

Electricity, gas, water and waste services

...covers the electricity supply sector, the gas supply sector, water supply, sewerage and drainage services and waste collection, haulage, treatment and disposal services.

This suite of Industry Snapshots complements *Future Focus*, the 2013 National Workforce Development Strategy. These snapshots provide additional information and analysis on each industry to assist stakeholders in planning for the future of their industry or sector. It should be noted that the longer term data contained in this publication is based on AWPA's four scenarios for Australia to 2025 and is not intended to be compared to other data sources or projections.

Key points

- ▶ The electricity, gas, water and waste services industry employs approximately 139,200 persons, accounting for just over one per cent of the total Australian workforce.
- ▶ The electricity, gas, water and waste services sector is the smallest employing industry within the Australian economy. While employment in the sector grew strongly over the past five years, future growth to 2025 is expected to be below the all-industry average.
- ▶ The majority of electricity, gas, water and waste services workers are employed in large enterprises, with 73 per cent employed in businesses that have 200 staff or more.
- ▶ A higher proportion of electricity, gas, water and waste services workers are employed in regional and remote areas (44 per cent), as compared to the all-industry average of 37 per cent.¹
- ▶ The industry workforce is predominantly male (75 per cent) and comprised of full-time workers (91 per cent).
- ▶ 38 per cent of workers in electricity, gas, water and waste services have completed a Certificate III or IV level qualification, compared to 29 per cent for all industries.
- ▶ A detailed employment profile for electricity, gas, water and waste services (including information on its workforce, industry and occupational characteristics) can be found at www.skillsinfo.gov.au.

Industry outlook

The electricity, gas, water and waste services sector is a small but important industry within the Australian economy: providing essential services and utilities, and employing 1.2 per cent of the total Australian workforce. In terms of industry value added, electricity, gas and water services contributed 2.6 per cent (\$35.5b) to the national economy in 2011–12.²

¹ Regional and remote areas are defined as those outside state capital cities.

² 'Industry value added' is the measure of the contribution by industry to gross domestic product (GDP) at basic prices. ABS (2012) *Australian System of National Accounts*, cat. no. 5204.0, Table 11.

Short-term growth

The electricity, gas, water and waste services industry has experienced strong employment growth over the past five years, albeit from a small base. The strongest growth has been experienced in the Electricity Supply subsector, which may have been driven in part by the deregulation of energy markets and demand for renewable sources of energy, as well as increased investment in infrastructure.³

Table 1 Current and past employment in electricity, gas, water and waste services

Industry	Current employment		Past growth: five years	
	'000	% of total	'000	%
Electricity, gas, water and waste services	139.2	1.2	23.0	19.8
Electricity Supply	69.6	0.6	24.9	55.8
Gas Supply	11.2	0.1	1.0	10.2
Water Supply, Sewerage and Drainage Services	30.7	0.3	-0.8	-2.5
Waste Collection, Treatment and Disposal Services	21.8	0.2	-2.9	-11.9
All industries	11,588.7	100.0	798.1	7.4

Note: Data for industry subsectors may not sum to the industry total because data for each subsector have been separately seasonally adjusted and trended and at the higher levels include 'not further defined' categories. Source: ABS (2013) *Labour Force Australia*, February, cat. no. 6291.0.55.003 (DEEWR trend).

Long-term growth

Australia needs to position itself in a world where work is changing rapidly. Technological innovation, globalisation, the Asian century and new patterns of work are impacting on the demand for skills and the speed of change is making it hard to predict and plan for the future.

To deal with this uncertainty, the Australia Workforce and Productivity Agency (AWPA) has adopted a scenario planning approach to help us overcome these limitations in making projections about the future. Scenarios are alternative visions of potential futures, and provide a means to make decisions that take account of uncertainty.

AWPA developed four possible, plausible scenarios for Australia to 2025.

- ▶ In the **Long Boom** scenario, the high demand for resources traded with China and other countries continues. Industries challenged by the high terms of trade undertake structural adjustment. This results in a scenario of sustained prosperity and a restructured economy.
- ▶ In **Smart Recovery**, the challenges facing Europe and the United States affect financial markets. This means low growth for Australia to 2014–15. Growth then improves and Australia benefits from industry and government strategies to implement a knowledge economy.
- ▶ In **Terms of Trade Shock**, resource prices fall mainly due to increased supply from other countries, the Australian dollar falls and we move to a broader-based economy.

