



Renewable Energy Employment in Australia: Methodology

Appendices 1–5: Renewable Energy Surveys

Prepared for the Clean Energy Council
By UTS Institute for Sustainable Futures

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APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

Utility Scale Renewable Energy Employment Survey

Welcome to the CEC Jobs Survey

The Clean Energy Council (CEC) has partnered with the Institute of Sustainable Futures (ISF), University of Technology Sydney (UTS) to undertake a study to collect data on employment in Australian renewable energy.

Currently, there is a lack of quality data for workforce planning and the number of jobs in renewable energy is often under-estimated.

The aims of the study are to collect data to:

- Estimate the number of jobs in renewable energy now and out to 2030 under growth scenarios, such as AEMO's Integrated System Plan;
- Enable the mapping of jobs in declining sectors to renewable energy jobs to identify opportunities for redeployment and retraining;
- Identify and quantify employment in the key occupations for large-scale solar and wind projects and utility scale batteries;
- Identify skill shortages and priority occupations for forward planning.

Your participation

The survey will take approximately 60 minutes. The survey includes questions on the number and type of jobs for employees, contractors and apprentices across the design and development, construction, manufacturing and operation & maintenance phases. The questions cover skills shortages and recruitment issues in addition to employment numbers.

The data you provide will be aggregated with other survey responses and used in combination with other data sources in a spreadsheet model to develop overall employment estimates. Your answers will not be directly quoted or released. No commercial in confidence or personally identifiable information will be included in the study report or any other publication, and these publications will not identify you or your organisation in any way.

Outputs

The purpose of this survey is to collect data on employment for utility-scale solar and wind energy projects. A final report will be presented to the CEC which is intended to be released publicly.

UTS researchers

This evaluation is led by project director Dr Chris Briggs (+61 477 301 892). The survey is being distributed by the CEC.

Research ethics

Studies undertaken by the Institute for Sustainable Futures have been approved in principle by the University of Technology Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may

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contact the ISF Ethics Coordinator, Federico Davila (0403 657 124) or the ISF Responsible Academic, Dr Keren Winterford (0418 910 800).

You may also contact the UTS Ethics Committee through the Research Ethics Officer (02 9514 9772, Research.Ethics@uts.edu.au). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

By completing the survey you agree to the provisions of the research conduct as outlined above.

Thank you for participating in our survey. Your feedback is important.

Utility Scale Renewable Energy Employment Survey

Market Sectors - Technologies

* 1. What sectors does your company work in?

- Solar PV - Utility scale
- Solar PV - Commercial
- Solar PV - Domestic
- Solar PV - Stand Alone
- Solar Hot Water
- Wind - Utility Scale
- Battery Storage
- Other (Hydro, Bioenergy, Marine, Geothermal, etc.; please list any that apply)

* 2. Please select how you would describe your company (tick as many that apply)

- Developer or IPP (Independent Power Producer)
- EPC (Engineering, procurement and construction)
- Operations and Maintenance specialist
- Manufacturer
- Other (please specify)

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Total Employees

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* 3. What was the total number of workers in your company in Australia in the 2018-19 financial year?
(FTE equivalent, including employees and contractors)

* 4. Approximately what proportion of employees are in each area? Please ensure that the % adds up to 100%.

Solar PV - Utility scale

Solar PV - Commercial

Solar PV - Domestic

Solar PV - Stand Alone

Solar Hot Water

Wind - Utility Scale

Battery Storage

[Insert text from Other]

Utility Scale Renewable Energy Employment Survey

Project Phase - Utility Solar PV

* 5. For your Utility Solar projects, in which of the following project phases does your company regularly undertake work (please tick **all** relevant phases)?

- Development & Finance
- Preliminary Design (pre-financial close)
- Detailed design
- Construction
- Operation & Maintenance
- Asset management and/or Retailing
- Other (please specify)

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Business Size - Utility Solar PV

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6. What is the total number of full-time equivalent (FTE) workers employed in solar projects over the last financial year?

Employees

Contractors

* 7. How many MW of **solar** did your company have under **development** (pre-financial close) last financial year (2018-19)?

8. What is the total number of full-time equivalent (FTE) workers employed over the last financial year (2018-19) in the **development** phase of **solar** projects? Note this includes preliminary design and financing.

Employees

Contractors

* 9. How many MW of **solar** did your company have under **construction** last financial year (2018-19)?

10. What is the total number of full-time equivalent (FTE) workers employed over the last financial year (2018-19) in the **construction** phase of **solar** projects?

Employees

Contractors

* 11. For how many MW of **solar** did your company undertake **O&M** last financial year (2018-19)?

12. What is the total number of full-time equivalent (FTE) workers employed over the last financial year (2018-19) in the **O&M** phase of **solar** projects?

Employees

Contractors

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The next questions are about the number of workers needed to implement a typical project

13. What is a typical size of **solar** project your organisation implements in MW?

14. Would your typical project include battery storage?

Yes

No

Comment

15. What size would the battery be for your typical solar project? (please answer KW and KWh)

KW

KWh

16. How many years does your typical **solar** project take for **development** (up to financial close)?

17. How long does your typical **solar** project take for detailed design and **construction**? (please answer in years and months)

18. If you are a Developer / Independent Power Producer with teams working across multiple projects , you can choose whether to answer the following questions for last financial year or for your typical solar project.

Please enter "financial year" if you prefer to answer the questions below based on the last financial year , or "Typical project" if you prefer to answer for a typical project.

Utility Scale Renewable Energy Employment Survey

Development phase jobs - Utility Solar

We are now going to ask questions about the number of workers engaged over the last financial year for different occupations:

- managers/administrators;
- professionals & technicians;
- trades; and
- machine operators, drivers & labourers.

Note to be classified as a manager, staff should have internal staff that report to them (eg if a finance analyst has no staff reports they are a professional, not a manager).

Again, please include both employees and contractors.

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Please answer for the typical project or the last financial year depending on your answer to the last question.

19. How many Managers and Administrators in terms of full time equivalent (FTE) jobs (employees & contractors) do you engage for a typical project (or last financial year, 2018-19) during the **preliminary design, development and finance** phase of a **solar** project?

20. For each of the following managerial and administrative jobs please enter the number of full time equivalent (FTE) jobs (including contractors) during the **preliminary design, development and finance** phase of your **solar** projects.

General Managers / Executive Team

Business administration managers (HR, finance, etc.)

Commercial / Business Development Managers

Construction / Project Managers

Other managers (please describe below)

Other managers

Accounting clerks & book-keepers

Office managers/contract administrators

Project Control Officer

Other administrative staff (please describe below)

Other administrative staff

21. How many Professionals and Technicians in terms of full time equivalent (FTE) jobs (including contractors) do you employ for a typical project (or during the last financial year, 2018-19) during the **preliminary design, development and finance phase** of your **solar** projects?

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22. For each of the following professional and technicians jobs please enter the number of full time equivalent (FTE) jobs (including contractors) during the **preliminary design, development and finance phase** of your **solar** projects.

Surveyors

Civil engineers

Electrical engineers

Grid engineers

Mechanical engineers

Health and Safety professionals

SCADA engineers

Land developers

Community engagement

Environment assessment professionals

GIS specialist

Legal professionals

Finance & accounting professionals

Human resource professionals

Other professional jobs (please describe below)

Civil engineering technicians

Electrical technician support

SCADA technician support

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Other technician jobs (please describe below)

23. Which, if any, of the **preliminary design, development and finance phase** jobs for **solar** projects are likely to be local to the project (i.e. within 100 km of the site)?

Please make a note of which specific jobs and how long (years) they would be employed for.

Utility Scale Renewable Energy Employment Survey

Construction Jobs - Utility Solar

We are now going to ask questions about the number of workers engaged during the construction phase of projects for different occupations:

- **managers/administrators;**
- **professionals & technicians;**
- **trades; and**
- **machine operators, drivers & labourers.**

Again, please include both employees and contractors. Please enter for a typical project (EPC company) or financial year (development company).

24. How many Managers and Administrators did you engage in the last financial year, 2018-19 (or a typical project) during the **construction** phase of your **solar** projects? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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25. For each of the following managerial & administrative jobs , please enter the number of full time equivalent (FTE) jobs (including contractors) during the **construction phase** for a typical **solar** project. In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
General Managers / Executive Team	<input type="text"/>	<input type="text"/>
Business administration managers (HR, finance, etc.)	<input type="text"/>	<input type="text"/>
Construction / Project Managers	<input type="text"/>	<input type="text"/>
Other managers (please describe below)	<input type="text"/>	<input type="text"/>
Accounting clerks & book-keepers	<input type="text"/>	<input type="text"/>
Project Controller	<input type="text"/>	<input type="text"/>
Office managers & contract administrators	<input type="text"/>	<input type="text"/>
Other administrative jobs (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

26. How many Professionals and Technicians did you engage in the last financial year (or for a typical project) during the **construction** phase in your **solar** projects? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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27. For each of the following professional & technician jobs , please enter the number of full time equivalent (FTE) jobs (including contractors) during the **construction phase** for a typical **solar** project. In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
Surveyors	<input type="text"/>	<input type="text"/>
Civil engineers	<input type="text"/>	<input type="text"/>
Electrical engineers	<input type="text"/>	<input type="text"/>
Mechanical engineers	<input type="text"/>	<input type="text"/>
Health and Safety professionals	<input type="text"/>	<input type="text"/>
SCADA engineers	<input type="text"/>	<input type="text"/>
Grid engineers	<input type="text"/>	<input type="text"/>
Community engagement	<input type="text"/>	<input type="text"/>
Environment assessment professionals	<input type="text"/>	<input type="text"/>
Legal professionals	<input type="text"/>	<input type="text"/>
Finance & accounting professionals	<input type="text"/>	<input type="text"/>
Human resource professionals	<input type="text"/>	<input type="text"/>
Transport & Logistics	<input type="text"/>	<input type="text"/>
Other professional jobs (please describe below)	<input type="text"/>	<input type="text"/>
Site supervisors	<input type="text"/>	<input type="text"/>
Civil engineering technicians	<input type="text"/>	<input type="text"/>
Electrical technician support	<input type="text"/>	<input type="text"/>
SCADA technician support	<input type="text"/>	<input type="text"/>
Other technician jobs (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

28. How many trades did you engage in the last financial year (or for a typical project) during the **construction** phase for your **solar** projects? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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29. For each of the following trades, please put in the number of full time equivalent (FTE) jobs (including contractors) during the **construction** phase for a typical **solar** project. In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
Metal trades	<input type="text"/>	<input type="text"/>
Mechanical trades	<input type="text"/>	<input type="text"/>
Carpenters	<input type="text"/>	<input type="text"/>
Plumbers	<input type="text"/>	<input type="text"/>
Electricians	<input type="text"/>	<input type="text"/>
Telecommunications trades	<input type="text"/>	<input type="text"/>
Other trades (please describe)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

30. How many machine operators, drivers & labourers did you engage in the last financial year (or for a typical project) during the **construction** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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31. For each of the following machine operators, drivers and labourers, please put in the number of full time equivalent (FTE) jobs (including contractors) during the **construction** phase for a typical **solar** project. In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
Cranes and hoist operators	<input type="text"/>	<input type="text"/>
Earthmoving, grader operators	<input type="text"/>	<input type="text"/>
Forklift operators	<input type="text"/>	<input type="text"/>
Drivers (trucks, vans)	<input type="text"/>	<input type="text"/>
Other drivers & machine operators (please describe)	<input type="text"/>	<input type="text"/>
Concreters	<input type="text"/>	<input type="text"/>
Riggers	<input type="text"/>	<input type="text"/>
Dogmen	<input type="text"/>	<input type="text"/>
Scaffolders	<input type="text"/>	<input type="text"/>
Security guards	<input type="text"/>	<input type="text"/>
Electrical trades assistants	<input type="text"/>	<input type="text"/>
Mechanical trades assistants/labourers (e.g. module assembly)	<input type="text"/>	<input type="text"/>
Civil trades assistants/ labourers	<input type="text"/>	<input type="text"/>
Other labourers (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

32. What proportion of your detailed design and **construction solar** work is spent on batteries?

0% 50% 100%

33. Would you say the job types are the same for batteries and for detailed design and construction of **solar** projects? Please note major differences if relevant.

- Yes
- No

Please comment if the job types are very different

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Utility Scale Renewable Energy Employment Survey

Manufacturing - Utility Solar

34. On average, what proportion of the following inputs do you source from Australian manufacturers ? (please enter the percentage as a number between 0 & 100)

	Percentage
Racks & Mounting	<input type="text"/>
Inverters	<input type="text"/>
Cabling and electrical equipment	<input type="text"/>
Software and control or monitoring equipment	<input type="text"/>

Other - please list any other components you purchase from Australian manufacturers, and the approximate percentage for each one that you source on-shore.

Utility Scale Renewable Energy Employment Survey

Operations & Maintenance - Utility Solar

35. How many Managers and Administrators did you engage in the last financial year, 2018-19 during the **O&M** phase of your **solar** projects? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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36. For each of the following managerial & administrative jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ for a typical project (or during the last financial year, 2018-19) for **solar farm O&M**.

