

Just transition out of coal-fired power: Policy lessons from Australia's automotive sector closure

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ABSTRACT

Nearly three-quarters of Australia's electricity generation is coal-dependent with fossil fuel-led electricity contributing to over a third of Australia's CO₂ emissions. Climate change imperatives are calling for permanent shifts to these patterns, leading to early closure announcements of several coal-fired power plants across the country. Although the pace and scale of the energy transition are unprecedented, the closure of large-scale industries is not uncommon. The most recent closure in Australia's industrial past that remains vivid in the nation's collective memory was the end of nearly 70 years of automotive manufacturing.

Drawing on expert consultations, and applying just transitions and transition management thinking, this paper identifies four key insights from the auto sector closure experience. These offer compelling pointers to guide socio-economic transformations in frontline regions that are likely to face challenging, often deeply personal, impacts resulting from the closure of coal-fired power stations over the coming decades.

1. Introduction

The urgency of climate change has firmly established the need to transition out of coal-fired power. In its 2022 update of the Nationally Determined Contributions (NDCs) as part of the Paris Agreement, Australia committed to reducing its carbon emissions to 43 % below 2005 levels by 2030 (Australian Government, 2022). The closure of coal-fired power plants (CFPPs) is indispensable to its domestic strategy to achieve these targets. Numerous definitive closure announcements have been made over the last 24 months by the private sector as well as various state governments across Australia (EnergyAustralia, 2021; Synergy, 2022). Implementing these closures will not be without challenges – both from techno-economic and socio-institutional perspectives (Parliament of Victoria, 2022; Sheldon et al., 2018).

While the pace and scale of the energy transition are unprecedented, the closure of large-scale industry is not unusual (Beer et al., 2023). In Australia, several industries have closed over the decades; the most recent in the nation's collective memory being the car manufacturing sector. Since the 1950s, for nearly seven decades, automotive production was a thriving industry, with manufacturing facilities located across metropolitan Adelaide in South Australia and Geelong and Melbourne in Victoria (Wormald and Rennick, 2019). Over the last few decades, however, the industry experienced a significant decline with the last remaining plant shutting its doors in October 2017 (Dean and Broomhill, 2018; Irving et al., 2022). The industry's closure resulted in significant job losses and localised uncertainties, thus calling for economic diversification (Armstrong et al., 2008; Beer, 2018).

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There is growing acknowledgement – domestically and internationally – that the process and outcomes associated with any large-scale industrial transition must regard complex but necessary matters of equity, justice, and fairness as foundational (Bang et al., 2022; Denton et al., 2022; MacNeil and Beauman, 2022; Mayer, 2018). These elements are the *raison d'être* for Australia's first-ever national Net Zero Authority announced in May 2023 (Prime Minister of Australia, 2023). Yet, there is little practical understanding currently of exactly 'how' to operationalise a transitions approach that is rooted in these foundational aspects of equity and justice. This paper argues that there is value in looking outwards and learning from both successes and failures of past industrial closure experiences, and applying that knowledge in the design and implementation of policies to manage coal-fired power station closures.

The paper is a first-of-its-kind effort to draw lessons from Australia's relatively recent experience of the automotive industry closure to inform policy design for transitions in the domestic power sector. We argue that these two sectors are comparable due to similarities across stakeholder types, operational scale, nature of closures, and social and political milieu that informs these identity-forming industrial sites (see Section 3). Specifically, the paper explores the broader socio-economic and institutional contexts within which the automotive industry closures took place and the role of various state and non-state actors in designing and planning transition pathways for those impacted. In doing so, it furthers empirical understanding of how large-scale industrial transitions are designed and implemented, and with what outcomes. These insights will be significant for national and regional policy makers as they navigate complex shifts in climate and energy systems over the next several decades.

The paper draws on two theoretical frameworks appropriate for unpacking complex techno-economic and socio-institutional systems. The first is the idea of 'just transition' (JT) which appeals for social justice and a people-centric approach to transition planning (Carley and Konisky, 2020). The second is 'transition management' (TM) which offers a critical approach to making sense of the multi-actor policy ecosystems that govern socio-technical transitions across time and scale. It not only advances the emerging literature bridging these theoretical frameworks (Goddard and Farrelly, 2018; Nel et al., 2023; Wang and Lo, 2022) but in doing so, provides empirical guidance for decision-makers to engage deeply and directly with regions and communities where "the social license for climate action is most delicate" (Colvin 2023). Drawing on the collective strengths of these two frameworks, and primary data collected through focus group discussions and interviews with key informants, the paper is able to extrapolate experiences of closures in one industry to bring fresh nuances to our understanding of the social-institutional complexities underlying transitions in the Australian energy sector. The findings will find resonance amongst researchers interested in studying the closure of large-scale industries and regional transformations as well as with policy- and decision makers who seek to advance justice and equity in energy transition processes and outcomes.

The rest of the paper is organised as follows. Section two presents analytical frameworks guiding this paper. Section three provides the context of Australia's industry transitions, including energy transitions and planned CFPP closures, and an account of the automotive sector's demise and specifically, Holden's closure. This discussion is anchored within a detailed review of grey and academic literature covering the two sectors. Section four outlines the paper's methodological approach. This is followed by key insights from the automotive closure experiences, discussed in section five. Section six draws on these findings to inform policy design to pro-actively manage impacts from coal-fired power sector transition. The paper concludes with key recommendations.

2. Just transitions and transition management

Since its first use in the US labour movements of the 1970s, the term 'just transition' has evolved into an aspirational concept that maximises benefits and minimises harm for frontline communities (International Labour Organization, 2015). Its biggest strength, however, lies in its assertion for climate action to align with the principles of social fairness, "equity and justice in the planning, implementation, and assessment of every socio-energy system change that shapes the energy transition" (Carley and Konisky, 2020). It thus seeks to engage stakeholders in a social dialogue that enables policymaking to address systemic inequities across space and time. By asking questions about the past and present distribution and use of power and rights, the idea of just transition cuts across race, class, gender, and economic divides. Yet, in practice, two key concerns have emerged: first, for much of its history, just transition discussion has been framed as an 'end in itself' fostering an agenda dominated by jobs, labour, and economic impacts relating to coal miners. Whilst important, this parochial view can be limiting for a broader societal buy-in for long-term climate action (Abram et al., 2022; Colvin, 2023). Second, its interpretation varies considerably across governments, businesses, civil society organisations, unions, and Indigenous peoples, leading to ambiguity and inconsistency on how to operationalise inclusive participation and fairness in outcomes (Snell, 2018; Stark et al., 2023; Thomas, 2021).

A recent review by Stark et al. (2023) identified a weak understanding of the governance implications of just transitions (in other words, the "how" question). Considering the dynamic nature of the energy transition process, better understanding the governance mechanisms influencing interactions between actor motivations, preferences, and value systems is critical to developing a whole-systems approach to climate action (Abram et al., 2022). To address these observations and gaps, this paper draws theoretical insights from the field of transition studies, in particular transition management.

Over the past decade, 'transition management' has emerged as a useful theoretical basis to unpack the governance of long-term transitions. The framework brings a strong focus on the transition process, drawing on the power of existing and innovative social policy to mobilise a long-term multi-dimensional vision that can inform the scale and pace of transition planning. (Rotmans et al., 2001). Rooted in a participatory ethos, transition management fosters actor accountability and equity in the participation process, and bridges top-down and bottom-up models to create new knowledge through collective learning. It follows a reflexive outlook for long-term social change by "reframing problems" through ongoing learning and experimenting (Loorbach, 2010, p. 168). The ultimate aim is to work "towards a transition that offers collective benefits in an open, exploratory manner" (Rotmans et al., 2001, p. 16). It is in this context that the complementarity between transition management and just transition thinking becomes apparent.

As an analytical tool (Fig. 1), the combined strengths of these two frameworks offer a medium to navigate multi-scalar problems expected in the context of the two industrial sectors considered in this paper – coal-fired power and automotive manufacturing. As comparable sectors, both are confronted by goalposts shifting over time, making the quantification of risks and benefits challenging (Geels, 2004). Both sectors involve *multiple actors*, each with its own rules, capabilities, interests, and beliefs. The underlying transition processes are *multi-scalar*, influencing interdependencies across actors and institutions. While triggers for each transition will likely vary, the *temporal dimensions* are critical as system-wide shifts are *long-term* processes. Transition management framing offers three types of governance activities to facilitate better coordination and legitimisation of public policies. These include: strategic (e.g. future vision, collective goal-setting, long-term governance); tactical (medium-term, inward-focused, sub-sector level); and operational (individual-led, innovations-focused, short-term). Additionally, transitions are *deeply embedded in socio-cultural and political milieu* which influence, and are in turn shaped by, vested interests and contestations (Colvin and Przybyszewski, 2022). Cumulatively, these characteristics explain the complex, dynamic, non-linear, and uncertain nature of sustainability transitions (Rotmans et al., 2001). As discussed further below, these transition characteristics underpinned contending interests, priorities and negotiations that not only shaped the automotive closure experience but continue to influence energy transitions, including the phase-out of coal-fired power (Rosenbloom, 2018).

