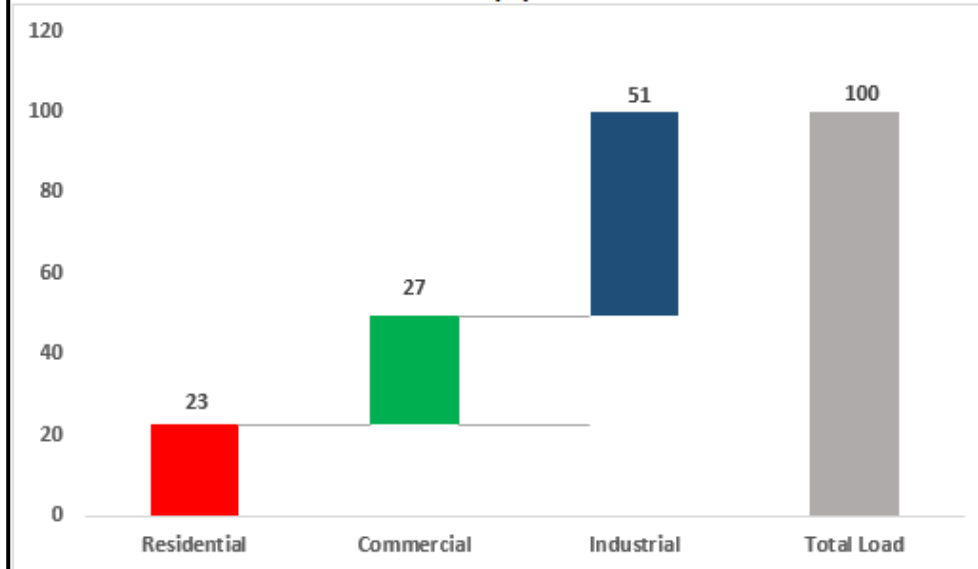
Zone Substation Load Profile by Customer Segment- MD Day (MW)
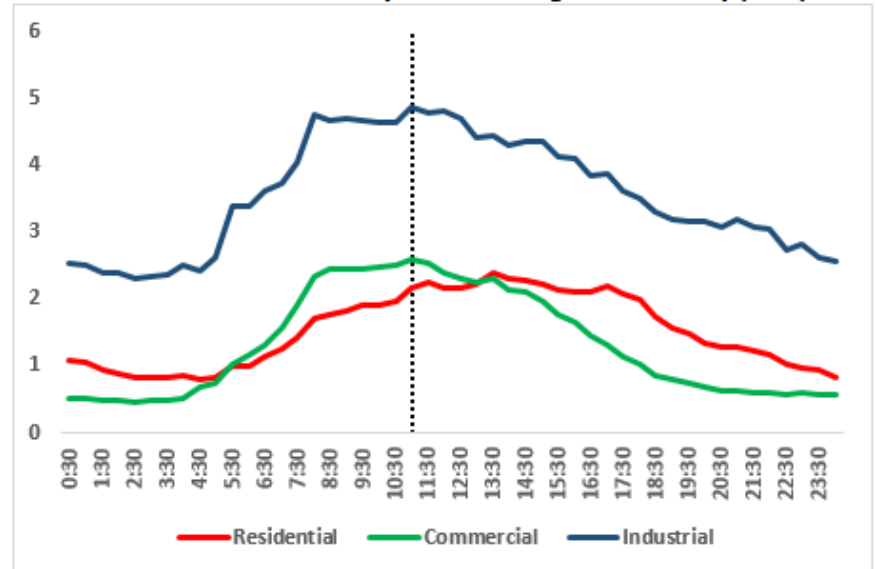
Customer Segment	Customer Number	Coincident Demand
Residential	2002	0.91
Commercial	274	1.00
Industrial	11	1.00

4 — LOAD FORECAST DATA

Point of Supply	East Preston - Switch House B (EP B)	
Nominal Voltage	HV 66 kV	LV 6.6 kV
Terminal Station	TTS (B12)	

Address	Cnr Quinn & Swanston Streets, Preston
Melway Map Ref	31 C1

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	13.8	14.2	14.1	14.1	14.1	14.0	13.9	13.8	13.8	13.7	13.7	13.7
	Load MVAr	6.5	6.3	6.6	6.6	6.6	6.5	6.4	6.4	6.4	6.4	6.4	6.4
	Tx MVA	14.0	14.3	14.4	14.4	14.3	14.2	14.1	14.0	14.0	13.9	13.9	13.9
50PoE Winter	MW	12.6	12.9	12.9	12.9	12.8	12.6	12.4	12.3	12.2	12.1	12.0	12.0
	Load MVAr	5.4	5.7	5.8	5.8	5.7	5.6	5.5	5.5	5.4	5.4	5.4	5.3
	Tx MVA	12.7	13.0	13.1	13.0	12.9	12.7	12.5	12.4	12.3	12.2	12.1	12.0
10PoE Summer	MW	13.8	14.2	15.2	15.2	15.2	14.9	14.8	14.8	14.8	14.7	14.7	14.7
	Load MVAr	6.5	6.3	7.1	7.1	7.1	6.9	6.9	6.9	6.9	6.8	6.8	6.8
	Tx MVA	14.0	14.3	15.6	15.5	15.5	15.2	15.1	15.1	15.0	15.0	14.9	14.9
10PoE Winter	MW	12.6	13.2	13.3	13.3	13.1	12.9	12.7	12.6	12.5	12.5	12.4	12.3
	Load MVAr	5.4	5.9	5.9	5.9	5.8	5.8	5.7	5.6	5.6	5.6	5.5	5.5
	Tx MVA	12.7	13.4	13.4	13.4	13.2	13.0	12.8	12.7	12.6	12.6	12.5	12.4

Station Configuration		
Power Transformers	Number	2
	Nameplate	1-20/27 & 1-10/13.5
Capacitor		4.0
No. of Distribution Feeders		7
Other		-

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	28.5	28.5	Transformer CB & Cable Limit
24-hour	28.5	28.5	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	10.5	8.8
LV 6.6 kV	15.5	15.4

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
EP27	Summer	375	169	123	121	124	130	133	131	131	
	Winter	375	128	131	130	134	138	141	138	137	
EP34	Summer	285	289	254	268	265	262	258	256	254	
	Winter	285	220	225	223	220	216	211	208	206	
EP35	Summer	360	250	254	249	246	243	240	238	236	
	Winter	360	235	240	239	235	231	226	222	221	
EP36	Summer	360	214	229	231	238	248	253	256	260	
	Winter	360	169	173	175	180	186	189	190	192	
EP37	Summer	360	281	279	295	307	303	299	296	295	
	Winter	360	241	246	263	273	267	262	258	256	
EP41	Summer	360	209	206	202	200	197	195	193	192	
	Winter	360	201	205	204	201	197	193	190	189	
EP42	Summer	375	249	252	247	244	242	238	236	235	
	Winter	375	211	216	214	211	207	203	200	198	

Feeder Loading (Amps) - East Preston - Switch House B (EP B)

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
EP27	**Summer**	375	169	123	128	131	137	139	138	138	
	Winter	375	128	134	134	137	142	144	142	141	
EP34	**Summer**	285	289	254	302	297	294	288	286	285	
	Winter	285	220	231	230	226	222	217	214	212	
EP35	**Summer**	360	250	254	264	259	257	251	249	249	
	Winter	360	235	247	245	242	237	232	228	226	
EP36	**Summer**	360	214	229	260	267	278	282	286	291	
	Winter	360	169	178	180	185	191	194	195	197	
EP37	**Summer**	360	281	279	320	331	328	321	318	318	
	Winter	360	241	253	270	280	275	269	265	262	
EP41	**Summer**	360	209	206	214	210	208	204	202	202	
	Winter	360	201	211	210	207	203	199	195	194	
EP42	**Summer**	375	249	252	261	257	255	249	247	247	
	Winter	375	211	222	220	217	213	209	205	203	

Table caption: Feeder Loading (Amps) - East Preston - Switch House B (EP B)

East Preston Switch House B – Insights

| EP B | Peak Time | 13:00 |

Customer Contribution to Peak Demand (%)
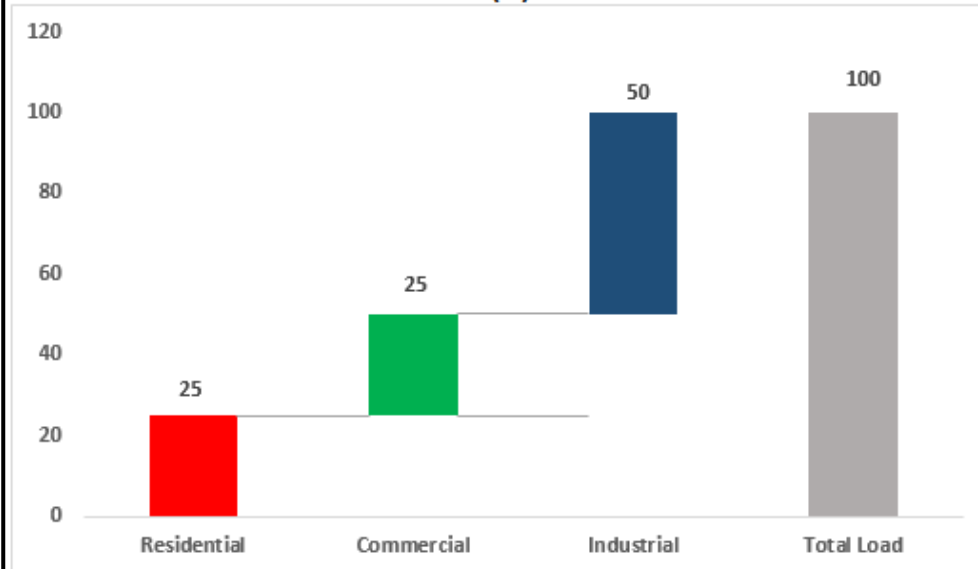
Zone Substation Load Profile by Customer Segment- MD Day (MW)
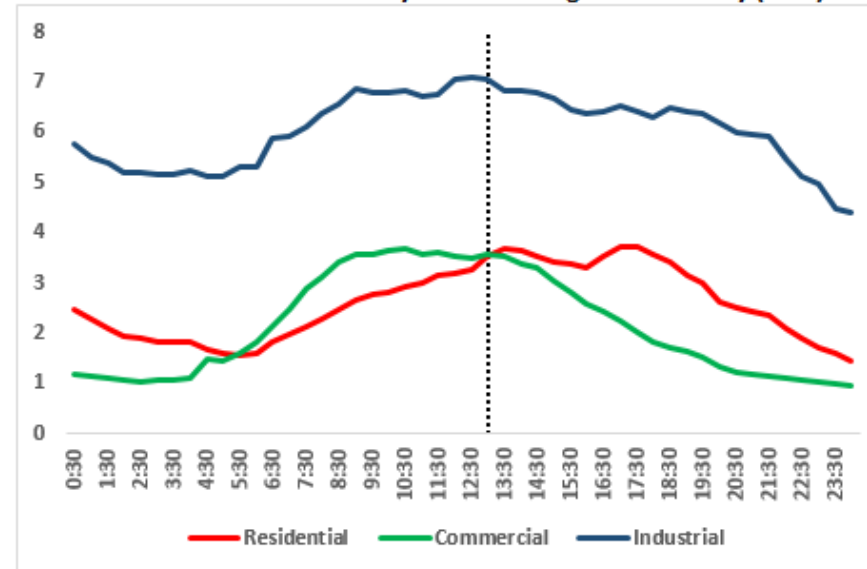
Customer Segment	Customer Number	Coincident Demand
Residential	2002	0.95
Commercial	274	0.97
Industrial	11	0.99

4 — LOAD FORECAST DATA

Point of Supply	East Preston (EPN)		Address	Cnr Quinn & Swanston Streets, Preston
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	31 C1
Terminal Station	TTS (B12)			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	20.5	23.4	21.0	12.0	12.1	12.1	12.2	12.1	12.1	12.0	12.0	12.0
	Load MVAr	1.9	10.6	5.5	3.1	3.1	3.1	3.2	3.1	3.1	3.1	3.1	3.1
	Tx MVA	20.6	23.6	21.1	12.4	12.5	12.5	12.6	12.5	12.5	12.4	12.4	12.4
50PoE Winter	MW	14.8	15.1	15.6	7.3	7.3	7.3	7.4	7.3	7.2	7.2	7.1	7.1
	Load MVAr	2.9	3.7	3.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7
	Tx MVA	15.1	15.6	16.0	7.5	7.5	7.5	7.6	7.5	7.5	7.4	7.3	7.3
10PoE Summer	MW	20.5	23.4	23.5	13.4	13.5	13.4	13.5	13.5	13.4	13.4	13.3	13.3
	Load MVAr	1.9	10.6	6.1	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	Tx MVA	20.6	23.6	23.6	13.8	13.9	13.8	13.9	13.9	13.9	13.8	13.8	13.8
10PoE Winter	MW	14.8	15.6	16.0	7.5	7.5	7.5	7.5	7.5	7.4	7.4	7.3	7.3
	Load MVAr	2.9	3.8	3.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	Tx MVA	15.1	16.0	16.5	7.7	7.7	7.7	7.8	7.7	7.7	7.6	7.5	7.5

Station Configuration		
Power Transformers	Number	1
	Nameplate	20/33
Capacitor		8
No. of Distribution Feeders		4
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	33.0	33.0	Transformer thermal limit
24-hour	33.0	33.0	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	10.0	8.6
LV 22 kV	4.9	1.5

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Feeder Loading (Amps) - East Preston (EPN)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
EPN31	Summer	375	166	162	160	158	156	154	153	152	
	Winter	375	110	112	112	110	108	106	104	103	
EPN33	Summer	375	159	154	143	60	61	61	61	61	
	Winter	375	123	126	126	53	53	52	52	53	
EPN34	Summer	375	48	44	43	43	44	46	47	49	
	Winter	375	42	43	43	42	43	45	46	47	
EPN35	Summer	375	229	310	291	132	137	140	144	149	
	Winter	375	176	180	196	89	91	93	95	98	

Feeder Loading (Amps) - East Preston (EPN)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
EPN31	Summer	375	166	162	179	176	174	170	169	169	
	Winter	375	110	116	115	113	111	109	107	106	
EPN33	Summer	375	159	154	162	68	69	68	68	69	
	Winter	375	123	129	129	55	54	54	54	54	
EPN34	Summer	375	48	44	46	45	46	48	50	52	
	Winter	375	42	44	44	43	44	46	47	48	
EPN35	Summer	375	229	310	307	139	144	147	151	156	
	Winter	375	176	185	202	91	94	96	97	100	

East Preston Zone Substation – Insights

EPN   Peak Time   13:00   14:30

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	159	0.08
Commercial	16	0.22
Industrial	0	0.81
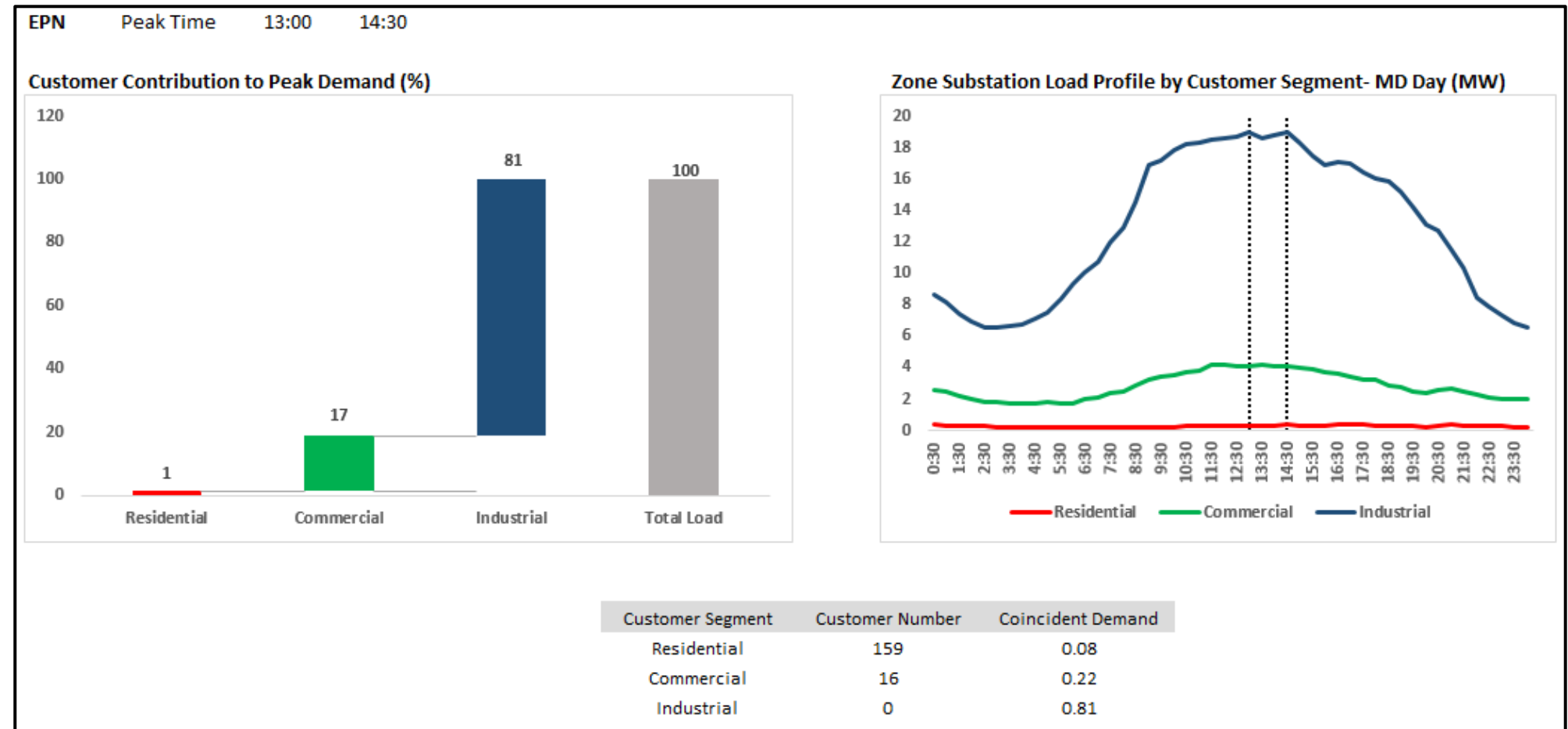
Point of Supply	Essendon (ES)		Address	Cnr Buckley & Price Streets, Essendon
Nominal Voltage	HV 66 kV	LV 11 kV	Melway Map Ref	28 B4
Terminal Station	KTS B1-B2			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	43.5	41.7	39.5	39.4	39.7	39.8	39.9	40.0	40.2	40.3	40.5	40.8
	Load MVAr	11.2	16.0	12.2	12.2	12.2	12.3	12.3	12.3	12.4	12.4	12.5	12.6
	Tx MVA	43.8	42.9	40.0	39.9	40.2	40.3	40.4	40.5	40.7	40.8	41.0	41.3
50PoE Winter	MW	29.8	27.9	28.0	27.9	28.0	28.0	28.0	27.9	27.9	27.9	27.9	27.9
	Load MVAr	9.9	6.7	6.7	6.7	6.8	6.8	6.7	6.7	6.7	6.7	6.7	6.7
	Tx MVA	30.0	27.9	28.0	27.9	28.0	28.0	28.0	28.0	27.9	27.9	27.9	27.9
10PoE Summer	MW	43.5	41.7	44.5	44.2	44.6	44.4	44.6	44.8	44.9	45.0	45.3	45.5
	Load MVAr	11.2	16.0	13.7	13.6	13.8	13.7	13.8	13.8	13.9	13.9	14.0	14.1
	Tx MVA	43.8	42.9	45.1	44.8	45.2	45.0	45.2	45.5	45.6	45.7	45.9	46.2
10PoE Winter	MW	29.8	28.7	28.7	28.6	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.7
	Load MVAr	9.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	Tx MVA	30.0	28.7	28.8	28.7	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.7

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/33
Capacitor		7
No. of Distribution Feeders		10
Other		NER

Cogeneration	
Remarks	The Power Transformers Nameplate specified is after the completion of ES transformer replacement project by March 2020 (Existing Nameplate is 20/27)

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	36.0	37.3	Transformer thermal limit
24-hour	36.0	37.3	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	11.8	7.8
LV 11 kV	13.7	2.0

Feeder Loading (Amps) - Essendon (ES)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
ES11	Summer	305	254	258	239	239	242	244	243	244	
	Winter	305	200	204	203	203	204	203	202	202	
ES12	Summer	305	173	167	167	166	167	165	165	165	
	Winter	305	117	120	120	119	118	117	116	115	
ES13	Summer	305	259	246	247	249	251	250	250	251	
	Winter	305	239	244	246	247	247	245	243	244	
ES15	Summer	305	242	296	232	239	252	261	265	270	
	Winter	305	184	127	131	134	140	144	145	148	
ES16	Summer	285	177	174	173	171	169	167	166	166	
	Winter	285	125	128	127	125	123	121	119	119	
ES21	Summer	305	273	252	238	235	233	231	229	229	
	Winter	305	160	164	163	161	158	155	153	152	
ES22	Summer	330	381	286	354	351	348	344	342	341	
	Winter	330	349	357	357	353	347	340	336	335	
ES23	Summer	305	75	76	70	69	88	112	130	152	
	Winter	305	50	51	51	50	63	80	92	107	
ES24	Summer	305	271	251	234	239	248	254	254	256	
	Winter	305	227	161	160	164	168	171	170	171	
ES25	Summer	305	253	258	243	240	240	239	239	240	
	Winter	305	163	167	166	164	162	160	160	160	
ES26	Summer	375	249	256	248	250	252	252	251	252	
	Winter	375	206	211	215	216	216	214	213	213	

