BIOFUTURES- Additional Industries (Wind, Solar and Waste to Energy)

Market Capability Assessment Report 2018

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Industry Capability Network (ICN) Queensland

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An activity procured by Queensland Government
ICN Industry Capability Network

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The purpose of this report is to showcase the capabilities of Engineering Procurement and Construction (EPC) Contractors with bases in Queensland to build Wind and Solar power generation projects. The report also covers EPCs based in Australia, who are capable of building waste to energy projects. The research and analysis performed by the ICN relies wholly on information available from the ICN Gateway database, business websites, capability statements, media statements and information available online. Detailed and/or independent verification of this data has not been undertaken by the ICN as part of this project.

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When contacting any of the businesses nominated within the report, it would be appreciated if the reader could identify the ICN as the source of information.

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TERMS OF REFERENCE

ICN Queensland was contracted by the Queensland Government's Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) to develop a list of companies with the capability to act as Engineering, Procurement and Construction (EPC) contractors for;

- Solar and Wind power generation projects with operating office(s) in Queensland and;
- Waste to Energy generation projects with operating office(s) in Australia.

The scope of the work to be undertaken by ICN included;

- Identifying Queensland and Australian companies with the capabilities to execute an EPC contract for a Wind, Solar and Waste to Energy generation including;
    - Previous EPC experience in such projects, if available.
    - Information on previous successful work including the type and size of the construction
- Where the companies are based (operational locations) and primary contact details listed for companies on ICN gateway company profile

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1 SUMMARY

1.1 ACTIVITY OVERVIEW

As a part of the Advance Queensland program several of Queensland's industry sectors were identified as emerging priority industries to be supported by the government to build their competitive strengths and create the knowledge-based jobs of the future. Biofutures is one of the targeted priority industries. To assist this industry to realise its potential and become a major contributor to jobs and the economy, the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) intends to showcase the capabilities of Engineering, Procurement and Construction (EPC)[1] contractors with operations in Queensland to build Biorefineries in Queensland. In addition to the above exercise and due to synergies between Bio Refineries and other industries viz Renewables and Waste to Energy, ICN has been requested to analyse the data on historical engagement with proponents in this space.

ICN Queensland was contracted by DSDMIP to develop a list of companies with the capability to build Solar, Wind and Waste to Energy power generation projects as EPC.

The scope of the work to be undertaken by ICN included;

- Identifying Queensland companies with the capabilities to execute an EPC contract for a Wind, Solar and Australian companies to execute EPC contact for Waste to Energy generation including;
    - Previous EPC experience in such projects, if available.
    - Information on previous successful work including the type and size of the construction, if available.
- Where the companies are based (operational locations) and primary contact details listed for companies on ICN gateway company profile

[1] See Appendix G “Definitions”

2 OBJECTIVE AND METHODOLOGY

2.1 OBJECTIVE

The purpose of this report is to provide DSDMIP with a tool to showcase the capabilities of Engineering Procurement and Construction (EPC) Contractors with operating office(s) in Queensland to build Wind and Solar power generation projects. Also, showcase capabilities of EPCs with operating office(s) in Australia to build Waste to Energy generation projects.

2.2 PROCEDURE

The following process was followed during the execution of this market analysis and report:

Step 1	Report outline was developed to deliver report covering the objective of the activity and outcome requested
Step 2	To identify and develop a list of EPCs with the capability to build Wind, Solar and Waste to Energy projects, following resources were used; - EPCs/Project owners for whom ICN has worked in Solar, Wind and Waste to Energy power generation companies. - Search for EPCs for projects listed in Bureau of Resources and Energy Economics' list of major electricity generation projects. - Search for EPCs for operational projects listed in online resource like Wikipedia - Information on companies' website of their capability in Solar, Wind and Waste to Energy projects.
Step 3	Company profiles of companies identified in step 2 on ICN database were reviewed and updated with current publically available information. The companies not already registered were added into ICN database with publically available information.
Step 4	Capability matrix was created and included in the report
Step 5	Abridged company details developed and included in the report

3 MARKET CAPABILITY ASSESSMENT

3.1 OVERVIEW

26 companies capable of executing EPC contract for either Wind, Solar or Waste to Energy generation projects were identified. Some large EPC companies have capabilities to execute such EPC contract by more than one such process.

10 companies with capability and experience to build Wind projects and have their operating office(s) in Queensland.
11 companies with capability and experience to build Solar projects and have their operating office(s) in Queensland.
14 companies with capability to build Waste to Energy projects have their operating office(s) in Australia.

A summary showing companies with capabilities to execute EPC contract in Wind, Solar and Waste to Energy projects are listed in the matrix below.

