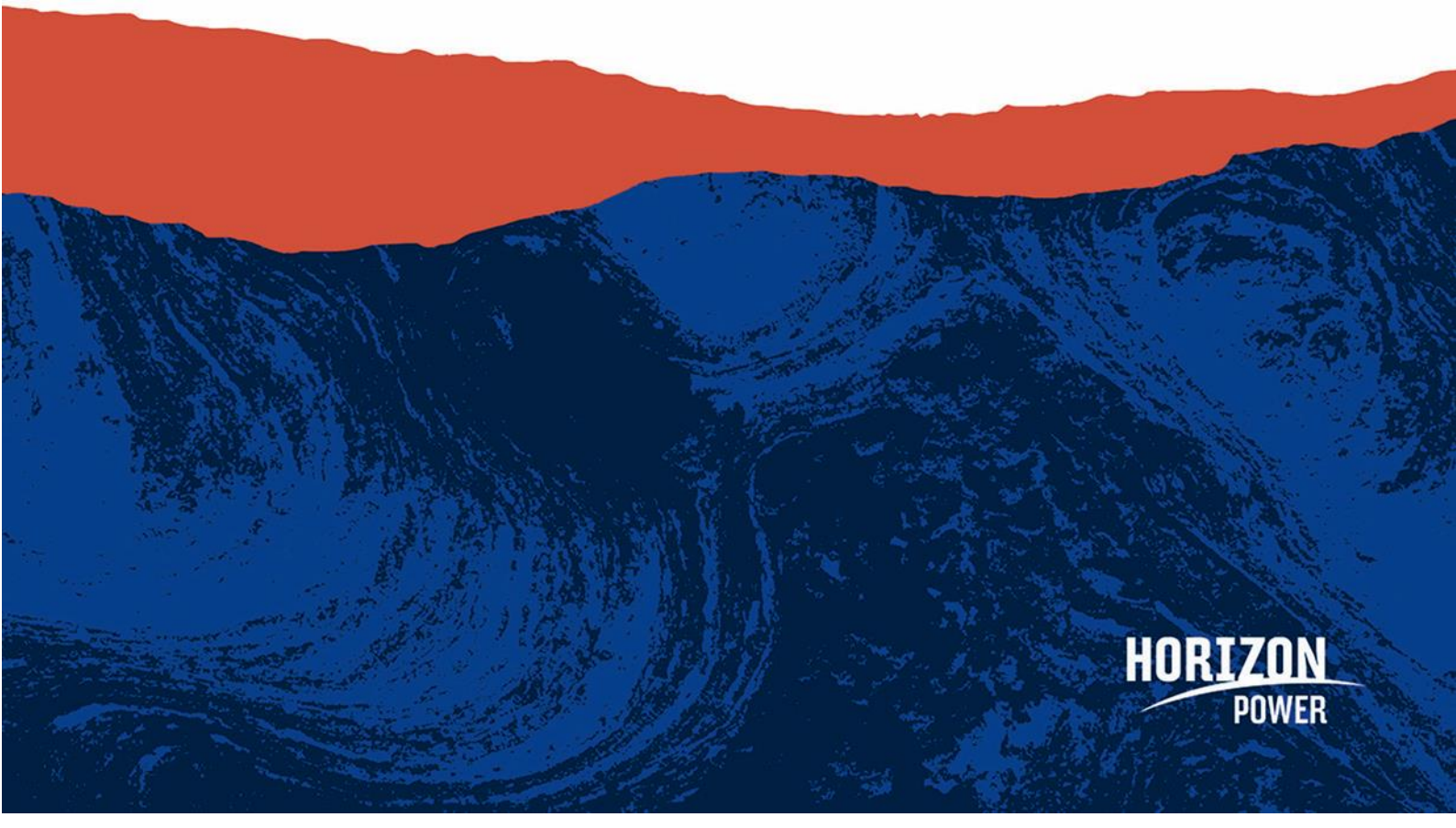
# Overview of Horizon Power's network and customers in the Pilbara Region



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# 1. PURPOSE OF THIS DOCUMENT

The purpose of this document is to provide an overview of Horizon Power's network and customers in the Pilbara region.

Section 2 provides an overview of Horizon Power and section 3 provides an overview of the electricity system in the Pilbara region. Section 4 provides contextual information on the Pilbara economy and section 5 provides a range of metrics that illustrate that:

- Horizon Power's network and customer base in the Pilbara region are small relative to other electricity network service providers
- Horizon Power's Pilbara network is less diversified than other networks – the demand on the network is driven by three resource based customers that are exposed to the risks in the iron ore market.

# 2. OVERVIEW OF HORIZON POWER

Horizon Power is a State Government-owned energy corporation established under the *Electricity Corporations Act 2005 (WA)*, providing electricity across regional and remote Western Australia.

We supply electricity to more than 100,000 households and more than 10,000 businesses in regional towns and remote communities across Western Australia. Our service area is vast, approximately 2.3 million square kilometres. Horizon Power services the largest area with the least number of customers in the world. For every 53.5 square kilometres, we have just one customer.

As shown in the figure below, we operate in the Pilbara, Kimberley, Gascoyne, Mid West and southern region of Western Australia, which includes the Southern Goldfields, Esperance, Hopetoun and Norseman. We have regional depots based in Karratha, Broome, Kununurra, Carnarvon, Esperance and Port Hedland, with administrative support provided from Perth.

We maintain three electricity systems connected in the East Kimberley (Kununurra, Wyndham and Lake Argyle), two rural systems (Esperance and Hopetoun), the North-West Interconnected System between Port Hedland and Karratha and 32 microgrids, or isolated power systems. The systems are exposed to diverse climatic conditions characterised by intense heat and cyclonic conditions in the north and storms in the south.