			Actual		10PoE Forecast							
Feeder	Season	Rating	2018	2019	2020	2021	2022	2023	2024	2025	Comments
ES11	**Summer**	305	254	258	270	269	272	272	272	274	
	Winter	305	200	210	209	208	209	209	207	208	
ES12	**Summer**	305	173	167	190	189	190	187	187	188	
	Winter	305	117	123	123	122	122	120	119	119	
ES13	**Summer**	305	259	246	283	284	287	284	285	287	
	Winter	305	239	251	253	254	254	252	250	250	
ES15	**Summer**	305	242	296	262	269	284	291	296	303	
	Winter	305	184	130	134	138	144	148	149	152	
ES16	**Summer**	285	177	174	197	194	192	188	188	188	
	Winter	285	125	131	131	129	127	124	123	122	
ES21	**Summer**	305	273	252	263	260	257	253	252	252	
	Winter	305	160	168	167	165	162	159	157	156	
ES22	**Summer**	330	381	286	399	394	391	384	382	383	
	Winter	330	349	367	367	362	356	350	345	343	
ES23	**Summer**	305	75	76	80	79	100	127	148	173	
	Winter	305	50	53	52	52	65	82	95	110	
ES24	**Summer**	305	271	251	264	269	278	283	284	287	
	Winter	305	227	165	165	168	173	176	175	175	
ES25	**Summer**	305	253	258	269	265	265	262	263	265	
	Winter	305	163	171	170	168	167	165	164	164	
ES26	**Summer**	375	249	256	274	275	278	275	276	278	
	Winter	375	206	217	221	222	222	220	219	219	

Table title: **Feeder Loading (Amps) - Essendon (ES)**

Essendon Zone Substation – Insights

| ES | Peak Time | 14:30 |

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	13180	1.00
Commercial	1156	0.92
Industrial	26	0.90

Point of Supply	Footscray East (FE)		Address	Somerville Road, Yarraville
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	42 C8
Terminal Station	WMTS			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	33.7	33.7	37.0	37.7	39.1	40.6	41.9	42.5	43.3	43.9	44.7	45.6
	Load MVAr	9.7	17.0	13.4	13.6	14.1	14.7	15.1	15.4	15.6	15.9	16.2	16.5
	Tx MVA	33.8	33.7	37.4	38.1	39.6	41.2	42.6	43.2	43.3	43.9	44.7	45.6
50PoE Winter	MW	30.5	31.2	31.7	32.2	33.2	34.4	35.5	35.9	36.2	36.7	37.1	37.5
	Load MVAr	4.2	4.5	4.5	4.6	4.8	4.9	5.1	5.1	5.2	5.3	5.3	5.4
	Tx MVA	30.8	31.5	32.0	32.5	33.6	34.8	35.8	36.2	36.6	37.0	37.5	37.9
10PoE Summer	MW	33.7	33.7	40.5	41.0	42.6	43.9	45.5	46.3	47.1	47.7	48.6	49.5
	Load MVAr	9.7	17.0	14.6	14.8	15.4	15.9	16.4	16.7	17.0	17.2	17.5	17.9
	Tx MVA	33.8	33.7	41.1	41.6	43.3	43.9	45.5	46.4	47.1	47.8	48.6	49.5
10PoE Winter	MW	30.5	32.1	32.5	33.1	34.1	35.4	36.4	36.8	37.3	37.7	38.1	38.6
	Load MVAr	4.2	4.6	4.7	4.7	4.9	5.1	5.2	5.3	5.3	5.4	5.5	5.5
	Tx MVA	30.8	32.4	32.9	33.4	34.5	35.7	36.8	37.2	37.6	38.1	38.5	39.0

Station Configuration		
Power Transformers	Number	2
	Nameplate	1-20/30 & 1-20/33
Capacitor		14.3
No. of Distribution Feeders		5
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	30.5	30.5	Transformer circuit breaker limit
24-hour	30.5	30.5	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	14.7	10.4
LV 22 kV	9.3	2.2

Feeder Loading (Amps) - Footscray East (FE)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
FE2	Summer	400	196	194	191	189	193	198	212	229	▬▬▬▬
	Winter	400	168	172	171	169	171	175	186	200	
FE5	Summer	325	155	87	242	257	268	268	269	272	
	Winter	325	154	158	170	181	187	185	185	186	
FE6	Summer	360	276	286	272	289	334	391	426	467	
	Winter	360	235	241	241	255	293	341	369	403	
FE8	Summer	360	212	236	234	239	248	262	276	292	
	Winter	360	165	169	174	177	182	191	200	211	
FE9	Summer	360	192	251	249	248	249	249	250	253	▬▬▬▬▬
	Winter	360	197	202	201	200	199	198	198	199	

Feeder Loading (Amps) - Footscray East (FE)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
FE2	Summer	400	196	194	202	199	203	207	223	241	▬▬▬▬
	Winter	400	168	177	176	174	176	180	191	206	
FE5	Summer	325	155	87	277	294	307	305	307	310	
	Winter	325	154	162	175	185	192	190	190	191	
FE6	Summer	360	276	286	301	318	369	428	468	514	
	Winter	360	235	247	248	262	301	350	379	413	
FE8	Summer	360	212	236	254	259	268	282	297	316	
	Winter	360	165	174	179	182	187	196	206	217	
FE9	Summer	360	192	251	278	275	276	275	277	280	▬▬▬▬▬
	Winter	360	197	207	207	205	204	203	203	204	

Footscray East Zone Substation – Insights

| FE | Peak Time | 14:00 |

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	11823	0.94
Commercial	1313	1.00
Industrial	23	1.00
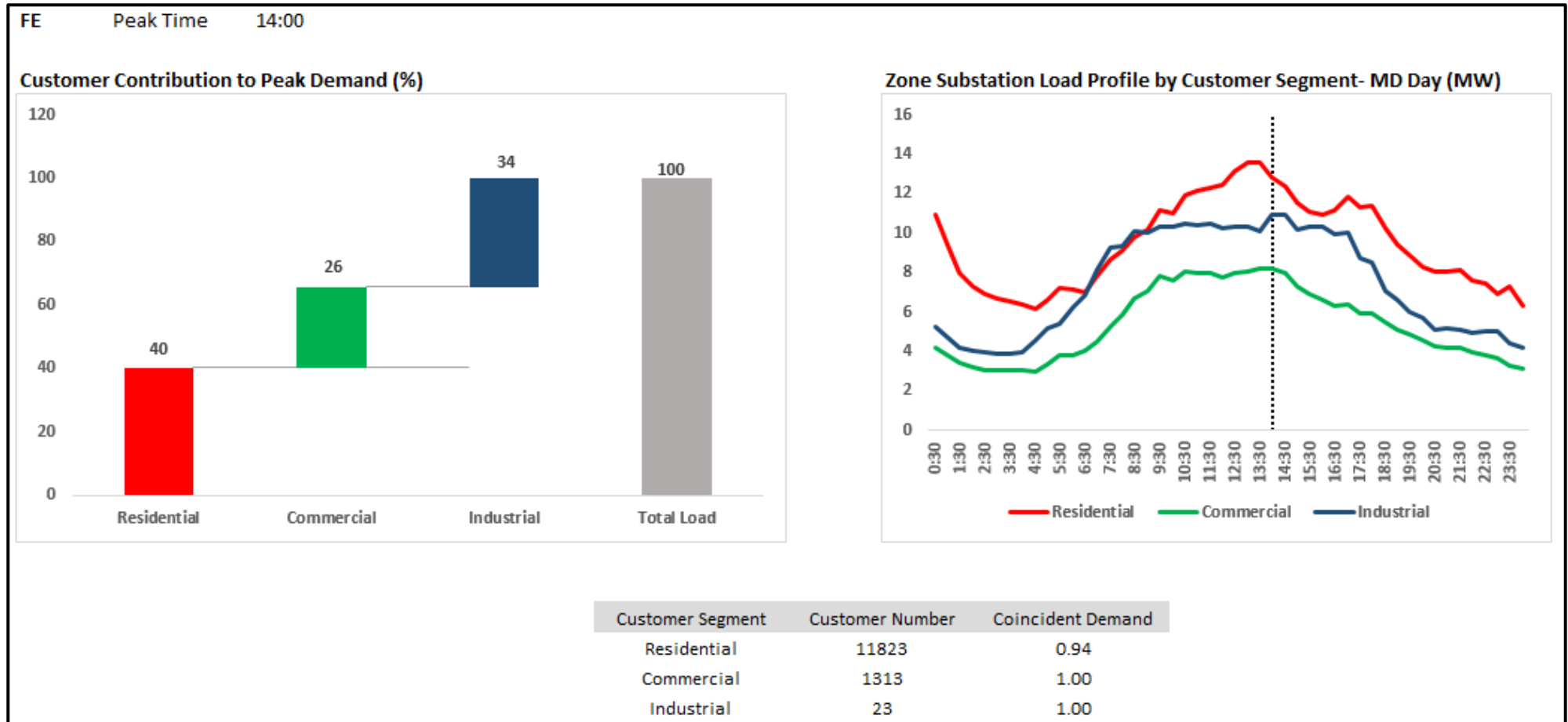
4 — LOAD FORECAST DATA

Point of Supply	Fairfield (FF)	
Nominal Voltage	HV 22 kV	LV 6.6 kV
Terminal Station	BTS	

Address	Cnr Station & Mcgregor Streets, Fairfield
Melway Map Ref	30 K8

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	22.4	23.0	23.4	23.8	24.6	25.4	26.0	27.0	28.1	29.1	29.3	29.4
	Load MVAr	6.5	7.1	7.4	7.5	7.8	8.0	8.2	8.5	8.9	9.2	9.3	9.3
	Tx MVA	22.5	23.2	23.6	24.0	24.8	25.7	26.3	27.3	28.5	29.5	29.7	29.8
50PoE Winter	MW	18.0	18.4	18.5	18.9	19.5	20.1	20.6	21.4	22.2	23.1	23.0	23.0
	Load MVAr	4.6	6.2	6.2	6.3	6.5	6.7	6.9	7.2	7.5	7.7	7.7	7.7
	Tx MVA	18.0	18.5	18.6	19.0	19.6	20.2	20.7	21.6	22.4	23.3	23.3	23.2
10PoE Summer	MW	22.4	23.0	26.0	26.3	27.2	27.9	28.7	29.8	31.0	32.1	32.2	32.3
	Load MVAr	6.5	7.1	8.2	8.3	8.6	8.8	9.1	9.4	9.8	10.1	10.2	10.2
	Tx MVA	22.5	23.2	26.3	26.6	27.5	28.2	29.0	30.2	31.4	32.6	32.7	32.9
10PoE Winter	MW	18.0	18.9	19.0	19.4	20.0	20.7	21.2	22.0	22.9	23.7	23.7	23.7
	Load MVAr	4.6	6.3	6.4	6.5	6.7	6.9	7.1	7.4	7.7	8.0	7.9	7.9
	Tx MVA	18.0	19.0	19.1	19.5	20.1	20.8	21.3	22.2	23.1	24.0	23.9	23.9

Station Configuration		
Power Transformers	Number	3
	Nameplate	10 / 13.5
Capacitor		4.9
No. of Distribution Feeders		6
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	25.7	31.7	Transformer thermal limit
24-hour	25.7	31.7	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 22 kV	7.6	4.2
LV 6.6 kV	17.8	2.1

Feeder Loading (Amps) - Fairfield (FF)										
Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
FF87	Summer	285	158	158	168	185	205	227	241	258	
	Winter	285	148	151	170	187	205	226	239	254	
FF88	Summer	285	195	202	189	187	185	183	182	181	
	Winter	285	175	179	178	176	172	169	167	166	
FF89	Summer	285	200	208	200	198	196	194	192	192	
	Winter	285	191	195	194	191	188	184	182	181	
FF90	Summer	285	227	256	234	241	242	239	237	237	
	Winter	285	150	153	159	163	163	160	158	157	
FF95	Summer	285	235	238	248	324	471	625	744	904	███████████
	Winter	285	194	199	208	271	390	514	608	737	
FF96	Summer	285	258	253	251	249	248	246	245	246	
	Winter	285	243	249	248	245	242	239	236	236	

4 — LOAD FORECAST DATA

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
FF87	Summer	285	158	158	186	204	226	249	265	284	
	Winter	285	148	155	175	192	211	232	245	261	
FF88	Summer	285	195	202	210	207	205	201	200	200	
	Winter	285	175	184	183	180	177	174	171	170	
FF89	Summer	285	200	208	216	213	211	207	206	206	
	Winter	285	191	201	199	197	193	190	187	186	
FF90	Summer	285	227	256	261	267	269	264	263	263	
	Winter	285	150	157	163	168	167	164	162	161	
FF95	Summer	285	235	238	286	373	542	714	853	1040	████████████
	Winter	285	194	204	213	278	400	528	625	756	
FF96	Summer	285	258	253	282	279	278	274	274	275	
	Winter	285	243	256	254	251	248	245	243	242	

Fairfield Zone Substation – Insights

Customer Segment	Customer Number	Coincident Demand
Residential	5712	0.89
Commercial	402	1.00
Industrial	4	1.00
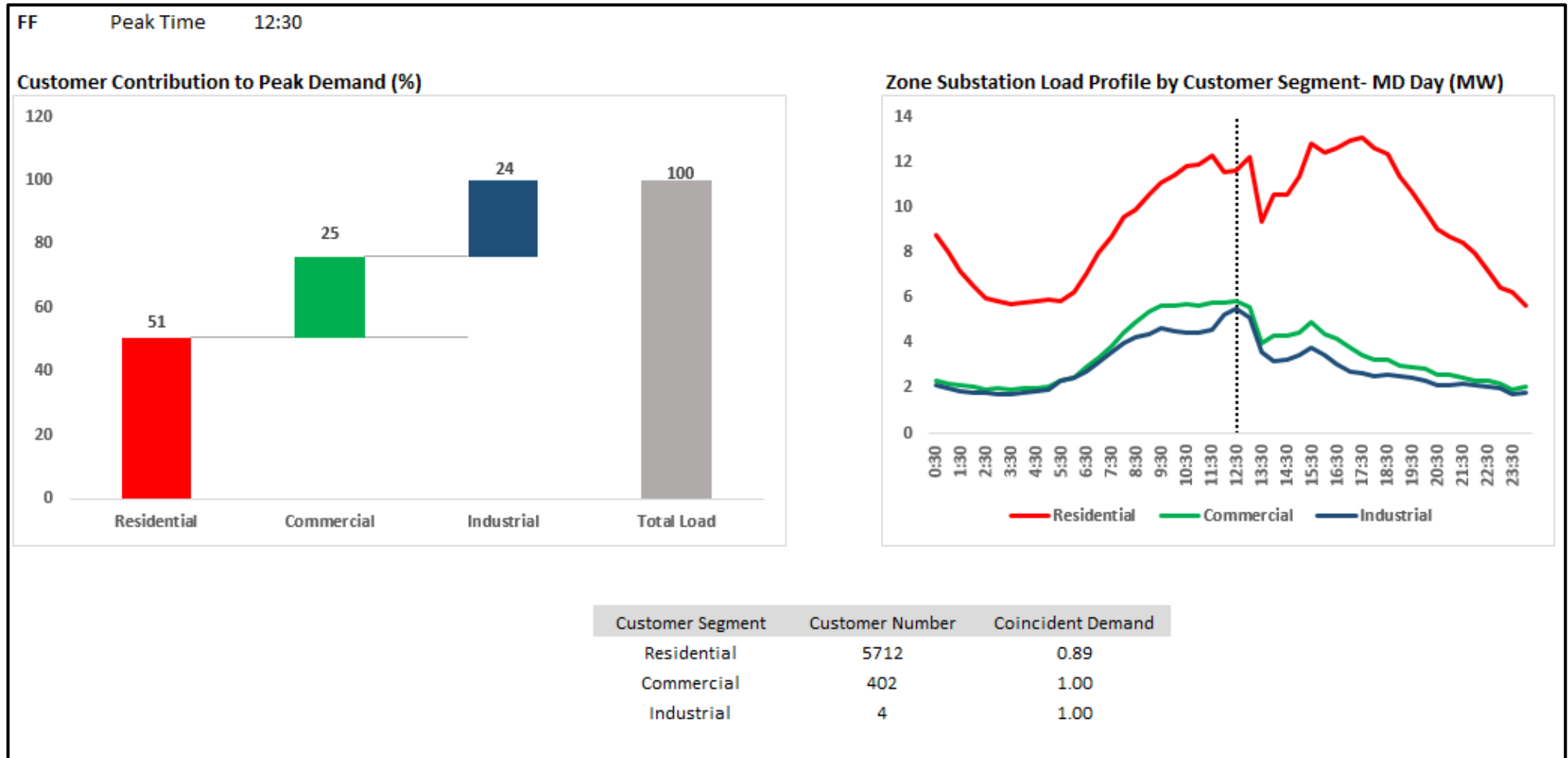
4 — LOAD FORECAST DATA

Point of Supply	Flemington (FT)	
Nominal Voltage	HV 66 kV	LV 11 kV
Terminal Station	WMTS	

Address	Cnr Smith Street & Rankins Road, Flemington
Melway Map Ref	2A A3

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	**MW**	34.7	34.2	32.7	32.6	33.1	33.5	34.1	34.4	34.8	35.2	35.6	36.2
	Load MVAr	14.9	7.3	10.5	10.5	10.6	10.8	11.0	11.1	11.2	11.3	11.5	11.6
	Tx MVA	34.8	34.2	33.0	33.0	33.4	33.9	34.4	34.8	35.2	35.6	36.1	36.2
50PoE Winter	**MW**	29.9	30.6	30.7	30.6	30.7	30.9	31.3	31.5	31.6	31.9	32.1	32.3
	Load MVAr	6.6	6.8	6.8	6.8	6.8	6.9	6.9	7.0	7.0	7.1	7.1	7.2
	Tx MVA	29.9	30.6	30.7	30.6	30.7	30.9	31.3	31.5	31.7	31.9	32.1	32.3
10PoE Summer	**MW**	34.7	34.2	36.1	36.0	36.5	36.7	37.4	37.9	38.3	38.6	39.1	39.7
	Load MVAr	14.9	7.3	11.6	11.6	11.7	11.8	12.0	12.2	12.3	12.4	12.6	12.8
	Tx MVA	34.8	34.2	36.1	36.0	36.5	36.7	37.4	37.9	38.3	38.6	39.1	39.7
10PoE Winter	**MW**	29.9	31.5	31.6	31.4	31.5	31.8	32.1	32.3	32.5	32.8	33.0	33.2
	Load MVAr	6.6	7.0	7.0	7.0	7.0	7.1	7.1	7.2	7.2	7.3	7.3	7.4
	Tx MVA	29.9	31.5	31.6	31.4	31.6	31.8	32.1	32.3	32.6	32.8	33.0	33.3

Station Configuration		
Power Transformers	**Number**	2
	Nameplate	20/30
Capacitor		13.3
No. of Distribution Feeders		10
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	34.8	34.8	Transformer thermal limit
24-hour	45.0	45.0	Transformer thermal limit

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	16.5	13.1
LV 11 kV	14.5	2.7

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
FT11	Summer	305	290	248	244	241	240	238	237	237	
	Winter	305	285	292	290	287	283	278	276	275	
FT15	Summer	420	210	185	187	190	192	193	212	234	
	Winter	420	117	120	122	124	125	124	135	149	
FT16	Summer	420	205	171	172	173	171	170	169	170	
	Winter	420	136	139	141	141	139	137	136	136	
FT21	Summer	250	384	262	218	226	233	238	241	244	
	Winter	250	388	222	187	194	198	201	202	204	
FT22	Summer	375	209	229	220	219	218	217	217	218	
	Winter	375	192	196	196	194	192	190	189	189	
FT24	Summer	300	236	201	199	197	198	200	202	205	
	Winter	300	202	207	206	203	203	203	204	206	
FT26	Summer	375	235	234	233	232	234	236	238	242	
	Winter	375	213	218	218	217	217	217	218	220	
FT31	Summer	305	282	223	219	217	229	245	258	272	
	Winter	305	219	224	223	220	231	246	257	271	
FT32	Summer	230	106	82	81	80	93	110	123	138	
	Winter	230	82	84	84	83	95	112	124	139	
FT33	Summer	375	0	181	178	176	185	196	204	214	
	Winter	375	0	175	174	172	178	186	192	200	
FT35	Summer	375	251	248	294	293	291	289	288	288	
	Winter	375	191	195	235	233	230	226	224	224	

Table title: **Feeder Loading (Amps) - Flemington (FT)**

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
FT11	Summer	305	290	248	258	254	253	249	249	250	
	Winter	305	285	300	299	295	290	286	283	283	
FT15	Summer	420	210	185	198	200	202	202	222	246	
	Winter	420	117	123	126	128	128	128	139	153	
FT16	Summer	420	205	171	191	191	189	186	186	187	
	Winter	420	136	143	145	145	143	141	139	139	
FT21	Summer	250	384	262	230	238	246	249	252	257	
	Winter	250	388	229	193	199	203	207	207	210	
FT22	Summer	375	209	229	238	236	236	233	233	235	
	Winter	375	192	202	201	199	197	195	194	194	
FT24	Summer	300	236	201	218	215	217	217	220	224	
	Winter	300	202	212	212	209	208	209	210	212	
FT26	Summer	375	235	234	262	261	263	263	266	271	
	Winter	375	213	224	224	223	223	223	224	226	
FT31	Summer	305	282	223	232	229	242	256	270	286	
	Winter	305	219	230	229	226	237	252	264	278	
FT32	Summer	230	106	82	88	87	101	119	134	150	
	Winter	230	82	86	86	85	98	115	128	143	
FT33	Summer	375	0	181	188	186	195	204	214	226	
	Winter	375	0	180	179	177	182	191	197	205	
FT35	Summer	375	251	248	311	308	307	302	302	303	
	Winter	375	191	201	242	239	236	233	230	230	

