RACE for 2030
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# Electricity Workforce Projections for the 2024 Integrated System Plan: Focus on Tasmania

Final Report

UTS Institute for Sustainable Futures
AEMO
Australian Government Department of Industry, Science and Resources
Cooperative Research Centres Program

## Final report

RACE for Change

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Australian Energy Market Operator (AEMO)

RACE for 2030

## Project partners


## Acknowledgements

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## Acknowledgement of Country

The authors of this report would like to respectfully acknowledge the Traditional Owners of the ancestral lands throughout Australia and their connection to land, sea and community. We recognise their continuing connection to the land, waters, and culture and pay our respects to them, their cultures and to their Elders past, present, and emerging.

## What is RACE for 2030?

Reliable, Affordable Clean Energy for 2030 (RACE for 2030) is an innovative cooperative research centre for energy and carbon transition. We were funded with $68.5 million of Commonwealth funds and commitments of $280 million of cash and in-kind contributions from our partners. Our aim is to deliver $3.8 billion of cumulative energy productivity benefits and 20 megatons of cumulative carbon emission savings by 2030. racefor2030.com.au

## Disclaimer

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# List of abbreviations

| Acronym | Term |
|---|---|
| AEMO | Australian Energy Market Operator |
| FTE | Full Time Equivalent |
| ISF | Institute for Sustainable Futures |
| ISP | Integrated System Plan |
| NEM | National Electricity Market |
| O&M | Operations & Maintenance |
| PV | Solar Photovoltaic |
| TAS | Tasmania |

# 1 Introduction

This report provides projections for the electricity sector workforce in Tasmania. It is embedded in a wider study that looks at the projected electricity workforce requirements associated with the Australian Energy Market Operator's (AEMO) 2024 Integrated System Plan (ISP)[1].

Projections are segmented to include technology, location and occupation, and cover the generation and storage of electricity and the construction of new transmission lines included in the ISP in Tasmania.

The project was conducted by the Institute for Sustainable Futures, University of Technology (ISF) in partnership with AEMO and funded by the RACE for 2030 Co-operative Research Centre. An Industry Reference Group made up of representatives from state government, industry and universities, provided valuable insights.

The aim of this report is to provide stakeholders with an in-depth understanding of the workforce implications of different electricity scenarios, with a specific focus on Tasmania. This report develops workforce projections for each, broken down by technology, occupation and location, using the ISP's three scenarios. The ISP's three scenarios (or optimal development paths) reflect various policy and market contexts on the path towards net zero by 2050. Importantly, each scenario considers all existing state and federal policies. They are:

- Step Change is a path that illustrates a pace of energy transition – with CER playing a strong role – that is in line with Australia's commitment to keep global temperature rise to below 2°C.
- Progressive Change, like step change, includes current Australian policies and commitments to decarbonisation, yet it reflects a constrained economic and supply chain environment meaning less uptake of CER and deployment of utility-scale developments.
- Green Energy Exports indicates an exceptionally fast rate of decarbonisation aimed at Australia making its contribution to keeping global temperature increase to below 1.5°C, with a strong emphasis on a green exports economy and electrification.

After extensive consultation with a wide range of stakeholders, AEMO has determined that the most likely scenario is Step Change (43% likelihood), followed closely by Progressive Change (42% likelihood), with Green Energy Exports assigned a likelihood of just 15%.

[1] Rutovitz, J., Gerrard, E., Lara, H., and Briggs, C. (2024). The Australian Electricity Workforce for the 2024 Integrated System Plan: Projections to 2050. Prepared for RACE for 2030. www.uts.edu.au/isf/explore-research/projects/australian-electricity-workforce-2024-integrated-system-plan-projections-2050

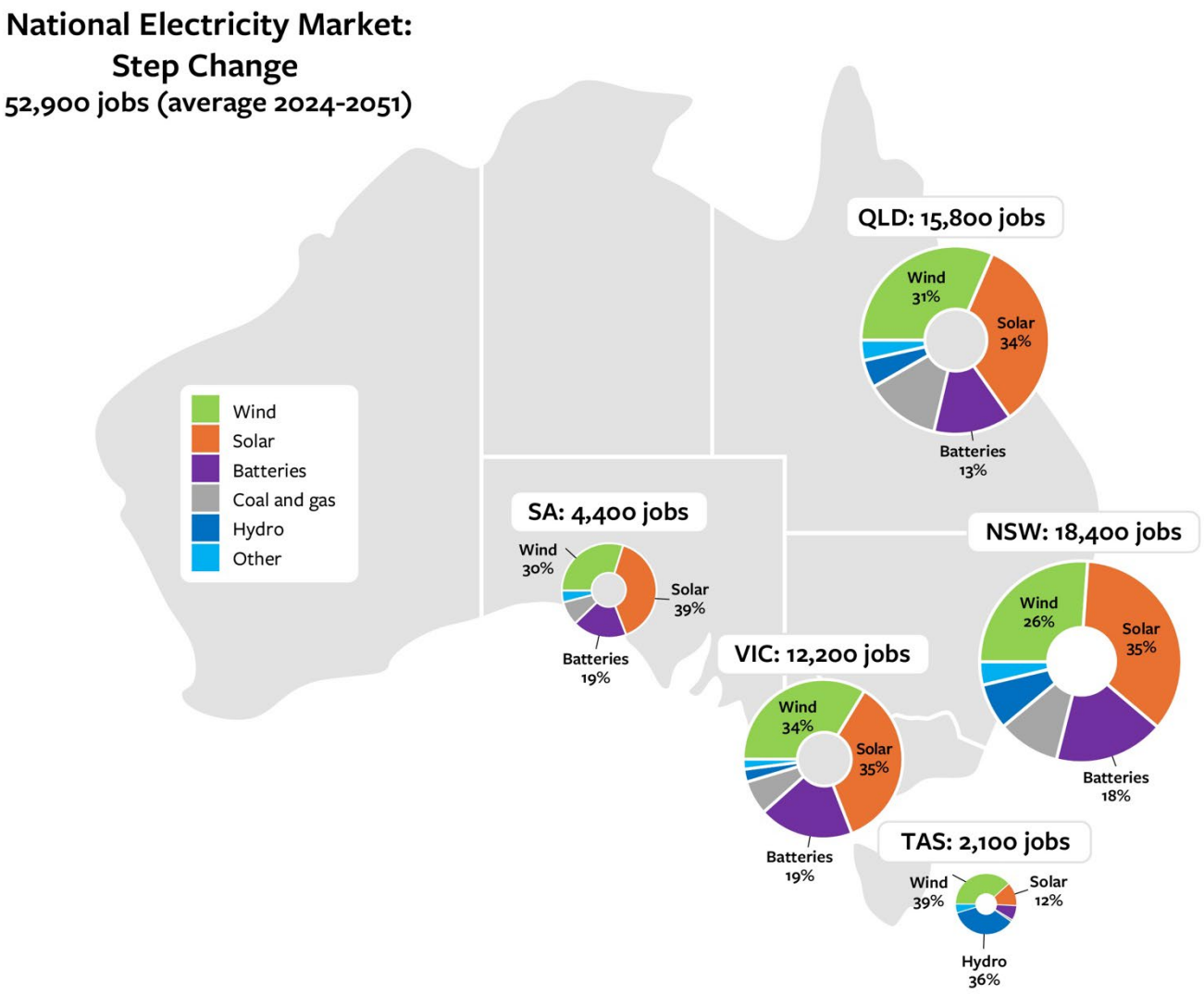



*Figure 1 Average electricity sector jobs by State, 2024-2050 (Step Change)*

Under Step Change, Tasmania averages 2,100 jobs in generation and storage or transmission line construction from 2024-2050 (Figure 1).

New South Wales is the leading state under the Step Change, averaging 18,400 full-time jobs per year, followed closely by Queensland (15,800). Victoria is some way behind with 12,200 jobs on average.

In Tasmania, average workforce requirements are highest in wind (39%), closely followed by hydro at 36%, with solar at 13% of the workforce share by technology. In all other states, solar and wind together account for between 61% and 69% of jobs.

See the main report *The Australian Electricity Workforce for the 2024 Integrated System Plan: Projections to 2050* (Rutovitz et al, 2024). for details on the methodology including a full list of employment factors, results for the NEM as a whole, a comparison of results by State, and recommendations for further work to support planning for workforce development.

