

# NIGHT SHIFTS IN AUSTRALIA: HOW MANY PEOPLE WORK IN THE NIGHT-TIME ECONOMY?

A REVIEW OF CURRENT EVIDENCE



Melbourne Centre  
for Cities

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## A REVIEW OF CURRENT EVIDENCE

Authors: Anna Edwards, Prof. Michele Acuto, Prof. Alison Young, Jesse Mentha



COUNCIL OF CAPITAL CITY LORD MAYORS

*"The Council of Capital City Lord Mayors (CCCLM) commends Melbourne's Centre for Cities for its evidence review, "Night Shift in Australia: How Many People Work in the Night Time Economy." This important work highlights the significant yet often overlooked segment of the workforce active during night hours, contributing to the vibrancy and functionality of our urban environments. Accurate data on night-time employment is essential for informed urban planning, ensuring cities are effectively designed for both day and night activities. Recognising the contributions of night-time workers in national urban policy is imperative for fostering inclusive, dynamic, and resilient cityscapes. The Centre's review complements the CCCLM's efforts in the Night Time Economy initiative, underscoring the necessity of integrating this vital workforce into the broader narrative of urban development"*

Kon Vatskalis

Lord Mayor of Darwin

Council of Capital City Lord Mayors (CCCLM) Chair

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## INTRODUCTION<sup>1</sup>

How many people work at night? This apparently simple question hides deep complexities in accounting for night shift workers in our cities and depicting their conditions across the country. This evidence paper draws attention to the importance of measuring and understanding nocturnal workforces in Australia. We do so in light of increasing attention to the night time economy (NTE) within Australian cities and major regional centres, and the growing success of NTE governance initiatives internationally in general. Despite the rise in interest in better managing Australian cities after dark, we find that there is limited availability of data depicting the temporal characteristics of the Australian economy and labour market. We stress these problems are not of a statistical and academic nature, but an essential challenge in recognising the size, importance and contribution that night workers have to our cities, and the country's economy. Ultimately, better assessing how many work at night, and in what conditions, can pave the way for engaging more effectively with night workers, understanding their importance, and crucially giving them a better voice in the future of Australian cities.

With some degree of confidence, we argue here that upwards of a million people could be conservatively counted as night workers in Australia. However, we note in our study that the overall number of night workers is probably much bigger. We argued we should be going beyond 'core' sectors (like entertainment and hospitality) of the NTE and capture major nocturnal activities in the likes of logistics, care, and transport, for instance. We also stress current data fails to capture domestic, informal, and volunteer work that takes place after dark.

Yet we also recognise here that there is a tension regarding our definitional and statistical efforts on counting 'night work'. Whilst there are well-established versions of 'working hours' and the 'workday', notions like the 'worknight' are scant or wholly absent in policy and scholarship. Indeed, we could consider advocating for the 'worknight' to become a commonly used term by academics as much as decision-makers, just as we do for the 'overnight'. To that end this report (and more broadly our Night Shift program) carries out a particular task in that it seeks to generate more reliable data about night work upon which such definitional efforts could be based. Yet, while we hope this approach will create opportunities for the needs and voices of night workers to be better attended to, we do not mean for night work to be regarded as some kind of anomaly to be measured against or separated from day work. Rather, our effort here is to shed light on an overshadowed critical component of the workforce – one that is often precarious, underpaid and facing challenging health conditions. In doing so we take a specific step

toward raising the profile of night workers in policy and scholarship, toward a better integration of this workforce rather than specialist separation, without of course undermining the necessity to account for, not least in remuneration, as to the complex wellbeing challenging underpinning working at night.

To achieve an initial stocktake of night workers, the report reviews several possible sources of information. The Council of Capital City Lord Mayors' longitudinal datasets and reports provide valuable insights into employment trends within the consumer-facing the "core" NTE (food, drink entertainment and leisure activities). The datasets, however, lack details about employees' working hours and demographic characteristics. Additional datasets, such as the Australian Work and Life Index, Household, Income and Labour Dynamics in Australia Survey, and Time Use Surveys, offer some glimpses into the scale and composition of night work. Nonetheless, challenges in definitions, sample sizes and cadence hinder a comprehensive exploration of night work metrics, particularly concerning cities.

Our research underscores the need for, and lack of, consistent sub-national/granular, up-to-date data to inform evidence-based policies to support the people who underpin Australia's NTE. We recommend improved data collection, potentially through the Census, Time Use Surveys, or as a supplementary question in the Labour Force Survey.

## BACKGROUND: DATA AND THE GROWING PURCHASE OF NTE GOVERNANCE

In recent years, recognition of the importance of the Night Time Economy (NTE) has been on the rise in cities worldwide (Seijas & Gelders, 2021). Australia has not been immune to this, pre- and post-pandemic. This has gone hand in hand not only with advertising night time economies, but with greater attention to the formalisation of NTE governance, and distinct moves that further enhance how cities and regional hubs tackle what happens after dark. Increasingly, city governments have been appointing dedicated night mayors, night tzars, NTE managers, or similar positions, and/or establishing consultative groups of key night time stakeholders to identify, discuss and manage challenges and opportunities (Acuto et al., 2023). In many instances, city governments have also been developing night time (or 24-hour) economy policies, strategies, or action plans that seek to develop the economic and social vibrancy of city nightlife, while maintaining or improving levels of public safety. More recently, however, there has been a (not always explicit) move away from traditional alcohol-fuelled nightlife, towards one that incorporates a greater variety of cultural, social, and economic experiences to ensure that Australian cities appeal to a diverse audience of people at night.