Table title: Feeder Loading (Amps) - Flemington (FT)

Flemington Zone Substation – Insights

FT   Peak Time   14:30

Customer Contribution to Peak Demand (%)

Residential	Commercial	Industrial	Total Load
42	19	39	100

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Legend: Residential, Commercial, Industrial

Customer Segment	Customer Number	Coincident Demand
Residential	13387	1.00
Commercial	894	1.00
Industrial	70	0.93
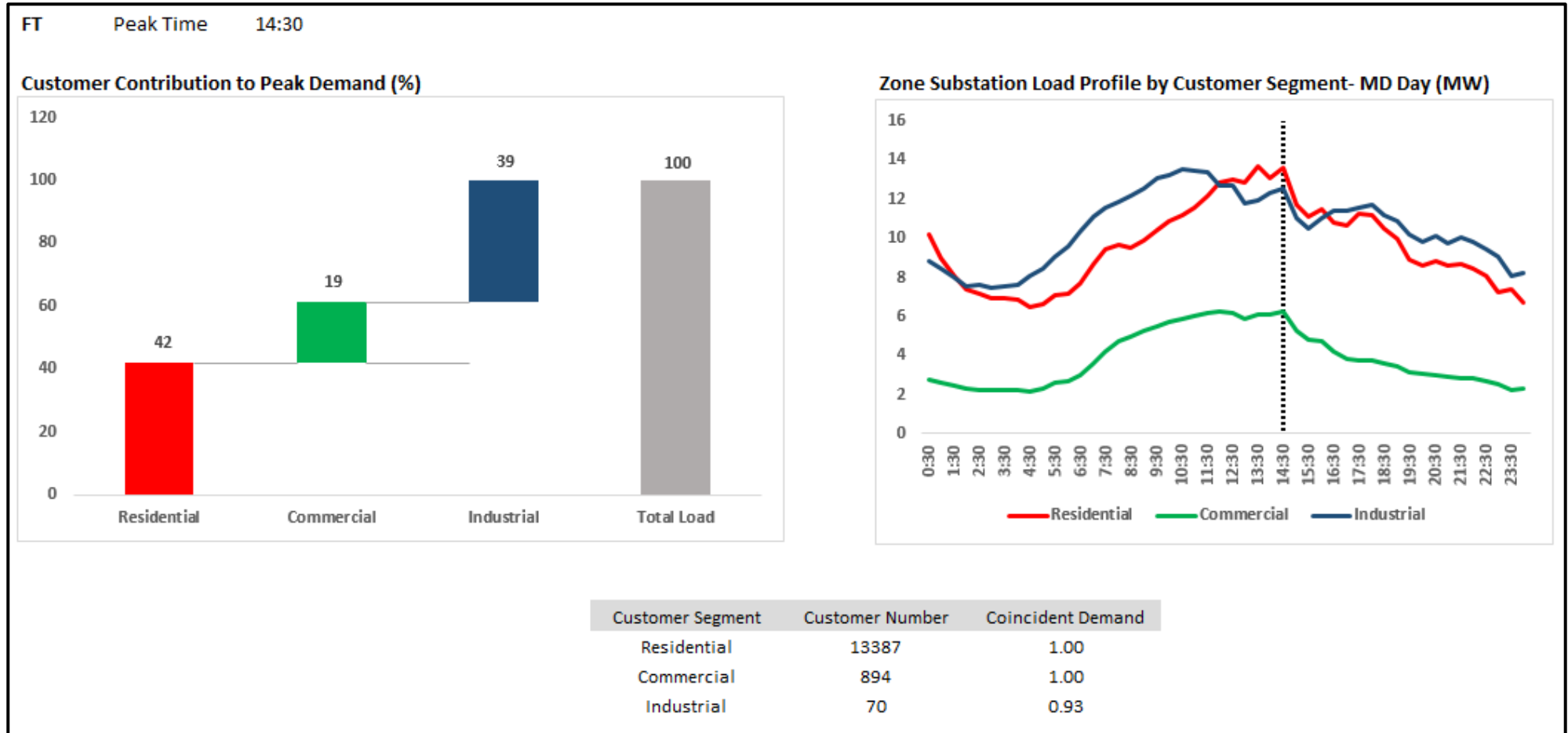
Point of Supply		Footscray West (FW)		Address	Sanderson Street, West Footscray
Nominal Voltage	HV 66 kV		LV 22 kV	Melway Map Ref	41 G8
Terminal Station		BLTS			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	43.9	37.7	37.0	39.9	39.2	38.5	38.4	37.8	37.4	36.8	36.4	36.0
	Load MVAr	12.7	17.2	15.2	16.4	16.1	15.8	15.8	15.5	15.3	15.1	14.9	14.8
	Tx MVA	44.0	37.7	37.0	39.9	39.3	38.5	38.4	37.9	37.4	36.8	36.4	36.0
50PoE Winter	MW	34.0	34.4	34.0	36.7	35.8	34.9	34.6	34.0	33.3	32.7	32.1	31.6
	Load MVAr	14.8	11.0	10.9	11.8	11.5	11.2	11.1	10.9	10.7	10.5	10.3	10.1
	Tx MVA	34.0	34.4	34.1	36.8	35.9	34.9	34.7	34.0	33.4	32.8	32.2	31.6
10PoE Summer	MW	43.9	37.7	40.3	43.4	42.7	41.6	41.6	41.1	40.5	39.9	39.4	38.9
	Load MVAr	12.7	17.2	16.5	17.8	17.5	17.0	17.1	16.9	16.6	16.4	16.2	16.0
	Tx MVA	44.0	37.7	40.3	43.4	42.7	41.6	41.6	41.1	40.5	39.9	39.4	39.0
10PoE Winter	MW	34.0	35.3	35.0	37.7	36.7	35.8	35.5	34.9	34.3	33.6	33.0	32.5
	Load MVAr	14.8	11.3	11.2	12.1	11.8	11.5	11.4	11.2	11.0	10.8	10.6	10.4
	Tx MVA	34.0	35.4	35.0	37.8	36.8	35.9	35.6	34.9	34.3	33.7	33.1	32.5

Station Configuration		
Power Transformers	Number	3
	Nameplate	20/30
Capacitor		31.9
No. of Distribution Feeders		8
Other		NER

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	70.3	77.2	Transformer thermal limit
24-hour	90.0	90.0	

Cogeneration	
Remarks	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	17.9	14.8
LV 22 kV	12.7	3.5

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
FW4	Summer	360	207	157	149	146	144	140	137	135	▬▬▬▬▬▬
	Winter	360	170	172	170	167	162	157	153	150	
FW5	Summer	360	127	121	117	35	35	35	34	34	
	Winter	360	110	111	110	32	32	32	31	30	
FW6	Summer	360	104	109	103	101	101	100	101	103	
	Winter	360	99	100	99	97	96	94	95	97	
FW8	Summer	320	193	197	202	199	196	191	187	184	
	Winter	320	170	172	170	167	164	158	154	152	
FW9	Summer	360	183	0	0	210	205	200	207	216	
	Winter	360	0	0	0	184	179	173	178	185	
FW13	Summer	360	284	305	302	295	290	284	279	276	
	Winter	360	256	259	260	254	247	240	235	231	
FW16	Summer	360	187	176	170	168	165	162	169	178	
	Winter	360	181	183	181	178	175	170	177	185	
FW17	Summer	360	169	160	159	159	159	157	155	154	
	Winter	360	147	149	148	148	148	145	142	140	

Feeder Loading (Amps) - Footscray West (FW)

Feeder Loading (Amps) - Footscray West (FW)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
FW4	Summer	360	207	157	163	159	156	152	149	147	▬▬▬▬▬▬▬▬
	Winter	360	170	177	175	171	166	162	157	154	
FW5	Summer	360	127	121	127	38	38	38	37	37	
	Winter	360	110	114	113	33	33	33	32	31	
FW6	Summer	360	104	109	112	110	110	108	110	113	
	Winter	360	99	103	101	100	98	97	98	100	
FW8	Summer	320	193	197	222	218	215	208	204	202	
	Winter	320	170	177	175	172	168	163	159	156	
FW9	Summer	360	183	0	0	227	222	215	223	233	
	Winter	360	0	0	0	189	183	178	183	190	
FW13	Summer	360	284	305	319	311	306	298	293	291	
	Winter	360	256	266	267	260	254	247	241	238	
FW16	Summer	360	187	176	181	178	176	171	180	189	
	Winter	360	181	188	186	183	179	175	181	190	
FW17	Summer	360	169	160	177	176	177	173	172	171	
	Winter	360	147	153	152	152	151	149	146	144	

Footscray West Zone Substation – Insights

| FW | Peak Time | 12:00 |

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	12672	0.99
Commercial	720	1.00
Industrial	30	1.00
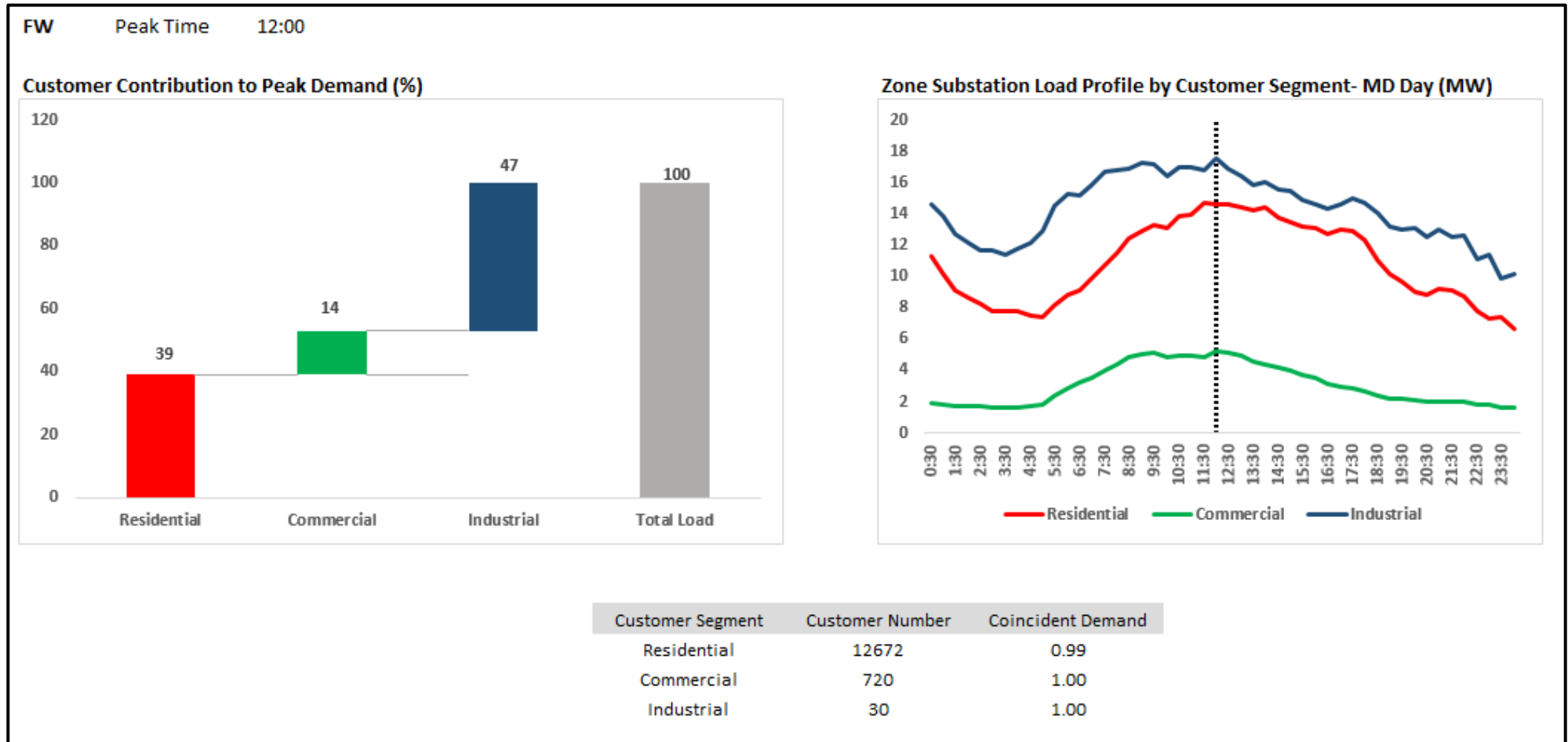
4 — LOAD FORECAST DATA

Point of Supply	Heidelberg (HB)	
Nominal Voltage	HV 66 kV	LV 11 kV
Terminal Station	TSTS	

Address	Yarra Street, Heidelberg
Melway Map Ref	32 B5

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	26.1	26.4	25.0	25.3	25.8	26.1	26.1	26.0	26.0	25.9	25.9	26.0
	Load MVAr	6.8	7.1	7.2	7.2	7.4	7.4	7.5	7.4	7.4	7.4	7.4	7.4
	Tx MVA	27.0	27.4	26.0	26.3	26.8	27.1	27.1	27.1	27.1	27.0	27.0	27.0
50PoE Winter	MW	17.6	18.0	18.2	18.5	18.8	19.0	19.0	18.9	18.7	18.6	18.5	18.4
	Load MVAr	3.2	3.5	3.5	3.6	3.7	3.7	3.7	3.7	3.6	3.6	3.6	3.6
	Tx MVA	17.9	18.4	18.6	18.8	19.2	19.4	19.4	19.2	19.1	19.0	18.9	18.8
10PoE Summer	MW	26.1	26.4	27.9	28.1	28.7	28.8	28.9	28.9	28.8	28.7	28.7	28.7
	Load MVAr	6.8	7.1	8.0	8.0	8.2	8.2	8.3	8.3	8.2	8.2	8.2	8.2
	Tx MVA	27.0	27.4	29.0	29.2	29.8	29.9	30.1	30.0	30.0	29.9	29.9	29.9
10PoE Winter	MW	17.6	18.5	18.7	19.0	19.3	19.6	19.5	19.4	19.3	19.1	19.0	18.9
	Load MVAr	3.2	3.6	3.6	3.7	3.7	3.8	3.8	3.8	3.7	3.7	3.7	3.7
	Tx MVA	17.9	18.9	19.1	19.3	19.7	19.9	19.9	19.7	19.6	19.5	19.4	19.3

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/27
Capacitor		0
No. of Distribution Feeders		7
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	29.2	35.6	Overvoltage limit (S & W)
24-hour	29.2	35.6	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	8.3	5.6
LV 11 kV	12.0	1.6

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
HB14	Summer	375	251	240	225	236	252	261	259	259	
	Winter	375	147	150	150	158	167	172	170	169	
HB15	Summer	375	313	315	298	302	318	337	350	366	
	Winter	375	226	231	236	238	249	262	270	282	
HB22	Summer	285	203	190	182	182	181	179	177	177	
	Winter	285	164	168	170	170	168	165	162	161	
HB23	Summer	285	205	196	198	201	203	200	198	197	
	Winter	285	129	132	134	135	135	133	131	130	
HB24	Summer	285	212	194	180	178	182	187	191	196	
	Winter	285	119	122	121	119	121	123	125	128	
HB31	Summer	285	189	173	176	192	211	221	223	226	
	Winter	285	115	117	123	135	147	153	153	154	
HB32	Summer	180	136	144	141	143	145	145	145	145	
	Winter	180	101	103	104	106	106	106	105	105	

Table title: Feeder Loading (Amps) - Heidelberg (HB)

Feeder Loading (Amps) - Heidelberg (HB)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
HB14	Summer	375	251	240	254	266	284	292	291	292	
	Winter	375	147	154	155	162	171	177	174	173	
HB15	Summer	375	313	315	341	344	363	381	398	417	
	Winter	375	226	237	243	245	256	269	278	289	
HB22	Summer	285	203	190	204	203	202	198	197	197	
	Winter	285	164	172	175	175	172	169	167	166	
HB23	Summer	285	205	196	226	229	231	226	224	224	
	Winter	285	129	136	138	139	139	136	134	133	
HB24	Summer	285	212	194	204	200	205	209	214	221	
	Winter	285	119	125	124	122	124	127	129	132	
HB31	Summer	285	189	173	191	208	229	238	241	245	
	Winter	285	115	121	127	138	151	157	157	158	
HB32	Summer	180	136	144	152	154	156	155	155	156	
	Winter	180	101	106	107	108	109	109	108	108	

Heidelberg Zone Substation – Insights

HB	Peak Time	14:00

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	8156	0.99
Commercial	785	0.96
Industrial	8	0.95
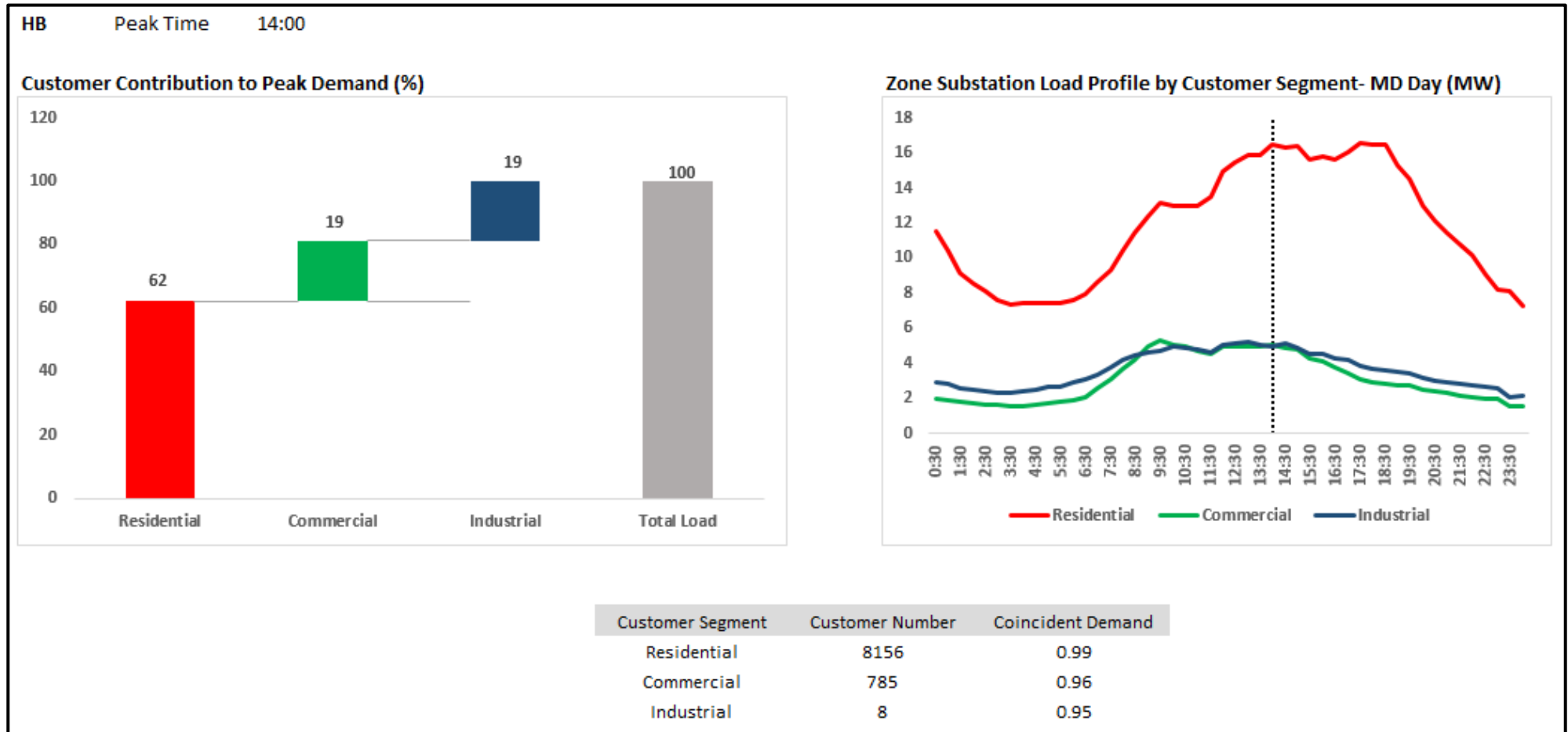
4 — LOAD FORECAST DATA

Point of Supply	Kalkallo (KLO)		Address	Cnr Donnybrook Rd & Hume Hwy
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	367 C5
Terminal Station	SMTS			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	**MW**	7.6	10.6	12.5	14.8	16.9	18.5	19.8	21.1	22.5	24.0	25.6	27.4
	Load MVAr	0.2	-0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.1
	Tx MVA	7.6	10.6	12.5	14.8	16.9	18.6	19.8	21.1	22.5	24.0	25.6	27.4
50PoE Winter	**MW**	6.7	6.9	8.7	10.9	12.7	14.1	15.1	16.0	17.0	18.0	19.1	20.3
	Load MVAr	-1.1	1.2	1.5	1.9	2.2	2.4	2.6	2.7	2.9	3.1	3.3	3.5
	Tx MVA	6.7	7.0	8.9	11.0	12.9	14.3	15.3	16.2	17.2	18.3	19.4	20.6
10PoE Summer	**MW**	7.6	10.6	13.5	16.0	18.3	19.9	21.3	22.7	24.2	25.8	27.5	29.4
	Load MVAr	0.2	-0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.2
	Tx MVA	7.6	10.6	13.5	16.0	18.3	19.9	21.3	22.8	24.2	25.8	27.5	29.4
10PoE Winter	**MW**	6.7	7.1	9.0	11.2	13.1	14.5	15.5	16.4	17.4	18.5	19.6	20.9
	Load MVAr	-1.1	1.2	1.5	1.9	2.2	2.5	2.6	2.8	3.0	3.2	3.4	3.6
	Tx MVA	6.7	7.2	9.1	11.3	13.2	14.7	15.7	16.7	17.7	18.8	19.9	21.2