There is also a downloadable workbook of results for each state and for the NEM.

www.uts.edu.au/isf/explore-research/projects/australian-electricity-workforce-2024-integrated-system-plan-projections-2050

# 2 Workforce projections for Tasmania by scenario

Figure 1 outlines the projected electricity sector workforce for Tasmania according to each ISP scenario. Tasmania updated its emissions targets in 2022 and has legislated an economy-wide target of net zero by 2030[2]. This is reflected in the employment peak seen at the end of this decade for all scenarios. Workforce demand is fairly volatile under all scenarios, with several peaks and troughs. Green Energy Exports has a drastic increase initially.

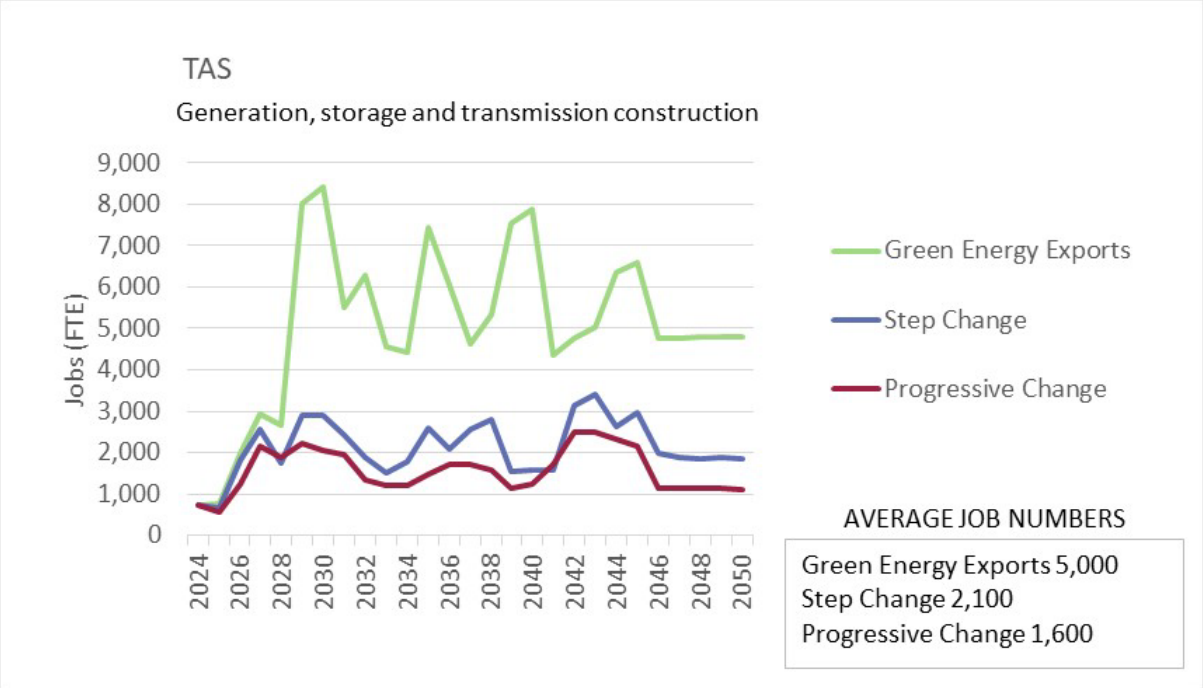



*Figure 1 TAS, electricity sector jobs by scenario*

- Under the Step Change scenario, jobs average 2,100 from now to 2050. The workforce more than triples by 2030, starting out at 700 jobs and reaching 2,900.
- Under the Green Energy Exports scenario, exponential job growth occurs over the next five years, reaching 8,400 by 2030. For the remainder of the period out to 2050, jobs fluctuate significantly, with four peaks and following troughs. Jobs average of 5,000 over the period.
- Under the Progressive Change scenario, annual electricity sector employment averages 1,600. It peaks in 2029 and again in 2043, at 2,200 and 2,500. Outside of these two peaks, the workforce remains relatively low (between 1,200-2,000).

*Total jobs*

*When we talk about the number of jobs in this report, we mean the number of full time equivalent (FTE) positions for each year. These are the sum of people working on construction projects, operations and maintenance, manufacturing (as it relates to the energy sector), and fuel supply for coal and gas generation in that year. One FTE could be one person working full time, two people working full time for six months, or an ongoing full-time job in operations and maintenance. Construction jobs are by their nature temporary, although workers may move from one project to another and be in continuous employment.*

[2] Climate Change (State Action) Act 2008, Tasmania, https://www.recfit.tas.gov.au/what_is_recfit/climate_change/climate_change_legislation

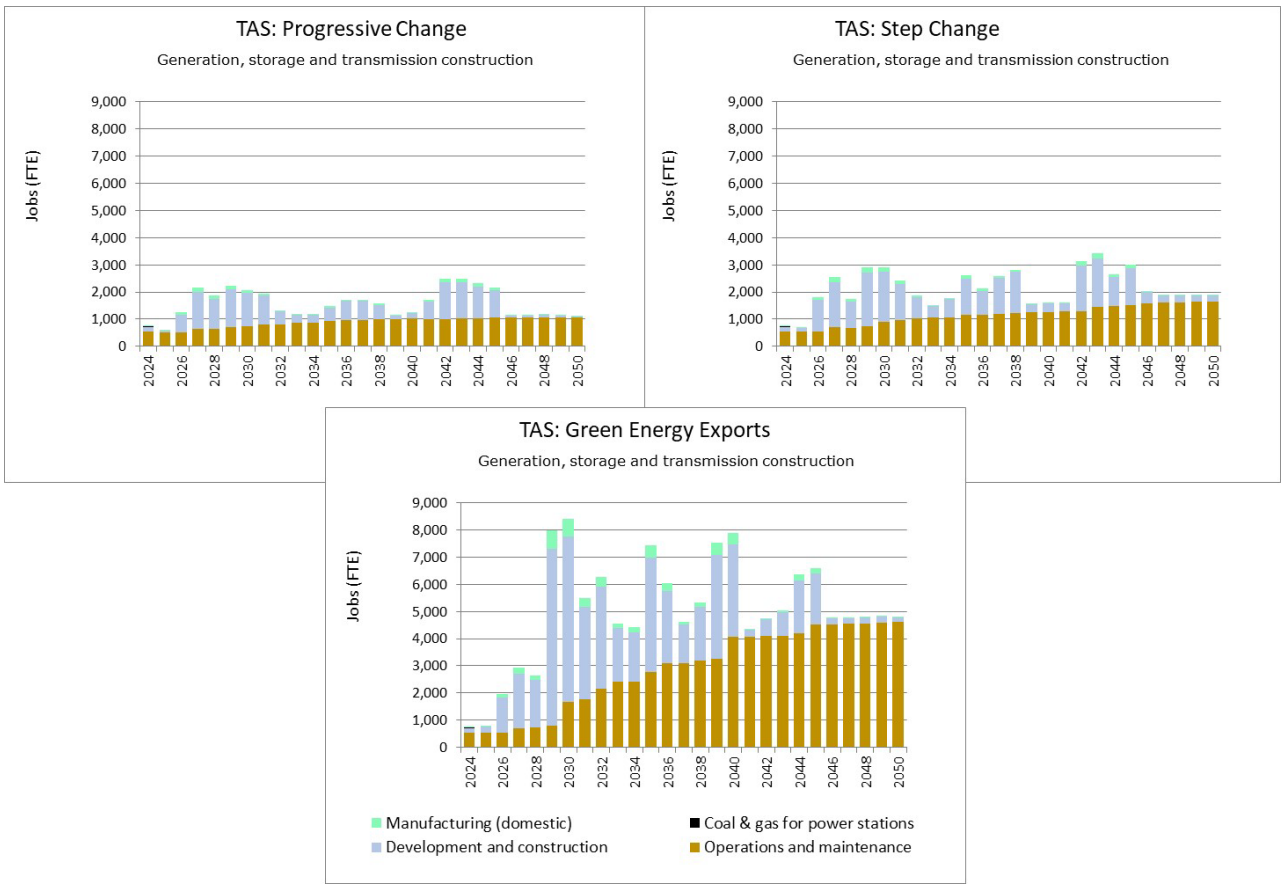



*Figure 2 TAS, jobs by phase (all scenarios)*

Figure 2 shows the total employment by project phase, from manufacturing to development and construction and operations and maintenance, noting that Tasmania does not have a coal or gas sector, so these jobs are not covered. Under all scenarios development and construction jobs follow a volatile profile, whereas operations and maintenance roles, grow steadily. The steady growth in operations and maintenance jobs, under all scenarios, results from the increased fleet of renewable energy and storage projects coming online.