3. Industry transitions in Australia

Industrial transitions in Australia have been widely studied. For example, researchers have examined the outcomes of Australia's automotive industry closure, outlining short- and long-term impacts across employment, poverty, and physical and mental health (Beer, 2018; Browne-Yung et al., 2020). Research has also focused on the transition process followed during the large-scale automotive manufacturing closures, and highlighted various gaps in policy design and implementation (Armstrong et al., 2008; Beer and Thomas, 2007; Stanford, 2017).

More recently, a growing number of studies are reflecting on potential impacts of energy transitions across Australian regions. While discussion on just transition has typically focused on the decline of fossil fuel use and resulting employment concerns for coal mining communities, much less attention has been paid to other “frontline” sectors. “Often overlooked, for example, are non-extractive communities that rely on coal, such as communities that host coal-fired power plants” (Carley and Konisky, 2020). One study that considered past Australian CFPP closure impacts suggests that regions that hosted these operations have experienced “an increase in their unemployment rates of around 0.7 percentage points on average” (Burke et al., 2019). Considering that CFPPs are the biggest source of employment, economic strength, and social identity for several regional towns across Australia, their expedited closures in coming decades without clear policy support will lead to complex multifarious impacts both temporally and spatially. So far, research has made critical contributions in the CFPP closure space by highlighting the importance of local context (Colvin and Przybyszewski, 2022), generational identities (Della Bosca and Gillespie, 2018), and local autonomy and control over the transition process (MacNeil and Beauman, 2022).

3.1. Australia's energy transitions and the coal-fired power sector

Australia is the world's largest exporter of coal, with coking and thermal coal exports worth more than \$100 billion annually (Minerals Council of Australia, 2022). More than half of Australia's electricity generation is coal-dependent (Fig. 2) with fossil fuel-led electricity generation contributing to over a third of Australia's total CO₂ emissions (CSIRO, 2021; Geoscience Australia, 2020). Cheap and reliable electricity generation has contributed to job creation and regional development. This national socio-economic significance of the coal sector coupled with strong industry-state nexus have furthered Australia's reluctance in formalising a robust climate policy (Warren et al., 2016).

Changes to the federal government in 2022, however, have showed signs of a policy shift. It has led to the introduction – and subsequent passing – of the Climate Change Bill (2022), thereby legislating a national commitment to reduce greenhouse gas emissions by 43 % below 2005 levels by 2030 and achieve net zero by 2050 (Parliament of Australia, 2022). The change of political guard nationally has helped build momentum around the country to seek a renewed climate agenda. State and Territory governments have set interim emissions reduction targets by 2030: 50 % below 2005 levels in New South Wales, South Australia, and Victoria; 30 % in Queensland, 80 % below 2020 levels in Western Australia, and 65–75 % below 1990 levels in the Australian Capital Territory.

In May 2023, Australia established its first-ever Net-Zero Transition Authority with the mandate to “leave no-one behind ... [and] ensure the workers, industries and communities that have powered Australia for generations can seize the opportunities of Australia's net zero transformation.” (Prime Minister of Australia, 2023). At the time of writing, a Chair and ten members had been appointed to the Authority's advisory board, comprising representation from key energy and mining companies, worker unions, academics, investors, and peak bodies. This significant effort from the federal government includes structural support in the form of resource commitments needed to operationalise the Authority's mandate.

The shifts in climate policy and the establishment of a transition authority are indicative of several developments that will influence Australia's electricity landscape moving forward. The biggest among these entails a growing acceptance of the inevitability of the



Fig. 1. Transition characteristics.

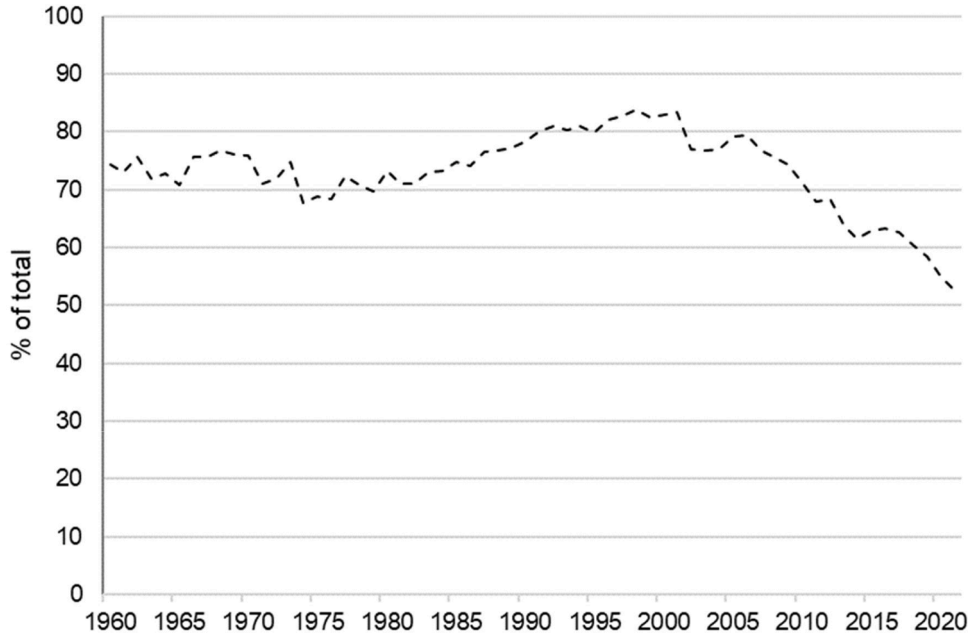


Fig. 2. Coal contribution to Australia's electricity generation, 1960–2021.

Data source: The World Bank (2016) for data before 1990. Department of Climate Change, Energy, the Environment and Water (2022) for data after 1990.

decline of coal-fired power nationally. According to the Integrated System Plan¹ 2022 (Australian Energy Market Operator, 2022a), up to 20 GW of the 23GW currently existing coal-fired electricity generation may be withdrawn by 2030. Indications are that Australia's coal fleet will close three times faster than is currently announced (Hannam, 2021).

As of June 2023, 18 CFPPs consisting of 53 units were operating across Australia, with a combined capacity of over 20 GW (Fig. 3). Annually, these operations are responsible for over 120 million tonnes of CO₂ emissions. Key factors contributing to this significant carbon footprint include a large proportion of units being old and inefficient, and running on sub-critical technologies. In fact, by 2030, nearly half of Australia's coal-fired generators will be over 40 years old (Climate Council, 2014), set to become both economic and environmental liabilities. A mix of climate, environmental, and economic concerns are thus likely to push many of the CFPPs to close over the next decade. Similar reasons led to the closure of the Hazelwood power station in 2017. At the time, Hazelwood was Australia's oldest and largest power station by capacity, with the highest emissions intensity of any coal power station nationally (Sharma et al., 2023).

In February 2022, Origin Energy, one of Australia's largest energy providers, announced the closure of Australia's largest power station in Eraring, New South Wales. The plant is now scheduled to close by 2025, seven years earlier than originally planned, owing to stiff competition from cheaper clean energy. Although economic drivers for the closure decision remain important, the announcement for Eraring's early closure suggests climate imperatives are shaping many of these decisions at the highest level. The case of Eraring is not an isolated development. Similar announcements from other states have since been made. In Victoria, the Yallourn coal-fired power station has had its closure brought forward four years to 2028 (Parliament of Victoria, 2022). The Queensland government

¹ The Integrated System Plan (ISP) is a 'whole of system plan' to ensure an affordable and reliable electricity supply to homes and businesses in Australia's east and southeast. The plan aims to transition the National Electricity Market – that caters to nearly 80% of the country's population – out of fossil fuels and towards renewables, to support national net zero ambitions.