Station Configuration		
Power Transformers	**Number**	2
	Nameplate	20/33
Capacitor		0
No. of Distribution Feeders		3
Other		-

Station Transformer Cyclic Rating (MVA)			
	Summer	**Winter**	**Limitations**
(n-1)			
24-hour			

Cogeneration	
Remarks	AusNet zone substation

Fault Levels (kA)		
	3 Phase	**1 Phase to Ground**
HV 66 kV		
LV 22 kV		

Feeder Loading (Amps) - Kalkallo (KLO)											
Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
KLO13	Summer	375	48	81	142	193	232	261	299	343	████████████████████
	Winter	375	49	50	89	121	144	161	183	210	
KLO21	Summer	375	27	25	25	25	25	26	26	27	
	Winter	375	23	24	24	24	24	24	24	25	
KLO22	Summer	375	145	187	220	252	272	288	303	322	
	Winter	375	128	162	191	218	235	246	258	273	
KLO23	Summer	375	0	0	0	31	71	102	104	107	
	Winter	375	0	0	0	27	62	88	89	92	

Feeder Loading (Amps) - Kalkallo (KLO)											
Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
KLO13	Summer	375	48	81	150	203	244	273	313	361	████████████████████
	Winter	375	49	52	92	124	148	166	188	215	
KLO21	Summer	375	27	25	28	28	28	29	29	30	
	Winter	375	23	24	24	24	24	25	25	26	
KLO22	Summer	375	145	187	248	283	307	321	340	362	
	Winter	375	128	167	197	224	241	253	265	280	
KLO23	Summer	375	0	0	0	32	75	106	109	113	
	Winter	375	0	0	0	28	63	90	92	94	

Kalkallo Zone Substation – Insights

| KLO | Peak Time | 16:30 | 17:00 |

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	572	0.96
Commercial	12	0.35
Industrial	0	0.93

Point of Supply	███████████		Address	██████████████████
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	5 D11
Terminal Station	KTS B1-B2			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	27.8	26.8	25.9	25.7	25.4	25.2	25.0	25.1	25.3	25.3	25.5	25.8
	Load MVAr	9.2	5.7	6.2	6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.1	6.1
	Tx MVA	29.3	27.4	26.7	26.4	26.1	25.9	25.7	25.8	26.0	26.1	26.2	26.5
50PoE Winter	MW	23.6	24.1	24.0	23.7	23.3	22.9	22.6	22.6	22.6	22.6	22.7	22.7
	Load MVAr	3.2	4.3	4.2	4.2	4.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	Tx MVA	23.8	24.5	24.4	24.1	23.7	23.2	23.0	23.0	23.0	23.0	23.0	23.0
10PoE Summer	MW	27.8	26.8	27.8	27.4	27.2	26.7	26.6	26.8	26.9	27.0	27.2	27.4
	Load MVAr	9.2	5.7	6.6	6.5	6.5	6.4	6.3	6.4	6.4	6.4	6.5	6.5
	Tx MVA	29.3	27.4	28.6	28.2	28.0	27.5	27.4	27.6	27.7	27.8	28.0	28.2
10PoE Winter	MW	23.6	24.8	24.7	24.3	23.9	23.5	23.2	23.2	23.2	23.3	23.3	23.3
	Load MVAr	3.2	4.4	4.4	4.3	4.2	4.2	4.1	4.1	4.1	4.1	4.1	4.1
	Tx MVA	23.8	25.2	25.1	24.7	24.3	23.9	23.6	23.6	23.6	23.6	23.6	23.7

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/30
Capacitor		8
No. of Distribution Feeders		0
Other		-

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)			
24-hour			

Cogeneration	
Remarks	Customer owned substation.

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	12.1	8.1
LV 22 kV	8.6	11.0

4 — LOAD FORECAST DATA

Point of Supply	███████████	
Nominal Voltage	HV 22 kV	LV 6.6 kV
Terminal Station	BLTS22	

Address	███████████
Melway Map Ref	41 C11

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	2.8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	Load MVAr	2.6	2.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	Tx MVA	3.8	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
50PoE Winter	MW	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	Load MVAr	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Tx MVA	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
10PoE Summer	MW	2.8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	Load MVAr	2.6	2.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	Tx MVA	3.8	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
10PoE Winter	MW	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	Load MVAr	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Tx MVA	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4

Station Configuration		
Power Transformers	Number	0
	Nameplate	0
Capacitor		0
No. of Distribution Feeders		0
Other		-

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)			
24-hour			

Cogeneration	
Remarks	Customer owned substation.

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 22 kV	13.7	14.7
LV 6.6 kV	14.5	16.2

Point of Supply	North Heidelberg (NH)		Address	Cnr Mcnamara & Ruthven Streets, Macleod
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	20 A9
Terminal Station	TTS (B12)			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	55.3	61.2	58.0	58.0	58.0	57.7	57.5	57.5	57.6	57.6	57.8	58.1
	Load MVAr	22.5	16.0	19.6	19.6	19.7	19.5	19.5	19.5	19.5	19.5	19.6	19.7
	Tx MVA	56.1	61.3	58.3	58.3	58.4	58.0	57.8	57.8	58.0	58.0	58.2	58.5
50PoE Winter	MW	45.0	46.0	46.3	46.3	46.0	45.5	45.1	45.0	44.8	44.6	44.5	44.4
	Load MVAr	15.0	13.8	13.9	13.9	13.8	13.6	13.5	13.5	13.4	13.4	13.3	13.3
	Tx MVA	45.0	46.0	46.3	46.3	46.0	45.5	45.1	45.0	44.8	44.6	44.5	44.4
10PoE Summer	MW	55.3	61.2	64.8	64.5	64.6	63.7	63.7	63.9	64.0	63.9	64.1	64.3
	Load MVAr	22.5	16.0	22.0	21.9	21.9	21.6	21.6	21.7	21.7	21.7	21.7	21.8
	Tx MVA	56.1	61.3	65.4	65.1	65.2	64.3	64.3	64.5	64.5	64.5	64.7	64.9
10PoE Winter	MW	45.0	47.3	47.6	47.5	47.2	46.7	46.3	46.2	46.0	45.9	45.7	45.6
	Load MVAr	15.0	14.2	14.2	14.2	14.1	14.0	13.9	13.8	13.8	13.7	13.7	13.7
	Tx MVA	45.0	47.3	47.6	47.5	47.3	46.7	46.3	46.2	46.0	45.9	45.7	45.6

Station Configuration		
Power Transformers	Number	3
	Nameplate	2-20/30 & 1-20/33
Capacitor		13.5
No. of Distribution Feeders		10
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	75.2	76.0	Transformer thermal limit
24-hour	76.0	76.0	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	11.3	6.1
LV 22 kV	11.1	2.0

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
NH2	Summer	375	250	364	349	350	351	347	344	343	
	Winter	375	286	292	297	298	296	290	286	285	
NH3	Summer	285	165	161	155	153	151	150	148	148	
	Winter	285	144	147	146	144	142	139	137	136	
NH5	Summer	285	149	144	143	142	140	138	137	137	▬▬▬▬
	Winter	285	114	117	116	115	113	110	109	108	
NH8	Summer	215	148	141	140	138	137	135	134	134	
	Winter	215	93	95	95	93	92	90	89	88	
NH9	Summer	375	183	167	166	166	167	166	166	166	
	Winter	375	176	180	181	181	180	178	177	177	
NH12	Summer	375	153	159	156	154	153	151	150	149	
	Winter	375	125	128	127	125	123	121	119	118	
NH13	Summer	395	240	239	248	245	243	240	238	237	▬▬▬▬
	Winter	395	188	192	191	188	185	182	179	178	
NH16	Summer	235	179	204	199	201	200	199	203	209	
	Winter	235	134	137	140	142	140	138	140	143	
NH17	Summer	345	179	214	219	239	263	278	285	295	
	Winter	345	145	148	159	174	190	199	203	209	
NH20	Summer	590	126	133	127	126	125	124	123	122	▬▬▬▬
	Winter	590	92	94	94	94	92	90	89	89	

Table title: Feeder Loading (Amps) - North Heidelberg (NH)

Feeder Loading (Amps) - North Heidelberg (NH)											
Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
NH2	Summer	375	250	364	389	390	391	383	381	381	
	Winter	375	286	301	305	306	304	298	294	292	
NH3	Summer	285	165	161	168	165	163	160	159	159	
	Winter	285	144	151	151	148	146	143	141	140	
NH5	Summer	285	149	144	163	160	159	156	155	155	▬▬▬▬▬
	Winter	285	114	120	119	118	116	114	112	111	
NH8	Summer	215	148	141	159	157	155	152	151	151	
	Winter	215	93	98	97	96	94	92	91	90	
NH9	Summer	375	183	167	176	175	176	174	174	175	
	Winter	375	176	185	187	186	185	183	182	182	
NH12	Summer	375	153	159	165	163	161	158	157	157	
	Winter	375	125	131	131	129	126	124	122	121	
NH13	Summer	395	240	239	269	265	262	257	256	256	▬▬▬▬▬
	Winter	395	188	198	197	194	190	187	184	183	
NH16	Summer	235	179	204	219	221	220	217	222	229	
	Winter	235	134	141	144	145	143	142	144	147	
NH17	Summer	345	179	214	241	263	289	303	312	324	
	Winter	345	145	152	164	178	195	204	209	215	
NH20	Summer	590	126	133	140	139	138	135	134	134	▬▬▬▬▬
	Winter	590	92	97	97	96	95	93	92	91	

North Heidelberg Zone Substation – Insights

Customer Segment	Customer Number	Coincident Demand
Residential	18903	0.99
Commercial	1192	0.77
Industrial	140	0.95
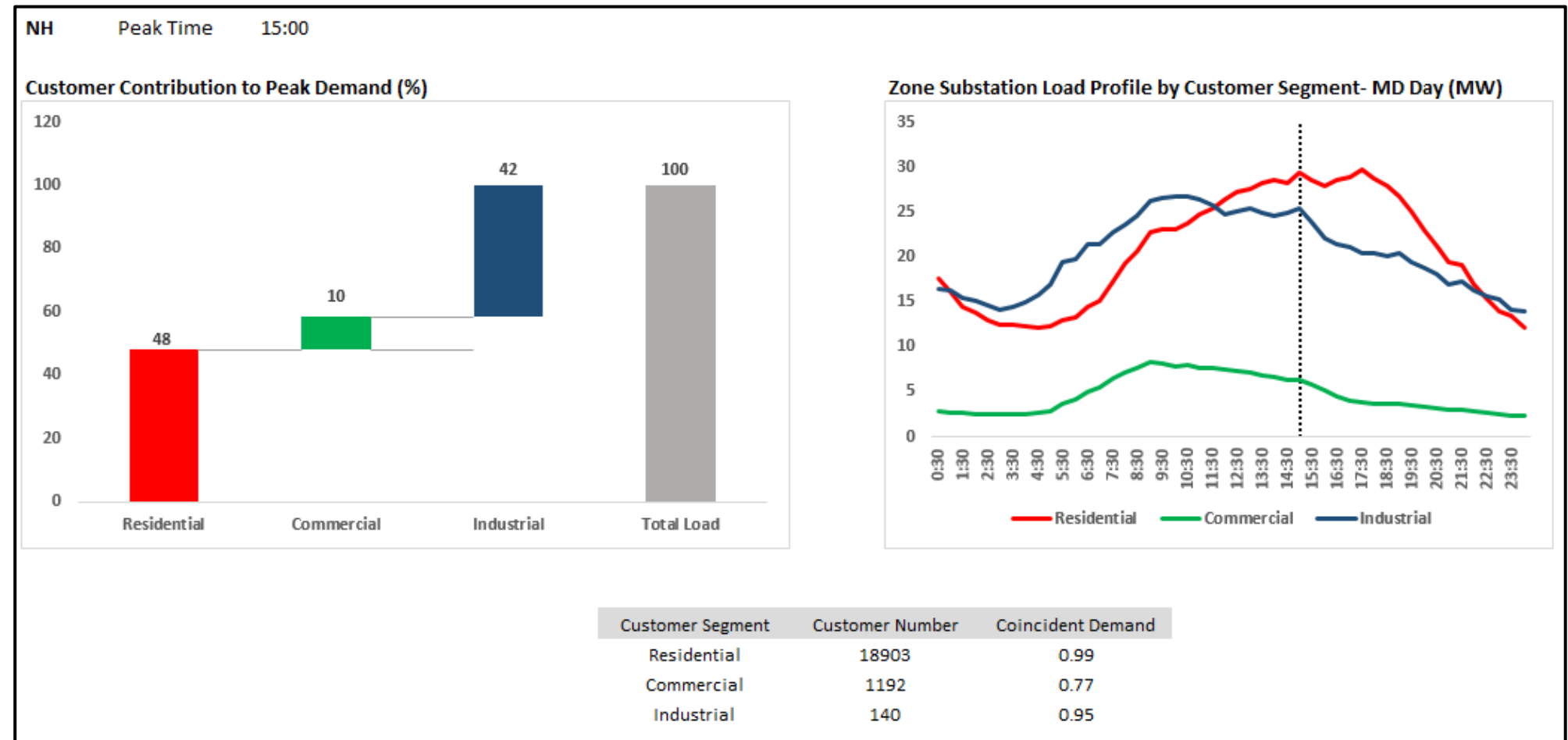
Point of Supply	North Essendon (NS)		Address	Cnr Johnson Street & Moreland Road, North Essendon
Nominal Voltage	HV 22 kV	LV 11 kV	Melway Map Ref	28 K3
Terminal Station	BTS			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	30.9	36.5	33.2	33.6	34.5	35.4	36.2	37.5	39.0	39.3	39.9	40.5
	Load MVAr	6.9	9.5	9.1	9.2	9.5	9.7	9.9	10.3	10.7	10.8	10.9	11.1
	Tx MVA	31.6	37.7	34.4	34.8	35.7	36.7	37.6	38.9	40.4	40.8	41.3	42.0
50PoE Winter	MW	23.8	26.9	27.2	27.6	28.2	28.8	29.5	30.5	31.5	31.8	32.0	32.2
	Load MVAr	3.0	4.3	4.3	4.4	4.5	4.6	4.7	4.9	5.0	5.1	5.1	5.1
	Tx MVA	24.0	27.2	27.6	27.9	28.5	29.2	29.8	30.9	31.9	32.2	32.4	32.6
10PoE Summer	MW	30.9	36.5	39.1	39.4	40.4	41.2	42.3	44.0	45.6	46.0	46.6	47.2
	Load MVAr	6.9	9.5	10.7	10.8	11.1	11.3	11.6	12.1	12.5	12.6	12.8	13.0
	Tx MVA	31.6	37.7	40.5	40.8	41.9	42.7	43.9	45.6	47.3	47.7	48.3	49.0
10PoE Winter	MW	23.8	27.7	28.0	28.3	28.9	29.6	30.2	31.3	32.4	32.7	32.9	33.1
	Load MVAr	3.0	4.4	4.5	4.5	4.6	4.7	4.8	5.0	5.2	5.2	5.2	5.3
	Tx MVA	24.0	28.0	28.3	28.7	29.3	30.0	30.6	31.7	32.8	33.1	33.3	33.6

Station Configuration		
Power Transformers	Number	3
	Nameplate	12/18
Capacitor		0
No. of Distribution Feeders		9
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	36.0	36.0	Transformer thermal limit
24-hour	36.0	36.0	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 22 kV	5.6	2.5
LV 11 kV	9.7	1.6

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
NS7	Summer	305	224	190	164	163	169	177	184	192	
	Winter	305	195	169	171	170	174	181	187	195	
NS8	Summer	345	154	148	153	155	154	152	152	152	
	Winter	345	128	131	136	137	135	133	132	132	
NS9	Summer	375	262	209	206	204	207	224	257	287	
	Winter	375	199	203	202	200	201	217	247	275	
NS11	Summer	375	0	280	287	308	334	349	360	373	
	Winter	375	0	225	235	252	273	284	292	303	
NS12	Summer	285	143	179	164	165	174	182	188	256	
	Winter	285	94	96	97	98	102	106	109	148	
NS14	Summer	375	272	281	266	267	274	281	288	296	
	Winter	375	171	175	177	178	181	184	187	192	
NS15	Summer	285	236	237	229	229	230	228	227	228	
	Winter	285	152	155	158	158	157	154	153	153	
NS16	Summer	305	108	105	105	105	106	105	105	105	
	Winter	305	73	75	75	75	75	74	74	74	
NS17	Summer	190	154	138	155	154	154	154	155	156	
	Winter	190	96	98	98	97	96	95	95	96	
NS18	Summer	305	237	170	174	204	253	302	332	366	
	Winter	305	187	130	140	164	201	239	260	286	

Feeder Loading (Amps) - North Essendon (NS)

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
NS7	Summer	305	224	190	180	179	185	192	201	211	
	Winter	305	195	173	175	175	179	186	192	200	
NS8	Summer	345	154	148	170	171	170	167	167	168	
	Winter	345	128	135	140	141	139	137	136	135	
NS9	Summer	375	262	209	217	214	218	234	269	302	
	Winter	375	199	209	208	205	207	223	253	282	
NS11	Summer	375	0	280	304	324	352	365	378	393	
	Winter	375	0	231	241	259	280	292	300	311	
NS12	Summer	285	143	179	195	197	207	215	223	304	
	Winter	285	94	99	100	101	105	109	112	152	
NS14	Summer	375	272	281	300	300	308	314	322	332	
	Winter	375	171	180	182	182	185	189	192	197	
NS15	Summer	285	236	237	253	252	253	249	249	251	
	Winter	285	152	159	162	162	161	159	157	157	
NS16	Summer	305	108	105	120	120	121	119	120	121	
	Winter	305	73	77	77	77	77	76	76	76	
NS17	Summer	190	154	138	179	177	177	176	177	180	
	Winter	190	96	101	101	99	98	98	98	98	
NS18	Summer	305	237	170	192	226	279	332	365	403	
	Winter	305	187	133	144	168	206	246	267	294	

Feeder Loading (Amps) - North Essendon (NS)

North Essendon Zone Substation – Insights

| NS | Peak Time | 14:30 |

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	9620	1.00
Commercial	879	0.85
Industrial	26	0.93
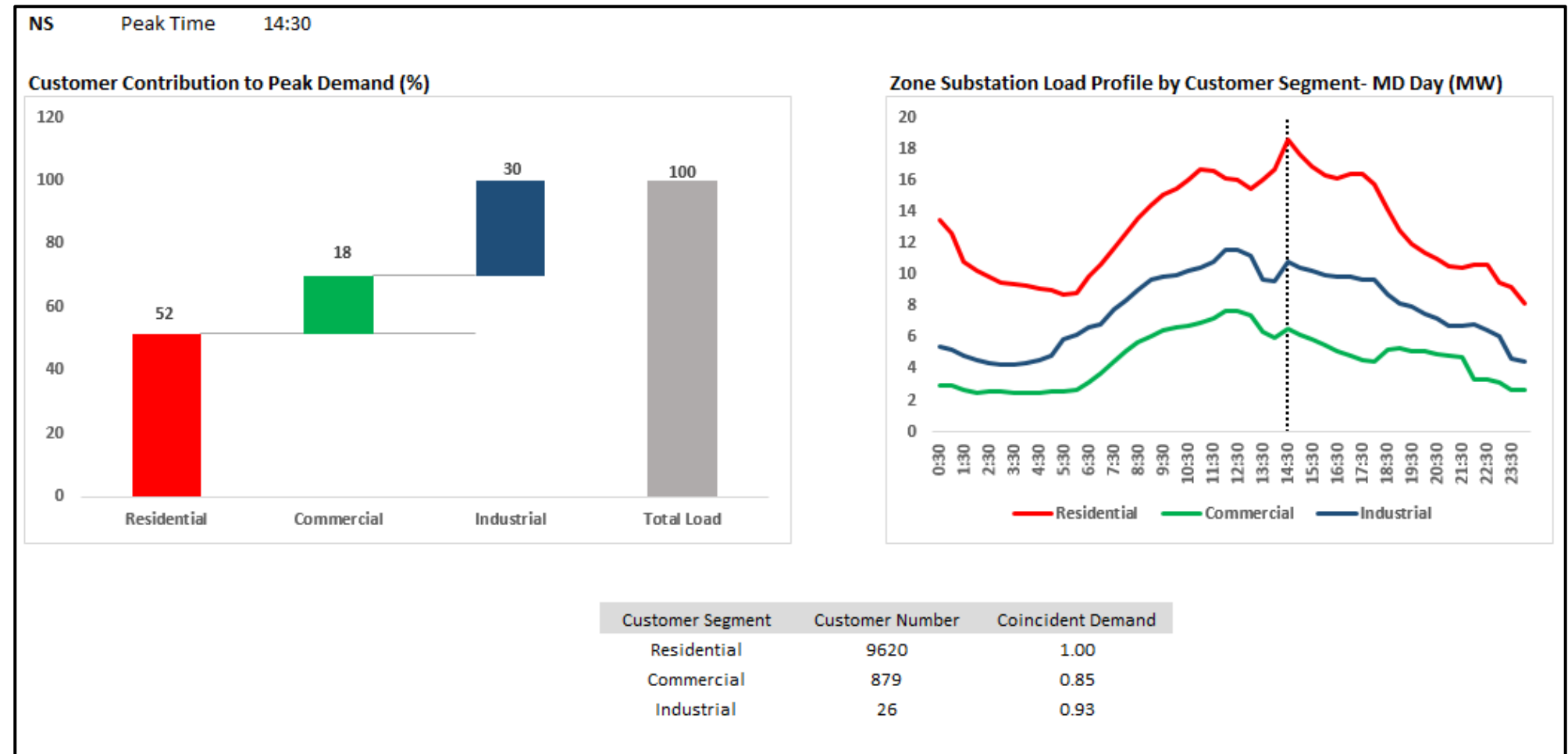
Point of Supply	Newport (NT)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	BLTS	