By 2050, under Step Change O&M represents 89% of the total electricity sector workforce. Under both Green Energy Exports and Progressive Change, it reaches 96%. The O&M workforce will be servicing not only utility scale developments, but also the growth in rooftop solar and distributed batteries.

In Figure 3 jobs are shown according to technology group for each scenario. The breakdown covers renewables, storage, transmission construction and coal and gas (although, fuel supply jobs are non-existent). Under all scenarios, renewables generate the largest share of jobs.

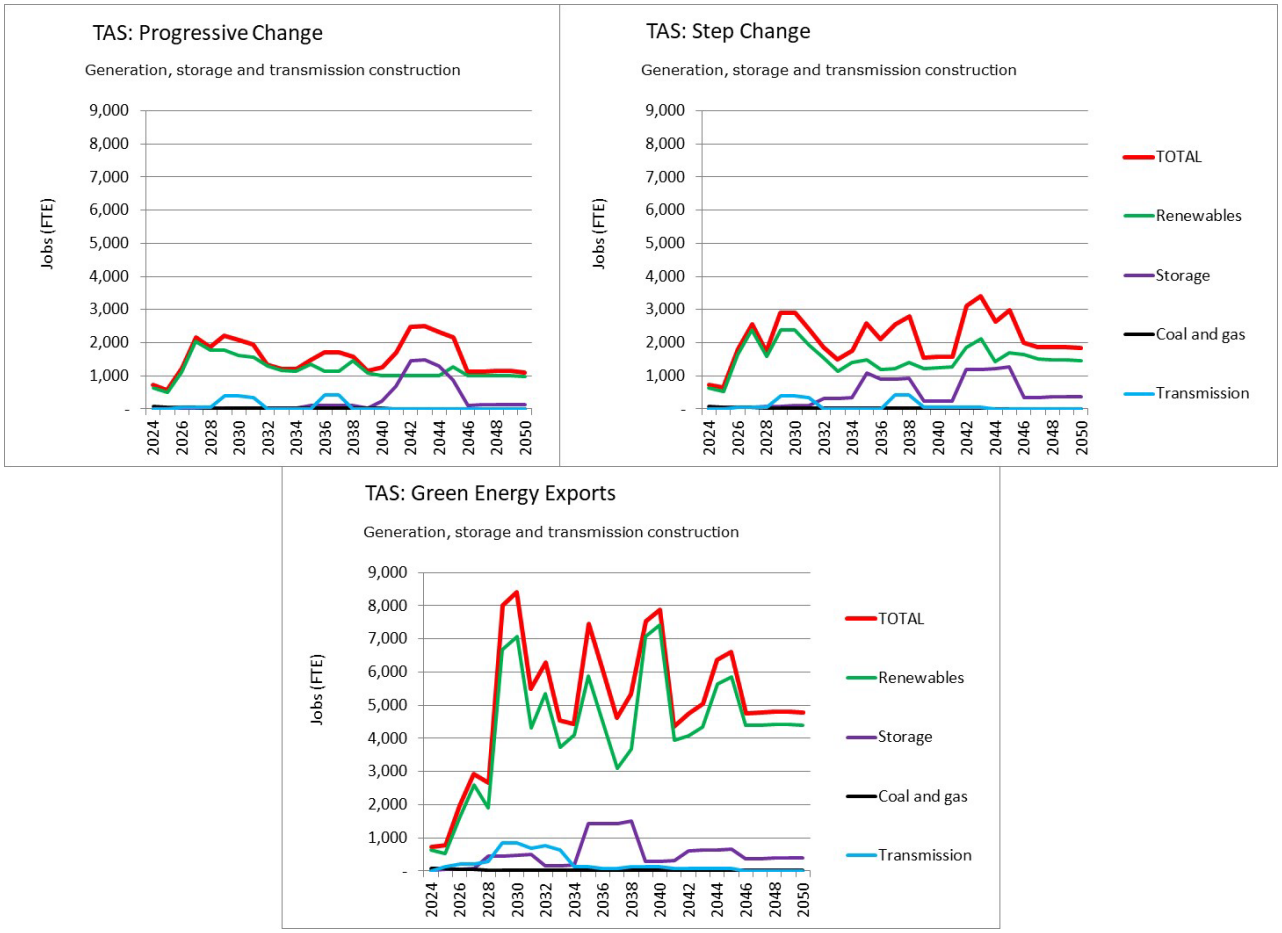
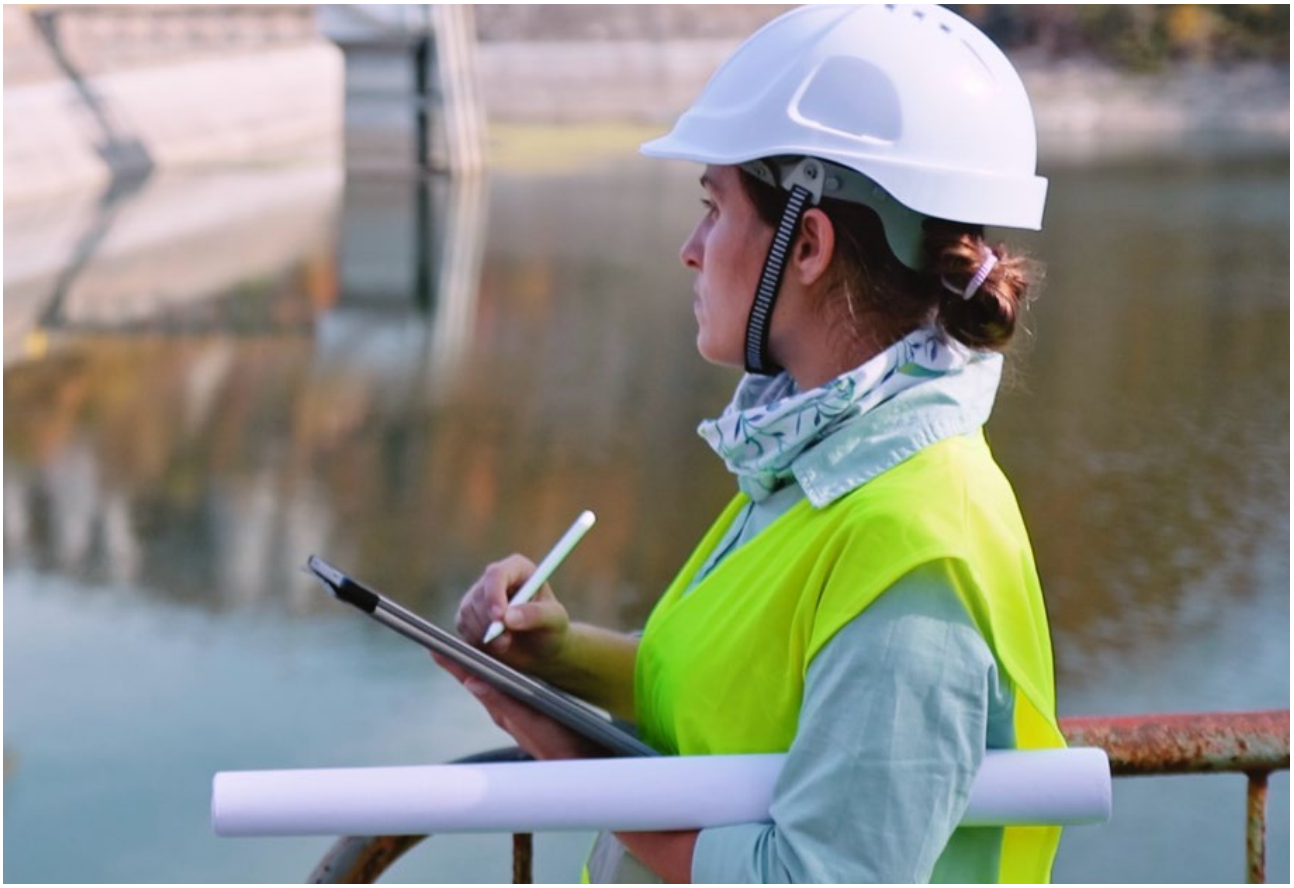



*Figure 3 TAS, jobs by technology group (all scenarios)*



# 3 Employment by occupation for Tasmania

When it comes to planning for the energy transition, occupational employment trends – that is, what type of jobs are required – provide government, industry, the training sector, and the community with vital insights. This information then informs policy design, education and training packages, and individual employment pathways.

