OXFORD ECONOMICS AUSTRALIA

Regional Economic Transition Analysis – Worker Transitions in the Hunter

Final report

December 2025

Disclaimer

The modelling and results presented here are based on information provided by third parties, upon which Oxford Economics Australia has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

To discuss the report further please contact:

Emily Dabbs

Head of Macroeconomic Consulting, ANZ

edabbs@oxfordeconomics.com

Level 6, 95 Pitt St Sydney, Sydney, 2000, NSW

Tel: +61 424 389 909

EXECUTIVE SUMMARY

KEY FINDINGS

There are an estimated 15,600 fossil fuel workers in the Hunter, with 11,200 jobs expected to be lost by 2035.

- These workers are predominantly employed in the coal mining industry where closures of coal mines are expected to result in significant job losses.
- An estimated 73% of these workers are in highly specialised roles with skillsets closely linked to the mining sector.
- These workers are more likely to be male and prime working-aged people than the broader non-fossil fuel workforce, with a higher representation of First Nation peoples.
- Fossil fuel workers as a share of the workforce are expected to fall from 2.9% in 2025 to 0.7% by 2035.

Around 2,580 fossil fuel workers are expected to retire by 2035, leaving 8,620 workers who are likely to undergo a workforce transition.

- An estimated 48% of workers are likely to be able to transition to similar roles in other industries with minimal transition support.
- An estimated 52% of workers may be able to transition to roles with similar skills requirements with the right support for focused upskilling and reskilling.
- Growth opportunities are focused around health and education, with opportunities for high skill engineering roles in professional services and priority investment areas.

Training capacity and focus is well aligned with the needs of fossil fuel workers.

- Around 5.4% of the working aged population completed a VET or higher education degree in 2023, with population growth offsetting recent declines in completion rates.
- Around 76% of fossil fuel workers undergoing a workforce transition will require reskilling, which is well suited to the VET sector priority areas and courses.
- New facilities such as the Net Zero Centre and Modern Manufacturing Workshop are well aligned with the needs of fossil fuel workers, although capacity growth will be critical.

Role-specific barriers are likely to hinder workforce transition pathways more than regional conditions or demographic considerations.

- Broadly, there is sufficient capacity within the Hunter region's employment outlook to absorb displaced workers and enable their mobility.
- There are no major demographic factors that are likely to create barriers for worker mobility, although the high First Nation's footprint may require targeted support measures.
- Role-specific barriers present a significant challenge to workforce movement, particularly relating to the match between qualification requirements and income expectations.

Economic diversification will be a critical lever to supporting workforce transitions, and current policy is suitably focused on this area.

- Specialist roles that account for much of the fossil fuel workforce are heavily represented in the wider industrial labour market, which itself is in structural decline.
- The Hunter region already has a significant number of economic diversification policies in place, reflecting both state and local efforts to reduce reliance on coal.
- Ensuring the success of these policies, especially those aligned with identified priority investment sectors, will support fossil fuel worker transitions.

Targeted redeployment programs can reduce workforce transition barriers if enacted before job losses are experienced.

- Fossil fuel workers are likely to encounter smaller pay disparities if they can redeploy to positions that maximise the use of their experience and any formal qualifications they hold.
- An opportunity exists for all levels of government to explore options to prepare export coal mine workers for the transition.

INTRODUCTION

NZEA has engaged Oxford Economics to support evidence-based action in transition-affected regions.

Project Overview

The Net Zero Economy Authority (NZEA) commissioned this project to understand how the net zero transition will materially reshape key regional economies. There are a number of regions central to Australia's energy system and industrial base that face disproportionate exposure to structural shifts as emissions-intensive activities decline. The Hunter, Central Queensland and Latrobe Valley were prioritised for this project due to the size and complexity of their region and economies, but the analytical framework can be deployed in other regions. These regions also present opportunities to lead in clean energy generation, advanced manufacturing, and resource-based value-adding, provided that the right policy, investment and workforce conditions are in place. The project seeks to inform strategic planning and intervention by forecasting how regional economies will evolve under different decarbonisation scenarios.

Oxford Economics was engaged to deliver a structured, scenario-led analysis across three core domains. These include forward-looking forecasts of industry and labour market change, an assessment of each region's comparative advantages and investment potential, and a detailed examination of transition pathways for fossil fuel and related workers. The analytical framework integrates AEMO's 2025 transition scenarios with regional planning assumptions, closure timelines, and infrastructure settings to ensure alignment with real-world transition drivers. Regional priorities and economic exposures have been informed by the NZEA's own statistical framework, which identifies both downside risks and economic opportunities across Australia's key regions.[1] The analytical framework used within this project can be deployed across other NZEA priority regions beyond the Hunter, Central Queensland and Latrobe Valley.

The project aims to generate region-specific insights that can support practical decision-making across multiple levels of government. By quantifying the scale and timing of industrial change, identifying investment barriers, and mapping reskilling needs, the work creates an evidence base that links long-term economic modelling with near-term policy and program levers. This enables a more coordinated approach to managing transition risk while positioning each region to attract and retain high-value activity.

This work provides a foundation for coordinated, place-based action across governments, industry and communities. Outputs will support the NZEA's role in shaping policy, allocating resources, and engaging stakeholders on transition risks and opportunities. By identifying emerging demand for labour and skills, sectoral growth trajectories, and enablers of investment readiness, the project aims to assist in sequencing investment, workforce support and infrastructure development. Ultimately, the analysis will help ensure that transition efforts are locally grounded, forward-looking, and capable of delivering resilient and inclusive economic outcomes.

Project Components

The project was structured into three core analytical components to align with NZEA's transition objectives. Several regions central to Australia's energy system and industrial base are facing disproportionate exposure to structural shifts as emissions-intensive activities decline. The Hunter, Central Queensland and Latrobe Valley were prioritised due to their economic size and complexity, but the analytical framework can be deployed in other regions. Additionally, a summary report was developed synthesising key insights across all three project components.

Regional Economic Forecasts

This stream provides scenario-based projections of industry composition, employment, and skills demand across 5, 10, and 25 years. These forecasts are based on AEMO's 2025 transition scenarios and represent regional futures based on current trends and industrial structures within the region. Outputs include identification of sectors likely to decline, grow, or emerge, the timing of major structural shifts, and profiles of key workforce cohorts.

Regional Investment Analysis

Focusing on each region's strategic position, this stream identifies comparative economic advantages, evaluates barriers to investment, and highlights opportunities to attract net zero aligned industries. It also outlines region-specific enablers such as infrastructure, workforce capability, and resource availability that could support long-term industrial development beyond what is identified in the *Regional Economic Forecasts* report.

Worker Transition Analysis

Centred on transition-affected workers, this stream delivers occupational pathway mapping, retraining requirements, and an assessment of local training system capacity. It also provides targeted support strategies to address cohort-specific barriers and enable workforce mobility within the regional economy. The analysis considers both the likely future economic structure of the region as identified in the *Regional Economic Forecasts* report and opportunities identified in the *Regional Investment Analysis* report.

This report identifies the potential training needs of the Hunter based on the fossil fuel workforce transitions expected over the coming decade.

Purpose of this Report

This report provides an assessment of potential workforce transition pathways for fossil fuel workers in the region. It forms part of the Net Zero Economy Authority's (NZEA) worker transition stream and supports its broader mandate to support workers and communities in adapting to the changes under the net zero transition. The focus is on analysing various worker transitions pathways available to the region's fossil fuel workers, and developing evidence-based advice to support these workers as they transition to different roles over the next 5 and 10 years.

The report draws on a wide range of data and inputs to develop the evidence base underpinning potential transition pathways available to fossil fuel workers in the region. Key inputs to this work are the labour market forecasts for the region from the *Regional Economic Forecasts* report under the *Step Change* scenario. This is supplemented with detailed labour market information on the current fossil fuel workers, job mobility information from Seek's candidate dataset, and skills and qualifications analysis developed by Oxford Economics.

Findings from this report will identify potential transition pathways available to fossil fuel workers in the region, and the policy levers available to support these transitions. The outputs are designed to help NZEA and its partners understand the potential pathways fossil fuel workers may transition to new roles as facilities close in the region, the types of support required to make these transitions, the magnitude of training required within the region's labour market, and the policy levers that could be implemented to improve worker transition outcomes.

The structure and methodology are consistent across all NZEA priority regions. While the specific pathways and magnitude of training varies by place, each report follows a shared framework to ensure comparability. The analysis is forward-looking and designed to inform decision-making over the next 5 to 10 years.

Report Structure

The report is structured around four core analytical components: identification of the region's fossil fuel workforce, analysis of potential transition pathways, analysis of the education & training needs of fossil fuel workers in the region and identification of transition barriers & enablers facing these workers. Each of these analytical components are critical to informing a wholistic view of the policy levers required to support fossil fuel worker transitions in the region which is outlined in the final section of this report.

THE HUNTER'S FOSSIL FUEL WORKFORCE: This section provides an overview of the Hunter's fossil fuel workforce including characteristics of the workers and changes to future demand under the *Step Change* scenario as modelled in the *Regional Economic Forecasts* report.

POTENTIAL TRANSITION PATHWAYS: This section outlines the three core transition pathways available for the Hunter's fossil fuel workers and provides an estimate of the training needs for these workers to support worker transitions.

EDUCATION & TRAINING ENVIRONMENT: This section assesses the current training capacity of the Hunter and provides an estimate of the training needs for fossil fuel workers under the identified transition pathways.

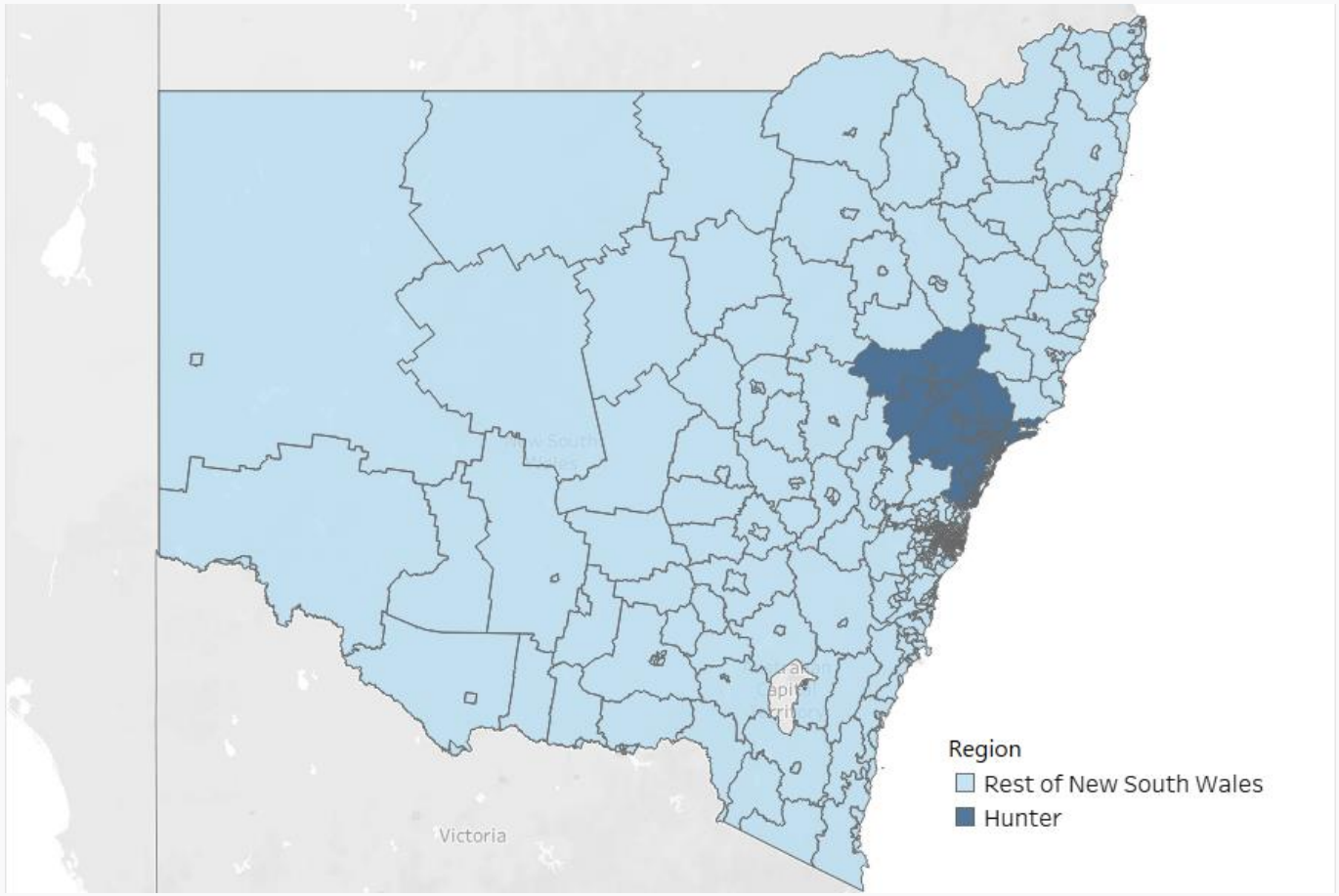
TRANSITION BARRERS & ENABLERS: This section identifies the key barriers and enablers facing worker transitions including the regional capacity of the labour force, differences in role characteristics, demographic considerations, and current support programs and alternative support programs to be considered.

POLICY GAP ASSESSMENT: This section outlines the recommended policy levers that could be used to support fossil fuel worker transitions in the Hunter.

APPENDICES: This section provides technical detail on the definitions, approaches and data sources used within the analysis of this report.

The analysis in this report is focused on the Hunter which is defined as the combination of four working zones which cover a total of 85 SA2 regions.

Hunter region map



Hunter region working zone listing

State	Working Zone Name
NSW	Central Coast and surrounds
NSW	Muswellbrook, Scone and surrounds
NSW	Newcastle, Lower Hunter and surrounds
NSW	Nelson Bay Peninsula and Anna Bay

Source: Net Zero Economy Authority, Australian Bureau of Statistics

Hunter Region SA2 listing

Central Coast and surrounds

SA2 NAME	SA2 CODE
Avoca Beach - Copacabana	102011028
Bateau Bay - Killarney Vale	102021044
Blue Haven - San Remo	102021045
Box Head - MacMasters Beach	102011029
Budgewoi - Buff Point - Halekulani	102021046
Calga - Kulnura	102011030
Chittaway Bay - Tumbi Umbi	102021047
Erina - Green Point	102011031
Gorokan - Kanwal - Charmhaven	102021048
Gosford - Springfield	102011032
Jilliby - Yarramalong	102021049
Kariong	102011033
Kincumber - Picketts Valley	102011034
Lake Munmorah - Mannering Park	102021050
Narara	102011035
Niagara Park - Lisarow	102011036
Ourimbah - Fountaindale	102021051
Point Clare - Koolewong	102011037
Saratoga - Davistown	102011038
Summerland Point - Gwandalan	102021052
Terrigal - North Avoca	102011039
The Entrance	102021053
Toukley - Norah Head	102021054
Tuggerah - Kangy Angy	102021055
Umina - Booker Bay - Patonga	102011040
Wamberal - Forresters Beach	102011041
Warnervale - Wadalba	102021056
Woy Woy - Blackwall	102011042
Wyoming	102011043
Wyong	102021057

Muswellbrook, Scone and surrounds

SA2 NAME	SA2 CODE
Muswellbrook	106041126
Muswellbrook Surrounds	106041127
Scone	106041128
Scone Surrounds	106041129
Muswellbrook	106041126

Nelson Bay Peninsula and Anna Bay

SA2 NAME	SA2 CODE
Anna Bay	106031119
Nelson Bay Peninsula	106031121

Newcastle, Lower Hunter and surrounds

SA2 NAME	SA2 CODE
Adamstown - Kotara	111031222
Belmont - Bennetts Green	111011206
Belmont South - Blacksmiths	111011207
Beresfield - Hexham	111031223
Bolton Point - Teralba	111021215
Bonnells Bay - Silverwater	111021216
Branxton - Greta - Pokolbin	106011107
Cessnock	106011108
Cessnock Surrounds	106011109
Charlestown - Dudley	111011208
Dungog	106011110
East Maitland - Metford	106021614
Edgeworth - Cameron Park	111021217
Glendale - Cardiff - Hillsborough	111011209
Hamilton - Broadmeadow	111031224
Kurri Kurri - Abermain	106011111
Lambton - New Lambton	111031225
Lemon Tree Passage - Tanilba Bay	106031120
Maitland	106021114
Maitland - North	106021116
Maryland - Fletcher - Minmi	111031226
Mayfield - Warabrook	111031227
Merewether - The Junction	111031228
Morisset - Cooranbong	111021218
Mount Hutton - Windale	111011210
Newcastle - Cooks Hill	111031229
Newcastle Port - Kooragang	111031230
Raymond Terrace	106031122
Redhead	111011211
Rutherford (North) - Aberglasslyn	106021615

Newcastle, Lower Hunter and surrounds

SA2 NAME	SA2 CODE
Rutherford (South) - Telarah	106021616
Seaham - Woodville	106031123
Shortland - Jesmond	111031231
Singleton	106011112
Singleton Surrounds	106011113
Stockton - Fullerton Cove	111031232
Swansea - Caves Beach	111011212
Tea Gardens - Hawks Nest	106031124
Tenambit - East Maitland	106021617
Thornton - Millers Forest	106021618
Toronto - Awaba	111021219
Valentine - Eleebana	111011213
Wallsend - Elermore Vale	111031233
Wangi Wangi - Rathmines	111021220
Waratah - North Lambton	111031234
Warners Bay - Boolaroo	111011214
West Wallsend - Barnsley - Killingworth	111021221
Wickham - Carrington - Tighes Hill	111031235
Williamtown - Medowie - Karuah	106031125

HUNTER REGION’S FOSSIL FUEL WORKFORCE

There are currently 15,600 fossil fuel workers in the Hunter, with a high concentration of male prime working-aged employees in specialised mining roles.

The current fossil fuel workforce in the Hunter

The Hunter is estimated to employ 15,600 fossil fuel workers as of 2024, representing 2.9% of the region's total workforce. The vast majority (94.7%) work in coal mining. Major employers include Glencore[2], BHP[3] and Yancoal[4], who employ an estimated 5,500, 2,000, and 1,750 employees, respectively. BHP's MT Arthur coal mine is preparing to close by 2030[5], impacting all 2,000 BHP roles in the region.

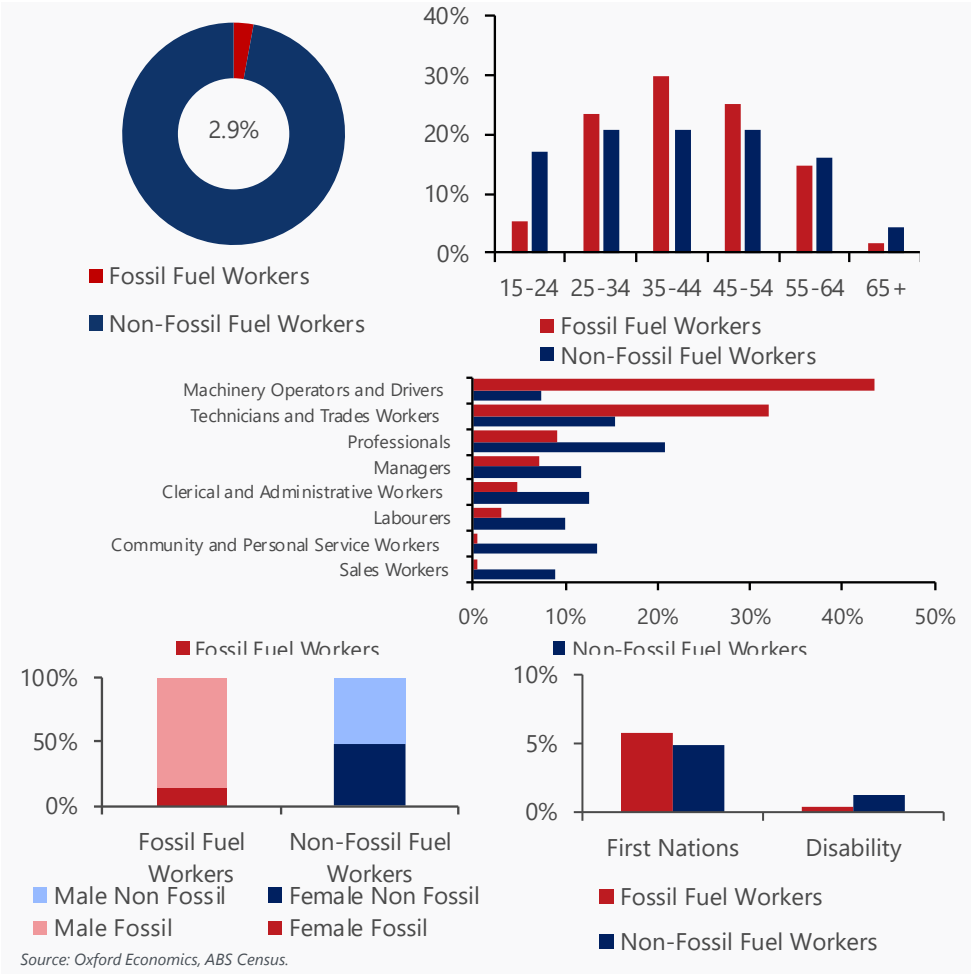
The occupational makeup of the fossil fuel workforce differs significantly from the wider Hunter workforce, which may increase challenges for workforce transitions. Machinery operators & drivers and technicians & trades workers account for 75.3% of fossil fuel workers but make up only 22.8% of the region's occupational employment. Employment is highly concentrated in miners, making up 30.2% of all fossil fuel workers.* Across the Hunter, professionals are the largest occupational cohort among non-fossil fuel workers, employing 1 in 5 workers. Fossil fuel workers, in contrast, are employed as professionals at less than half this rate (9.2%). While some workers may be able to transition into machinery operators & drivers and technicians & trades roles outside of the fossil fuel sector, the concentration of workers in these roles suggests that pathways into alternate occupations may be required. The size and skillset of the Hunter's fossil fuel workforce could attract additional industrial investment, supporting these workers to pivot into alternative industrial roles.

Workers in fossil fuel industries are more likely to be in their prime working age (78.3%), compared to the non-fossil fuel workforce (62.4%). The age difference is predominantly driven by fewer 15–24-year-olds in fossil fuel jobs, which reflects the higher skill level required, often linked to greater qualifications and experience, and less workplace flexibility. The concentration of prime age workers indicates most will still be in the workforce by 2035 and potentially require transition support as facilities close.

The Hunter's fossil fuel workforce is predominantly male. Men account for 86.4% of fossil fuel workers, while accounting for only 50.7% of the Hunter's workforce. The prevalence of male workers is partially explained by the concentration of machinery operators & drivers and technicians & trades workers, which tend to skew heavily towards male workers. However, the share of men within these male-dominated occupations is even higher within mining, skewing the workforce more heavily towards male workers than the occupation makeup would suggest.

Workers who identify as needing assistance with core activities are underrepresented in the fossil fuel industry. Only 0.4% of workers identify as having a disability compared to 1.2% of the Hunter's workforce. There are a higher percentage of First Nation peoples employed in the fossil fuel workforce (5.8%) compared to in the non-fossil fuel workforce (4.9%). The higher representation of First Nations peoples suggests targeted support measures may be needed for this group.

The Hunter's fossil fuel worker profile



Source: Oxford Economics, ABS Census.

**Miners are a 6-digit ANZSCO occupation within the machinery operators & drivers 1-digit ANZSCO group.*

Around 11,200 fossil fuel roles are expected to be lost by 2035, continuing a trend over the last decade, as power stations close and related mines pare back activities.

Outlook for fossil fuel worker employment in the Hunter region

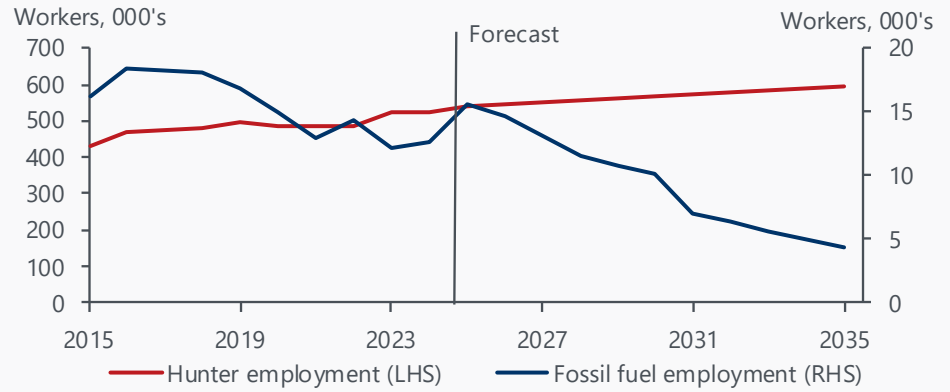
Fossil fuel employment has been declining over the past decade, despite the Hunter region's overall workforce sustaining steady growth. The fossil fuel workforce peaked in 2017 at 18,230 workers, with a sustained downward trend in employment to now sit at 15,600 workers. This is against a backdrop of annual average employment growth of 2.3% in the region. Overall, fossil fuel workers as a share of the workforce has fallen from 3.7% in 2015 to an estimated 2.9% in 2025.