³ V. Topp and T. Kulys (2012) *Productivity in Electricity, Gas and Water: Measurement and Interpretation*, Staff working paper, Canberra: Productivity Commission.

- ▶ **Ring of Fire** is a risky world with multiple economic and environmental shocks resulting in ongoing lower growth.

Economic modelling against each of these four scenarios was undertaken by Deloitte Access Economics (DAE) to determine the skills demand for the economy into the future.⁴

Average industry employment growth per annum in the electricity, gas, water and waste services industry is predicted to be below the Australian average for all scenarios. While employment in the sector is expected to grow marginally in the Long Boom and Terms of Trade Shock worlds, it is expected to show a small decline in Smart Recovery and Ring of Fire worlds. This decline is most marked in the Water Supply, Sewerage and Drainage Services sub-sector, in which employment is forecast to contract by between 6 and 7.3 per cent per annum to 2025 across all scenarios. Conversely, employment in the Electricity Supply subsector is expected to grow by between 2 and 3.7 per cent per annum across all scenarios to 2025, exceeding the all industry average.

Table 2 Average annual industry employment growth in four scenarios, 2011–18 and 2011–25 (% per annum)

Industry	Long Boom		Smart Recovery		Terms of Trade Shock		Ring of Fire	
	2018	2025	2018	2025	2018	2025	2018	2025
Electricity, Gas, Water and Waste Services	0.3	0.4	-0.2	-0.3	0.2	0.2	-0.8	-0.9
Electricity Supply	3.1	3.7	2.7	3.1	3.1	3.5	2.0	2.4
Gas Supply	0.2	-1.9	-0.2	-2.5	0.2	-2.1	-0.9	-3.1
Water Supply, Sewerage and Drainage Services	-6.0	-6.1	-6.5	-6.6	-6.1	-6.3	-7.1	-7.3
Waste Collection, Treatment and Disposal Services	0.3	-3.1	-0.1	-3.8	0.3	-3.4	-0.8	-4.4
All industries	2.1	2.0	1.5	1.5	1.7	1.6	0.8	0.7

Source: Deloitte Access Economics (2012) *Economic modelling of skills demand and supply*, Scenario output—detailed employment results.

Occupation outlook

Key occupations

The top ten electricity, gas, water and waste services occupations account for more than one third (38.5 per cent) of industry employment. Electricians and Truck Drivers are the highest employing occupations within the sector, followed by Electrical Distribution Trades Workers.

⁴ A description of the scenarios and the Deloitte Access Economics modeling of employment in each, with state and territory breakdowns, is available at the AWPA website www.awpa.gov.au.

Table 3 Top ten electricity, gas, water and waste services occupations

Occupation	People employed	Industry employment
	'000	% of total
3411 Electricians	11.2	7.4
7331 Truck Drivers	9.4	6.2
3422 Electrical Distribution Trades Workers	7.6	5.0
5111 Contract, Program and Project Administrators	5.4	3.6
5311 General Clerks	4.8	3.2
2333 Electrical Engineers	4.6	3.1
5412 Inquiry Clerks	4.0	2.6
7129 Other Stationary Plant Operators	3.9	2.6
3232 Metal Fitters and Machinists	3.8	2.5
5511 Accounting Clerks	3.7	2.4
Total electricity, gas, water and waste services	152.1	38.5

Source: ABS (2013) *Labour Force Australia*, detailed quarterly report, 2012 average of four quarters, cat. no. 6291.0.55.003.

Short-term growth

Table 4 shows current employment and past growth for the occupations that feature prominently within the industry. **Note that the figures refer to the expected number of people in these occupations across all industries, not just in the electricity, gas, water and waste services sector.**

Employment in all of the top ten electricity, gas, water and waste services occupations has grown above the national average, with several occupations (such as Electrical Engineers and Electrical Distribution Trades Workers) increasing in size by more than three-quarters over the last five years.