Figure 4 illustrates the average employment demand from 2024 through to 2041 in terms of occupational structure (employment grouping) for Step Change. It includes generation technologies and the construction of transmission lines but does not include employment in batteries. Employment in batteries is not included because we do not have sufficient employment factor data for projections due to the emerging nature of the technology. Importantly, solar represents both rooftop and utility-scale.

- For Tasmania, the occupational group with highest number of jobs is trades and technicians, with an average of just below 600 jobs under Step Change. Wind is the dominant technology, taking well over half of the average trades and technician workforce.
- Following trades and technicians is the professional workforce, which includes occupations such as engineers, finance, stakeholder and community engagement professionals. Under Step Change, the professional workforce averages 400 from now until 2041.
- Under Step Change, labourers and managers average 300, driven in large part by the demand for construction managers in the build out of renewable energy infrastructure.
- Under Step Change, an average of 100 jobs will be required in both administration and machine operators (such as truck drivers and crane operators).

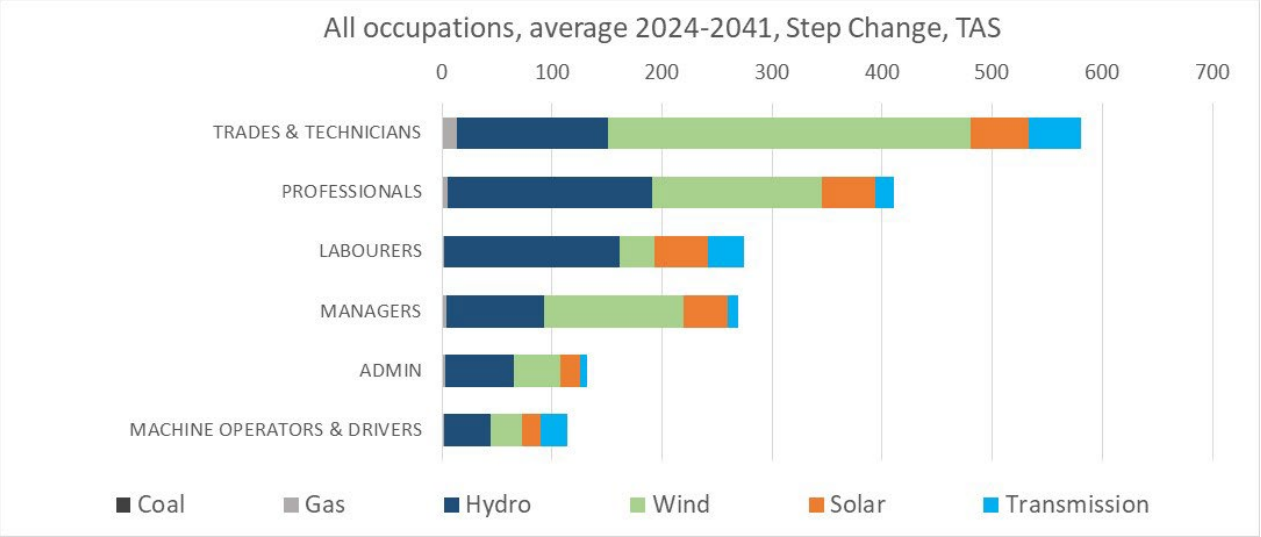



*Figure 4 TAS, average occupational structure*

To effectively coordinate the labour supply, and the requisite skills and training, the peaks in employment are the most important. The training and skills development policies and packages designed and delivered in the short to medium term, cater for the subsequent 10 to 15 years. Labour requirements under Step Change for the peak year for energy sector employment in Tasmania (2029), are shown in Figure 5. The Progressive Change and the Green Energy Exports occupational requirements are shown in Appendix A.

Under Step Change, electricians are in high demand in 2030, with over 300 electricians needed, with the wind sector accounting for the bulk of demand. This is followed by a demand for administrative staff and construction labourers, which both require just under 200 jobs in the peak year under Step Change. Occupations, such as finance, business, legal and policy professionals, mechanical trades and technicians and concreters all hover around 100 jobs in the peak year 2030.

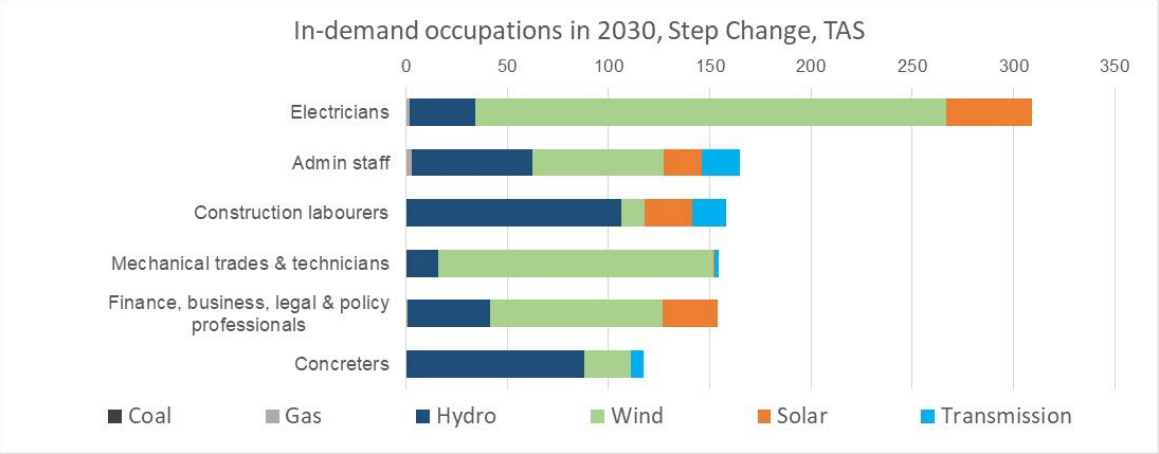



*Figure 5 TAS, in-demand occupations during peak year (2030)*

The six most in-demand occupations under Step Change are shown by technology for the period 2024-2041 in Figure 6.

Electricians and administrative staff dominate the in-demand occupations, and both grow steadily over the projected period. For electricians, wind is the dominate employer, for administrative staff hydro is also a major employer. Construction labourers and mechanical trades and technicians are also in-demand occupations, construction labourers follow a volatile employment profile in-line with the nature of construction jobs, whereas mechanical trades and technicians grow steadily with the wind sector dominating demand. Electrical engineers are also in-demand and follow a fluctuating profile, followed by operations and production managers, which grow steadily over the period.


*Figure 6 TAS, in-demand occupations annual requirement by technology, Step Change*

*Note: Electricians and admin staff have a scale reaching 400 jobs, whereas other occupations have a scale maximum of 250 jobs.*

# 4 Workforce projections by technology for Tasmania

Tasmania is set to see significant employment growth in the wind and hydro sector under all scenarios. Figure 7 shows the average electricity sector jobs under each scenario by technology. Figure 8 gives a more detailed technological breakdown and the workforce requirements for each year.

- Rooftop PV and distributed batteries draw from the same workforce, with installers working across both technologies. Combined, this sector accounts for between 10% and 20% of average employment in all scenarios.
- Under Progressive Change and Step Change, employment in wind makes up 39% or over of the average electricity sector employment profile, under Green Energy Exports wind sector jobs boom and become 70% of the workforce.
- Hydro jobs account for 44% of jobs under Progressive Change and 36% under the Step Change. Under the Green Energy Exports, however, this drops to 15%, as huge growth in wind overtakes hydro.
- In all scenarios, utility-scale solar accounts for a very small proportion of the total electricity sector employment (only 1% in Green Energy Exports and 0% in Step Change and Progressive Change).