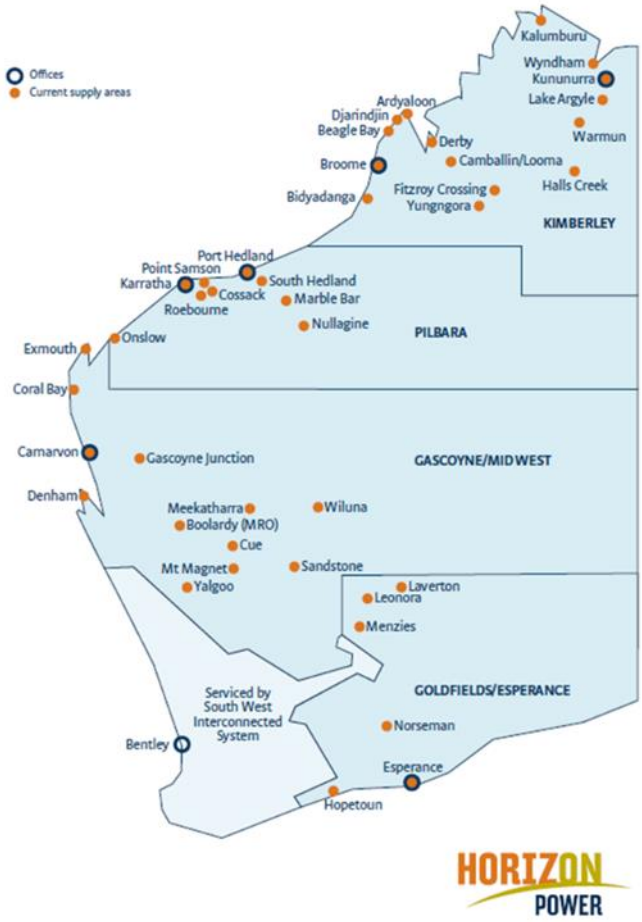



*Figure 1: Horizon Power's service area*

Our decentralised delivery model ensures we have a presence on the ground so that we can respond immediately to local issues and tailor our services to customers' individual requirements. We employ people who live and work in the communities in which we operate and who understand local energy needs.

The way we generate electricity varies between our major interconnected systems and our microgrids, with the energy supplied to most mainstream towns by gas and to smaller communities by diesel. Increasingly, renewable energy sources are also being integrated into our generation portfolio.

## 3. PROVIDING ELECTRICITY SERVICES IN THE PILBARA REGION

The North West Interconnected System (NWIS) is located in the Pilbara region in the north west of Western Australia. The NWIS supplies the communities of Dampier to Port Hedland and inland to Paraburdoo and Tom Price.

The NWIS comprises the following networks and generation assets, which are electrically connected (see Figure 2 below):

- Horizon Power's coastal network
- Alinta's generation and network assets, which interface with Horizon Power's coastal network at the Wedgefield and Murdoch Drive substations
- network assets owned by BHP and FMG
- generation assets owned by ATCO and TransAlta
- Rio Tinto's generation assets and network, which supply electricity from the towns of Dampier to Pannawonica, then to Paraburdoo and across to the Yandicoogina mine in the East Pilbara.

Horizon Power's Pilbara coastal network supplies the townships of Karratha, Roebourne, Point Samson, and Port Hedland (including Wedgefield and South Hedland). It also supplies major loads in the port area of Port Hedland.

As the generation and network assets in the Pilbara region are owned by a number of different entities, the rules governing the way in which we supply electricity to our customers in that region are different to those that apply elsewhere. Access to some networks within the NWIS, including our network, is subject to a light regulatory regime as set out in the *Pilbara Networks Access Code 2021*. The wholesale electricity market supplied by this subset of lightly regulated networks within the NWIS is subject to administered arrangements by the Independent System Operator.

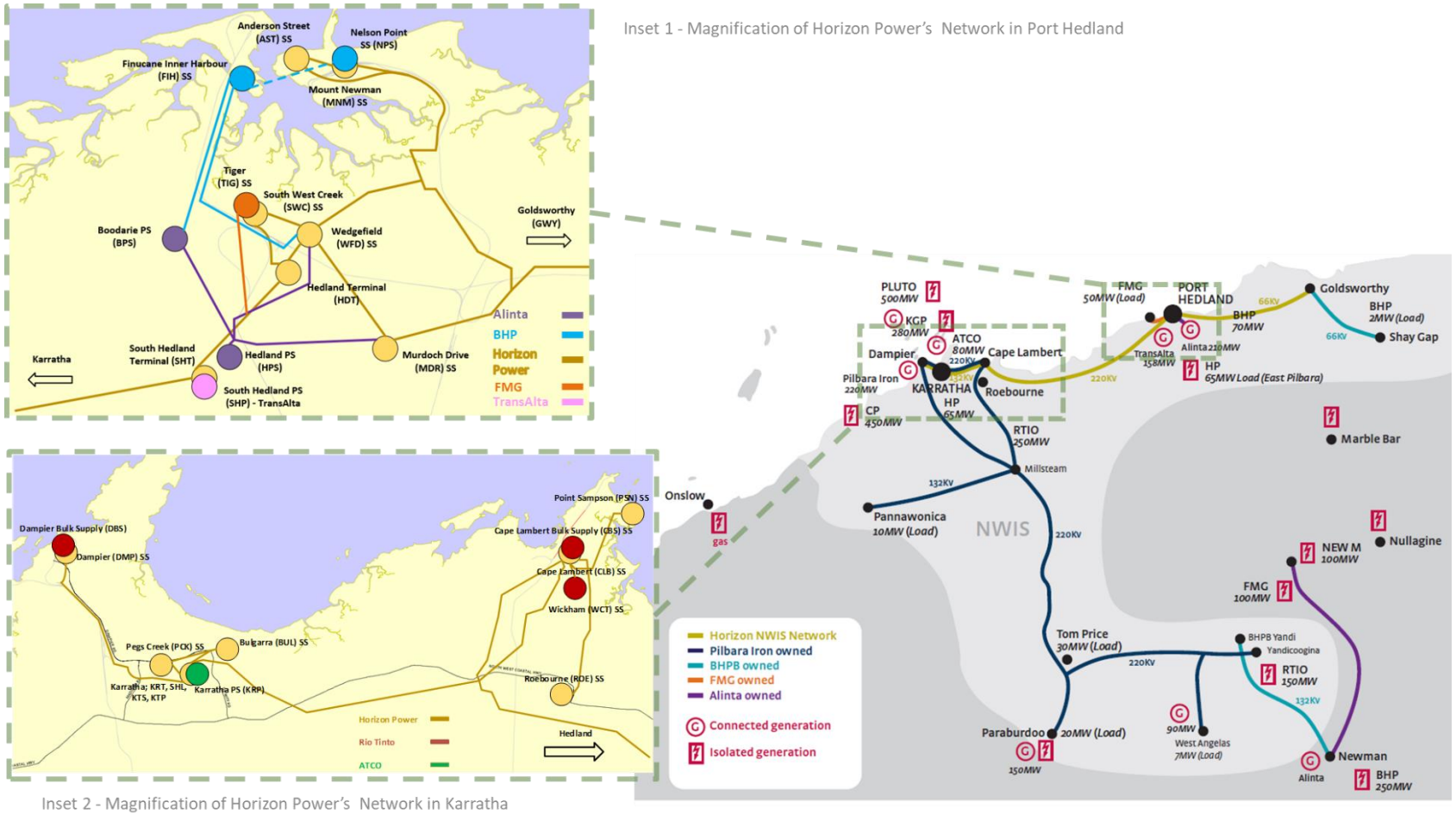



*Figure 2: Networks within the North West Interconnected System*

# 4. THE PILBARA ECONOMY

The Pilbara region is Western Australia's mineral and energy heartland, responsible for generating a significant proportion of the State's economic activity, wealth and prosperity.