<sup>1</sup> Acknowledgements: The preparation of this report was supported by funding from the Australian Research Council (DP220101078).

In Australia, many examples of NTE governance initiatives can be found within local government, such as the City of Sydney’s Open Sydney agenda, Parramatta’s Night City Framework and Canterbury Bankstown’s Night Time Economy Action Plan, to name a few. While examples of the initiation and development of NTE and 24-hour economy agendas in Australia are most commonly found within local government organisations, there are exceptions to this. For example, in 2020, the New South Wales State Government launched its 24-Hour Economy Strategy for Sydney, and in 2021 announced the appointment of a 24-Hour Economy Commissioner, now flanked by the world’s first Minister for the Night Time Economy, with the of the 24-Hour Economy Commissioner role now a statutory entity (24-Hour Economy Commissioner Bill, 2023). Industry lobby groups such as the Night Time Industries Association in New South Wales have also played a part in this emerging agenda.

Given the proliferation of government agendas to support and grow economic activity at night in Australian cities, it is important to measure NTE activity, and to understand how this is perhaps changing, to inform evidence-based government policies. With planning, governing, and indeed advertising and promoting, comes measuring and assessing – perhaps a lesser-known story behind these NTE trends and the growing popularity of ‘night mayors’ and commissions. Amidst this busy flurry of lobbying, governing, reforming and planning on the NTE across the country, measurement of the NTE and assessment of trends, geographies and economic returns the NTE brings to Australian cities has been more and more on the cards. To appropriately support those keeping our society and urban centres running at night in Australia, policymakers and other governance stakeholders need to understand such things as how many people are working at night, where they are located, the work that they are conducting, their working conditions and demographic composition. Night work encompasses a wide variety of roles conducted by people from a range of demographic backgrounds. Research from the United States and the United Kingdom, however, has already underscored how sizeable percentages of the night workforce are poorly paid, casualised and carried out by marginalised groups (Hamermesh, 2019; Kolioulis et al., 2021; Shaw, 2018, 2022). Moreover, well-

established medical and public health research has also shown across a multitude of countries, Australia included, that night work can be detrimental to workers’ mental and physical health (Books et al., 2020; Ganesan et al., 2019; Huggins et al., 2022; Torquati et al., 2019). Notwithstanding the provision of modest supplementary compensation for eligible night workers in the form of penalty rates, it has been acknowledged that the health-related costs associated with night work are ‘unlikely to be factored into freely negotiated wages’ due to the unequal distribution of market power between employers and employees (Productivity Commission, 2015, p. 404).

Knowledge of where activity is taking place, at what time, and by whom, will enable Australian policies and cities to be developed, planned and shaped to cater for those night workers who underpin the development of our night time and 24-hour economies. Without this information, academics and policymakers are effectively working in the dark. In the following sections, we identify several datasets that have the potential to quantify night work in Australia. We briefly examine the insights that each dataset can provide, as well as analytical limitations in relation to understanding night work.

### MEASURING THE “CORE” NTE IN AUSTRALIA

For most Australians, the night is a period of time outside of the usual “nine-to-five” that allows them opportunities to socialise, dine, participate in leisure and entertainment activities, exercise, relax and sleep. The consumer-facing “going out economy” or “core” NTE has been the focus of NTE agendas and measurements in Australia. For more than ten years, analysis commissioned by the Council of Capital City Lord Mayors (CCCLM) has been the primary data source used by Australian local governments to benchmark the number of people employed in the NTE. The analysis uses a methodology that was initially developed around fifteen years ago in the United Kingdom by economic consultancy Trends Business Research

(TBR). TBR used granular Dun & Bradstreet credit agency business data to identify those industries most likely to operate at night and mapped this analysis to the Australian and New Zealand Standard Industrial Classification (ANZSIC) system. Since 2017, this data has been prepared by Australian-based

Table 1: Definition of the Core, Non-Core and Supply NTE (adapted from Edwards and License (2023))

Sector	Description
Core NTE	Economic activity occurring at establishments that provide services to leisure users – mainly between 6pm and 6am. The Core NTE is split into sub-sectors of Drink, Leisure & Entertainment and Food and then further sub-divided by specific activity types.
Non-Core NTE	Economic activity occurring at establishments that may operate across the 24-hour day, some of which provide integral services to Core NTE leisure activities. These include public and private transport, hotels and other accommodation, retail services, policing, health, parking, and lighting.
Supply NTE	Supply NTE establishments tend to operate during the day but are part of the Core NTE supply chain via the manufacturing or wholesaling of Food, Drink or Entertainment products for resale in leisure outlets.



consultancy Ingenium Research, using the original methodology. The research Australian Bureau of Statistics data to estimate the number of people who work within the core NTE, non-core NTE, and supply NTE, as defined in Table 1.