Table 3.1-1: Matrix for companies capable of executing EPC contract for Wind, Solar and Waste to Energy projects

Company	Office(s) in QLD	Solar Power	Wind Power	Waste to Energy	Website URL
ACCIONA ENERGY AUSTRALIA GLOBAL PTY LTD	Yes	Y	Y		http://www.acciona.com.au/business-divisions/energy/
AQUATEC MAXCON	Yes			Y	http://www.aquatecmaxcon.com.au
BECA PTY. LTD.	Yes	Y	Y		www.beca.com
BGC CONTRACTING PTY LTD	No			Y	www.bgc.cc
BLUE TONGUE ENERGY PTY LTD	Yes			Y	www.btenergy.com.au
BMD CONSTRUCTIONS PTY LTD	Yes		Y		www.bmd.com.au
BOUYGUES CONSTRUCTION AUSTRALIA PTY LTD	Yes	Y			www.bouygues-construction.com.au
CPB CONTRACTORS PTY LIMITED	Yes		Y		www.cpbcon.com.au
DOWNER EDI LIMITED	Yes	Y	Y	Y	https://www.downergroup.com/renewables
ENEA CONSULTING PTY LTD	Yes			Y	http://www.enea-consulting.com/en
ENTURA	Yes		Y		www.entura.com.au
FINN BIOGAS PTY LTD	Yes			Y	http://www.finnbiogas.com/
GENERAL ELECTRIC INTERNATIONAL INC	No	Y			https://www.ge.com/renewableenergy
GPA ENGINEERING PTY LTD	Yes		Y		http://www.gpaeng.com.au/industry/renewable/

Company	Office(s) in QLD	Solar Power	Wind Power	Waste to Energy	Website URL
GREEN LIGHT CONTRACTORS PTY. LTD.	No	Y			Not Available
HITACHI ZOSEN INOVA AUSTRALIA PTY LIMITED	No			Y	http://www.hz-inova.com/cms/en/home?page_id=217
JOHN HOLLAND PTY LTD	No	Y	Y	Y	https://www.johnholland.com.au/what-we-do/industry-sectors/power-energy/
JUSTSEN PACIFIC	Yes			Y	https://justsenpacific.com/
JUWI RENEWABLE ENERGY PTY LTD	Yes	Y			http://www.juwi.com.au/solar-energy/epc/
NEW ENERGY CORPORATION PTY LTD	Yes			Y	http://www.newenergycorp.com.au
OMEGA ENERGY PTY LTD	Yes			Y	http://www.omegaenergy.com.au
PYROCAL PTY LTD				Y	https://www.pyrocal.com.au
RICARDO ENERGY AND ENVIORNMENTAL	Yes			Y	https://ee.ricardo.com/
RCR TOMLINSON LTD		Y	Y	Y	www.rcrtom.com.au
THYSSENKRUPP INDUSTRIAL SOLUTIONS (AUSTRALIA) PTY LTD				Y	www.thyssenkrupp-industrial-solutions-australia.com
UGL ENGINEERING PTY LIMITED		Y			www.ugllimited.com
WBHO INFRASTRUCTURE PTY LTD		Y	Y		www.wbho.com.au

4 ABRIDGED COMPANY DETAILS

This section contains company profile information of 21 companies, who have capability and experience to execute EPC contract for either Wind, Solar or Waste to Energy generation project.

4.1 ACCIONA ENERGY AUSTRALIA GLOBAL PTY LTD

Business Details	
ABN	54600910647
ICN Primary Contact	Angela Nham Mob: 61 04 09182262 Email: Angela.nham@acciona.com
QLD / Australia Office address	Level 5, 88 Creek Street BRISBANE QLD 4000 Australia Ph: 61 07 30874333 Fax: 61 07 30874334 Email: energy.brisbane@acciona.com
Website	http://www.acciona.com.au/business-divisions/energy/
Employees	Not available
Turnover $	Not available
Summary	ACCIONA Energy is a major player in the renewable energy market, with a strong presence in over 15 countries on five continents. The company works exclusively with renewable technologies, specifically in five of them - wind, solar PV, solar thermal, hydro and biomass. It has nearly 8,600 megawatts (MW) in property which annually produces more than 21 terawatt hours (TWh) of emissions-free electricity, equivalent to the consumption of more than six million homes. The company also undertakes projects for third parties, for which it has installed nearly 2,000 MW. ACCIONA carries out projects both for the company and for third parties. Based on its experience of over 20 years in the field of renewable energy, the company provides reliable and efficient solutions based on cutting-edge technologies. ACCIONA makes its technological capabilities available to customers at any stage of a wind or PV project, from resource assessment, processing, engineering, design, construction, operation and maintenance, which includes all the services included in EPC (engineering, procurement and construction) contracts or other types of contract.
Relevant Project Experience	Project Year: Not Available Project Name: MT GELLIBRAND WIND FARM Client Name: N/A