Address	Douglas Pde - In Front Of Newport Power Station, Newport
Melway Map Ref	56 B4

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	36.3	37.6	35.8	36.4	37.2	37.4	37.6	37.6	37.7	37.7	37.8	38.0
	Load MVAr	8.7	8.5	8.4	8.5	8.7	8.8	8.8	8.8	8.8	8.8	8.9	8.9
	Tx MVA	36.4	37.7	35.9	36.5	37.3	37.5	37.7	37.7	37.8	37.8	37.9	38.1
50PoE Winter	MW	29.8	30.5	30.9	31.4	31.9	31.9	32.0	31.8	31.7	31.6	31.5	31.4
	Load MVAr	4.6	4.4	4.5	4.6	4.7	4.7	4.7	4.6	4.6	4.6	4.6	4.6
	Tx MVA	30.1	30.8	31.2	31.7	32.2	32.3	32.3	32.2	32.0	32.0	31.8	31.8
10PoE Summer	MW	36.3	37.6	39.9	40.5	41.4	41.3	41.7	41.8	41.8	41.8	41.9	42.1
	Load MVAr	8.7	8.5	9.4	9.5	9.7	9.7	9.8	9.8	9.8	9.8	9.8	9.9
	Tx MVA	36.4	37.7	40.1	40.6	41.5	41.5	41.8	42.0	42.0	42.0	42.1	42.2
10PoE Winter	MW	29.8	31.3	31.8	32.3	32.7	32.8	32.8	32.7	32.6	32.5	32.4	32.3
	Load MVAr	4.6	4.6	4.6	4.7	4.8	4.8	4.8	4.8	4.8	4.7	4.7	4.7
	Tx MVA	30.1	31.6	32.1	32.6	33.1	33.2	33.2	33.0	32.9	32.8	32.7	32.7

Station Configuration		
Power Transformers	Number	2
	Nameplate	35/38
Capacitor		12
No. of Distribution Feeders		8
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	41.5	41.5	Transformer thermal limit
24-hour	57.0	57.0	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	14.4	13.5
LV 22 kV	12.2	2.0

Feeder Loading (Amps) - Newport (NT)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
NT1	Summer	285	0	0	0	0	0	0	0	0	
	Winter	285	0	0	0	0	0	0	0	0	
NT3	Summer	285	310	150	145	144	145	145	145	145	
	Winter	285	141	144	146	145	145	144	143	143	
NT4	Summer	285	130	128	120	119	117	116	115	115	
	Winter	285	98	100	100	98	97	95	93	93	
NT10	Summer	285	70	51	50	50	55	61	66	72	
	Winter	285	54	55	55	54	59	66	71	77	
NT11	Summer	285	241	250	246	251	253	252	250	249	
	Winter	285	197	201	208	212	212	209	206	205	
NT15	Summer	295	190	194	204	227	252	264	277	293	
	Winter	295	170	174	185	206	226	235	245	259	
NT16	Summer	305	134	132	130	128	127	125	124	124	
	Winter	305	134	137	136	134	132	129	128	127	
NT17	Summer	285	154	295	295	306	319	325	324	325	
	Winter	285	249	254	258	267	276	279	277	277	

			Actual		10PoE Forecast						Comments
Feeder	**Season**	**Rating**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
NT1	**Summer**	285	0	0	0	0	0	0	0	0	
	Winter	285	0	0	0	0	0	0	0	0	
NT3	**Summer**	285	310	150	161	159	160	159	159	160	
	Winter	285	141	148	150	149	148	148	146	146	
NT4	**Summer**	285	130	128	135	132	131	129	128	128	
	Winter	285	98	103	102	101	99	97	96	95	
NT10	**Summer**	285	70	51	53	52	58	64	70	76	
	Winter	285	54	57	56	56	61	68	73	79	
NT11	**Summer**	285	241	250	270	274	277	274	272	272	
	Winter	285	197	207	214	218	217	215	212	211	
NT15	**Summer**	295	190	194	215	239	266	276	291	308	
	Winter	295	170	179	190	211	232	241	252	265	
NT16	**Summer**	305	134	132	137	135	134	131	130	130	
	Winter	305	134	141	140	138	135	133	131	130	
NT17	**Summer**	285	154	295	312	323	337	340	340	343	
	Winter	285	249	262	265	274	284	287	284	284	

Table title: **Feeder Loading (Amps) - Newport (NT)**

Newport Zone Substation – Insights

| NT | Peak Time | 13:30 |

Customer Contribution to Peak Demand (%)

Residential: 58
Commercial: 17
Industrial: 24
Total Load: 100

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Legend: Residential, Commercial, Industrial

Customer Segment	Customer Number	Coincident Demand
Residential	11533	1.00
Commercial	690	1.00
Industrial	46	0.98
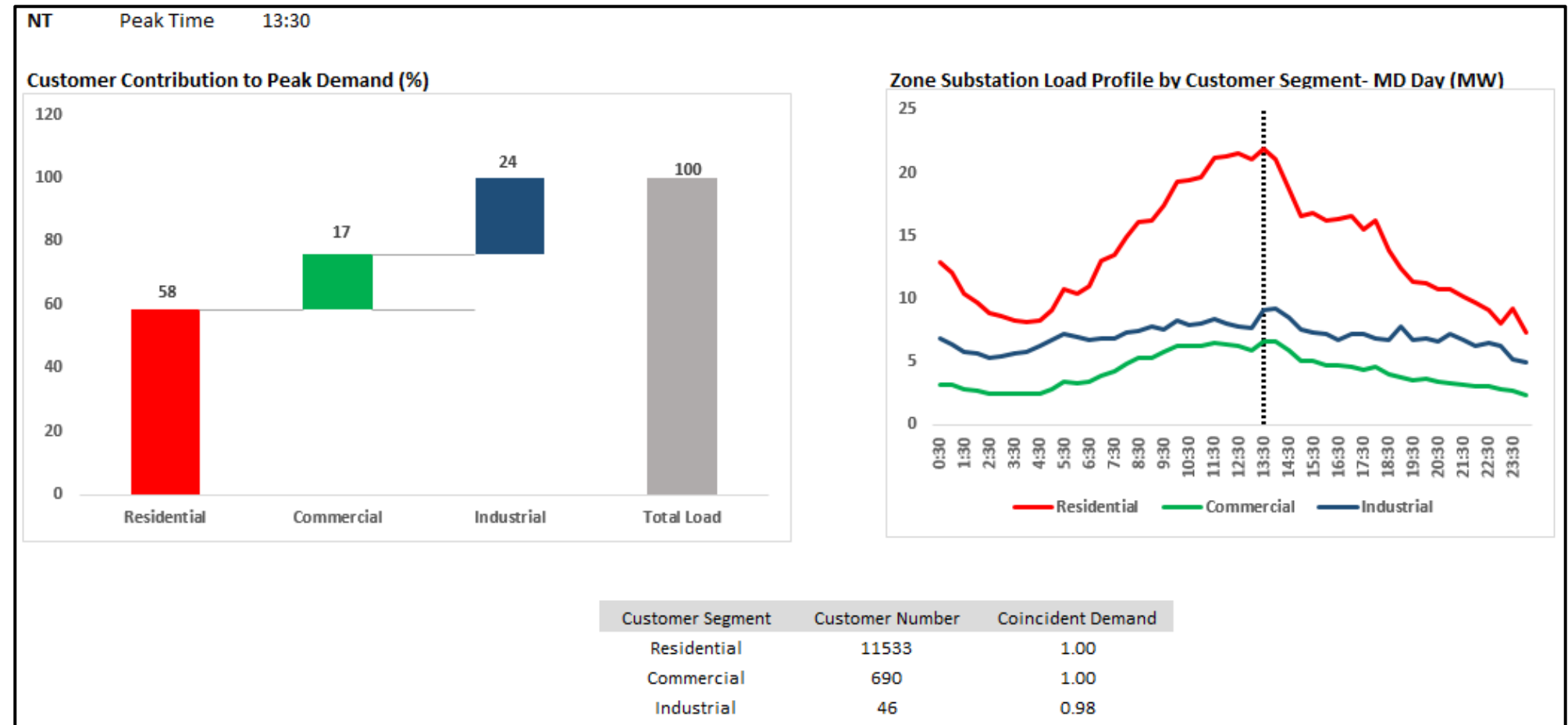
Point of Supply	Preston (PTN)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B12)	

Address	Murray Road, Preston
Melway Map Ref	18 F11

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	0.0	0.0	0.0	26.4	26.1	25.8	25.6	25.5	25.6	25.6	25.7	25.8
	Load MVAr	0.0	0.0	0.0	9.2	9.1	9.0	9.0	9.0	9.0	9.0	9.0	9.1
	Tx MVA	0.0	0.0	0.0	26.9	26.6	26.3	26.0	26.0	26.1	26.1	26.2	26.3
50PoE Winter	MW	0.0	0.0	0.0	23.7	23.5	23.2	23.0	23.0	23.1	23.1	23.1	23.2
	Load MVAr	0.0	0.0	0.0	5.2	5.1	5.1	5.0	5.0	5.0	5.0	5.0	5.1
	Tx MVA	0.0	0.0	0.0	23.8	23.5	23.2	23.0	23.0	23.1	23.1	23.2	23.3
10PoE Summer	MW	0.0	0.0	0.0	29.2	29.0	28.4	28.3	28.3	28.3	28.3	28.4	28.5
	Load MVAr	0.0	0.0	0.0	10.3	10.2	10.0	9.9	9.9	9.9	9.9	10.0	10.0
	Tx MVA	0.0	0.0	0.0	29.9	29.6	29.0	28.9	28.9	29.0	28.9	29.0	29.1
10PoE Winter	MW	0.0	0.0	0.0	25.0	24.8	24.3	24.1	24.2	24.2	24.2	24.3	24.4
	Load MVAr	0.0	0.0	0.0	5.4	5.4	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	Tx MVA	0.0	0.0	0.0	25.0	24.8	24.3	24.2	24.2	24.3	24.2	24.3	24.4

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/33
Capacitor		8
No. of Distribution Feeders		5
Other		NER

Cogeneration	
Remarks	New Zone Substation to be commissioned in 2020

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	TBC	TBC	New Zone Substation to be commissioned in 2020
24-hour	TBC	TBC	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	TBC	TBC
LV 6.6 kV	TBC	TBC

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
PTN011	**Summer**	375	0	0	0	209	207	205	203	202	
	Winter	375	0	0	0	184	180	177	174	173	
PTN014	**Summer**	375	0	0	0	183	181	179	178	177	
	Winter	375	0	0	0	161	158	155	153	152	
PTN015	**Summer**	375	0	0	0	182	180	178	177	176	
	Winter	375	0	0	0	160	157	154	152	151	
PTN021	**Summer**	375	0	0	0	75	74	73	72	72	
	Winter	375	0	0	0	65	64	63	62	62	
PTN024	**Summer**	375	0	0	0	100	99	98	97	97	
	Winter	375	0	0	0	88	86	84	83	83	

Table title: **Feeder Loading (Amps) - Preston (P)**

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
PTN011	Summer	375	0	0	0	233	231	226	225	225	
	Winter	375	0	0	0	189	185	182	179	178	
PTN014	Summer	375	0	0	0	200	199	195	194	194	
	Winter	375	0	0	0	165	162	159	157	156	
PTN015	Summer	375	0	0	0	197	195	192	191	191	
	Winter	375	0	0	0	164	161	158	156	155	
PTN021	Summer	375	0	0	0	83	82	81	80	80	
	Winter	375	0	0	0	67	66	65	64	63	
PTN024	Summer	375	0	0	0	105	104	102	102	102	
	Winter	375	0	0	0	90	88	87	85	85	

Table title: **Feeder Loading (Amps) - Preston (P)**

4 — LOAD FORECAST DATA

Point of Supply	Pascoe Vale (PV)	
Nominal Voltage	HV 66 kV	LV 11 kV
Terminal Station	KTS B1-B2	

Address	Cnr Northumberland Road & Arnold Crt, Pascoe Vale
Melway Map Ref	17 A7

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	37.2	37.5	36.1	36.0	35.9	35.5	35.2	35.1	35.1	34.9	34.9	34.9
	Load MVAr	16.4	14.7	13.6	13.6	13.6	13.4	13.3	13.3	13.3	13.2	13.2	13.2
	Tx MVA	37.5	37.6	36.1	36.0	35.9	35.6	35.3	35.1	35.1	34.9	34.9	34.9
50PoE Winter	MW	26.2	26.8	27.0	27.0	26.7	26.3	26.0	25.8	25.6	25.4	25.2	25.0
	Load MVAr	4.1	4.9	4.9	4.9	4.9	4.8	4.7	4.7	4.6	4.6	4.6	4.6
	Tx MVA	26.6	27.3	27.5	27.4	27.2	26.7	26.4	26.2	26.0	25.8	25.6	25.5
10PoE Summer	MW	37.2	37.5	42.1	41.8	41.7	41.0	40.8	40.8	40.6	40.4	40.4	40.4
	Load MVAr	16.4	14.7	15.9	15.8	15.8	15.5	15.4	15.4	15.4	15.3	15.3	15.3
	Tx MVA	37.5	37.6	42.2	42.0	41.9	41.2	41.0	40.9	40.8	40.6	40.5	40.5
10PoE Winter	MW	26.2	27.6	27.8	27.7	27.4	27.1	26.7	26.5	26.3	26.1	25.9	25.8
	Load MVAr	4.1	5.0	5.1	5.0	5.0	4.9	4.8	4.8	4.8	4.7	4.7	4.7
	Tx MVA	26.6	28.0	28.2	28.2	27.9	27.5	27.1	26.9	26.7	26.5	26.3	26.2

Station Configuration		
Power Transformers	Number	3
	Nameplate	2-20/27 & 1-10/11
Capacitor		12
No. of Distribution Feeders		9
Other		NER

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	45.6	45.6	Transformer thermal limit
24-hour	53.7	53.7	

Cogeneration	
Remarks	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	11.1	7.1
LV 11 kV	12.5	1.6

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
PV12	Summer	345	113	182	190	190	190	189	187	186	
	Winter	345	94	96	96	96	96	94	93	92	
PV13	Summer	305	325	339	228	232	241	246	250	255	
	Winter	305	246	251	181	185	190	193	194	198	
PV14	Summer	375	280	299	319	319	317	313	310	308	
	Winter	375	213	218	246	245	242	237	233	231	
PV15	Summer	345	182	203	201	200	200	198	196	195	
	Winter	345	134	137	136	135	134	132	130	129	
PV21	Summer	375	139	147	230	228	227	224	222	222	
	Winter	375	103	105	176	174	172	169	166	165	
PV22	Summer	375	283	331	308	316	315	312	310	309	
	Winter	375	219	224	209	214	211	208	205	205	
PV23	Summer	375	277	263	261	257	255	251	248	247	
	Winter	375	192	196	195	192	189	185	182	180	
PV24	Summer	345	184	200	192	197	200	200	198	198	
	Winter	345	170	174	178	183	184	182	180	180	
PV31	Summer	375	225	253	240	239	236	233	230	229	
	Winter	375	177	181	184	182	179	175	172	171	

Table title: Feeder Loading (Amps) - Pascoe Vale (PV)

Feeder Loading (Amps) - Pascoe Vale (PV)											
Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
PV12	Summer	345	113	182	215	214	215	212	211	210	
	Winter	345	94	99	99	99	98	97	95	95	
PV13	Summer	305	325	339	257	261	271	275	280	287	
	Winter	305	246	258	187	190	195	198	200	203	
PV14	Summer	375	280	299	362	360	359	351	348	348	
	Winter	375	213	224	253	252	248	243	239	237	
PV15	Summer	345	182	203	233	230	230	227	225	225	
	Winter	345	134	141	140	139	137	135	133	132	
PV21	Summer	375	139	147	257	255	253	249	247	247	
	Winter	375	103	108	181	179	176	173	171	169	
PV22	Summer	375	283	331	347	354	353	347	346	346	
	Winter	375	219	230	215	220	217	214	211	210	
PV23	Summer	375	277	263	296	291	288	282	280	280	
	Winter	375	192	202	201	197	194	190	187	185	
PV24	Summer	345	184	200	217	222	226	224	223	224	
	Winter	345	170	179	183	187	189	188	185	184	
PV31	Summer	375	225	253	270	267	265	259	257	257	
	Winter	375	177	186	189	187	184	180	177	176	

Pascoe Vale Zone Substation – Insights

Customer Segment	Customer Number	Coincident Demand
Residential	17766	1.00
Commercial	716	0.92
Industrial	15	0.91
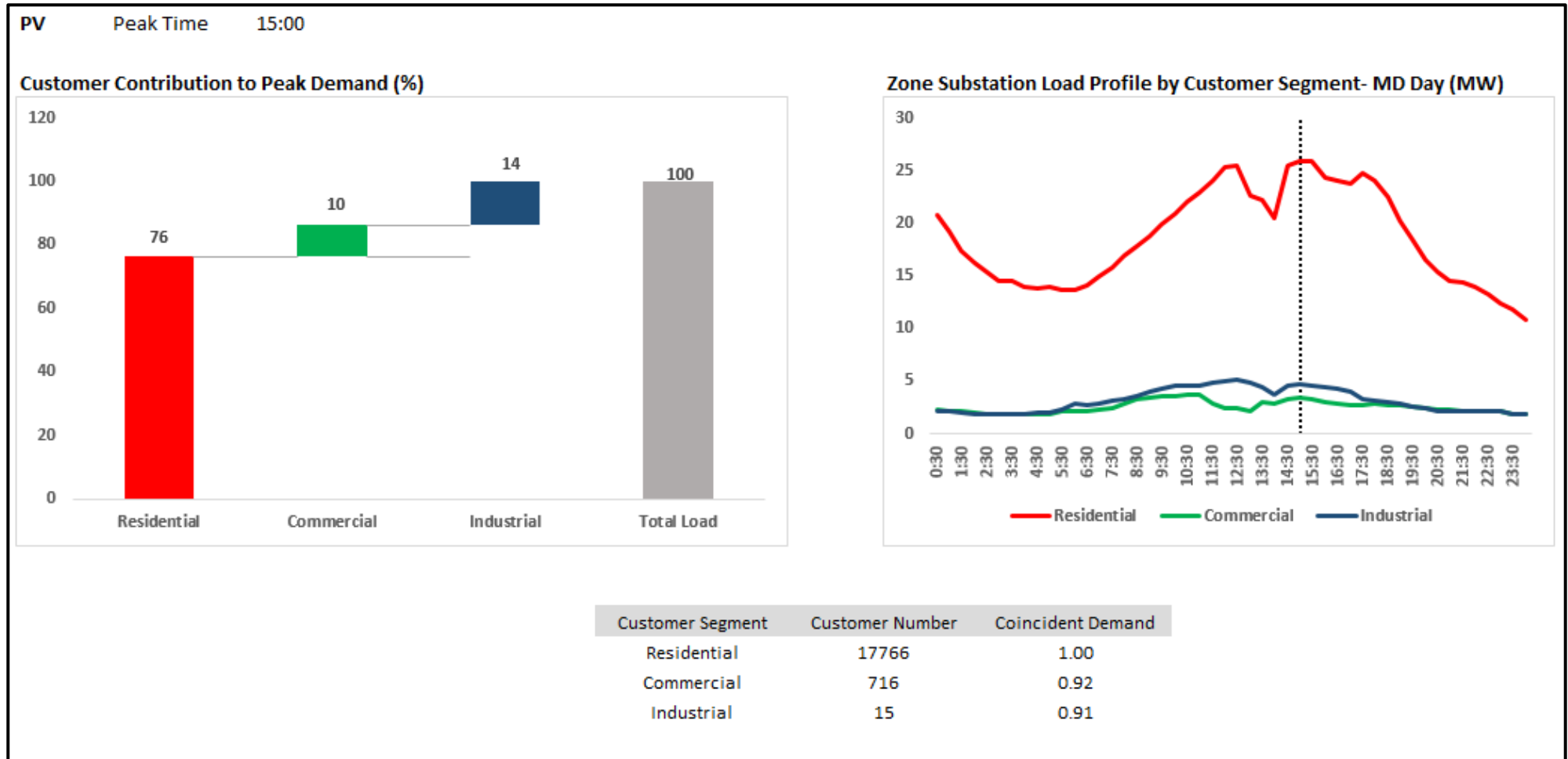
4 — LOAD FORECAST DATA

Point of Supply	St Albans (SA)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	KTS B3-B4	

Address	Cnr Sunshine Avenue & Stenson Road, St Albans
Melway Map Ref	14 F2

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	4.3	3.8	3.6	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	Load MVAr	3.4	1.5	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Tx MVA	5.5	4.1	4.3	4.2	4.2	4.1	4.0	4.0	4.0	4.0	4.0	4.0
50PoE Winter	MW	3.1	3.1	3.1	3.1	3.0	2.9	2.9	2.9	2.8	2.8	2.8	2.8
	Load MVAr	0.5	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.7
	Tx MVA	3.1	3.7	3.6	3.6	3.5	3.4	3.4	3.3	3.3	3.3	3.3	3.2
10PoE Summer	MW	4.3	3.8	4.0	3.9	3.9	3.8	3.7	3.7	3.7	3.7	3.7	3.7
	Load MVAr	3.4	1.5	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Tx MVA	5.5	4.1	4.7	4.6	4.6	4.5	4.4	4.4	4.4	4.4	4.4	4.4
10PoE Winter	MW	3.1	3.2	3.2	3.1	3.1	3.0	3.0	2.9	2.9	2.9	2.9	2.9
	Load MVAr	0.5	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7
	Tx MVA	3.1	3.8	3.7	3.7	3.6	3.5	3.5	3.4	3.4	3.4	3.4	3.3

Station Configuration		
Power Transformers	Number	3
	Nameplate	20/30
Capacitor		0
No. of Distribution Feeders		3
Other		-

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	69.8	83.5	Transformer thermal limit
24-hour	76.8	83.5	

Cogeneration	
Remarks	Powercor zone substation.