This decline in fossil fuel workforce over the last 10 years can largely be attributed to the closure of specific sites, although investment uncertainty and increased costs pressures also play a role. The Liddell Power Station, which employed over 700 workers at its prime, closed in 2023[6] and there were also closures at the Austar underground mine in 2020[7] and Muswellbrook coal mine in 2022[8].

The demand for fossil fuel workers in Hunter is projected to decline, falling by 71.8% to 2035. The region currently employs around 15,600 fossil fuel workers, with an estimated 11,200 roles expected to be lost over the forecast period leaving just 4,400 workers in the industry by 2035. Drillers, miners and shot firers represent 34% of the current fossil fuel workforce and are expected to decline 65% by 2035. This decline in employment demand is expected to continue beyond 2035, with the fossil fuel industry falling to a negligible share of the region's workforce by 2050.

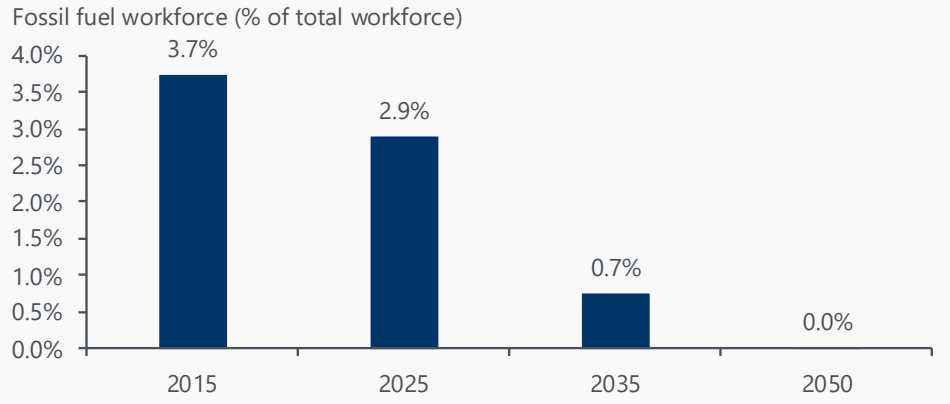
While the fossil fuel workforce is predominantly in their prime working age, a proportion are likely to retire by 2035 and reduce the number of workers likely to undergo a workforce transition by 2035. Taking into account both natural attrition and the projected industry decline, approximately 8,620 fossil fuels workers are likely to transition into similar or skill adjacent roles within the region. While these pathways may offer some transferability, many workers are likely to require reskilling or upskilling to facilitate smooth transition. Furthermore, barriers remains, including mismatches in workers' interest, competition from new entrants and access to necessary support services, which may affect the success of worker transition pathways.

Fossil fuel worker employment, 000's, 2015 - 2035



Source: Oxford Economics based on AEMO Step Change scenario, ABS labour force, ABS Census.

Fossil fuel share of workforce, 2015 - 2050



Source: Oxford Economics based on AEMO Step Change scenario, ABS labour force, ABS Census.

POTENTIAL TRANSITION PATHWAYS

We have estimated 8,620 fossil fuel workers are likely to undertake a workforce transition by 2035 based on the current make up of the workforce and changes to demand over time.

Method for quantifying the workforce transition need

11,200 fewer fossil fuel roles

Under the *Step Change Scenario* the expected loss of fossil fuel roles is 11,200 due to closures in fossil fuel generators and mines. Renewable projects provide some offset, but overall employment demand is lower.

2,580 workers likely to retire

Around a quarter of the impacted fossil fuel workforce is aged 55+. We assume that these workers exit the labour market in the 10 years to 2035, reducing the size of the workforce likely to undertake workforce transitions to 8,620.

8,620 workers likely to undertake a workforce transition

Most of the workers likely to undergo a transition into a new role are in key specialist roles (73%), followed by highly transferable roles (20%) and a small number of other specialist roles (7%).

Key specialist roles - 73%

Largest 10 roles with skills highly relevant to fossil fuel activities including drillers, miners & shot firers, metal fitters & machinists, electricians, other building & engineering technicians, truck drivers, production managers, structural steel & welding trades workers, mining engineers, industrial, mechanical & production engineers, and earthmoving plant operators

Other specialist roles - 7%

Other roles with skills highly relevant to fossil fuel activities

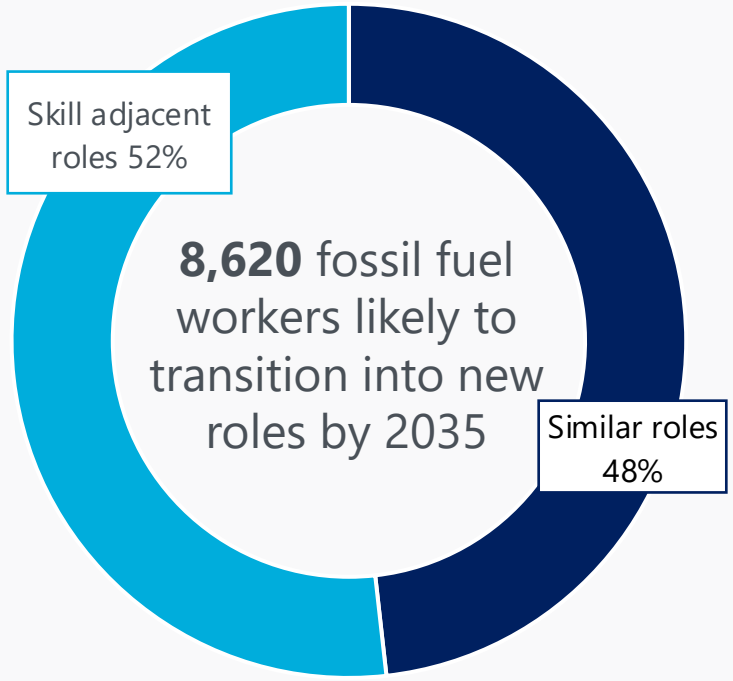
Highly transferable roles - 20%

Back office functions and transferable on-site functions

Source: Oxford Economics based on AEMO Step Chance scenario.

Fossil fuel workers that are likely to transition into new roles have the potential to find both similar and skill adjacent role opportunities.

Fossil fuel workforce transition pathways



Source: Oxford Economics.

Headline analysis of transition pathways

Similar roles present a significant opportunity for workforce transition, with around 48% of fossil fuel workers requiring transition potentially able to pursue this pathway. This pathway is predominantly suitable for highly transferable roles due to the industry agnostic nature of their skillset. Roles in finance and human resource functions are likely to be fully absorbed into occupations outside the fossil fuel industry. Many key fossil fuel roles could also utilise this pathway, with electricians, truck drivers, industrial, mechanical & production engineers, and earthmoving plant operators also able to be fully absorbed into roles outside the fossil fuel industry.

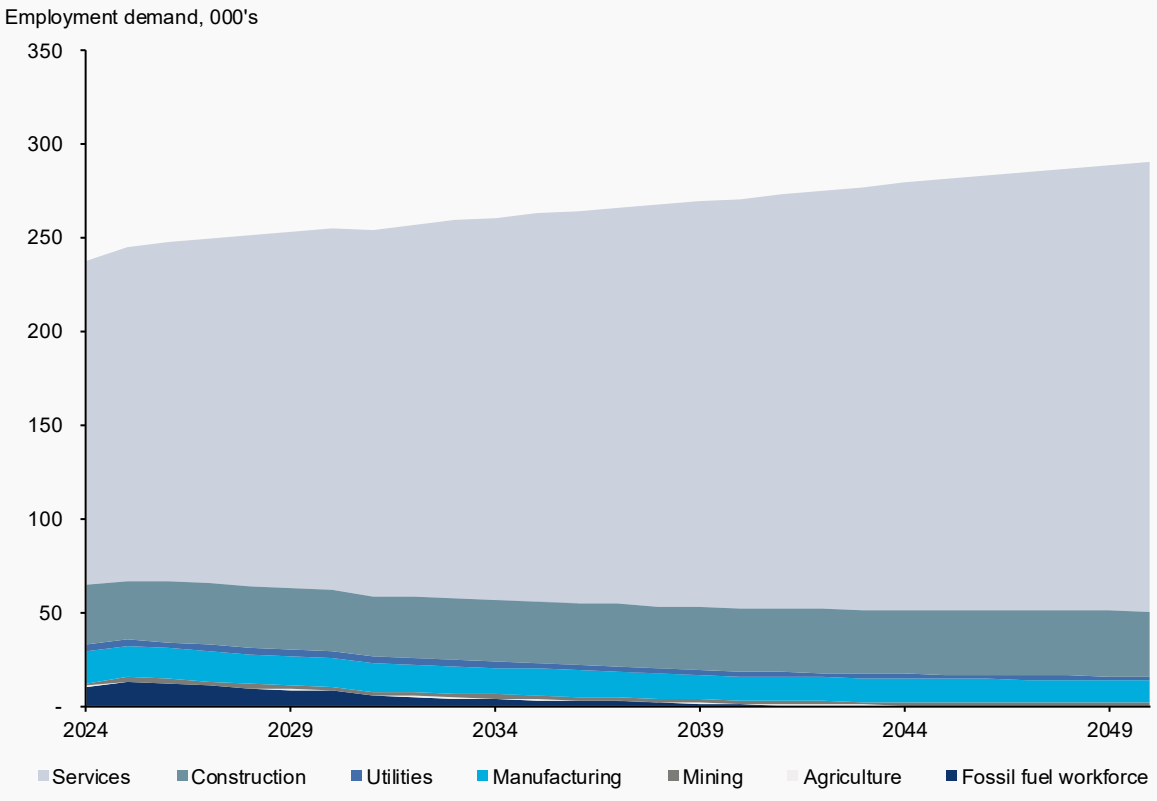
Skill adjacent roles present a slightly larger pathway for workforce transitions. Around 52% of the workforce are likely to require support in pursuing this pathway, particularly in key fossil fuel roles where the specialised nature of their work can limit similar role opportunities. Many of the opportunities require reskilling into different specialist skills areas and upskilling in generalist skills such as digital engagement, planning & organising and teamwork.

Growth roles are not a critical pathway for fossil fuel workforce transitions, with similar and skill adjacent roles potentially able to absorb the transitioning workforce. However, the fossil fuel workforce will need to compete with new entrants to the workforce which may impact their ability to move into similar and skill adjacent roles. Potential pathways into high growth roles will also be important to support the workforce transition.

To tap into high growth opportunities fossil fuel workers will need to reskill into areas that are significantly removed from their current area of specialization. Under a *Step Change* scenario, there are some opportunities in a broad set of engineering roles related to professional services. High growth roles are concentrated in high skill health and education roles, with lower skill roles in administrative support and hospitality roles. Priority investment areas for the region as identified in the ***Regional Investment Analysis*** also present important growth opportunities for fossil fuel workers, as these industries are well aligned to the fossil fuel workforce skillset.

An estimated 48% of fossil fuel workers may be able to transition into similar roles due to demand for both support roles and key fossil fuel specialist roles in other industries.

Employment demand for similar roles, by industry



Source: Oxford Economics based on AEMO Step Change scenario.

Analysis of similar role transition pathways

Employment demand for similar roles across the region is expected to grow over the forecast period. Much of this growth is across Services areas, with construction and manufacturing showing steady demand.

An estimated 4,140 roles in the fossil fuel workforce (48%) are expected to be able to transition to similar roles within the Hunter economy. Within the fossil fuel workforce, highly transferable roles are most likely to benefit from this pathway, with around 97% of back and front office roles able to move into similar roles by 2035. Transitions into similar roles have limited need for formal training or significant support programs. However, programs such as career guidance and job search assistance could support workforce transitions.

Electricians, metal fitters & machinists, truck drivers, structural steel & welding trades workers, industrial, mechanical & production engineers, and earthmoving plant operators are key specialist roles that are also likely to undergo similar role transition pathways. These roles account for 30% of the fossil fuel workforce and are critical to mining operations. But these roles are also highly transferable across industry. Demand for these key fossil fuel roles is likely to be strongest in construction and professional services, where these roles are in high demand and an older workforce is likely to require replacement over the next 10 years.

There are a significant number of highly transferable back-office roles that are likely to transition out of the fossil fuel industry with limited support. These roles include finance, HR, cleaning and food preparation roles, accounting for around 13% of the fossil fuel workforce. The industry agnostic nature of these roles indicates they are highly transferable, with significant demand in services industries. The outlook for labour demand in the Hunter will be the key determinant of how easily these workers can transition.

Competition with new entrants to the workforce may create challenges for fossil fuel workers undertaking transitions into similar roles. This is particularly challenging for key specialist roles given the broader slowdown in industrial employment under a *Step Change Scenario*. However, their previous experience is likely to increase their attractiveness over relatively newer workers. In addition, priority opportunities identified in the *Regional Investment Analysis* are also likely to present additional opportunities for these roles.

An estimated 52% of fossil fuel workers may be able to transition into skill adjacent roles, with most requiring reskilling of their specialist skills into areas with broader demand.

Analysis of skill adjacent roles

An estimated 4,480 roles in the fossil fuel workforce (52%) are expected to be able to transition to skill adjacent roles within the Hunter economy. This represents the remainder of the fossil fuel workforce after accounting for potential similar role opportunities. Skill adjacent workforce transitions are likely to require formal training support in either upskilling (24%) or reskilling (76%).

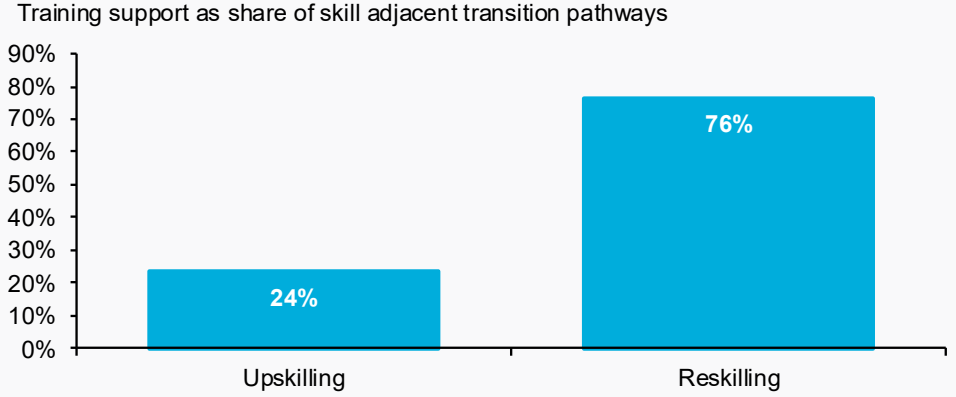
Key specialist roles have fewer similar role options and are more likely to explore skill adjacent roles (60% of workforce transitions) compared to highly transferable (3% of workforce transitions). Movements into these skill adjacent roles are likely to require reskilling given the specialised nature of fossil fuel skill sets. Most reskilling is likely to focus on building and business & management specialist skills. In addition, upskilling in digital engagement and planning & organising will also be critical to supporting workforce transitions.

Drillers, miners and shot firers are highly likely to move into a skill adjacent roles. Similar roles are likely to provide only a small portion of opportunities for the workforce to transition into new roles. Fossil fuel workers account for 80% of the occupation in the region, leaving little room for absorption into other industries. Most skill adjacent role opportunities are likely to require reskilling, particularly in areas of building and automotive engineering & technology. These opportunities are concentrated in three roles, motor mechanics, carpenters & joiners and plumbers. There are a broader range of opportunities requiring upskilling, predominantly in generalist skills such as digital engagement, learning, planning & organising and initiative & innovation. While specialist skills are of a similar level, there may be gaps requiring formal qualification or accreditation, especially in machinery or technical roles.

Mining engineers are also more likely to move into skill adjacent roles. The high level of proficiency in specialist mining skills reduce the transferability of this role without reskilling. Skill adjacent opportunities are concentrated in other engineering or management roles, which can build on mining engineers' current skill set. Despite the likely overlap in the underlying specialist skills, formal qualifications will be needed, most likely delivered through higher education facilities. Generalist and foundational skills are broadly in line with skill adjacent roles, though additional support to build learning capability may be required.

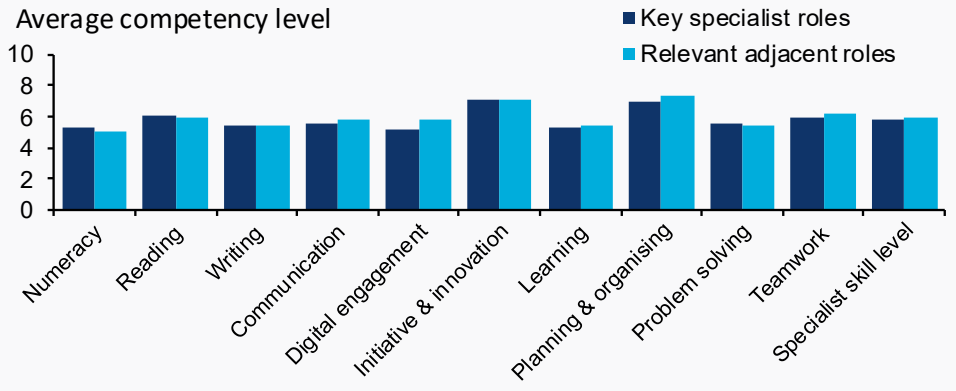
Development of priority industries as identified in the *Regional Investment Analysis* report would further support skill adjacent opportunities. Most of the fossil fuel workforce exploring this transition pathway are likely to have relatively high skill levels associated with industrial activities. Training focused on expanding skill sets into high priority areas such as hydrogen and bioenergy will be important.

Upskilling and reskilling requirements for skill adjacent roles



Source: Oxford Economics.

Average skills competency for key specialist roles



Source: Oxford Economics, JSA.

High growth roles under the current outlook would require fossil fuel workers to significantly invest in retraining, while priority investment areas present skill aligned opportunities.

Analysis of growth role opportunities in the Hunter region

While fossil fuel workers will be able to move into similar or skills adjacent roles within the Hunter region, there are broader opportunities across the workforce that may be of interest for some workers that require retraining.

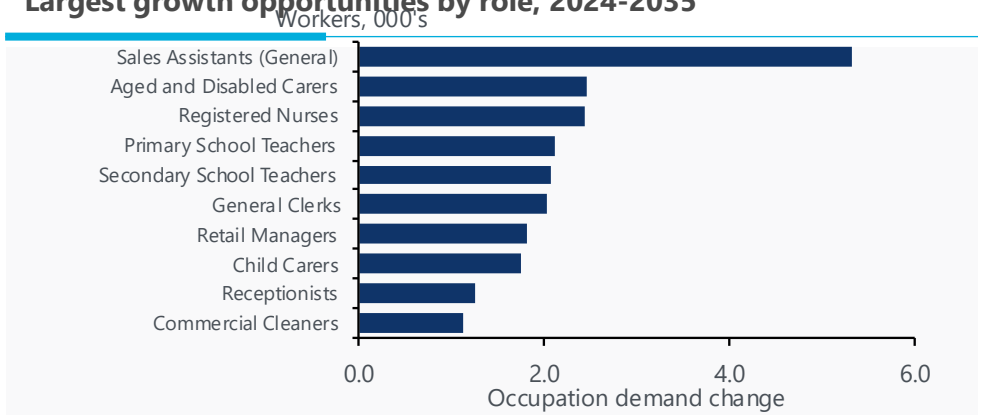
Demand for fossil fuel roles is expected to decline in the Hunter region, but there are roles that are expected to grow strongly over the forecast period. These high growth roles present additional opportunities for fossil fuel workers undertaking workforce transitions. Total employment demand in the Hunter region is expected to grow from 540,000 in 2025 to 595,000 by 2035 under *Step Change* scenario. This translates to net employment gains over 10 years of around 55,000, which is well below the approximately 110,000 increase experienced in the prior decade. This slowing pace trend suggests increased competition and structural shifts in key industries.

There is limited overlap of the skills and experience held by fossil fuels workers and those required in the high growth roles. Sales assistant roles are projected to experience the largest increase in job demand as are required in all sectors across the economy. There is also strong demand for roles in education and the healthcare positions, driven by the strong outlook for these related sectors. Most of the fossil fuel workforce is made up of machine operators (35%) and trades workers (22%). However, these are not the types of roles in high demand over the forecast period. Due to the differences in skill sets and industry requirements, the transition pathways into these high growth occupations are likely to require significant retraining investment and are more suitable for some of the support roles within the fossil fuel workforce.

Specialist skills in teacher education, human welfare studies & services, business & management, and nursing are anticipated to experience significant demand over the forecast period. These fields highlight the growing need for specialized skills that can support the societal needs of the regions. The demand for specialist skills held by fossil fuel workers is projected to decline significantly by 2035, as the region undergoes an industrial shift. This indicates that fossil fuel workers will need to reskill into areas that are significantly removed from their current area of specialization to tap into the high growth opportunities. This may be easier for some of the highly transferable roles, especially in back-office positions, but presents challenges for key specialist roles with specialist skill sets focused on areas in decline. Furthermore, while on-the-job training roles presents opportunities for fossil fuel workers, the challenge remains as these roles often do not leverage their existing specialized skills and experience.

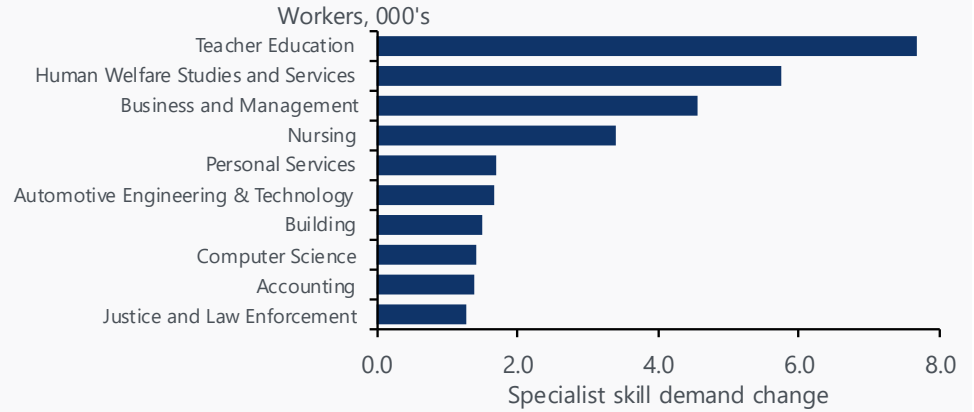
There are also opportunities in a broad set of engineering roles related to professional services. The highest demand roles in professional services that are engineering related are civil engineering professionals. These are important growth opportunities for highly skilled fossil fuel workers such as mining engineers and industrial, mechanical and production engineers. Another important growth role pathway for fossil fuel workers is for those roles that are key to the priority areas identified in the *Regional Investment Analysis*.

Largest growth opportunities by role, 2024-2035



Source: Oxford Economics based on AEMO Step Change Scenario.

Largest growth opportunities by specialist skill, 2024-2035



Source: Oxford Economics based on AEMO Step Change Scenario.

EDUCATION & TRAINING ENVIRONMENT

VET is a key pathway for training in the Hunter, especially in areas supporting fossil fuel worker transitions into skill adjacent roles.

VET sector analysis

The vocational and education training (VET) sector is a critical pathway for supply skills into the Hunter region's workforce. Around 40% of the workforce hold a VET qualification as their highest qualification, with high concentrations in mining, construction and other services industries.

VET completion rates* have declined in the Hunter, reflecting a broader trend in this training pathway at a state and national level. Around 4.3% of the Hunter region population completed a VET course in in 2023, down from 4.4% in 2015. While lower than the national average (4.6% in 2023) the rate of decline has been less severe. The decline in completion rates has been offset by population growth, with total VET completions growing over the period. Furthermore, the recent uptick in completion rates combined with a strong pattern of VET commencements suggests a steady pipeline of graduates coming through the system.

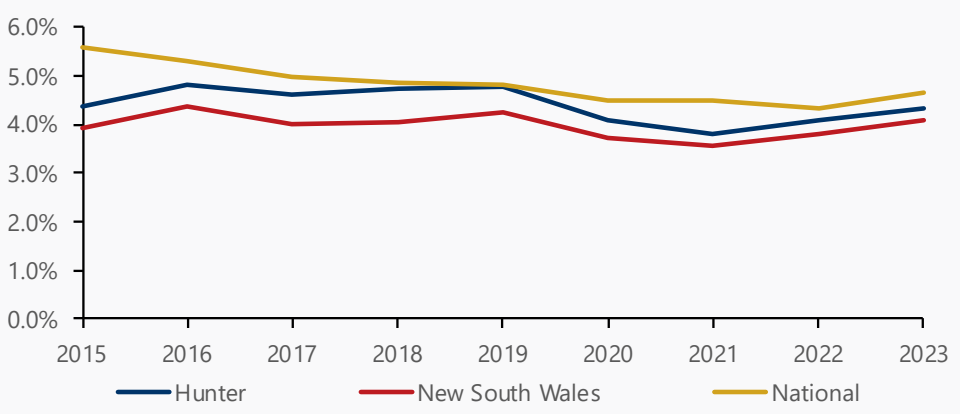
Apprenticeships are a key part of the VET sector, and especially important for trades in construction, utilities and manufacturing. The Hunter outperforms the national and state averages, with a completion rate of 0.9% of the population compared to 0.6% and 0.5% respectively. This has resulted in nearly 5,800 apprentice completions in the Hunter in 2023, with a significant step up from the weak performance over COVID.