Repowering a renewable asset, such as solar panels or wind turbines, refers to the process of replacing hardware either due to end of life or because improvements in the technology have significantly enhanced performance, meaning it is more profitable to do so. In this study, we have included repowering in the model for utility-scale solar, rooftop PV and onshore wind, with the construction times and employment factors remaining the same. Any employment associated with recycling of materials is not included in the study.

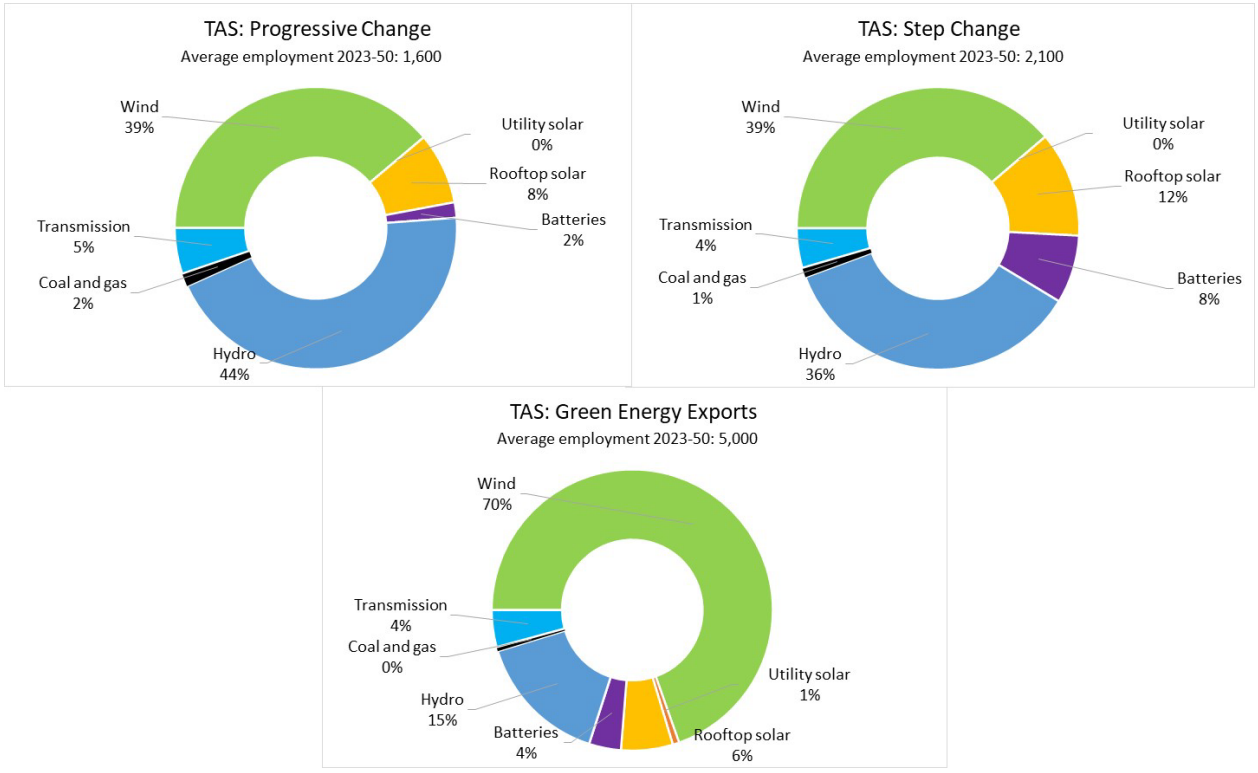



*Figure 7 TAS, average electricity sector jobs by technology and scenario*

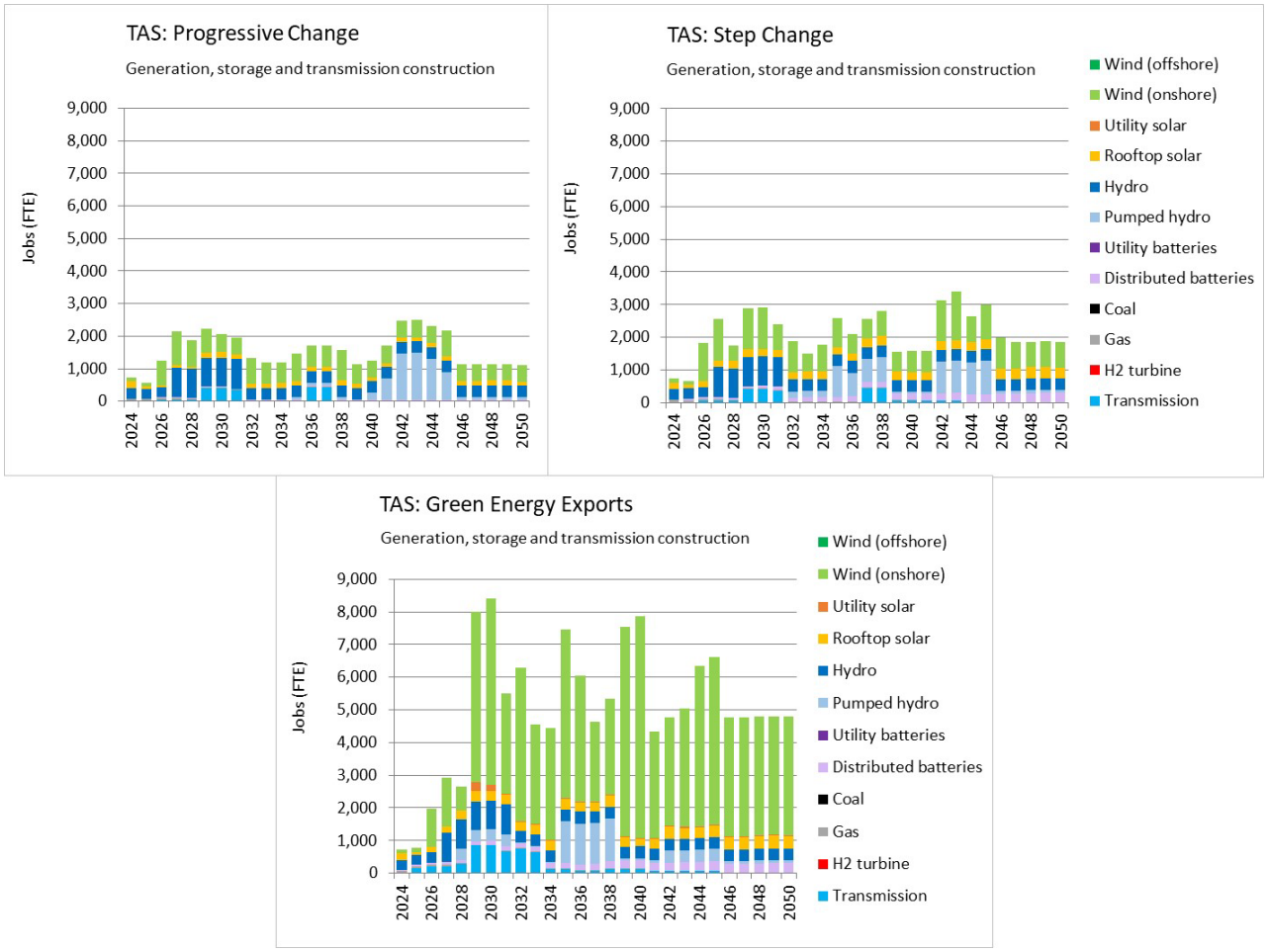



*Figure 8 TAS, jobs by technology (all scenarios)*

*Note the different graph scales: the top two graphs go to 4,000 jobs and the bottom to 9,000 jobs.*

## 4.1 Wind

Employment in the wind sector in Tasmania averages 800 jobs under Step Change and 600 under Progressive Change (Figure 9). Under Green Energy Exports the average increases fivefold to 3,500 jobs. Offshore wind does not feature in the energy mix.

Repowering starts in 2030 in all scenarios, but overall numbers are small, averaging less than 30 during the 2040s in all scenarios. Under both Progressive Change and Step Change, jobs boom over the next two-five years. Under Green Energy Exports, however, the workforce grows exponentially to reach 5,700 in 2030; it then fluctuates around 3,000 before another boom in 2039-2040.