The data is prepared for 88 cities across Australia, although the annual report usually presents the findings for the eight capitals, as well as selection of other local government areas and incorporates contextual policy insights from the cities themselves. While non-core and supply data has been analysed and provided regularly to the capital city councils for the past decade, with increasing degrees of sophistication, the primary focus of the Australian NTE annual report published by the CCCLM is the core NTE. In 2023, however, retail and accommodation were added to the report – a reflection of the appreciation of the desire to enhance the diversity of consumer-facing night time activities and the range of people participating in the NTE in Australian cities.

The latest (2023) CCCLM report shows that across the whole of Australia, 1.06 million people worked in the core NTE in 2021/22. Most of this employment was classified as belonging to the food (restaurants, cafes and takeaways) sub-sector (65%), followed by leisure and entertainment (23%) and drink (12%). Notably, the core NTE has been growing at a faster rate than the overall Australian economy. As can be seen in *Table 2*, between the 2008/09 and 2021/22 financial years, the value of the Australian core NTE increased by 62% (33% of this may be attributed to inflation). During the same period, the number of core NTE businesses grew by 47% and the number of people employed at these businesses increased by 14% (Bevan et al., 2013; Edwards & License, 2023).

While the number of employees in the core NTE has not grown at the same rate as the number of establishments and sales turnover, the Australian Bureau of Statistics' Labour Force Survey data shows that employment in this sector has been growing at a faster rate than the overall economy over the past four decades. In February 1985, there were 324,000 Australians employed in the Accommodation and Food Services sector, representing 5% of all employed persons, rising to 928,100 in February 2020 (7% of all employed persons), at the commencement of the COVID-19 pandemic (Australian Bureau of Statistics, 2022).

Unsurprisingly, the pandemic had a devastating impact on core NTE employees, with the CCCLM data showing a loss of 230,000 jobs between 31 June 2019 and 31 June 2020 (-20%). This was attributed to pandemic restrictions, which were particularly challenging for consumer-facing roles. The highly casualised nature of many roles within the NTE workforce was also considered to have contributed to these job losses. Employment in these industries has since recovered, although many businesses are still reporting staff shortages in key roles. There are many factors that may have contributed to this, including hospitality workers leaving the industry during the pandemic and not returning, and fewer overseas students and backpackers in the country applying for these roles. In addition to these staff shortages, in June 2022, there were 12% more core NTE businesses in Australia than there were in pre-pandemic June 2019, and if this trend continues, the shortage of these workers could escalate further.

While this dataset is valuable in benchmarking Australian cities' NTE performance over time, its limitations are that it does not break down the times that these employees work, nor the demographic characteristics of the night time workforce beyond the geographic area and industry in which they work. We know that there are a large number of people living in Australia who work at night – many of whose work is directly related to the core NTE. It is important to note, however, there will be a large cohort of night shift workers whose roles have no relationship to the consumer-facing core NTE, such as mining, road transport logistics, and residential care activities that take place at night.

In complement to CCCLM's research there have been many emerging non-governmental datasets in recent years, such as consumer card spending, business trading hours and mobile phone GPS data that have been used to build on the understanding of activity within Australia's cities at night. These datasets, however, explore economic activity and people movement more broadly, rather than providing insights specifically about people who work at night. Below, we examine further datasets that may be useful to garner more specific information as to what the Australian NTE workforce looks like.

Table 2: Pre-pandemic contribution of the Core NTE to the total economy in 2008-09 compared to 2021/22

Measure	2008/09	2021/22	Percentage change 2008/09-2021/22	Change 2008/09-2021/22
Establishments	89,670	131,373	47%	41,703
Employment	925,925	1,057,895	14%	131,970
Turnover (A\$bn)	\$90.2	\$146.1	62%	\$55.9

## THE AUSTRALIAN WORK AND LIFE INDEX

The Australian Work and Life Index (AWALI) was a national Australian annual survey administered by the University of South Australia's Centre for Work + Life. The survey collected information about Australians' current employment assessed respondents' perceptions of work-life balance between 2004 and 2014, and included a question about night work (Skinner & Pocock, 2014, p. 8). The data classified evenings as after 9pm and worked on the basis that those who replied 'sometimes', 'rarely' or 'never' to working at this time were classified as not working during that time. Analysis of the survey data by the Productivity Commission found that 19.1% per cent of Australian employees 'often or always' worked evenings or nights past 9pm' (Productivity Commission, 2015, p. 393).

Daly's (2014, p. 8) analysis of the results of the AWALI survey found that people aged 35-44 were the most likely to work evenings (7.4% of this age group), and couples with children were most likely to work evenings (7.5%). Those on the highest end of the wage spectrum (\$90k+) were most likely to say that they worked evenings only (6.7% of people earning \$90k+) (p10). Using the same data, Skinner and Pocock (2014) found that 13% of Australian surveyed worked a combination of weekends and evenings, and 6% worked 'exclusively on night/evening shifts' (no weekends) (p27). Men (16% evenings and weekends /11% evenings, no weekends) were more likely to work during these time periods when compared to women (7%/5%) (p. 28). Their research showed that the frequency of 'working a combination of weekends and nights, or just evenings/nights' was associated with the highest "work-to-life interference" (p. 3) – defined by the researchers as the 'capacity to satisfactorily engage in the activities and responsibilities of other spheres of life' and to have the 'time available to spend on activities outside work' (p. 8). Evening/night work was also found to be 'associated with the greatest negative impact on women's work-life outcomes - whether combined with weekend work or not' (p. 3). Although this dataset offers valuable insights into nocturnal employment, it is outdated, given that the most recent survey was conducted in 2014. Another limitation is the survey's sample size (2,690 in 2014), hindering reliable analysis at a sub-national level.