The Pilbara region's Gross Value Added (GVA) for 2017-18 was $90.9 billion (see Figure 3). This directly accounts for around 36 per cent of total gross value added in Western Australia.

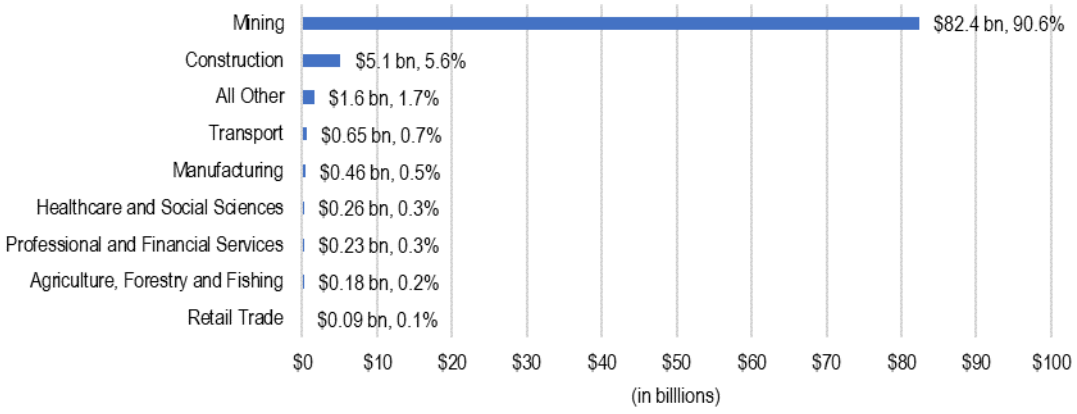


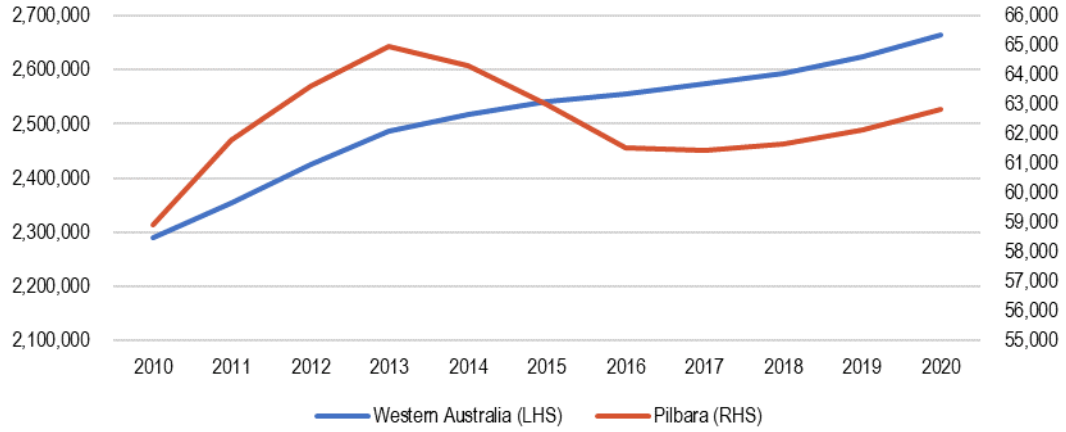

*Figure 3: Pilbara region – Gross Value Added by industry, 2017-18*

Mining (which includes oil and gas industry activity) is by far the Pilbara's largest industry, accounting for approximately 90.6 per cent ($82.4 billion) of the Pilbara's total GVA. Construction was the Pilbara's second largest industry, accounting for approximately 5.6 per cent ($5.1 billion) of the Pilbara's total GVA. Excluding the 'All Other' category (1.7 per cent), Transport was the Pilbara's third largest industry, accounting for approximately 0.7 per cent ($650 million) of the Pilbara's total GVA.

While the Pilbara is Western Australia's most significant economic region, its population is relatively small compared to its economic heft. As presented in Figure 4, the population of the Pilbara region reached a peak of 64,978 in 2013 after growing by an average annual rate of 3.9 per cent over the preceding five years. In 2020, the population of the Pilbara was 62,841, a decline of 3.3 per cent since the peak in 2013. The largest LGA in the Pilbara is Karratha (23,118), followed by Port Hedland (15,471), Ashburton (13,331) and East Pilbara (10,921).

The population of Western Australia has enjoyed steady growth since 2010 – increasing by an annual average of 1.5 per cent. Population growth over the last five years has slowed however with an annual average of 0.9 per cent.

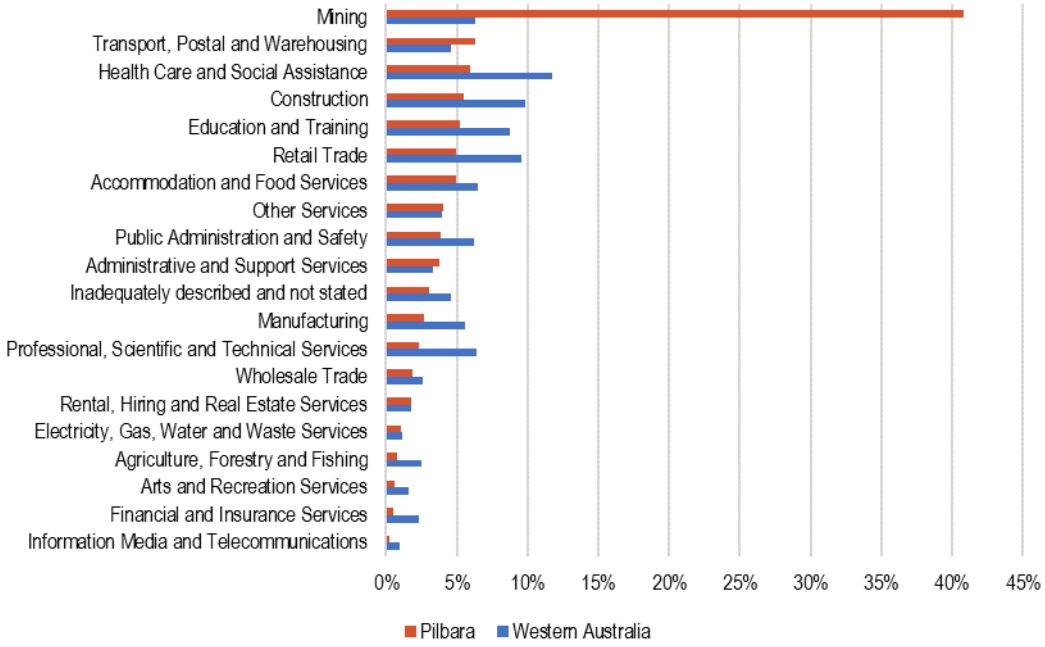
To serve the needs of industry, the Pilbara region has a large fly-in fly-out (FIFO) worker population, which to some extent has limited growth in the local resident population. It has also meant that the population of the Pilbara region can fluctuate significantly as a result of construction workers for major projects residing in Port Hedland and Karratha for short periods of time.