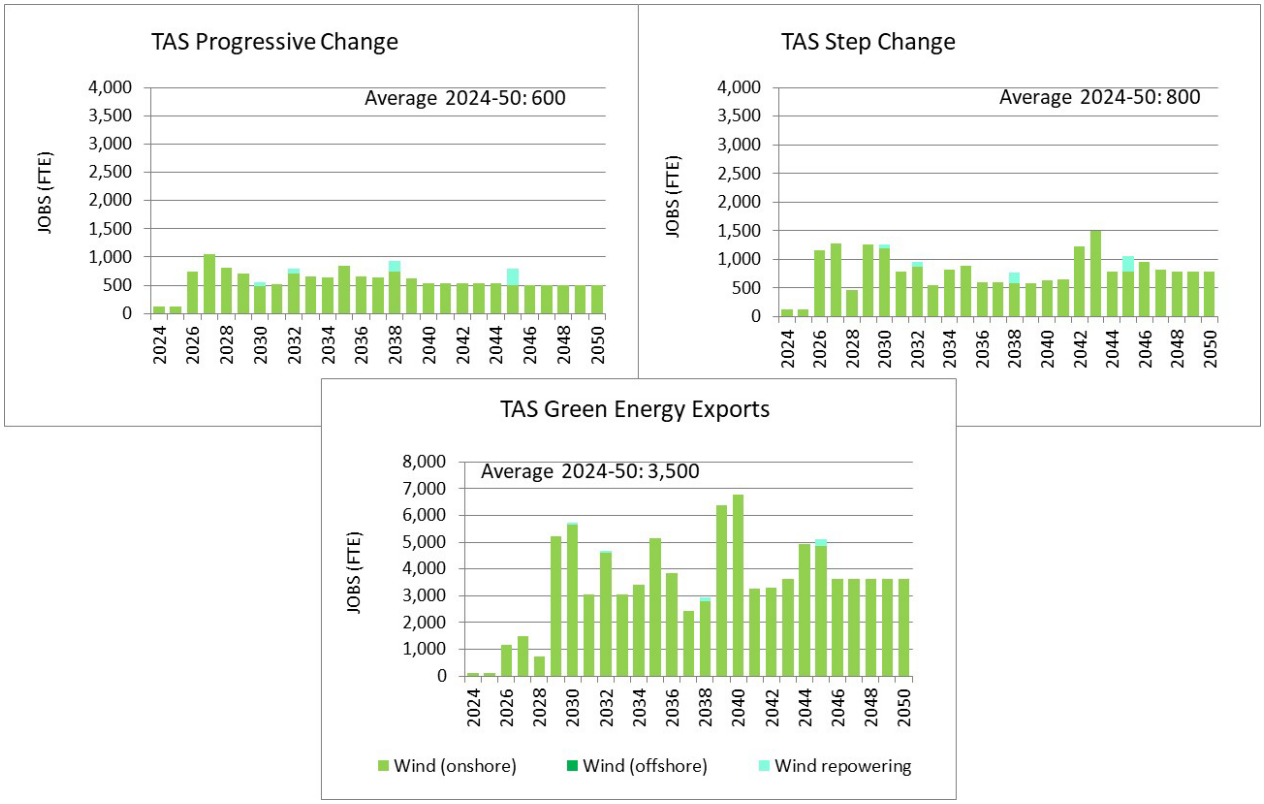



*Figure 9 TAS, jobs in wind (all scenarios)*

*Note the different graph scales: the top two graphs go to 4,000 jobs and the bottom to 8,000 jobs.*

## 4.2 Utility-scale solar

Utility-scale solar does not feature in either Step Change or Progressive Change (Figure 10). Under Green Energy Exports, utility scale solar peaks around 250 construction jobs in 2029 and 2030, before dropping to less than 50 O&M jobs for the remainder of the period.

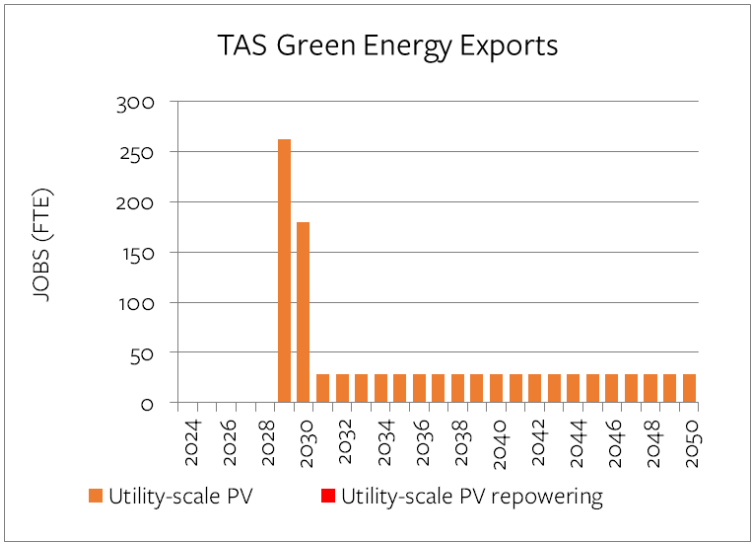



*Figure 10 TAS, jobs in utility-scale PV (Green Energy Exports)*

## 4.3 Rooftop solar and distributed batteries

For Tasmania, rooftop solar and distributed batteries contribute significant numbers to overall electricity sector jobs growth under all scenarios (Figure 11). Under Progressive Change, jobs in rooftop solar and distributed batteries average 200 over the projected period, from now until 2050. Under Step Change this figure doubles to average 400 jobs, which grow steadily over the period. Green Energy Exports follows a similar profile as Step Change averaging 500 jobs. Under all scenarios, repowering of rooftop solar begins to contribute to the overall share of jobs in the mid 2030s.