	Annual	Average % local to project
General Managers / Executive Team	<input type="text"/>	<input type="text"/>
Business administration managers (HR, finance, etc.)	<input type="text"/>	<input type="text"/>
Site Managers	<input type="text"/>	<input type="text"/>
Operations / Asset Managers	<input type="text"/>	<input type="text"/>
Other managers (please describe below)	<input type="text"/>	<input type="text"/>
Accounting clerks & book-keepers	<input type="text"/>	<input type="text"/>
Office managers/contract administrators	<input type="text"/>	<input type="text"/>
Other administrative jobs (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

37. How many Professionals and Technicians did you engage in the last financial year during the **O&M** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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38. For each of the following professional and technician jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ for a typical project for **solar farm O&M**.

	Annual	Average % local to project
Health and Safety professionals	<input type="text"/>	<input type="text"/>
Community engagement staff	<input type="text"/>	<input type="text"/>
Finance & accounting professionals	<input type="text"/>	<input type="text"/>
Legal professionals	<input type="text"/>	<input type="text"/>
Human resource professionals	<input type="text"/>	<input type="text"/>
Electrical Technician Support	<input type="text"/>	<input type="text"/>
SCADA technician support	<input type="text"/>	<input type="text"/>
Power plant/control room operator	<input type="text"/>	<input type="text"/>
Sales & Trading	<input type="text"/>	<input type="text"/>
Other professionals (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

39. How many trades did you engage in the last financial year during the **O&M** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

40. For each of the following trade jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ for a typical project for **solar farm O&M**

	Annual	Average % local to project
Electricians	<input type="text"/>	<input type="text"/>
Landscape gardener	<input type="text"/>	<input type="text"/>
Other (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

41. How many machine operators, drivers & labourers did you engage in the last financial year during the **O&M** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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42. For each of the following machine operators, drivers and labourers, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ for a typical project for solar farm O&M

	Annual	Average % local to project
Electrical trades assistants	<input type="text"/>	<input type="text"/>
General labourers	<input type="text"/>	<input type="text"/>
Other labourers (please describe below)	<input type="text"/>	<input type="text"/>
Cleaners	<input type="text"/>	<input type="text"/>
Security guards	<input type="text"/>	<input type="text"/>
Earthmoving, grader operators	<input type="text"/>	<input type="text"/>
Drivers (trucks, vans)	<input type="text"/>	<input type="text"/>
Other drivers & operators (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

43. What proportion of your O&M solar work is spent on batteries?

0% 50% 100%

44. Would you say the job types are the same for batteries and solar O&M? Please note major differences if relevant.

- Yes
- No

Please comment if the job types are very different

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* 45. For **wind** projects, in which of the following project phases does your company regularly undertake work (please tick all relevant phases)?

- Development & Finance
- Preliminary Design (pre-financial close)
- Detailed Design
- Construction
- Operation & Maintenance
- Asset Management and/or Retailing
- Other (please specify)

Utility Scale Renewable Energy Employment Survey

Business Size - Utility Wind

46. What is the total number of full-time equivalent (FTE) workers employed over the last financial year (2018-19) in your **wind** projects?

Employees

Contractors

* 47. How many MW of **wind** did your company have under **development (pre-financial close)** last financial year (2018-19)?

48. What is the total number of full-time equivalent (FTE) workers employed over the last financial year (2018-19) in the **preliminary design, development & finance** phase of your **wind** projects?

Employees

Contractors

* 49. How many MW of **wind** did your company have under **construction** last financial year (2018-19)?

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50. What is the total number of full-time equivalent (FTE) workers employed over the last financial year (2018-19) in the **construction** phase of your **wind** projects?

Employees

Contractors

* 51. For how many MW of **wind** did your company undertake **O&M** last financial year (2018-19)?

52. What is the total number of full-time equivalent (FTE) workers employed over the last financial year (2018-19) in the **O&M** phase of **wind** projects?

Employees

Contractors

Utility Scale Renewable Energy Employment Survey

Typical Project - Utility Wind

The next questions are about the number of workers needed to implement a typical project

53. What is a typical size of **wind** project your organisation implements in MW?

54. Would your typical **wind** project include battery storage?

Yes

No

Comment

55. What size would the battery be for your typical **wind** project? (please answer KW and KWh)

KW

KWh

56. How many years does your typical **wind** project take for **development** (up to financial close)?

57. How long does your typical **wind** project take for **detailed design and construction**? (please answer in years and months)

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58. If you are an Independent Power Producer with teams working across multiple projects , you can choose whether to answer the following questions for last financial year or for your typical **wind** project.

Please enter 'financial year' if you prefer to answer the questions below based on the last financial year, or 'Typical project' if you prefer to answer for a typical project.

Utility Scale Renewable Energy Employment Survey

Development phase jobs - Utility Wind

We are now going to ask questions about the number of workers engaged over the last financial year for different occupations:

- **managers/administrators;**
- **professionals & technicians;**
- **trades; and**
- **machine operators, drivers & labourers.**

Again, please include both employees and contractors.

Please answer for the typical project or the last financial year depending on your answer to Q36.

59. How many Managers and Administrators did you engage in the last financial year, 2018-19 (or a typical project) during the **preliminary design, development and finance** phase of your **wind** projects? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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60. For each of the following managerial and administrative jobs, please enter the number of full time equivalent (FTE) jobs (including contractors) for the last financial year, 2018-19 (or your typical project) **during the preliminary design, development and finance phase** of your **wind** projects.

Note to be classified as a manager, staff should have internal staff that report to them.

General Managers / Executive Team

Business administration managers (HR, finance, etc.)

Commercial managers

Construction Managers

Other managers (please describe below)

Other managers

Secretaries & clerical staff

Accounting clerks & book-keepers

Office managers/contract administrators

Other administrative staff (please describe below)

Other administrative staff

61. How many Professionals and Technicians did you engage in the last financial year (or for a typical project) during the **project design, development and finance phase**? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

62. For each of the following professional and technicians jobs please enter the number of full time equivalent (FTE) jobs (including contractors) for your typical project (or in the last financial year, 2018-19) during the **preliminary design, development and finance phase** of your **wind** projects.

Surveyors

Civil engineers

Electrical engineers

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Grid engineers

Wind engineers

Mechanical engineers

Health and Safety professionals

SCADA engineers

Land developers

Community engagement

Noise specialist

Environment assessment professionals

Legal and policy professionals

Finance & accounting professionals

Human resource professionals

Marketing and sales professionals

Other professional jobs (please describe below)

Other professional jobs

Civil engineering technicians

Electrical technician support

SCADA technicians

Other technician jobs (please describe below)

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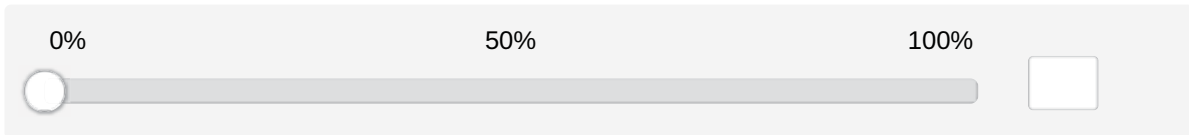
Other technician jobs

63. Which, if any, of the **preliminary design, development and finance** phase jobs of your **wind** projects are likely to be local to the project (i.e. within 100 km of the site)?

Please make a note of which specific jobs and how long (years) they would be employed for.

64. What proportion of your **development** phase **wind** work is spent on batteries?

0% 50% 100%



65. Would you say the job types are the same for batteries and for wind during the development phase?

Please note major differences if relevant.

Yes

No

Please comment if the job types are very different

Utility Scale Renewable Energy Employment Survey

Construction Jobs - Utility Wind

We are now going to ask questions about the number of workers engaged during the construction phase of projects. Again, please include both employees and contractors.

66. How many Managers and Administrators did you engage in the last financial year, 2018-19 (or a typical project) during the **construction** phase of your **wind** projects? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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67. For each of the following managerial & administrative jobs , please enter the number of full time equivalent (FTE) jobs (including contractors) during the **construction** phase for a typical **wind** project. In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
General Managers / Executive Team	<input type="text"/>	<input type="text"/>
Business administration managers (HR, finance, etc.)	<input type="text"/>	<input type="text"/>
Construction Managers	<input type="text"/>	<input type="text"/>
Other managers (please describe)	<input type="text"/>	<input type="text"/>
Secretaries & clerical staff	<input type="text"/>	<input type="text"/>
Accounting clerks & book-keepers	<input type="text"/>	<input type="text"/>
Office managers & contract administrators	<input type="text"/>	<input type="text"/>
Other administrative jobs (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

68. How many Professionals and Technicians did you engage in the last financial year (or for a typical project) during the **construction** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

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69. For each of the following professional & technician jobs , please enter the number of full time equivalent (FTE) jobs (including contractors) during the **construction** phase for a typical **wind** project. In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
Surveyors	<input type="text"/>	<input type="text"/>
Civil engineers	<input type="text"/>	<input type="text"/>
Electrical engineers	<input type="text"/>	<input type="text"/>
Wind engineers	<input type="text"/>	<input type="text"/>
Mechanical engineers	<input type="text"/>	<input type="text"/>
Health and Safety professionals	<input type="text"/>	<input type="text"/>
SCADA engineers	<input type="text"/>	<input type="text"/>
Community engagement	<input type="text"/>	<input type="text"/>
Noise specialist	<input type="text"/>	<input type="text"/>
Environment assessment professionals	<input type="text"/>	<input type="text"/>
Legal and policy professionals	<input type="text"/>	<input type="text"/>
Finance & accounting professionals	<input type="text"/>	<input type="text"/>
Sales & marketing professionals	<input type="text"/>	<input type="text"/>
Human resource professionals	<input type="text"/>	<input type="text"/>
Transport & Logistics	<input type="text"/>	<input type="text"/>
Other professional jobs (please describe below)	<input type="text"/>	<input type="text"/>
Site supervisors	<input type="text"/>	<input type="text"/>
Civil engineering technicians	<input type="text"/>	<input type="text"/>
Electrical technician support	<input type="text"/>	<input type="text"/>
SCADA technicians	<input type="text"/>	<input type="text"/>
Other technician jobs (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

70. How many trades did you engage in the last financial year (or for a typical project) during the **construction** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

71. For each of the following trades, please put in the number of full time equivalent (FTE) jobs (including contractors) during the **construction** phase for a typical **wind** project.

In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
Metal trades	<input type="text"/>	<input type="text"/>
Mechanical trades	<input type="text"/>	<input type="text"/>
Carpenters	<input type="text"/>	<input type="text"/>
Plumbers	<input type="text"/>	<input type="text"/>
Electricians	<input type="text"/>	<input type="text"/>
Telecommunications trades	<input type="text"/>	<input type="text"/>
Other trades (please describe)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

72. How many machine operators, drivers & labourers did you engage in the last financial year (or for a typical project) during the **construction** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

APPENDIX 1 UTLITY WIND AND SOLAR SURVEY

73. For each of the following machine operators, drivers and labourers, please put in the number of full time equivalent (FTE) jobs (including contractors) during the **construction** phase for a typical **wind** project.

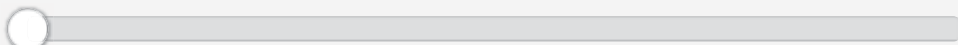
In the last column put the percentage, on average, that are local (within 100 km of the project).

	Total	Average % local to project
Cranes and hoist operators	<input type="text"/>	<input type="text"/>
Earthmoving, grader operators	<input type="text"/>	<input type="text"/>
Forklift operators	<input type="text"/>	<input type="text"/>
Drivers (trucks, vans)	<input type="text"/>	<input type="text"/>
Other drivers & machine operators (please describe)	<input type="text"/>	<input type="text"/>
Concreters	<input type="text"/>	<input type="text"/>
Riggers	<input type="text"/>	<input type="text"/>
Dogmen	<input type="text"/>	<input type="text"/>
Scaffolders	<input type="text"/>	<input type="text"/>
Security guards	<input type="text"/>	<input type="text"/>
Electrical trades assistants	<input type="text"/>	<input type="text"/>
Mechanical trades assistants/labourers (e.g. module assembly)	<input type="text"/>	<input type="text"/>
Civil trades assistants/ labourers	<input type="text"/>	<input type="text"/>
Other labourers (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

74. What proportion of your detailed design and construction wind work is spent on batteries?

0% 50% 100%



75. Would you say the job types are the same for batteries and for wind design and construction?

Please note major differences if relevant.