Business Details	
	Brief Scope: Mount Gellibrand Wind Farm will be located 25 kilometres east of Colac and 17km west of Winchelsea in the Colac Otway Shire on Victoria's Western Plains. The wind farm will be constructed around the southern and western sides of Mt Gellibrand itself. These open and partly elevated plains make the site an ideal location for a wind farm Project Value: AUD$250,000,000 Project Year: 2007 Project Name: CATHEDRAL ROCKS WIND FARM Client Name: Joint venture between ACCIONA Energy and EnergyAustralia Brief Scope: Location near the southern tip of the Eyre Peninsula in South Australia, approximately 28 km south-west of Port Lincoln Capacity 64 MW, using 32 Vestas 2MW wind turbine generators. May 2007 Energy production Meets the energy needs of approximately 35,000 households each year. Projected CO2 Emmision benefit : Approximately 150,000 tonnes annually Job Creation : 85 manufacturing and installation jobs during construction from July 2004 to February 2007. Project Value: AUD$200,000,000 Project Year: 2009 Project Name: WAUBRA WIND FARM Client Name: N/A Brief Scope: Location : Approximately 35 kilometres north-west of Ballarat in Victoria. Capacity: 192 MW, using 128 ACCIONA Windpower 1.5MW wind turbine generators. Completion date :July 2009 Energy production :Meets the energy needs of approximately 120,000 households each year Projected CO2 emissions benefit : Approximately 650,000 tonnes annually Job creation :200 manufacturing and installation jobs during construction from December 2007 to June 2009. A number of operations and maintenance roles will exist throug Project Value: AUD$450,000,000 Project Year: 2011 Project Name: GUNNING WIND FARM Client Name: N/A Brief Scope: Location :Approximately 35 kilometres north-east of Gunning and 70 km north-east of Canberra Capacity 46.5 MW (31 wind turbine generators)

Business Details	
	Completion date May 2011 Energy production :Gunning Wind Farm can power 23,250 homes annually Projected CO2 Emission benefit :160,000 tonnes Job Creation :100 manufacturing and installation jobs were created during the construction phase. A number of operations and maintenance roles will exist throughout the operation of the wind farm. Project Value: AUD$150,000,000 Project Year: 2014 Project Name: RFV 20 MW ROYALLA SOLAR FARM Client Name: FRV Brief Scope: Location :Approximately 23 kilometres south of Canberra, ACT, Australia Peak Capacity :24 MWp Nominal Capacity :20 MW Technology : Photovoltaic solar with fixed structures Operation Commisisioned :August 2014 Owner :FRV Contrator :ACCIONA Energy Energy production :Approximately 4,500 homes Project Value: Not Available Project Year: 2014 Project Name: BERRIMAL WIND FARM Client Name: N/A Brief Scope: Location: Approximately 16 km west of Wedderburn and 19 km south of Charlton, within the Buloke Shire. Project Configuration: Up to 24 turbines Expected capacity: 72 MW Energy production: Equivalent to 36,000 households Project value: A$150M Project Value: AUD$150,000,000 Project Year: 2018 Project Name: MORTLAKE SOUTH WIND FARM Client Name: N/A Brief Scope: Location :Approximately 5km south of the Mortlake township, within the Moyne Shire Project Configuration :Up to 42 turbines. Maximum Tip height: 186 metres Anticipated construction completion :October 2020 Project Value: AUD$250,000,000

Business Details	
	Project Year: 2018 Project Name: KERANG SOLAR FARM Client Name: N/A Brief Scope: Location Kerang, Victoria Expected Capacity :Up to 40 MW Project Value :A$55M Anticipated construction completion :Late 2019 Construction duration :Approx. 9 months Project Value: AUD$50,000,000

4.2 AQUATEC MAXCON

Business Details	
ABN	45002250482[2]
ICN Primary Contact	Anthony Davey Manager P: +61 3 9480 8000 e-mail- anthonyd@aquatecmaxcon.com.au
QLD / Australia Office address	119 Toongarra Road, Wulkuraka QLD 4305 Australia TELEPHONE: +61 (0) 7 3813 7100 FACSIMILE: +61 (0) 7 3813 7199
Website	http://www.aquatecmaxcon.com.au
Employees	210
Turnover $	70,000,000
Summary	Aquatec Maxcon Pty Ltd designs and/or manufactures water and waste water treatment products and solutions. We work with commercial builders, water councils and municipalities, oil and gas and mining clients. We have supplied 1000+ large scale water sewage plants in Australia, New Zealand and Indonesia since 1970. We are fully integrated from design and construction to commissioning and operation. We have been a principal constructor for projects. We sell over 90 products and equipment ranging from $20,000 to $5 million. We can project manage up to $20 million. We hold international third party accreditation for safety, quality and environment.
Relevant Project Experience	Client : Yarra Valley Water Location : Wollert, VIC Service : Waste to Energy Capacity : 100m3 of waste This project was developed over three years, from feasibility through to detailed design, in a collaborative partnership with Yarra Valley Water who were seeking an innovative solution. The project drivers were sustainability, reduction of greenhouse gases and additional revenue sources from normal water projects. The WTE facility was designed and built within 15 months and has been successfully operating since May 2017. Aquatec Maxcon has built upon innovative