Table 4 Current and past employment in key occupations

Occupation	Current employment (all industries)		Past growth: five years	
	'000	% of total	'000	%
3411 Electricians	130.2	1.2	17.3	15.3
7331 Truck Drivers	198.5	1.8	30.6	18.2
3422 Electrical Distribution Trades Workers	12.1	0.1	5.6	85.4
5111 Contract, Program and Project Administrators	120.1	1.1	38.8	47.8
5311 General Clerks	204.1	1.8	70.0	52.2
2333 Electrical Engineers	26.4	0.2	11.4	75.4
5412 Inquiry Clerks	69.6	0.6	7.8	12.7
7129 Other Stationary Plant Operators	18.9	0.2	3.0	18.7
3232 Metal Fitters and Machinists	115.6	1.0	13.3	13.0
5511 Accounting Clerks	168.3	1.5	43.8	35.2
All employed	11,588.7	100.0	798.1	7.4

Source: ABS (2013) *Labour Force Australia*, February, cat. no. 6291.0.55.003 (DEEWR trend).

Long-term growth and job openings

Table 5 indicates the long-term net job growth per annum expected in these occupation groups, according to Deloitte Access Economics' economic modelling of the scenarios. The average annual growth for each of the top ten electricity, gas, water and waste services occupations is expected to vary over the longer-term. Occupational growth for Electrical Engineers is anticipated to exceed the Australian average, regardless of which scenario eventuates. Similarly, General Clerks and Contract, Program and Project Administrators are also expected to experience above-average growth to 2025. Electricians are forecast to have strong employment growth to 2018 and 2025 under the Long Boom and Smart Recovery scenarios, but to show below-average growth under Terms of Trade Shock and Ring of Fire.

Table 5 Average annual occupation growth in four scenarios, 2011–18 and 2011–25 (%pa)

Industry	Long Boom		Smart Recovery		Terms of Trade Shock		Ring of Fire	
	2018	2025	2018	2025	2018	2025	2018	2025
3411 Electricians	2.8	2.1	1.7	1.6	1.0	1.0	0.6	0.6
7331 Truck Drivers	1.2	0.9	0.6	0.5	0.5	0.3	-0.2	-0.4
3422 Electrical Distribution Trades Workers	1.8	0.7	1.0	0.2	0.9	0.0	0.2	-0.6
5111 Contract, Program and Project Administrators	3.4	2.8	2.7	2.3	3.1	2.4	2.0	1.5
5311 General Clerks	4.0	3.1	3.2	2.6	3.5	2.6	2.3	1.6
2333 Electrical Engineers	5.4	3.9	4.4	3.3	4.5	3.4	3.6	2.7
5412 Inquiry Clerks	0.8	1.2	0.3	0.8	0.6	0.9	-0.3	0.1
7129 Other Stationary Plant Operators	1.7	1.3	1.2	0.9	1.0	0.6	0.5	0.1
3232 Metal Fitters and Machinists	1.3	1.0	1.0	0.7	0.7	0.5	0.5	0.1
5511 Accounting Clerks	1.6	1.3	1.1	0.9	1.1	0.9	0.6	0.4
All occupations	2.1	2.0	1.5	1.5	1.7	1.6	0.8	0.7

Source: Deloitte Access Economics (2012) *Economic modelling of skills demand and supply*, Scenario output—detailed employment results.

As noted, the data in Table 5 concerns employment growth in an industry. The number of total **job openings** which includes both employment growth and **the replacement resulting from individuals leaving the occupation net of those re-entering** can also be estimated. This replacement requirement is particularly significant in industries where there are high numbers of people retiring or leaving the occupation.

Table 6 shows the average annual job openings projected in key electricity, gas, water and waste services occupations to 2025.

Across all four scenarios the highest proportion of job openings per annum is forecast for Electrical Engineers, with job openings of between 4.5 per cent per annum (under Ring of Fire) to 5.7 per cent (under Long Boom) to 2025. General Clerks are also expected to have above-average rates of job openings to 2025 across all four scenarios.