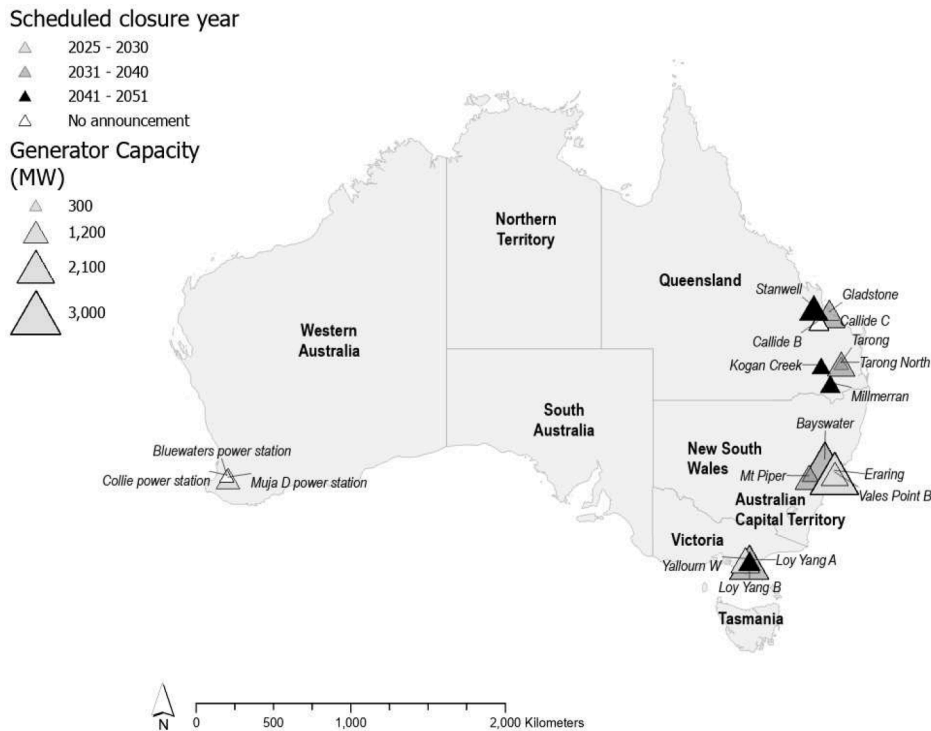


Fig. 3. Operating coal-power plants in Australia’s states and territories. Size shows generator capacity in MW and the colour gradient indicates closure timing. Figure compiled by authors using data from [Australian Energy Market Operator \(2022b\)](#); [Global Energy Monitor \(2023\)](#).

has announced its plans to phase out coal-fired power generation by 2035 – nearly a decade earlier than planned – to meet its 80 per cent renewable energy target by then. If achieved, this would be a significant milestone considering coal currently generates 75 % of Queensland’s power ([Ludlow, 2022](#)). The Western Australian government has also announced that all state-owned coal power stations will retire by 2030 ([Government of Western Australia, 2022](#)). This includes the two power stations of Collie and Muja, set to close by 2027 and 2029 respectively.

The widespread scale and permanent nature of CFPP closures are driving discussions both nationally and in states on the future of regional towns that currently host these operations. The establishment of the Net-Zero Transition Authority offers a credible first step in supporting communities undergoing change. Although early days, it would be important for the Authority to draw lessons from the 2017–18 experience of the Hazelwood plant closure which has been described as a ‘mixed bag’ of support and interventions from the state and federal governments ([Sharma et al., 2023](#); [Wiseman et al., 2020](#)). Other studies examining the Latrobe Valley experiences have also pointed out inefficiencies in state policy design whereby resource mis-allocations and networks of power relations created further imbalances and diverted attention and funds away from places in need ([Weller, 2017](#)). In addition to these internal reflections from within Australia’s recent energy sector transitions, perhaps, there is benefit in looking outwards; there are other significant industries that have undergone multiple large-scale closures in Australia’s recent past with similar challenges as the CFPP sector. The next section outlines the experience of one such industry – focusing on the impacts and outcomes of South Australia’s automotive industry closure.

3.2. The automotive sector closure in Australia

The Australian car manufacturing industry emerged in the early 20th century. Over the next several decades, General Motors, Ford, Chrysler, Toyota, and Mitsubishi established their production units in Victoria and South Australia, laying the foundations for manufacturing-based regional and national development. However, by the turn of this century, the restructuring of the global economy and changes across the international automotive sector led to a steady decline in the local auto industry’s production and profitability ([Conley, 2022](#)).

By the early 2000s, the closure of the car manufacturing industry was imminent. Announcements soon followed with Mitsubishi deciding to close its Lonsdale and Tonsley plants – both in Adelaide – in 2004 and 2008 respectively. Following the election of a conservative government in the 2013 federal elections, the industry protection policy was withdrawn. Several other factors worked in tandem to lead to a full-scale closure of the industry in Australia: historically small production numbers, unfavourable exchange rates, removal of tariff barriers, actively organised labour force, and stiff price competition from cars made overseas ([Beer, 2018](#); [Clibborn et al., 2016](#); [Stanford, 2017](#); [Wormald and Rennick, 2019](#)).

What followed was a “profound event in Australia’s history ... in fewer than 12 months, all remaining OEMs [Original Equipment Manufacturers] in Australia had signalled their intention to exit domestic automotive production” (Irving et al., 2022, p. 8). General Motors Holden and Toyota Australia both announced all vehicle production to end by 2017 (Conley, 2022). This coincided with Ford deciding to end automotive production at its Geelong and Broadmeadows plants, located in Victoria, in 2016. In October 2017, after 70 years of shaping regional and national pride, the Holden plant closed its doors permanently, ending the era of car manufacturing in the country. With this final closure, Australia became the first economy in the OECD (Irving et al., 2022) to shut down its “hallmark industry that had long been held up as a symbol of national industrial strength” (Beer et al., 2023, p. 34).

Initial estimates suggested approximately 40,000–50,000 job losses within three years of Holden’s closure (Beer, 2018), with ripple effects likely to be experienced throughout the supply chain. In some cases, differences have been reported between direct labour market impacts experienced over a bigger geographic scale compared to the second-order, more localised impacts (Beer et al., 2023). In regions at the frontline of deindustrialisation, impacts included economic downturn, rising unemployment and employment insecurity, population decline, impacts on community, place and social cohesion, and heightened social and health inequities (Browne–Yung et al., 2022). By the end of 2018, the impact on employment was less than anticipated: 14,000 jobs were reported lost, with 85 % of former workers still in the labour market. The account of impacts monitored over time, however, remains far less reassuring. Conservative estimates suggest that over 14 % of workers active in the labour market, remained unemployed three years post-closure, with the rate of unemployment much higher than the national target (Irving et al., 2022). Research by Tierney et al., (2023) demonstrates similar employment concerns in other Australian regions (e.g. Geelong in Victoria) where despite overall growth in employment, auto sector closure impacts disproportionately affected those living in already disadvantaged parts of the city.

To assist with closures, the federal and state governments implemented a range of structural adjustment interventions, including programs to make displaced workers more competitive, limit impacts on the supply chain, and create diverse jobs in affected regions (Beer et al., 2021; Dean and Broomhill, 2018; Irving et al., 2022). These included the Federal Industry Growth Fund (2013), the Skills and Training Initiative (2017–2018), the Automotive Diversification Programme (ADP) (2015–2016), Automotive Industry Structural Adjustment Programme (AISAP) (2014–2018), the Automotive Transformation Scheme (ATS), and infrastructure spending in affected regions (Fig. 4). South Australia’s Our Jobs Plan (2014–2018) provided a roadmap for re-skilling and job diversification, and the Northern Economic Plan (2016–2017) facilitated collaboration between state and affected local governments.