[2] Aquatec maxcon has been added to the report based on feedback from DSDMIP

Business Details	
	ideas and waste to energy products as part of the vision to provide innovative and sustainable technology to the Australian water industry. Aquatec Maxcon has always considered that digesters are an under-utilised asset in Australia and partnered with Weltec Bio Power, a German company specializing in building Waste to Energy facilities with over 10 years of experience. Weltec has built over 300 biogas installations across Europe, the United States, China and Japan and is a pioneer in the field of biogas plants. The Waste to Energy (WtE) facility was designed to generate electricity by feeding organic waste, typically disposed to landfill, into a biological process and using the methane-rich biogas produced to fuel generators. The WtE facility will receive 100t of waste each day and produces approximately 1MW of electricity; enough to provide its own power, as well as supply the adjacent sewage treatment plant at Aurora, with the excess electricity exported to the grid as renewable energy. As the designer and technology provider on the project, Aquatec Maxcon's scope of works included design and construction of all civil works; and design, installation, and commissioning of all mechanical and electrical works, HV, procurement and installation of cogeneration plant. The facility consists of: • A weighbridge to weigh incoming and outgoing waste trucks; • A waste receival and processing building where trucks deliver waste which is then prepared for the next stage of the process; • Two process tanks (digesters) (~3.6ML each); • Four liquid waste storage tanks (~0.08ML each); • One weekend waste storage tank (~0.3ML), for temporary storage of wastes during times when the facility is unmanned; • A pasteurisation system for treating the waste following the digestion stage; • A residual storage tank (digestate storage) (~4.5ML). This tank stores the fully treated residual matter (digestate). • Space for an additional digestate storage tank if approval is obtained to sell the digestate as a soil amendment for agriculture; • Two Combined Heat and Power (CHP) biogas engines (generators) capable of using the biogas produced by the digesters to create electricity. Each engine can produce up to 530kW; • One biogas flare to be used in rare situations when the biogas cannot be supplied to the engines;

4.3 BECA PTY. LTD.

Business Details	
ABN	85004974341
ICN Primary Contact	Mr Gareth McSweeney Ph: 61 3 92721573 Mob: 61 439 149787 Email: gareth.mcsweeney@beca.com
QLD / Australia Office address	825 Ann Street Level 4 FORTITUDE VALLEY QLD 4006 Australia Ph: 61 7 37330600 Fax: 61 13 00262714 Email: info@beca.com
Website	www.beca.com
Employees	3,000
Turnover $	3,00,000,000
Summary	A multi-disciplinary consulting and engineering organisation with over 2,500 employees working from 20 offices across Asia Pacific.
Relevant Project Experience	Project Year: 2010 Project Name: Mt Mercer Wind Farm Client Name: Meridian Energy Westwind Energy Brief Scope: Mt Mercer Wind Farm is located over a 2,600 hectare site south of Ballarat, Victoria. 64 wind turbines, each rated at 2.05MW, give a total wind farm capacity of 131.2MW. Beca were engaged to provide power dystems engineering to the project. Project Value: Not available

4.4 BGC CONTRACTING PTY LTD

Business Details	
ABN	88008766407
ICN Primary Contact	Mrs Rochan Blunt Submissions Manager Ph: 61 8 92602282 Email: rblunt@bgc.cc rblunt@bgc.cc
QLD / Australia Office address	143 Coronation Drive Level 3 MILTON QLD 4064 Australia Ph: 61 7 35137800 Fax: 61 7 35137890 Email: contractingQLD@bgc.cc Web: www.bgc.cc
Website	www.bgc.cc
Employees	1,500
Turnover $	1,000,000,000
Summary	BGC Contracting's three operational business units, construction, mining and fabrication deliver a wide range of civil and mining services across the resources, government infrastructure, building and manufacturing sectors.
Relevant Project Experience	Project Year: 2016 Project Name: Kwinana Waste to Energy Project, Western Australia Client Name: Phoenix Brief Scope: Phoenix Energy has hired BGC Contracting as its engineering, procurement and construction contractor for its $400 million WA waste to energy project. The project will be the first of its kind in Australia, integrating the disposal of waste with the generation of energy to provide a practical solution to two community challenges: waste disposal and renewable energy supply. Project Value: Not available

4.5 BLUE TONGUE ENERGY PTY LTD

Business Details	
ABN	95605791599
ICN Primary Contact	Mr Kevin Robinson Director Ph: 61 8 62440133 Mob: 61 4 00100572 Email: kev.robinson@btenergy.com.au
QLD / Australia Office address	NABL Facility 2600 Stuart Highway LIVINGSTONE NT 0822 Australia Ph: 08 89784125 Email: info@btenergy.com.au Web: www.btenergy.com.au/
Website	www.btenergy.com.au
Employees	10
Turnover $	4,000,000
Summary	BT ENERGY is a specialist energy service provider in the power generation sector, with a project capability from simple open cycle power plants to the most complex Tri generation solutions, on an international scale across all industries. Our focus is to always ensure we deliver the best fit solution utilising state of the art proven technical solutions, with our strategic ambition to reduce the consumption of fuel and emissions, whilst delivering a highly reliable and competitive service. Our technology capability includes - Diesel Engines - Energy Storage and Distribution - Gas Engines - Gas Turbines - Heat to Energy - Solar - Wind
Relevant Project Experience	Project Year: 2010 Project Name: Banyan Bio-Diesel & Cogen Plant Client Name: Banyan Utilities Brief Scope: BOOT contract for a Kawasaki 5 MW Combined CoGeneration Power Plant. The group also completed the electrical, instrumentation and controls contract for the natural fuel bio-diesel plant consisting of three bio-diesel production and glycerin refining trains.