- Yes
- No

Please comment if the job types are very different

Operations & Maintenance and / or Asset Management - Utility Wind

77. How many Managers and Administrators did you engage in the last financial year, 2018-19 during the **O&M / Asset Management** phase of your **wind** projects? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

78. For each of the following managerial & administrative jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ in a typical project (or in the last financial year, 2018-19) for **wind farm O&M**

	Annual	Average % local to project
General Managers / Executive Team	<input type="text"/>	<input type="text"/>
Business administration managers (HR, finance, etc.)	<input type="text"/>	<input type="text"/>
Site Managers	<input type="text"/>	<input type="text"/>
Operations Managers / Asset Managers	<input type="text"/>	<input type="text"/>
Other managers (please describe below)	<input type="text"/>	<input type="text"/>
Secretaries & clerical staff	<input type="text"/>	<input type="text"/>
Accounting clerks & book-keepers	<input type="text"/>	<input type="text"/>
Office managers/contract administrators	<input type="text"/>	<input type="text"/>
Other administrative jobs (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

79. How many Professionals and Technicians did you engage in the last financial year during the **O&M / Asset Management** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

80. For each of the following professional and technician jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ for a typical project (or in the last financial year, 2018-19) for **wind farm O&M / Asset Management**

	Annual	Average % local to project
Health and Safety professionals	<input type="text"/>	<input type="text"/>
SCADA engineers	<input type="text"/>	<input type="text"/>
Community engagement staff	<input type="text"/>	<input type="text"/>
Finance & accounting professionals	<input type="text"/>	<input type="text"/>
Legal and policy professionals	<input type="text"/>	<input type="text"/>
Human resource professionals	<input type="text"/>	<input type="text"/>
Electrical Technicians	<input type="text"/>	<input type="text"/>
SCADA technicians	<input type="text"/>	<input type="text"/>
Power plant/control room operator	<input type="text"/>	<input type="text"/>
Sales & Trading	<input type="text"/>	<input type="text"/>
Other professionals (please describe)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

81. How many trades did you engage in the last financial year during the **O&M / Asset Management** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

82. For each of the following trade jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ for a typical projects (or in the last financial year) for **wind farm O&M / Asset Management**

	Annual	Average % local to project
Electricians	<input type="text"/>	<input type="text"/>
Landscape gardener	<input type="text"/>	<input type="text"/>
Other (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

83. How many machine operators, drivers & labourers did you engage in the last financial year during the **O&M/ Asset Management** phase? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

84. For each of the following machine operators, drivers and labourers, please put in the number of full time equivalent (FTE) jobs (including contractors) you employ for a typical projects (or in the last financial year, 2018-19) for **wind farm O&M / Asset Management**

	Annual	Average % local to project
Electrical trades assistants	<input type="text"/>	<input type="text"/>
Civil labourers	<input type="text"/>	<input type="text"/>
Other labourers (please describe below)	<input type="text"/>	<input type="text"/>
Cleaners	<input type="text"/>	<input type="text"/>
Security guards	<input type="text"/>	<input type="text"/>
Earthmoving, grader operators	<input type="text"/>	<input type="text"/>
Drivers (trucks, vans)	<input type="text"/>	<input type="text"/>
Other drivers and operators (please describe below)	<input type="text"/>	<input type="text"/>

Please list the other occupations if you've ticked 'other' (If there is more than one job type here, please give an approximate split between the numbers you entered above)

Recruitment

* 85. In which states did you recruit staff during financial year 2018/19?

- | | |
|--------------------|-------------------|
| None | Tasmania |
| NSW or ACT | Victoria |
| Northern Territory | Western Australia |
| Queensland | South Australia |

Skills Shortages - NSW & ACT

For each of the following jobs, please indicate if you have attempted to recruit workers into these positions in the past 12 months and your experience with recruitment

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

Medium Difficulty: Able to find the workers we need in Australia within 5 - 8 weeks

High Difficulty: Unable to find workers we need in Australia within 2 months

Note: the time period applies to search (i.e. doesn't mean physical placement which may take longer due to notice requirements etc).

* 86. Please fill in for all jobs you recruited in the last financial year

	Low difficulty	Medium difficulty	High difficulty
Construction managers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Operations manager (O&M)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Surveyors	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Civil engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical engineers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Grid engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health & Safety professionals	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Scada engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community engagement professionals	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Environmental assessment professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site supervisors	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Civil engineering technicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical technicians	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Scada technicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Power plant/control room operators	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Carpenters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Plumbers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Electricians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Steel fixers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Crane & Hoist Operators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earthmoving operators	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Forklift operators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Truck drivers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Concreters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Riggers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Landscape gardeners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please describe below)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

Skill Shortages - NSW & ACT

87. What was the reason for the difficulty in recruitment (choose all that apply)?

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in solar or renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but they wanted longer-term employment
Construction managers						
Operations manager (O&M)						
Surveyors						
Civil engineers						
Electrical engineers						
Grid engineers						
Electronic engineers						
Health & Safety professionals						
Scada engineers						
Community engagement professionals						
Environmental assessment professionals						
Site supervisors						
Civil engineering technicians						
Civil engineering technicians						
Electrical technicians						
Scada technicians						
Power plant/control room operators						
Carpenters						
Plumbers						
Electricians						
Steel fixers						
Crane & Hoist Operators						
Earthmoving operators						
Forklift operators						
Truck drivers						

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in solar or renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but they wanted longer-term employment
Concreters						
Riggers						
Landscape gardeners						
Other (please describe below)						
Other (please specify)						

Skills Shortages - Victoria

For each of the following jobs, please indicate if you have attempted to recruit workers into these positions in the past 12 months and your experience with recruitment

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

Medium Difficulty: Able to find the workers we need in Australia within 5 - 8 weeks

High Difficulty: Unable to find workers we need in Australia within 2 months

NOTE: SKILL SHORTAGES QUESTIONS REPEAT FOR THOSE STATES WHERE RESPONDENT RECRUITED DURING THE LAST FINANCIAL YEAR

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

Apprenticeships & Traineeships

* 100. Did you employ apprentices or trainees during 2018-19 financial year?

Yes

No

Apprenticeships & Traineeships

* 101. How many apprentices did you have during financial year 2018/19? (FTE equivalent)

Civil labourers

Electrician

Engineering ElectricalTrade

Electrical Supply Industry - Power systems

Electrical Supply Industry - Wind Generation

Electrical/electro-technology - Renewable Energy

Electrical - PV

Other (please specify)

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

102. How many trainees did your company have during financial year 2018/19? (FTE equivalent)

Concreter

Dogger

Rigging

Scaffolder

Business Administration

Other - please specify

103. What market sectors did they work in (please tick all that apply)?

Solar PV - Utility scale

Solar PV - Commercial

Solar PV - Domestic

Solar PV - Stand Alone

Solar Hot Water

Wind - Utility Scale

Battery Storage

[Insert text from Other]

Report

104. Would you like a copy of the report on wind and solar employment when it comes out?

Yes

No

Please enter your email if you would like a report emailed to you

APPENDIX 1 UTILITY WIND AND SOLAR SURVEY

105. To win two full conference tickets to the Australian Clean Energy Summit 2020 as well as a table for 10 people at the Australian Clean Energy Summit gala dinner (total value \$7,315 inc. GST), tell us in 25 words or less what your ultimate Australian Clean Energy Summit session includes

(name of session/speakers/panel/content/you decide)

Response

Name

Organisation

Email address

Phone number

Thank You

Thank you for completing the survey, we know it's a lot of work and really appreciate your time and the contribution you've made to getting better information out there about renewable energy.

If you have any queries or would like further information please contact:

Maryanne Coffey, Policy and Project Manager at the Clean Energy Council on mcoffey@cleanenergycouncil.org.au or call 0419 493 519.

Thank you for participating, but this may not be the right survey!

Thank you for participating but this may not be the right survey - this one is for utility scale wind and utility scale solar, and in question 1 you didn't tick either of those.

If you do work on utility wind or solar, please go back and tick those boxes in Question 1 and then you'll see all the other questions.

If you don't work on those sectors but do work in renewable energy, we'd really appreciate you filling in a different survey, so please drop us a line.

If you have any queries or would like further information please contact:

Maryanne Coffey, Policy and Project Manager at the Clean Energy Council on mcoffey@cleanenergycouncil.org.au or call 0419 493 519.

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Welcome to the CEC Jobs Survey

Welcome to the CEC Distributed Solar Energy Jobs Survey

The Clean Energy Council (CEC) has partnered with the Institute of Sustainable Futures (ISF), University of Technology Sydney (UTS) to undertake a survey to collect data on employment in Australian renewable energy.

The survey will usually take 30 - 45 minutes to complete, and completing it will enter you into a prize draw to win 2 * \$500 Jetstar Vouchers.

Currently, there is a lack of quality data for workforce planning and the number of jobs in renewable energy is often under-estimated.

The aims of the study are to collect data to:

- Estimate the number of jobs in renewable energy now and out to 2030 under growth scenarios, such as AEMO's Integrated System Plan;
- Enable the mapping of jobs in declining sectors to renewable energy jobs to identify opportunities for redeployment and retraining;
- Identify and quantify employment in the key occupations for large-scale solar and wind projects and utility scale batteries;
- Identify skill shortages and priority occupations for forward planning.

Your participation

The survey will take approximately 30-45 minutes. The survey includes questions on the number and type of jobs for employees, contractors and apprentices across the development, installation, manufacturing and operation & maintenance phases for distributed solar energy (residential/commercial & industrial PV, solar hot water, battery storage). The questions cover skills shortages and recruitment issues in addition to employment numbers.

The data you provide will be aggregated with other survey responses and used in combination with other data sources in a spreadsheet model to develop overall employment estimates. Your answers will not be directly quoted or released. No commercial in confidence or personally identifiable information will be included in the

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

study report or any other publication, and these publications will not identify you or your organisation in any way.

Outputs

The purpose of this survey is to collect data on employment for utility-scale solar and wind energy projects. A final report will be presented to the CEC which is intended to be released publicly.

UTS researchers

This evaluation is led by project director Dr Chris Briggs (+61 477 301 892). The survey is being distributed by the CEC.

Research ethics

Studies undertaken by the Institute for Sustainable Futures have been approved in principle by the University of Technology Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact the ISF Ethics Coordinator, Federico Davila (0403 657 124) or the ISF Responsible Academic, Dr Keren Winterford (0418 910 800).

You may also contact the UTS Ethics Committee through the Research Ethics Officer (02 9514 9772, Research.Ethics@uts.edu.au). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

By completing the survey you agree to the provisions of the research conduct as outlined above. Thank you for participating in our survey. Your feedback is important.

Market Sectors - Technologies

What sectors did your company work in during the financial year 2018-19? Please click all that apply

- Solar PV - Utility Scale
- Solar PV - Commercial & Industrial
- Solar PV - Residential

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

- Solar PV - Stand Alone
- Solar Hot Water
- Battery Storage - Commercial & Industrial
- Battery Storage - Residential
- Other (Wind, Hydro, Bioenergy, Marine, Geothermal, etc.; please list any that apply)

Are you able to answer a survey about the number of workers and the jobs they do for your organisation?

- Yes
- No

Total Employment

What was the total number of workers employed in your business (Full time equivalent, FTE) in the last financial year (2018-19) in Australia? Please include both employees & contractors. As an example, if you employed a part-time worker 3 days a week for the year that is an FTE of 0.6.

Number (FTE)

Employees

Contractors

On average, what proportion (%) of your workforce time was spent in each sector in the 2018-19 financial year? Please include employees and contractors.

Please ensure the total adds up to 100%.

Workerforce time (%)

» Solar PV - Utility Scale

» Solar PV - Commercial & Industrial

» Solar PV - Residential

» Solar PV - Stand Alone

» Solar Hot Water

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Workerforce time (%)

» Battery Storage - Commercial & Industrial	<input type="text" value="0"/>
» Battery Storage - Residential	<input type="text" value="0"/>
» Other (Wind, Hydro, Bioenergy, Marine, Geothermal, etc.; please list any that apply)	<input type="text" value="0"/>
<input type="text"/>	
#Conjoint, Total#	<input type="text" value="0"/>

Business Size

Approximately how much Solar PV has your company installed in the last financial year 2018/19?

	KW in 2018-19	Number of systems in 2018-19
Solar PV - Commercial & Industrial	<input type="text"/>	<input type="text"/>
Solar PV - Residential	<input type="text"/>	<input type="text"/>

Approximately how much Solar PV has your company installed since inception?

	Cumulative KW since inception of company	Cumulative number of systems since inception
Solar PV - Commercial & Industrial	<input type="text"/>	<input type="text"/>
Solar PV - Residential	<input type="text"/>	<input type="text"/>

Approximately how many Solar Hot Water systems has your company installed in the last financial year 2018/19?

	KW in 2018-19	Square meters in 2018 -19	Number of systems in 2018 - 19
Flat Plate Systems	<input type="text"/>	<input type="text"/>	<input type="text"/>

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

	KW in 2018-19	Square meters in 2018 -19	Number of systems in 2018 - 19
Evacuated Tube Systems	<input type="text"/>	<input type="text"/>	<input type="text"/>

Approximately how many Solar Hot Water systems has your company installed since inception?

	Cumulative KW since inception	Cumulative area (sq. m) since inception	Cumulative numbers since inception
Flat Plate Systems	<input type="text"/>	<input type="text"/>	<input type="text"/>
Evacuated Tube Systems	<input type="text"/>	<input type="text"/>	<input type="text"/>

Approximately, how much battery storage has your company installed in the last financial year 2018/19?

	KW installed in 2018-19	Number of systems installed in 2018-19	Average size (KW) in 2018-19	Average size (KWH) in 2018-19
Battery Storage - Commercial & Industrial	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Battery Storage - Residential	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Approximately, how much battery storage has your company installed since inception?

	Cumulative KW installed since inception	Cumulative number of systems since inception
Battery Storage - Commercial & Industrial	<input type="text"/>	<input type="text"/>
Battery Storage - Residential	<input type="text"/>	<input type="text"/>

What proportion of your workforce time was engaged on post installation or operations & maintenance activities for the last financial year 2018/19? Please include all employees & contractors.