The region's VET providers include around 15 TAFE NSW campuses and numerous private RTOs. These TAFE campuses include the creative arts hub in Newcastle[9], the net zero manufacturing centre in Newcastle[10] and the mining skills centre in Muswellbrook[11]. In addition, training courses focused on engineering, building, sustainability and health are available across the range of campuses. Training output has been bolstered in recent years by initiatives like NSW's fee-free courses and targeted skills programs.

The Net Zero Centre aims to training around 450 students annually with first courses open for enrolment in 2025[12]. These courses could be useful in supporting the 1,800 fossil fuel workers likely to require reskilling into new roles, noting this would absorb the fully operational capacity of the centre for 4 years. New short courses on renewable manufacturing, innovation, numeracy, and generative design are also available through the centre and online. Funding is expected to support over 10,000 learners in the next four years across the state[13]. These may support fossil fuel workers undertaking workforce transitions, which would absorb around 60% of that learner target.

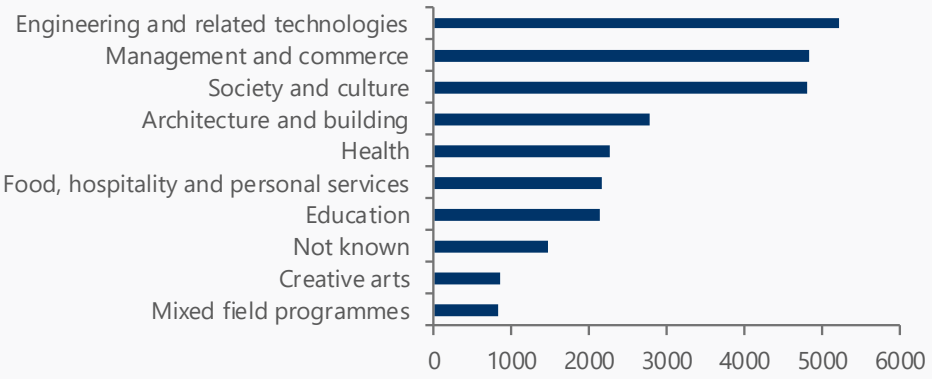
The national average cost of undertaking a VET program for students can exceed $3,000[14]. Funding through the centre aims to deliver fee-free courses or heavily subsidised which would reduce the cost burden for students.

VET program completion rates, 2015 to 2023



Source Oxford Economics, NCVER.

Top 10 VET program completions by field of education, 2023



Source Oxford Economics, NCVER.

**Completion rate is calculated as total completions as a share of the 15 to 64 year old population.*

The higher education sector has played a smaller role in supplying graduates to the region, but short course programs for highly specialized roles will likely be needed.

Higher education sector analysis

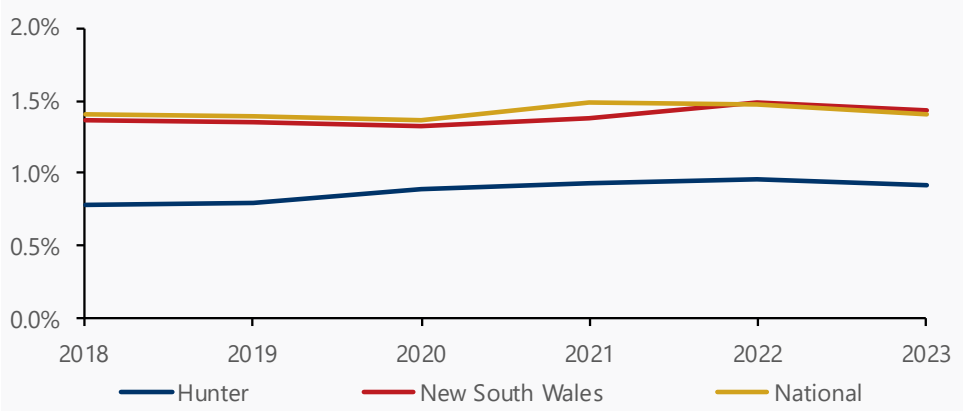
The higher education (HE) sector is an important education pathway for supply of highly skilled workforce into the Hunter region. Around 27% of the workforce hold a HE qualification as their highest qualification, with high concentrations in education, professional services and health industries.

The primary university in the Hunter is the University of Newcastle (UON), which serves as the region's flagship HE provider. UON (including its Central Coast campus) produces graduates across a range of fields relevant to the local economy – notably health, education, business and engineering. Completion rates* have remained relatively stable between 2018 and 2023 at the UON, sitting at 0.9%. This is slightly below national and state averages which are closer to 1.4%. There has been a significant step down in enrolments since COVID which suggests a slightly weaker pipeline of graduates can be expected over the coming years.

UON is a national leader in advanced manufacturing and net zero innovation, with strengths spanning intelligent manufacturing (robotics, automation, IoT, additive manufacturing, nanomaterials)[15], clean energy, and heavy industry decarbonisation. Recent investments include the TRaCE Trailblazer initiative, which established a Modern Manufacturing Workshop and Advanced Prototyping Facility to accelerate clean energy and circular economy commercialisation[16], the Future Industries Facility ($20.7m federal funding) to scale large-prototype testing and industry collaboration[17], and new infrastructure such as a $2m Intellivation Roll-to-Roll Coater supporting sovereign manufacturing in advanced materials[18]. Research hubs like the Newcastle Institute for Energy and Resources (NIER) and the ARC Training Centre for the Global Hydrogen Economy anchor UON's net zero work, while initiatives like the Net Zero Grand Challenge fund student-led carbon reduction projects[19]. Collectively, these expansions reinforce the Hunter's role as a national hub for engineering talent, clean energy R&D, and advanced manufacturing capability.

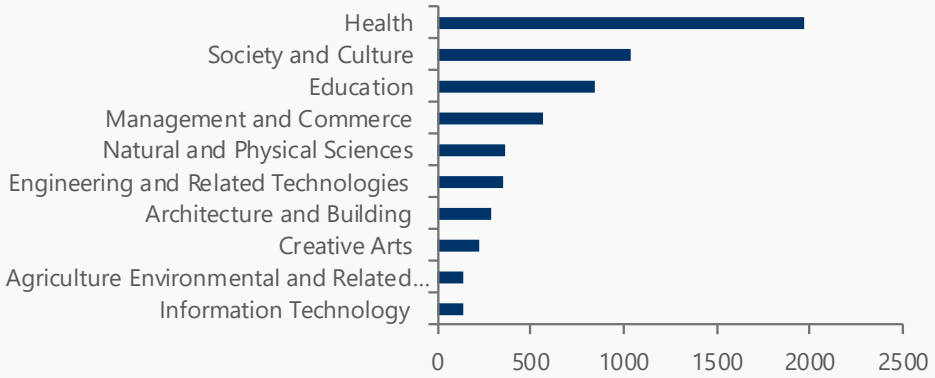
UON is significantly investing in regional expansion, particularly through the development of the Gosford Mann Street campus, offering local access to university-level programs starting in 2026. This is expected to lift the overall capacity of UON in the region to over 38,500 students a year upon completion. HE bachelor courses are unlikely to be the initial pathway of choice for fossil fuel workers undertaking workforce transitions, with workers in engineering related roles more likely to pursue this avenue through short courses such as graduate certificates. The number of fossil fuel workers undertaking these pathways would likely be less than 1,000, putting limited pressure on the university's capacity.

HE course completion rates, 2018 to 2023



Source Oxford Economics, Department of Education.

Top 10 HE course completions by field of education, 2023



Source Oxford Economics, Department of Education.

**Completion rate is calculated as total completions as a share of the 15 to 64 year old population.*

TRANSITION BARRIERS & ENABLERS

Regional conditions and demographic considerations present limited barriers to workforce transition pathways, but there are some role-specific barriers

Workforce barrier analysis

Regional barriers to workforce transition for fossil fuel workers appear to be relatively limited, with sufficient capacity to absorb displaced workers and enable their mobility. There are numerous opportunities for these workers to transition into new roles, particularly in occupations where skills are highly transferable. However, some groups, namely drillers, miners & shot firers, other building & engineering technicians and mining engineers, are likely to face greater challenges. These roles have few similar alternatives and face weak demand outside the fossil fuel sector, making it difficult for these workers to undertake transitions into new roles. The fossil fuel workforce is willing to overcome geographic mobility barriers, as these workers typically commute longer distances than the broader workforce average. However, willingness to travel to new jobs will depend on the nature of the work. Furthermore, the region is well equipped with training facilities, which can support workers who require upskilling or reskilling as part of their career transition.

Role-specific barriers present more significant challenges, particularly relating to the match between qualification requirements and income expectations. The fossil fuel workforce exhibit a varied skill profile, with some groups possessing sufficient foundational and generalist skills set to support a smooth transition, while others are likely to need substantial reskilling. Engineering and managerial workers are usually highly skilled, whereas trades workers and machine operators generally score lower in skill assessment and hold lower formal qualifications compared to the broader workforce average. This limits the direct transferability of their skills to other sectors without targeted training. Furthermore, the fossil fuel workforce typically earn higher wages, largely due to their specialised skills and industry productivity. The income disparity is a potential barrier to transition pathways as many alternative roles may offer lower wages. There is also some risks of competition between displaced fossil fuel workforce and new entrants into the sector, which may further limit the already constrained opportunities. However, the current number of graduates entering the field remains moderate, suggesting this pressure is manageable in the short term. On a more positive note, employment type is unlikely to pose a barrier, with most of fossil fuel workers employed full-time, aligning with the workforce average.

Demographic barriers to workforce movements are minimal. The fossil fuel workforce is unlikely to experience demographic challenges when transitioning into other roles and industries. Except for other building & engineering technicians and production managers who are more likely to fall into older age groups, most fossil fuel workers are within the prime working age, supporting their capacity to reskill and adapt. Additionally, the share of workers requiring assistance are relatively low, suggesting limited need for targeted support measures during transition. There is a higher share of First Nations people in the workforce which may require targeted support measures specific to this cohort.

Workforce barrier assessment by barrier type

Barrier type		Barrier assessment
Regional	Job availability	Low
	Diversification of roles	Medium
	Workforce willingness to commute	Low
	Training availability	Low
Role	Skills*	Medium
	Qualifications*	Medium
	New graduates supply**	Medium
	Wages	High
	Employment type	Low
Demographic	Age	Low
	First Nations	High
	Disability	Low

Source: Oxford Economics.

**Ranking compares the fossil fuel workforce skills and qualifications to the broader workforce.*
***Based on SA4 and OE workforce supply modelling.*

Policy response is required across all three levels of government, ensuring consistent support for fossil fuel communities that is flexible to a region's economic priorities

Policy levers

Diversification

Create new economic opportunities through investment in new industries and infrastructure to reduce regional dependence on fossil fuels and create alternative employment opportunities

Retraining

Provide workers with the resources to make informed decisions on retraining pathways that are likely to provide long-term, stable employment

Redeployment/ Transition Support

Utilise and repurpose the existing fossil fuel workforce as the industry declines to ensure continued employment opportunities for fossil fuel workers

Early Retirement*

Offer older workers with limited redeployment opportunities and limited benefits from retraining, redundancy and retirement bridging packages to ease labour market pressure on key occupations in decline.

Government roles

Federal

Provides national frameworks that guarantee worker entitlements, provide structural adjustment funding, and coordinate transition planning across jurisdictions.

State

Implements regionally tailored transition mechanisms such as statutory authorities, training and reskilling programs, and industry development initiatives for coal-dependent areas.

Local

Engages with communities and industry stakeholders, contributes to transition authorities, and facilitates local initiatives that reflect workforce and economic priorities.

**Early retirement was out of scope for this analysis.*

Workforce transition policy is primarily focused on economic diversification and retraining, with limited policy on transition support before workers are made redundant

Current workforce policy support

Workforce transition policies in the Hunter combine national consistency with regional flexibility, guaranteeing workers' core entitlements in transitioning industries while enabling communities to adapt solutions to their circumstances.

Across all levels of government, diversification and retraining are the primary levers used to prepare fossil fuel regions for change. Diversification efforts focus on attracting investment and new industries to coal-dependent areas, while retraining programs expand pathways for workers into clean energy, advanced manufacturing, and other growth sectors. In contrast, redeployment has received less policy attention and is applied less consistently across the regions' fossil fuel workforce, leaving fewer structured opportunities for workers to transition into equivalent roles. Early retirement and income bridging policies have been used in international approaches but are far less developed in the Australian policy mix and are outside the scope of this report.

Federally, the *Energy Industry Jobs Plan* provides a framework which may oblige employers to provide redeployment support to workers at closing power stations in the region as well as dependent employers who are likely to cease a substantial part of their operations due to the closure of the power station[20]. This is reinforced by *Regional Workforce Transition Plans* that will set out place-specific strategies for regions significantly impacted by Australia's transition to a net-zero emissions economy, delivered on the ground by *Regional Workforce Transition Officers* who link workers to training, jobs, and support services[21,22]. Transition support for retrenched workers can be accessed through the Department of Employment and Workplace Relations *Transition Support Network*; however, beyond this, there appear to be limited resources to help workers in declining industries proactively transition[23]. Training access is expanded through the *New Energy Apprenticeships* stream of the *Key Apprenticeship Program* (supporting apprentices in clean energy trades), *Fee-Free TAFE* (eliminating training costs for priority courses), and the *Clean Energy Training Investment Fund* (building new capacity in TAFE and registered training organisations to deliver clean energy skills)[24,25,26]. Training products are informed directly by industry feedback, with the relevant Jobs and Skills Council advising on the type of training that is required by the job market and that will drive high-quality outcomes for employers and employees.

Current state policy is primarily focused on generating new employment opportunities and retraining pathways, with less emphasis on structured redeployment schemes. The proposed *Future Jobs & Investment Authority* is planned to be funded by the *Royalties for Rejuvenation Fund* and is the state's statutory body dedicated to workforce transition[27,28]. It has established local authorities in coal communities, each comprising local government, unions, industry, and community representatives, to ensure decisions are grounded in regional needs. Employment creation is supported by the *Electricity Infrastructure Roadmap*, which sets the rules for renewable energy zones and requires project developers to demonstrate community benefits and local hiring in the Hunter–Central Coast REZ[29]. Training is advanced through the *Hunter Net Zero Manufacturing Centre of Excellence,* which develops pathways for trades, engineers, and technicians into clean industries, alongside the *NSW Hydrogen Strategy* and *Clean Manufacturing Precincts,* which focus on building industry clusters in hydrogen and advanced manufacturing that can absorb existing trade and technical skills[30,31,32].

At the local level, councils and regional development groups complement state and federal programs by driving place-based economic diversification and workforce support. The *Hunter Joint Organisation* coordinates regional transition planning across councils and feeds local perspectives into broader state workforce strategies[33]. *Newcastle City Council* has adopted a *Climate Action Plan* and *Economic Development Strategy* that builds on its strengths in clean energy, advanced manufacturing, and technology jobs to continue to diversify the economy and replace coal-related employment[34,35]. The Department of Employment and Workplace Relations *Hunter Locals Jobs Plan* sets out the local job and skill priorities with health, construction and infrastructure, manufacturing, defence, hospitality and emerging industries priority growth opportunities for the Hunter[36]. Together, these initiatives ensure coal communities can leverage wider investment in ways tailored to their economic base.

Transition policies in the Hunter target industries that build on existing mining and power station workforce capabilities, reducing retraining barriers with new energy and advanced manufacturing as natural pathways for trade and technical workers. The *Electricity Infrastructure Roadmap* requires renewable energy zone developers to prepare *Local Employment Plans* that draw directly on local electrical, construction, and heavy industry expertise[29]. The *Hunter Net Zero Manufacturing Centre of Excellence* was created to translate coal-region trades and engineering experience into renewables, hydrogen, and advanced manufacturing. The *NSW Hydrogen Strategy* and *Clean Manufacturing Precincts* further support this by focusing on industries where existing process, mechanical, and electrical trades are directly relevant, reducing the scale of workforce retraining required[30,32].

International policy efforts have combined a mix of diversification, redeployment, retraining and early retirement to support workforce transitions

International workforce policy support examples

International workforce transition plans use a mix of policies to support displaced fossil fuel workers. Countries such as Germany, Spain, Canada, and the United States have combined diversification funding, redeployment, retraining, and early retirement schemes to protect livelihoods while building pathways into new industries.

Diversification funding has been used internationally to reduce a region's reliance on fossil fuel industries by investing in infrastructure and programs to attract new industries. The German government's *Structural Strengthening of Coal Regions Act 2020* committed to spending €40 billion over 20 years on infrastructure upgrades, industry attraction and diversification, and research and development[37] Canada and the United States have both committed more modest resources to increasing economic diversification in fossil fuel communities. Funding in Canada was primarily directed towards infrastructure, with the C$150 million *Infrastructure Fund* providing coal regions funding to upgrade local infrastructure to make the regions more attractive to investment[38]. Furthermore, the C$35 million *Coal Transition Initiative* provided funding for communities to develop sector strategies to attract future industries[38]. In the United States, the *POWER (Partnerships for Opportunity and Workforce and Economic Revitalisation) Initiative*, run by the Appalachian Regional Commission, has channelled more than US$480 million into projects such as broadband networks, business incubators, and land redevelopment to attract new employers[39].

Redeployment policies help workers remain employed by shifting them into roles that use existing skills. In Spain, the *2018 Just Transition Agreements* were negotiated specifically around coal mine closures, with ex-miners prioritised for mine land rehabilitation and public works that matched their heavy equipment, safety, and environmental management skills[40]. In Canada, redeployment was less formalised but present, with the provincial government providing enhanced employment services including a top-up on traditional unemployment benefits, education and relocation support [42,43].

Retraining programs internationally have focused on aligning training opportunities with identified growth industries and boosting training infrastructure to meet the increased needs of regions in transition. Spain focused retraining on miners not covered by early retirement or redeployment, with training programs designed to redirect younger workers into identified industries, including construction, energy, and environmental services[40]. German workers who were not old enough to retire were provided access to their national upskilling fund[37]. Canada's *Just Transition Task Force* recommended the creation of locally based worker transition centres that provide career counselling and subsidised training, with programs aligned to regional opportunities in clean energy, construction, and advanced manufacturing[42]. In the United States, the *POWER Initiative* channels funding to community colleges and workforce boards to reskill displaced workers in IT, healthcare, and advanced manufacturing, emphasising sectoral diversification[39].

Early retirement and pension bridging schemes reduce pressure on the labour market by offering older workers a secure exit when retraining is less realistic. In Germany, the *Anpassungsgeld (APG)* allowance provided income support for workers aged 58 and above in both mines and power plants until they qualified for statutory pensions, ensuring stability and protecting entitlements[38]. Spain's *2018 Just Transition Agreement* offered miners aged 48 and above early retirement packages with state-backed pension top-ups, while younger workers received redundancy payments and retraining opportunities[41]. In Canada, Alberta's *Coal Workforce Transition Program* considered a "bridge to retirement" payment for eligible power sector workers close to pension age, complementing federal transition supports, however, it decided against this and instead relied on more generous unemployment benefits to help workers transition within instead of out of the labour market[42].

POLICY GAP ASSESSMENT

Diversification and retraining are currently the key levers to overcoming workforce transition barriers, with potential for redeployment to take a bigger role.

Barriers

Diversification of roles

- Declining employment demand for fossil fuel workers is likely to be exacerbated by falling employment in the wider industrial sector in the Hunter region, where many similar and skill-adjacent roles exist in higher concentrations.
- Several key specialist roles are highly specialised to mining, and there is a highly limited number of roles they can transfer into within their current occupation and into similar occupations within the region.
- Growth in skill adjacent roles for the fossil fuel workforce more broadly is set to be soft to 2035 as manufacturing and utility roles, which contain high concentrations of skill adjacent roles, also come under pressure from falling demand for employment in industrial roles.

Qualifications & skills

- Declining industrial employment* will potentially hamper the ability of fossil fuel workers to utilise their current qualifications and skills and exacerbate financial pressure if they move into lower-skilled roles not well aligned with their current skillset.
- Fossil fuel workers have marginally lower education levels on average, with workforce education primarily centred around VET and on-the-job training. Despite having lower levels of formal education, they currently receive above-average wages.
- Workers transitioning, being redeployed, reskilling or retraining, may not find comparable wages due to the high levels of compensation present in the fossil fuel industry.

Assessment of current levers

Across all levels of government, diversification and retraining have been the primary levers relied upon by current policy to prepare fossil fuel regions for the workforce transition.

Diversification efforts are primarily directed at the state and local level with the proposed *Future Jobs & Investment Authority*, funded through the *Royalties for Rejuvenation Fund*, empowering coal communities to shape their workforce strategies. In the Hunter, diversification strategies have identified clean energy and advanced manufacturing as industries diversification should target. Policies, including the *Electricity Infrastructure Roadmap,* ensure renewable energy projects in the Hunter–Central Coast Renewable Energy Zone generate local jobs, while the *Hunter Net Zero Manufacturing Centre of Excellence*, *Hydrogen Strategy*, and *Clean Manufacturing Precincts* deliver new training pathways linked to advanced manufacturing and hydrogen.

Retraining efforts have been further supported by the Australian Government with *Fee-Free TAFE*, the *Clean Energy Training Investment Fund*, and the *New Energy Apprenticeships* stream of the *Key Apprenticeship Program*, which target critical skills in identified industries of interest for the region, as well as broader national skill priorities. However, there is a risk if diversification policies do not achieve their stated outcomes; linked retraining could increase competition in key occupations currently forecast to decline in demand.

The Australian Government supports the Hunter through the *Energy Industry Jobs Plan (EIJP),* provides a framework to support workers affected by power station closures through which employers must offer transition assistance. This will be complemented by the *Regional Workforce Transition Plans (RWTP),* which will support workers, their families and communities in regions that are, or will be, significantly impacted by the transition to a net-zero emissions economy.

Additional support to address barriers

Diversification and retraining are well supported by current policy, with significant investment in attracting new industries to the Hunter and expanding training pathways into clean energy, advanced manufacturing, hydrogen and other national employment priorities. In contrast, redeployment has received less policy attention, leaving fewer structured opportunities for workers to transition into equivalent roles.

Currently, the *EIJP* provides a framework which may oblige employers to provide redeployment support to workers at closing power stations in the region as well as dependent employers who are likely to cease a substantial part of their operations due to the closure of the power station. This also includes broader support programs including access to training and employment services. The closure of export coal mines is not covered under EIJP legislation. This program is currently under review, including scope of coverage.

Workers in the Hunter affected by the transition to Net Zero will be supported by the *RWTP*. Support provided by the *RWTPs* is not done on a site-by-site basis but is instead provided to the region at large. The majority of fossil fuel employment in the Hunter is in coal mining, with most coal exported.

An opportunity exists for all levels of government to explore options to prepare export coal mine workers for the transition, both through new and the expansion of existing programs. This would need to consider current and planned supports across government, as well as budgetary implications. A review of the effectiveness of existing transition supports and their applicability to export coal mine closures would be beneficial to inform future government decision-making.

** Industrial employment is made up of employment in agriculture, mining, manufacturing, utilities and construction.*

Economic diversification will be a critical lever to supporting workforce transitions, and current policy is suitably focused on this area.