## THE HILDA SURVEY

The Household, Income and Labour Dynamics in Australia (HILDA) Survey is an annual longitudinal survey of around 17,000 Australians. One of the questions in the survey asks people to best describe their current work schedule. Analysis of this survey data by the Productivity Commission found that in 2013-14 almost 1.2 million Australians were working either a regular night shift or a rotating shift, equating to 11% of all Australian employees (Productivity Commission, 2015, p. 393). The Productivity Commission estimated that this figure was likely to have been 2 million, or 20% of the workforce if those working irregular hours, split shifts, or in on-call work were also taken into account (although not all of those on these type of work patterns work nights). Furthermore, regular evening shifts are not included in the above figures. Analysis of HILDA survey data has also indicated that night work is often casualised in nature (Abhayaratna et al., 2008).

Healthcare, accommodation and food services and retail trade were found to have the greatest number of night workers – with each of these sectors having more than 200,000 night workers, according to 2009-2014 HILDA survey data (Productivity Commission, 2015, p. 393). Bittman (2016, p. 533) explains that the growth of employment in these industries (retail, hospitality, security and healthcare) has led to 'a higher proportion of employment that has spread beyond the usual working hours'.

The limitation of this dataset is that the question about current work schedules forces respondents to select one answer from a list of eight different schedule types, some of which are ambiguous as to the time of day (e.g. "a split shift", "on call" and "irregular schedule"). As such, it is not possible to definitively say with certainty which respondents work at night.

Table 3: Estimating the size of Australia's night time labour market using the ABS' Working Time Arrangements Survey

Year and link to source	Definition of night work	Night workers ('000s)	Total employees <sup>2</sup> ('000s)	Percentage of population who are night workers
<a href="#">1993</a>	Shift workers with majority of hours 5pm to 6am	146.0	4,790.1	3.0%
<a href="#">1995</a>	Shift workers with majority of hours 5pm to 6am	154.5	5,103.8	3.0%
<a href="#">1997</a>	Shift workers with majority of hours 5pm to 6am	173.8	5,055.5	3.4%
<a href="#">2000</a>	Shift workers with majority of hours 5pm to 6am	182.8	5,606.9	3.3%
<a href="#">2003</a>	Shift workers with majority of hours 5pm to 6am	229.1	5,801.9	3.9%
<a href="#">2006</a>	Usually worked any hours between 7pm and 7am	2,586.0	8,636.1	29.9%
<a href="#">2009</a>	Not collected in 2009	NA	8,563.0	NA
<a href="#">2012</a>	Usually worked majority of hours between 7pm and 7am	638.9	9,275.7	6.9%

## THE WORKING TIME ARRANGEMENTS SURVEY

The Australian Bureau of Statistics' Working Time Arrangements survey was conducted every two to three years between 1993 and 2012, and asked questions about the time of day people worked. Unfortunately, from 2003 onwards the survey questions were altered, meaning that the results are not comparable from this point onwards. Furthermore, only high-level aggregated survey results were made publicly available. A summary of night worker data and definitions from the Working Time Arrangements survey is provided in *Table 3*.

Originally, night work was captured in the survey as the majority of working hours by a respondent taking place between 5pm and 6am. In 1993 3.0% of Australia's working population fell into this category, rising to 3.9% by 2003 – indicating growth in the number of people working at night.

In 2006 the survey question was fundamentally changed, asking respondents whether they usually worked any hours between 7pm and 7am on a regular basis. More than 2.5 million people (29.9% of respondents) reported regularly working at some point during these night time hours. This is a very different metric to the 1993-2003 surveys, with the earlier surveys counting pure night shift workers and the 2006 survey encompassing a much broader group of people, including those who regularly finished work late or started work early. The 2009 Working Time Arrangements survey did not ask about night work and, in 2012, the Australian Bureau of Statistics changed the wording of the survey yet again, asking whether people worked the majority of hours between 7pm and 7am in all jobs (6.9%), bringing the survey more in line with the 1993-2003 iteration, although not entirely. This means that it is not possible to compare this metric to any of the earlier iterations of the survey. Furthermore, the latest dataset was collected more than twelve years ago, in 2012.

<sup>2</sup> Aged 15 years and over, excluding owner managers of incorporated enterprises (OMIEs)

Table 4: Number of Australian employees aged 15-64 by shift work pattern in main job ('000s)

Reference year	Aug-15	Aug-17	Aug-19	Aug-21
Rotating shift which periodically changes	815.4	850.7	807.6	787.5
Regular evening shift or graveyard shift	215.2	251	255.1	190.8
Regular morning shift	115.7	149.6	170.4	212.0
Regular afternoon shift	128.7	121.3	124.2	152.9
Irregular shift	371.5	372.9	434.8	344.7
Split shift	64.4	88.5	80.8	70.8
On call	78.0	72.5	62.5	75.9
Other	72.7	72.3	74.2	82.1
Did not usually work shift work	9,880.4	10,298.8	10,857.3	11,016.4
<b>Total</b>	<b>11,740.7</b>	<b>12,275.7</b>	<b>12,869.9</b>	<b>12,933.0</b>

## THE CHARACTERISTICS OF EMPLOYMENT SURVEY

The Australian Bureau of Statistics' Characteristics of Employment survey allows analysis of Australian employees aged 15 and over by their shift work patterns biennially from 2015 to 2021. As can be seen in *Table 4*, it is estimated that 191k Australian employees were working regular evening or graveyard shifts in 2021. A further 1.3m were working rotating, irregular or split shifts or were on call – although it is not possible to break down whether these people worked at night.