At an operational level, Holden led the establishment of a ‘Transition Centre’ that became a critical source of strength across the region. Established in 2014, the Centre was staffed by a team of experts, including career advisors, training specialists, and financial counsellors. This initiative proved to be effective in serving as a one-stop-shop for support and assistance to its workforce and families

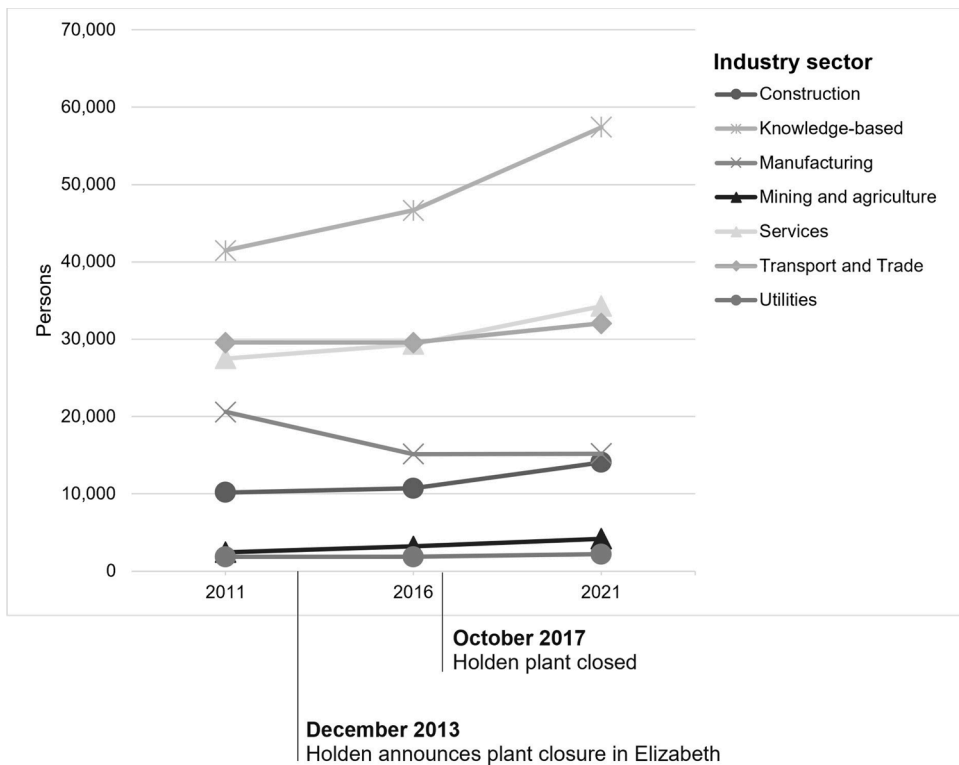


Fig. 4. Holden closure and employment (persons) by industry sector in selected South Australian Local Government Areas (cumulative data for Playford, Port Adelaide Enfield, and Salisbury) between 2011 and 2021. Data source: Australian Bureau of Statistics (2021).

but subsequently extending to its suppliers and other business partners (Browne-Yung et al., 2020). The Transition Centre hosted industry leaders to meet with prospective employees and organised information sessions with state and federal service providers to inform at-risk members of the communities of the full range of assistance and services available. Its location in Elizabeth, close to the Holden plant, worked to its advantage, making it a thriving hub of activity for a significant period leading up to and after the closure.

In addition to the Transition Centre, unions and community organisations such as Northern Futures advocated for the rights and interests of the workers and their families (Clibborn et al., 2016). The northern Adelaide region where Holden was located had historically been an area of immigrant settlements, with low-socio-economic profile, and high disadvantage (Beer et al., 2023). A ‘Northern Connections’ office was already present in the region to provide community services in the areas of health, education, and early childhood development. Despite vulnerability to hardship, the region was proud of its multi-generational families, and the strong social capital that had been fostered as a result of deep community ties. This was recognised as a key strength and efforts were made by local governments and the Transition Centre to preserve the social fabric through initiatives focused on youth empowerment, family resilience, and children’s wellbeing.

At the same time, streamlined support that focused on identifying and assessing long-term social and health impacts was lacking (Browne-Yung et al., 2020). There was also little explicit recognition of the ‘personal’ loss experienced by the closure of the Holden plant. Family breakdowns, negativity in the community, disillusionment, and the experience by many of an ‘existential crisis’ led the closure event to cause “potentially traumatic change” across the region (Beer et al., 2023., p.48).

3.3. Comparing transition characteristics between the two sectors

The context presented above highlights several characteristics unique to both industries: for example, CFPPs are often located in regional areas away from metropolitan cities, whereas the automotive manufacturing industry in Australia was largely located within greater metropolitan regions of capital cities (in South Australia and Victoria). There are other notable differences in terms of ownership and governance structures: while state governments co-own several of the operating CFPPs, the automotive industry in Australia existed in subsidiary arrangements with large multinationals with head offices in foreign locations. Yet, the broader operating contexts within which the automotive and the coal-fired power sectors exist are clearly comparable (Table 1). Both industries have significant socio-cultural and economic ties to local, immediate areas of operations. At the same time, closure impacts have a wider spatial footprint due to their supply chains, policy and stakeholder influences extending across regional, national, and international scales.

4. Approach

The paper draws on a qualitative research design, informed by complementary methods to collect and analyse data – review of academic and media articles, focus group discussions (FGDs), and qualitative expert interviews. The research design (see Fig. 5) followed The University of Queensland Human Research Ethics Guidelines.

The desktop review included targeted peer-reviewed literature; grey literature, including government, industry, and civil society reports; and media articles. We undertook advanced searches of Scopus, the Web of Science, Google Scholar, the University library, and

Table 1
Key transition characteristics as applied to the two sectors.

Transition characteristic	Automotive sector	Coal-fired power sector
<i>Actors</i>	OEMs: General Motors Holden, Toyota, Mitsubishi, for example. Workers and families Supply chain firms Federal, State and Local Governments Unions	State-owned energy companies Private energy companies Coal mines Workers and families Supply chain firms Federal, State and Local Governments Unions
<i>Scale and timing</i>	Most closures took place between 2000 and 2017. Differentiated lead times across various closures. Concentrated in the outer parts of Melbourne, the regional city of Geelong, and the outer suburbs of Adelaide (Tonsley, Playford, Salisbury). In terms of job losses: from an anticipated 40–50,000 job losses, government records suggested 14,000 jobs were lost. Supply chain companies were able to cope better with a low rate of job losses as they were able to diversify by investing in R&D (Department of Employment Skills Small and Family Business, 2019).	Nearly all CFPPs are set to close between now and 2051. Closures are set to occur across four states where some of Australia’s largest CFPPs are located: Queensland, New South Wales, Victoria and Western Australia. Approximately 10,000 people are employed across the operating CFPPs and the mines that feed these plants (Australian Energy Council, 2022). Additionally, there are several local business owners and service providers who indirectly depend on these power stations.
<i>Socio-cultural and political milieu</i>	Blue collar, low socio-economic demographics, low levels of formal education and skills training. A strong identity and a multigenerational sense of attachment to the auto industry.	A mix of blue-collar and semi-skilled jobs. ‘Better-paid jobs’ A strong identity and multigenerational attachment to the power industry in regional areas.

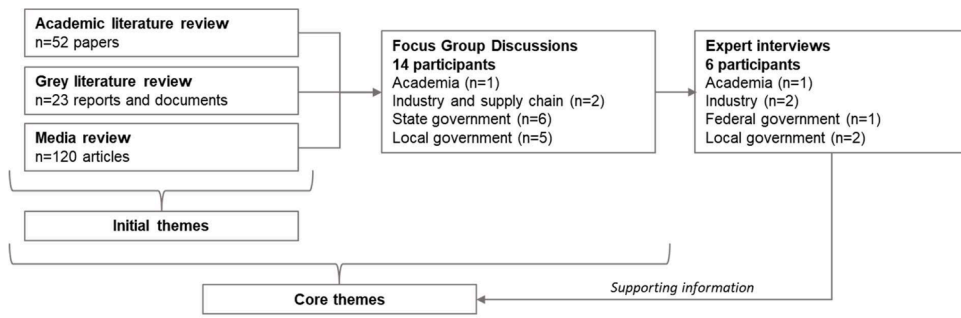


Fig. 5. Paper’s methodological approach.

the Dow Jones’s Factiva global news databases, using keywords (“car manufacturing” OR “automotive” or “automobile”) AND “Australia” AND (“closure” OR “transition” OR “restructuring”). The search included a 13-year period from 2010 to 2023 to align with Holden’s plant closure timelines. The search yielded 195 documents. To analyse these sources, a two-step process was followed. Initial screening involved reading document titles and abstracts (where available) to identify those relevant to the study’s aims and purpose. This was followed by an in-depth review to identify initial themes using the analytical software NVivo.

To complement the desktop review, primary data was collected using focus group discussions (FGDs) and expert interviews. Two FGDs were organised in person in Adelaide (one in the northern part of the city, and another in southern Adelaide) in October 2022. The main goal of these FGDs was to bring together key members from various stakeholder groups who had played a critical role in directly planning for and managing the local automotive sector’s closure process. FGDs were chosen for their ability to allow collective reflections on a topic of shared interest and experience (Gailing and Naumann, 2018; Nyumba et al., 2018). 14 participants attended two FGDs that discussed key learnings from the local auto industry’s closure process, reflections on immediate and long-term outcomes, and potential lessons that may inform the planning of coal-fired power station closures in Australia. Discussions lasted for two hours each, were audio-recorded, transcribed, and subsequently used to review initial themes identified through the desktop review process to draw core themes.