Gap analysis for economic diversification

Barriers

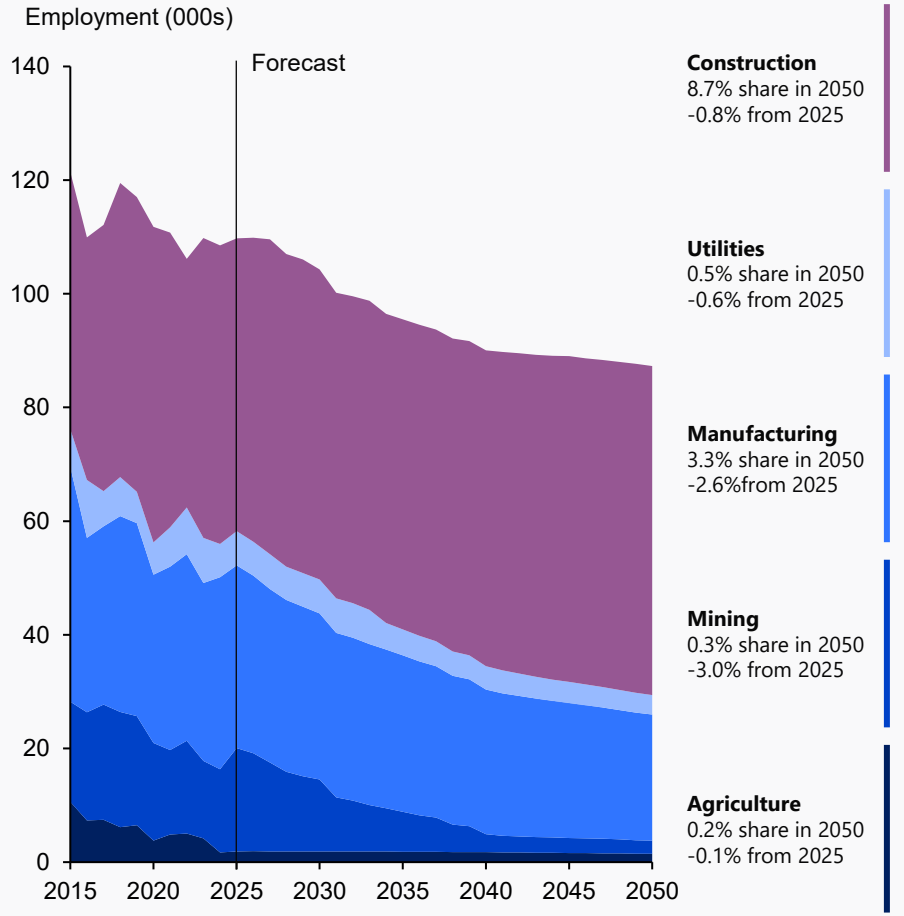
Workforce transition for fossil fuel workers is expected to be compounded by the broader decline in industrial employment, which reduces opportunities for lateral movement into similar roles. This structural shift limits the capacity of affected workers to transition either within their current occupation or into adjacent roles requiring minimal reskilling.

The barriers are most acute for specialist occupations such as drillers, miners and shot firers, and mining engineers. These roles are highly concentrated in fossil fuel industries and have limited transferability to other sectors, particularly given their strong linkage to the Hunter region's fossil fuel industry. Other specialist roles that account for much of the fossil fuel workforce are less narrowly concentrated but remain heavily represented in the wider industrial labour market, which itself is in structural decline. While some scope for natural redeployment exists through workforce turnover and retirements, these opportunities will be constrained by competition from new graduates entering the labour market, placing additional pressure on displaced workers and heightening the need for identified economic diversification programs to support industrial employment.

Current support programs

The Hunter region already has a significant number of economic diversification policies in place, reflecting both state and local efforts to reduce reliance on coal. At the state level, the *Future Jobs & Investment Authority* (funded through the *Royalties for Rejuvenation Fund*) channels investment into locally guided priorities, ensuring coal communities shape their own economic future[27,28]. The *Electricity Infrastructure Roadmap* and the *Hunter–Central Coast Renewable Energy Zone* are designed to attract new businesses and infrastructure investment while linking renewable projects to local jobs[29]. Targeted industry development is supported through the *Hunter Net Zero Manufacturing Centre of Excellence*, the *NSW Hydrogen Strategy*, and *Clean Manufacturing Precincts*, which aim to build advanced manufacturing and hydrogen supply chains in the region[30,31]. Complementing these state initiatives, local councils and Regional Development Australia (Hunter) have adopted strategies to grow clean energy, defence, aerospace, and technology sectors, embedding diversification into long-term regional planning[33,34,35,36]. The Commonwealth support includes the Future Made in Australia, National Reconstruction Fund, Clean Energy Finance Corporation and Australian Renewable Energy Agency. Furthermore, the *Regional Investment Analysis* undertaken for NZEA has identified hydrogen, ammonia and biofuels as potential priority investment areas in manufacturing and energy from waste in utilities. A suite of policies has been adopted to diversify the Hunter region's industrial base and strengthen employment pathways, leveraging skills from the declining fossil fuel workforce. Given the breadth of programs in place and recommended in this report, future outcomes will depend on the effectiveness of implementation and delivery.

Industrial employment in the Hunter region



Source: Oxford Economics based on AEMO Step Change scenario.

** Industrial employment is defined as employment in agriculture, mining, manufacturing, utilities and construction.*

Targeted redeployment programs can reduce workforce transition barriers if enacted before job losses are experienced and reduce the need for retraining.

Gap analysis for redeployment and retraining

Barriers

Supporting workers into roles that maximise their qualifications and skillsets will likely minimise the change in workers' financial situation and help to reduce the retraining burden. The skill profile of the fossil fuel workforce is broadly comparable to that of the wider Hunter region, but many of these capabilities have been developed through on-the-job experience and VET, and lower levels of HE. The workforce holds relatively lower levels of formal qualifications despite earning significantly higher average wages, particularly in specialist roles that dominate industry employment.

Wage disparity between fossil fuel workers and the equivalent average worker in the Hunter tends to increase for lower-skilled workers. Whether workers transition through the labour market or are supported by redeployment into equivalent or adjacent roles, workers are likely to encounter smaller pay disparities if they can secure positions that maximise the use of their experience and any formal qualifications they hold.

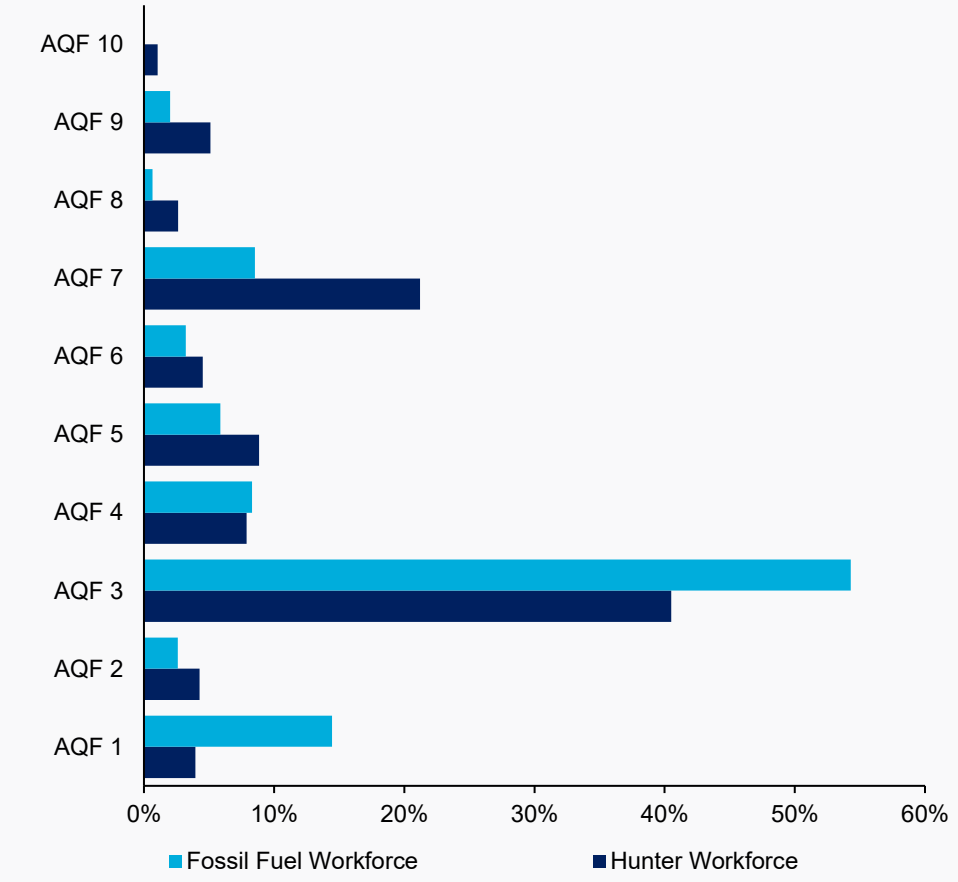
Current support programs

In the Hunter, the *Regional Workforce Transition Plan (RWTP)* provides a place-based framework for transition delivered by *Regional Workforce Transition Officers* who connect workers to potential supports, including training, jobs and career services[22]. The RWTPs will be able to fund new supports tailored to regional need. By contrast, workers at Eraring Power Station and eligible associated businesses will potentially be covered under an *Energy Industry Jobs Plan (EIJP),* which could see employers obligated to offer transition assistance[20]. Retrenched workers across both frameworks are also able to access the *Transition Support Network*, which provides job search, career advice, and referral to relevant services, although this is a reactive rather than a proactive support service[23].

Gap

The closure of export coal mines, where the majority of fossil fuel employment exists, is not covered under *EIJP* legislation. A review of the effectiveness of existing transition supports and their applicability to export coal mine closures would be beneficial to inform future government decision-making. Any new transition supports would depend on the coverage of any Regional Workforce Transition Plan, existing or new redeployment supports from the NSW government, and contributions from employers.

Share of workforce by AQF level



Source: Oxford Economics, ABS Census.

TECHNICAL APPENDIX

FOSSIL FUEL WORKER ESTIMATES

The current size of the fossil fuel workforce has been estimated using a combination of census and labour force data.

Methodology for estimating fossil fuel workers in the region

Using Census data on industrial structures for the region and ABS Detailed Labour Force the following process was used to estimate the fossil fuel workforce.

1. **Workers are divided into smaller regions (SA3s) based on the share of the workforce that was in that location during the 2021 census, over the larger region it is a part of (SA3/SA4). This is done for each industry individually.** SA4 1-digit employment by industry is divided based on the share of 1-digit industry employment held by an SA3 in the 2021 Census.
2. **The share of workers in the smaller region is then multiplied by the current number of workers in the larger region to estimate the number of workers in the smaller region. (SA3/SA4)*(SA4)** Industrial share by SA3 is multiplied by the relevant industry SA4 ABS Detailed Labour Force employment to produce a current estimate of employment for the region of interest.
3. **Smaller industries (4D) are estimated by dividing the smaller industry by its parent industry (4D/1D). Once the smaller industry has been estimated we divide it into occupations based on the the share of workers each occupation represented at the census.** 4-digit fossil fuel industries' shares from the Census are applied to estimate the fossil fuel workforce. 1-digit Census occupation shares are applied to the 4-digit industries of interest to estimate the occupational makeup of the fossil fuel industry

Definition of fossil fuel workers, ANZSIC 4-digit industries

Industry name	ANZSIC code	Definition
Coal mining	0600	This class consists of units mainly engaged in open-cut or underground mining of black or brown coal.
Fossil fuel electricity generation	2611	This class consists of units mainly engaged in the generation of electricity using mineral or fossil fuels in internal combustion or combustion-turbine conventional steam processes.
Gas supply	2700	This class consists of units primarily engaged in the distribution of gas such as natural gas or liquefied petroleum gas through mains systems.

Source: ABS ANZSIC (2006)

Additional source information

After producing the fossil fuel workforce estimates, we conducted a feasibility check using a bottom-up research approach. This involved aggregating employment numbers from company reports, government publications, and credible third-party sources across the relevant fossil fuel industries. This method allowed us to account for approximately 90% of the overall estimate, with the majority of identified employment concentrated among the largest companies. The remaining shortfall was anticipated, supporting our conclusion that the estimates were reasonable.

WORKFORCE TRANSITION METHODOLOGY

There are four pathways that fossil fuel workers can take as they transition to other roles in the Hunter economy.

Transition pathway	Similar roles	Skill adjacent roles	Growth roles	Workforce exits
	Similar roles are those that are the same or nearly identical to other roles within the regional workforce.	Skill adjacent roles are roles where qualifications and/or skills have similarities to other roles within the regional workforce.	Growth roles are those with strong demand in the region where specialist skills and qualifications are not well aligned to fossil fuel workers' skill sets.	A proportion of fossil fuel workers will continue to retire each year, exiting the workforce naturally as they enter retirement.
Support measures	**Transition support** will enable workers to identify the types of roles they are suitable for and the industries these roles are often in. This support often takes the form of employment services or financial assistance. Supporting workers into equivalent roles where their qualifications and skills are aligned should be prioritized as this pathways has the lowest investment requirement. Emphasis should be placed on growing and stable industries to provide longer-term role security for transitioning workers.	Supporting workers to identify and undertake **reskilling and upskilling** opportunities that align with current skills and qualifications will enable workers to transition to a skill adjacent role. Minimal training is needed to bridge the gap between a worker's current role and an identified skill adjacent role which can reduce pressure on the education system. Reskilling & upskilling should focus on pathways that minimise time out of employment and educational resources needed, while offering access to stable employment that leverages workers' existing skills and experience.	**Retraining** pathways should highlight qualifications that lead to roles in growing or stable industries to support long-term job security and living standards for at-risk workers. Significant training will be needed to retrain at-risk roles requiring investment from the worker, their employer and the region's education system. There are two key components of retraining support: the provision of training through educational pathways, and support to enable at-risk individuals to identify new employment opportunities.	Workers exiting the workforce due to retirement will not require workforce transition support. In some cases, these workers may need financial advice to support their retirement decisions and planning*.
Additional considerations	Regional demand will determine how many workers can access transition support. Where a surplus of similar roles exists, prioritisation should be given to reskilling & upskilling over retraining.	Where workforce supply exceeds demand for workers in skill-adjacent roles, retraining may be required.	Retraining will also be required where there is a surplus of workers with similar and skill-adjacent roles.	Consideration should be given to the types of roles that tend to have older age cohorts and how this will impact workforce support pathways.

Notes: The workforce transition methodology appendix presents a decision tree outlining how fossil fuel workers can be assessed to ensure they receive the most appropriate employment support for their transition.
** A review of retirement support policies and requirements is outside the scope of this project.*

Identifying appropriate transition pathways draws on three sources of information.

Skillsets demanded by the workforce

Skills analysis will identify transition pathways by highlighting viable alternative occupation pathways for fossil fuel workers. Viable pathways are defined as pathways where an occupation's **specialist, generalist** and **foundational** skills are equivalent to or greater than another occupation's skills.

Specialist skills

- Minimum education requirements are based on the Australian Qualifications Framework (AQF) level.
- The field of education is based on the most common field by industry occupation pair.

Generalist

- Are classified as a set of the required proficiency levels in core skills focused on generalist thinking and work-based learning experiences.

Foundational skills

- Are the basis upon which all other skills are built and are common across all occupations. Generalist skills (e.g. reading and numeracy).

Qualifications held within roles

Analysis of identified viable job pathways will be complemented with an assessment of the level and fields of education (**specialist skills**) held by fossil fuel workers.

Level of education (LOE)

- Data on the level of education that fossil fuel workers possess, e.g. Census data on highest educational attainment, will be analysed to confirm alignment with occupations' minimum education requirements.
- Seek data will be used to confirm the LOE that viable job pathways typically ask for, to determine if there are deviations in minimum educational requirements and actual education requirements demanded by employers.

Field of education (FOE)

- Analysis will be undertaken on the distribution of FOE by industry occupation pairs using the Census to understand the implications for viable job pathways on workers who have equivalent industry occupation pairings but a different FOE.

Historic movement patterns

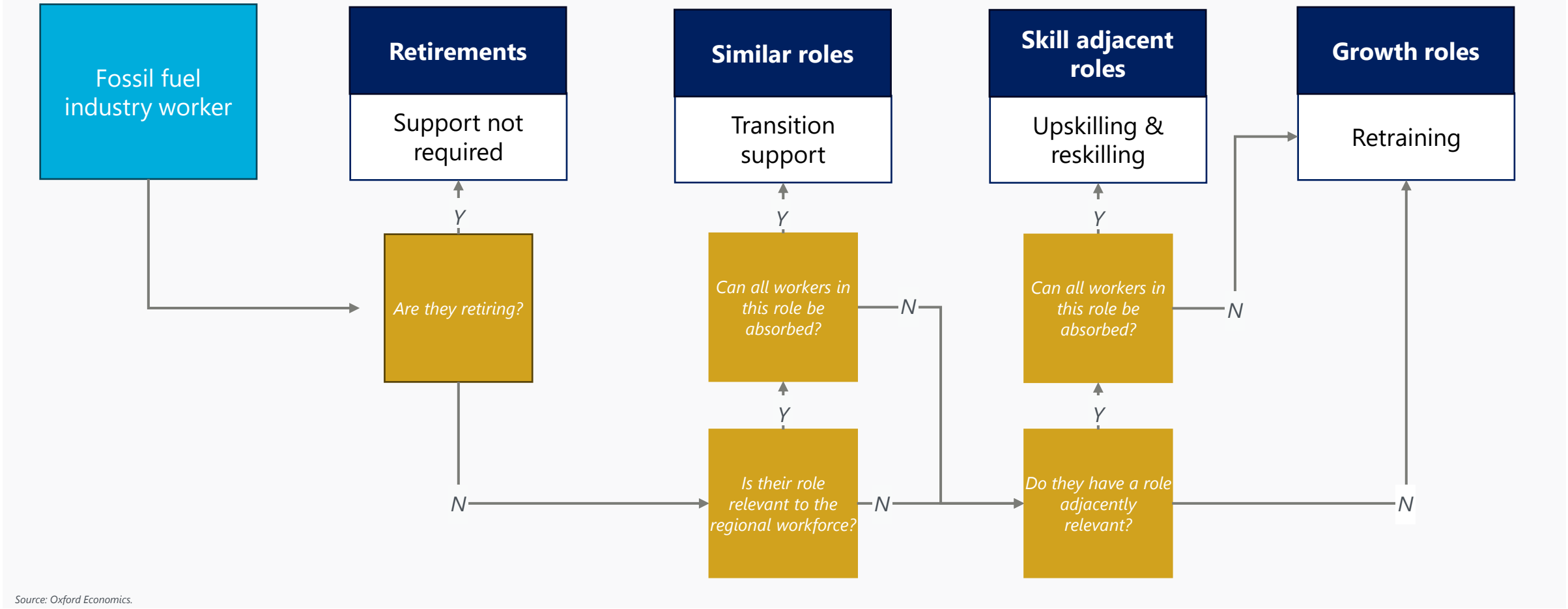
To corroborate that transition pathways are appropriate and viable for fossil fuel workers, Oxford Economics will undertake an analysis of historic movements of fossil fuel workers out of industry.

Historic movements of fossil fuel workers

- Seek data will be used to identify the known pathways by occupation industry pairs that fossil fuel workers have moved into successfully in the past and the propensity for them to do so.
- Historical movements will be tested against occupation industry pair transition pathways identified in the skillsets and qualifications analysis.
- Where viable job pathways have been determined based on our skills framework, and an analysis of actual qualifications held by fossil fuel workers, but there is limited evidence of historic job movements analysis of potential barriers limiting these pathways will be undertaken.

Identifying the workforce transition pathway that fossil fuel workers are most likely to need is based on a decision tree framework.

Fossil fuel worker, workforce transition pathway decision tree



Source: Oxford Economics.

WORKFORCE BARRIER ASSESSMENT

Role diversification is a more significant regional barrier to workforce transition than job availability.

Regional barrier assessment by role

Hunter fossil fuel workforce barrier assessment	Job availability	Diversification of roles	Workforce willingness to commute	Training availability
Metric	*Ratio measures the availability of similar roles against the number of transitioning workers.*	*Growth in employment demand for skill adjacent roles by 2035*	*Average commute distance* ratio of role to region average.*	*Availability of training within the region*
Rating	*Low barrier: ratio > 2* *Medium barrier: ratio between 1 & 2* *High barrier: ratio < 1*	*Low barrier: growth > 15%* *Medium barrier: growth 10-15%* *High barrier: growth < 10%*	*Low barrier: ratio > 2* *Medium barrier: ratio between 1 & 2* *High barrier: ratio < 1*	*Qualitative assessment*
Fossil fuel workforce	**LOW**	**MEDIUM**	**LOW**	**LOW**
Drillers, Miners and Shot Firers	HIGH - 0.2 ratio	MEDIUM - 10% increase	LOW – 2.3 ratio	3 University campuses • Growing tertiary education ecosystem, significantly investing in regional expansion. • Recent investments in workshops and facilities to accelerate clean energy and circular economy commercialisation. 15 TAFE campuses • Vocational and micro-credential programs at the Net Zero Manufacturing Centre of Excellence in Newcastle • Offer free short courses that are designed to upskill workers for transmission and renewable projects in the region under the NSW Government's energy and construction skills program
Metal Fitters and Machinists	MEDIUM - 1.2 ratio	MEDIUM - 11% increase	LOW – 2.1 ratio	
Electricians	LOW - >2 ratio	MEDIUM - 13% increase	LOW – 2.3 ratio	
Other Building and Engineering Technicians	HIGH - 0.0 ratio	MEDIUM - 12% increase	LOW - 2.1 ratio	
Truck Drivers	LOW - >2 ratio	MEDIUM - 11% increase	LOW – 2.3 ratio	
Production Managers	LOW - >2 ratio	MEDIUM - 13% decrease	LOW - 2.1 ratio	
Structural Steel and Welding Trades Workers	MEDIUM - 1.9 ratio	HIGH - 9% decrease	MEDIUM - 1.6 ratio	
Mining Engineers	HIGH - 0.3 ratio	MEDIUM - 13% increase	LOW – 2.4 ratio	
Industrial, Mechanical and Production Engineers	LOW - >2 ratio	MEDIUM - 14% decrease	MEDIUM – 2.0 ratio	
Earthmoving Plant Operators	LOW - >2 ratio	HIGH - 9% increase	LOW – 2.4 ratio	
Highly transferable roles***	LOW - >2 ratio	MEDIUM - 13%**	MEDIUM - 1.6 ratio	

Source: Oxford Economics based on AEMO Step Chance scenario, ABS Census.

**Uses 2016 Census due to COVID. **Based on growth in employment of the region. ***Back-office functions and transferable on-site roles are industry-agnostic and essential across all sectors, making them highly transferable.*

Differences in wages are a significant role barrier to workforce transitions, with differences in skill levels and competition from new graduates also contributing.

Role barrier assessment by role

Hunter fossil fuel workforce barrier assessment	Skills	Qualifications	New graduates supply*	Wages	Employment type
Metric	*Average skill level (5.8 regional workforce average)*	*Level of education (AQF level 3 most common across regional workforce)*	*Estimated new graduates as a share of total workforce (2% regional workforce average)*	*Average wages ($52,000 - $77,999 regional workforce average)*	*Most common work type (full-time workforce average)*
Rating	*Low barrier: > 6 Medium barrier: 5.5 & 6 High barrier: < 5.5*	*Low barrier: > 3 Medium barrier: 3 High barrier: < 3*	*Low barrier: < 2% Medium barrier: 2% High barrier: > 2%*	*Low barrier: < $52,000 Medium barrier: within range High barrier: > $77,999*	*Low barrier: same type High barrier: different type*
Fossil fuel workforce	**MEDIUM**	**MEDIUM**	**MEDIUM**	**HIGH**	**LOW**
Drillers, Miners and Shot Firers	HIGH - 5.0	MEDIUM - AQF level 3	MEDIUM - 2%	HIGH - $104,000 – $155,999	LOW - Full-time
Metal Fitters and Machinists	MEDIUM - 5.8	MEDIUM - AQF level 3	LOW - 1%	HIGH - $104,000 – $155,999	LOW - Full-time
Electricians	MEDIUM - 5.7	MEDIUM - AQF level 3	LOW - 1%	HIGH - $104,000 – $155,999	LOW - Full-time
Other Building and Engineering Technicians	LOW - 6.4	MEDIUM - AQF level 3	LOW - 1%	HIGH - $182,000 or more	LOW - Full-time
Truck Drivers	HIGH - 4.8	MEDIUM - AQF level 3	HIGH - 3%	HIGH - $104,000 – $155,999	LOW - Full-time
Production Managers	LOW - 6.7	MEDIUM - AQF level 3	MEDIUM - 2%	HIGH - $182,000 or more	LOW - Full-time
Structural Steel and Welding Trades Workers	HIGH - 5.1	MEDIUM - AQF level 3	LOW - 1%	HIGH - $104,000 – $155,999	LOW - Full-time
Mining Engineers	LOW -7.2	LOW - AQF level 7	HIGH - 4%	HIGH - $104,000 – $155,999	LOW - Full-time
Industrial, Mechanical and Production Engineers	LOW - 7.3	LOW - AQF level 7	MEDIUM - 2%	HIGH - $182,000 or more	LOW - Full-time
Earthmoving Plant Operators	HIGH - 4.6	MEDIUM - AQF level 3	MEDIUM - 2%	HIGH - $104,000 – $155,999	LOW - Full-time
Highly transferable fossil fuel roles	MEDIUM - 5.9	MEDIUM - AQF level 3	HIGH - 3%	HIGH - $104,000 – $155,999	LOW - Full-time

Source: Oxford Economics, JSA, ABS ANZSCO, ABS Census.

**Based on SA4 and OE workforce supply modelling.*

The demographic make-up of the fossil fuel workforce presents limited barriers to workforce transitions, although the First Nations cohort may require targeted support programs.