It can be seen that the number of people working a regular evening shift or graveyard shift fell from 255k in 2019 to 190k in 2021, likely due the COVID-19 pandemic. The data shows that just over 40% of people working regular evening or graveyard shifts were born overseas. The industries with the highest number of people working regular evening shift or graveyard shifts were:

- Health Care and Social Assistance – 42,300 people (22% of all evening/graveyard shift employees)
- Accommodation and Food Services – 33,900 people (17%)
- Manufacturing – 27,300 people (14%)
- Retail Trade – 23,600 people (12%).

The latest data, from 2023 shows that 203,800 reported working a regular evening or graveyard shift; an increase since 2021, but still substantially below pre-pandemic levels.

A limitation of this dataset is its sample size. Despite the Characteristics of Employment survey having the largest sample size of all the survey-based data sources reviewed, detailed analysis for every industry or by small geographic area is considered too unreliable for general use. Additionally, the Characteristics of Employment survey, respondents are asked whether they “usually work any shift work”. Those who respond “yes”, are asked a follow up question that forces them to select one of eight different shift work types (e.g. “on call”, “irregular shift”, “split shift”). The ambiguous temporal nature of most of these shift types means that it is not possible to account for every person who works at night (beyond the small proportion of people who stated that they work evening or graveyard shifts). This is a similar limitation to the HILDA survey.



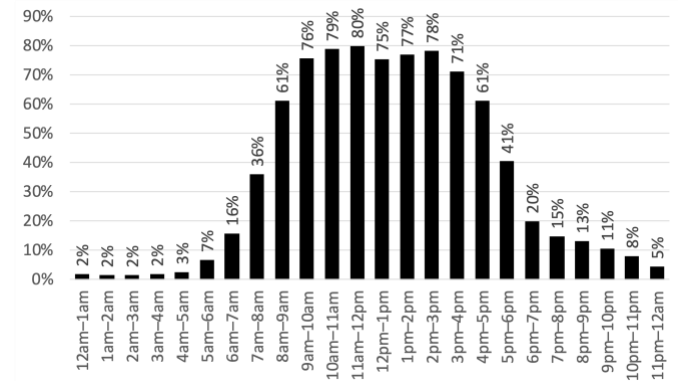
## TIME USE SURVEYS

In 1974, the Cities Commission sponsored Australia’s Time Use Survey, which collected almost 1,500 single-day responses to compare time use by participants in Melbourne and Albury-Wodonga. The first Australian Bureau of Statistics pilot Time Use Survey was carried out in Sydney in 1987. This pilot was followed by full national time use surveys in 1992, 1997 and 2006. In 2018, the Federal Government’s Women’s Economic Security Package (Commonwealth of Australia, 2018, p. 5) committed to reinstating the Australian Time Use Survey after a hiatus of more than ten years.

The Australian Bureau of Research’s Time Use Survey, collects detailed information about a representative sample of Australians and how they use their time in each five-minute interval across the 24-hour day; a method Ironmonger (2008, p. 1) described as the ‘most valid technique to measure time use’. Despite the availability of the detailed results from the 1992, 1997 and 2006 survey, no analysis appears to have been carried out to explore work by Australians across the twenty-four-hour day, with the Australian Bureau of Statistics’ Time Use Survey most commonly drawn upon to calculate how much aggregate time is spent on specific tasks, such as unpaid work in the home.

Figure 1 shows that according to Australian Bureau of Statistics’ Time Use Survey data, Australians aged 15 and over are much more likely to be working in the evening than they are later into the night and the early hours. For example, in the early evening between 6pm and 7pm 20.1% of people reported that they were working, compared to just 1.6% between 2am and 3am. By combining this data with the Australian Bureau of Statistics’ Labour Force Survey, it has been estimated that the number of people working between 6pm and 6am fluctuates from 2.7 million between 6pm and 7pm to just half a million between 12am and 5am (Edwards & License, 2024, p. 2).

Figure 1: Proportion of Australians aged 15 years and over who participated in work, by time of day in 2020/21



As can be seen in Table 5, the industries in which people are most likely to be working between the hours of 6pm and 6am are accommodation, food, arts and recreation services.

The 2020/21 Time Use Survey data also shows that night work is more prevalent among Australian people who identify as male and younger people. Interestingly, many people reported working at night from home. For example, in 2020-21, 15% of employees worked between 8pm and 9pm at their own home, compared to 13% at a workplace. Time Use Surveys collect comprehensive data, enabling a detailed analysis of the demographics of respondents and how they use their time across the twenty-four-hour day. A key limitation of this data, however, have been the relatively small survey sample sizes in Australia – particularly in the 2020/21 data, reducing its capacity to provide reliable sub-national analysis or cross-metric analysis.