Workforce time	%	<input type="text"/>
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APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Approximately, what proportion of post-installation time (%) was spent in each area?
(please ensure your answers total 100%)

	%
» Solar PV - Utility Scale	<input type="text" value="0"/>
» Solar PV - Commercial & Industrial	<input type="text" value="0"/>
» Solar PV - Residential	<input type="text" value="0"/>
» Solar PV - Stand Alone	<input type="text" value="0"/>
» Solar Hot Water	<input type="text" value="0"/>
» Battery Storage - Commercial & Industrial	<input type="text" value="0"/>
» Battery Storage - Residential	<input type="text" value="0"/>
» Other (Wind, Hydro, Bioenergy, Marine, Geothermal, etc.; please list any that apply)	<input type="text" value="0"/>
<input type="text"/>	
#Conjoint, Total#	<input type="text" value="0"/>

Job Types

We are now going to ask questions about the number of workers engaged over the last financial year for different occupations:

- managers & administrators;
- professionals & technicians;
- trades; and
- machine operators, drivers & labourers.

Please read through the full list of jobs below before answering as it will make it easier to place jobs, and please include both employees and contractors.

On average, how many Managers and Administrators did you engage in the last financial year, 2018-19 Please answer in terms of full time equivalent (FTE) jobs (including contractors).

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Note to be defined as a manager they should usually have internal staff that report to them.

Managers & administrative jobs

Commercial & Industrial	<input type="text"/>
Residential	<input type="text"/>

For each of the following managerial & administrative jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

	Commercial & Industrial	Residential
Executives/General Managers	<input type="text"/>	<input type="text"/>
HR, Finance & Business administration managers (etc)	<input type="text"/>	<input type="text"/>
Commercial & Sales Managers	<input type="text"/>	<input type="text"/>
Project managers	<input type="text"/>	<input type="text"/>
Business Development Managers	<input type="text"/>	<input type="text"/>
Other management jobs (please specify)	<input type="text"/>	<input type="text"/>
<input type="text"/>		
Office managers/contract administrators	<input type="text"/>	<input type="text"/>
Accounting clerks & book-keepers	<input type="text"/>	<input type="text"/>
Other administrative jobs (please specify)	<input type="text"/>	<input type="text"/>
<input type="text"/>		

On average, how many Professionals did you engage in the last financial year, 2018-19? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

Professionals

Commercial & Industrial	<input type="text"/>
Residential	<input type="text"/>

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

For each of the following professional jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

	Commercial & Industrial	Residential
Financial and accounting professionals	<input type="text"/>	<input type="text"/>
Human resource professionals	<input type="text"/>	<input type="text"/>
Marketing and sales	<input type="text"/>	<input type="text"/>
Legal & planning assessment professionals	<input type="text"/>	<input type="text"/>
Accredited PV system designer	<input type="text"/>	<input type="text"/>
Electrical engineers	<input type="text"/>	<input type="text"/>
Health & safety professionals	<input type="text"/>	<input type="text"/>
Site supervisors	<input type="text"/>	<input type="text"/>
Estimators	<input type="text"/>	<input type="text"/>
Other professionals (please specify)	<input type="text"/>	<input type="text"/>
<input type="text"/>		

On average, how many trades & technicians did you engage in the last financial year, 2018-19 ? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

	Trades
Commercial & Industrial	<input type="text"/>
Residential	<input type="text"/>

For each of the following trades & technicians jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

	Commercial & Industrial	Residential
SCADA technician	<input type="text"/>	<input type="text"/>
Electrical technician (e.g. grid commissioning)	<input type="text"/>	<input type="text"/>

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Commercial & Industrial

Residential

Other technicians (please specify)

Electricians

Plumbers

Carpenters

Metal trades

Other trades (please specify)

On average, how many machine operators, drivers & labourers did you engage in the last financial year, 2018-19 ? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

Machine operators, drivers & labourers

Commercial & Industrial

Residential

For each of the following machine operators, drivers & labourers jobs, please put in the number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

Commercial & Industrial

Residential

Warehouse assembly

Solar roofers & labourers

Electrical trades assistants (or apprentices)

Elevated Work Platform Operators

Drivers (trucks, vans)

Cranes and hoist operators

Security guards

Other (please specify)

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Would you say that the job mix is roughly the same for the solar hot water projects that you undertake relative to solar PV?

	Yes	No
Commercial & Industrial	<input type="radio"/>	<input type="radio"/>
Residential	<input type="radio"/>	<input type="radio"/>

Please list the major differences in job mix and FTE between hot water and PV projects

On average, what proportion of the following inputs do you source from Australian suppliers? (please enter the percentage as a number between 0 & 100). If you don't know, please enter don't know in the other box.

	%
Racks & Mounting	<input type="text"/>
Solar Modules	<input type="text"/>
Inverters	<input type="text"/>
Cabling and electrical equipment	<input type="text"/>
Batteries	<input type="text"/>
Other - please list any other components you purchase from Australian suppliers and the approximate percentage for each one that you source on-shore.	<input type="text"/>

Contractors

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

What proportion (%) of the following functions did you regularly contract out to other companies in the last financial year (2018-2019)?

	% contracted out
Installations	<input type="text"/>
Warehousing	<input type="text"/>
Other (please specify) <input type="text"/>	<input type="text"/>

For those areas you contract out to other businesses, did you include the number of jobs in the previous questions?

	None of them	Some of them	All of them
» Installations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Warehousing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Other (please specify) <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recruitment

In which states did you recruit staff during financial year 2018/19?

- None
- NSW or ACT
- Victoria
- South Australia
- Queensland
- Tasmania
- Western Australia
- Northern Territory

For each of the following jobs, please indicate if you have attempted to recruit workers into these positions in the past 12 months and your experience with recruitment in **Australia**.

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Please fill in for all roles, skills and qualifications you recruited for in the last financial year.

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

Medium Difficulty: Able to find the workers we need in Australia within 5 - 8 weeks

High Difficulty: Unable to find workers we need in Australia within 2 months

Note: the time period applies to search (i.e. doesn't mean physical placement which may take longer due to notice requirements etc).

	Low difficulty	Medium difficulty	High difficulty
Commercial & Sales Managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accredited PV system designers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solar roofers/labourers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site supervisors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electricians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health & safety professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scada engineer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scada technician	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical TA's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Plumbers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crane & Hoist Operators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elevated work platform operators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What was the reason for the difficulty in recruitment in Australia (choose all that apply)?

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but they wanted longer employment
Commercial & Sales Managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accredited PV system designers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solar roofers/labourers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site supervisors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electricians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health & safety professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scada engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scada technician	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical TA's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plumbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crane & Hoist Operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elevated work platform operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did you have the same experience recruiting for these jobs across all states or was it harder or easier to recruit staff in some states?

- Yes
 No

For which states was it harder or easier?

- » None

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

- » NSW or ACT
- » Victoria
- » South Australia
- » Queensland
- » Tasmania
- » Western Australia
- » Northern Territory

For each of the following jobs, please indicate if you have attempted to recruit workers into these positions in the past 12 months and your experience with recruitment in **NSW/ACT**.

Please fill in for all roles, skills and qualifications you recruited for in the last financial year.

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

Medium Difficulty: Able to find the workers we need in Australia within 5 - 8 weeks

High Difficulty: Unable to find workers we need in Australia within 2 months

Note: the time period applies to search (i.e. doesn't mean physical placement which may take longer due to notice requirements etc).

	Low difficulty	Medium difficulty	High difficulty
Commercial & Sales Managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accredited PV system designers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solar roofers/labourers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site supervisors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electricians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health & safety professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scada engineer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scada technician	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical TA's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

	Low difficulty	Medium difficulty	High difficulty
Plumbers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crane & Hoist Operators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elevated work platform operators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) <input style="width: 200px; height: 20px;" type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What was the reason for the difficulty in recruitment in NSW / ACT (choose all that apply)?

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but they want longer employment
Commercial & Sales Managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accredited PV system designers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solar roofers/labourers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site supervisors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electricians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health & safety professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scada engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scada technician	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical TA's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plumbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crane & Hoist Operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elevated work platform operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) <input style="width: 200px; height: 20px;" type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

QUESTIONS ON RECRUITMENT ISSUES
 REPEAT FOR ALL STATES WHERE RESPONDENT
 RECRUITED

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but they want longer employment
Electricians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health & safety professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scada engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scada technician	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical TA's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plumbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crane & Hoist Operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elevated work platform operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) <input style="width: 150px; height: 20px;" type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Apprentices & Traineeships

Did you employ apprentices or trainees during 2018-19 financial year?

- Yes
- No

How many apprentices / trainees did you have during financial year 2018/19? (FTE equivalent)

Click to write Scale Point 1

Electrician	<input style="width: 50px; height: 20px;" type="text"/>
Electrical/electro-technology - Renewable Energy	<input style="width: 50px; height: 20px;" type="text"/>
Plumber	<input style="width: 50px; height: 20px;" type="text"/>

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

Click to write Scale Point 1

Business
administration

Others

What market sectors did they work in (please tick all that apply)?

- » Solar PV - Utility Scale
- » Solar PV - Commercial & Industrial
- » Solar PV - Residential
- » Solar PV - Stand Alone
- » Solar Hot Water
- » Battery Storage - Commercial & Industrial
- » Battery Storage - Residential
- » Other (Wind, Hydro, Bioenergy, Marine, Geothermal, etc.; please list any that apply)

Wrap Up

Are there any other workforce recruitment, skills or training issues you would like to highlight?

Would you like a copy of the report on solar employment when it comes out?

- Yes
- No

Would you like to enter a lucky draw to win 2 x \$500 Jetstar vouchers?

Please tell us what you would like to see in next year's Clean Energy Summit - panels,

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

speakers, themes, etc., and also your name, organisation and email address

Click to write Scale Point 1

Response

Name

Organisation

Email Address

Email:

Can we contact you again if we have follow up questions?

Yes

No

Please give us your contact details (fill in whichever you would prefer)

Click to write Scale Point 1

Name

Email

Telephone

Powered by Qualtrics

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

APPENDIX 2 - DISTRIBUTED SOLAR SURVEY

APPENDIX 3: SUPPLY CHAIN SURVEY

Welcome to the CEC Jobs Survey

Welcome to the CEC Renewable Energy Jobs in the Supply Chain Survey

The Clean Energy Council (CEC) has partnered with the Institute of Sustainable Futures (ISF), University of Technology Sydney (UTS) to undertake a survey to collect data on employment in Australian renewable energy.

Currently, there is a lack of quality data for workforce planning and the number of jobs in renewable energy is often under-estimated.

The aims of the study are to collect data to:

- Enable the mapping of jobs in declining sectors to renewable energy jobs to identify opportunities for redeployment and retraining;
- Identify and quantify employment in the key occupations for large-scale solar and wind projects and utility scale batteries;
- Identify skill shortages and priority occupations for forward planning.

Your participation

The survey will take approximately 30-45 minutes. The survey includes questions on the number and type of jobs for employees, contractors and apprentices across the supply-chain for renewable energy. The questions cover skills shortages and recruitment issues in addition to employment numbers.

The scope of the survey includes manufacturing, warehousing, distribution and supply.

There is another survey for the development, construction/installation and operation and maintenance of renewable energy projects so please do not include these jobs in your answers. If your company does undertake work in development, construction/installation and/or operation and maintenance please contact us at the number below to participate in this survey.

The data you provide will be aggregated with other survey responses and used in

APPENDIX 3: SUPPLY CHAIN SURVEY

combination with other data sources in a spreadsheet model to develop overall employment estimates. Your answers will not be directly quoted or released. No commercial in confidence or personally identifiable information will be included in the study report or any other publication, and these publications will not identify you or your organisation in any way.

Outputs

The purpose of this survey is to collect data on renewable energy employment. A final report will be presented to the CEC which is intended to be released publicly.

UTS researchers

This evaluation is led by project director Dr Chris Briggs (+61 477 301 892). The survey is being distributed by the CEC.

Research ethics

Studies undertaken by the Institute for Sustainable Futures have been approved in principle by the University of Technology Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact the ISF Ethics Coordinator, Federico Davila (0403 657 124) or the ISF Responsible Academic, Dr Keren Winterford (0418 910 800).

You may also contact the UTS Ethics Committee through the Research Ethics Officer (02 9514 9772, Research.Ethics@uts.edu.au). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

By completing the survey you agree to the provisions of the research conduct as outlined above.

Thank you for participating in our survey. Your feedback is important.

Renewable Energy Supply-Chain and Technologies

APPENDIX 3: SUPPLY CHAIN SURVEY

In which parts of the supply chain does your business operate in Australia for each of the following renewable energy technologies?

Note the survey is only collecting data on manufacturing which occurs in Australia. For warehousing, distribution, supply, installation and maintenance, the survey covers imported products and those that are locally produced.

	Solar PV	Solar Hot Water	Wind	Battery Storage	Other (Hydro, Bioenergy, Marine, Geothermal, etc.)
Manufacturing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Warehousing, distribution & supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RE Project Development (IPP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RE project construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RE project operation (including asset management)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tell us what "Other" includes

Total Employment

On average, what was the **total number** of workers employed in your business (Full time equivalent, FTE) in the last financial year (2018-19) in Australia? (so for example if 3 people were employed for a month each, it would be 0.25 FTE)

Please include both employees & contractors.