Table 6 Average annual job openings per annum 2011 to 2025, in four scenarios

Occupation	Long Boom		Smart Recovery		Terms of Trade Shock		Ring of Fire	
	('000)	%	('000)	%	('000)	%	('000)	%
3411 Electricians	5.9	3.4	5.0	2.9	3.9	2.3	3.4	1.8
7331 Truck Drivers	4.9	2.7	4.2	2.3	3.7	2.0	3.3	1.4
3422 Electrical Distribution Trades Workers	0.3	2.5	0.2	2.0	0.2	1.8	0.2	1.2
5111 Contract, Program and Project Administrators	4.8	4.3	4.1	3.8	4.3	3.9	3.1	3.0
5311 General Clerks	10.6	4.7	9.2	4.2	9.4	4.2	6.7	3.2
2333 Electrical Engineers	1.4	5.7	1.2	5.1	1.2	5.2	1.0	4.5
5412 Inquiry Clerks	3.2	3.6	2.9	3.2	2.9	3.3	2.3	2.5
7129 Other Stationary Plant Operators	0.6	2.9	0.5	2.5	0.5	2.3	0.4	1.7
3232 Metal Fitters and Machinists	4.1	3.1	3.6	2.8	3.4	2.6	3.1	2.2
5511 Accounting Clerks	3.8	2.3	3.2	1.9	3.2	1.9	2.4	1.3
All occupations	576.4	4.4	500.9	3.9	513.3	4.0	391.4	3.1

Source: Deloitte Access Economics (2012) Economic modelling of skills demand and supply, Scenario output—detailed employment results. Net replacement demand by AWPA (2013).

As Table 7 shows, around half of the key occupations within the electricity, gas, water and waste services industry have more job openings created by replacement than by new growth in the Long Boom, Smart Recovery and Terms of Trade Shock scenarios. This is attributable to workforce demographics such as the age profile of current workers, and workforce dynamics such as the rate of job turnover.

As Table 7.1 shows, more than two thirds of job openings for Truck Drivers will be created by replacement requirements (50,000) than from new jobs (24,100) under the Long Boom. Similarly, 38,800 job openings for Metal Fitters and Machinists are anticipated to be generated by replacement demand to 2025, compared to 22,000 job openings from new growth.

Under Ring of Fire, nine out of the top ten occupations are expected to have more job openings created by replacement demand, with only Electrical Engineers expected to have more job openings created by growth (that is, new jobs).

Table 7 Total job openings (growth and net replacement) in four scenarios, 2011 to 2025

7.1 Long Boom

Occupation	Total growth (persons)		Net replacement estimates (persons)		Total job openings (persons)	
	('000)	%	('000)	%	('000)	%
3411 Electricians	55.4	62.9	32.7	37.1	88.1	100.0
7331 Truck Drivers	24.1	32.5	50.0	67.5	74.0	100.0
3422 Electrical Distribution Trades Workers	1.3	32.0	2.7	68.0	3.9	100.0
5111 Contract, Program and Project Administrators	44.1	61.8	27.2	38.2	71.4	100.0
5311 General Clerks	102.0	64.1	57.1	35.9	159.0	100.0
2333 Electrical Engineers	13.2	64.9	7.1	35.1	20.3	100.0
5412 Inquiry Clerks	21.4	44.4	26.7	55.6	48.1	100.0
7129 Other Stationary Plant Operators	4.0	42.9	5.3	57.1	9.2	100.0
3232 Metal Fitters and Machinists	22.0	36.2	38.8	63.8	60.8	100.0
5511 Accounting Clerks	34.3	59.8	23.0	40.2	57.4	100.0
All occupations	3,889.7	45.0	4,755.6	55.0	8,645.3	100.0

7.2 Smart Recovery

Occupation	Total growth (persons)		Net replacement estimates (persons)		Total job openings (persons)	
	('000)	%	('000)	%	('000)	%
3411 Electricians	44.2	59.0	30.6	41.0	74.8	100.0
7331 Truck Drivers	15.2	24.0	48.2	76.0	63.3	100.0
3422 Electrical Distribution Trades Workers	1.0	28.7	2.5	71.3	3.6	100.0
5111 Contract, Program and Project Administrators	36.0	58.0	26.1	42.0	62.1	100.0
5311 General Clerks	83.0	60.4	54.3	39.6	137.3	100.0
2333 Electrical Engineers	10.7	61.4	6.7	38.6	17.5	100.0
5412 Inquiry Clerks	17.1	39.8	25.8	60.2	42.9	100.0
7129 Other Stationary Plant Operators	3.0	37.4	5.1	62.6	8.1	100.0
3232 Metal Fitters and Machinists	16.6	30.5	37.8	69.5	54.4	100.0
5511 Accounting Clerks	25.6	53.5	22.3	46.5	47.9	100.0
All occupations	2,953.2	39.3	4,559.6	60.7	7,512.9	100.0