Table 5: Proportion of people aged 15 years+ who participated in work, by time of day, by industry, 2020/21

Time period	Manufacturing	Construction	Retail Trade	Professional, Scientific and Technical Services	Public Administration and Safety	Education and Training	Health Care and Social Assistance	Accommodation and Food Services - Arts and Recreation Services	Other
6:00 PM - 7:00 PM	10	10	21	20	18	17	27	41	18
7:00 PM - 8:00 PM	8	4	18	12	15	13	22	40	12
8:00 PM - 9:00 PM	11	5	12	12	10	14	15	33	10
9:00 PM - 10:00 PM	12	2	7	10	11	12	14	26	9
10:00 PM - 11:00 PM	7	2	6	8	12	9	11	19	7
11:00 PM - 12:00 AM	6	1	3	7	5	9	6	8	4
12:00 AM - 5:00 AM	7	0	2	4	2	1	4	5	5
5:00 AM - 6:00 AM	17	9	4	2	3	2	6	4	10

## FROM CHALLENGES TO OPPORTUNITIES IN MEASURING NIGHT TIME WORKERS

Overall, our investigation of methods of accounting for night time workers underscored two key challenges not just for data collection and analysis, but also for the application of effective evidence into policymaking. The first challenge we would see needing to be addressed is that of classifying who is, and who is not, a “night worker”. Should only paid workers be counted? Or, consistent with the growing scholarship on the precarity and invisibility of night workers, should people conducting volunteer, informal or domestic work at night be considered too? At what time does the night start and end – it is after dark, or is it at a specified clock time? Should only regular night work be counted, or should occasional or intermittent night work be incorporated into the analysis too? What about those who primarily work during the day, but whose shifts end later than, or before, the usual nine-to-five? A factor particularly relevant post-pandemic is whether those working from home at night in flexible positions should be counted as night workers. There is no singular consensus to any of these questions – although the most commonly used definition of the NTE in Australia is economic activity occurring between the hours of 6pm and 6am.

Alongside this, a further challenge is that of data availability. While detailed labour market data is collected and analysed by Australian government agencies, there is no perfect dataset that allows the analysis of the Australian labour market temporally across the 24 hour day and over time. While governments typically collect data to monitor the levels of economic activity in their countries, cities and regions, there has been limited or no perceived need to collect or analyse this data on a temporal basis to date. In Australia, data collection pertaining to the time of hours worked by Australians over the years has been inconsistent and therefore is not always comparable. There are, as we noted above, a few data indicators that can be drawn on to demonstrate what appears to be increased working hours at night, which in turn tell us a base for better evidence-based action is already available and thus that clear strides ahead in the modes of accounting for night work could be achieved.

## CONCLUSIONS

Night workers, however we count them, are a fundamental part of the Australian workforce. They are also at often times poorly understood, calling us to step up our analytical capacity and their recognition in urban policy and governance across the country. Our review of currently available data sources that might be available to account for night time workers has sketched a first picture of what the NTE workforce in Australia might look like. It is, of course, a very preliminary effort on what could be a fundamental piece of not only specifically applied urban analytics and city policy, but potentially a country-wide effort to better contextualise the workforce behind the sizeable night time economy that takes place in Australia after dark. With some degree of confidence, we could argue that upwards of a million people could be counted as night workers in Australia.

This number could be, however, and probably is, much bigger. As we stressed in our assessment, this is in fact a particularly conservative reading of how many people work at night: a million would be but a portion of the overall NTE workforce. If we were to go, as we have argued, beyond ‘core’ NTE (like entertainment and hospitality) and capture other major nocturnal activities in the likes of non-core logistics, care and transport, for instance.

Yet our review also underscored these facts are highly contingent both of wide methodological diversities between the various sources we could rely on, as well as sizeable data limitations. Our brief analysis of available information has demonstrated that there remain many challenges to understanding the prevalence and characteristics of night work in Australia. Above we have outlined several data sources that could be drawn upon for this purpose and high-level findings from each of these datasets.

*Table 6* summarises the data sources reviewed, showing the years for which data is available, the sample size, and the estimated size of the night time workforce based on the latest data set, and the definition. While this review tells us we do have important longitudinal information and some insights that cover most of the past two decades, and reasonably large sample sizes, it also stresses clear differences. Likewise, definitions of what constitutes ‘night work’ varies, with important temporal divergences as to *when* night work really starts and ends.