*Source: ABS, Estimated Regional Population by Local Government Area, released 30 March 2021*
*Figure 4: Population profile, 2010-20*

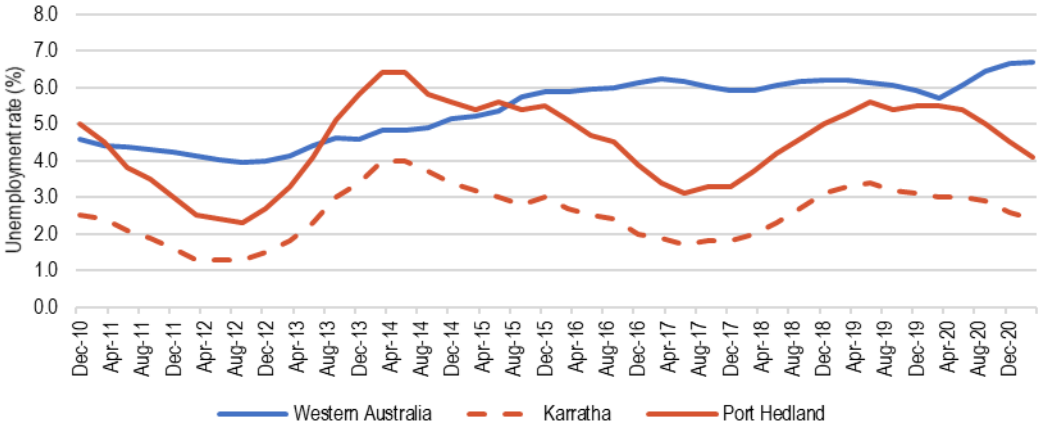
As may be expected, the mining industry (which includes the oil and gas sector) employs approximately 40.8 per cent of the Pilbara's workforce, making it by far the largest industry, followed by Transport, Postal and Warehousing (6.3 per cent) and Health Care and Social Assistance (6.0 per cent).

As reflected in Figure 5, employment across Western Australia is more evenly distributed with the top five industries of employment accounting for almost half of all jobs. Health Care and Social Assistance, the largest industry of employment across Western Australia, accounts for approximately 11.7 per cent of all jobs in the state. Across Western Australia, Mining accounts for approximately 6.3 per cent of all jobs, a significantly smaller of the workforce than that recorded in the Pilbara region.




*Source: ABS, Census 2016, G53 Industry of employment by occupation*
*Figure 5: Employment by industry*

Like most regional areas, where people tend to live only if they have a job, the Pilbara's labour force has generally experienced low levels of unemployment relative to the state. Since December 2010, the unemployment rate has averaged 2.6 per cent in Karratha and 4.5 per cent in Port Hedland (Figure 6). Over this period, unemployment peaked at 4.0 per cent in Karratha and 6.4 per cent in Port Hedland in 2014, and reached a low of 1.3 per cent in Karratha and 2.3 per cent in Port Hedland in 2012.

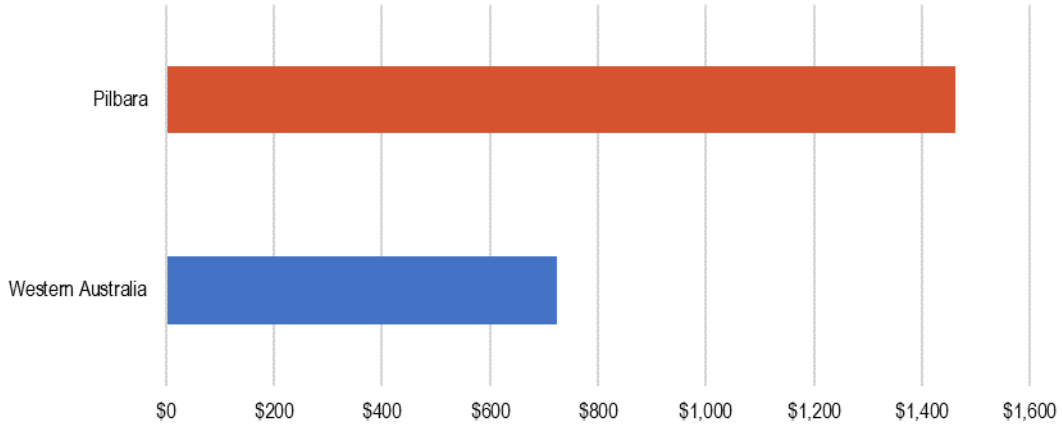



*Source: Australian Government, Labour Market Information Portal, LGA Data Tables, March quarter 2021; ABS, 6291.0.55.001 Labour Force, Australia, Detailed, Table 16b: Labour force status by Labour market region (ASGS) and Sex, Annual averages of the previous 12 months*
*Figure 6: Employment by industry*

The Pilbara region compares favourably to Western Australia over the same period, with the unemployment rate averaging 5.4 per cent, reaching a high of 6.7 per cent in 2020 and a low of 3.9 per cent in 2012.

According to the 2016 census, the median personal income for Pilbara residents was $1,462 – more than twice the median income across Western Australia (Figure 6).

In the Pilbara region, 42 per cent of households had a gross weekly income in excess of $3,000, compared to just 19 per cent across Western Australia. A contributing factor to higher median personal weekly incomes in the Pilbara region is that 72 per cent of the Pilbara's labour force were in full-time employment, compared to 57 per cent across Western Australia at the time of reporting.




*Source: ABS – 2016 Census Quickstats*
*Figure 6: Median personal weekly income, 2016*

## 4.1 The importance of iron ore to the Pilbara region

The Pilbara region is home to Western Australia's globally significant minerals and petroleum industries, as illustrated in Figure 7, which provide the raw materials and energy used in an array of important production processes across the world.