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV		
LV 22 kV		

Feeder Loading (Amps) - St Albans (SA)											
Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
SA2	Summer	138	6	12	12	11	11	11	11	11	Shared feeder with Powercor. JEN Share of Load
	Winter	138	11	12	12	11	11	11	11	11	
SA6	Summer	315	10	14	14	14	14	14	14	14	Shared feeder with Powercor. JEN Share of Load
	Winter	315	9	9	9	9	9	9	9	9	
SA12	Summer	230	100	80	79	78	77	76	75	74	Shared feeder with Powercor. JEN Share of Load
	Winter	230	66	67	67	66	65	63	62	62	

Feeder Loading (Amps) - St Albans (SA)											
Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
SA2	Summer	138	6	12	13	13	13	12	12	12	Shared feeder with Powercor. JEN Share of Load
	Winter	138	11	12	12	12	12	11	11	11	
SA6	Summer	315	10	14	16	16	16	15	15	15	Shared feeder with Powercor. JEN Share of Load
	Winter	315	9	10	10	10	9	9	9	9	
SA12	Summer	230	100	80	83	82	81	79	78	78	Shared feeder with Powercor. JEN Share of Load
	Winter	230	66	69	69	68	66	65	64	63	

St Albans Zone Substation – Insights

Customer Segment	Customer Number	Coincident Demand
Residential	2012	0.99
Commercial	37	0.85
Industrial	5	0.78
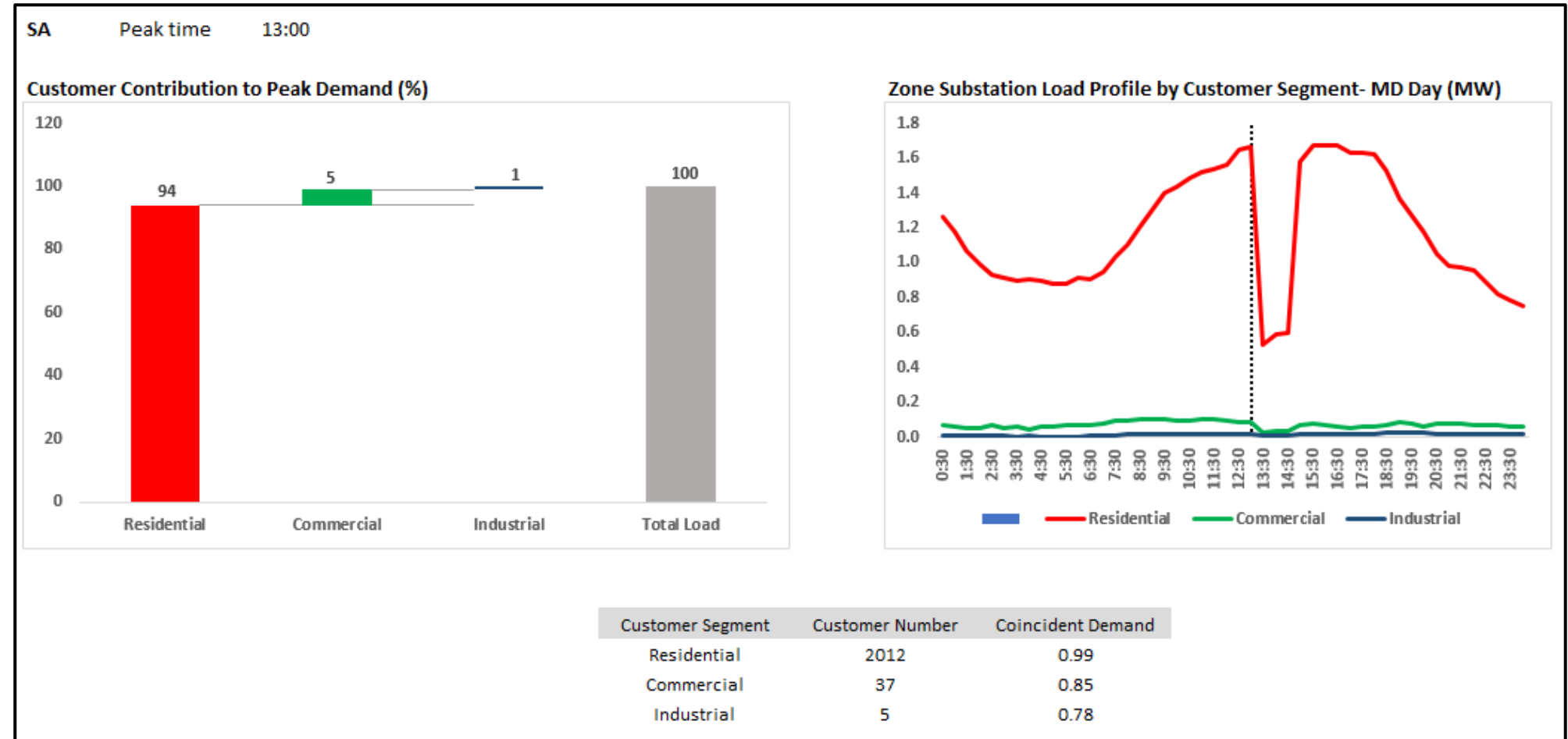
Point of Supply	Sunbury (SBY)		Address	Horne Street - Opp.Mitchells Lne, Sunbury
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	113 A11
Terminal Station	KTS B3-B4			

Station Loading		Actual		Forecast										
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	39.0	41.4	40.6	40.7	40.9	41.2	41.5	41.9	42.5	42.9	43.4	44.1
	Load MVAr	11.3	11.3	11.5	11.6	11.6	11.7	11.8	11.9	12.1	12.2	12.3	12.5
	Tx MVA	39.4	41.8	40.9	41.1	41.2	41.6	41.9	42.3	42.9	43.3	43.9	44.6
50PoE Winter	MW	31.7	32.4	32.7	32.7	32.7	32.8	32.9	33.1	33.3	33.6	33.8	34.0
	Load MVAr	7.9	5.0	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.2	5.2	5.2
	Tx MVA	31.7	32.5	32.7	32.8	32.7	32.8	33.0	33.2	33.4	33.6	33.8	34.1
10PoE Summer	MW	39.0	41.4	45.2	45.2	45.4	45.4	46.0	46.6	47.0	47.5	48.1	48.7
	Load MVAr	11.3	11.3	12.8	12.8	12.9	12.9	13.1	13.2	13.4	13.5	13.7	13.8
	Tx MVA	39.4	41.8	45.8	45.7	46.0	45.9	46.5	47.1	47.6	48.1	48.7	49.4
10PoE Winter	MW	31.7	33.3	33.6	33.6	33.5	33.7	33.8	34.0	34.3	34.5	34.7	35.0
	Load MVAr	7.9	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.3	5.3	5.3	5.4
	Tx MVA	31.7	33.4	33.6	33.7	33.6	33.7	33.9	34.1	34.3	34.6	34.8	35.1

Station Configuration		
Power Transformers	Number	3
	Nameplate	33, 16 & 16
Capacitor		5.3
No. of Distribution Feeders		7
Other		NER

Cogeneration	
Remarks	Fault level indicated are for 3 transformers in parallel

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	38.0	38.0	Transformer thermal limit
24-hour	38.0	38.0	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	7.1	4.0
LV 22 kV	7.8	1.6

4 — LOAD FORECAST DATA

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
SBY12	Summer	375	174	192	187	192	196	197	197	199	
	Winter	375	213	218	224	229	233	232	231	233	
SBY13	Summer	330	205	180	181	184	186	186	186	188	
	Winter	330	139	142	143	145	146	145	144	145	
SBY23	Summer	375	153	221	219	218	219	221	223	226	
	Winter	375	155	159	158	157	156	156	157	159	
SBY24	Summer	375	172	207	205	213	219	238	255	275	
	Winter	375	229	167	174	181	184	200	212	228	
SBY32	Summer	375	296	196	195	194	194	193	192	193	
	Winter	375	123	125	126	125	124	122	121	121	
SBY34	Summer	375	101	94	92	92	91	90	90	90	
	Winter	375	96	98	98	97	95	94	93	93	
SBY35	Summer	375	0	93	92	91	90	90	89	90	
	Winter	375	0	67	67	66	65	64	64	64	

Feeder Loading (Amps) - Sunbury (SBY)

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
SBY12	Summer	375	174	192	206	211	216	215	217	219	
	Winter	375	213	224	230	235	239	238	238	239	
SBY13	Summer	330	205	180	205	207	210	208	209	211	
	Winter	330	139	146	147	149	150	149	148	148	
SBY23	Summer	375	153	221	247	244	245	245	249	253	
	Winter	375	155	163	163	161	160	161	161	163	
SBY24	Summer	375	172	207	227	236	242	262	281	303	
	Winter	375	229	172	179	186	189	205	218	234	
SBY32	Summer	375	296	196	215	213	213	210	210	211	
	Winter	375	123	129	129	128	127	126	124	124	
SBY34	Summer	375	101	94	98	96	96	94	94	95	
	Winter	375	96	101	101	99	98	96	95	95	
SBY35	Summer	375	0	93	101	100	99	98	98	98	
	Winter	375	0	69	69	68	67	66	65	65	

Table title: **Feeder Loading (Amps) - Sunbury (SBY)**

Sunbury Zone Substation – Insights

SBY	Peak Time	16:30

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	14426	1.00
Commercial	859	0.87
Industrial	30	0.99

Point of Supply	Sydenham (SHM)		Address	Victoria Rd, Hillside
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	354 K6
Terminal Station	KTS B3-B4			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	40.4	41.1	40.5	40.9	41.9	42.7	43.5	44.1	44.9	45.5	46.4	47.3
	Load MVAr	6.9	10.5	10.0	10.1	10.3	10.5	10.7	10.9	11.1	11.2	11.4	11.7
	Tx MVA	40.5	41.1	40.5	41.0	42.0	42.8	43.5	44.2	45.0	45.7	46.5	47.4
50PoE Winter	MW	28.4	29.0	29.5	29.9	30.6	31.2	31.7	32.1	32.4	32.8	33.2	33.6
	Load MVAr	5.4	3.3	3.3	3.4	3.4	3.5	3.6	3.6	3.6	3.7	3.7	3.8
	Tx MVA	28.4	29.2	29.7	30.1	30.8	31.4	31.9	32.3	32.6	33.0	33.4	33.8
10PoE Summer	MW	40.4	41.1	44.8	45.1	46.2	46.8	47.8	48.6	49.4	50.1	50.9	51.9
	Load MVAr	6.9	10.5	11.1	11.1	11.4	11.5	11.8	12.0	12.2	12.4	12.6	12.8
	Tx MVA	40.5	41.1	44.9	45.2	46.4	46.9	47.9	48.8	49.5	50.2	51.2	52.1
10PoE Winter	MW	28.4	29.8	30.3	30.7	31.4	32.1	32.6	32.9	33.3	33.7	34.1	34.5
	Load MVAr	5.4	3.4	3.4	3.4	3.5	3.6	3.7	3.7	3.7	3.8	3.8	3.9
	Tx MVA	28.4	30.0	30.5	30.9	31.6	32.3	32.8	33.1	33.5	33.9	34.3	34.8

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/33
Capacitor		8
No. of Distribution Feeders		6
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	38.0	39.6	Transformer circuit breaker limit
24-hour	47.6	47.6	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	7.1	4.0
LV 22 kV	7.5	1.7

Feeder Loading (Amps) - Sydenham (SHM)											
Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
SHM11	Summer	375	94	125	150	181	221	252	277	306	
	Winter	375	98	100	122	147	178	201	220	242	
SHM12	Summer	375	220	230	226	224	225	225	227	229	
	Winter	375	140	143	143	141	140	140	140	141	
SHM14	Summer	375	234	221	222	226	232	236	239	244	
	Winter	375	145	148	150	152	155	157	158	160	
SHM21	Summer	375	245	245	243	242	241	239	239	240	
	Winter	375	159	163	162	161	159	157	156	156	
SHM22	Summer	375	154	152	151	151	150	149	149	149	
	Winter	375	100	102	102	102	100	99	98	98	
SHM24	Summer	375	165	167	164	163	162	161	161	161	▬▬▬▬▬▬
	Winter	375	164	168	167	165	163	161	160	160	

Feeder Loading (Amps) - Sydenham (SHM)											
Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
SHM11	Summer	375	94	125	158	191	233	264	291	322	
	Winter	375	98	103	125	151	183	207	226	249	
SHM12	Summer	375	220	230	239	236	237	236	238	241	
	Winter	375	140	147	147	145	144	144	144	145	
SHM14	Summer	375	234	221	248	252	259	261	266	271	
	Winter	375	145	153	154	156	159	161	162	165	
SHM21	Summer	375	245	245	274	271	270	267	267	269	
	Winter	375	159	167	167	165	163	161	160	160	
SHM22	Summer	375	154	152	171	169	168	166	166	168	
	Winter	375	100	105	105	104	103	102	101	101	
SHM24	Summer	375	165	167	174	171	171	168	169	170	▬▬▬▬▬▬
	Winter	375	164	173	172	170	168	165	164	164	

Sydenham Zone Substation – Insights

SHM Peak Time 16:00

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	12630	1.00
Commercial	321	0.91
Industrial	35	0.73
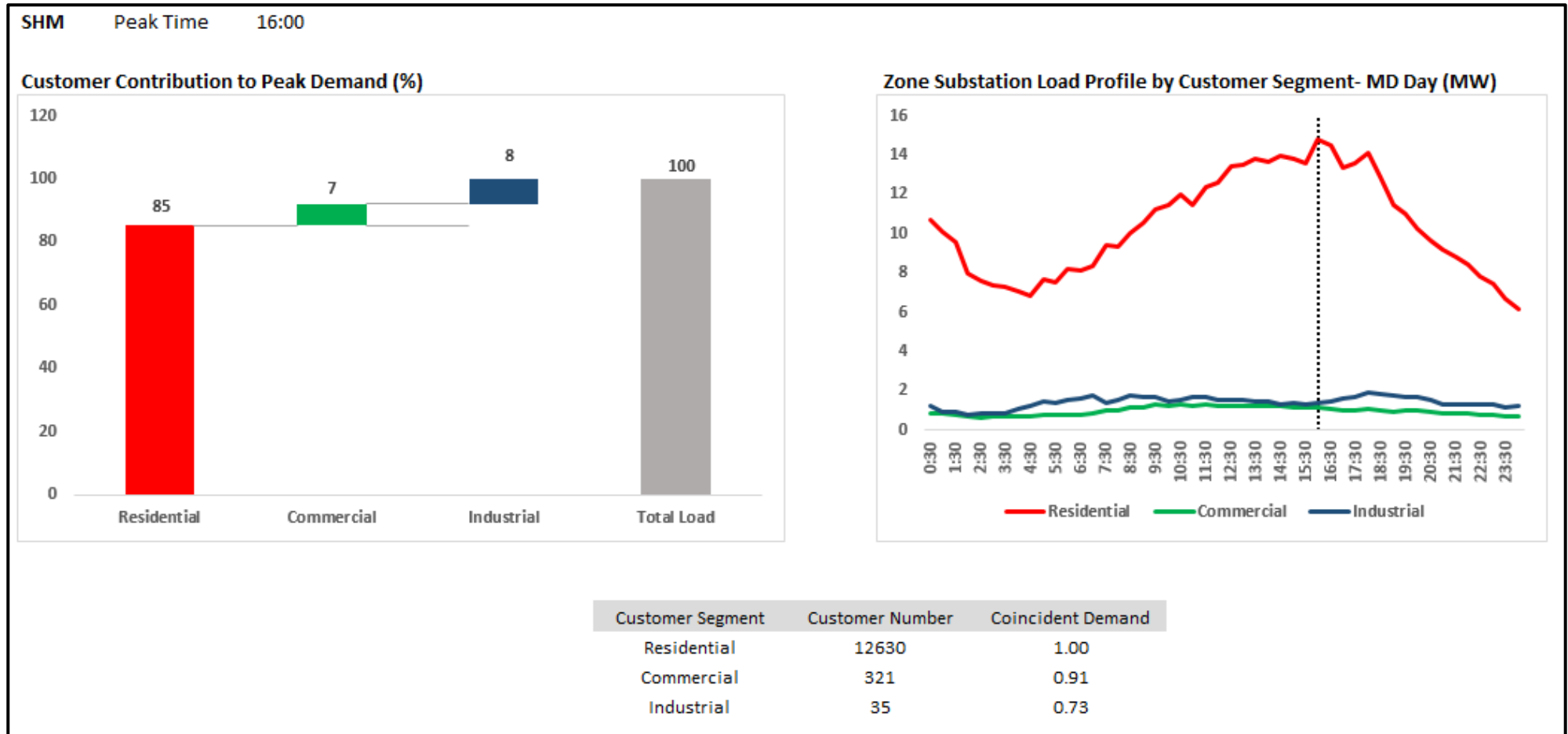
4 — LOAD FORECAST DATA

Point of Supply	Somerton (ST)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	SMTS	

Address	Hume Hwy Opposite Patullos Lane, Somerton
Melway Map Ref	180 D4

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	70.7	72.1	72.7	74.2	75.2	75.9	76.4	77.2	78.2	78.9	80.0	81.2
	Load MVAr	20.4	20.8	24.9	25.4	25.8	26.0	26.2	26.5	26.8	27.1	27.4	27.8
	Tx MVA	71.0	72.4	73.5	75.1	76.1	76.9	77.4	78.2	79.2	80.0	81.1	82.3
50PoE Winter	MW	62.4	63.9	65.7	67.0	67.4	67.6	67.7	68.1	68.5	69.0	69.5	70.0
	Load MVAr	14.9	12.8	13.2	13.5	13.5	13.6	13.6	13.7	13.8	13.9	14.0	14.1
	Tx MVA	62.4	64.0	65.9	67.2	67.6	67.8	67.9	68.4	68.8	69.3	69.7	70.0
10PoE Summer	MW	70.7	72.1	78.7	80.0	81.2	81.4	82.2	83.2	84.1	84.9	86.0	87.2
	Load MVAr	20.4	20.8	27.0	27.4	27.9	27.9	28.2	28.6	28.9	29.1	29.5	29.9
	Tx MVA	71.0	72.4	79.8	81.1	82.4	82.5	83.4	84.5	85.4	86.2	87.4	88.6
10PoE Winter	MW	62.4	65.7	67.6	68.8	69.2	69.5	69.5	70.0	70.5	70.9	71.4	72.0
	Load MVAr	14.9	13.2	13.6	13.8	13.9	14.0	14.0	14.1	14.2	14.3	14.4	14.5
	Tx MVA	62.4	65.9	67.8	69.0	69.4	69.7	69.8	70.0	70.5	70.9	71.4	72.0

Station Configuration		
Power Transformers	Number	3
	Nameplate	20/33
Capacitor		14
No. of Distribution Feeders		12
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	79.7	89.3	Transformer thermal limit
24-hour	95.2	95.2	Transformer circuit breaker limit

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	12.3	10.6
LV 22 kV	12.0	2.1

			Actual		50PoE Forecast							
Feeder	**Season**	**Rating**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**Comments**
ST11	**Summer**	590	353	259	337	335	333	331	330	332	████████████████
	Winter	590	318	325	429	425	419	413	411	411	
ST12	**Summer**	375	215	214	211	209	208	206	205	205	
	Winter	375	209	214	213	211	208	205	202	202	
ST13	**Summer**	375	212	201	224	237	245	246	247	250	
	Winter	375	213	218	246	260	266	265	265	267	
ST14	**Summer**	375	207	208	204	202	202	202	202	204	
	Winter	375	193	197	196	194	192	191	190	191	
ST21	**Summer**	375	37	39	38	38	37	37	37	37	
	Winter	375	39	40	40	39	38	38	37	37	
ST22	**Summer**	590	416	413	352	351	350	349	350	354	████████████████
	Winter	590	348	357	307	305	302	299	299	300	
ST23	**Summer**	590	262	203	201	228	226	223	221	220	
	Winter	590	223	228	229	259	254	249	246	244	
ST24	**Summer**	375	49	48	47	47	46	45	45	45	████████
	Winter	375	53	54	54	53	52	51	50	50	
ST31	**Summer**	590	21	20	59	58	57	57	56	56	██████
	Winter	590	17	17	52	51	50	49	48	48	
ST32	**Summer**	325	299	273	290	327	364	396	414	435	375A rating applies for transfer via switch 16285
	Winter	325	217	191	217	244	269	291	302	317	
ST33	**Summer**	315	190	317	283	292	298	298	298	300	
	Winter	315	137	171	162	167	169	168	167	167	
ST34	**Summer**	375	193	244	241	239	260	287	307	331	████████████████
	Winter	375	182	237	237	235	253	277	295	317	