Table 6: Summary of data sources

Data source	Years	Sample (latest year)	Size of night time workforce <sup>3</sup>	Definition
CCCLM	2008/9 - 2020/21	NA	1.05m (2020/21)	Employees belonging to consumer-facing that usually operate between 6pm and 6am.
AWALI	2004 - 2014	2,690	19% (2014)	Employees who 'often or always' work evenings or nights past 9pm.
HILDA	2001 - 2021/22	17,000	1.2m (11%) / 2m (20%) (2013-14)	Employees working regular night shifts or a rotating shifts / plus irregular hours, split shifts, on-call
Working Time Arrangements	1993 - 2012	25,959	638,900 (2012)	Employees who usually worked majority of hours between 7pm and 7am (2012 – this definition changed over the years)
Characteristics of Employment	2015 -2021	44,000 <sup>4</sup>	204k / 1.9m (2023)	Employees who worked regular evening shift or graveyard shift / work any form of shift work
Time Use Surveys	1992, 1997, 2006, 2020/21	3,630	1.9% - 20.1% by time (2020/21)	Proportion of Australians participating in work by time of day

A key challenge for most surveys reviewed was the inability to accurately determine the number of night shift workers based on the questions asked. For example, while it is possible to count those who report they usually work regular evening or graveyard shifts, workers whose schedules fall into a rotating, irregular, split or on-call shifts should be excluded – as it is not possible to determine whether or not these shift arrangements involve night work. The Time Use Survey data is the most helpful in being able to determine the level of work activity conducted across each of the night time hours and the demographic characteristics of these workers, however, as with most of the data sources looked at, the sample design is not designed to enable detailed analysis beyond the national level.

In light of the NTE agenda being pursued by many Australian government organisations, there is a requirement for better data on the number and characteristics of night workers. This would best be achieved via existing Federal Government data collection mechanisms such as the national surveys administered by the Australian Bureau of Statistics.

Some proposals on how this could be achieved are provided here. On the one hand, the Australian Bureau of Statistics could insert a question about the temporal nature of people's employment into the Census questionnaire. This would result in the ability for policymakers, academics and other researchers to analyse and plan for night workers at a very granular geographic level and would enable a range of other economic, social and

cultural characteristics of night workers to be analysed and better understood. The challenge, however, with this approach is the cadence of the data, with the Census only conducted every five years. Another option, or indeed a supplementary approach to the Census one, would be to include a supplementary question about night work/time of day worked in the Labor Force Survey. This could take the shape of an improved version of the question asked in the Characteristics of Employment survey. Practically, this statistical effort could be piloted in the first instance, with the potential to be followed up on a regular basis to enable more current analysis for policymakers' use. Finally, another approach could be for the sample size for the Time Use Survey to be expanded to enable night time worker analysis at a sub-national level. The benefit of this survey is that it collects a comprehensive picture of individuals' lives and work patterns. The survey is, however, onerous for participants to complete, and time-consuming for the Australian Bureau of Statistics to administer. As such, it is likely that the geographic granularity required may be cost-prohibitive, making in our view a compelling case for much more extensive, country-wide efforts at leveraging urban science advances in geospatial analysis and urban economic research to step up our capacities to unpack night work across Australian urban settlements.

Nonetheless, data is but the start of a wider conversation. We recognise here that there is an inherent tension regarding the effort we have made to single out 'night work' and the call we have sketched here. That is, much of the discussion on jobs,

<sup>3</sup> Based on latest published analysis available

<sup>4</sup> The exact sample size is not published by the Australian Bureau of Statistics. It is a supplementary survey to the Labour Force Survey,

comprising a sample no more than seven-eighths of the Labour Force sample (c. 50,000).

urban economics, and productivity, is still captured by a dominant version of so-called ‘working hours’, or what we call the ‘workday’, whereas notions like the ‘worknight’ still do not exist either in common parlance or policy and statistical jargons. Here we could consider adopting in policy and scholarship a more explicit definition of the ‘worknight’ to become a commonly used term, just as we do for the ‘overnight’. Yet the awkwardness of terms like ‘overnight’ and ‘worknight’ reveal that the daytime is still the overweening norm in the way we characterise urban economics and urban life more generally. A first step, presented here, away from this day-time bias is greater night literacy. This report (and more broadly our *Night Shift* program) carries out a particular task in that it seeks to generate more reliable data about night work. Yet, while we hope this effort will create opportunities for the needs of night workers to be addressed, we do not mean for night work to be regarded as some kind of anomaly to be measured against or separated from day work, but rather better accounted for in the sprawling discussions about the night-time economy in Australia, and beyond.

To that end, data-driven temporal insights play a foundational role in developing evidence-based policy for the future of night work in the context of 24-hour economies in Australian cities. The systematic capture of information about the locations, times and demographic characteristics of night work is vital in effectively planning for the working conditions, travel, safety, social and infrastructure needs of this growing workforce, and yet this data is currently lacking. Hence, it becomes amply clear to us that more investment and research are urgently needed to fill not just this gap in knowledge, but to ensure that the mounting efforts to manage the NTEs of cities and regional centres across the country are centred on effective, up-to-date, and reliable data. Surveying night shift workers is not a luxury for academic studies or a curiosity for data experts, but a fundamental pressing need to better attend to the hundreds of thousands, if not millions, whose working conditions after dark are rarely chronicled, discussed, and acted upon in local, state, and federal policy. We simply cannot afford not to account for this sizeable workforce and continue to silence it whilst they provide essential services that keep our cities ticking and economy functioning.