Employees	Number (FTE)
	<input style="width: 50px; height: 20px;" type="text"/>
Contractors	<input style="width: 50px; height: 20px;" type="text"/>

APPENDIX 3: SUPPLY CHAIN SURVEY

What is the percentage (%) of your **overall workforce** that works on renewable energy activities (or percentage of **workforce time** if staff work on renewables and non-renewables work)?

Approximately, what proportion of your Australian renewable energy workforce's time was used in each of these technologies and sectors? (please include employees and contractors)

Please put a percentage in each box that applies, ensuring the total for the **whole question** adds up to 100% (not just a row).

	» Solar PV	» Solar Hot Water	» Wind	» Battery Storage	» Other (Hydro, Bioenergy, Marine, Geothermal, etc.)	#Conjoint, Total#
» Manufacturing	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
» Warehousing, distribution & supply	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
» Installation	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
» Maintenance	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
» RE Project Development (IPP)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
» RE project construction	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
» RE project operation (including asset management)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Products

Of your workforce time in Solar PV in Australia, approximately what was the proportion used for each of the **solar PV** products you manufactured, supplied, installed or maintained during financial year 2018/19?

Please ensure that **each column** total adds up to 100%.

APPENDIX 3: SUPPLY CHAIN SURVEY

Note the survey is only collecting data on manufacturing which occurs in Australia. For warehousing, distribution, supply and installation, the survey covers imported products and those that are locally produced.

	Manufacturing	Warehousing, distribution & supply	Installation	Maintenance
Solar modules	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Solar frames	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Inverters	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Cabling	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Transformers	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Software	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Other (please specify) <input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
#Conjoint, Total#	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Of your workforce time in wind energy in Australia, approximately what was the percentage used for each of the **wind** products during financial year 2018/19?

Please ensure the total for **each column** is equal to 100%.

Note the survey is only collecting data on manufacturing which occurs in Australia. For warehousing, distribution, supply and installation, the survey covers imported products and those that are locally produced.

	Manufacturing	Warehousing, distribution & supply	Installation	Maintenance
Steel for towers	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Wind tower	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Blades	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Generators	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Nascelle	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Inverters	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Transformers	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Cabling	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Software	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

APPENDIX 3: SUPPLY CHAIN SURVEY

	Manufacturing	Warehousing, distribution & supply	Installation	Maintenance
Other (please specify) <input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
#Conjoint, Total#	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Of your workforce time in solar hot water, approximately what was the proportion used for each of the **solar hot water** products you manufactured, supplied and/or installed during financial year 2018/19 in Australia?

Please ensure that **each column** adds up to 100%.

Note the survey is only collecting data on manufacturing which occurs in Australia. For warehousing, distribution and supply, the survey covers imported products and those that are locally produced.

	Manufacturing	Warehousing, distribution & supply	Installation	Maintenance
Solar flat plat collector	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Solar evacuated tubes	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Other (please specify) <input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
#Conjoint, Total#	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Approximately how many MW did you manufacture or supply products for each of these sectors during the last financial year (2018-19)

If you do not know the capacity in MW, leave it blank and you'll get the option to use a different measure in the next question.

Note the survey is only collecting data on manufacturing which occurs in Australia. For warehousing, distribution and supply, the survey covers imported products and those that are locally produced.

	MW (Manufacturing)	MW (Supply)	MW (Installation)	MW (Maintenance)
Solar PV	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

APPENDIX 3: SUPPLY CHAIN SURVEY

	MW (Manufacturing)	MW (Supply)	MW (Installation)	MW (Maintenance)
Solar Hot Water	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Battery Storage	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Wind	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Please provide us an alternative measure if you don't know the capacity in MW (for example, number of installations, number of systems, m2, MWh).

	Unit / Measure	Number
» Solar PV	<input type="text"/>	<input type="text"/>
» Solar Hot Water	<input type="text"/>	<input type="text"/>
» Battery Storage	<input type="text"/>	<input type="text"/>
» Wind	<input type="text"/>	<input type="text"/>

Recruitment

In which states did you recruit staff during financial year 2018/19?

- None
- NSW or ACT
- Victoria
- South Australia
- Queensland
- Tasmania
- Western Australia
- Northern Territory

For each of the following jobs, please indicate if you have attempted to recruit workers into these positions in the past 12 months and your experience with recruitment in Australia

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

Medium Difficulty: Able to find the workers we need in Australia within 5 - 8 weeks

APPENDIX 3: SUPPLY CHAIN SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but it was longer employment
Project managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transport & logistics professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT Technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structural steel and welding trades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Metal machinists & fitters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other metal trades <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Construction trades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electricians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telecommunications trades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did you have the same experience recruiting across all states or were there different experiences in recruitment for one or more states?

- Yes
- No

For which states did you have a different experience?

- » None
- » NSW or ACT

APPENDIX 3: SUPPLY CHAIN SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but it was longer employment
Telecommunications trades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other <input style="width: 200px; height: 20px;" type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Apprentices & Traineeships

Did you employ apprentices or trainees during 2018-19 financial year?

- Yes
- No

How many apprentices / trainees did you have during financial year 2018/19? (FTE equivalent)

	Number
Electrician	<input style="width: 50px; height: 20px;" type="text"/>
Structural steel and welding trades	<input style="width: 50px; height: 20px;" type="text"/>
Metal machinists & fitters	<input style="width: 50px; height: 20px;" type="text"/>
Mechanical trades	<input style="width: 50px; height: 20px;" type="text"/>
Business administration	<input style="width: 50px; height: 20px;" type="text"/>
Others <input style="width: 200px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>

Job Types

We are now going to ask questions about the number of workers in renewable energy activities over the last financial year for different occupations:

APPENDIX 3: SUPPLY CHAIN SURVEY

- managers & administrators;
- professionals;
- technicians & trades; and
- machine operators, drivers & labourers.

Please read through the full list of jobs below before answering as it will make it easier to place jobs, and include both employees and contractors.

On average, how many Managers and Administrative support staff were engaged in renewable energy work in the last financial year, 2018-19.

Please answer in terms of full time equivalent (FTE) jobs (including contractors) so if staff work on renewable and non-renewable work allocate based on percentage of time.

Note to be defined as a manager they should usually have internal staff that report to them.

Total managers & administrative jobs

Manufacturing

Warehousing,
distribution & supply

For each of the following managerial & administrative jobs, please enter the average number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

	Manufacturing	Warehousing, distribution & supply
Executives/General Managers	<input type="text"/>	<input type="text"/>
HR, Finance & Business administration managers (etc)	<input type="text"/>	<input type="text"/>
Commercial & Sales Managers	<input type="text"/>	<input type="text"/>
Project managers	<input type="text"/>	<input type="text"/>
Production managers	<input type="text"/>	<input type="text"/>
Operations managers	<input type="text"/>	<input type="text"/>

APPENDIX 3: SUPPLY CHAIN SURVEY

Warehousing, distribution & supply

Manufacturing

Transport & logistics managers	<input type="text"/>	<input type="text"/>
Supervisors	<input type="text"/>	<input type="text"/>
Other management jobs (please specify)	<input type="text"/>	<input type="text"/>
<input type="text"/>		
Office managers/contract administrators	<input type="text"/>	<input type="text"/>
Accounting clerks & book-keepers	<input type="text"/>	<input type="text"/>
Other administrative jobs (please specify)	<input type="text"/>	<input type="text"/>
<input type="text"/>		

On average, how many Professionals did you have in the last financial year, 2018-19?
Please answer in terms of full time equivalent (FTE) jobs (including contractors).

Total professionals

Manufacturing	<input type="text"/>
Warehousing, distribution & supply	<input type="text"/>

For each of the following professional jobs, please enter the average number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

Warehousing, distribution & supply

Manufacturing

Financial and accounting professionals	<input type="text"/>	<input type="text"/>
Human resource professionals	<input type="text"/>	<input type="text"/>
Marketing and sales	<input type="text"/>	<input type="text"/>
Legal professionals	<input type="text"/>	<input type="text"/>
Production engineers	<input type="text"/>	<input type="text"/>
Electrical Engineers	<input type="text"/>	<input type="text"/>
Mechanical Engineers	<input type="text"/>	<input type="text"/>
Other engineers	<input type="text"/>	<input type="text"/>
<input type="text"/>		

APPENDIX 3: SUPPLY CHAIN SURVEY

Warehousing, distribution & supply

Manufacturing

supply

IT professionals	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Health & safety professionals	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Transport & logistics	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Other professional (please specify)	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>		

On average, how many trades and technicians did you have in the last financial year, 2018-19? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

Total trades & technicians

Manufacturing	<input style="width: 100%;" type="text"/>
Warehousing, distribution & supply	<input style="width: 100%;" type="text"/>

For each of the following trades & technician jobs, please enter the average number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

Please include any installation and / or maintenance jobs below.

Warehousing, distribution & supply

Manufacturing

supply

Electrical technicians	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Mechanical technicians	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
IT Technicians	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Other technicians	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>		
Structural steel and welding trades	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Metal machinists & fitters	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Metal trades assistants / apprentices	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Other metal trades	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>		

APPENDIX 3: SUPPLY CHAIN SURVEY

Warehousing, distribution & supply

Manufacturing

Electricians	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Telecommunications trades	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Construction trades	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
blasters/painters	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Other trades (please specify)	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
<input style="width: 235px; height: 25px;" type="text"/>		

On average, how many machine operators, drivers & labourers did you have in the last financial year, 2018-19? Please answer in terms of full time equivalent (FTE) jobs (including contractors).

Total machine operators, drivers & labourers

Manufacturing	<input style="width: 60px; height: 25px;" type="text"/>
Warehousing, distribution & supply	<input style="width: 60px; height: 25px;" type="text"/>

For each of the following machine operators, drivers & labourers jobs, please enter the average number of full time equivalent (FTE) jobs (including contractors) in the last financial year (2018-19)

Please include any installation and / or maintenance jobs below.

Warehousing, distribution & supply

Manufacturing

Process workers & labourers	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Product quality controllers	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Storeperson & packers	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Drivers (trucks, vans)	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Cleaners	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Security guards	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Other (please specify)	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
<input style="width: 235px; height: 25px;" type="text"/>		

APPENDIX 3: SUPPLY CHAIN SURVEY

Contractors

What functions, if any, do you contract out or source from another business? Please answer in terms of the percentage of volume or value depending on which is easiest.

	%
Manufacturing	<input type="text"/>
Production inputs or componentry	<input type="text"/>
Warehousing	<input type="text"/>
Distribution & supply	<input type="text"/>
Other (please specify) <input type="text"/>	<input type="text"/>

For those areas you contract out to other businesses, did you include the number of jobs in the previous questions?

	None of them	Some of them	All of them
» Manufacturing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Production inputs or componentry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Warehousing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Distribution & supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Other (please specify) <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please provide any information you can on the type and/or amount of work you contract out or supply from other Australian businesses.

(e.g. "there is a ratio of 2:1 jobs for the supply of x, y, z components relative to our workforce")

Wrap Up

APPENDIX 3: SUPPLY CHAIN SURVEY

Are there any other workforce recruitment, skills or training issues you would like to highlight?

Can we contact you again if we have follow up questions?

Yes

No

Would you like a copy of the report on renewable energy employment when it comes out?

Yes

No

To win 2 * \$500 Jetstar vouchers tell us what your ultimate Australian Clean Energy Summit session includes

(name of session/speakers/panel/content/you decide)

Please give us your contact details

Details

Name

Organisation

APPENDIX 3: SUPPLY CHAIN SURVEY

Details

Email

Telephone

Powered by Qualtrics

Welcome to the CEC Jobs Survey

Welcome to the CEC survey of Batteries Jobs in Australia

The Clean Energy Council (CEC) has partnered with the Institute of Sustainable Futures (ISF), University of Technology Sydney (UTS) to undertake a survey to collect data on employment in Australian renewable energy. There is currently a lack of quality data for workforce planning and the number of jobs in renewable energy is often underestimated.

The survey will usually take 30 - 45 minutes to complete, and completing it will enter you into a prize draw to win two \$500 Jetstar vouchers.

This survey is for battery storage (solar, wind and hydro are covered in different surveys) and the scope includes:

- manufacturing;
- technology & product distribution and supply;
- development, construction and
- operations & maintenance.

The aims of the study are to :

- Identify and quantify employment in the key occupations
- Identify skill shortages and priority occupations for forward planning, and
- Enable the mapping of jobs in declining sectors to renewable energy jobs to identify opportunities for redeployment and retraining.

Your participation

The survey will take approximately 30-45 minutes. The survey includes questions on the number and type of jobs for employees, contractors and apprentices across the supply-chain for battery storage. The questions cover skills shortages and recruitment issues in addition to employment numbers.

APPENDIX 4 BATTERIES SURVEY

The data you provide will be aggregated with other survey responses and used in combination with other data sources in a spreadsheet model to develop overall employment estimates. Your answers will not be directly quoted or released. No commercial in confidence or personally identifiable information will be included in the study report or any other publication, and these publications will not identify you or your organisation in any way.

Outputs

The purpose of this survey is to collect data on renewable energy employment. A final report will be presented to the CEC which is intended to be released publicly.

This evaluation is led by project director Dr Chris Briggs (+61 477 301 892). The survey is being distributed by the CEC.

Research ethics

Studies undertaken by the Institute for Sustainable Futures have been approved in principle by the University of Technology Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact the ISF Ethics Coordinator, Federico Davila (0403 657 124) or the ISF Responsible Academic, Dr Keren Winterford (0418 910 800).