Demographic barrier assessment by role

Hunter fossil fuel workforce barrier assessment	Age	First Nations	Disability
Metric	*Average age of fossil fuel workforce (35-44 regional workforce average)*	*First Nations representation (4.6% regional workforce representation)*	*Disability representation (1.1% regional workforce representation)*
Rating	*Low barrier: younger age group* *Medium barrier: same age group* *High barrier: older age group*	*Low barrier: < 4%* *Medium barrier: 4-5%* *High barrier: > 5%*	*Low barrier: < 1%* *Medium barrier: 1-2%* *High barrier: > 2%*
Fossil fuel workforce	**LOW**	**HIGH**	**LOW**
Drillers, Miners and Shot Firers	MEDIUM - 35-44	HIGH - 6.8%	LOW - 0.5%
Metal Fitters and Machinists	LOW - 25-34	MEDIUM – 4.8%	LOW - 0.0%
Electricians	LOW - 25-34	MEDIUM - 4.3%	LOW – 0.0%
Other Building and Engineering Technicians	HIGH - 45-54	LOW - 3.7%	LOW - 0.5%
Truck Drivers	LOW - 25-34	HIGH – 8.9%	LOW - 0.4%
Production Managers	MEDIUM - 35-44	LOW - 3.7%	LOW – 0.0%
Structural Steel and Welding Trades Workers	LOW - 25-34	HIGH - 8.8%	LOW – 0.0%
Mining Engineers	LOW - 25-34	LOW - 2.4%	LOW – 0.0%
Industrial, Mechanical and Production Engineers	MEDIUM - 35-44	HIGH – 5.6%	LOW – 0.0%
Earthmoving Plant Operators	MEDIUM - 35-44	HIGH – 8.3%	LOW – 0.0%
Highly transferable fossil fuel roles	MEDIUM - 35-44	MEDIUM - 4.4%	LOW – 0.0%

Source: Oxford Economics, ABS Census.

POLICY LEVER IDENTIFICATION

Workforce policy support programs are available across federal, state and local government.

Summary of current policies

Region	Agency	Policy
Federal	*Net Zero Economy Authority*	• Energy Industry Jobs Plan (EIJP)
	Dept. of Employment and Workplace Relations (DEWR)	• New Energy Apprenticeships Program • Regional Workforce Transition Plans • Regional Workforce Transition Officers
	DEWR + State Governments	• Fee-Free TAFE and Training Places
	Dept. of Climate Change, Energy, Environment and Water	• Clean Energy Training Investment Fund • National Energy Workforce Strategy
	Other	• Future Made in Australia • National Reconstruction Fund • Clean Energy Finance Corporation • Australian Renewable Energy Agency
State	*Future Jobs & Investment Authority*	• Future Jobs & Investment Fund (ongoing $22.5m p.a.; framework to spend on infrastructure, post-mining land-use planning, skills mapping, feasibility and training programs)
	Dept. of Climate Change, Energy, Environment & Water (NSW) / EnergyCo	• Electricity Infrastructure Roadmap
	TAFE NSW	• Hunter Net Zero Manufacturing Centre of Excellence
	NSW Net Zero Industry & Innovation Program	• Clean Manufacturing Precincts • Hydrogen Strategy
Local	*Hunter Joint Organisation of Councils*	• Regional transition planning (Coordinated council input into workforce and economic strategies)
	City of Newcastle	• Climate Action Plan • Economic Development Strategy (focus on clean energy, advanced manufacturing, and technology jobs)
	Department of Employment and Workplace Relations (Hunter Local Jobs PLan)	• Workforce skills and employment programs, aligning training priority sectors with skill requirements (manufacturing, defence, aerospace, clean energy, hospitality)

International examples cover diversification, retraining, redeployment and early retirement policies

Summary of international policies

Policy	Type
Germany	
€40 billion *Structural Strengthening of Coal Regions Act* (infrastructure, R&D, diversification)	Diversification
Vocational training and apprenticeships in renewables, logistics, advanced manufacturing	Retraining
Anpassungsgeld (APG) – early retirement allowance bridging income to pensions	Early Retirement
Canada	
Infrastructure Fund (C$150m) for coal community projects and *Coal Transition Initiative* (C$35m)	Diversification
Just Transition Task Force – local transition centres, career counselling, subsidised training	Retraining
Alberta Coal Workforce Transition Program – "Bridge to Retirement" payments	Early Retirement
Spain	
2018 Just Transition Agreement (Plan del Carbón) – early retirement at 48+ with pension top-ups; redundancy and retraining for younger workers	Early Retirement / Retraining
Redeployment of ex-miners into *mine land rehabilitation* projects	Redeployment
United States	
POWER Initiative (US$480m since 2015: workforce programs, small business, broadband, land reuse)	Diversification
Workforce retraining grants via community colleges and workforce boards (IT, healthcare, advanced manufacturing)	Retraining

DRILLERS, MINERS & SHOT FIRERS PROFILE

Drillers, miners and shot firers account for a significant portion of the fossil fuel workforce with demand expected to decline substantially by 2035.

Commentary

There are approximately 4,380 drillers, miners and shot firers in Hunter region's fossil fuel workforce as at 2024. Under a *Step Change Scenario* employment in this group is expected to decline 65.0% by 2035, down to around 1,530 workers. Of the 2,850 roles expected to be lost, an estimated 660 are likely to retire over this period, leaving 2,190 drillers, miners and shot firers likely to undergo a workforce transition.

Drillers, miners and shot firers make up the largest proportion of the fossil fuel workforce, accounting for 34% of the sector's workforce in Hunter. This occupation is also heavily concentrated in the fossil fuel sector, with 80% of the occupation across the region employed in the fossil fuel industry. This high concentration suggests drillers, miners and shot firers are particularly vulnerable to changes in the fossil fuel sector.

Specialist skills are usually learned through on-the-job training for this role. Drillers, miners and shot firers tend to have intermediate foundation skills levels and in most generalist skills. The exception is digital engagement, where the cohort only has a basic level of competency, which may limit their ability to move into more tech-heavy roles without additional training.

Fossil fuel occupation employment size and outlook

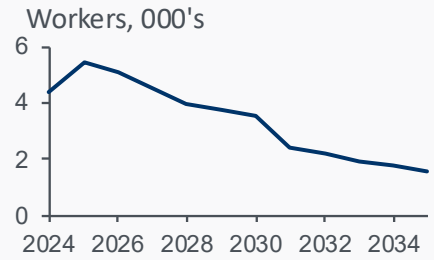
4,380 drillers, miners & shot firers in the Hunter in 2024

65.0% decline in employment by 2035

This represents

34% of fossil fuel workers

80% of all drillers, miners and shot firers



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

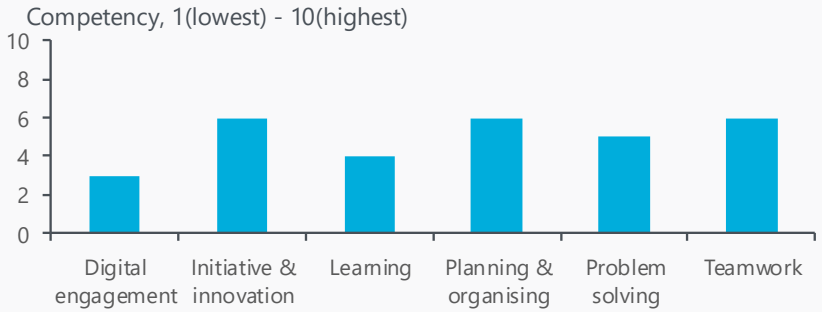
On-the-job training

4

Skill level 4 which corresponds to AQF level 2 (requiring skills equivalent to the competencies gained through a certificate II or III)

Foundational skills

Generalist skills

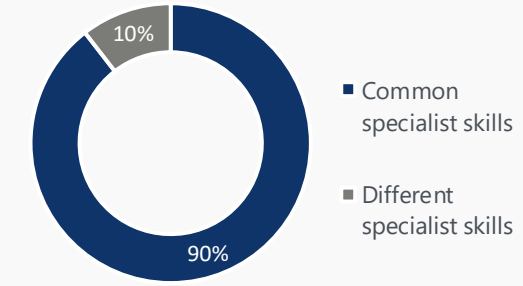


Source: Oxford Economics, ABS ANZSCO, JSA.

Drillers, miners and shot firers have transferable skills across machinery operators, technicians and labourer roles outside the fossil fuel industry.

Identification of similar roles

Share of industries with the fossil fuel specialist skill set

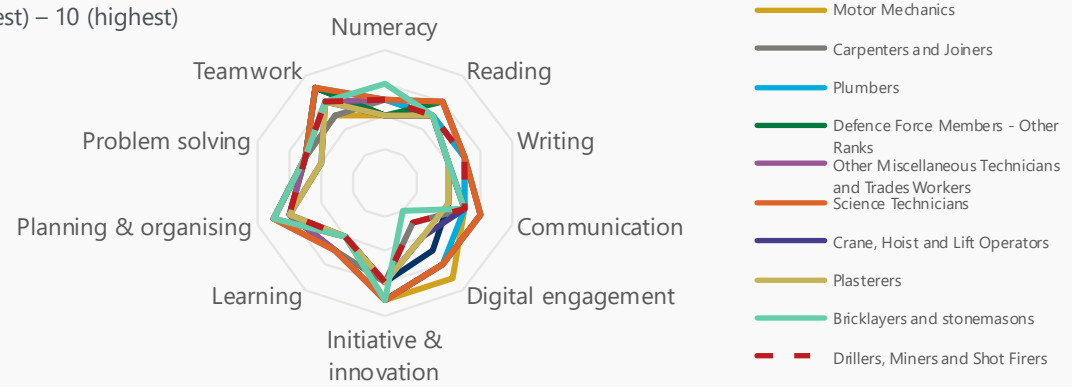


Similar roles	Seek movement	ATO movement
Other construction & mining labourers	Yes	Ranked #1

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Generalist and foundational competency requirements by role, 1 (lowest) – 10 (highest)



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Other Machine Operators	On-the-job training	Same
Motor Mechanics	Automotive Engineering and Technology	Same
Carpenters and Joiners	Building	Same
Plumbers	Building	Same
Defence Force Members - Other Ranks	On-the-job training	Same
Other Miscellaneous Technicians and Trades Workers	On-the-job training	Same
Science Technicians	On-the-job training	Higher
Crane, Hoist and Lift Operators	On-the-job training	Same
Plasterers	On-the-job training	Same
Bricklayers and Stonemasons	On-the-job training	Same

Source: Oxford Economics

Drillers, miners and shot firers are likely to find more opportunities in skill adjacent roles than similar roles across the Hunter, requiring specialist reskilling and digital upskilling.

Analysis of similar role pathways

Demand for drillers, miners and shot firers is muted across the Hunter region, with limited similar role opportunities for fossil fuel workers needing to transition. Overall, 2,200 drillers, miners and shot firers in the fossil fuel industry are expected to undergo a workforce transition by 2035, while demand for similar roles is only expected to increase by 46 over this time.

Demand for drillers, miners and shot firers within the Hunter region is declining over the forecast period to 2050. There is some growth outside of the fossil fuel industry, particularly in industries supporting fossil fuel sector, but this is not enough to offset the significant decline in demand from fossil fuel industries.

The demand for other similar roles is concentrated in labouring roles, and this is also unlikely to be sufficient to absorb the current numbers of drillers, miners and shot firers in Hunter region. The demand for similar roles only grow by 14% by 2035, whereas, drillers, miners and shot firers demand is expected to decline almost 50% over the same period.

Analysis of skill adjacent role pathways

Drillers, miners and shot firers are likely to have more opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 5,260 roles by 2035.

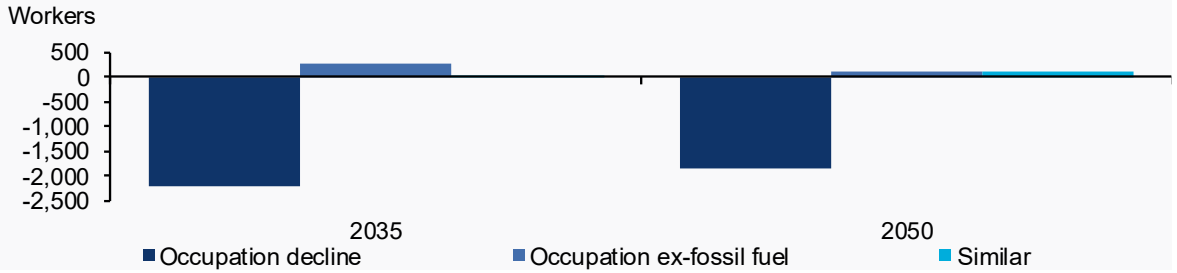
The biggest demand in skill adjacent roles is for motor mechanics, increasing by 1,880 by 2035. However, transitioning into this role may require reskilling, as it involves a different set of specialist skills albeit at a similar skill level.

Demand for roles heavily concentrated in construction and building is also strong, with a projected increase of over 2,240 by 2035. These roles are also likely to require reskilling due to different specialist skills sets specific to the building sector.

There is minimal demand from other machinery operator roles, with projected increase approximately 330 by 2035. These roles generally present lower skill barriers, requiring mostly on-the-job training.

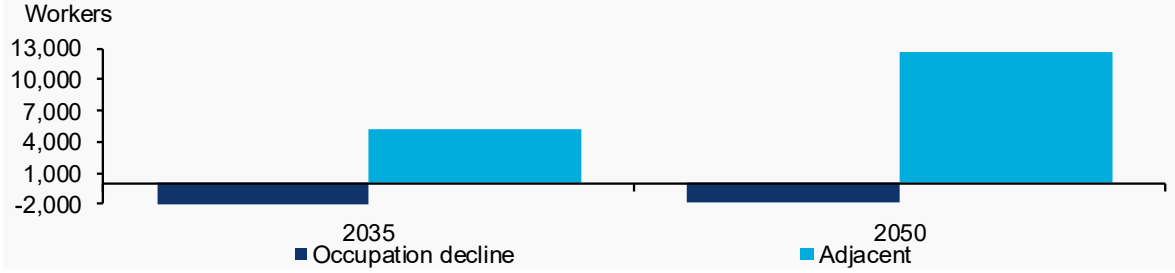
Drillers, miners and shot firers are likely to need upskilling across areas such as digital engagement, learning, planning & organising and initiative & innovation. On average, these skills are over half a point lower for drillers, miners and shot firers compared to skill adjacent roles, with digital engagement being close to 2 points lower.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

METAL FITTERS & MACHINISTS PROFILE

Metal fitters and machinists account for a sizeable portion of the fossil fuel workforce with demand expected to decline substantially by 2035.

Comments

The Hunter region has approximately 1,750 metal fitters and machinists as at 2024. Under a *Step Change Scenario* employment in this group is expected to decline significantly, by 65.4% by 2035, falling to around 610 workers. Of the 1,140 roles expected to be lost, an estimated 300 are likely to retire over this period, leaving 840 metal fitters and machinists likely to undergo a workforce transition.

Metal fitters and machinists account for 14% of the fossil fuel's workforce in Hunter. Within this occupation, 24% across the region are employed in fossil fuel industry. This is relatively a sizeable share of workers that may be impacted by fossil fuel industry changes.

Employment in this field usually requires a certificate-level qualification in mechanical and industrial engineering and technology. Metal fitters and machinists tend to have intermediate levels of foundational skills. They also display intermediate generalist capabilities, with particular strengths in digital engagement, initiative & innovation and planning & organisation.

Fossil fuel occupation employment size and outlook

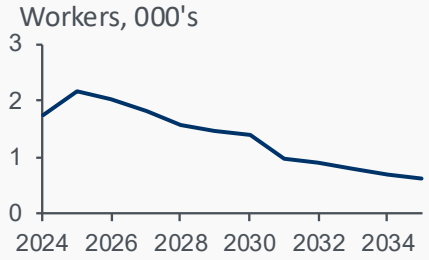
1,750 metal fitters and machinists in the Hunter in 2024

65.4% decline in employment by 2035

This represents

14% of fossil fuel workers

24% of all metal fitters and machinists



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

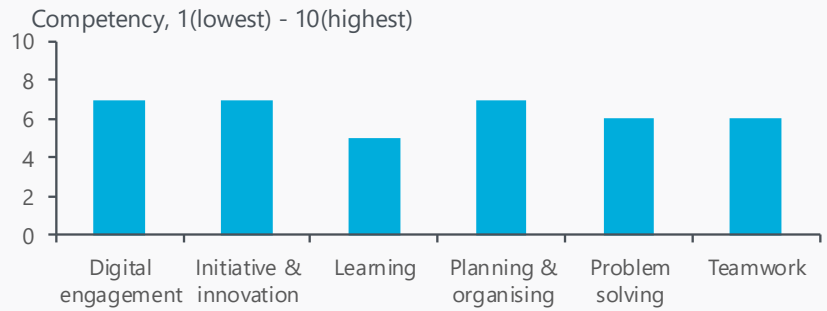
Mechanical and Industrial Engineering and Technology

4

Skill level 4 which corresponds to AQF level 3 (requiring skills equivalent to the competencies gained through a certificate III)

Foundational skills

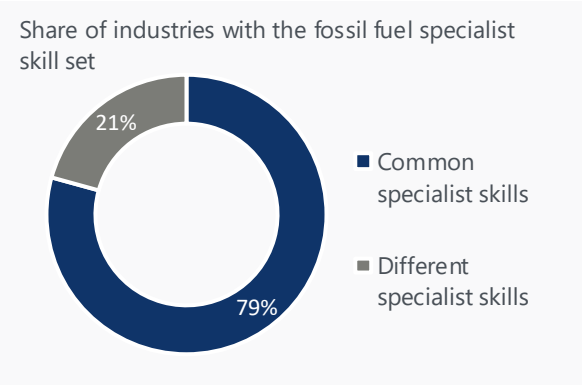
Generalist skills



Source: Oxford Economics, ABS ANZSCO, JSA.

Metal fitters and machinists have relatively high digital engagement skills compared to skill adjacent trades worker and technician roles.

Identification of similar roles



Similar role	Seek movement	ATO movement
NA – No identified roles		

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Motor Mechanics	Automotive Engineering and Technology	Same
Other Machine Operators	On-the-job training	Same
Motor Vehicle Parts and Accessories Fitters	On-the-job training	Same
Mechanical Engineering Draftspersons and Technicians	Mechanical and Industrial Engineering and Technology	Higher
Defence Force Members - Other Ranks	On-the-job training	Same
Carpenters and Joiners	Building	Same
Other Miscellaneous Technicians and Trades Workers	On-the-job training	Same
Structural Steel Construction Workers	On-the-job training	Same
Plumbers	Building	Same
Engineering Managers	Mechanical and Industrial Engineering and Technology	Higher

Source: Oxford Economics.

Metal fitters and machinists are likely to be able to find roles in other industries, with reskilling required to move into skill adjacent roles.

Analysis of similar role pathways

Demand for metal fitters and machinists is expected to grow across the Hunter region, with strong demand outside the fossil fuel industry likely sufficient to absorb workers who undertake a workforce transition. Demand for metal fitters and machinists are strongest in the repair and maintenance related industry, where fossil fuel workers are able to transfer their skill set.

Outside the metal fitter and machinist occupation there are no identified similar role opportunities.

Analysis of skill adjacent role pathways

Metal fitters and machinists are also likely to face opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 5,190 roles by 2035, well above the expected loss of roles in fossil fuel.

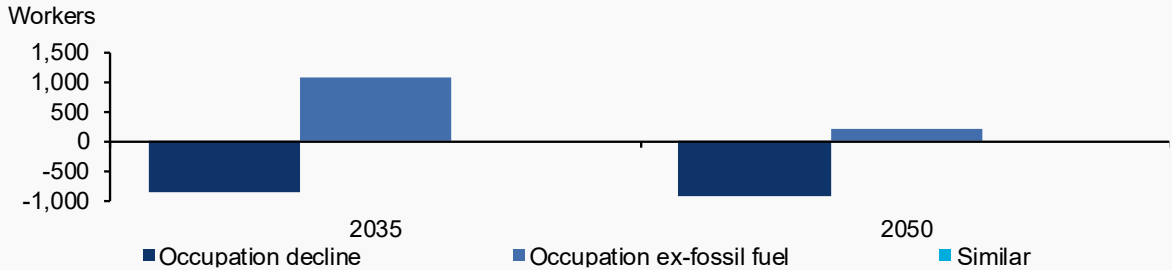
The biggest demand in skill adjacent roles is for motor mechanics, increasing by 1,880 by 2035. However, transitioning into this role may require reskilling, as it involves a different set of specialist skills albeit at a similar skill level.

Demand for roles concentrated in construction and building is also strong, with a projected increase of over 1,970 by 2035. These roles are also likely to require reskilling due to different specialist skills sets specific to the building sector.

There are some minimal opportunities to transition to roles with same specialist skills, though some upskilling might be needed. These roles are projected to increase 320 by 2035.

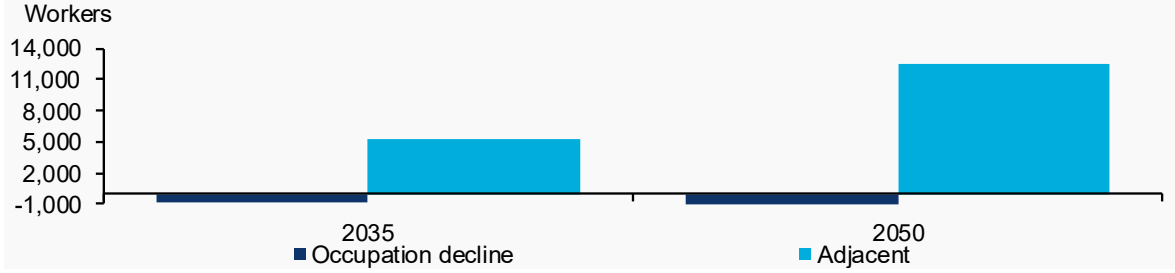
Overall, metal fitters and machinists are on quite comparable level with the average skill adjacent roles level. The area they are likely to need upskilling is numeracy, which is over half a point lower for metal fitters and machinists in comparison.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

ELECTRICIANS PROFILE

Electricians account for a moderate portion of the fossil fuel workforce with a significant footprint outside of the fossil fuel industry.

Comments

Approximately 780 electricians are employed in Hunter region's fossil fuel workforce as at 2024. Under a *Step Change Scenario,* employment in this group is expected to decline by 65.6% by 2035, dropping to around 270 workers. Of the 510 roles expected to be lost, an estimated 110 are likely to retire over this period, leaving 400 electricians likely to undergo a workforce transition.

In the Hunter's fossil fuel industry, electricians make up 6% of the workforce. Generally, 10% of all electricians are employed within the fossil fuel industry. This suggests a moderate level of exposure to transition risks with a substantial footprint in non-fossil fuel industries.

Specialist skills are usually required at certificate-level qualification in electrical and electronic engineering & technology. In general, electricians have intermediate foundational skills. Their generalist skills are also within the intermediate range, with strengths in initiative & innovation and planning & organisation, though digital engagement is at the lower end.

Fossil fuel occupation employment size and outlook

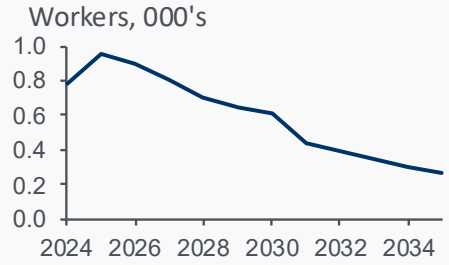
780 electricians in the Hunter in 2024

65.6% decline in employment by 2035

This represents

6% of fossil fuel workers

10% of all electricians



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

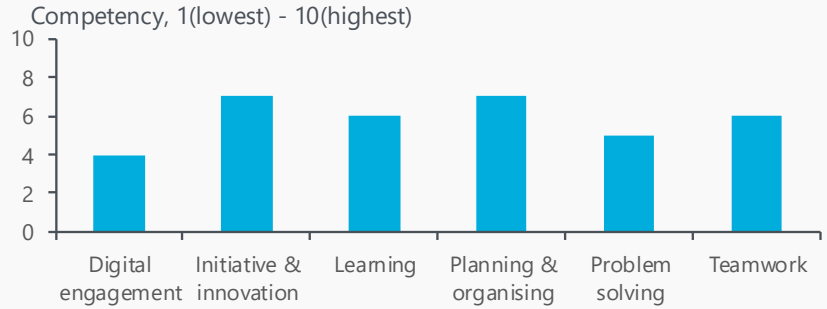
Electrical and Electronic Engineering and Technology

4

Skill level 4 which corresponds to AQF level 3 (requiring skills equivalent to the competencies gained through a certificate III)

Foundational skills

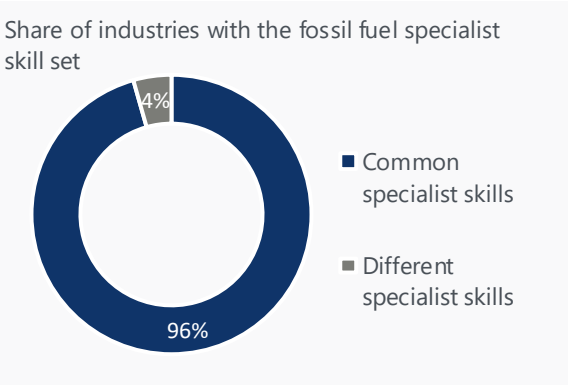
Generalist skills



Source: Oxford Economics, ABS ANZSCO, JSA.