The desktop review and FGDs identified several important insights, as well as knowledge gaps. Targeted semi-structured expert interviews were then undertaken to crosscheck this information, and supplement data collected thus far. Six experts were identified based on recommendations made during the FGDs. These experts had direct experience of the automotive sector closure and represented local and federal governments, the industry, impacted employees and researchers. Interviews lasted between 45 and 60 minutes each, were audio recorded and transcribed for further analysis.

5. Learning from the automotive closure experience: key themes

5.1. Time-sensitivity around closures

The automotive sector closure is a case in point demonstrating the time-sensitive nature of a transition. As mentioned earlier, ‘the writing had been on the wall’ for Australia’s auto industry for a long time. The closure was, therefore, a gradual process that unfolded over several years. As explained during the FGDs, this extended timeline allowed workers, families, and businesses to be prepared – as well as they could – for imminent re-structuring. Businesses in the supply chain were able to plan to diversify and seek new clients for their goods and services. The workers were able to cross over to other OEMs that were still operating, and in several cases, could upskill and identify ways to (re)develop their profiles and skills for jobs in existing and emerging industries. The time afforded to plan for these activities proved particularly critical for workers who had, in most cases, been out of the job market for decades, and had rarely therefore needed to update their resume, appear for interviews, or deal with employment-related ‘anxiety’.

However, not all businesses and workers were able to sensitise themselves to the impending pressure of closure. Several cases were highlighted in the discussions where “the ones who got on to it early had better success because they were willing to listen”. In most cases, delayed action was not always due to a lack of intent, but a lack of time-sensitive support from the government. The quote below from an industry representative directly involved in Holden’s transition planning aptly captures the dependence on external support:

“I think there were moments when we relied too much on our government friends. In the early stages, we were trying hard to get funding support. And to be honest, we waited [unnecessarily]. We were never going to get what we needed ... In the government... the speed is different. The approval process is different. And it was just difficult. If we had to wait for any support from the government, we would have waited another 12 months, and we still would have got nothing.”

Drawing on OEM closure experiences from the early 2000s, several industry and local government actors involved with Holden’s closure who participated in the FGDs recognised that the short-term decision-making horizons were counter-productive to the long-term challenge of sustainable social and industrial transformation. Short-term, often stopgap arrangements not only constrained the opportunity for meaningful engagement on community aspirations and capabilities but also downplayed the complex legacy challenge of post-closure asset and land management. This led Holden to plan a staged release of workers over three years. It fostered a shift

amongst local and state agencies to coordinate resources and collaborate with companies across the auto sector's supply chain. A gradual wind-down of the industry provided an important additional advantage for workers and families who were now able to plan in their own time, without experiencing immediate pressure on their social and economic wellbeing.

Importantly, as highlighted by an interviewee formerly associated with Holden, timing the closure in a staged manner allowed building a monitoring component to review the process and subsequent outcomes for impacted workers and the broader community. Monitoring enabled the process to remain iterative; by learning from the experiences of those recently retrenched, the company was able to improvise its process of engagement with workers and their families and work with agencies to identify new and additional forms of service support, where possible.

5.2. Leadership and organisational catalysts

Leadership has long been considered a critical aspect of successful transition management (Beer et al., 2023). In a complex multi-actor socio-technical system such as the automotive sector of South Australia, forces both internal and external to the sector often played out in a disjointed manner. The FGDs pointed to the importance of an internal leader within the industry – a catalyst, who challenged conventional thinking amongst Holden's senior leaders to foster the creativity needed to manage transition challenges across the full suite of stakeholder groups. As one interviewee closely involved with the Transition Centre observed:

“Holden's leadership wasn't one to believe in people or culture back in 2012, but we began a shift within the organisation ... a sort of gradual cultural change journey ... without this work upfront, we wouldn't have had the success we had with the closure ... Although Holden's leadership wanted to make a difference, it wasn't easy to convince the company to fund the Centre. There was no other way... Government funds were not arriving soon enough and were going to be accessible only to certain employees for certain purposes. At the government's request, the Centre opened its doors to the whole supply chain eventually ... This was a big deal in managing second-order people-focused impacts.”

The importance of leadership came through in the discussions too, “Leadership is also required from the business to put their heads out and show a willingness to be part of the transition ... being pro-active.” An earlier OEM closure in South Australia was highlighted as a case in point where poor leadership resulted in a lack of intent to support workers believing that “[the workers] are big boys. They can work it out. They don't need any assistance”. Focus group discussions highlighted how the local Holden team had to navigate initial challenges to seek internal support to establish the Transition Centre at a time when the company was seeking a swift cessation of its business operations. Profits remained low and financial support for the Centre was understandably limited. However, as interviewees explained, several factors triggered a strong business case for setting up an onsite Centre. These included, among others, Holden's association with the General Motors Group and the responsibility to uphold the parent group's international reputation; local ties of then-members of Holden's Senior Leadership Team to the Elizabeth-Playford region, who recognised the cultural significance of the plant, and potential impacts of the closure on a proud region, and finally, lessons from South Australia's past automotive transition experiences, many of which had caused unpleasant experiences for affected workers, families and local regions.

For Holden, the presence of an internal champion catalysed change in two important ways: first, it triggered positive shifts in the organisational culture from within. Second, it allowed the company to be a conscientious citizen by acknowledging the full scale of its closure impact across different stakeholder groups – frontline communities, unions, local and state government agencies, support workers from the civil society, and other businesses, big and small, along the supply chain.

5.3. People at the core of the closure process

Those managing Holden's closure were able to keep affected groups and communities at the heart of the transition planning process by learning from the experiences of other global regions. Holden's closure strategy entailed a clear, dedicated focus on its people. This meant that workers and their families had access to resources that extended beyond simply job-seeking. According to a participant working with one of the local governments in the impacted region at the time,

“I can't fault the way in which Holden worked with us [the council] and with the community ... the transition centre wasn't just a place where they [employees] got a little bit of help. It took care of every aspect of their life... their social, their health and well-being, their finances. The centre was designed specifically to think about every aspect of the person.”

By focusing on people, the transition process was able to prepare families to acknowledge and adapt to potential shifts in family-level power dynamics (for example, arising from men staying home while their partners sought suitable jobs) and consequent impacts on mental health for the whole family unit. With the mental health of the workers and their families in mind, Holden's Transition Centre invested in providing information about healthy eating and exercising as well as resources on how and where to seek help when needed. Morning and afternoon tea sessions were organised specifically for workers' partners, highlighting the impacts of the transition on the family, beyond the worker. Financial literacy programs were introduced to equip the workers and their families with the knowledge and capacity to manage large company payouts. This was highlighted as one of the key areas of failure where many employees made weak investment choices (buying a boat, travelling to “clear their heads” but in the process, dismantling future financial security). In several cases, poor financial decision-making subsequently led to family breakdowns, bankruptcy, and other unpleasant personal circumstances.

These observations do not dismiss the many negative outcomes experienced locally. The most significant, but frequently overlooked, was the threat of destabilising the broader community through impact on social capital. With Holden's long presence in the

community and a strong tradition of supporting generations of social events (through sporting clubs and local festivals), specific demographics were suspected to be particularly vulnerable. For close-knit communities of northern Adelaide, friendships and social networks existed due to the common ‘Holden’ factor. The breakdown of these social relationships brought about changes to people’s daily lives that hit them the hardest. However, the region was largely able to bear these impacts due to “its characteristically high levels of resilience, and support systems built through generations of hardship”.

According to the study’s participants, this sense of pride in the community and its efforts to preserve and safeguard its social capital was in sharp contrast to the narrative highlighted in the media at the time. Media’s coverage of the closure process was inappropriately negative as it focused on the anticipated economic decline in the region, and highlighted the low-skilled nature of the local labour pool. This created an unconstructive view of the region for the local youth, promoting a counterproductive view that stoked an anti-establishment sentiment and further fuelled many workers’ denial of Holden’s imminent closure.

5.4. Coordination for meaningful stakeholder engagement

The Holden experience highlights the institutional complexity of multiple actors navigating the diversity of impacts and divergent future priorities emerging from a shared past. Over time, key stakeholders within the industry, and state and local governments recognised this as messy and challenging and thus called for a more coordinated approach to engagement and impact management. Coordination entailed a reflective process of learning from past auto sector experiences in the state, to build on the strong people-centred focus of the present transition ambition and design. The ultimate objective was to explore coordination efforts that would enable a smoother transition experience for workers and their families recognising that vulnerabilities varied, and therefore, some within the community would be at a greater risk of further marginalisation. Whilst agencies recognised the need for early consultations and coordination, gaps remained in terms of progress on the ground. As a state government expert closely involved with the transition process suggested,

“there was no shortage of mechanisms of consultation, but the translation of the messages into something that was appropriate for the scale of the transition and that responded to the specific needs and aspirations of the community was significantly lacking”.