Iron ore is one of the most important commodities in the global economy. Iron ore is extracted via open cut mining, where rock is blasted, dug up and transported to crushing and screening plants where it is then further processed to increase the iron content by removing impurities.[1]

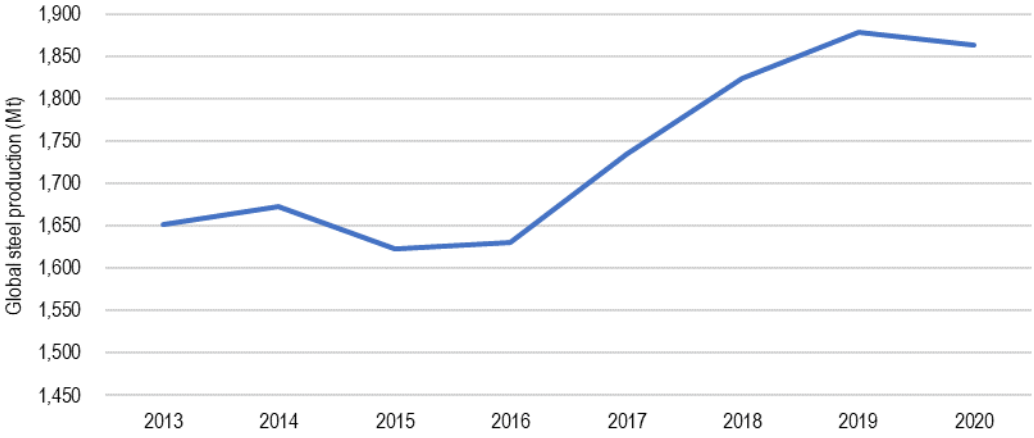
[1] World Steel Association (2019), World steel in figures 2019.


*Source: Department of Mines, Industry Regulation and Safety (blue squares = iron ore projects, gold diamonds = gold projects, green circles = lithium projects, crosses = construction materials, orange triangles = base metal projects)*

*Figure 7: Pilbara region minerals industry*

The global demand for iron ore's ultimate product – steel – increased by 2.2 per cent per annum from 2013 to 2019, reaching 1,880 million tonnes in 2019[2] (Figure 8). However, global steel production declined by 0.9 per cent in 2020 due to COVID-19.

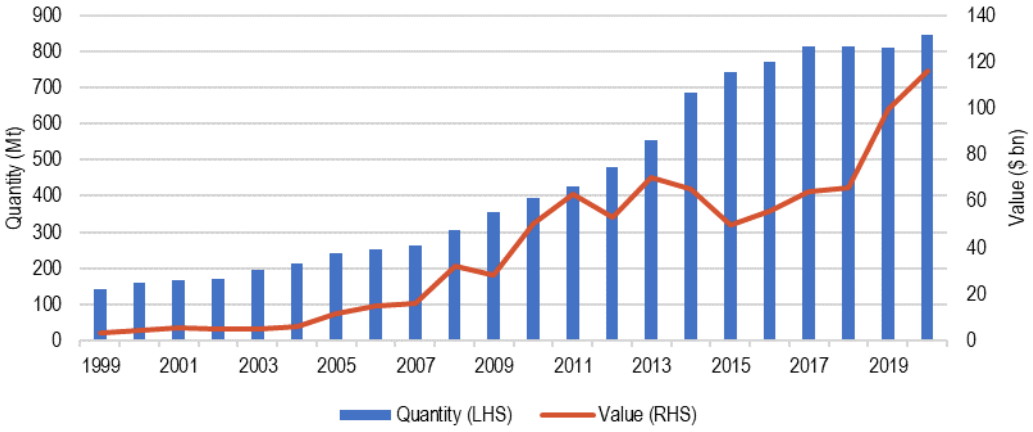
Global demand for steel is estimated to increase by 5.8 per cent in 2021 after the decline in 2020, and is forecast to grow by 2.7 per cent in 2022.[3] Demand for steel is expected to recover firmly following the impacts of COVID-19 in 2020, supported by pent-up demand and governments' recovery programs.




*Source: World Steel Association, Media release: Global crude steel output decreases by 0.9% in 2020, 26 January 2021*
*Figure 8: Global steel production, 2013-20*

Investment in Australia's iron ore sector during the mid-2000's lead to a nearly six -fold increase in production, from 143 million tonnes in 1999 to 846 million tonnes in 2020.[4] The value of Western Australia's iron ore production has increased by an average of 18 per cent per annum over the past two decades, reaching A$116 billion in 2020 (Figure 9). The region's growth and development has been primarily driven by two factors – large-scale capacity expansions of legacy miners BHP and Rio Tinto, and emergence of new players such as Fortescue Metals Group (FMG), Hancock Prospecting, Citic Pacific, and a range of projects which are now owned by diversified mining house Mineral Resources.

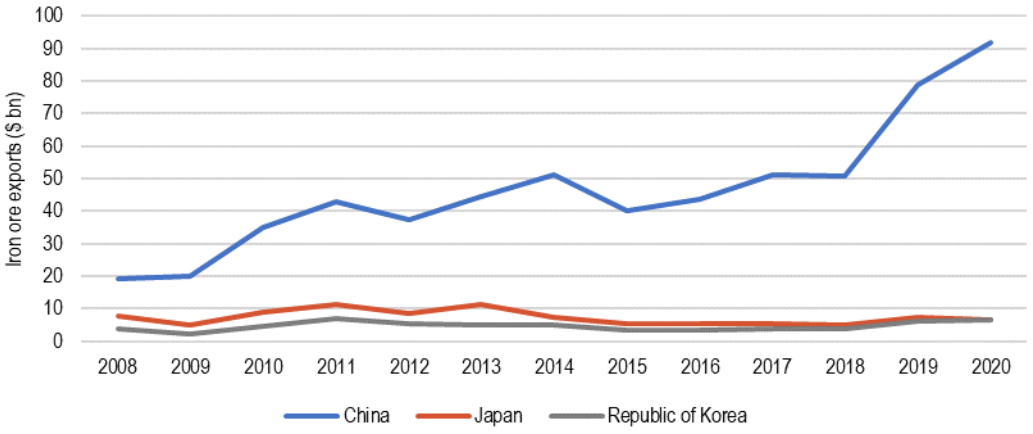
[2] World Steel Association (2021), Media release: Global crude steel output decreases by 0.9% in 2020, 26 January 2021.
[3] World Steel Association (2019), worldsteel Short Range Outlook, April 2021
[4] Ibid.




*Source: WA Government, Department of Mines, Industry Regulation and Safety. 2020-Major-Commodities.xlsx*
*Figure 9: Iron ore production in WA – quantity and value, 1999 to 2020*

Most of these mines are operating in a similar region in the Pilbara, with two main supply chains linked by fixed rail networks which export via the Port of Port Hedland or the Port of Dampier.