Electricians have strong transferability into a range of skill adjacent roles within the electrical and technical fields.

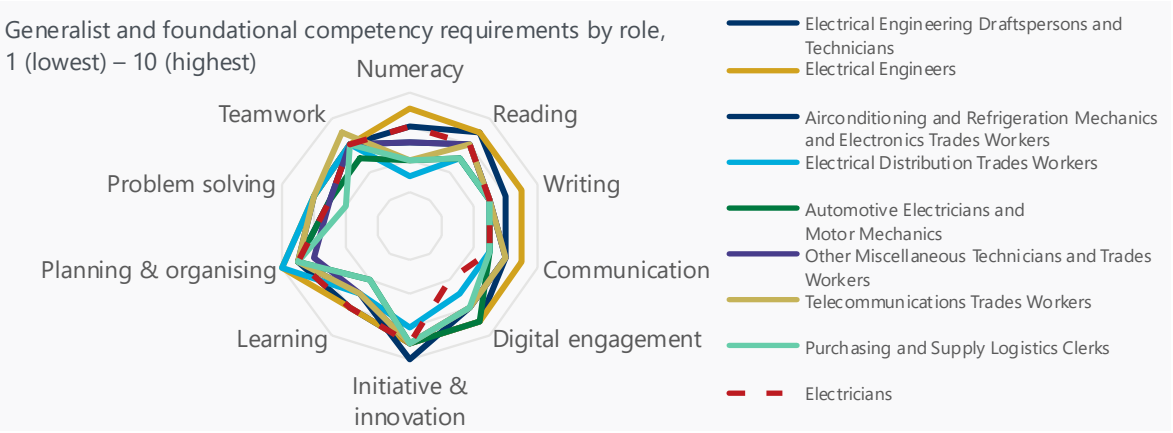
Identification of similar roles



Similar roles	Seek movement	ATO movement
NA – No identified roles		

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Electrical Engineering Draftspersons and Technicians	Electrical and Electronic Engineering and Technology	Higher
Electrical Engineers	Electrical and Electronic Engineering and Technology	Higher
Airconditioning and Refrigeration Mechanics	Electrical and Electronic Engineering and Technology	Same
Electrical Distribution Trades Workers	Electrical and Electronic Engineering and Technology	Same
Automotive Electricians	Automotive Engineering and Technology	Same
Motor Mechanics	Automotive Engineering and Technology	Same
Electronics Trades Workers	Electrical and Electronic Engineering and Technology	Same
Other Miscellaneous Technicians and Trades Workers	On-the-job training	Same
Telecommunications Trades Workers	Electrical and Electronic Engineering and Technology	Same
Purchasing and Supply Logistics Clerks	On-the-job training	Same

Source: Oxford Economics.

Demand for electricians and their related skill sets is strong outside the fossil fuel industry, presenting both similar and skill adjacent role opportunities.

Analysis of similar role pathways

Demand for electricians is expected to grow across the Hunter region, with strong demand outside the fossil fuel industry likely sufficient to absorb workers who undertake a workforce transition. Demand for electricians are strongest in the electrical services industry within construction, where fossil fuel workers are able to transfer their skill set.

Outside the electricians occupation, there are no identified similar role opportunities.

Analysis of skill adjacent role pathways

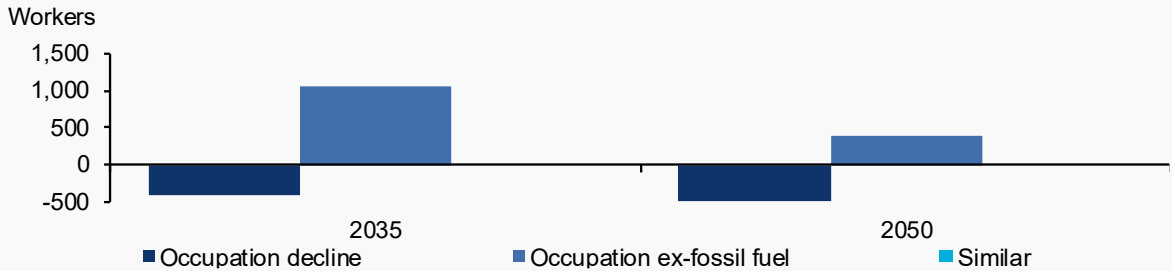
Electricians are likely to have strong opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 4,230 roles by 2035, ample capacity to accommodate the transition of fossil fuel electricians.

The biggest demand in skill adjacent roles is for motor mechanics, increasing by 1,880 by 2035. However, transitioning into this role may require reskilling, as it involves different specialist skills despite being at a similar skill level.

There are moderate opportunities to transition into roles with same specialist skills, with over 1,070 increase projected over the same period. Some upskilling in foundational and generalist skills may be necessary to support transition.

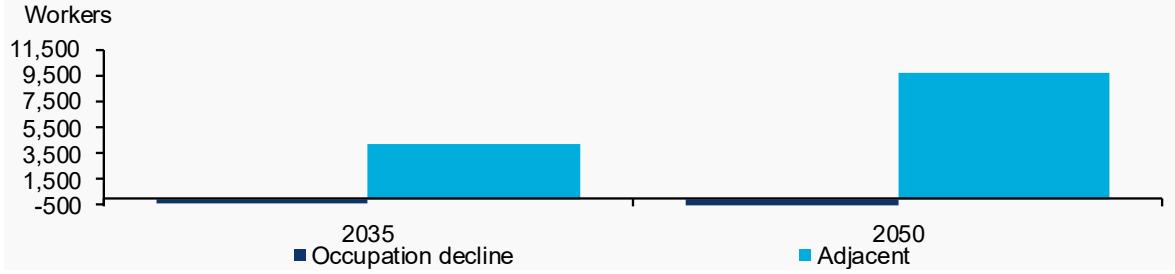
Electricians are likely to need training across areas such as communication, and digital engagement, with digital engagement being over 2 point lower for these workers compared to the average skill adjacent roles level.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

OTHER BUILDING & ENGINEERING TECHNICIANS PROFILE

While representing a modest share, other building & engineering technicians are highly dependent on fossil fuel employment, facing sharp demand decline by 2035.

Comments

The Hunter region's fossil fuel sector employs approximately 770 other building & engineering technicians as at 2024. However, employment in this group is expected to decline sharply, by 65.2% by 2035, dropping to around 270 workers. Of the 500 roles expected to be lost, an estimated 160 are likely to retire over this period, leaving 340 workers likely to undergo a workforce transition.

Other building and engineering technicians make up just 6% of the Hunter's fossil fuel's workforce. Despite this, 42% of all workers in this occupation are employed within the regional fossil fuel industry. This indicates a high reliance on fossil fuels for employment, exposing them to risks associated with changes in the fossil fuel industry.

Working in this field usually requires a diploma-level qualification in process and resources engineering. Other building and engineering technicians sit at the higher-end of intermediate level across foundational skills. Similarly, their generalist skills are also within intermediate range, creating a relatively even skill profile overall.

Fossil fuel occupation employment size and outlook

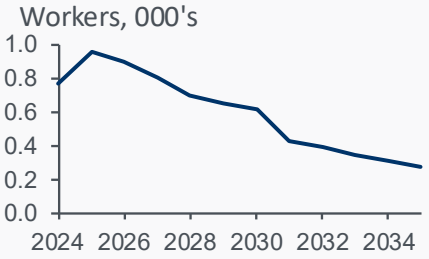
770 other building and engineering technicians in the Hunter in 2024

65.2% decline in employment by 2035

This represents

6% of fossil fuel workers

42% of all other building and engineering technicians



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

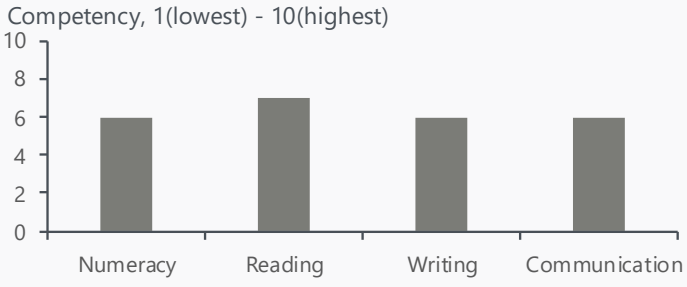
Specialist skills

Process and Resources Engineering

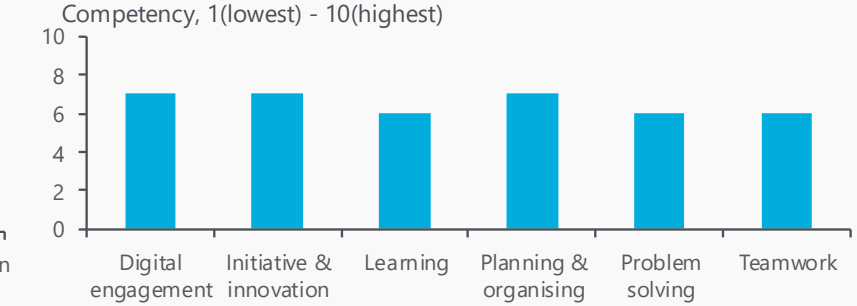
2

Skill level 2 which corresponds to AQF level 5 (requiring skills equivalent to the competencies gained through a diploma)

Foundational skills



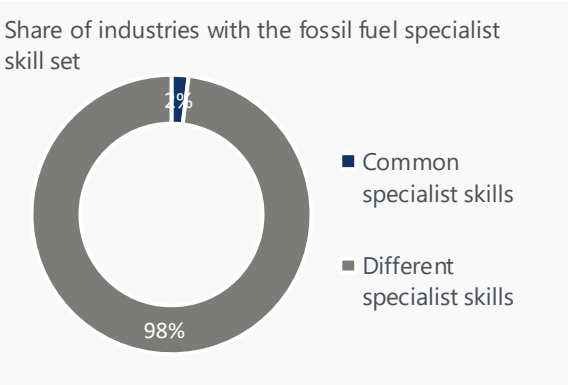
Generalist skills



Source: Oxford Economics, ABS ANZSCO, JSA.

Other building & engineering technicians have a comparable skill set to skill adjacent roles, despite limited specialist skills transferability.

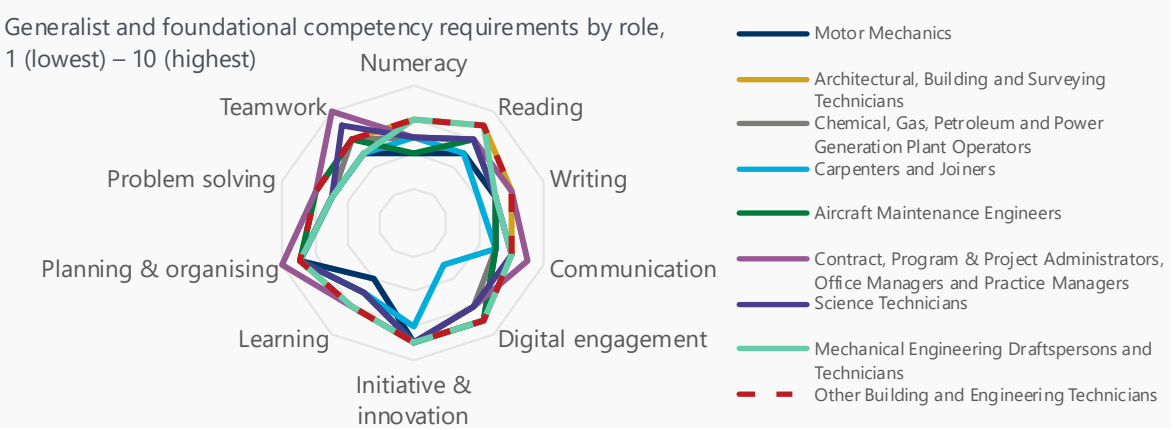
Identification of similar roles



Similar roles	Seek movement	ATO movement
NA – No identified roles		

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Motor Mechanics	Automotive Engineering and Technology	Lower
Architectural, Building and Surveying Technicians	Building	Same
Chemical, Gas, Petroleum and Power Generation Plant Operators	On-the-job training	Lower
Carpenters and Joiners	Building	Lower
Aircraft Maintenance Engineers	Aerospace Engineering and Technology	Lower
Contract, Program and Project Administrators	Business and Management	Same
Office Managers	On-the-job training	Same
Science Technicians	On-the-job training	Same
Practice Managers	Business and Management	Same
Mechanical Engineering Draftspersons and Technicians	Mechanical and Industrial Engineering and Technology	Same

Source: Oxford Economics.

Similar roles capacity for other building & engineering technicians is limited, requiring transition into skill adjacent roles to fully absorb fossil fuel workers.

Analysis of similar role pathways

Demand for other building and engineering technicians is weak across the Hunter region. There is moderate demand outside the fossil fuel industry such as in scientific testing and analysis industry, but this is unlikely to absorb workers who undertake a workforce transition as their skill sets are not transferable.

Outside the other building and engineering technicians occupation, there are no identified similar role opportunities.

Analysis of skill adjacent role pathways

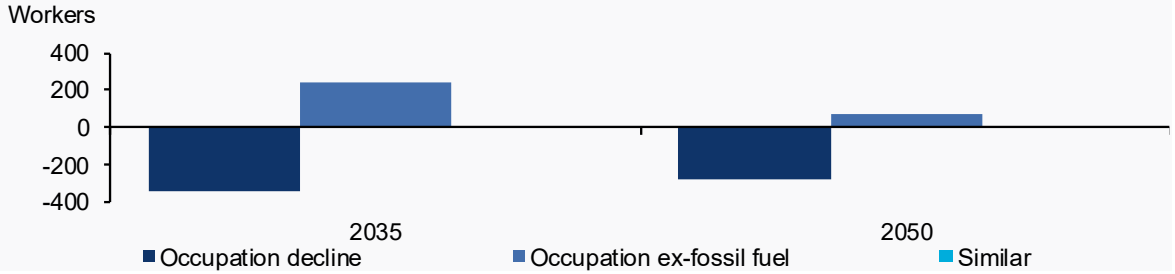
Other building and engineering technicians are likely to have more opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 9,230 roles by 2035.

The biggest demand in skill adjacent roles is for office managers, increasing by 2,390 by 2035. Followed by motor mechanics, with a projected increase of 1,880 over the same period. These roles may require reskilling to different specialist skills area.

Demand for roles concentrated in construction and building is also strong, with a projected increase of over 2,240 by 2035. These roles are also likely to require reskilling due to different specialist skills sets specific to the building sector.

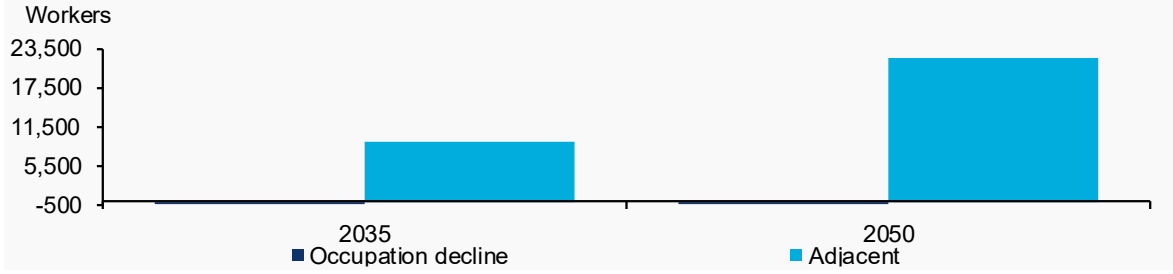
Other building and engineering technicians generally possess a skill set sufficient to support transition into skill-adjacent roles, with minimal training is likely needed. They are particularly strong in numeracy and reading compared to the average skill-adjacent role level.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

TRUCK DRIVERS PROFILE

Truck drivers account for a small portion of the fossil fuel workforce and are more likely to be employed in other industries.

Comments

As at 2024, the Hunter region employs approximately 670 truck drivers in fossil fuel sector. However, employment in this group is expected to decrease by 65.3% by 2035, falling to around 230 workers. Of the 440 roles expected to be lost, an estimated 210 are likely to retire over this period, leaving 230 truck drivers likely to undergo a workforce transition.

Truck drivers make up 5% of the Hunter's fossil fuel's workforce. More broadly across the occupation, 8% of truck drivers work within the regional fossil fuel industry. This indicates a limited level of exposure to demand transition.

Training for truck driving are usually acquired on the job. Truck drivers are generally assessed at the intermediate level across both foundational skills and generalist skills. However, most of these skills, particularly numeracy, writing, digital engagement and learning capabilities, are falling on the lower end of intermediate range, suggesting potential challenges in adapting to new roles.

Fossil fuel occupation employment size and outlook

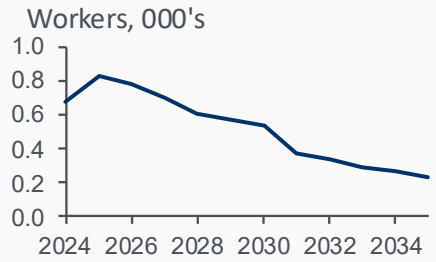
670 truck drivers in the Hunter in 2024

65.3% decline in employment by 2035

This represents

5% of fossil fuel workers

8% of all truck drivers



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

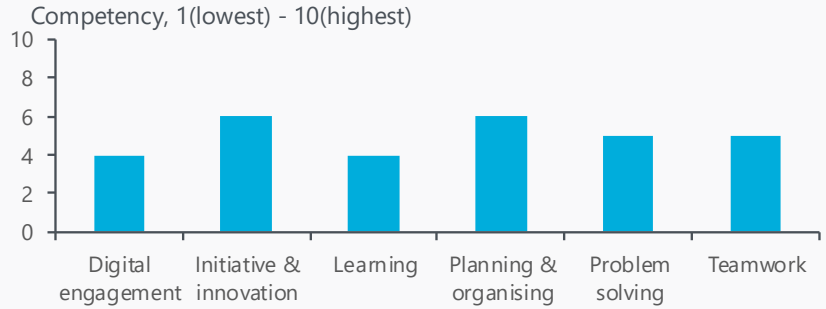
On the job training

4

Skill level 4 which corresponds to AQF level 2 (requiring skills equivalent to the competencies gained through a certificate II)

Foundational skills

Generalist skills

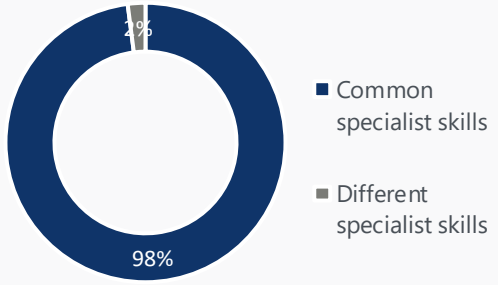


Source: Oxford Economics, ABS ANZSCO, JSA.

Truck drivers have strong transferability into driving-related roles, despite their relatively low skill profile.

Identification of similar roles

Share of industries with the fossil fuel specialist skill set

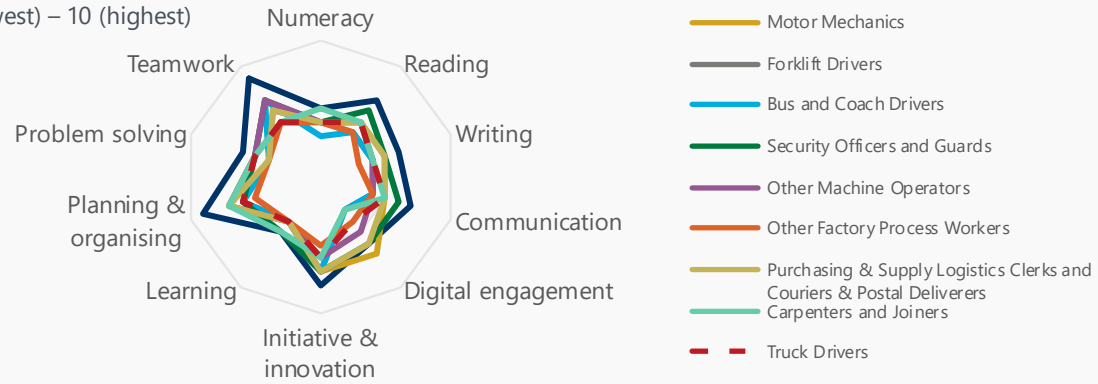


Similar roles	Seek movement	ATO movement
Other miscellaneous labourers	No	Ranked #1
Delivery drivers	Yes	Ranked #2
Storepersons	No	Ranked #3

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Generalist and foundational competency requirements by role, 1 (lowest) – 10 (highest)



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Transport Services Managers	On-the-job training	Higher
Motor Mechanics	Automotive Engineering and Technology	Same
Forklift Drivers	On-the-job training	Same
Bus and Coach Drivers	On-the-job training	Same
Security Officers and Guards	On-the-job training	Same
Other Machine Operators	On-the-job training	Same
Other Factory Process Workers	On-the-job training	Lower
Purchasing and Supply Logistics Clerks	On-the-job training	Same
Couriers and Postal Deliverers	On-the-job training	Lower
Carpenters and Joiners	Building	Same

Source: Oxford Economics.

Truck drivers are likely well-positioned to transition into both similar and skill adjacent roles due to strong demand for their skill sets.

Analysis of similar role pathways

Demand for truck drivers outside of fossil fuel industry is strong across the Hunter region, particularly in labour supply services and road freight transport sector, with abundant capacity to fully absorb workers who undertake a workforce transition.

Furthermore, the demand for other similar roles is also robust, providing alternative pathways for these workers to pursue.

Analysis of skill adjacent role pathways

Truck drivers are likely to have even stronger opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 8,110 by 2035.

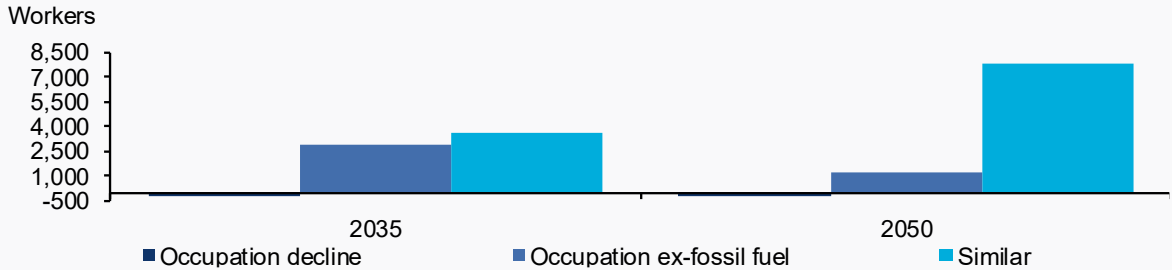
The biggest demand in skill adjacent roles is for motor mechanics, increasing by 1,880 by 2035. However, transitioning into this role may require additional training, as it involves different specialist skills despite being at a similar skill level.

There is high demand for comparable driving and operators roles, with a projected increase of approximately 3,070 by 2035. These roles require similar skills and minimal retraining.

There is some opportunities to upskill into more managerial positions. Though demand is minimal for these roles, with a projected increase of 280 by 2035.

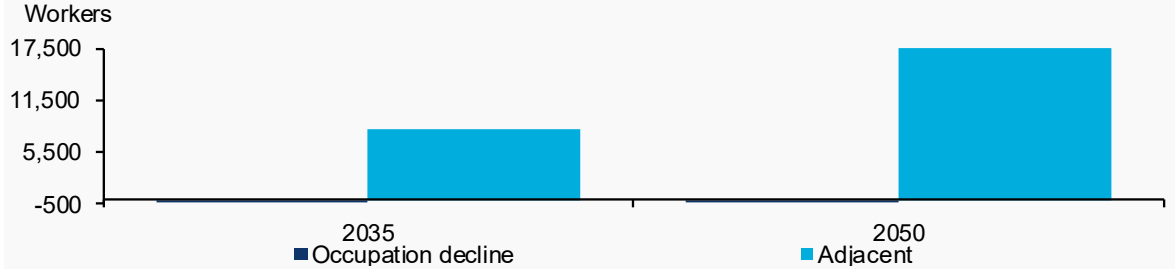
Truck drivers are likely to need upskilling across most foundational and generalist skills to support transitioning into skill adjacent roles. Particularly, skills such as digital engagement, initiative & innovation, planning & organising, and teamwork are notably lower than average for skill adjacent roles, sitting around one point below.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

PRODUCTION MANAGERS PROFILE

Production managers account for a minor fraction of the fossil fuel workforce with demand expected to decline substantially by 2035.

Comments

There are approximately 350 production managers in 2024 employed in Hunter's fossil fuel industry. Under a Step Change Scenario employment in this group is expected to decline by 65.2% by 2035, falling to around 120 workers. Of the 230 roles expected to be lost, an estimated 80 are likely to retire over this period, leaving 150 production managers likely to undergo a workforce transition.

Production managers contribute 3% to the Hunter's fossil fuel's workforce. Relatively, this occupation is reliant on fossil fuel sector, with 13% of all production managers in the region work within the industry. This indicates a moderate level of vulnerability to shifts in fossil fuel demand.