It has been argued that at a basic level, leadership from the government was lacking (Beer et al., 2023). Efforts were piecemeal during the time immediately following the closure announcement. Gradually, state government initiatives were put in place through the Northern Futures Strategic Plan (2014–16) to provide information, service, and support to enhance local workforce and employment opportunities. The Northern Connections Office too, although understaffed, allowed focus on family well-being, and community support. To the region’s benefit, despite haphazard support from the government, closure did not lead to a long-term socio-economic decline as seen in other contexts due to its fortuitous timing. Holden’s closure impacts were significantly offset by a healthy state and national economy at the time. South Australia’s place on the national map as a key defence, horticultural and food processing hub was taking off just as the automotive sector was moving towards permanent closure. This sentiment was shared by several experts in the field who believed that the northern Adelaide auto sector closure got “lucky with [regard to its] timing”.

6. Discussion: what does it mean for the CFPP sector?

[when large industries close], what happens to working people and their communities is seen through the prism of managing negative publicity ... What we don’t see is a long-term, comprehensive and integrated program that puts the interests of those that are going to be hurt alongside and with equal priority to managing the central policy issue ... Germany has done a lot of restructuring of its power industry and heavy industry over recent decades. But guess what? They have always prioritised social impacts. They have something called social dialogue over there – joint work between government and other major stakeholders – that doesn’t seem to make it into the lexicon here [in Australia].

*Tony Maher, at the Australian Council of Trade Unions Just Transition Conference (Mining and Energy Union, 2016)*²

The South Australian automotive sector’s transition experience highlights the complexities that arise when an industry with long, local historic ties closes. For communities in the region, these ties are not only economic but hold strong social and cultural significance, exposing vulnerabilities, and making the process acutely personal for those impacted (Beer et al., 2023). Insights presented above point to the challenges in determining the nature and type of support necessary for workers and their families, systematising engagement modalities amongst stakeholder groups, and governing the transition process.

Australia’s coal-fired power sector closure that is both temporally imminent and socio-spatially formidable necessitates a similar, but more tailored and systematic process-driven approach. This is because, unlike the one-company, (mostly) one-region paradigm in the automotive sector, the closure of CFPPs is shaped by diverse spatial and temporal characteristics. Whilst at a strategic level, the gamut of challenges its stakeholders are likely to face – industry, governments across all tiers, communities, and supply chains – are not entirely dissimilar to the South Australian experience, the operational challenges will vary due to the diversity of multi-actor dependencies spread across Australia’s rural/regional communities. These operational challenges are situated within localised boundary conditions shaped by power dynamics and the broader socio-economic ecosystem characteristically unique to each CFPP (Colvin and

² Tony Maher has been the General President of Australia’s Mining and Energy Union since 1998.

Table 2

Policy considerations for CFPP closures building on just transition management characteristics.

Transition characteristic	Policy considerations
<i>Multiple actor coordination and meaningful stakeholder engagement</i>	<p>Multi-actor coordination entails a reflective process of meaningful engagement that builds on a strong people-centred ethos. Such engagement acknowledges differentiated vulnerabilities, thereby fostering sensitivity from service providers in how they design early consultation and coordination protocols across agencies and stakeholder groups.</p> <p>Both interviews and focus group discussions highlighted the value of actively engaging with diverse stakeholder groups by acknowledging multiple actors, including their needs and aspirations. Sources reaffirmed the significance of identifying and managing impacts across scale and time (in a way that extends beyond first-order impacts within the immediate asset and consider vulnerabilities across the full supply chain).</p> <p>Although still early days, the diversity in stakeholder impacts is an important consideration that will shape the processes driving Australia's Net-Zero Transition Authority (Colvin, 2023; Weller, 2017). It is expected to offer a constructive platform for early dialogue and ongoing meaningful consultations to identify potential mismatches arising, for example, due to "the complex interaction of state and federal policies where, for example, the effects of high unemployment are felt locally while income support payments that fail to meet basic standard of living costs are regulated federally" (Browne-Yung et al., 2020).</p>
<i>Leadership and innovation across space and time to exert pressure on the regime</i>	<p>Coordination allows recognising interdependencies which, in turn, influence the diversity of mechanisms needed for tactical and operational governance to manage impacts across space and time. Innovation in governance can create "positive tipping points" which can help improve the resilience of vulnerable and complex energy systems (Sharpe and Lenton, 2021).</p> <p>Organisational cultures need to re-imagine industry norms and catalyse creative leadership to shape positive outcomes from large-scale industry transitions (Derkach et al., 2023). The case of Holden's transition centre demonstrates the effect private sector efforts guided by trust and open communication with stakeholders – both internally and externally – can have on countering destabilising forces. A policy that enables decisive leadership and organisational innovation can help recalibrate power dynamics to positively influence alignment between niche and landscape characteristics. Over time, this may disrupt the regime, and help identify an equilibrium between the "past and the future in a way that is coherent and inspiring" (Derkach et al., 2023).</p> <p>For the CFPP sector, innovation in policy design is critical to enable regions to explore and develop new and sustainable economic linkages. Compared to the automotive sector discussed here which was proximate to a capital city, Australia's coal-fired power stations are often located in regions that are mono-industry reliant. According to multiple FGD participants, this adds a new, more complex layer of disruption, that will require novel shifts in leadership governance to help with regional-level socio-economic re-designing and restructuring. The Holden transition experience points to the strengths derived from collaboration and innovation in managing long-term impacts.</p>
<i>Recognise and build on the embeddedness in the socio-cultural and political milieu</i>	<p>As the CFPP sector maps its closure pathway, one of the most critical considerations is its sensitivity to the local context (Colvin and Przybyszewski, 2022). Divergence in aspirations, expectations, and outcomes across stakeholders is indicative of the complexity and challenge of maintaining the transition process to remain people-centric. Recognising the local socio-cultural and political contexts that condition stakeholders is an important tactical consideration. This requires, for example, policy support to identify social groups likely to be most at-risk early and develop timely interventions to reduce or appropriately manage vulnerabilities to allow communities to generate optimism from within.</p> <p>Interviews with stakeholders involved with the auto sector's closure in South Australia also attest to the importance of approaching transitions from a systems perspective. Despite poor outcomes from past automotive closures in the state, Holden's transition process entailed experimenting and iterative learning that provided a systems view of first-, second-, and even third-order linkages with local communities, supply chain stakeholders, and other public and private service providers across the broader metropolitan region. By doing so, Holden was able to situate its closure within the local and regional socio-institutional structures, and maintain greater agility in its impact assessment and management processes.</p> <p>To manage impacts from Australia's CFPP sector closures, there is scope to draw on these experiences and build further capability. The Latrobe Valley Authority in Victoria, for example, highlights the importance of long-term support that extends beyond creating jobs and economic enterprise. From its initial mandate of helping workers find jobs, over time, it has metamorphosed into building social resilience, trust, and awareness, thereby supporting communities "to move from describing the problems and losses of the past, into opportunities that can ... be identified and deployed to maximum effect" (Parliament of Victoria, 2022, p. 12).</p>

Przybyszewski, 2022). Unpacking these conditions will require "forward-looking analysis ... where the politics underlying decision processes have a significant influence on whether new policy designs, supporting transitions better, are successfully adopted and implemented." (Köhler et al., 2019).

The just transition aspiration provides a vital anchor to test the alignment between policy imperatives and local aspirations and realities. By focusing on the people, and embedding principles of social justice, fairness and equity, it fosters active thinking on the transition's 'how' question and guides policy and decision-makers to support progressively creative closure outcomes (MacNeil and Beauman, 2022). Holden's Transition Centre offered one such experience that sensitively treated class- and gender-based dynamics amongst impacted workers and communities and safeguarded them from permanent socio-economic decline. By working with multiple actors, the platform identified capability gaps and undertook initiatives to match stakeholder expectations with tactical institutional and structural support.

The auto sector's closure process acknowledged multi-actor dependencies and consequentially, the uncertain nature of the challenge. Additionally, it drew on the deeply embedded socio-institutional conditions of the region within which closure was to take place to navigate the influence of industry leadership, state and federal political differences, and citizenship engagement. As Table 2 summarises below, Australia's coal-fired power sector closure process can learn from these experiences by fostering a just transition-informed approach. This will ensure that considerations for equity and justice are at the centre of innovative and forward-thinking policy design. It can help frame social innovation in ways that constructively disrupt incumbent regimes by "placing local communities in the driver's seat, and building an inclusive process that places a premium on developing trust between the community and process convenors, ensuring relevant stakeholders have an equal ability to participate, and providing space for dissenting views and voices across the community." (MacNeil and Beauman, 2022, p. 124).