Business Details	
	Project Value: AUD$20,000,000 Project Name: Kwinana Power Station Client Name: Western Energy Brief Scope: BTE Executives completed - Turnkey EPC of 120MW peaking power plant. The project was built around two Pratt and Whitney FT8-3 Swiftpac gas turbines operating in dual fuel configuration. Scope provided design, specification and procurement of all plant components as well as construction, commissioning, documentation and reliability and performance testing. "" 170,000 Man Hours "" Peak Construction Employment >150 An operations and maintenance contract followed Project Value: AUD$90,000,000

4.6 BMD CONSTRUCTIONS PTY LTD

Business Details	
ABN	59010126100
ICN Primary Contact	Mr Mark Elliott Area Manager Ph: 61 08 89304455 Mob: 61 041 8997321 Email: mark.elliott@bmd.com.au
QLD / Australia Office address	1 Sandpiper Avenue PORT OF BRISBANE QLD 4178 Australia Ph: 61 7 30339400 Fax: 61 7 38931006 Email: brisbane@bmd.com.au
Website	www.bmd.com.au
Employees	1,700
Turnover $	1,000,000,000
Summary	BMD is a national group of companies engaged in engineering design, construction and land development for clients and partners in the urban development, transport infrastructure and resources and energy sectors. Since 1979, BMD has employed a relationship based business model founded on certainty, collaboration and performance. With more than 1,700 staff throughout Australia, BMD has the resources and experience to deliver projects ranging in size from $1 million to over $1 billion.
Relevant Project Experience	Project Name: QNI Yabulu Refinery Extension Client Name: QLD Nickel Brief Scope: Deliver foundation work (piling and concrete works) to duplicate the existing nickel plant. The scope included piling and concrete which involved earthworks, drainage, detailed excavation, sub-bases under concrete slabs, bored piles, pile caps, pedestals, footing, raft footings, equipment foundations, ring beams, bunds and concrete slabs across the site. Detailed quantities included 7,760m of piling, 12,800m3 of concrete, 6,200m2 of formwork and 1,200 tonnes of reinforcement. Project Value: AUD$30,000,000 Project Year: 2009 Project Year: 2017 Project Name: LAKELAND SOLAR AND STORAGE PROJECT Client Name: N/A

Business Details	
	Brief Scope: BMD Industrial was awarded the civil, structural and mechanical works on the project. The project consists of a grid connected 13MWdc capacity energy generation and storage system which will be constructed adjacent to the Ergon substation site at Lakeland in North Queensland's Cook Shire. BMD's package of work forms part of a world-leading project by the Australian Renewable Energy Agency which is set to combine big battery storage and big solar to supply solar power after sundown. Project Value: AUD$4,000,000 Project Year: 2018 Project Name: Crookwell 2 Wind Farm project Client Name: N/A Brief Scope: BMD Constructions is delivering the Crookwell 2 Wind Farm as part of a consortium with Consolidated Power Projects Australia (CPP), with the project being delivered under a Balance of Plant (BoP) contract. The combination of local spend by BMD Constructions and CPP exceeded the consortium's original commitment. Project Value: AUD$10,000,000

4.7 BOUYGUES CONSTRUCTION AUSTRALIA PTY LTD

Business Details	
ABN	37144013801
ICN Primary Contact	Mr Benoit Arsac Construction Manager - Solar Farm - BYCA Mob: 61 4 28242695 Email: b.arsac@bouygues-construction.com b.arsac@bouygues-construction.com
QLD / Australia Office address	Christie Centre 320 Adelaide Street Brisbane City QLD 4000 Australia Ph: 61 07 30109412
Website	www.bouygues-construction.com.au
Employees	12,000
Turnover $	Not available
Summary	Bouygues Construction Australia Pty Ltd (BYCA) is a construction and civil engineering company dedicated to providing world-class services in building, civil engineering, earthworks and infrastructure for mining services throughout Australia and New Zealand. As a wholly-owned subsidiary of Bouygues Construction, BYCA is part of the Bouygues Group, a worldwide industrial group active in the sectors of construction (building, civil works, energy and services), property, roads, telecommunications and media.
Relevant Project Experience	Project Year: 2017 Project Name: Whitsunday Solar Farm Client Name: Edify Energy Brief Scope: The Whitsunday Solar Farm is a 69.0 MW DC single-axis tracking project located a few kilometres north of Collinsville in North Queensland. The project is supported by both ARENA and the Queensland Government. The Whitsunday Solar Farm is 94.9% owned by Wirsol and 5.1% by Edify Energy and was financed in a portfolio transaction that included the Hamilton and Gannawarra Solar Farms. It has an approximate capital cost of $100m. Contract value: Not available. Project Value: Not available Project Year: 2017 Project Name: Parkes Solar Farm Client Name: Parkes Solar Fram Pty Ltd