Employment in this occupation usually requires bachelor qualifications in process and resources engineering. In terms of skills, production managers demonstrate intermediate levels of foundational skills, with reading and communication at the higher end of the intermediate range. Their generalist skills also sit mostly at intermediate level, though initiative & innovation and planning & organising are rated at high level, making them well-suited for leadership roles in other industries pathways.

Fossil fuel occupation employment size and outlook

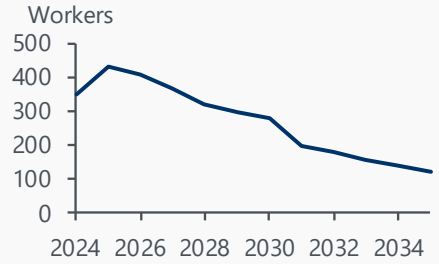
350 production managers in the Hunter in 2024

65.2% decline in employment by 2035

This represents

3% of fossil fuel workers

13% of all production managers



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

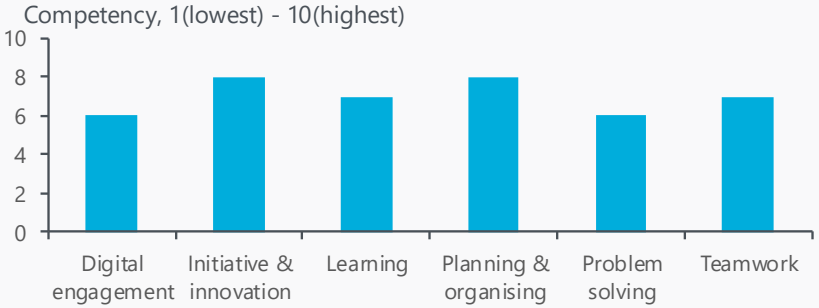
Process and Resources Engineering

1

Skill level 1 which corresponds to AQF level 7 (requiring skills equivalent to the competencies gained through vocational or bachelor degree)

Foundational skills

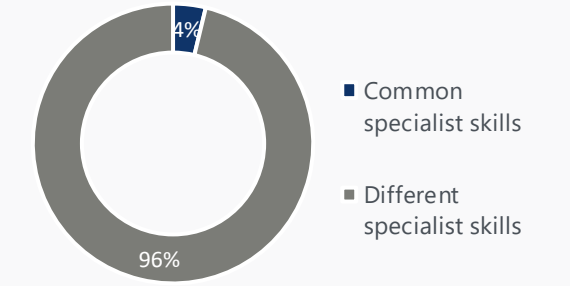
Generalist skills



Source: Oxford Economics, ABS ANZSCO, JSA.

Despite having low transferability, production managers are well-equipped to transition to other managerial roles with their high skill profile.

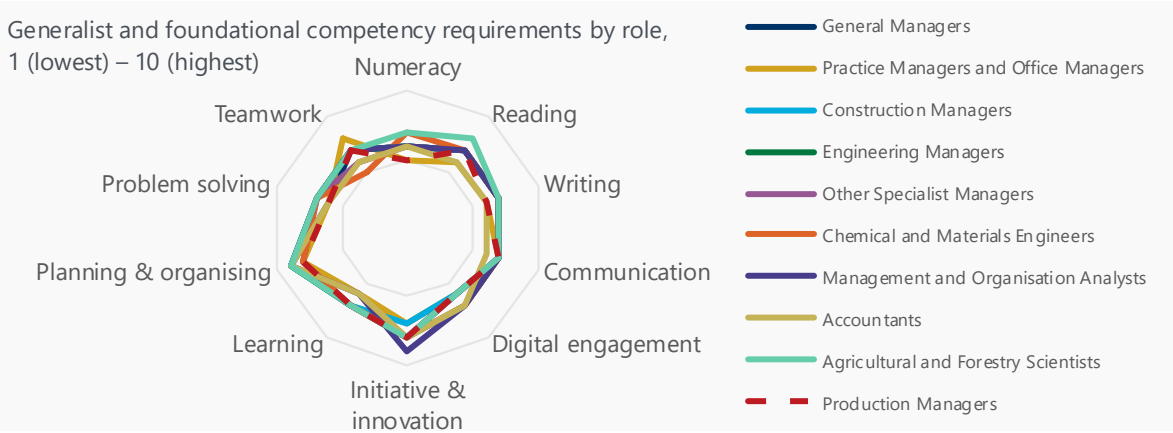
Identification of similar roles



Similar roles	Seek movement	ATO movement
Manufacturers	No	Ranked #3

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
General Managers	Business and Management	Same
Practice Managers	Business and Management	Lower
Office Managers	On-the-job training	Lower
Construction Managers	Building	Same
Engineering Managers	Mechanical and Industrial Engineering and Technology	Same
Other Specialist Managers	Business and Management	Same
Chemical and Materials Engineers	Process and Resources Engineering	Same
Management and Organisation Analysts	Business and Management	Same
Accountants	Accounting	Same
Agricultural and Forestry Scientists	Agriculture	Same

Source: Oxford Economics.

Production managers are likely to face some capacity limits transitioning into similar roles, whereas skill adjacent roles shows strong demand.

Analysis of similar role pathways

Demand for production managers outside of fossil fuel industry is moderate across the Hunter region by 2035, though, it is expected to also experience decline by 2050. As fossil fuel production managers have limited transferability this pathway doesn't present a strong opportunity for transition.

The demand for similar roles is projected to provide additional opportunities for production managers in Hunter region by 2050. Overall, these roles are likely to fully absorb workers needing transition in the long term. Although, competition amongst production managers across industries may pose challenges.

Analysis of skill adjacent role pathways

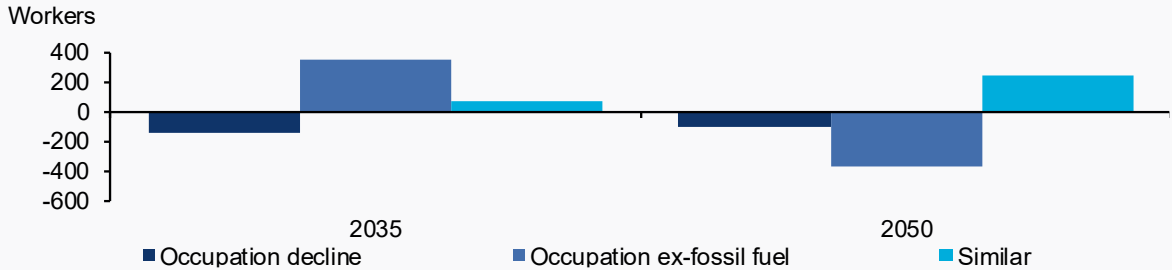
Production managers are likely to have more opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 9,340 roles by 2035.

The biggest demand in skill adjacent roles is managerial positions, with office managers increasing by 2,390 by 2035. Other managerial roles also observed strong demand, with over 4,300 increase projected over the same period. Despite being on same skill level, transitioning into these roles may require reskilling, as specific specialist skills such as business management or building may be required for different industries.

There is particularly strong demand for accountants that may also require a shift in specialised skill, with projected increase approximately 1,760 by 2035.

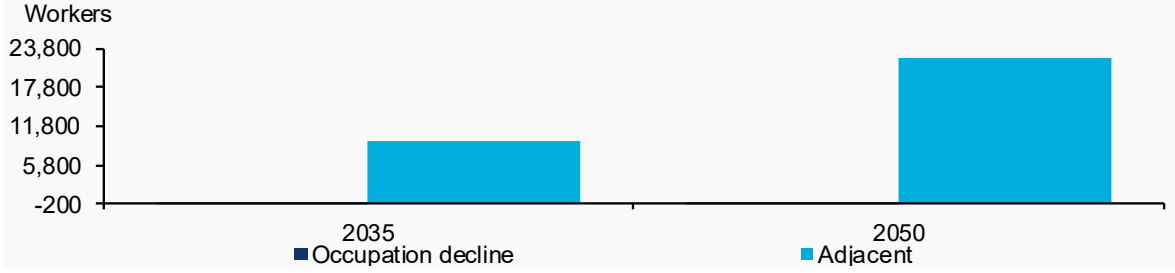
Production managers are likely to need training across areas such as numeracy, writing, problem solving, and planning & organising. On average, these skills are over half a point lower for production managers, notably numeracy is one point lower than the average skill adjacent roles level.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

STRUCTURAL STEEL & WELDING TRADES WORKERS PROFILE

Structural steel & welding trades workers account for a minor portion of the fossil fuel workforce with a significant footprint in other industries.

Comments

There are approximately 310 structural steel and welding trades workers in 2024 employed in Hunter's fossil fuel sector. Under a Step Change Scenario, employment in this group is expected to decrease by 66.0% by 2035, falling to around 110 workers. Of the 200 roles expected to be lost, an estimated 50 are likely to retire over this period, leaving 150 workers likely to undergo a workforce transition.

Structural steel and welding trades workers make up 2% to the Hunter's fossil fuel's workforce. More broadly, 8% of all workers in this occupation work within fossil fuel industry in the region. This reflects a low level of exposure to demand transition.

The occupation usually requires certificate-level qualification in mechanical and industrial engineering and technology. In terms of skills, structural steel and welding trades workers demonstrate intermediate levels of foundational skills. Their generalist skills are also mostly at intermediate level, with particular strength in initiative & innovation capabilities.

Fossil fuel occupation employment size and outlook

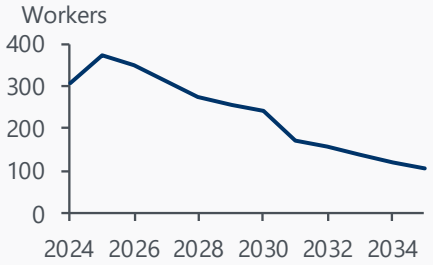
310 structural steel and welding trades workers in the Hunter in 2024

66.0% decline in employment by 2035

This represents

2% of fossil fuel workers

8% of all structural steel and welding trades workers



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

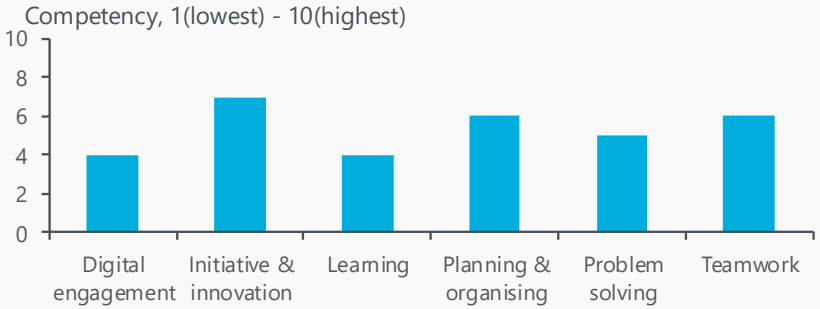
Mechanical and Industrial Engineering and Technology

4

Skill level 4 which corresponds to AQF level 3 (requiring skills equivalent to the competencies gained through a certificate II or III)

Foundational skills

Generalist skills

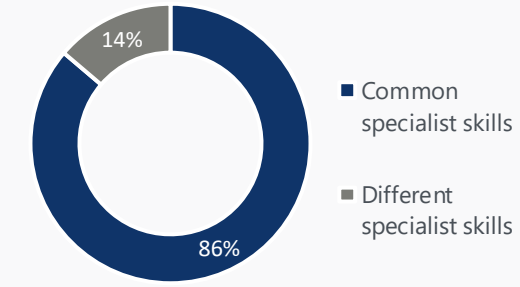


Source: Oxford Economics, ABS ANZSCO, JSA.

Structural steel and welding trades workers have high transferability, but their specialist skill is not in high demand across skill adjacent roles.

Identification of similar roles

Share of industries with the fossil fuel specialist skill set

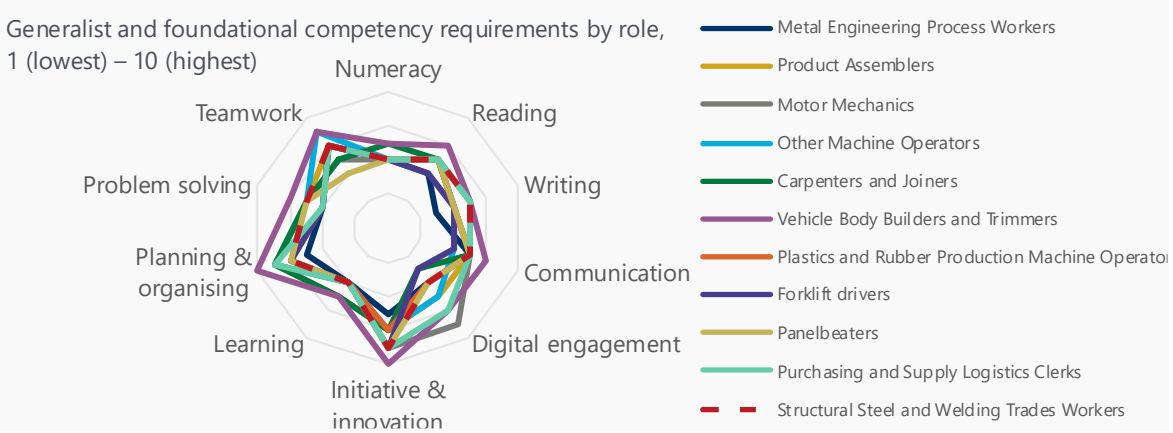


Similar roles	Seek movement	ATO movement
Sheetmetal Trades Workers	Yes	Ranked #4

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Generalist and foundational competency requirements by role, 1 (lowest) – 10 (highest)



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Metal Engineering Process Workers	On-the-job training	Lower
Product Assemblers	On-the-job training	Lower
Motor Mechanics	Automotive Engineering and Technology	Same
Other Machine Operators	On-the-job training	Same
Carpenters and Joiners	Building	Same
Vehicle Body Builders and Trimmers	Automotive Engineering and Technology	Same
Plastics and Rubber Production Machine Operators	On-the-job training	Same
Forklift Drivers	On-the-job training	Same
Panelbeaters	Automotive Engineering and Technology	Same
Purchasing and Supply Logistics Clerks	On-the-job training	Same

Source: Oxford Economics.

Structural steel and welding trades workers are unlikely to transition into similar due to declining demand, with skill adjacent roles offering more optimistic alternatives.

Analysis of similar role pathways

Demand for structural steel and welding trades workers outside of the fossil fuel industry is solid across the Hunter region by 2035, however, this demand is expected to decrease significantly by 2050. Similar roles are projected to experience insignificant change in demand over the full forecast period. So, while there is sufficient capacity to transition existing numbers of for structural steel and welding trades workers in fossil fuel industry by 2035, the outlook by 2050 is pessimistic.

Analysis of skill adjacent role pathways

Structural steel and welding trades workers are likely to have more opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 4,930 by 2035.

Motor mechanics shows the highest demand amongst skill adjacent roles, with an increase of 1,880 by 2035, though transitioning into this role may require additional training due to differing specialist skills despite being at a similar skill level.

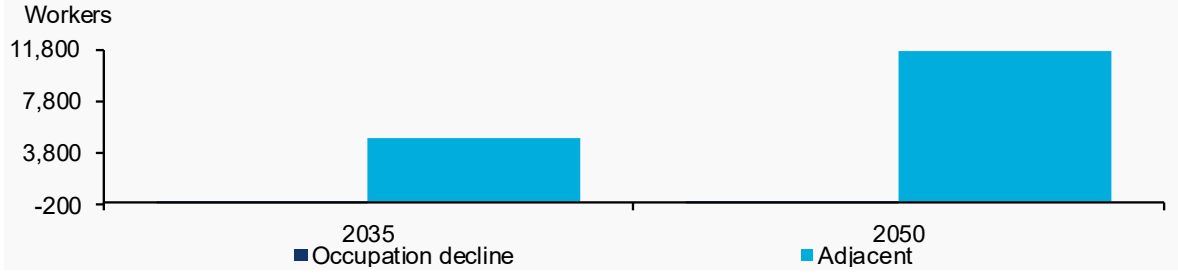
There is moderate demand for carpenters and joiners, with a projected increase of 1,100 by 2035, which also require reskilling.

To transition into the majority of the identified skill adjacent roles, structural steel and welding trades workers are likely to need training in digital engagement and planning & organising, where these workers score over half a point lower than the average skill adjacent level.

Demand for similar roles

Source: Oxford Economics based on AEMO Step Change scenario.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

MINING ENGINEERS PROFILE

Mining engineers account for a modest portion of the fossil fuel workforce, but are highly dependent on this sector, where demand is declining substantially by 2035.

Comments

Approximately 210 mining engineers work in Hunter region in 2024. Under a Step Change Scenario, employment in this group is expected to decrease by 65% by 2035, falling to around 80 workers. Of the 130 roles expected to be lost, an estimated 30 are likely to retire over this period, leaving 100 mining engineers likely to undergo a workforce transition.

Mining engineers make up only 2% to the Hunter's fossil fuel's workforce. But importantly, 65% of all mining engineers in Hunter region are employed within the fossil fuel industry. This reflects a high dependence on one industry, making them highly vulnerable as fossil fuels activities continue to decline.

This career path usually requires bachelor qualifications in process and resources engineering. Mining engineers tend to possess high level foundational skills. Their generalist skills are mostly at intermediate level, though they show high capabilities in initiative & innovation and planning & organising. Overall, mining engineers are relatively a high-skilled group, with strong potential to transition into other technical roles.

Fossil fuel occupation employment size and outlook

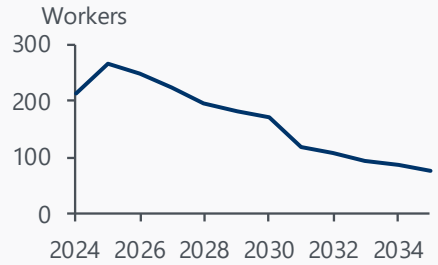
210 mining engineers in the Hunter in 2024

65.0% decline in employment by 2035

This represents

2% of fossil fuel workers

65% of all mining engineers



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

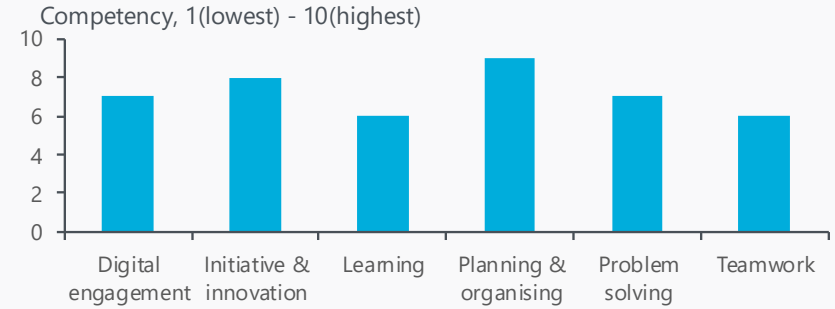
Process and Resources Engineering

1

Skill level 1 which corresponds to AQF level 7 (requiring skills equivalent to the competencies gained through Vocational or Bachelor degree)

Foundational skills

Generalist skills

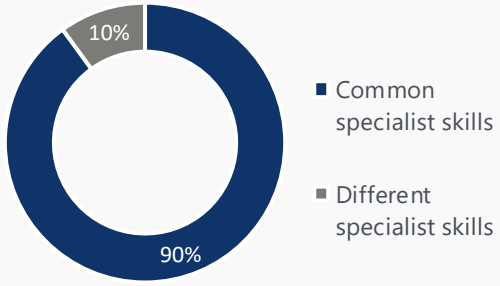


Source: Oxford Economics, ABS ANZSCO, JSA.

Mining engineers are well-equipped to transition into skill adjacent roles with their high skill profile, although reskilling are likely required.

Identification of similar roles

Share of industries with the fossil fuel specialist skill set



Similar roles	Seek movement	ATO movement
NA – No identified roles		

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Generalist and foundational competency requirements by role, 1 (lowest) – 10 (highest)

Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Other Engineering Professionals	Mechanical and Industrial Engineering and Technology	Same
Civil Engineering Professionals	Civil Engineering	Same
Engineering Managers	Mechanical and Industrial Engineering and Technology	Same
Chemical and Materials Engineers	Process and Resources Engineering	Same
General Managers	Business and Management	Same
University Lecturers and Tutors	Teacher Education	Same
Electrical Engineers	Electrical and Electronic Engineering and Technology	Same
Management and Organisation Analysts	Business and Management	Same
Science Technicians	On-the-job training	Lower
Architectural, Building and Surveying Technicians	Building	Lower

Source: Oxford Economics.

Mining engineers are likely to face challenges transitioning into similar roles, whereas skill adjacent roles offer strong opportunities but come with reskilling requirements.

Analysis of similar role pathways

Demand for mining engineers is subdued in the Hunter region across industries. Despite having some growth outside of the fossil fuel sector, this demand is minimal and is not sufficient to fully absorb workers needing transition.

Outside the mining engineers occupation, there are no identified similar role opportunities.

Analysis of skill adjacent role pathways

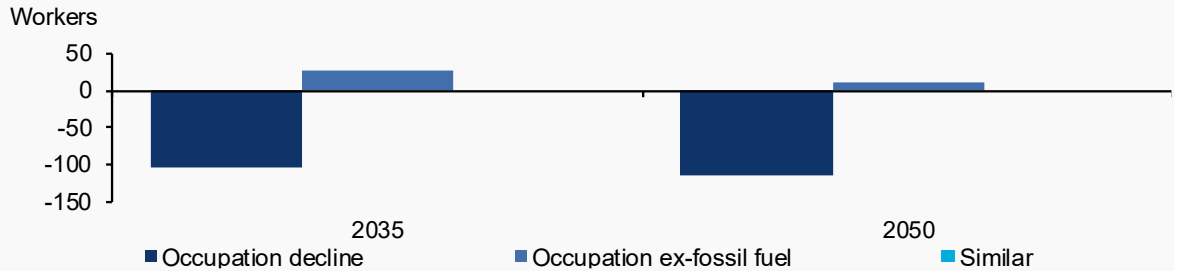
Mining engineers are likely to have more opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 5,440 roles by 2035.

Other engineering–related roles expected to have the strongest demand across skill adjacent roles, with over 1,190 increase projected over the same period. Transitioning into these roles would require reskilling, as specific specialist skills may be required for different industries.

There is also in demand from university lecturers and tutors, increasing by 1,160 by 2035 as many in the field retire. This occupation, though at similar skill level, would require reskilling into different specialist skill.

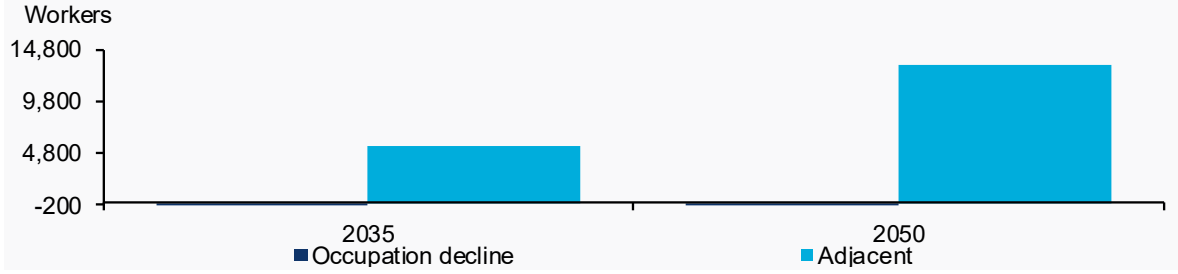
Mining engineers are highly-skilled workers, they are likely only needing upskilling in learning area, which is half a point lower than average skill adjacent roles level.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

INDUSTRIAL, MECHANICAL & PRODUCTION ENGINEERS PROFILE

Industrial, mechanical & production engineers account for a small percentage of the fossil fuel workforce with a relatively high skill level.

Comments

The Hunter region employs approximately 140 industrial, mechanical and production engineers as at 2024. Under a Step Change Scenario employment in this group is expected to drop drastically by 66.3% by 2035, falling to around 50 workers. Of the 90 roles expected to be lost, an estimated 30 are likely to retire over this period, leaving 60 workers likely to undergo a workforce transition.

Industrial, mechanical & production engineers make up only 1% of the Hunter's fossil fuel workforce. More broadly, 10% of all industrial, mechanical & production engineers in Hunter region are employed within the fossil fuel industry. This reflects a relatively high moderate level of exposure to fossil fuel demand shifts.

The occupation usually requires bachelor qualifications in mechanical and industrial engineering and technology. These engineers tend to possess higher-end intermediate levels across most of foundational skills and generalist skills. Skills such as numeracy, reading and initiative & innovation and planning & organising reaching high level, creating a strong skill profile.