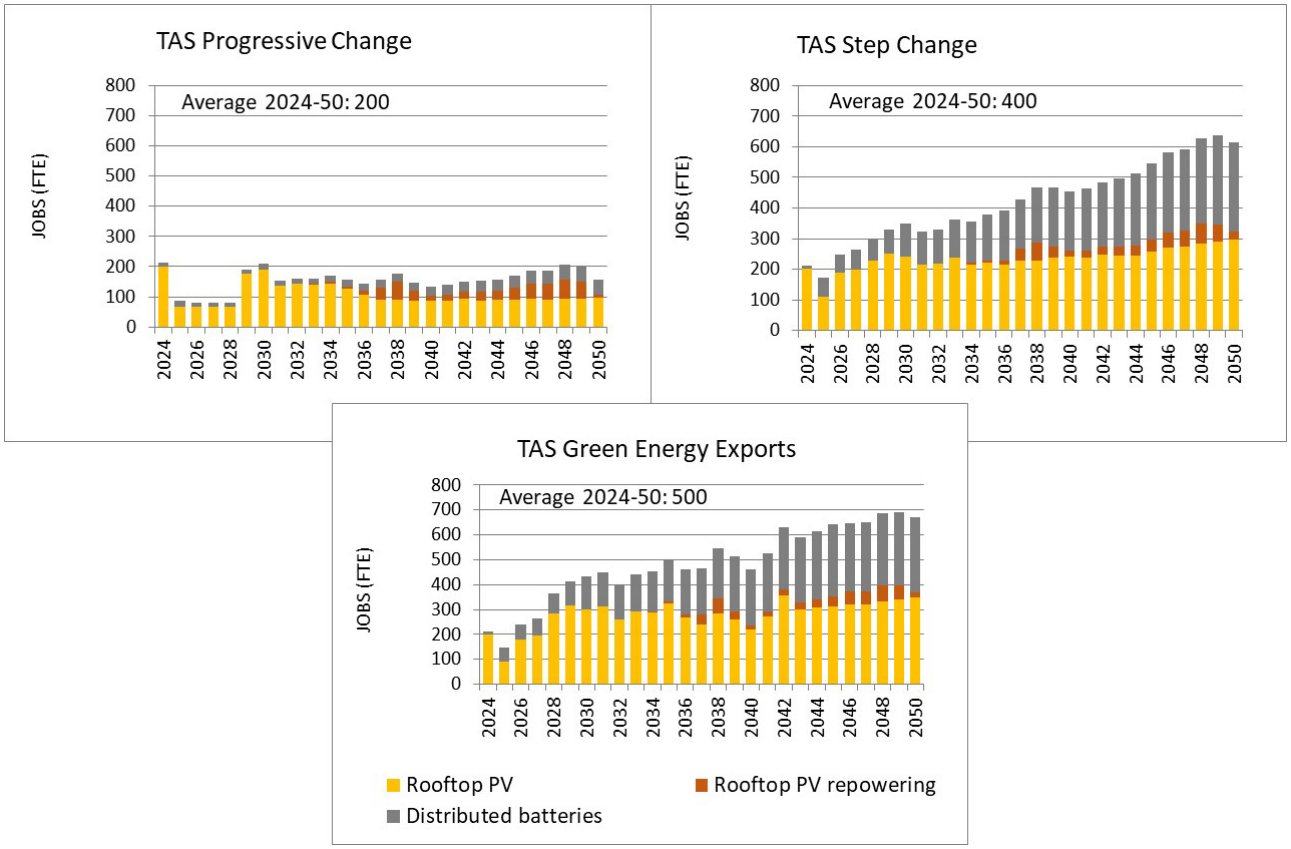



*Figure 11 TAS, jobs in rooftop PV and distributed batteries (all scenarios)*

## 4.4 Large scale storage

Jobs in large scale storage, that is hydro and pumped hydro projects, are captured in Figure 12. There are no jobs in utility batteries in Tasmania under any of the scenarios, due to its considerable hydro and pumped hydro capacity.

Employment trends in pumped hydro are volatile, indicative of the workforce requirements for construction of the projects. Under all scenarios, there is significant growth in hydro jobs in the late 2020s through to the early 2030s. Under the Step Change and Green Energy Exports scenarios there is a second boom in 2035 through to 2038. Under Progressive Change, there is an average of 700 jobs per annum in both pumped and non-pumped hydro. Under Step Change and Green Energy Exports this rises to an average of 800.

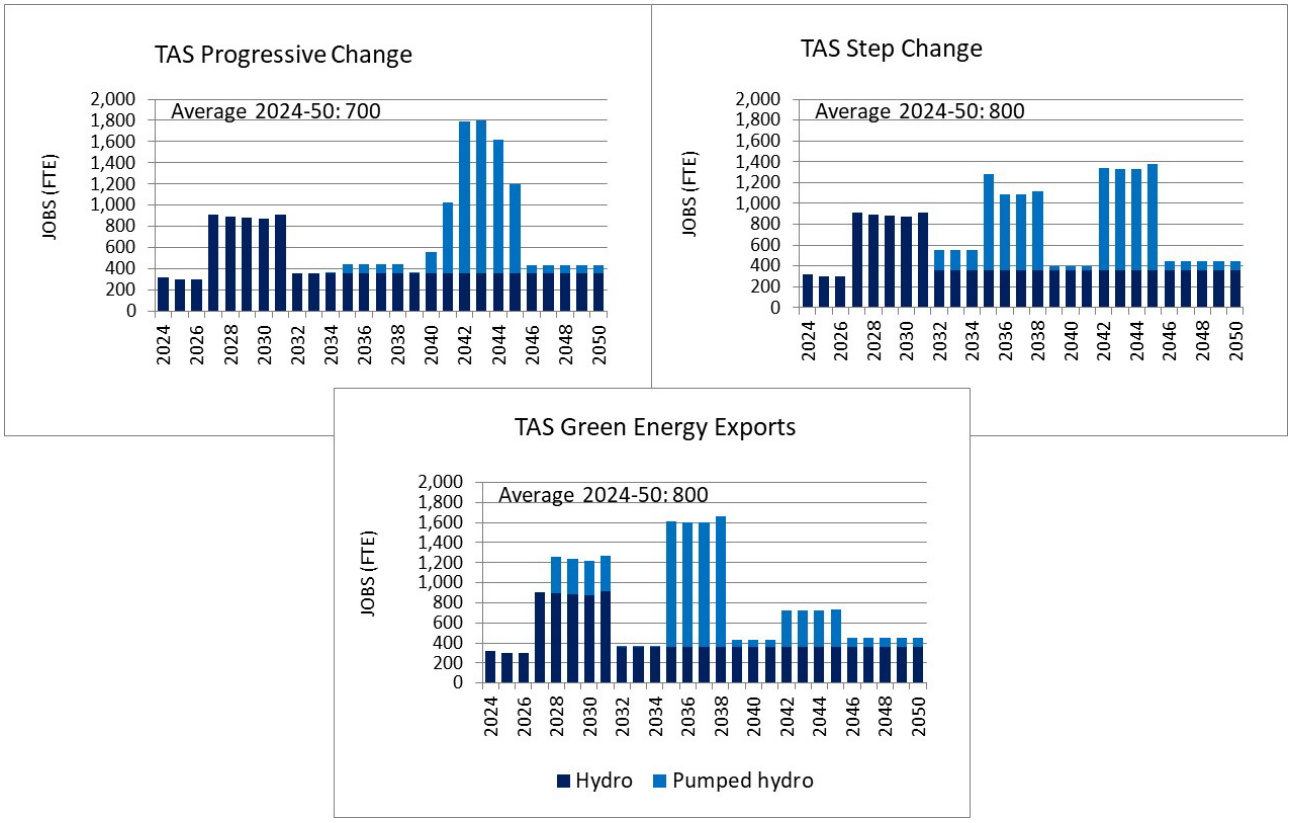



*Figure 12 TAS, jobs in pumped hydro (all scenarios)*

## 4.5 Transmission construction

Under both Step Change and Progressive Change employment in transmission construction[3] in Tasmania averages 100, with two- to three- year periods of construction activity where numbers are close to 400 (Figure 13). Both scenarios also follow a similar employment pattern with construction peaks in 2029-2031 and again in 2037-2038.

The Green Energy Exports transmission workforce averages 200 per annum. It peaks at 800 in 2029, and stays relatively high until 2033, before dropping down to under 100 through to the end of the projected period. Under both Green Energy Exports and Step Change scenarios, transmission construction finishes by 2046.

Actual employment in transmission, it should be noted, is likely to be more variable than illustrated here, as these calculations work with the assumption that employment is spread evenly across the construction period for each project.