Business Details	
	Brief Scope: Parkes Solar Farm (PSF) is a 66MW renewable electricity project consisting of approximately 206,000 solar panels installed on 210 hectares of land 10km west of Parkes, New South Wales. PSF will generate approximately 138,000 megawatt hours (MWh) of clean, renewable electricity into the national power grid each year, thereby making a major contribution to Australia's greenhouse gas reductions. Contract Value: Not available Project Value: Not available Project Year: 2017 Project Name: Hamilton Solar Farm Client Name: Edify Energy Brief Scope: The Hamilton Solar Farm is a 69.0 MW DC single-axis tracking project located a few kilometres north of Collinsville in North Queensland. The project is located in close proximity to the Whitsunday Solar Farm. The Hamilton Solar Farm is 94.9% owned by Wirsol and 5.1% by Edify Energy and was financed in a portfolio transaction that included the Whitsunday and Gannawarra Solar Farms. Contract value: Not available Project Value: Not available Project Year: 2017 Project Name: Griffith Solar Farm Client Name: Griffith Solar Farm Pty Ltd Brief Scope: The Griffith Solar Farm is a 36MW renewable electricity project consisting of approximately 112,000 solar panels installed on 100 hectares of land in the town of Yoogali, a few kilometers south-east of Griffith in New South Wales. Contract value: Not available. Project Value: Not available Project Year: 2017 Project Name: Dubbo Solar Hub Client Name: Dubbo Solar Hub Pty Ltd Brief Scope: The Dubbo Solar Hub is a 29MW renewable electricity project consisting of approximately 90,000 solar panels installed on 55 hectares of land to the east of Dubbo, and 30ha of land to the north of Narromine in New South Wales. Contract value: Not available. Project Value: Not available

4.8 CPB CONTRACTORS PTY LIMITED

Business Details	
ABN	98000893667
ICN Primary Contact	Jane Dunbar Submission Coordinator Ph: 61 8 64366495 Email: Jane.Dunbar@cpbcon.com.au Jane.Dunbar@cpbcon.com.au
QLD / Australia Office address	520 Wickham Street, Level 6, HQ South Tower FORTITUDE VALLEY QLD 4006 Australia Ph: 61 7 32154600 Fax: 61 7 32154999
Website	www.cpbcon.com.au
Employees	18,000
Turnover $	5,000,000,000
Summary	CPB Contractors is a leading international construction contractor, with operations across Australia, New Zealand and Papua New Guinea. CPB has it's origins as far back as 1934, as a civil contracting business. CPB Contractors delivers projects spanning all key sectors of the construction industry, including major infrastructure, Defence and building projects.
Relevant Project Experience	Project Year: Not available Project Name: Waubra Wind Farm Client Name: NA Brief Scope: Leighton Contractors was responsible for the design and construction of all of the civil works required for the project. These works included: geotechnical survey, investigation and verification. design and construction of 128 turbine tower. foundations, each containing approximately 200m3 of reinforced concrete.route selection, design and construction of 60km of access roads and hardstand areas. associated environmental protection.landowner accommodation works. Project Value: Not available Project Year: 2012 Project Name: Mumbida Wind Farm Client Name: Verve Energy and Macquarie Capital joint venture

Business Details	
	Brief Scope: The development will generate 55 Megawatts of renewable electricity into the South West Interconnected System (SWIS) - enough energy to power around 35,000 homes and offset approximately 165,000 tonnes of greenhouse gas emissions per year. It is expected the wind farm will be complete by November 2012. The project will be delivered by Leighton Contractors and GE through a single Engineer, Procure, Construct (EPC) contract, comprising GE's 2.5MW wind turbines mounted on 85 metre towers, electric Project Value: Not available Project Year: 2015

4.9 DOWNER EDI LIMITED

Business Details	
ABN	97003872848
ICN Primary Contact	Bids & Proposals Admin Co-ordinator Penny Beath Bids & Proposals Ph: 61 2 49187540 Fax: 61 2 49187401 Email: construction.tenders@downergroup.com
QLD / Australia Office address	2 Burke Street WOOLLOONGABBA QLD 4102 Australia Ph: 61 7 32490513 Email: Nikki.Poteri-Collie@downergroup.com
Website	https://www.downergroup.com/renewables
Employees	19,000
Turnover $	7,000,000,000
Summary	Downer is a leading provider of services to customers in markets including transport, rail, utilities services, technology and communications services, engineering, construction and maintenance and mining. Downer employs about 19,000 employees across more than 200 sites and projects, mostly in Australia and New Zealand, but also in the Asia-pacific region, South America and Southern Africa. We build strong relationships of trust with our customers, truly understanding and predicting their needs and bringing them world leading insights and solutions.
Relevant Project Experience	Project Year: 2017 Project Name: Sunshine Coast Solar Farm Client Name: Sunshine Coast Council Brief Scope: The Sunshine Coast Solar Farm is the second largest in Queensland and the sixth largest Australia wide.At its peak, the solar farm generates 15,000 kilowatts of electricity. The electricity generated over one year will be enough to power the equivalent of 5000 homes. Aluminium tables held up on screw piles are used to hold over 57,000 panels above the flood plain. Project Value: Not available Project Year: 2018 Project Name: Numurkah Solar Farm, Victoria Client Name: Neoen Energy Brief Scope: Downer has been awarded an EPC contract worth ~$160m to build the 128 MW Numurkah Solar Farm in Victoria. It will power Melbourne's tram network, which is operated and maintained by Keolis Downer.