7.3 Terms of Trade Shock

Occupation	Total growth (persons)		Net replacement estimates (persons)		Total job openings (persons)	
	('000)	%	('000)	%	('000)	%
3411 Electricians	29.1	49.6	29.5	50.4	58.6	100.0
7331 Truck Drivers	7.2	13.2	47.6	86.8	54.8	100.0
3422 Electrical Distribution Trades Workers	1.0	27.5	2.5	72.5	3.5	100.0
5111 Contract, Program and Project Administrators	37.7	58.7	26.6	41.3	64.3	100.0
5311 General Clerks	85.4	60.7	55.2	39.3	140.7	100.0
2333 Electrical Engineers	11.2	62.3	6.8	37.7	18.1	100.0
5412 Inquiry Clerks	17.9	40.6	26.2	59.4	44.0	100.0
7129 Other Stationary Plant Operators	2.1	29.7	5.0	70.3	7.2	100.0
3232 Metal Fitters and Machinists	13.4	26.4	37.3	73.6	50.7	100.0
5511 Accounting Clerks	25.7	53.5	22.4	46.5	48.1	100.0
All occupations	3,080.4	40.0	4,619.3	60.0	7,699.6	100.0

7.4 Ring of Fire

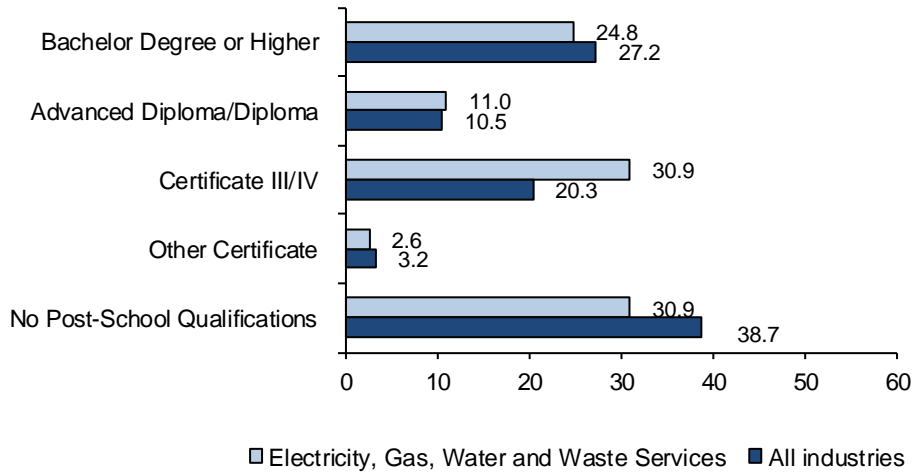
Occupation	Total growth (persons)		Net replacement estimates (persons)		Total job openings (persons)	
	('000)	%	('000)	%	('000)	%
3411 Electricians	22.5	44.0	28.6	56.0	51.0	100.0
7331 Truck Drivers	3.2	6.6	45.5	93.4	48.8	100.0
3422 Electrical Distribution Trades Workers	0.9	28.0	2.4	72.0	3.3	100.0
5111 Contract, Program and Project Administrators	21.5	46.5	24.7	53.5	46.2	100.0
5311 General Clerks	49.3	49.2	50.9	50.8	100.2	100.0
2333 Electrical Engineers	8.3	56.6	6.4	43.4	14.7	100.0
5412 Inquiry Clerks	9.8	28.4	24.7	71.6	34.5	100.0
7129 Other Stationary Plant Operators	1.5	24.1	4.8	75.9	6.4	100.0
3232 Metal Fitters and Machinists	9.9	21.4	36.4	78.6	46.4	100.0
5511 Accounting Clerks	13.9	39.2	21.5	60.8	35.4	100.0
All occupations	1,532.9	26.1	4,388.5	73.9	5,871.4	100.0

Source: Deloitte Access Economics (2012) *Economic modelling of skills demand and supply*, Scenario output—detailed employment results. Net replacement demand by AWPA (2013).

Education and training profile

Nearly a third (30.9 per cent) of workers in electricity, gas, water and waste services have completed a Certificate III or IV level qualification, compared to 20.3 per cent for all industries.