Fossil fuel occupation employment size and outlook

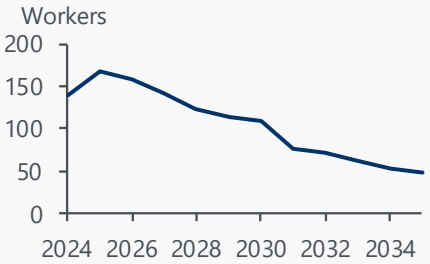
140 industrial, mechanical and production engineers in the Hunter in 2024

66.3% decline in employment by 2035

This represents

1% of fossil fuel workers

10% of all industrial, mechanical and production engineers



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

Mechanical and Industrial Engineering and Technology

1

Skill level 1 which corresponds to AQF level 7 (requiring skills equivalent to the competencies gained through Vocational or Bachelor degree)

Foundational skills

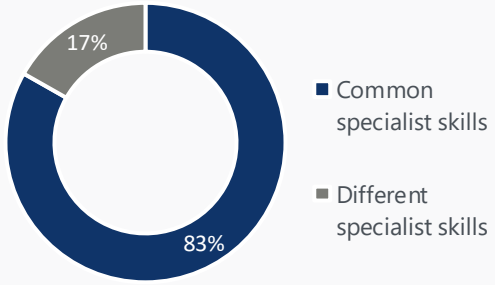
Generalist skills

Source: Oxford Economics, ABS ANZSCO, JSA.

Industrial, mechanical & production engineers are likely to need reskilling, despite possessing strong skill level.

Identification of similar roles

Share of industries with the fossil fuel specialist skill set

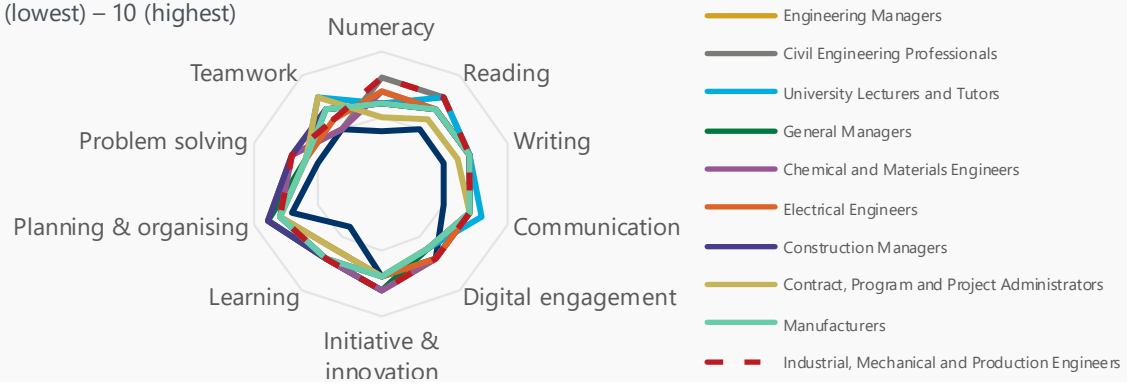


Similar roles	Seek movement	ATO movement
Other Engineering Professionals	Yes	3
Mechanical Engineering Draftspersons & Technicians	Yes	4

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Generalist and foundational competency requirements by role, 1 (lowest) – 10 (highest)



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Motor Mechanics	Automotive Engineering and Technology	Lower
Engineering Managers	Mechanical and Industrial Engineering and Technology	Same
Civil Engineering Professionals	Civil Engineering	Same
University Lecturers and Tutors	Teacher Education	Same
General Managers	Business and Management	Same
Chemical and Materials Engineers	Process and Resources Engineering	Same
Electrical Engineers	Electrical and Electronic Engineering and Technology	Same
Construction Managers	Building	Same
Contract, Program and Project Administrators	Business and Management	Lower
Manufacturers	On-the-job training	Same

Source: Oxford Economics.

Industrial, mechanical & production engineers have ample opportunities to transition into similar and skill adjacent roles.

Analysis of similar role pathways

Demand for industrial, mechanical and production engineers outside of fossil fuel industry is moderate across the Hunter region by 2035, which is sufficient to fully absorb workers needing transition.

Outside the occupation, the demand for similar roles is also strong, providing alternative pathways for these workers to utilise their existing skills.

Analysis of skill adjacent role pathways

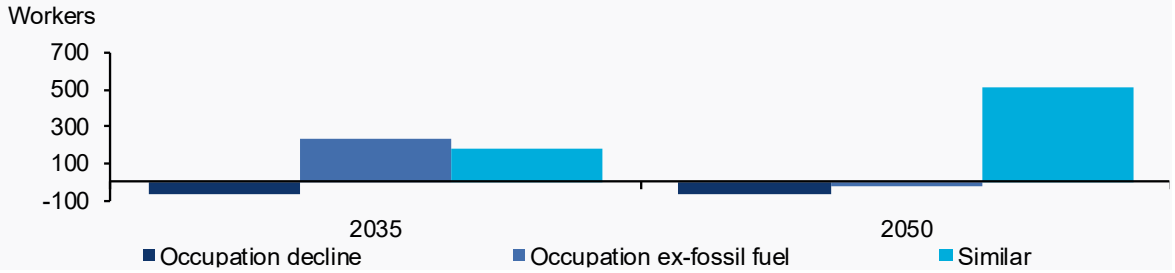
Industrial, mechanical and production engineers are likely to have stronger opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 8,200 roles by 2035.

Motor mechanics shows the highest demand amongst skill adjacent roles, followed by contract, program and project administrators, with an increase of 1,880 and 1,550 by 2035, respectively. Despite being at a lower skill levels, transitioning into these roles may require reskilling due to differing specialist skills.

There is strong demand for managerial positions, increasing by 2,740 by 2035. Other engineering-related roles also observed moderate demand, with over 790 increase projected over the same period. Transition pathways for these roles would also require reskilling to obtain the required specialist skills for different industries.

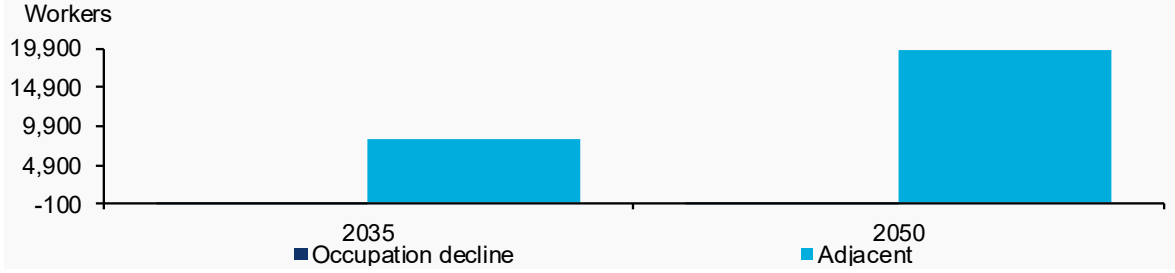
With a highly-skilled profile, industrial, mechanical and production engineers are well-equipped to transition into the identified skill adjacent roles. The only area that may need some upskilling is teamwork, which is half a point lower than average skill adjacent roles level.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

EARTHMOVING PLANT OPERATORS PROFILE

Earthmoving plant operators account for a minor share of the fossil fuel workforce with a diverse footprint across the regional economy.

Comments

There are approximately 120 earthmoving plant operators in Hunter's fossil fuel sector as at 2024. Under a Step Change Scenario employment demand in this group is expected to drop by 65.7% by 2035, falling to around 40 workers. Of the 80 roles expected to be lost, an estimated 30 are likely to retire over this period, leaving 50 operators likely to undergo a workforce transition.

Earthmoving plant operators make up only 1% of the Hunter's fossil fuel workforce. More broadly, 6% of all earthmoving plant operators in Hunter region are employed within the fossil fuel industry. This reflects a low level of exposure to fossil fuel demand transition.

Skills in this field is usually learned on the job. Earthmoving plant operators generally score at intermediate levels for foundational skills, though at the lower end of that range. Similarly, their generalist skills are mostly intermediate, with relative strength in initiative & innovation. Except for digital engagement, which is only rated at the basic level, posing some challenges in adapting to more technical roles.

Fossil fuel occupation employment size and outlook

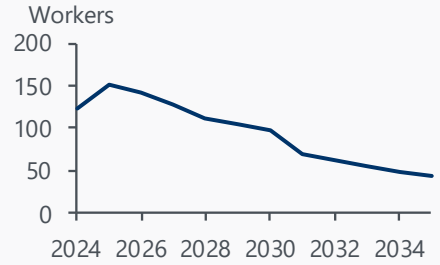
120 earthmoving plant operators in the Hunter in 2024

65.7% decline in employment by 2035

This represents

1% of fossil fuel workers

6% of all earthmoving plant operators



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

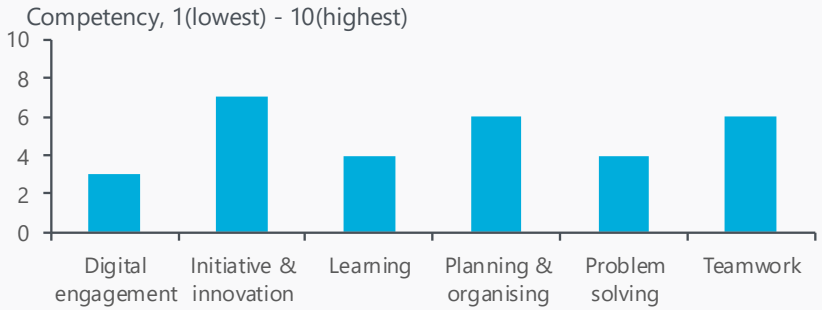
On-the-job training

4

Skill level 4 which corresponds to AQF level 2 (requiring skills equivalent to the competencies gained through a certificate II)

Foundational skills

Generalist skills

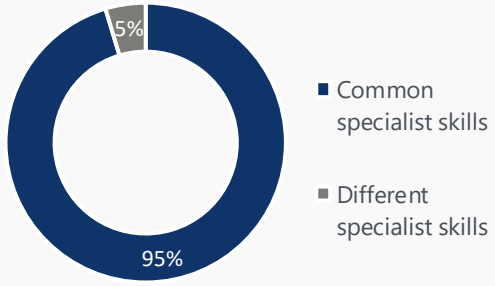


Source: Oxford Economics, ABS ANZSCO, JSA.

Earthmoving plant operators have relatively lower skill set than skill adjacent roles, particularly in digital engagement.

Identification of similar roles

Share of industries with the fossil fuel specialist skill set



Similar roles	Seek movement	ATO movement
Building and Plumbing Labourers	No	2
Other Miscellaneous Labourers	No	5
Other Stationary Plant Operators	Yes	7

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Generalist and foundational competency requirements by role, 1 (lowest) – 10 (highest)

Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Other Machine Operators	On-the-job training	Same
Chemical, Gas, Petroleum and Power Generation Plant Operators	On-the-job training	Same
Plumbers	Building	Same
Motor Mechanics	Automotive Engineering and Technology	Same
Agricultural, Forestry and Horticultural Plant Operators	On-the-job training	Same
Carpenters and Joiners	Building	Same
Clay, Concrete, Glass and Stone Processing Machine Operators	On-the-job training	Same
Crane, Hoist and Lift Operators	On-the-job training	Same
Other Farm, Forestry and Garden Workers	On-the-job training	Same
Transport Services Managers	On-the-job training	Higher

Source: Oxford Economics.

Earthmoving plant operators are likely to transition smoothly into similar and skill-adjacent roles, given the strong demand projected.

Analysis of similar role pathways

Demand for earthmoving plant operators outside of fossil fuel is strong across the Hunter region by 2035, more than enough to fully absorb workers needing to transition.

Furthermore, the demand outlook for similar roles outside of this occupation is also substantial, providing earthmoving plant operators abundant pathways to utilise their skill set when transitioning into new roles.

Analysis of skill adjacent role pathways

Earthmoving plant operators are likely to have even stronger opportunities to transition to skill-adjacent roles, where the demand is expected to increase by 4,600 by 2035.

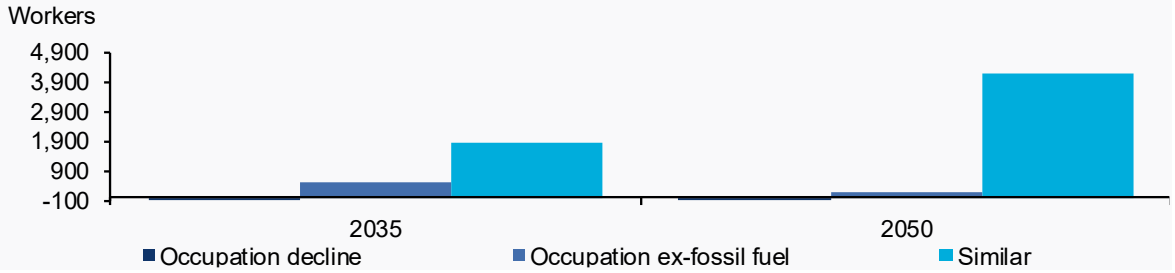
Motor mechanics shows the highest demand amongst skill adjacent roles, with an increase of 1,880 by 2035, though transitioning into this role may require additional training due to differing specialist skills despite being at a similar skill level.

There is moderate demand for roles in building and construction, with a projected increase of 1,800 by 2035.

There is minimal demand from other operators, with projected increase approximately 420 by 2035, most of which require on-the-job training.

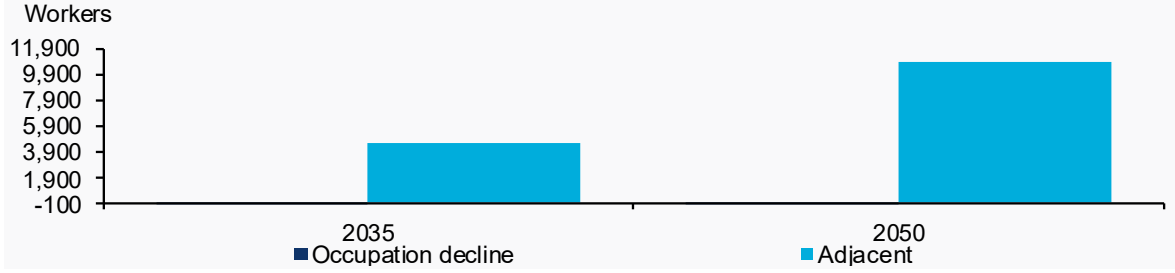
Earthmoving plant operators are likely to need training across most areas of both foundational and generalist skills, as their current levels are around one point below the average for skill adjacent roles, particularly in digital engagement, which is almost 2 point lower.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

OTHER SPECIALIST ROLES – CHEMICAL, GAS, PETROLEUM AND POWER GENERATION PLANT OPERATORS PROFILE

Chemical, gas, petroleum and power generation plant operators is project to experience significant decline in demand by 2035.

Comments

There are approximately 110 chemical, gas, petroleum and power generation plant operators in Hunter's fossil fuel sector as at 2024. Under a Step Change Scenario employment in this group is expected to drop by 73.0% by 2035, falling to around 30 workers. Of the 80 roles expected to be lost, an estimated 30 are likely to retire over this period, leaving 50 workers likely to undergo a workforce transition.

Chemical, gas, petroleum and power generation plant operators make up only 1% of the Hunter's fossil fuel workforce. However, 21% of all chemical, gas, petroleum and power generation plant operators in Hunter region are employed within the fossil fuel industry. This reflects a relatively high level of dependence on this sector, making them vulnerable to demand changes.

Employment in this field usually required certificate-level qualification in electrical and electronic engineering and technology. Chemical, gas, petroleum and power generation plant operators generally score at intermediate levels for foundational skills. Similarly, their generalist skills are mostly intermediate, with relative strength in initiative & innovation and planning & organising, creating an even skill profile.

Fossil fuel occupation employment size and outlook

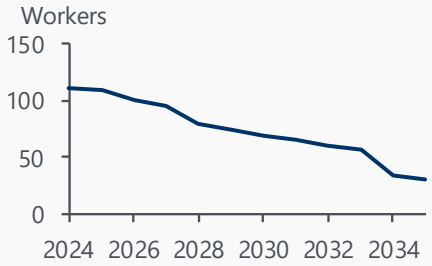
110 chemical, gas, petroleum and power generation plant operators in the Hunter in 2024

73.0% decline in employment by 2035

This represents

1% of fossil fuel workers

21% of all chemical, gas, petroleum and power generation plant operators



Source: Oxford Economics based on AEMO Step Change scenario, ABS Census.

Role specific skill set

Specialist skills

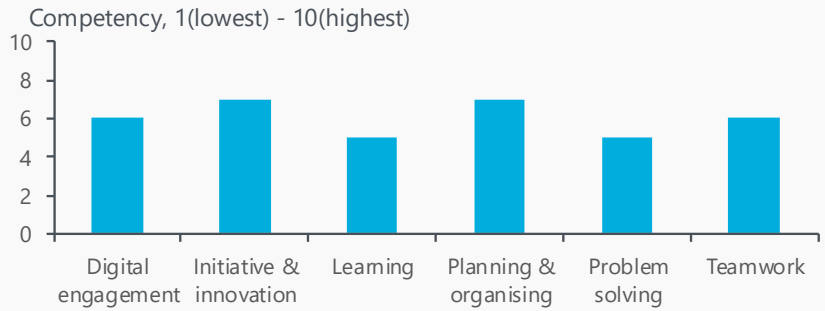
Electrical and Electronic Engineering and Technology

4

Skill level 4 which corresponds to AQF level 3 (requiring skills equivalent to the competencies gained through a certificate II)

Foundational skills

Generalist skills

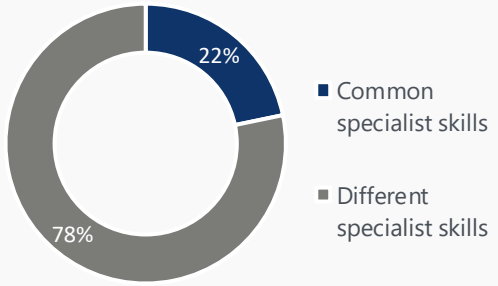


Source: Oxford Economics, ABS ANZSCO, JSA.

Chemical, gas, petroleum and power generation plant operators have low transferability, however, their skill profile is adequate into transition to skill adjacent roles.

Identification of similar roles

Share of industries with the fossil fuel specialist skill set

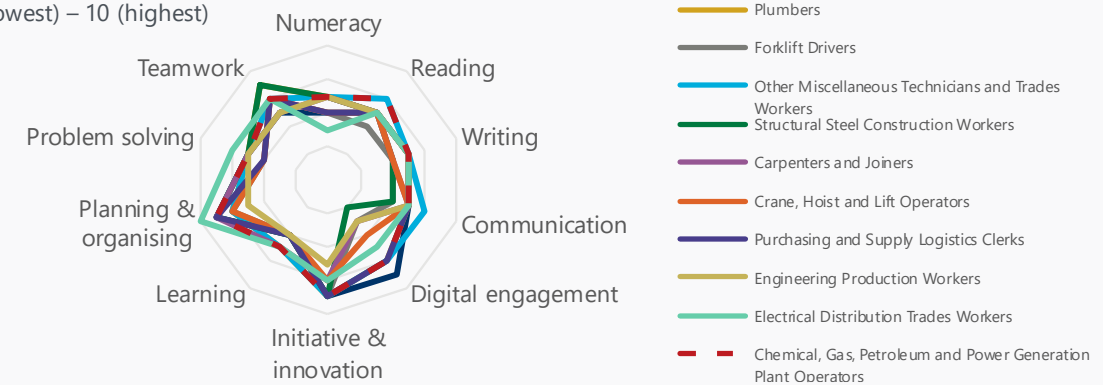


Similar roles	Seek movement	ATO movement
Other Factory Process Workers	Yes	1
Other Miscellaneous Labourers	Yes	4
Other Machine Operators	Yes	5

Source: Oxford Economics, JSA, Seek, ATO.

Generalist & foundational skill assessment for skill adjacent roles

Generalist and foundational competency requirements by role, 1 (lowest) – 10 (highest)



Source: Oxford Economics, JSA.

Identification of skill adjacent roles

Skill adjacent roles	Field of education	
	FOE	Skill level
Motor Mechanics	Automotive Engineering and Technology	Same
Plumbers	Building	Same
Forklift Drivers	On-the-job training	Same
Other Miscellaneous Technicians and Trades Workers	On-the-job training	Same
Structural Steel Construction Workers	On-the-job training	Same
Carpenters and Joiners	Building	Same
Crane, Hoist and Lift Operators	On-the-job training	Same
Purchasing and Supply Logistics Clerks	On-the-job training	Same
Engineering Production Workers	On-the-job training	Same
Electrical Distribution Trades Workers	Electrical and Electronic Engineering and Technology	Same

Source: Oxford Economics.

Chemical, gas, petroleum and power generation plant operators are unlikely to face challenges transitioning into similar and skill adjacent roles, given strong demand.

Analysis of similar role pathways

Demand for chemical, gas, petroleum and power generation plant operators is muted across all industries in the Hunter region by 2035. However, outside of the occupation, demand for similar roles is strong and able to fully absorb workers needing transition, providing alternative pathways for these workers.

Analysis of skill adjacent role pathways

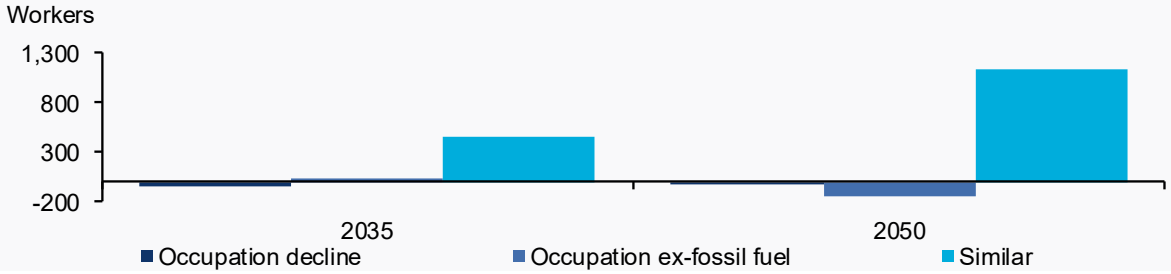
Chemical, gas, petroleum and power generation plant operators are likely to even stronger outlook to transition to skill-adjacent roles, where the demand is expected to increase by 5,570 by 2035.

Motor mechanics shows the highest demand amongst skill adjacent roles, with an increase of 1,880 by 2035, though transitioning into this role may require additional training due to differing specialist skills despite being at a similar skill level.

Demand for roles concentrated in construction and building is also strong, with a projected increase of over 1,800 by 2035. These roles are also likely to require reskilling due to different specialist skills sets specific to the building sector.

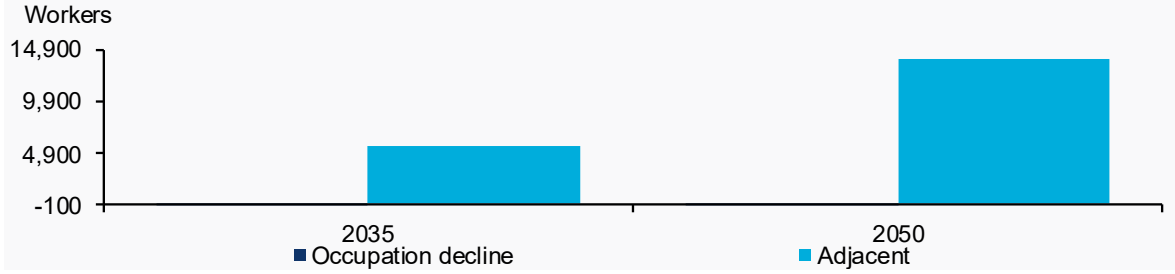
Chemical, gas, petroleum and power generation plant operators are unlikely to need training for both foundational and generalist skills. Their current skill levels are sufficient to facilitate smooth transition into most identified skill adjacent professions, particularly stronger in reading and digital engagement compared to the average for skill adjacent roles.

Demand for similar roles



Source: Oxford Economics based on AEMO Step Change scenario.

Demand for skill adjacent roles



Source: Oxford Economics based on AEMO Step Change scenario.

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Contacts

EUROPE

Oxford (Headquarters)
Tel: +44 (0)1865 268 900

London
Tel: +44 (0)20 3910 8000

Belfast
Tel: + 44 2892 635400

Milan
Tel: +39 02 8295 2521

Frankfurt
Tel: +49 69 96 758 658

Paris
Tel: +33 (0)1 78 91 50 52

Stockholm
Tel: +46 (0) 8 446 887 65

AFRICA AND MIDDLE EAST

Cape Town
Tel: +27(0)21 863-6200

Dubai
Tel: +971 56 396 7998

AMERICAS

New York
Tel: +1 (646) 786 1879

Philadelphia
Tel: +1 (646) 786 1879

Mexico City
Tel: +52 155 5419-4173

Boston
Tel: +1 (617) 780 2265

Chicago
Tel: +1 (847) 993-3140

Los Angeles
Tel: +1 (424) 303 3449

Toronto
Tel: +1 (905) 361 6573

ASIA PACIFIC

Singapore
Tel: +65 6850 0110

Sydney
Tel: +61 (0)2 8458 4200

Hong Kong
Tel: +852 3974 8842

Tokyo
Tel: +81-(0)3-4588-2798