In 2020, China, Japan and South Korea were the three largest export destinations for iron ore shipments from the Pilbara region (Figure 10). Iron ore exports to the value of $92.0 billion were shipped to China, $6.6 billion to Japan and $6.5 billion to South Korea in 2020. Significantly, iron ore exports from the Pilbara region to China have increased by 381 per cent since 2008 and as of 2020 China is the destination for 80.0 per cent of all iron ore exports from the Pilbara region. By contrast, iron ore exports from the Pilbara region to Japan have declined by 13 per cent since 2020 and now equates to only 5.8 per cent of all iron ore exports from the Pilbara region.




*Source: WA Government, Department of Mines, Industry Regulation and Safety. 2020-Major-Commodities.xlsx*
*Figure 10: Value of iron ore exports, 2008 to 2020*

Mining companies operating in the Pilbara region benefit from being among the world's lowest cost seaborne iron ore exporters. Among other factors, the ports in the Pilbara

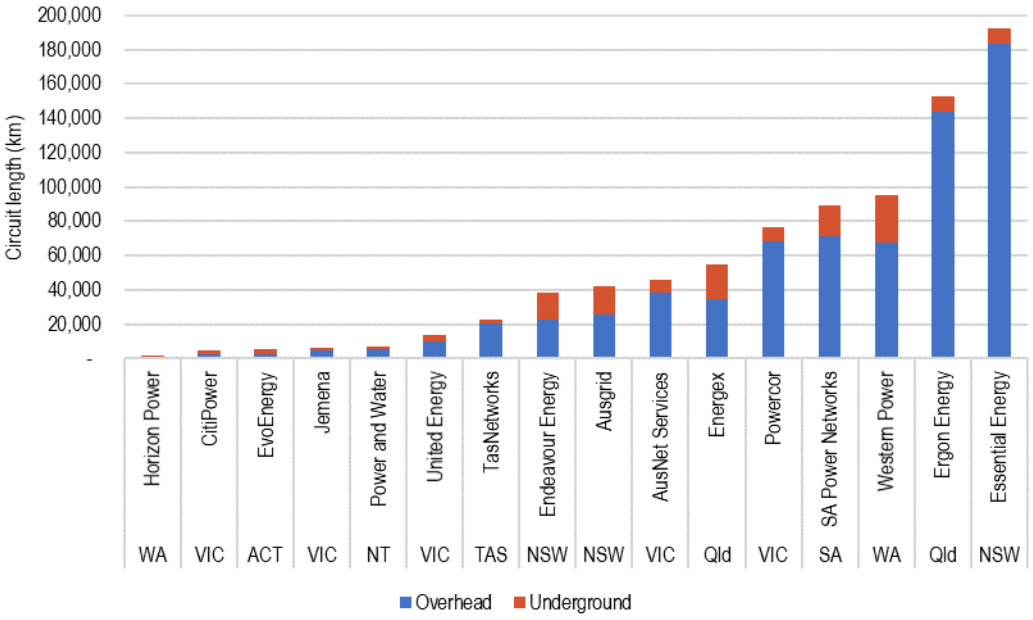
region are close to key markets throughout Asia, reducing shipping costs relative to competing exporters, such as Brazil.

# 5. HORIZON POWER'S ELECTRICITY NETWORK IN THE PILBARA

## 5.1 Comparing the Horizon Power's Pilbara networks to other electricity networks

On a range of metrics, Horizon Power's electricity network in the Pilbara region is small relative to other electricity network service providers in Australia.

As illustrated in Figure 11, the length of Horizon Power's Pilbara network is shorter than any other electricity distributor in Australia. Horizon Power's Pilbara network, which is 1,925 km, is less than half the length of CitiPower's network, which is 4,569 km. CitiPower is a highly urbanised network that supplies the Melbourne CBD and inner suburbs.

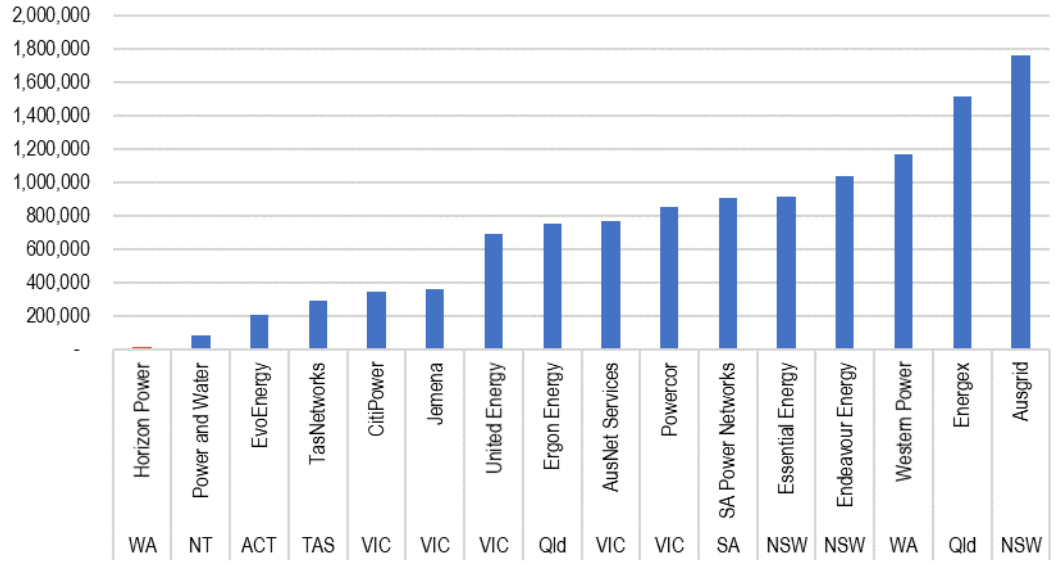



Note: Some 220 kV lines are included for Horizon Power. Lines rated above 132 kV are included in the ACT, NSW, NT and Queensland, but not in South Australia, Tasmania or Victoria

*Source: Economic benchmarking Regulatory Information Notices for 2019-20 or 2020 as published on the Australian Energy Regulator's (AER's) website; Annual data – Energy distributors 2019/20 as published on the Economic Regulation Authority's (ERA's) website*