7. Conclusion

The climate imperative demands an urgent shift away from coal-fired power generation. However, closing down CFPPs is much more than a techno-economic challenge. It necessitates consideration of complex social, cultural, and institutional contexts within which these large operations are situated. Learning from other industries that have undergone permanent closures in recent years is both strategically and operationally pertinent. This paper is an attempt in that direction. Energy transition planners and policymakers have looked towards international coal transition experiences, with studies documenting transition pathways adopted in Germany, Poland, the UK and the US among others (Campbell and Coenen, 2017; Jermain et al., 2022; Sharma et al., 2023; Sheldon et al., 2018). This paper has argued that domestic experiences of closures in another comparable industry, such as the automotive sector, offer important insights into what worked, what didn't, and how large-scale transitions may be operationalised whilst minimising disruption to the social and economic stability of frontline regions and communities.

The paper highlights four key observations from the closure management process of South Australia's longstanding Holden operations that have relevance for policy design to manage the closure of CFPPs over the coming decades. The first involves recognising the time-sensitive nature of the transition and the importance of extended timelines to better prepare workers and communities. The second relates to the indispensable role of local champions within organisations to catalyse creativity in how potential impacts are identified, managed and addressed over time. The third argues for a people-centric focus within the closure process as it allows safeguarding social capital whilst recognising that attention to loss of jobs and/or economic uncertainty is necessary but insufficient for long-term societal well-being. Finally, it highlights the importance of meaningful engagement and coordination across various levels of government to enable a streamlined approach to support and assistance in mapping, managing and monitoring potential impacts over time.

Although critical for public and private actors responsible for planning and managing the impacts of CFPP closures, these insights are constrained by at least two factors. First, the geographical focus of the industry and the specific case of Holden studied here is drawn from one specific region located within a metropolitan capital city in Australia. Second, the automotive industry, although comparable to the thermal power generation sector in many ways, entailed sector-specific multinational institutional structures that influenced the industry's reputation, supply chains and business linkages. In contrast, Australia's domestic coal-fired sector is more autonomous and as such, drawing on these lessons from the auto industry will require appropriate recalibration.

Having said this, we appeal to those advising Australia's recently announced Transition Authority to consider these insights as entry points to engage locally, collaborate widely and build lasting knowledge bases to prevent shocks and vulnerabilities across frontline regions. Australia's transition away from coal use for power generation is going to be neither easy nor cheap. But stakes remain high for workers, families, communities, and regions at the forefront of these closures.

CRedit authorship contribution statement

Vigya Sharma: Conceptualization, Formal analysis, Funding acquisition, Supervision, Writing – original draft, Writing – review & editing, Methodology, Project administration. **Julia Loginova:** Conceptualization, Methodology, Visualization, Writing – original draft, Writing – review & editing, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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References

- Abram, S., Atkins, E., Dietzel, A., Jenkins, K., Kiamba, L., Kirshner, J., Kreienkamp, J., Parkhill, K., Pegram, T., Santos Ayllón, L.M., 2022. Just transition: a whole-systems approach to decarbonisation. *Clim. Policy*. 22 (8), 1033–1049.
- Armstrong, K., Bailey, D., de Ruyter, A., Mahdon, M., Thomas, H., 2008. Auto plant closures, policy responses and labour market outcomes: a comparison of MG Rover in the UK and Mitsubishi in Australia. *Policy Studies* 29 (3), 343–355. <https://doi.org/10.1080/01442870802160051>.
- Australian Energy Council. (2022). *Australia's Energy Future: 55 by 35*. <https://www.energycouncil.com.au/media/5f4m2xvh/aec045-regional-transitions.pdf>.
- Australian Energy Market Operator. (2022a). *2022 integrated system plan for the national electricity market*. <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp>.
- Australian Energy Market Operator. (2022b). Available at: <https://aemo.com.au/en> (Accessed 30 June 2023).
- Australian Government. (2022). *Australia submits new emissions target to UNFCCC*. <https://www.dceew.gov.au/about/news/australia-submits-new-emissions-target-to-unfccc>.
- Bang, G., Rosendahl, K.E., Böhringer, C., 2022. Balancing cost and justice concerns in the energy transition: comparing coal phase-out policies in Germany and the UK. *Clim. Policy*. 22 (8), 1000–1015.
- Beer, A., 2018. The closure of the Australian car manufacturing industry: redundancy, policy and community impacts. *Austr. Geographer* 49 (3), 419–438. <https://doi.org/10.1080/00049182.2017.1402452>.
- Beer, A., Barnes, T., Horne, S., 2021. Place-based industrial strategy and economic trajectory: advancing agency-based approaches. *Reg. Stud.* 1–14.
- Beer, A., Sotarauta, M., Bailey, D., 2023. Leading change in communities experiencing economic transition: place leadership, expectations, and industry closure. *J. Change Manag.* 23 (1), 32–52.
- Beer, A., Thomas, H., 2007. The politics and policy of economic restructuring in Australia: understanding government responses to the closure of an automotive plant. *Space Polity* 11 (3), 243–261.
- Browne-Yung, K., Ziersch, A., Baum, F., Friel, S., Spoehr, J., 2020. General Motor Holden's closure in Playford, South Australia: analysis of the policy response and its implications for health. *Austr. J. Public Administr.* 79 (1), 76–92.
- Browne-Yung, K., Ziersch, A., Friel, S., Freeman, T., Baum, F., 2022. Deindustrialising economies, plant closures and affected communities: identifying potential pathways to health inequities. *Health Promotion J. Australia* 33 (3), 904–908.
- Burke, P.J., Best, R., Jotzo, F., 2019. Closures of coal-fired power stations in Australia: local unemployment effects. *Austr. J. Agric. Resource Econ.* 63 (1), 142–165.
- Campbell, S., & Coenen, L. (2017). *Transitioning beyond coal: lessons from the structural renewal of Europe's old industrial regions* (CCEP Working Paper 1709, Issue. Crawford School of Public Policy. <https://coaltransitions.org/publications/transitioning-beyond-coal-lessons-from-the-structural-renewal-of-europes-old-industrial-regions/>.
- Carley, S., Konisky, D.M., 2020. The justice and equity implications of the clean energy transition. *Nat. Energy* 5 (8), 569–577.
- Clibborn, S., Lansbury, R.D., Wright, C.F., 2016. Who killed the Australian automotive industry: the employers, government or trade unions? *Economic Papers* 35 (1), 2–15. <https://doi.org/10.1080/000371635600002>.
- Climate Council. (2014). *Australia's electricity sector: aging, inefficient and unprepared*. <http://www.climatecouncil.org.au/uploads/f9ba30356f697f238d0ae54e913b3faf.pdf>.
- Colvin, R., Przybyszewski, E., 2022. Local residents' policy preferences in an energy contested region—The Upper Hunter, Australia. *Energy Policy* 162, 112776.
- Colvin, R.M., 2023. Contextualizing coal communities for Australia's new Net Zero Authority. *Nat. Energy* 1–3.
- Conley, T., 2022. The decline and fall of the Australian automotive industry. *Econ. Labour Relat. Rev.* 33 (2), 415–433.
- CSIRO. (2021). *What are the sources of Australia's greenhouse gases?* <https://www.csiro.au/en/research/environmental-impacts/climate-change/climate-change-qa/sources-of-ghg-gases>.
- Dean, M., Broomhill, R., 2018. From post-fordism to 'post-holdenism': responses to deindustrialisation in playford, South Australia. *J. Austr. Pol. Econ.* (81), 166–192.
- Della Bosca, H., Gillespie, J., 2018. The coal story: generational coal mining communities and strategies of energy transition in Australia. *Energy Policy* 120, 734–740.
- Denton, F., Halsnes, K., Akimoto, K., Burch, S., Diaz Morejon, C., Farias, F., Jupesta, J., Shareef, A., Schweizer-Ries, P., Teng, F., Zusman, E., et al., 2022. Accelerating the transition in the context of sustainable development. In: Shukla, P.R., Skea, J., Slade, R., Khouardjajie, A.A., van Diemen, R., McCollum, D., et al. (Eds.), *IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel On Climate Change*. Cambridge University Press.
- Department of Employment Skills Small and Family Business. (2019). *The Transition of the Australian car Manufacturing Sector: Outcomes and Best Practices Summary Report*. <https://www.dese.gov.au/whats-next/resources/transition-australian-car-manufacturing-sector-outcomes-and-best-practice-summary-report>.
- Derkach, A., Fantaguzzi, I., Pearce, N., & Smith, M. (2023). *Powering up new leadership for a changing energy environment*. <https://www.mckinsey.com/industries/oil-and-gas/our-insights/powering-up-new-leadership-for-a-changing-energy-environment>.
- EnergyAustralia. (2021). *EnergyAustralia powers ahead with energy transition*. <https://www.energyaustralia.com.au/about-us/media/news/energyaustralia-powers-ahead-energy-transition>.
- Gailing, L., Naumann, M., 2018. Using focus groups to study energy transitions: researching or producing new social realities? *Energy Res. Soc. Sci.* 45, 355–362. <https://www.sciencedirect.com/science/article/pii/S2214629618307163>.
- Geoscience Australia. (2020). *Australia's energy production, consumption and exports*. [https://www.ga.gov.au/scientific-topics/energy/overview#:~:text=Australia's%20primary%20energy%20consumption%20is,around%20\(2%20per%20cent\)](https://www.ga.gov.au/scientific-topics/energy/overview#:~:text=Australia's%20primary%20energy%20consumption%20is,around%20(2%20per%20cent).).
- Global Energy Monitor. (2023). *Global Coal Plant Tracker*. Available at: <https://globalenergymonitor.org/projects/global-coal-plant-tracker/> (Accessed 30 June 2023).
- Goddard, G., Farrelly, M.A., 2018. Just transition management: balancing just outcomes with just processes in Australian renewable energy transitions. *Appl. Energy* 225, 110–123.
- Government of Western Australia. (2022). *State-owned coal power stations to be retired by 2030 with move towards renewable energy*. <https://www.wa.gov.au/government/announcements/state-owned-coal-power-stations-to-be-retired-2030-move-towards-renewable-energy#:~:text=Massive%20uptake%20of%20rooftop%20solar,supply%20and%20improving%20system%20security>.
- Hannan, P. (2021). Australia's coal-fired power plants likely to shut almost three times faster than expected, report suggests. *TheGuardian*. <https://www.theguardian.com/australia-news/2021/dec/10/australias-coal-fired-power-plants-likely-to-shut-almost-three-times-faster-than-expected-report-suggests>.
- International Labour Organization. (2015). *Guidelines for a just transition: towards environmentally sustainable economies and societies for all*. https://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_432859.pdf.
- Irving, J., Beer, A., Weller, S., Barnes, T., 2022. Plant closures in Australia's automotive industry: continuity and change. *Reg. Stud. Regional Sci.* 9 (1), 5–22. <https://doi.org/10.1080/000740039900001>.
- Jermain, D.O., Ren, Z.J., Foster, S.B., Pilcher, R.C., Berardi, E.J., 2022. Coal in the 21st century: integrating policy with practice for just transitions. *Electricity J.* 35 (10), 107220.
- Köhler, J., Geels, F.W., Kern, F., Markard, J., Onsongo, E., Wiecezorek, A., Alkemade, F., Avelino, F., Bergeck, A., Boons, F., 2019. An agenda for sustainability transitions research: state of the art and future directions. *Environ. Innov. Soc. Transit.* 31, 1–32.
- Loorbach, D., 2010. Transition management for sustainable development: a prescriptive, complexity-based governance framework. *Governance* 23 (1), 161–183.
- Ludlow, M., 2022. Queensland to cut off coal power by 2035. *Financial Review*. <https://www.afr.com/companies/energy/qlld-to-cut-off-coal-power-by-2035-20220928-p5bljs>.