Table title: **Feeder Loading (Amps) - Somerton (ST)**

			Feeder Loading (Amps) - Somerton (ST)									
Feeder	**Season**	**Rating**	**Actual**		**10PoE Forecast**							**Comments**
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
ST11	**Summer**	590	353	259	356	352	351	346	347	349	███████████
	Winter	590	318	335	441	436	430	425	422	422	
ST12	**Summer**	375	215	214	223	220	219	215	215	215	
	Winter	375	209	220	219	217	214	210	208	207	
ST13	**Summer**	375	212	201	236	250	258	257	259	263	
	Winter	375	213	224	253	267	273	272	272	274	
ST14	**Summer**	375	207	208	216	213	213	211	212	214	
	Winter	375	193	203	202	199	197	196	195	196	
ST21	**Summer**	375	37	39	40	40	40	39	39	39	█████
	Winter	375	39	41	41	40	39	39	38	38	
ST22	**Summer**	590	416	413	381	379	378	374	377	382	███████████████
	Winter	590	348	367	315	313	310	307	307	308	
ST23	**Summer**	590	262	203	213	240	238	233	232	232	███████
	Winter	590	223	234	235	266	261	256	252	251	
ST24	**Summer**	375	49	48	50	49	48	47	47	47	███████
	Winter	375	53	56	55	54	53	52	51	51	
ST31	**Summer**	590	21	20	62	61	61	59	59	59	█████
	Winter	590	17	18	53	52	51	50	49	49	
ST32	**Summer**	325	299	273	328	368	410	442	464	489	375A rating applies for transfer via switch 16285
	Winter	325	217	197	224	251	277	299	311	325	
ST33	**Summer**	315	190	317	318	326	334	331	332	335	
	Winter	315	137	176	167	171	173	172	171	172	
ST34	**Summer**	375	193	244	255	252	274	300	322	348	████████████████
	Winter	375	182	244	244	241	260	285	303	325	

Somerton Zone Substation – Insights

Customer Segment	Customer Number	Coincident Demand
Residential	15991	0.85
Commercial	1274	0.93
Industrial	112	1.00
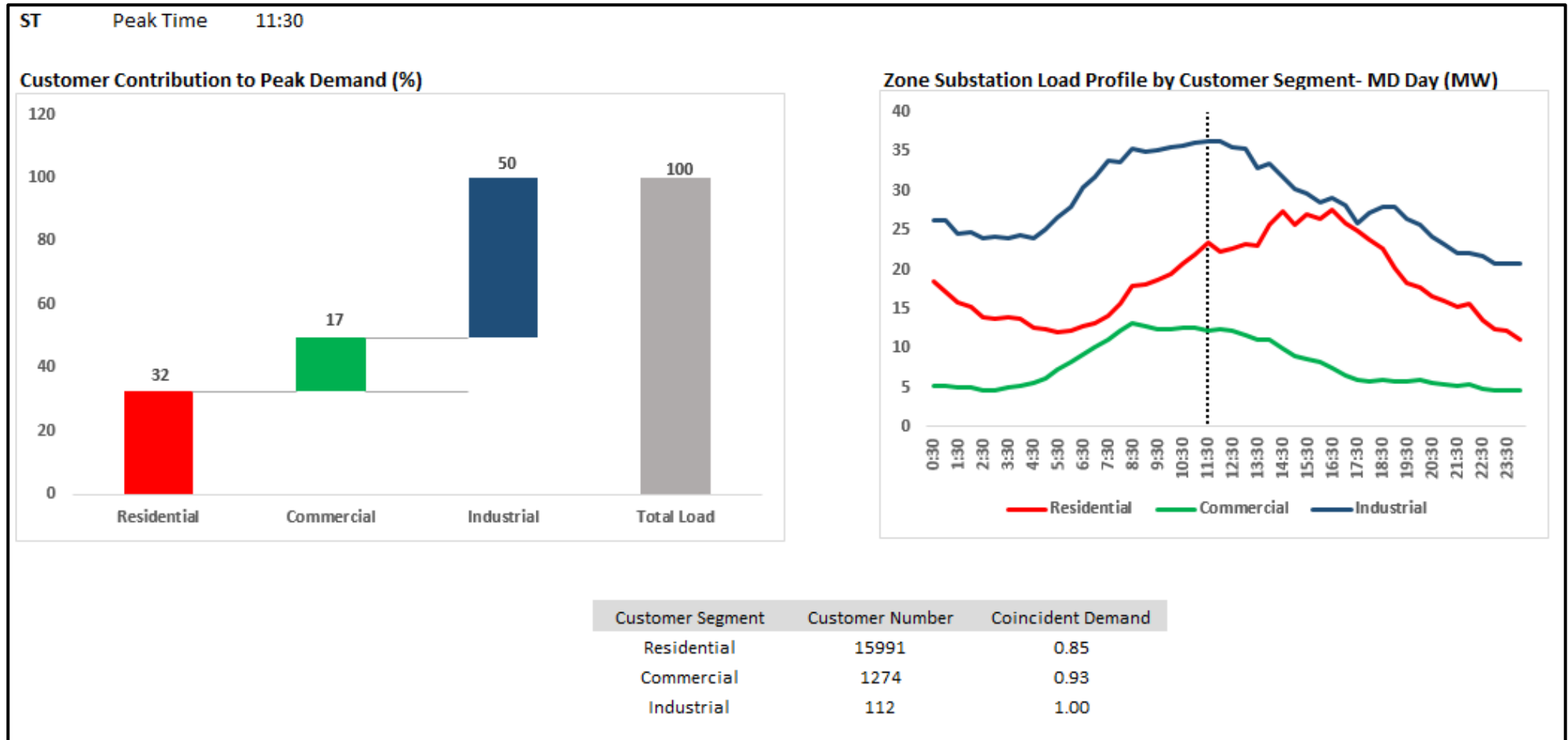
4 — LOAD FORECAST DATA

Point of Supply	Tottenham (TH)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	BLTS	

Address	Somerville Road Opp Mcdonald Road, Tottenham
Melway Map Ref	41 B6

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	28.2	27.8	28.2	24.6	24.5	24.2	23.9	23.5	23.3	23.0	22.8	22.6
	Load MVAr	17.6	16.0	18.6	16.2	16.1	16.0	15.7	15.5	15.3	15.1	15.0	14.9
	Tx MVA	28.7	28.1	29.0	25.0	24.9	24.6	24.1	23.8	23.5	23.2	23.0	22.8
50PoE Winter	MW	27.7	28.6	28.3	24.9	24.6	24.1	23.6	23.2	22.8	22.4	22.1	21.7
	Load MVAr	14.4	13.4	13.3	11.7	11.5	11.3	11.0	10.9	10.7	10.5	10.3	10.2
	Tx MVA	27.8	28.6	28.4	25.5	25.2	24.7	24.1	23.7	23.3	22.9	22.5	22.1
10PoE Summer	MW	28.2	27.8	29.8	25.9	25.8	25.4	25.0	24.8	24.5	24.1	23.9	23.7
	Load MVAr	17.6	16.0	19.6	17.1	17.0	16.7	16.5	16.3	16.1	15.9	15.7	15.6
	Tx MVA	28.7	28.1	30.8	26.4	26.3	25.8	25.4	25.2	24.8	24.5	24.2	23.9
10PoE Winter	MW	27.7	29.4	29.1	25.6	25.2	24.8	24.2	23.8	23.4	23.1	22.7	22.4
	Load MVAr	14.4	13.8	13.6	12.0	11.8	11.6	11.3	11.1	11.0	10.8	10.6	10.5
	Tx MVA	27.8	29.4	29.2	26.3	25.9	25.4	24.8	24.4	24.0	23.6	23.2	22.8

Station Configuration		
Power Transformers	Number	2
	Nameplate	30/45
Capacitor		12.9
No. of Distribution Feeders		8
Other		NER

Cogeneration	███████████
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	47.6	47.6	Transformer circuit breaker limit
24-hour	47.6	47.6	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	16.4	13.0
LV 22 kV	9.3	2.0

Feeder Loading (Amps) - Tottenham (TH)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
TH11	Summer	295	143	148	144	83	82	80	78	77	
	Winter	295	136	138	136	78	76	73	72	71	
TH12	Summer	445	174	190	185	123	121	118	116	114	
	Winter	445	168	170	168	111	108	105	102	101	
TH13	Summer	445	75	68	66	70	75	78	77	76	
	Winter	445	69	70	69	73	77	80	78	77	
TH14	Summer	415	399	460	448	439	430	421	413	407	████████████
	Winter	415	451	457	451	441	429	416	406	399	
TH21	Summer	415	159	158	155	152	149	146	143	141	████████████
	Winter	415	155	170	169	165	161	156	152	150	
TH22	Summer	325	145	112	117	128	140	149	150	152	
	Winter	325	122	124	130	143	156	164	164	166	

Feeder Loading (Amps) - Tottenham (TH)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
TH11	Summer	295	143	148	153	88	86	84	82	81	
	Winter	295	136	142	140	80	78	76	74	72	
TH12	Summer	445	174	190	196	129	127	123	122	120	
	Winter	445	168	175	173	114	111	108	105	103	
TH13	Summer	445	75	68	70	74	79	82	81	80	
	Winter	445	69	72	71	75	80	82	80	79	
TH14	Summer	415	399	460	474	462	454	440	433	429	████████████
	Winter	415	451	470	463	452	440	428	417	410	
TH21	Summer	415	159	158	164	160	157	152	150	148	████████████
	Winter	415	155	175	174	170	165	160	156	154	
TH22	Summer	325	145	112	123	135	148	156	157	160	
	Winter	325	122	127	134	147	160	168	169	171	

Tottenham Zone Substation – Insights

TH   Peak Time   10:30

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	702	0.77
Commercial	340	0.97
Industrial	23	0.95
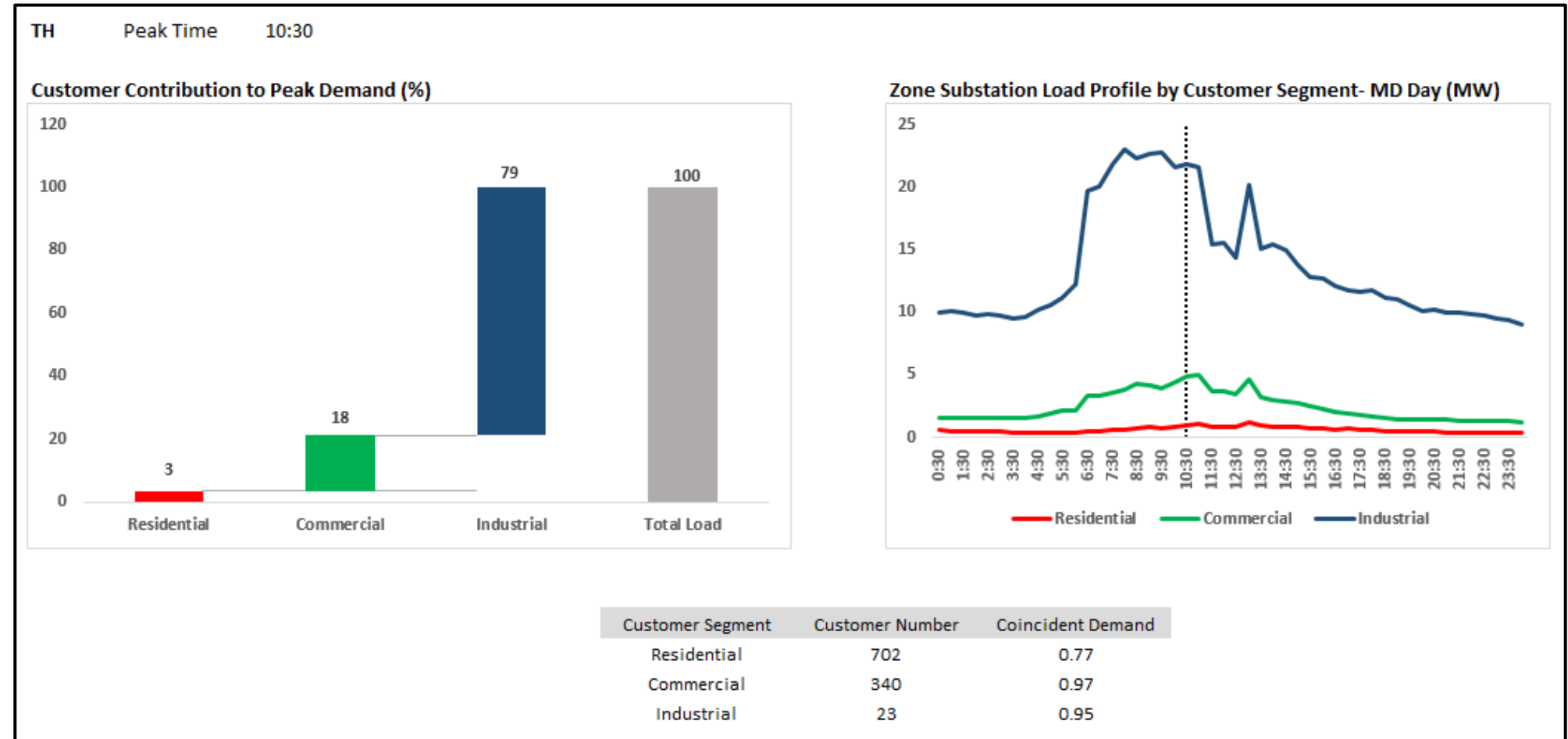
Point of Supply	Tullamarine (TMA)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	KTS B1-B2	

Address	77 Keilor Park Drive, Tullamarine
Melway Map Ref	15 D4

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	19.8	20.5	21.0	21.8	21.7	21.5	21.5	21.5	21.6	21.7	21.8	21.9
	Load MVAr	-0.2	3.7	7.3	7.6	7.5	7.5	7.4	7.5	7.5	7.5	7.6	7.6
	Tx MVA	19.8	20.8	21.1	21.8	21.7	21.6	21.5	21.6	21.7	21.7	21.8	22.0
50PoE Winter	MW	18.0	18.4	19.2	19.8	19.6	19.3	19.2	19.1	19.1	19.1	19.0	19.0
	Load MVAr	2.2	6.2	6.5	6.7	6.6	6.6	6.5	6.5	6.5	6.5	6.5	6.5
	Tx MVA	18.1	18.4	19.2	19.8	19.6	19.3	19.2	19.1	19.1	19.1	19.0	19.0
10PoE Summer	MW	19.8	20.5	23.2	23.9	23.8	23.5	23.5	23.6	23.7	23.7	23.8	23.9
	Load MVAr	-0.2	3.7	8.0	8.3	8.3	8.1	8.1	8.2	8.2	8.2	8.3	8.3
	Tx MVA	19.8	20.8	23.3	24.0	23.9	23.6	23.6	23.7	23.8	23.8	23.9	24.1
10PoE Winter	MW	18.0	18.9	19.7	20.4	20.1	19.9	19.7	19.6	19.6	19.6	19.6	19.6
	Load MVAr	2.2	6.4	6.7	6.9	6.8	6.7	6.7	6.7	6.7	6.6	6.6	6.6
	Tx MVA	18.1	18.9	19.7	20.4	20.1	19.9	19.7	19.6	19.6	19.6	19.6	19.6

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/33
Capacitor		6
No. of Distribution Feeders		6
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	38.0	39.6	Transformer thermal limit
24-hour	49.5	49.5	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	13.2	8.7
LV 22 kV	9.0	1.6

Feeder Loading (Amps) - Tullamarine (TMA)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
TMA11	Summer	375	103	115	119	122	121	120	119	119	
	Winter	375	80	82	87	90	88	87	86	85	
TMA14	Summer	375	179	170	168	167	167	167	170	175	
	Winter	375	159	163	162	161	159	158	160	163	
TMA21	Summer	375	90	71	70	69	68	68	67	67	
	Winter	375	71	73	72	71	70	69	68	67	
TMA22	Summer	305	60	63	62	61	61	60	59	59	
	Winter	305	63	64	64	63	62	61	60	60	
TMA24	Summer	375	0	97	134	171	169	167	166	165	
	Winter	375	47	84	117	149	146	144	142	141	
TMA25	Summer	375	184	168	166	167	170	172	170	170	
	Winter	375	161	165	164	165	166	166	163	163	

Feeder Loading (Amps) - Tullamarine (TMA)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
TMA11	Summer	375	103	115	128	132	131	128	128	128	
	Winter	375	80	84	90	92	91	89	88	87	
TMA14	Summer	375	179	170	183	181	182	180	184	190	
	Winter	375	159	167	166	165	164	162	164	168	
TMA21	Summer	375	90	71	74	73	72	71	70	70	
	Winter	375	71	75	74	73	72	71	70	69	
TMA22	Summer	305	60	63	65	64	64	63	62	62	
	Winter	305	63	66	66	65	64	63	62	61	
TMA24	Summer	375	0	97	142	180	178	175	174	174	
	Winter	375	47	86	120	153	150	148	146	145	
TMA25	Summer	375	184	168	179	180	183	184	183	183	
	Winter	375	161	169	168	169	170	170	168	167	

Tullamarine Zone Substation – Insights
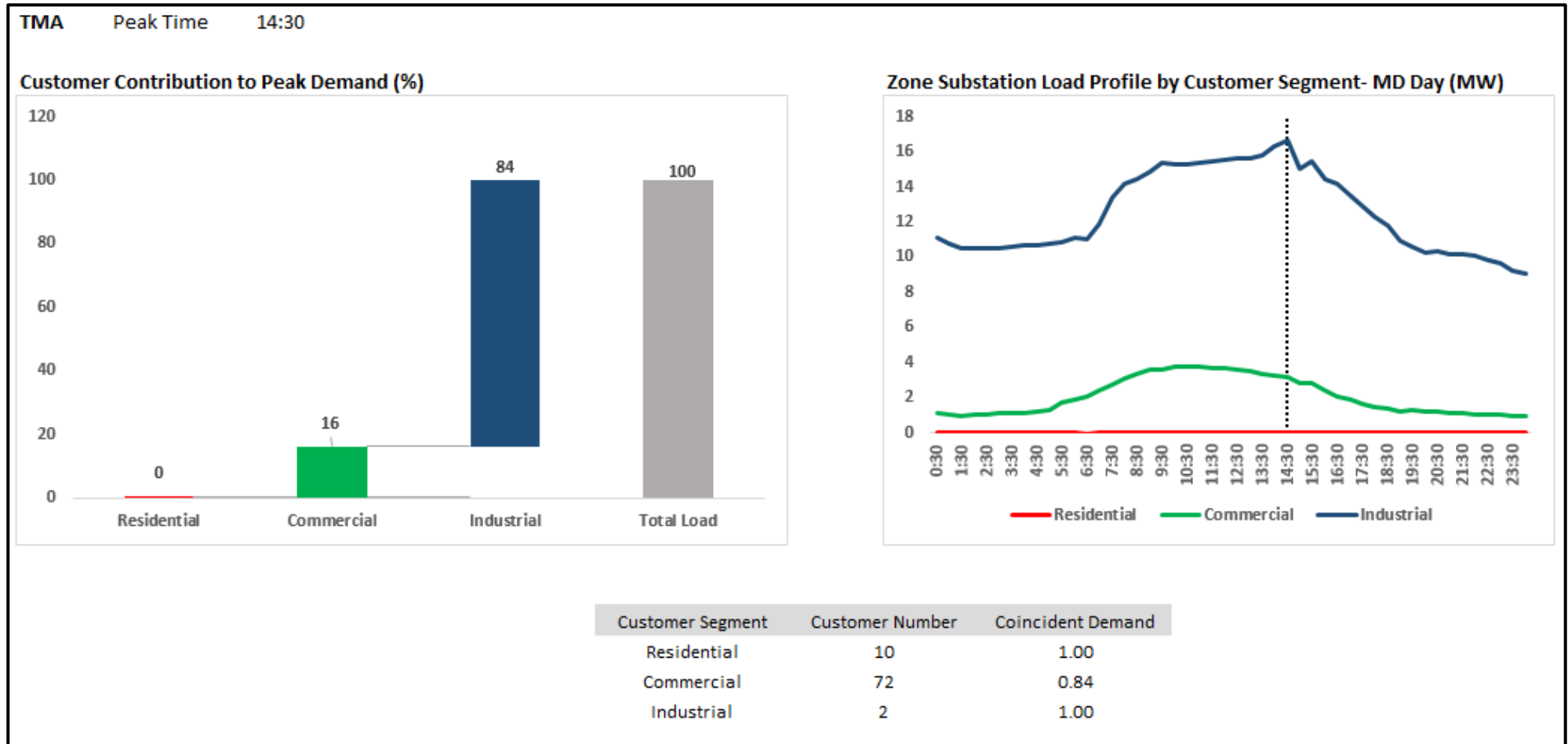
Point of Supply	Thomastown (TT)		Address	High Street, In Terminal Station Area, Thomastown
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	8 H11
Terminal Station	TTS (B34)			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	31.7	32.3	30.1	30.1	30.0	29.7	29.6	29.6	29.7	29.7	29.8	29.9
	Load MVAr	8.6	9.2	9.1	9.1	9.1	9.0	9.0	9.0	9.0	9.0	9.0	9.1
	Tx MVA	32.9	33.6	31.5	31.4	31.3	31.1	30.9	30.9	31.0	31.0	31.1	31.3
50PoE Winter	MW	23.5	24.0	24.2	24.1	23.9	23.5	23.3	23.2	23.1	23.1	23.0	22.9
	Load MVAr	4.9	5.5	5.5	5.5	5.5	5.4	5.3	5.3	5.3	5.3	5.3	5.3
	Tx MVA	24.0	24.6	24.8	24.7	24.5	24.1	23.9	23.8	23.7	23.7	23.6	23.5
10PoE Summer	MW	31.7	32.3	34.1	33.9	33.9	33.3	33.3	33.4	33.4	33.4	33.5	33.6
	Load MVAr	8.6	9.2	10.4	10.3	10.3	10.1	10.1	10.1	10.1	10.1	10.2	10.2
	Tx MVA	32.9	33.6	35.7	35.4	35.4	34.8	34.8	34.9	34.9	34.9	35.0	35.1
10PoE Winter	MW	23.5	24.7	24.8	24.7	24.5	24.2	23.9	23.8	23.8	23.7	23.6	23.6
	Load MVAr	4.9	5.7	5.7	5.7	5.6	5.5	5.5	5.5	5.5	5.4	5.4	5.4
	Tx MVA	24.0	25.3	25.5	25.4	25.1	24.8	24.6	24.5	24.4	24.3	24.2	24.2

Station Configuration		
Power Transformers	Number	3
	Nameplate	20/27
Capacitor		0
No. of Distribution Feeders		4
Other		NER

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	76.4	83.5	Transformer thermal & OLTC limit
24-hour	78.3	84.2	

Cogeneration	
Remarks	This Zone Substation is owned by AusNet Services.