*Figure 11: Circuit length*

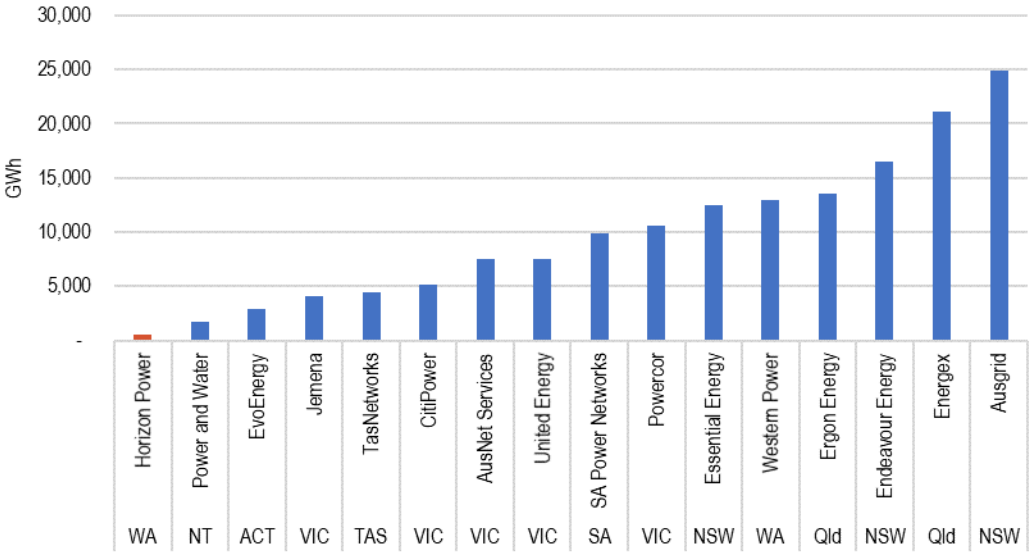
Horizon Power's Pilbara network has the smallest metered customer base than any other electricity distributor in Australia, as illustrated in Figure 12. There are 16,085 metered customers accessing Horizon Power's Pilbara network which is less than one fifth the number accessing Power and Water's network in the Northern Territory (85,930).




*Source: Economic benchmarking Regulatory Information Notices for 2019-20 or 2020 as published on the AER's website; Annual data – Energy distributors 2019/20 as published on the ERA's website*

*Figure 12: Number of metered customers*

The amount of energy delivered to Horizon Power's Pilbara customer base (594 GWh per annum) is less than any other electricity distributor, as illustrated in Figure 13. The next largest electricity distributor (Power and Water in the Northern Territory) delivers 1,667 GWh per annum.

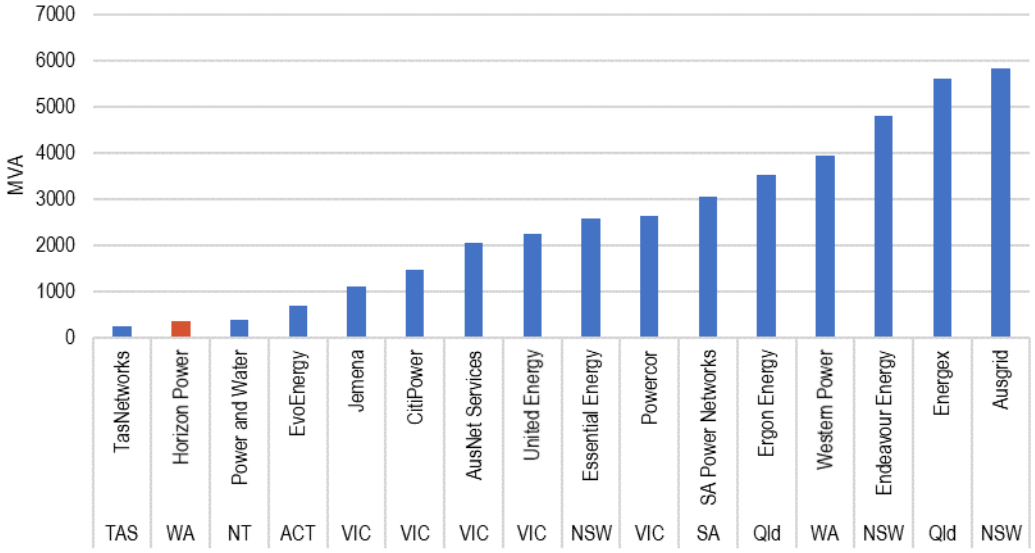



*Source: Economic benchmarking Regulatory Information Notices for 2019-20 or 2020 as published on the AER's website; Annual data – Energy distributors 2019/20 as published on the ERA's website*

*Figure 13: Energy delivered*

As illustrated in Figure 14, the non-coincident peak demand on Horizon Power's Pilbara network is not the lowest of the electricity distributors – the non-coincident peak demand on TasNetwork's network in Tasmania is lower. However, if the peak demand associated

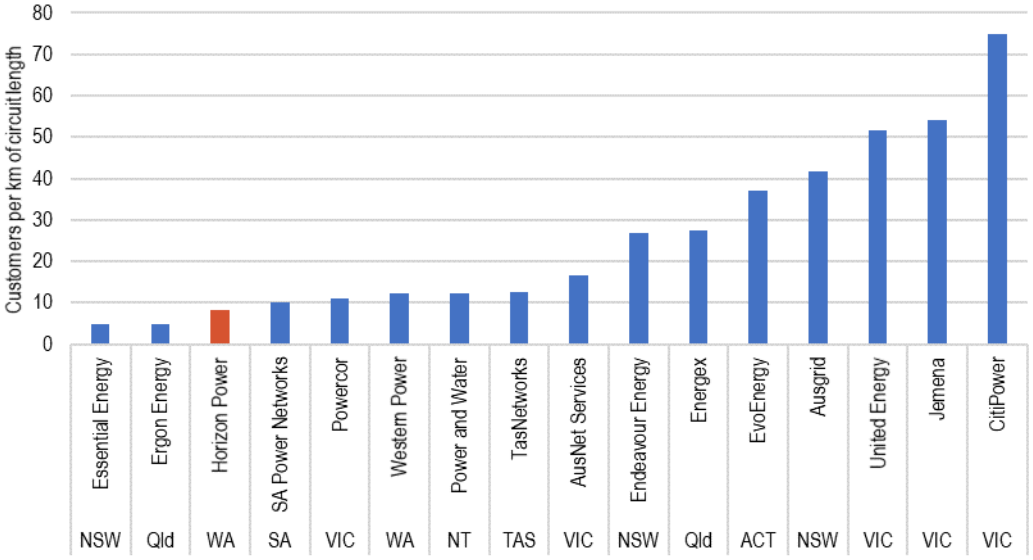
with three large mining customers on Horizon Power's Pilbara network is deducted, the non-coincident peak demand on Horizon Power's Pilbara network is the lowest.