Figure 1 Education profile of the electricity, gas, water and waste services workforce (%)



Note: Excludes 'Level of education not stated' from total.

Source: DEEWR (2012) *Australian Jobs 2012* (ABS 2011 Census data).

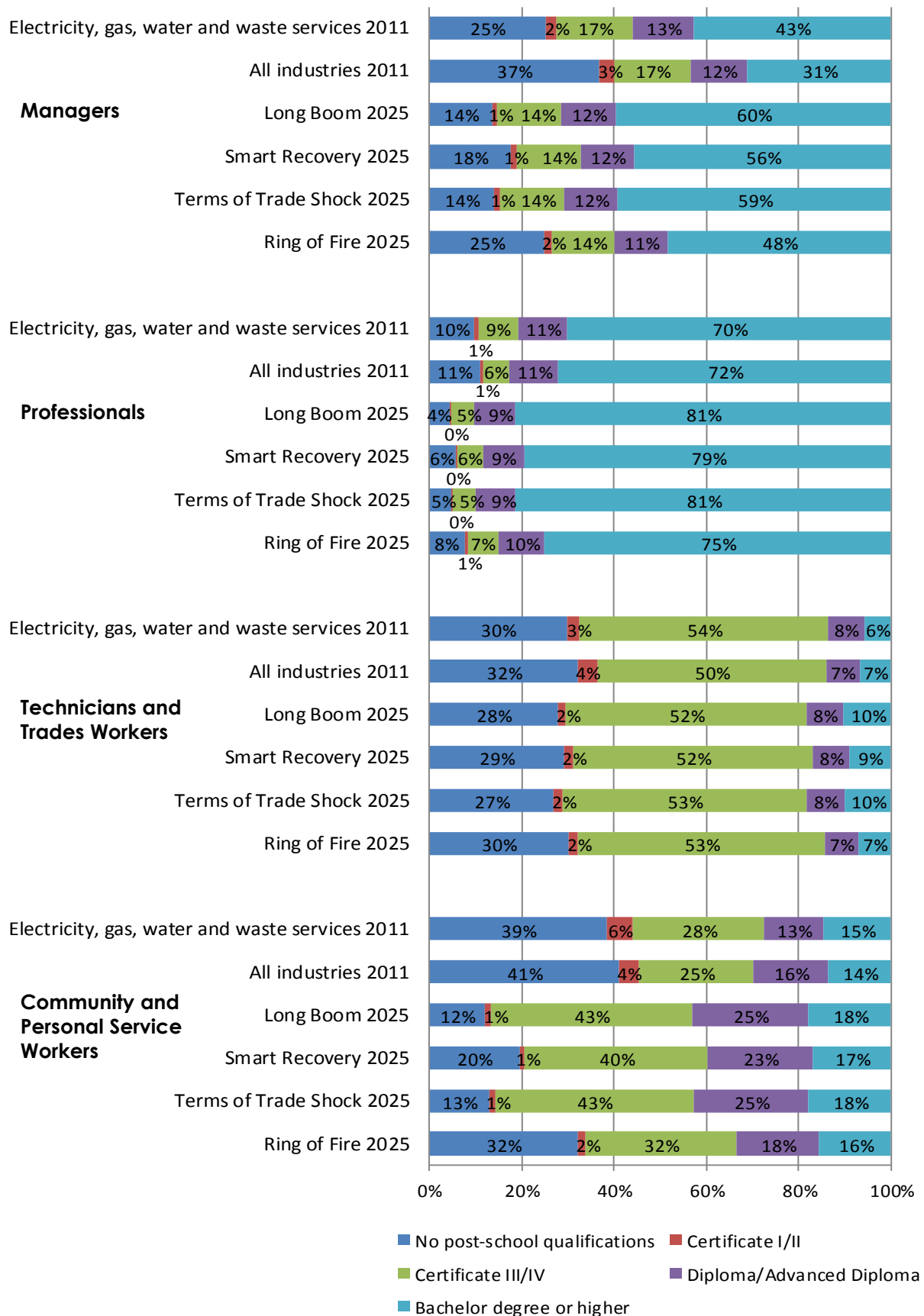
Figure 2 illustrates how demand for qualifications is expected to change over time. It shows the current education profile for each respective occupation: across all industries and within the electricity, gas, water and waste services industry. It also shows projected levels of educational attainment to 2025 by each occupation group depending on which of the four scenarios eventuates.