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV		
LV 22 kV		

Feeder	Season	Rating	Actual		50PoE Forecast						Comments
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
TT3	**Summer**	375	268	290	267	264	261	258	256	255	
	Winter	375	204	208	207	205	201	197	194	193	
TT8	**Summer**	325	197	219	206	206	207	206	206	207	
	Winter	325	142	145	146	145	145	143	142	142	
TT10	**Summer**	325	219	220	219	218	219	221	224	228	
	Winter	325	186	190	190	189	188	189	190	193	
TT11	**Summer**	325	162	162	171	178	181	179	177	177	
	Winter	325	124	127	134	140	141	138	136	135	

Feeder Loading (Amps) - Thomastown (TT)

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
TT3	**Summer**	375	268	290	304	299	296	291	289	289	
	Winter	375	204	214	213	210	206	202	199	198	
TT8	**Summer**	325	197	219	231	230	231	228	229	230	
	Winter	325	142	149	150	149	148	147	146	146	
TT10	**Summer**	325	219	220	247	245	246	247	251	256	
	Winter	325	186	195	196	194	193	194	195	198	
TT11	**Summer**	325	162	162	194	202	205	201	200	200	
	Winter	325	124	130	138	143	144	142	140	139	

Feeder Loading (Amps) - Thomastown (TT)

Thomastown Zone Substation – Insights

| TT | Peak Time | 15:00 |

Customer Contribution to Peak Demand (%)

Residential: 63
Commercial: 7
Industrial: 30
Total Load: 100

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Legend: Residential, Commercial, Industrial

Customer Segment	Customer Number	Coincident Demand
Residential	14507	1.00
Commercial	532	0.89
Industrial	11	1.00
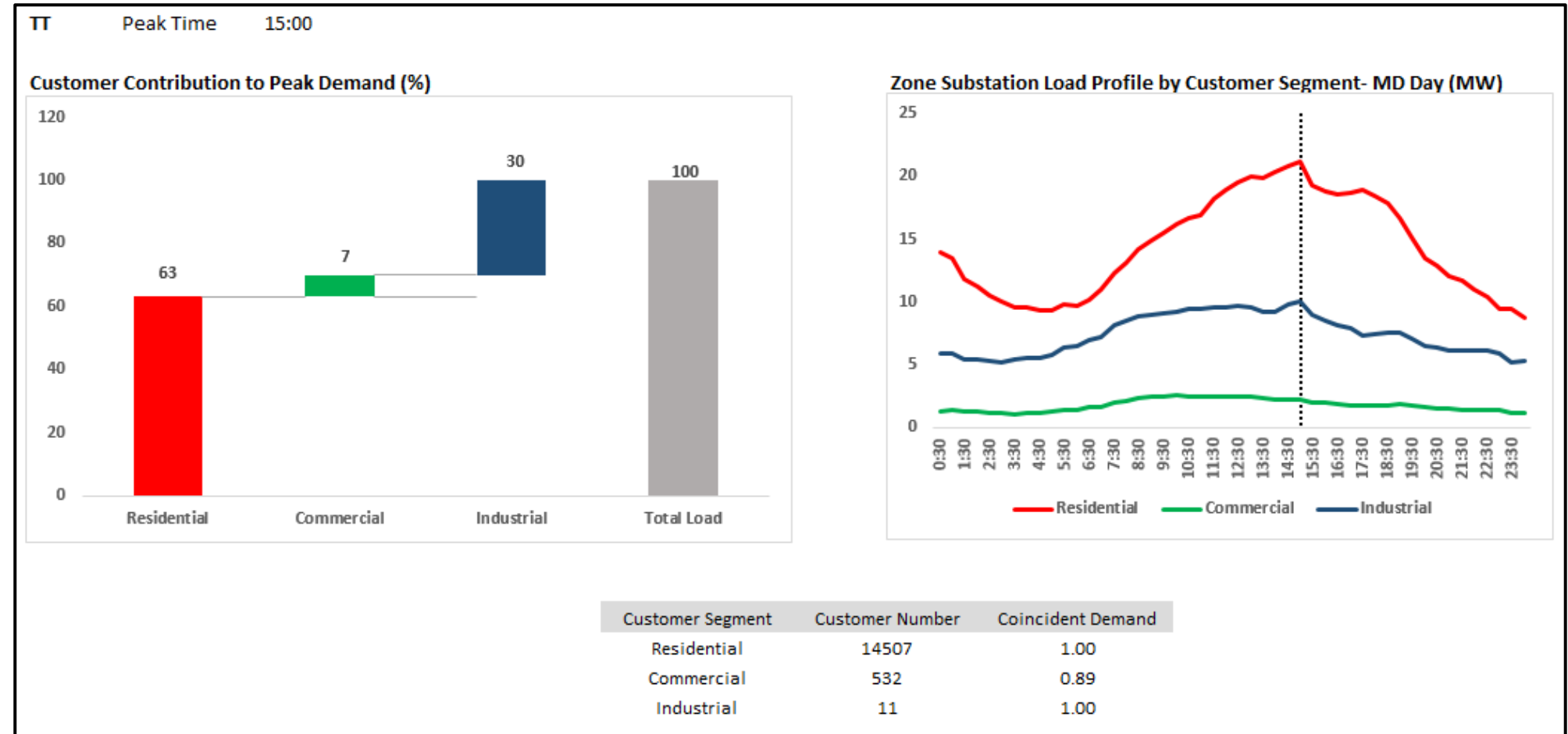
Point of Supply	Visyboard (VCO)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B34)	

Address	Visyboard Factory, Coolaroo
Melway Map Ref	180 A12

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	23.8	23.8	23.3	23.0	22.8	22.4	22.2	22.1	22.0	21.9	21.9	21.9
	Load MVAr	16.1	16.2	15.8	15.6	15.5	15.2	15.1	15.0	15.0	14.9	14.9	14.8
	Tx MVA	28.7	28.8	28.2	27.8	27.5	27.1	26.8	26.7	26.6	26.5	26.4	26.4
50PoE Winter	MW	23.8	24.3	24.2	23.8	23.4	22.9	22.5	22.3	22.1	21.9	21.8	21.6
	Load MVAr	16.5	17.0	16.9	16.7	16.3	16.0	15.7	15.6	15.5	15.3	15.2	15.1
	Tx MVA	29.0	29.7	29.5	29.1	28.5	27.9	27.5	27.2	27.0	26.8	26.5	26.3
10PoE Summer	MW	23.8	23.8	24.7	24.2	24.0	23.5	23.3	23.2	23.1	23.0	23.0	22.9
	Load MVAr	16.1	16.2	16.7	16.5	16.3	15.9	15.8	15.8	15.7	15.6	15.6	15.6
	Tx MVA	28.7	28.8	29.8	29.3	29.0	28.4	28.1	28.1	28.0	27.8	27.7	27.7
10PoE Winter	MW	23.8	25.0	24.9	24.5	24.0	23.5	23.1	22.9	22.7	22.5	22.4	22.2
	Load MVAr	16.5	17.5	17.4	17.1	16.8	16.4	16.2	16.0	15.9	15.8	15.6	15.5
	Tx MVA	29.0	30.5	30.4	29.9	29.3	28.7	28.2	28.0	27.7	27.5	27.3	27.1

Station Configuration		
Power Transformers	Number	2
	Nameplate	20/27
Capacitor		0
No. of Distribution Feeders		0
Other		-

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	24.5	30.8	0
24-hour	24.5	30.8	

Cogeneration	██████████████████
Remarks	Customer owned zone substation

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	12.5	7.5
LV 22 kV		

Point of Supply	Watsonia (WT)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	TTS (B12)	

Address	Frensham Road, Watsonia
Melway Map Ref	20 E4

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	2.1	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2
	Load MVAr	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9
	Tx MVA	2.2	2.1	2.0	2.0	2.1	2.3	2.4	2.3	2.3	2.3	2.3	2.3
50PoE Winter	MW	1.6	1.6	1.7	1.7	1.7	1.8	1.9	1.9	1.9	1.8	1.8	1.8
	Load MVAr	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Tx MVA	1.7	1.7	1.7	1.7	1.8	1.9	2.0	2.0	2.0	1.9	1.9	1.9
10PoE Summer	MW	2.1	1.9	2.0	2.0	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3
	Load MVAr	0.9	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	Tx MVA	2.2	2.1	2.2	2.2	2.3	2.4	2.5	2.5	2.5	2.5	2.5	2.5
10PoE Winter	MW	1.6	1.7	1.7	1.7	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9
	Load MVAr	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Tx MVA	1.7	1.8	1.8	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Station Configuration		
Power Transformers	Number	3
	Nameplate	2-35/38 & 1-20/33
Capacitor		0
No. of Distribution Feeders		1
Other		-

Cogeneration	
Remarks	This Zone Substation is owned by AusNet Services.

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	45.7	54.4	Transformer & cable limit
24-hour	50.3	59.8	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV		
LV 22 kV		

Feeder Loading (Amps) - Watsonia (WT)											Comments
Feeder	Season	Rating	Actual		50PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
WT4	**Summer**	215	56	54	53	53	56	59	62	64	
	Winter	215	45	46	47	47	49	51	53	55	

Feeder Loading (Amps) - Watsonia (WT)											Comments
Feeder	Season	Rating	Actual		10PoE Forecast						
			2018	2019	2020	2021	2022	2023	2024	2025	
WT4	**Summer**	215	56	54	58	58	60	63	66	69	
	Winter	215	45	47	48	48	50	53	54	57	

Watsonia Zone Substation – Insights

| WT | Peak Time | 15:00 |

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	131	1.00
Commercial	2	0.81
Industrial	0	0.98

Point of Supply	████████████		Address	████████████
Nominal Voltage	HV 66 kV	LV 22 kV	Melway Map Ref	
Terminal Station	WMTS and BLTS			

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	MW	0.0	0.0	24.0	24.0	24.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	Load MVAr	0.0	0.0	7.8	7.8	7.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Tx MVA	0.0	0.0	25.2	25.2	25.2	10.5	10.5	10.5	10.5	10.5	10.5	10.5
50PoE Winter	MW	0.0	24.0	24.0	24.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	Load MVAr	0.0	7.8	7.8	7.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Tx MVA	0.0	25.2	25.2	25.2	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
10PoE Summer	MW	0.0	0.0	24.0	24.0	24.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	Load MVAr	0.0	0.0	7.8	7.8	7.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Tx MVA	0.0	0.0	25.2	25.2	25.2	10.5	10.5	10.5	10.5	10.5	10.5	10.5
10PoE Winter	MW	0.0	24.0	24.0	24.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	Load MVAr	0.0	7.8	7.8	7.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Tx MVA	0.0	25.2	25.2	25.2	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5

Station Configuration		
Power Transformers	Number	-
	Nameplate	-
Capacitor		-
No. of Distribution Feeders		-
Other		-

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)			
24-hour			

Cogeneration	
Remarks	Customer owned zone substation

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV		
LV 22 kV		

4 — LOAD FORECAST DATA

Point of Supply	Yarraville (YVE)	
Nominal Voltage	HV 66 kV	LV 22 kV
Terminal Station	BLTS	

Address	Hyde Street, Yarraville
Melway Map Ref	42 B-10

Station Loading		Actual		Forecast									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50PoE Summer	**MW**	29.8	39.1	33.0	34.2	36.0	37.8	39.6	39.8	40.1	40.3	40.6	41.0
	Load MVAr	8.4	9.4	9.8	10.1	10.7	11.2	11.7	11.8	11.9	11.9	12.0	12.1
	Tx MVA	30.9	40.2	34.4	35.7	37.6	39.5	41.3	41.5	41.8	42.0	42.4	42.8
50PoE Winter	**MW**	27.1	27.7	28.3	29.4	30.9	32.3	33.8	33.8	33.8	33.9	34.0	34.0
	Load MVAr	5.6	6.0	6.1	6.3	6.7	7.0	7.3	7.3	7.3	7.3	7.3	7.4
	Tx MVA	27.7	28.3	29.0	30.1	31.6	33.1	34.5	34.6	34.6	34.7	34.8	34.8
10PoE Summer	**MW**	29.8	39.1	36.4	37.6	39.6	41.3	43.4	43.7	43.9	44.1	44.5	44.9
	Load MVAr	8.4	9.4	10.8	11.1	11.7	12.2	12.8	12.9	13.0	13.1	13.2	13.3
	Tx MVA	30.9	40.2	37.9	39.2	41.3	43.1	45.2	45.6	45.8	46.0	46.4	46.8
10PoE Winter	**MW**	27.1	28.5	29.1	30.2	31.7	33.2	34.7	34.7	34.8	34.9	34.9	35.0
	Load MVAr	5.6	6.2	6.3	6.5	6.8	7.2	7.5	7.5	7.5	7.5	7.5	7.6
	Tx MVA	27.7	29.1	29.8	30.9	32.4	34.0	35.5	35.5	35.6	35.7	35.7	35.8

Station Configuration		
Power Transformers	**Number**	2
	Nameplate	20/33
Capacitor		0
No. of Distribution Feeders		8
Other		NER

Cogeneration	
Remarks	

Station Transformer Cyclic Rating (MVA)			
	Summer	Winter	Limitations
(n-1)	38.0	39.6	Transformer thermal limit
24-hour	49.5	49.5	

Fault Levels (kA)		
	3 Phase	1 Phase to Ground
HV 66 kV	14.3	12.3
LV 22 kV	9.3	1.6

			Actual		50PoE Forecast						Comments
Feeder	**Season**	**Rating**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
YVE11	**Summer**	260	127	119	117	116	115	114	113	113	
	Winter	260	129	132	131	130	127	125	124	123	
YVE12	**Summer**	285	63	70	70	69	80	99	118	142	
	Winter	285	62	63	64	64	72	89	106	127	
YVE14	**Summer**	230	192	105	105	106	105	104	103	103	
	Winter	230	100	102	104	104	102	100	99	99	
YVE15	**Summer**	285	152	151	157	161	163	162	161	161	
	Winter	285	98	100	106	108	109	107	106	105	
YVE21	**Summer**	285	190	218	227	279	348	421	501	591	██████
	Winter	285	188	192	203	249	308	369	437	513	
YVE22	**Summer**	205	88	163	180	188	193	191	190	190	
	Winter	205	146	149	166	173	176	173	171	170	
YVE23	**Summer**	225	43	42	41	41	40	40	40	40	
	Winter	225	34	35	35	34	34	33	33	33	
YVE24	**Summer**	445	123	280	148	161	187	210	218	227	
	Winter	445	115	118	118	127	147	164	169	176	
YVE25	**Summer**	280	102	197	194	192	190	188	187	187	
	Winter	280	211	216	215	212	209	205	202	202	

Feeder Loading (Amps) - Yarraville (YVE)

Feeder	Season	Rating	Actual		10PoE Forecast						Comments
			2018	2019	2020	2021	2022	2023	2024	2025	
YVE11	Summer	260	127	119	124	122	121	119	118	119	
	Winter	260	129	136	135	133	131	129	127	127	
YVE12	Summer	285	63	70	74	73	84	104	124	150	
	Winter	285	62	65	66	65	74	92	109	131	
YVE14	Summer	230	192	105	111	111	110	108	108	108	
	Winter	230	100	105	107	107	105	103	102	102	
YVE15	Summer	285	152	151	166	170	172	170	169	170	
	Winter	285	98	103	109	111	111	110	109	108	
YVE21	Summer	285	190	218	240	294	367	440	526	622	▬▬▬▬
	Winter	285	188	198	209	255	316	379	449	526	
YVE22	Summer	205	88	163	200	208	213	209	208	209	
	Winter	205	146	154	171	178	180	177	175	175	
YVE23	Summer	225	43	42	44	44	43	43	42	43	
	Winter	225	34	36	36	35	34	34	34	33	
YVE24	Summer	445	123	280	157	169	197	220	229	239	
	Winter	445	115	121	121	131	150	168	173	180	
YVE25	Summer	280	102	197	205	202	200	197	196	197	
	Winter	280	211	222	221	218	214	211	208	207	

Table title: **Feeder Loading (Amps) - Yarraville (YVE)**

Yarraville Zone Substation – Insights

YVE	Peak Time	14:00

Customer Contribution to Peak Demand (%)

Zone Substation Load Profile by Customer Segment- MD Day (MW)

Customer Segment	Customer Number	Coincident Demand
Residential	5006	0.96
Commercial	524	0.94
Industrial	10	1.00
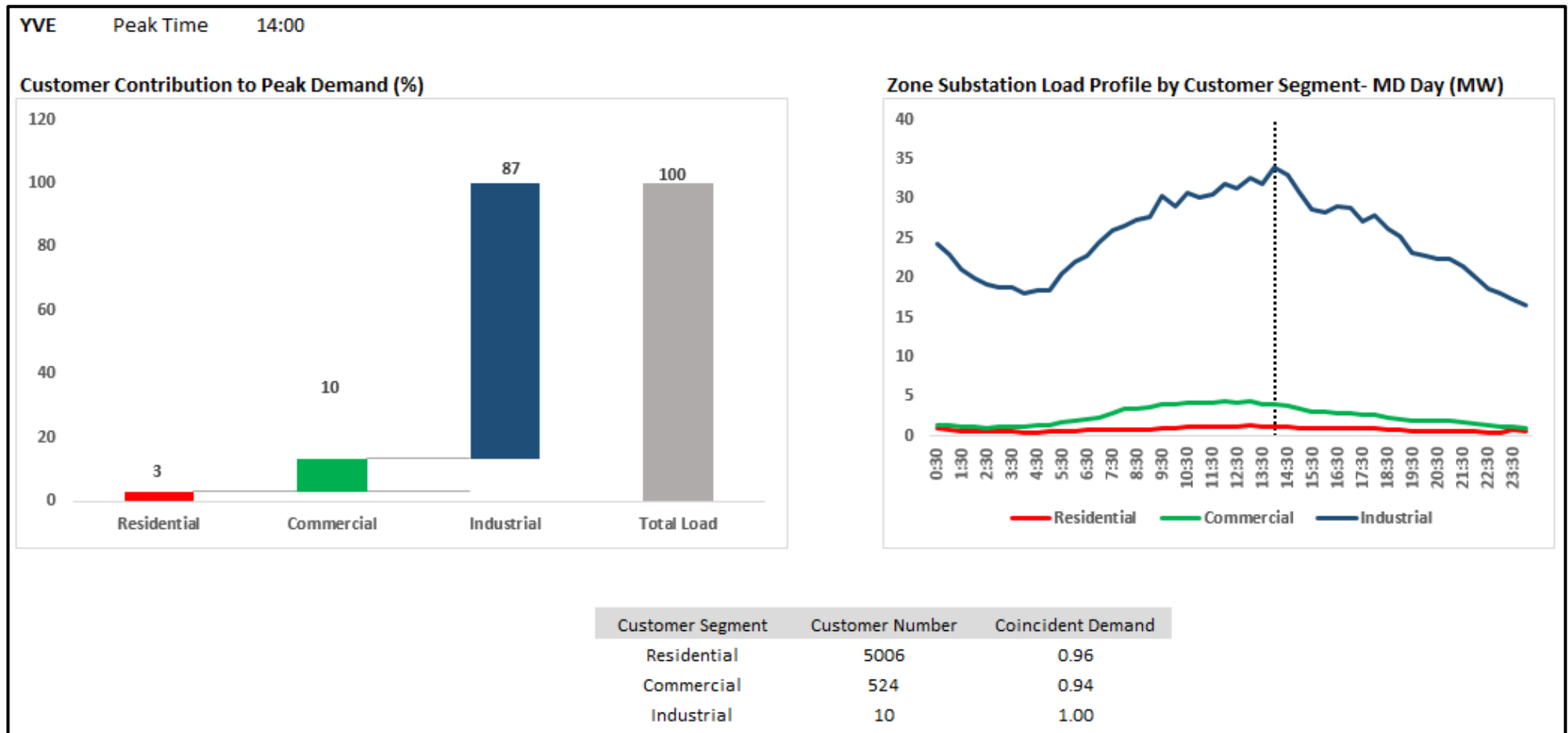
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6. APPENDIX A: JEN SUPPLY AREAS GROWTH MAP