## REFERENCES

- 24-Hour Economy Commissioner Bill (2023). <https://www.parliament.nsw.gov.au/bills/Pages/bill-details.aspx?pk=18524>
- Abhayaratna, J., Andrews, L., Nuch, H., & Podbury, T. (2008). Part Time Employment: The Australian Experience. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1159594>
- Acuto, M., Seijas, A., Edwards, A., & Bassett, S. (2023). Meeting afterhours: On the work that night commissions do. *Urban Geography*, 45(3), 372–389. <https://doi.org/10.1080/02723638.2023.2180192>
- Australian Bureau of Statistics. (2022, February 24). 6291.0.55.001 *Labour Force, Australia, Detailed: Table 04. Employed persons by Industry division of main job (ANZSIC)—Trend, Seasonally adjusted, and Original (Original)*. <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia-detailed/latest-release>
- Bevan, T., License, A., & Lester, M. (2013). *The Australian Night Time Economy A First Analysis 2009 to 2011* (p. 87). Trends Business Research. [https://web.archive.org/web/20140622100641/http://www.cityofsydney.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0003/149223/2013-153844-Report-The-Australian-Night-Time-Economy-A-First-Analysis-2009-2011.pdf](https://web.archive.org/web/20140622100641/http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0003/149223/2013-153844-Report-The-Australian-Night-Time-Economy-A-First-Analysis-2009-2011.pdf)
- Bittman, M. (2016). *Working Time*. Sage Publications Ltd. <https://rune.une.edu.au/web/handle/1959.11/21937>
- Books, C., Coody, L. C., Kauffman, R., & Abraham, S. (2020). Night Shift Work and Its Health Effects on Nurses. *The Health Care Manager*, 39(3), 122. <https://doi.org/10.1097/HCM.0000000000000297>
- Cibin, A. (2021). Forms of night-time economy governance: A framework towards clarification. In *Transforming urban nightlife and the development of smart public spaces* (pp. 22–39). IGI Global.
- Commonwealth of Australia. (2018). *Greater Choice for Australian Women—Women’s Economic Security Statement 2018*. 52.
- Daly, T. (2014). *Evenings, nights and weekends: Working unsocial hours and penalty rates* (Australia, South Australia) [Report]. University of South Australia. <https://apo.org.au/node/58848>
- Edwards, A., & License, A. (2023). *Measuring the Australian Night Time Economy 2021-22*. Ingenium Research/Council of Capital City Lord Mayors. <https://www.lordmayors.org/wp-content/uploads/2023/10/Measuring-the-Australian-NTE-2022-FINAL-201023-1.pdf>
- Edwards, A., & License, A. (2024). *Unveiling the nocturnal workforce: Taking a closer look at Australia’s after-hours employees*. <https://ingeniumresearch.com.au/articles/>
- Ganesan, S., Magee, M., Stone, J. E., Mulhall, M. D., Collins, A., Howard, M. E., Lockley, S. W., Rajaratnam, S. M. W., & Sletten, T. L. (2019). The Impact of Shift Work on Sleep, Alertness and Performance in Healthcare Workers. *Scientific Reports*, 9(1), Article 1. <https://doi.org/10.1038/s41598-019-40914-x>
- Hamermesh, D. S. (2019). *Spending Time: The Most Valuable Resource* (Illustrated edition). Oxford University Press.
- Huggins, C. E., Jong, J., Leung, G. K. W., Page, S., Davis, R., & Bonham, M. P. (2022). Shift workers’ perceptions and experiences of adhering to a nutrition intervention at night whilst working: A qualitative study. *Scientific Reports*, 12(1), Article 1. <https://doi.org/10.1038/s41598-022-19582-x>
- Ironmonger, D. (2008). Time Use. In Palgrave Macmillan (Ed.), *The New Palgrave Dictionary of Economics* (pp. 1–6). Palgrave Macmillan UK. [https://doi.org/10.1057/978-1-349-95121-5\\_2109-1](https://doi.org/10.1057/978-1-349-95121-5_2109-1)
- Kolioulis, A., Siravo, J., Apostolidis, P., Kummer-Buléon, C., Matheou, L., & Campani, C. (2021). *Working Nights municipal strategies for nocturnal workers*. Autonomy. <https://autonomy.work/portfolio/workingnights/>
- Productivity Commission. (2015). *Workplace Relations Framework, Productivity Commission Inquiry Report Volume 1* (76). <https://www.pc.gov.au/inquiries/completed/workplace-relations/report/workplace-relations-volume1.pdf>
- Seijas, A., & Gelders, M. M. (2021). Governing the night-time city: The rise of night mayors as a new form of urban governance after dark. *Urban Studies*, 58(2), 316–334. <https://doi.org/10.1177/0042098019895224>
- Shaw, R. (2018). *The Nocturnal City*. Taylor & Francis Group. <https://www.taylorfrancis.com/https://www.taylorfrancis.com/books/edit/10.4324/9781315560090/nocturnal-city-robert-shaw>
- Shaw, R. (2022). Geographies of night work. *Progress in Human Geography*, 03091325221107638.
- Skinner, N. J., & Pocock, B. (2014). *The persistent challenge: Living, working and caring in Australia in 2014* [PhD Thesis]. Centre for Work and Life, University of South Australia.
- Torquati, L., Mielke, G. I., Brown, W. J., Burton, N. W., & Kolbe-Alexander, T. L. (2019). Shift Work and Poor Mental Health: A Meta-Analysis of Longitudinal Studies. *American Journal of Public Health*, 109(11), e13–e20. <https://doi.org/10.2105/AJPH.2019.305278>