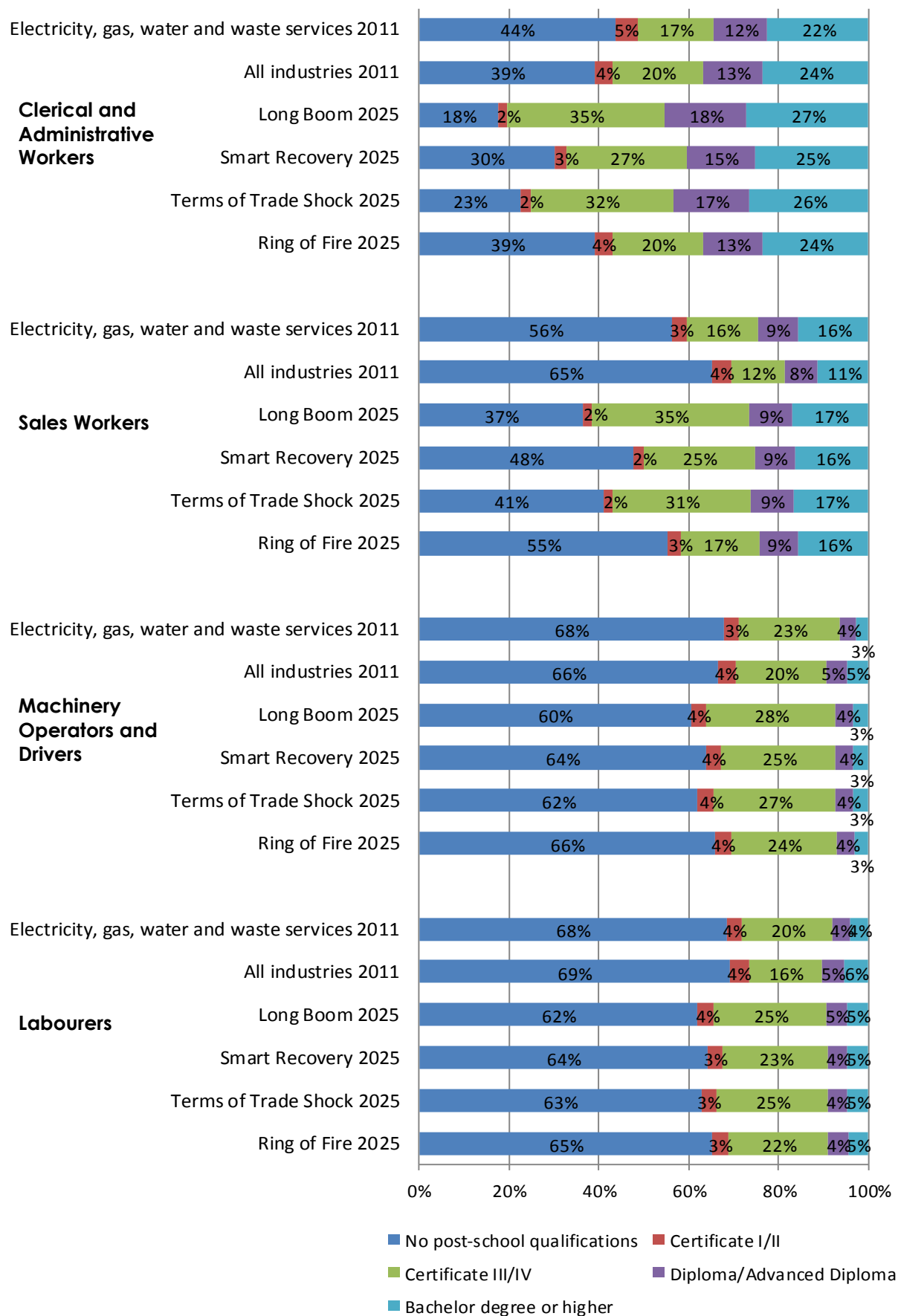
The proportion of managers in the electricity, gas, water and waste services industry with a Bachelor degree or higher qualification is expected to increase substantially to 2025 in the three highest growth scenarios, and by a more modest margin under Ring of Fire (from 43 per cent in 2011 to 48 per cent in 2025).