- MacNeil, R., Beauman, M., 2022. Understanding resistance to just transition ideas in Australian coal communities. *Environ. Innov. Soc. Transit.* 43, 118–126.
- Mayer, A., 2018. A just transition for coal miners? Community identity and support from local policy actors. *Environ. Innov. Soc. Transit.* 28, 1–13.
- Minerals Council of Australia. (2022). Coal: building Australia's future. Available at: <https://minerals.org.au/about/mining-facts/mineral-coal/> (Accessed 1 December 2023).
- Mining & Energy Union. (2016). *Tony Maher's speech to the ACTU just transition conference "why Australia needs a just transition?"*. <https://me.cfmeu.org.au/leadership-message/why-australia-needs-just-transition>.
- Nel, E., Marais, L., Mqotyana, Z., 2023. The regional implications of just transition in the world's most coal-dependent economy: the case of Mpumalanga, South Africa. *Front. Sustain. Cities.* 4, 1059312.
- Nyumba, O.T., Wilson, K., Derrick, C.J., Mukherjee, N., 2018. The use of focus group discussion methodology: insights from two decades of application in conservation. *Methods Ecol. Evol.* 9 (1), 20–32.
- Parliament of Australia. (2022). Climate Change Bill 2022. Available at: https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bld=r6885 (Accessed 1 December 2023).
- Parliament of Victoria. (2022). *Inquiry into the closure of the Hazelwood and Yallourn power stations*. Victorian Government Printer. <https://new.parliament.vic.gov.au/49fead/contentassets/bb36eec27c15447bbdefee0dec57d50f/lceic-59-08-closure-of-hazelwood-and-yallourn.pdf>.
- Prime Minister of Australia. (2023). *Media release: national Net Zero Authority*. <https://www.pm.gov.au/media/national-net-zero-authority>.
- Rosenbloom, D., 2018. Framing low-carbon pathways: a discursive analysis of contending storylines surrounding the phase-out of coal-fired power in Ontario. In: *Environ. Innov. Soc. Transit.*, 27, pp. 129–145.
- Rotmans, J., Kemp, R., Van Asselt, M., 2001. More evolution than revolution: transition management in public policy. *Foresight: J. Future Studies, Strategic Thinking Policy* 03 (01).
- Sharma, V., Loginova, J., Zhang, R., Kemp, D., Shi, G., 2023. How do past global experiences of coal phase-out inform China's domestic approach to a just transition? *Sustain. Sci.*, pp. 1–18.
- Sharpe, S., Lenton, T.M., 2021. Upward-scaling tipping cascades to meet climate goals: plausible grounds for hope. *Clim. Policy.* 21 (4), 421–433.
- Sheldon, P., Junankar, R., & Pontello, A.D.R. (2018). *The Ruhr or Appalachia? Deciding the future of Australia's coal power workers and communities*.
- Snell, D., 2018. Just transition? Conceptual challenges meet stark reality in a 'transitioning' coal region in Australia. *Globalizations.* 15 (4), 550–564.
- Stanford, J., 2017. Automotive surrender: the demise of industrial policy in the Australian vehicle industry. *Econ. Labour Relations Rev.* 28 (2), 197–217. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85019599057&doi=10.1177%2f1035304617709659&partnerID=40&md5=c24fbfe7c8db05513b187adb54886f2>.
- Stark, A., Gale, F., Murphy-Gregory, H., 2023. Just transitions' meanings: a systematic review. *Soc. Nat. Resour.* 1–21. <https://doi.org/10.1080/08941920.2023.2207166>.
- Synergy. (2022). *State-owned coal power stations to be retired by 2030*. <https://www.synergy.net.au/About-us/News-and-announcements/Media-releases/State-owned-coal-power-stations-to-be-retired-by-2030>.
- Thomas, A., 2021. Framing the just transition: how international trade unions engage with UN climate negotiations. *Global Environ. Change* 70, 102347.
- Tierney, J., Weller, S., Barnes, T., Beer, A., 2023. Left-behind neighbourhoods in old industrial regions. *Reg. Stud.* 1–15.
- Wang, X., Lo, K., 2022. Political economy of just transition: disparate impact of coal mine closure on state-owned and private coal workers in Inner Mongolia, China. *Energy Res. Soc. Sci.* 90, 102585. <https://www.sciencedirect.com/science/article/pii/S2214629622000901>.
- Warren, B., Christoff, P., Green, D., 2016. Australia's sustainable energy transition: the disjointed politics of decarbonisation. In: *Environ. Innov. Soc. Transit.*, 21, pp. 1–12.
- Weller, S.A., 2017. The geographical political economy of regional transformation in the Latrobe valley. *Austr. J. Reg. Stud.* 23 (3), 382–399.
- Wiseman, J., Workman, A., Fastenrath, S., & Jotzo, F. (2020). *After the Hazelwood coal fired power station closure: Latrobe Valley regional transition policies and outcomes 2017-2020*. Crawford School of Public Policy. https://ccep.crawford.anu.edu.au/sites/default/files/publication/ccep_crawford_anu_edu_au/2020-11/ccep20-10_wiseman_workman_fastenrath_jotzo_after_hazelwood.pdf.
- Wormald, J., Rennick, K., 2019. *National policy, Global Giants : How Australia Built and Lost its Automotive Industry*. Cambridge University Press.