Note: Western Power's non-coincident peak demand (in MVA) estimated based on its system peak demand (in MW)
*Source: Economic benchmarking Regulatory Information Notices for 2019-20 or 2020 as published on the AER's website; Annual data – Energy distributors 2019/20 as published on the ERA's website*
*Figure 14: Non-coincident peak demand*

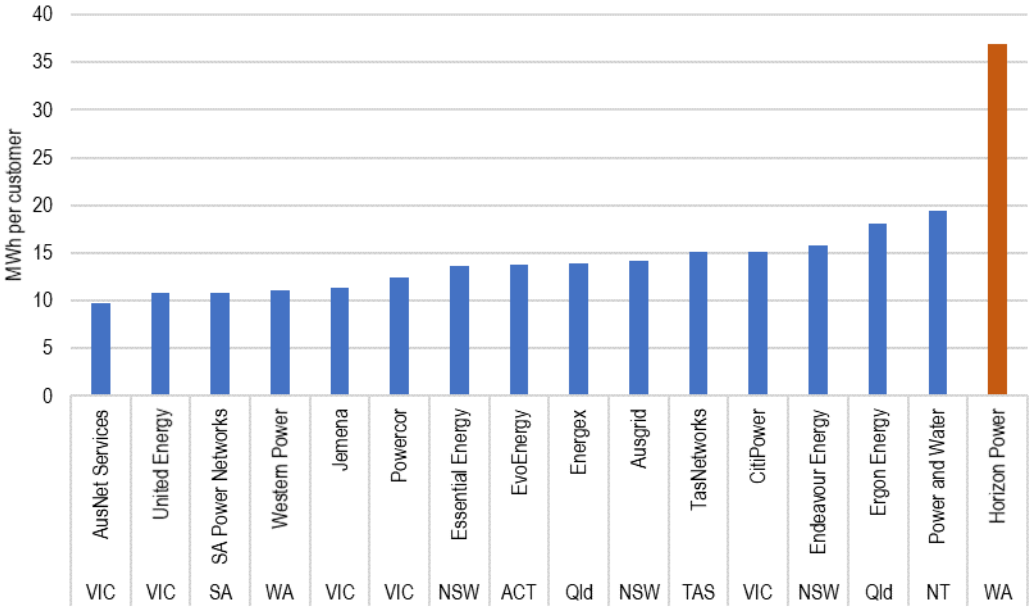
While Horizon Power's Pilbara network and customer base is small relative to the other electricity distributors, the composition of the network and customer base is quite different. As illustrated in Figures 15, 16 and 17:

- the customer density (customers per km of circuit length) is relatively low – the only electricity distributors with a lower customer density than Horizon Power's Pilbara network are Essential Energy and Ergon Energy which operate large regionally based networks in New South Wales and Queensland, respectively
- the energy density (energy per customer) is high – the average energy consumption per customer is higher than any other electricity distributor
- the demand density (peak demand per customer) is high – the average peak demand per customer is higher than any other electricity distributor.



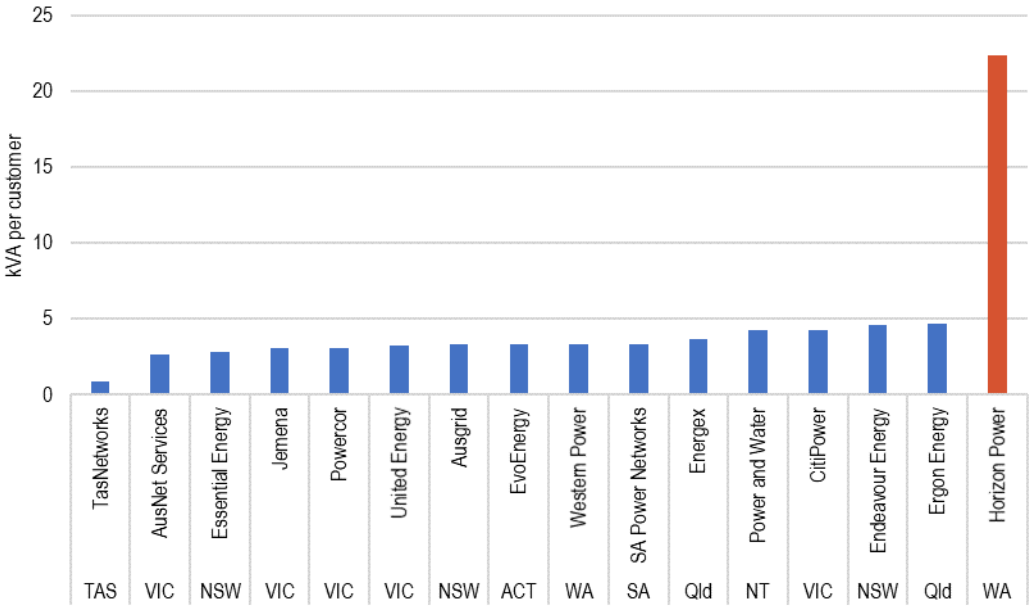

*Source: Economic benchmarking Regulatory Information Notices for 2019-20 or 2020 as published on the AER's website; Annual data – Energy distributors 2019/20 as published on the ERA's website*

*Figure 15: Customer density*




*Source: Economic benchmarking Regulatory Information Notices for 2019-20 or 2020 as published on the AER's website; Annual data – Energy distributors 2019/20 as published on the ERA's website*

*Figure 16: Energy density*




Note: Western Power's non-coincident peak demand (in MVA) estimated based on its system peak demand (in MW)
*Source: Economic benchmarking Regulatory Information Notices for 2019-20 or 2020 as published on the AER's website; Annual data – Energy distributors 2019/20 as published on the ERA's website*
*Figure 17: Demand density*

## 5.2 Horizon Power's customer base in the Pilbara region

As illustrated in Figure 12, Horizon Power's customer base in the Pilbara region is small and, as discussed in section 4, that customer base is strongly exposed to risks in commodity markets, particularly iron ore. As a consequence, Horizon Power's customer base in the Pilbara region is less diversified than the customer bases of other electricity network service providers.

A small number of large customers (0.2 per cent) represent less than 50 per cent of the non-coincident peak demand on the Pilbara network, while the majority of customers (99.8 per cent) represent more than 50 per cent of the non-coincident peak demand on the Pilbara network.

# 6. REFERENCES

The following material is required and should be read in conjunction with this document:

| | |
|---|---|
| LEGAL REFERENCES: | *Electricity Industry Act 2004*<br>Pilbara Networks Access Code 2021 |
| STANDARD & GUIDELINES: | |
| RELATED POLICIES AND OTHER DOCUMENTS: | |