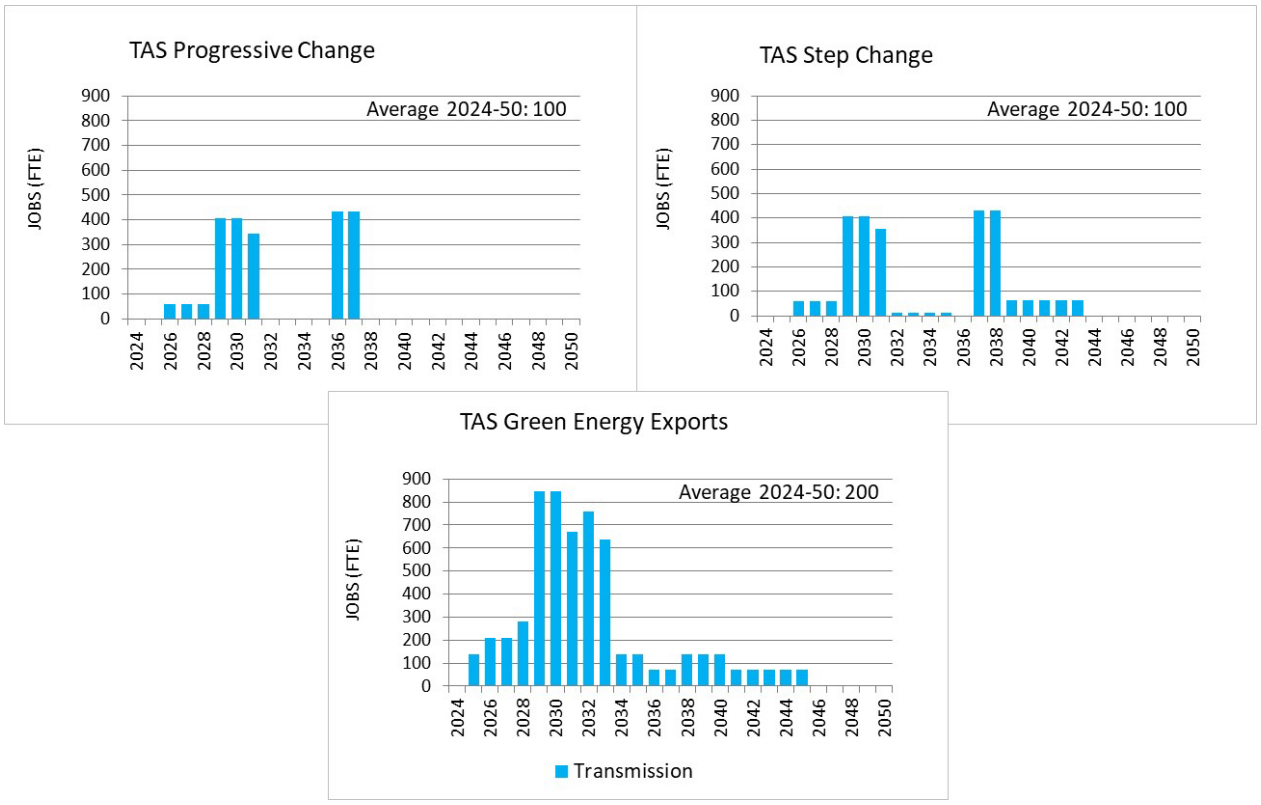
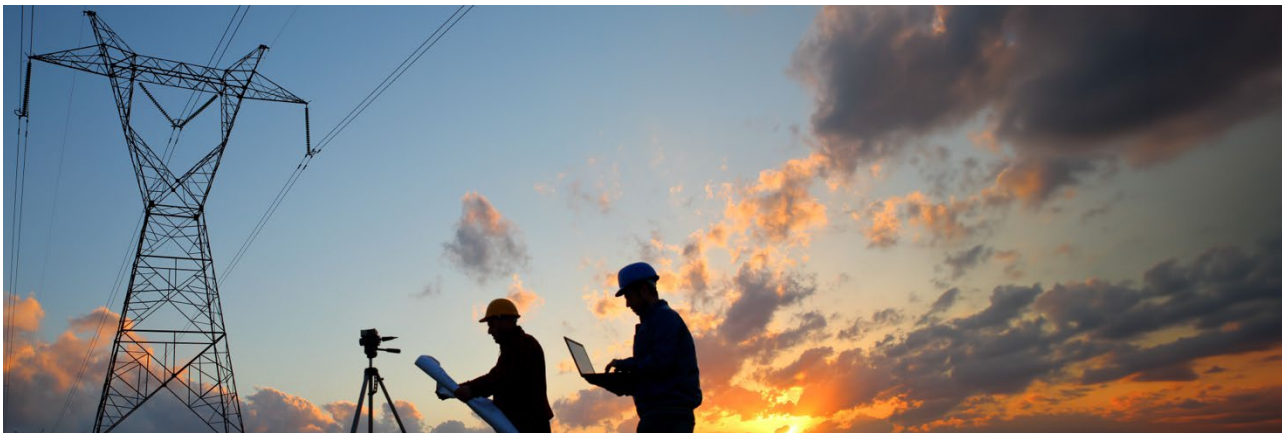



*Figure 13 TAS, jobs in transmission (all scenarios)*



[3] In this study, only employment in transmission construction is included in projections. This is because it would be extremely difficult to demarcate between operations and maintenance work for the new lines from the operations and maintenance for the rest of the network.

# Appendix A Additional information on occupational breakdowns

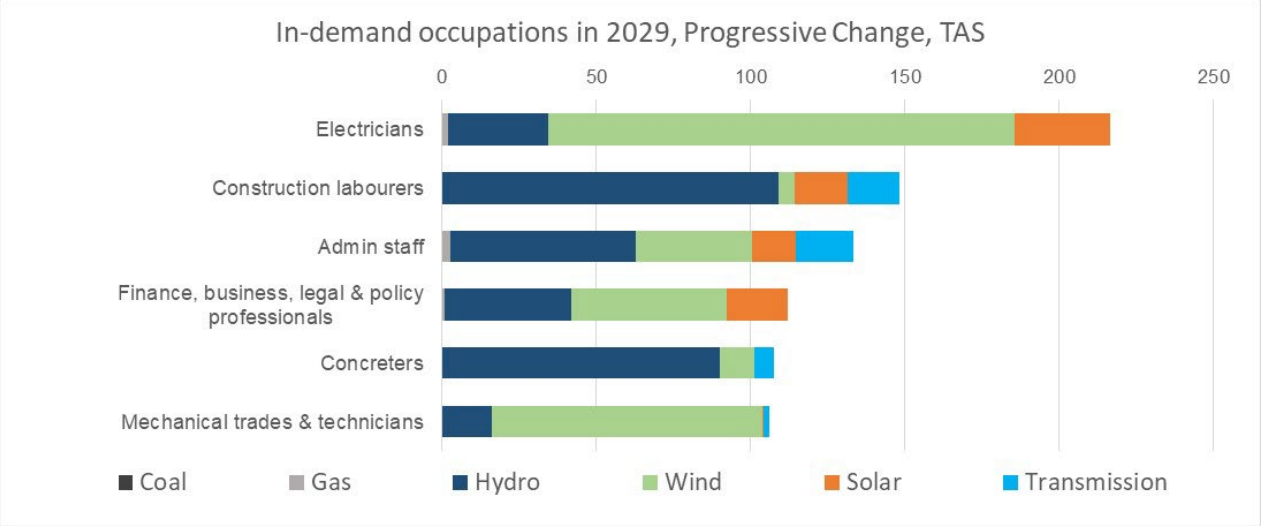



*Figure 14 TAS, in-demand occupations during peak year (2029) for Progressive Change*


*Figure 15 TAS, in-demand occupations annual requirement by technology, Progressive Change*

*Note: Electricians and admin staff have a scale reaching 350 jobs, whereas other occupations have a scale reaching only 160.*

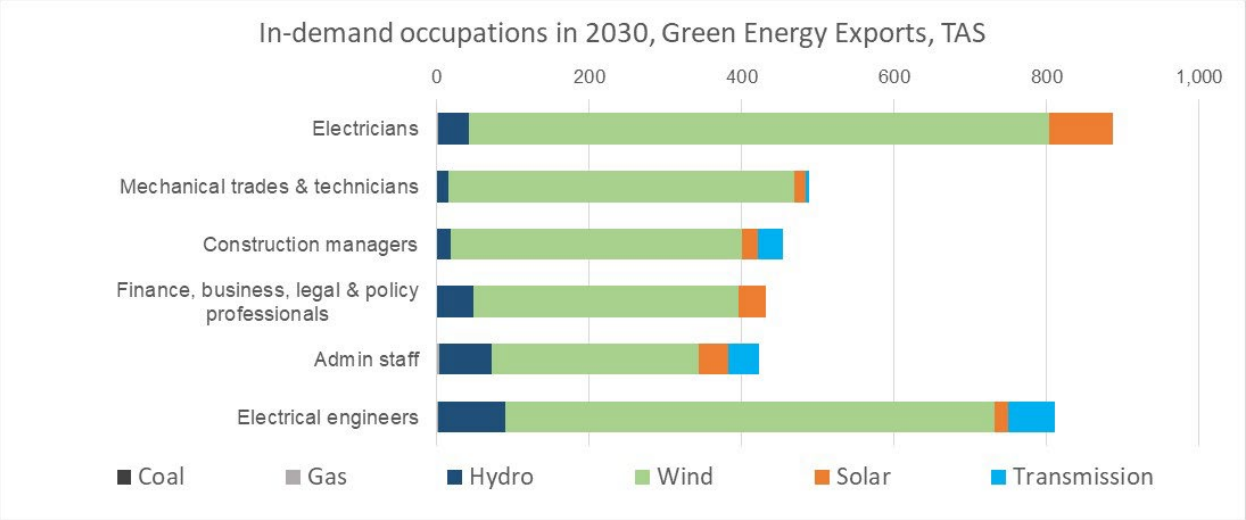



*Figure 16 TAS, in-demand occupations during peak year (2030) for Green Energy Exports*


*Figure 17 TAS, in-demand occupations annual requirement by technology, Green Energy Exports*

*Note: Electricians and admin staff have a scale reaching 1,800 jobs, whereas other occupations have a scale reaching only 1000.*

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