Business Details	
	Contract value: ~$160m Project Value: AUD$150,000,000

4.10 ENEA CONSULTING PTY LTD

Business Details	
ABN	78609508554[3]
Primary Contact	Elieta Carlu, e-mail : elieta.carlu@enea-consulting.com
QLD / Australia Office address	11 Tavistock Place, Melbourne VIC 3000, Australia
Website	http://www.enea-consulting.com/en
Employees	Not available
Turnover $	Not available
Summary	ENEA is a strategic advisory consulting firm contributing to the advancement of energy and environmental transition and the development of energy access worldwide, with offices in Paris, Melbourne and Hong Kong. Since 2007, ENEA has been advising and supporting leading private sector companies and public authorities around the world on the topic of energy transition sectors and markets.
Relevant Project Experience	Not available

[3] ENEA consulting pty ltd has been added to the report based on feedback from DSDMIP.

4.11 ENTURA

Business Details	
ABN	48072377158
ICN Primary Contact	Ms Abigail Foley Bid Optimisation Manager Ph: 61 3 62454583 Fax: 61 03 62454550 Mob: 61 4 38384896 Email: tenders@entura.com.au
QLD / Australia Office address	322 Glen Osmond Road MYRTLE BANK SA 5064 Australia 322 Glen Osmond Road, MYRTLE BANK SA 5064 Australia Ph: 61 8 83380085 Fax: 61 8 83384733 Email: info@entura.com.au
Website	www.entura.com.au
Employees	204
Turnover $	40,000,000
Summary	Entura is one of Australia's most experienced energy and water consultants. We provide services around the world, working with utilities, governments, developers and international companies to help them achieve their business goals using clever engineering and scientific solutions.
Relevant Project Experience	Not available

4.12 FINN BIOGAS PTY LTD

Business Details	
ABN	94610257406[4]
Primary Contact	Jason Hawley, info@finnbiogas.com, M- 0407 823 161
QLD / Australia Office address	3/323 Oxley Road, Graceville, QLD, AUSTRALIA 4075
Website	http://www.finnbiogas.com/
Employees	Not available
Turnover $	Not available
Summary	Finn Biogas is one of Australia's most prominent and experienced biogas engineering, design, procurement and construction companies with projects in Australia, Asia and Central America. We provide tailored energy and waste solutions to customers from a range of sectors including agriculture, government, energy, wastewater and universities.
Relevant Project Experience	Biogas Pilot Plant Design Finn Biogas provided engineering consultation services to design a pilot plant for a prospective client operating with bulk food and beverage waste. The pilot plant is designed to trial and demonstrate the quantity and production of biogas from organic food breakdown. Location: Australia Project Length: 2 weeks Waste Stream: Organic food and beverage waste Biogas Project Size: pilot plant scale Pilot plants are used for small scale demonstration purposes, or sometimes required by investors for large scale projects to show the project feasibility.

[4] FINN Biogas has been added to the report based on feedback from DSDMIP

4.13 GENERAL ELECTRIC INTERNATIONAL INC

Business Details	
ABN	85002420751
ICN Primary Contact	Mr Gordon Crane Account Executive Ph: 61 2 43361800 Mob: 61 4 77758399 Email: gordon.crane@ge.com
QLD / Australia Office address	51 Barry Alexander Drive SPRINGFIELD QLD 4300 Australia
Website	https://www.ge.com/renewableenergy
Employees	3,500
Turnover $	100,000,000,000
Summary	GE is a global leader in technology solutions and financial services. With over 130 years of expertise in engineering and deliver of technology solutions, we operate in over 100 countries and employ more than 300,000 people. GEs broad capabilities and expertise include more than 80 years experience in global mining, partnering with mining customer to increase revenues their and reduce their cost of production. Throughout Australia, GE have helped mining companies engineer, deliver and finance integrated solutions for mine infrastructure and utilities, including power generation, water treatment, electrification, control and automation and rail transportation. Our large install base of technology and solutions demonstrate our delivery capability and commitment to Australia's mining industry. Our expertise extends to big data solutions for end to end consolidation of asset utilisation, process and maintenance optimisation for mine, rail and port.
Relevant Project Experience	Not available