You may also contact the UTS Ethics Committee through the Research Ethics Officer (02 9514 9772, Research.Ethics@uts.edu.au). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

By completing the survey you agree to the provisions of the research conduct as outlined above. Thank you for participating in our survey. Your feedback is important.

Market Sectors

What battery types and sectors did your company work on in **Australia** during the last financial year 2018-19? Please tick all that apply.

APPENDIX 4 BATTERIES SURVEY

	Residential batteries	Commercial & Industrial batteries	Utility batteries (grid connected or located at solar or wind farms)	Electric vehicle batteries
Lead acid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lithium ion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sodium nickel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vanadium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zinc bromide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) <input style="width: 150px; height: 15px;" type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What parts of the battery supply chain did your company work on in **Australia** during the last financial year 2018-19? Please tick all that apply.

- Research & development
- Manufacturing
- Warehousing, distribution & supply
- Installation (including design)
- Operation & Asset Management
- Maintenance
- Other (please specify)

Total Employment

How many employees and contractors did you engage on average during the last financial year (2018-19) in Australia on a full time equivalent (FTE) basis?

For example, someone employed full time for 6 months would be 0.5 FTE.

In case you did not engage any contractors, please enter zero.

APPENDIX 4 BATTERIES SURVEY

Number (FTE)

Employees

Contractors

On average, what proportion of your workforce time was spent on **battery storage** in the last financial year (2018-19) in Australia?

0 10 20 30 40 50 60 70 80 90 100

Employees

Contractors



Approximately what proportion of your **Australian battery workforce's** time was spent in different activities across the supply chain? (please include employees and contractors)

Please put a percentage in each box that applies, ensuring the total for the **whole question** adds up to 100%.

	» Research & development	» Manufacturing	» Warehousing, distribution & supply	» Installation (including design)	» Zinc bromide	» Mainten.
» Residential batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Commercial & Industrial batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Utility batteries (grid connected or located at solar or wind farms)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Electric vehicle batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Recruitment

APPENDIX 4 BATTERIES SURVEY

In which states did you recruit staff during financial year 2018/19?

- None
- NSW or ACT
- Victoria
- South Australia
- Queensland
- Tasmania
- Western Australia
- Northern Territory

Which of the following jobs / positions did you attempt to recruit workers for in the past 12 months? What was your experience with recruitment in **Australia**?

Please fill in only for roles, skills and qualifications you recruited for in the last financial year.

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

Medium Difficulty: Able to find the workers we need in Australia within 5 - 8 weeks

High Difficulty: Unable to find workers we need in Australia within 2 months

Note: the time period applies to search (i.e. doesn't mean physical placement which may take longer due to notice requirements etc).

	Low difficulty	Medium difficulty	High difficulty
Commercial & sales Managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project Managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production Managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Battery system designer or engineer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grid Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scada Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transport & logistics professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX 4 BATTERIES SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy or hydro projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but it was longer employment
Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>						

Did you have the same experience recruiting for these jobs and skill shortages across all states or were there different experiences in recruitment for one or more states?

- Yes
- No

For which states did you have a different experience?

- » None
- » NSW or ACT
- » Victoria
- » South Australia
- » Queensland
- » Tasmania
- » Western Australia
- » Northern Territory

NOTE: SURVEY REPEATS RECRUITMENT DIFFICULTY QUESTIONS FOR RELEVANT STATES IF RESPONDENT IDENTIFIES DIFFERENT EXPERIENCE

For each of the following jobs, please indicate if you have attempted to recruit workers into these positions in the past 12 months and your experience with recruitment in **NSW / ACT**.

Please fill in for all roles, skills and qualifications you recruited for in the last financial year.

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

APPENDIX 4 BATTERIES SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but it was longer employment
» Electrical Engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Scada Engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Transport & logistics professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Environment, Health & safety professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Battery technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Grid technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» SCADA technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Construction trades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Electricians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>						

Apprentices & Traineeships

Did you employ apprentices or trainees during 2018-19 financial year?

Yes

No

How many apprentices / trainees did you have during financial year 2018/19? (FTE equivalent)

	Numbers
Electrician	<input type="text"/>
Engineering	<input type="text"/>
Power systems	<input type="text"/>
Mechanical	<input type="text"/>

APPENDIX 4 BATTERIES SURVEY

Numbers

Electro-technology or
renewable energy

Business administration

Others (please specify)

What market sectors did they work in (please tick all that apply)?

- » Residential batteries
- » Commercial & Industrial batteries
- » Utility batteries (grid connected or located at solar or wind farms)
- » Electric vehicle batteries

Supply chain

Which of the following elements does your business manufacture? Please tick all that apply.

	» Lead acid	» Lithium ion	» Sodium nickel	» Vanadium	» Zinc bromide	» Other (please specify)
Completed battery packs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cell materials (electrolyte, cathode / anode active material, electrode binders, solvents, additives, separators)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery cells	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery modules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inverters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Software & control systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Which of the following elements does your business warehouse, distribute or supply ?

Please tick all that apply.

APPENDIX 4 BATTERIES SURVEY

	» Lead acid	» Lithium ion	» Sodium nickel	» Vanadium	» Zinc bromide	» Other (please specify)
Completed battery packs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cell materials (electrolyte, cathode / anode active material, electrode binders, solvents, additives, separators)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery cells	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery modules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inverters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Software & control systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Approximately what capacity of batteries did you manufacture during the last financial year (2018-19)?

Note the survey is only collecting data on manufacturing which occurs in Australia.

	MW	MWh	Number of systems
» Residential batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Commercial & Industrial batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Utility batteries (grid connected or located at solar or wind farms)	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Electric vehicle batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>

Approximately what capacity of batteries did you warehouse, distribute or supply during the last financial year (2018-19)?

Note the survey is collecting data on both local and imported batteries.

	MW	MWh	Number of systems
» Residential batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Commercial & Industrial batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>

APPENDIX 4 BATTERIES SURVEY

	MW	MWh	Number of systems
» Utility batteries (grid connected or located at solar or wind farms)	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Electric vehicle batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>

Approximately what capacity of battery projects did you design and/or install during the last financial year (2018-19)?

Note the survey is only collecting data on projects which occur in Australia.

	MW	MWh	Number of systems
Residential batteries - installed	<input type="text"/>	<input type="text"/>	<input type="text"/>
Commercial & industrial batteries - projects under development	<input type="text"/>	<input type="text"/>	<input type="text"/>
Commercial & industrial batteries - installed	<input type="text"/>	<input type="text"/>	<input type="text"/>
Utility scale batteries - project under development	<input type="text"/>	<input type="text"/>	<input type="text"/>
Utility scale batteries - installed	<input type="text"/>	<input type="text"/>	<input type="text"/>

Approximately what capacity of batteries did you maintain or operate during the last financial year (2018-19)?

Note the survey is only collecting data on projects which occur in Australia.

	MW	MWh	Number of systems
» Residential batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Commercial & Industrial batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Utility batteries (grid connected or located at solar or wind farms)	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Electric vehicle batteries	<input type="text"/>	<input type="text"/>	<input type="text"/>

Job Types

We are now going to ask questions about the occupations of workers **who worked on batteries** in the 2018-19 financial year:

- managers & administrators;
- professionals;
- technicians & trades; and
- machine operators, drivers & labourers.

Please read through the full list of jobs below before answering as it will make it easier to place jobs, and include both employees and contractors.

On average, how many **Managers and Administrative support staff** did you engage in the 2018-19 financial year working in battery storage (including contractors)

Please answer in terms of full time equivalent (FTE) jobs so if a staff member worked half-time on battery storage that would be 0.5.

Note to be defined as a manager they should usually have internal staff that report to them.

Managers & administrative jobs

Manufacturing & R&D	<input type="text"/>
Warehousing & supply	<input type="text"/>
Installation	<input type="text"/>
Operation and/or maintenance	<input type="text"/>

On average, how many **Managers & Administrative support staff** did you engage in the **2018-19 financial year** in **battery storage**. Please enter the number of full time equivalent (FTE) jobs (including contractors).

Manufacturing and/or R&D	Warehousing, Sales & Distribution	Installation	Operation & Maintenance
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APPENDIX 4 BATTERIES SURVEY

	Manufacturing and/or R&D	Warehousing, Sales & Distribution	Installation	Operation & Maintenance
Executives/General Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
HR, Finance & Business administration managers (etc)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Commercial & Business Development Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Production Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Project managers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Site Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Operations & Asset Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other management jobs (please specify) <input style="width: 200px; height: 20px;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Office managers/contract administrators	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Accounting clerks & book-keepers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other administrative jobs (please specify) <input style="width: 200px; height: 20px;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

On average, how many **Professionals** did you engage in the 2018-19 financial year in battery storage. Please answer in terms of full time equivalent (FTE) jobs (including contractors).

	Professionals
» Manufacturing & R&D	<input type="text"/>
» Warehousing & supply	<input type="text"/>
» Installation	<input type="text"/>
» Operation and/or maintenance	<input type="text"/>

On average, how many **Professionals** did you engage in the 2018-19 financial year in **battery storage**. Please enter the number of full time equivalent (FTE) jobs

APPENDIX 4 BATTERIES SURVEY

(including contractors).

	Manufacturing and/or R&D	Warehousing, Sales & Distribution	Installation	Operation & Maintenance
Business professionals (finance, accounting, Human Resources etc)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Sales and marketing professionals	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Research/Science Professionals	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Battery system designer or engineer	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Electrical engineers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Grid Engineer	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Scada Engineers	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Transport & Logistics professionals	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Environment, Health & Safety professionals	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Control room operator	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Trading	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other professionals (please specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input style="width: 200px; height: 20px;" type="text"/>				

On average, how many **Trades and Technicians** did you engage in the 2018-19 financial year in battery storage. Please answer in terms of full time equivalent (FTE) jobs (including contractors).

Trades & Technicians

» Manufacturing & R&D	<input type="text"/>
» Warehousing & supply	<input type="text"/>
» Installation	<input type="text"/>
» Operation and/or maintenance	<input type="text"/>

APPENDIX 4 BATTERIES SURVEY

How many **Trades & Technicians** did you engage in the **2018-19 financial year in battery storage?** Please enter the number of full time equivalent (FTE) jobs (including contractors).

	Manufacturing and/or R&D	Warehousing, Sales & Distribution	Installation	Operation and/or Maintenance
SCADA technician	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Battery technician	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Research/Science Technicians	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Site supervisors	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other technicians (please specify) <input style="width: 200px; height: 20px;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Electricians	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Construction trades	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Metal trades	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Mechanical trades	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Telecommunications trades	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other trades (please specify) <input style="width: 200px; height: 20px;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

On average, how many **Machine Operator, Driver and Labourer jobs** did you engage in the 2018-19 financial year in battery storage. Please answer in terms of full time equivalent (FTE) jobs (including contractors).

Machine operators, drivers & labourers

» Manufacturing & R&D	<input type="text"/>
» Warehousing & supply	<input type="text"/>
» Installation	<input type="text"/>
» Operation and/or maintenance	<input type="text"/>

How many **Machine Operator, Driver and Labourers** did you engage in the **2018-19 financial year in battery storage?** Please enter the number of full time equivalent (FTE)

APPENDIX 4 BATTERIES SURVEY

jobs (including contractors).

	Manufacturing and/or R&D	Warehousing, Sales & Distribution	Installation	Operation and/or Maintenance
Forklift operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drivers (trucks, vans)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other drivers & machine operators (please specify) <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concreters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical labourers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Civil labourers/trades- assistants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical trade assistants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other labourers (please specify) <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Contracting

Please let us know if you contracted out some of your battery work in 2018/19?

	» Residential batteries	» Commercial & Industrial batteries	» Utility batteries (grid connected or located at solar or wind farms)	» Electric vehicle batteries
» Research & development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Manufacturing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Warehousing, distribution & supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Installation (including design)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Zinc bromide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Which proportion (%) of each function did you contract out to another business?

APPENDIX 4 BATTERIES SURVEY

%

- » Research & development
- » Manufacturing
- » Warehousing, distribution & supply
- » Installation (including design)
- » Zinc bromide
- » Maintenance
- » Other (please specify)

For those areas you contract out to other businesses, did you include the number of jobs in the previous questions?

	None of them	Some of them	All of them
» Research & development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Manufacturing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Warehousing, distribution & supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Installation (including design)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Zinc bromide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Maintenance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please add any description or comment about the jobs you weren't able to include .

Typical Project

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Please now consider a "typical" project under design or installation. If there is no such thing as typical, choose whatever size and type you are most familiar with.

What is the capacity of a typical project for your company?

	Capacity
MW	<input type="text"/>
MWh	<input type="text"/>

What battery chemistry is it?

- » Lead acid
- » Lithium ion
- » Sodium nickel
- » Vanadium
- » Zinc bromide
- » Other (please specify)

Is it grid connected?

- Yes
- No

How long did the project take?

	Years	Months
Development (pre-construction) phase	<input type="text"/>	<input type="text"/>
Installation phase	<input type="text"/>	<input type="text"/>
Other (please specify) <input type="text"/>	<input type="text"/>	<input type="text"/>

How many people (FTE) would you expect to be employed in each phase on average?