A similar pattern of upskilling can be observed for professionals in the sector, with those attaining a Bachelor degree or higher qualification increasing by around 10 percentage points to 2025 under the Long Boom, Smart Recovery and Terms of Trade Shock scenarios, and by approximately half that under the lowest growth scenario, Ring of Fire.

Technicians and trades workers show a small reduction in the proportion of workers without post-school qualifications, while the increase in qualification holding to 2025 is more pronounced among clerical and administrative workers. Under the Long Boom, the proportion of clerical and administrative workers without post-school qualification is expected to more than halve, from 44 per cent in 2011 to 18 per cent in 2025. The other scenarios also indicate a trend towards upskilling for this occupational group, albeit on a more modest scale in the case of Ring of Fire.

Figure 2 Educational attainment in the electricity, gas, water and waste services industry by occupation, 2011 and projections to 2025 (%)





Source: ABS (2012) *Survey of Education and Work 2012*, cat. no. 6227.0; and DAE (2012) Unpublished data.

Specialised occupations

In *Future Focus*, the 2013 National Workforce Development Strategy, AWPAs has proposed that national planning for skills and industry workforce development should focus on **specialised occupations**. Specialised occupations are defined as those ‘where specialised skills, learned in formal education and training, are needed at entry level and where the impact of market failure is potentially significant for the economy and/or the community.’

Specialised occupations demonstrate these characteristics:

- ▶ long lead time—skills are highly specialised and require extended learning and preparation time over several years;
- ▶ high use—skills are deployed for the uses intended (i.e. good occupational ‘fit’);
- ▶ high risk—the disruption caused by the skills being in short supply is great, resulting either in bottlenecks in supply chains or imposing significant economic or community costs because an organisation cannot operate; and
- ▶ high information—the quality of information about the occupation is adequate to the task of assessing future demand and evaluating the first three criteria.

Monitoring skills supply, especially for specialised occupations, will remain a critical element in meeting our workforce needs.

Specialised occupations associated with the electricity, gas, water and waste services industry include:

Engineering Managers

Electrical Engineers

Civil Engineering Professionals

Industrial, Mechanical and Production Engineers

Other Engineering Professionals

Civil Engineering Draftspersons and Technicians

Electrical Engineering Draftspersons and Technicians

Electricians

Electrical Distribution Trades Workers

Metal Fitters and Machinists

Plumbers

More detailed information about specialised occupations is available in *Future Focus, 2013 National Workforce Development Strategy* at <http://www.awpa.gov.au>.

Example workforce development initiatives

Investment in workforce development has been shown to maximise people's capabilities, lift productivity and increase workforce participation. Employee satisfaction levels and engagement also increase when enterprises make better use of their employees' skills.⁵ Current workforce development initiatives in electricity, gas, water and waste services include the following examples:

- ▶ The **Upskilling Existing Workers in Sustainability** initiative aims to upskill existing and suitably qualified Australian Electrotechnology industry workers in skills for a low-carbon, sustainable economy. This project supports individuals, enterprises and industry to build skills for sustainability through targeted training of existing workers in areas such as Photovoltaic Systems. Further information can be found at www.ee-oz.com.au.
- ▶ E-Oz Energy Skills Australia and the Construction and Property Services Industry Skills Council (CPSISC) are undertaking the **Joint Industry Skills Council Project to Address Safety Issues associated with Installed Photovoltaic Solar Small Generation Units**. The project will research issues regarding working around installed photovoltaic (solar) panels relevant to the occupations they cover, identify and amend existing units of competency relevant to these issues, develop any new units of competency required to adequately address identified issues, develop and publish support materials for new entrants/learners, and develop and publish support materials for the professional development of trainers and existing workers. Further information at www.ee-oz.com.au.
- ▶ The **Plumbing & Services Continuous Improvement Project** focuses on the environmental sustainability of plumbing waste. The project is an ongoing project addressing industry needs including changes in technology and work practices that will be incorporated into training. Further information can be found at www.cpsisc.com.au.

⁵ Skills Australia (2012) *Better use of skills, better outcomes: A research report on skills utilisation in Australia*.