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FTE

Development (pre-
construction) phase

Installation phase

Other (please specify)

Wrap Up

Are there any other workforce recruitment, skills or training issues you would like to highlight?

Can we contact you again if we have follow up questions?

Yes

No

Would you like a copy of the report on Renewable Energy employment when it comes out?

Yes

No

To win 2 * \$500 Jetstar vouchers tell us what your ultimate Australian Clean Energy Summit session includes

(name of session/speakers/panel/content/you decide)



Please give us your contact details

Details

Name

Organisation

Email

Telephone

Welcome to the CEC Jobs Survey

Welcome to the CEC survey of Hydro Jobs in Australia

The Clean Energy Council (CEC) has partnered with the Institute of Sustainable Futures (ISF), University of Technology Sydney (UTS) to collect data on employment in Australian renewable energy. There is currently a lack of quality data for workforce planning and the number of jobs in renewable energy is often under-estimated.

The survey will usually take 30 - 45 minutes to complete, and completing it will enter you into a prize draw to win two full conference tickets to the Australian Clean Energy Summit 2020 as well as a table for 10 people at the Australian Clean Energy Summit gala dinner (total value \$7,315 inc. GST).

This survey is for hydro generation and storage (solar, wind and battery storage are covered in different surveys) and the scope includes:

- manufacturing;
- technology & product distribution and supply;
- development, construction and operations & maintenance.

The aims of the study are to :

- Identify and quantify employment in the key occupations
- Identify skill shortages and priority occupations for forward planning, and
- Enable the mapping of jobs in declining sectors to renewable energy jobs to identify opportunities for redeployment and retraining.

Your participation

The survey will take approximately 30-45 minutes. The survey includes questions on the number and type of jobs for employees, contractors and apprentices across the supply-chain for hydro energy and storage. The questions cover skills shortages and recruitment issues in addition to employment numbers.

The data you provide will be aggregated with other survey responses and used in combination with other data sources in a spreadsheet model to develop overall employment estimates. Your answers will not be directly quoted or released. No commercial in confidence or personally identifiable information will be included in the study report or any other publication, and these publications will not identify you or your organisation in any way.

Outputs

The purpose of this survey is to collect data on renewable energy employment. A final report will be presented to the CEC which is intended to be released publicly.

This evaluation is led by project director Dr Chris Briggs (+61 477 301 892). The survey is being distributed by the CEC.

Research ethics

Studies undertaken by the Institute for Sustainable Futures have been approved in principle by the University of Technology Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact the ISF Ethics Coordinator, Federico Davila (0403 657 124) or the ISF Responsible Academic, Dr Keren Winterford (0418 910 800).

You may also contact the UTS Ethics Committee through the Research Ethics Officer (02 9514 9772, Research.Ethics@uts.edu.au). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

By completing the survey you agree to the provisions of the research conduct as outlined above. Thank you for participating in our survey. Your feedback is important.

Market Sectors

In which parts of the supply chain are you able to answer questions on typical project capacities, employee numbers and roles? Please tick all that apply.

APPENDIX 5 HYDRO SURVEY

	Manufacturing	Development (pre-financial close)	Construction (civil work)	Construction (electrical)	Construction (mechanical)	Operation & Maintenance (including asset management)	F
Large hydro (>50 MW)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Small hydro (< 50 MW)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Large pumped hydro (>50 MW)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Small pumped hydro (<50 MW)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Total Employment

On average, what was the total number of workers currently engaged in **hydro** activities in your business (Full time equivalent, FTE) in the last financial year (2018-19) in Australia?

So for example if 3 people were employed for 6 months each, it would be 1.5 FTE.

Please include both employees & contractors.

	Number (FTE)
Employees	<input style="width: 50px; height: 20px;" type="text"/>
Contractors	<input style="width: 50px; height: 20px;" type="text"/>

Approximately what proportion of your workforce is engaged in **hydro** activities? (please consider both employees and contractors)

0 10 20 30 40 50 60 70 80 90 100

0 10 20 30 40 50 60 70 80 90 100

Hydro activities



How many MW of hydro did your organisation have under development, construction or operating and maintaining in the last financial year 2018-19?

	Development	Construction	Operating & Maintaining
» Large hydro (>50 MW)	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Small hydro (< 50 MW)	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Large pumped hydro (>50 MW)	<input type="text"/>	<input type="text"/>	<input type="text"/>
» Small pumped hydro (<50 MW)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Recruitment

Did you recruit any hydro staff during 2018/19?

Yes

No

In which states did you recruit staff during financial year 2018/19?

- None
- NSW or ACT
- Victoria
- South Australia
- Queensland
- Tasmania
- Western Australia
- Northern Territory

APPENDIX 5 HYDRO SURVEY

For each of the following jobs, please indicate if you have attempted to recruit workers into these positions in the past 12 months and your experience with recruitment in **Australia**.

Please fill in for all roles, skills and qualifications you recruited for in the last financial year.

Low Difficulty: Able to find the workers we need in Australia within 4 weeks or less

Medium Difficulty: Able to find the workers we need in Australia within 5 - 8 weeks

High Difficulty: Unable to find workers we need in Australia within 2 months

Note: the time period applies to search (i.e. doesn't mean physical placement which may take longer due to notice requirements etc).

	Low difficulty	Medium difficulty	High difficulty
Construction Managers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operations Manager	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Surveyors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Civil Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grid Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mechanical Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SCADA Engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community engagement professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental health and safety assessment professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site supervisors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Civil engineering technicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical technicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SCADA technicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Power plant / control room operators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carpenters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Plumbers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electricians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX 5 HYDRO SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy or hydro projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but it was longer employment
Plumbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electricians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steel fixers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Truck drivers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concreters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Riggers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did you have the same experience recruiting for these jobs and skill shortages across all states or were there different experiences in recruitment for one or more states?

- Yes
- No

For which states did you have a different experience?

- » None
- » NSW or ACT
- » Victoria
- » South Australia
- » Queensland
- » Tasmania
- » Western Australia
- » Northern Territory

NOTE: SURVEY REPEATS RECRUITMENT DIFFICULTY QUESTIONS FOR RELEVANT STATES IF RESPONDENT IDENTIFIES DIFFERENT EXPERIENCE

APPENDIX 5 HYDRO SURVEY

	Not enough candidates with the right qualifications / licenses	Not enough candidates with general experience	Not enough candidates with specific experience in renewable energy projects	Suitable candidates but they wanted higher pay	Difficulty attracting suitable candidates for projects in regional or remote locations	Suitable candidates but it would take longer to employ
» Plumbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Electricians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Steel fixers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Truck drivers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Concreters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Riggers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
» Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>						

Apprentices & Traineeships

Did you employ apprentices or trainees during 2018-19 financial year?

Yes

No

How many apprentices did you have during financial year 2018/19? (FTE equivalent)

	Numbers
Civil labourers	<input type="text"/>
Electrician	<input type="text"/>
Engineering - Electrical Trade	<input type="text"/>
Electrical supply industry - Power systems	<input type="text"/>
Electrical supply industry - Wind generation	<input type="text"/>
Electrical/electro-technology - Renewable Energy	<input type="text"/>

APPENDIX 5 HYDRO SURVEY

Numbers

Electrical - PV

Others (please specify)

How many trainees did you have during financial year 2018/19? (FTE equivalent)

Numbers

Concreter

Dogger

Rigging

Scaffolder

Business administration

Others (please specify)

What market sectors did they work in (please tick all that apply)?

- » Large hydro (>50 MW)
- » Small hydro (< 50 MW)
- » Large pumped hydro (>50 MW)
- » Small pumped hydro (<50 MW)

Manufacturing

Which of the following products does your organisation manufacture for hydro generation or storage projects?

- | | |
|---|---|
| <input type="checkbox"/> Pipes | <input type="checkbox"/> Cabling |
| <input type="checkbox"/> Valves | <input type="checkbox"/> Cement |
| <input type="checkbox"/> Pumps/ turbines | <input type="checkbox"/> Steel reinforcing |
| <input type="checkbox"/> Generators/ motors | <input type="checkbox"/> Software |
| <input type="checkbox"/> Transformers | <input type="checkbox"/> Other (please specify) |
| | <input type="text"/> |

APPENDIX 5 HYDRO SURVEY

Approximately how many MW of hydro capacity did your organisation manufacture products for during the last financial year (2018-19)? If you don't know the capacity, please fill in an alternative measure.

Note the survey is only collecting data on manufacturing which occurs in Australia.

	MW hydro manufactured	Alternate measure if you don't know the MW
» Pipes	<input type="text"/>	<input type="text"/>
» Valves	<input type="text"/>	<input type="text"/>
» Pumps/ turbines	<input type="text"/>	<input type="text"/>
» Generators/ motors	<input type="text"/>	<input type="text"/>
» Transformers	<input type="text"/>	<input type="text"/>
» Cabling	<input type="text"/>	<input type="text"/>
» Cement	<input type="text"/>	<input type="text"/>
» Steel reinforcing	<input type="text"/>	<input type="text"/>
» Software	<input type="text"/>	<input type="text"/>
» Other (please specify) <input type="text"/>	<input type="text"/>	<input type="text"/>

Employment for a specific hydro project

Please now consider a major project for your organisation.

Choose whatever size and type you are most familiar with - it could be a project under development, in construction, or a planned future project. For some organisations, a planned future project may be a new development but for others a major refurbishment of an existing scheme is more common.

If you are able to answer for more than one size or type you will get the opportunity to answer for a second project.

The aim of these questions is to determine employment per MW for additional hydro capacity.

How many MW is your project ?

Is it a refurbishment of an existing scheme, an extension, or entirely new?

- Major rehabilitation/ refurbishment (please note which hydro it is refurbishing)
- Extension (please specify which hydro it extends)
- New

What are the major activities of the project?

What is the type of project?

- Pumped storage
- Generation
- Both pumped storage & generation
- Other (please specify)

Is the generation element :

- Impoundment
- Diversion
- Run of river
- Other (please specify)

How much storage is associated with the hydro, and what is the head?

MWh Storage

APPENDIX 5 HYDRO SURVEY
Storage

Head (metres)

If the hydro plant you are describing is entirely new, how would you characterise it?

- Seawater
- Disused mine
- Other (please specify)

How many years do you expect for each phase for the hydro project you are describing ?

	Years	Months
Development (pre-construction)	<input type="text"/>	<input type="text"/>
Construction	<input type="text"/>	<input type="text"/>

How often would you expect your hydro project to need such a Major Refurbishment Project to occur?

On average, what proportion of the following inputs do you **expect** to source from Australian suppliers for projects under development? (please enter the percentage as a number between 0 & 100).

	%
Pipes	<input type="text"/>
Valves	<input type="text"/>
Pumps/ turbines	<input type="text"/>
Generators/ motors	<input type="text"/>
Transformers	<input type="text"/>
Cabling	<input type="text"/>
Cement	<input type="text"/>
Steel reinforcing	<input type="text"/>
Software	<input type="text"/>

Other - please list any other components you purchase from Australian suppliers and the approximate percentage for each one that you source on-shore

Please list your main Australian suppliers you might expect to use, if you feel comfortable doing so (we would like to ask them about employment in manufacturing and supply).

Pipes

Valves

Pumps/ turbines

Generators/ motors

Transformers

Cabling

Cement

Steel reinforcing

`#{q://QID84/ChoiceTextEntryValue/9}`

Job Types

We are now going to ask questions about the number of workers, on average, you would expect to be engaged per year for the **typical hydro** project:

- managers & administrators;
- professionals;
- technicians & trades; and
- machine operators, drivers & labourers.

Please read through the full list of jobs below before answering as it will make it easier to place jobs, and include both employees and contractors.

APPENDIX 5 HYDRO SURVEY

On average, how many **Managers and Administrative support staff** would you expect to be engaged per year for your typical hydro project. Please enter:

- the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your typical hydro project; and

- the percentage of jobs you expect to be local to the site (local is defined as within 100km of the project).

Note to be defined as a manager they should usually have internal staff that report to them.

	Managers & administrative jobs	% of workers local to the project (defined as within 100 km)
Development	<input type="text"/>	<input type="text"/>
Construction	<input type="text"/>	<input type="text"/>
O&M / maintenance/ asset management	<input type="text"/>	<input type="text"/>

For each of the following **Managerial & Administrative** jobs, please enter the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your typical hydro project.

	Development	Construction (includes O&M major refurb)	Operations and Maintenance/ asset management
Executives/General Mangers	<input type="text"/>	<input type="text"/>	<input type="text"/>
HR, Finance & Business administration managers (etc)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Commercial & Business Development Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Construction / Project managers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Site Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Operations Managers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Asset managers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other management jobs (please specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>			

APPENDIX 5 HYDRO SURVEY
 Construction (includes O&M major refurb) Operations and Maintenance/ asset management

	Development	Construction (includes O&M major refurb)	Operations and Maintenance/ asset management
Office managers/contract administrators	<input type="text"/>	<input type="text"/>	<input type="text"/>
Project Control Officer	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other administrative jobs (please specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>			

On average, how many **Professionals** would you expect to be engaged per year for your typical hydro project. Please enter:

- the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your typical hydro project; and

- the percentage of jobs you expect to be local to the site (local is defined as within 100km of the project).

	Professionals	% of workers local to the project (defined as within 100 km)
Development	<input type="text"/>	<input type="text"/>
Construction	<input type="text"/>	<input type="text"/>
O&M and/or Asset Management	<input type="text"/>	<input type="text"/>

For each of the following **Professional** jobs, please enter the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your hydro project

	Development (pre financial close)	Construction	O&M and/or Asset Management
HR, finance and accounting professionals	<input type="text"/>	<input type="text"/>	<input type="text"/>
Legal & planning assessment professionals	<input type="text"/>	<input type="text"/>	<input type="text"/>
Civil Engineer	<input type="text"/>	<input type="text"/>	<input type="text"/>
Mechanical Engineer	<input type="text"/>	<input type="text"/>	<input type="text"/>
Electrical engineers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Grid Engineer	<input type="text"/>	<input type="text"/>	<input type="text"/>

APPENDIX 5 HYDRO SURVEY

Development (pre financial close)

Construction

O&M and/or Asset Management

Scada Engineers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Surveyors	<input type="text"/>	<input type="text"/>	<input type="text"/>
Land developers	<input type="text"/>	<input type="text"/>	<input type="text"/>
GIS Specialist	<input type="text"/>	<input type="text"/>	<input type="text"/>
Environment, Health & Safety professionals	<input type="text"/>	<input type="text"/>	<input type="text"/>
Community engagement	<input type="text"/>	<input type="text"/>	<input type="text"/>
Power plant/control room operator	<input type="text"/>	<input type="text"/>	<input type="text"/>
Transport & Logistics	<input type="text"/>	<input type="text"/>	<input type="text"/>
Sales & trading	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other professionals (please specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>			

On average, how many **Trades and Technicians** would you expect to be engaged per year for your typical hydro project. Please enter:

- the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your typical hydro project; and

- the percentage of jobs you expect to be local to the site (local is defined as within 100km of the project).

	Trades & Technicians	% of workers local to the project (defined as within 100 km)
Development	<input type="text"/>	<input type="text"/>
Construction	<input type="text"/>	<input type="text"/>
O&M or asset Management	<input type="text"/>	<input type="text"/>

For each of the following **Trades & Technicians** jobs, please enter the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your typical hydro project

Development	Construction	O&M or asset management
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APPENDIX 5 HYDRO SURVEY

O&M or asset
management

	Development	Construction	O&M or asset management
Electrical technician (e.g. grid commissioning)	<input type="text"/>	<input type="text"/>	<input type="text"/>
SCADA technician	<input type="text"/>	<input type="text"/>	<input type="text"/>
Civil engineering technician	<input type="text"/>	<input type="text"/>	<input type="text"/>
Site supervisors	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other technicians (please specify) <input style="width: 200px;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Electricians	<input type="text"/>	<input type="text"/>	<input type="text"/>
Plumbers	<input type="text"/>	<input type="text"/>	<input type="text"/>
Carpenters	<input type="text"/>	<input type="text"/>	<input type="text"/>
Metal trades	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other trades (please specify) <input style="width: 200px;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

On average, how many **Machine Operator, Driver and Labourer** jobs would you expect to be engaged per year for your typical hydro project. Please enter:

- the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your typical hydro project; and

- the percentage of jobs you expect to be local to the site (local is defined as within 100km of the project).

	Machine operators, drivers & labourers	% of workers local to the project (defined as within 100 km)
Development	<input type="text"/>	<input type="text"/>
Construction	<input type="text"/>	<input type="text"/>
O&M or asset management	<input type="text"/>	<input type="text"/>

For each of the following **Machine Operator, Driver and Labourer** jobs, please enter the number of full time equivalent (FTE) jobs (including contractors) you would expect to be engaged per year for your typical hydro project

APPENDIX 5 HYDRO SURVEY

Construction (includes O&M major refurb) O&M or asset management

Crane Hoist Operators	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Earthmoving, grader operations	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Forklift operators	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Drivers (trucks, vans)	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Other drivers & machine operators (please specify)	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
<input style="width: 230px; height: 20px;" type="text"/>		
Concreters	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Riggers	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Dogmen	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Mechanical labourers	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Civil labourers/trades-assistants	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Electrical trade assistants	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
General labourers	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Steel fixers	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
Other labourers (please specify)	<input style="width: 60px; height: 25px;" type="text"/>	<input style="width: 60px; height: 25px;" type="text"/>
<input style="width: 230px; height: 20px;" type="text"/>		

For the project you've just been describing, what proportion of jobs do you think you were able to capture?

None of them All of them

0 10 20 30 40 50 60 70 80 90 100

- » Manufacturing
- » Development (pre-financial close)
- » Construction (civil work)
 - » Construction (electrical)
 - » Construction (mechanical)

None of them All of them
 0 10 20 30 40 50 60 70 80 90 100

» Operation & Maintenance
 (including asset management)

» Rehabilitation / refurbishment major projects



Please give us any additional information about the types of jobs you weren't able to include.

Employment for a second hydro project

Would you like to answer questions for a second hydro project?
 (There won't be as much detail as for the last one)

Yes

No

How many MW is your second project ?

Is it a refurbishment of an existing scheme, an extension , or entirely new?

Major rehabilitation/ refurbishment (please note which hydro it is refurbishing)

Extension (please specify which hydro it extends)

New

What are the major activities of the project?

What is the type of project?

- Pumped storage
- Generation
- Both pumped storage & generation
- Other (please specify)

Is the generation element :

- Impoundment
- Diversion
- Run of river
- Other (please specify)

How much storage is associated with the hydro, and what is the head?

	Storage
MWh	<input style="width: 50px; height: 20px;" type="text"/>
Head (metres)	<input style="width: 50px; height: 20px;" type="text"/>

If the hydro plant you are describing is entirely new, how would you characterise it?

- Seawater
- Disused mine
- Other (please specify)

APPENDIX 5 HYDRO SURVEY

How many years do you expect for each phase for the hydro project you are describing ?

	Years	Months
Development (pre-construction)	<input style="width: 50px; height: 25px;" type="text"/>	<input style="width: 50px; height: 25px;" type="text"/>
Construction	<input style="width: 50px; height: 25px;" type="text"/>	<input style="width: 50px; height: 25px;" type="text"/>

How often would you expect your hydro project to need such a Major Refurbishment Project to occur?

Job Types for Second Hydro project

On average, how many **Managers and Administrators** would you expect to be engaged per year for your hydro project ; please answer in terms of full time equivalent (FTE) jobs (including contractors).

Note to be defined as a manager they should usually have internal staff that report to them.

	Managers & administrative jobs	% local to the project (defined as within 100 km)
Development	<input style="width: 50px; height: 25px;" type="text"/>	<input style="width: 50px; height: 25px;" type="text"/>
Construction	<input style="width: 50px; height: 25px;" type="text"/>	<input style="width: 50px; height: 25px;" type="text"/>
O&M / maintenance/ asset management	<input style="width: 50px; height: 25px;" type="text"/>	<input style="width: 50px; height: 25px;" type="text"/>

On average, how many **Professionals** would you expect to be engaged per year for your typical hydro project. Please answer in terms of full time equivalent (FTE) jobs (including contractors).

	Professionals	% local to the project (defined as within 100 km)
Development	<input style="width: 50px; height: 25px;" type="text"/>	<input style="width: 50px; height: 25px;" type="text"/>
Construction	<input style="width: 50px; height: 25px;" type="text"/>	<input style="width: 50px; height: 25px;" type="text"/>

APPENDIX 5 HYDRO SURVEY
 % local to the project (defined as within 100 km)

	Professionals	% local to the project (defined as within 100 km)
O&M and/or Asset Management	<input type="text"/>	<input type="text"/>

On average, how many **Trades and Technicians** would you expect to be engaged per year for your typical hydro project. Please answer in terms of full time equivalent (FTE) jobs (including contractors).

	Trades & Technicians	% local to the project (defined as within 100 km)
Development	<input type="text"/>	<input type="text"/>
Construction	<input type="text"/>	<input type="text"/>
O&M or asset Management	<input type="text"/>	<input type="text"/>

On average, how many **Machine Operator, Driver and Labourer jobs** would you expect to be engaged per year for your typical hydro project. Please answer in terms of full time equivalent (FTE) jobs (including contractors).

	Machine operators, drivers & labourers	% local to the project (defined as within 100 km)
Development	<input type="text"/>	<input type="text"/>
Construction	<input type="text"/>	<input type="text"/>
O&M or asset management	<input type="text"/>	<input type="text"/>

For the project you've just been describing, what proportion of jobs do you think you were able to capture?

None of them	All of them
0	100
10	90
20	80
30	70
40	60
50	50
60	40
70	30
80	20
90	10

- » Manufacturing
- » Development (pre-financial close)
- » Construction (civil work)

APPENDIX 5 HYDRO SURVEY

None of them 0 10 20 30 40 50 60 70 80 90 100 All of them

- » Construction (electrical)
- » Construction (mechanical)
- » Operation & Maintenance (including asset management)
- » Rehabilitation / refurbishment major projects



Please give us any additional information about the types of jobs you weren't able to include.

Wrap Up

Are there any other workforce recruitment, skills or training issues you would like to highlight?

Can we contact you again if we have follow up questions?

Yes

No

Would you like a copy of the report on renewable energy employment (solar, wind, hydro and batteries) when it comes out?

Yes

No

To win two full conference tickets to the Australian Clean Energy Summit 2020 as well as a table for 10 people at the Australian Clean Energy Summit gala dinner (total value \$7,315 inc. GST), tell us what your ultimate Australian Clean Energy Summit session includes

(name of session/speakers/panel/content/you decide)

Please give us your contact details

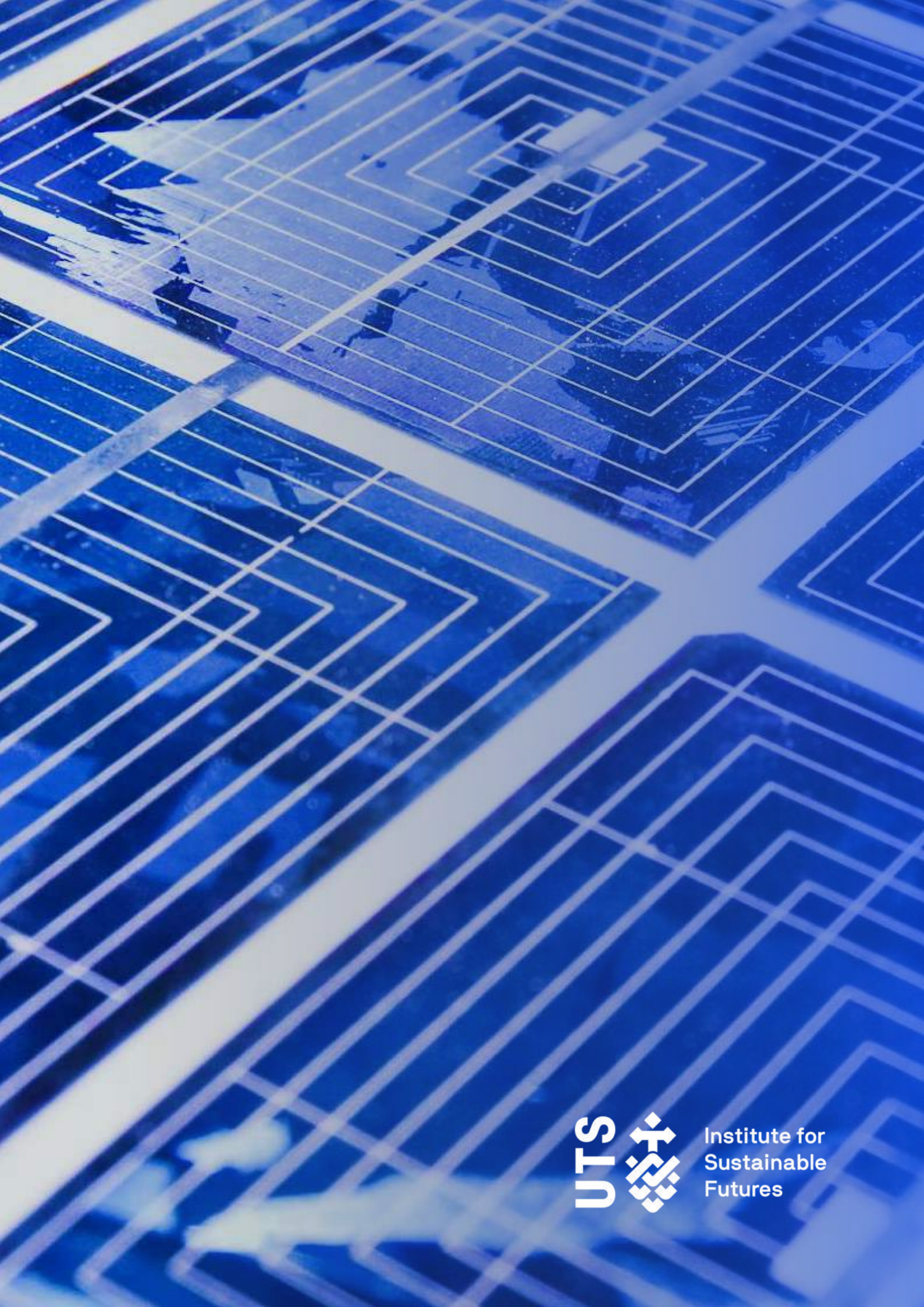
Details

Name

Organisation

Email

Telephone



Institute for
Sustainable
Futures