4.14 GPA ENGINEERING PTY LTD

Business Details	
ABN	71576133774
ICN Primary Contact	Mr Sean Flaherty General Manager Ph: 61 8 82998300 Mob: 61 4 13442488 Email: sean.f@gpaeng.com.au
QLD / Australia Office address	9 Gardner Close MILTON QLD 4064 Australia Ph: 61 07 35511300 Fax: 61 07 35511300 Email: tony.w@gpaeng.com.au
Website	http://www.gpaeng.com.au/industry/renewable/
Employees	160
Turnover $	35,000,000
Summary	A highly experienced, multidisciplinary engineering and management firm, GPA has consulted and provided engineering, procurement and construction management (EPCM) services, since 1987. We develop, engineer, and implement industrial-scale projects across the oil and gas, defence, water treatment and distribution, mining and minerals and power generation and distribution sectors. With a commitment to providing quality assurance and maintaining environmental integrity, our people are highly qualified and additionally possess expertise to advise on project and risk management.
Relevant Project Experience	Not available

4.15 GREEN LIGHT CONTRACTORS PTY. LTD.

Business Details	
ABN	83168435658
ICN Primary Contact	Pedro Fernandez Ph: 61 04 32526886 Mob: 61 04 32526886 Email: pfernandez@elecnor.es
QLD / Australia Office address	269 Wickham Terrace Fortitude Valley QLD 4006 Australia
Website	Not available
Employees	Not available
Turnover $	Not available
Summary	Green Light is a wholly owned subsidiary of Elecnor Australia, itself a subsidiary of Elecnor SA, a large Spanish-owned renewable energy group operating in 56 countries around the world. Green Light is the engineering, procurement and construction (EPC) contractor, as well as handling ongoing operation and maintenance (O&M) for the solar farm.
Relevant Project Experience	Project Year: 2014 Project Name: Moree in northern New South Wales Client Name: NA Brief Scope: Green Light is the appointed engineering, procurement and construction (EPC) contractor for the project, as well as handling ongoing operation and maintenance (O&M) for the solar farm. The 70 megawatt (MWp) solar farm project represents a significant development for the Australian renewables industry. One of the project's main aims is to demonstrate that large-scale solar power plants can be constructed and operated within Australia's major electricity grids. Project Value: AUD$150,000,000 Project Year: 2017 Project Name: Barcaldine Regional Community Solar Farm Client Name: Barcaldine Council Brief Scope: The Barcaldine Solar Farm is a 25 megawatt photovoltaic solar project located approximately five kilometres east of the central western Queensland township of Barcaldine. The project is currently in the commissioning phase. The project has been planned and developed by the Barcaldine Remote Community Solar Farm Pty Ltd (BRCSF), a company owned by Elecnor Australia Pty Ltd. Elecnor Australia is a subsidiary of Elecnor SA, one of the world's leading solar energy EPC companies. Project Value: AUD$100,000,000

4.16 HITACHI ZOSEN INOVA AUSTRALIA PTY LIMITED

Business Details	
ABN	14603901382
ICN Primary Contact	Not available
QLD / Australia Office address	Level 17 40 Mount Street North Sydney NSW 2060 Australia P +61 (02) 8003 4110 e-mail info@hz-inova.com
Website	http://www.hz-inova.com/cms/en/home/
Employees	Not available
Turnover $	Not available
Summary	The HZI branch office Hitachi Zosen Inova Pty Ltd. was opened in February 2015. It marks a further expansion of HZI's global presence, and will enable the company to establish proximity to regional markets and potential partners in Oceania. Thanks to the close cooperation with the Zurich based parent company, HZI Australia can provide the full range of HZI's product portfolio. The subsidiary's core competences include: Project Management Consulting Realization Hitachi Zosen Inova (HZI) is a global leader in energy from waste (EfW), operating as part of the Hitachi Zosen Corporation Group. HZI acts as an engineering, procurement and construction (EPC) contractor, delivering complete turnkey plants and system solutions for thermal and biological energy-from-waste recovery. Its solutions are based on efficient and environmentally sound technology, are thoroughly tested, can be flexibly adapted to user requirements, and cover the entire plant life cycle.
Relevant Project Experience	Project Year: 2018 Project Name: Perth, WA Client Name: N/A Brief Scope: HZI and its project partners New Energy Corporation (NEC) and Tribe recently won a tender for the long-term supply of residual waste in Perth, WA. In mid-2018, HZI will start construction of a 300,000 tpy energy-from-waste plant in East Rockingham. From 2021 onwards, the Resource Recovery Facility will convert approximately 300,000 tonnes of waste per year into baseload renewable energy, producing 28MW of electricity at full capacity - enough to power 36,000 homes. We shall also recycle aggrega Project Value: Not available

4.17 JOHN HOLLAND PTY LTD

Business Details	
ABN	11004282268
ICN Primary Contact	Mr Frank Jansen Business Development Manager Ph: 61 3 99345237 Email: frank.jansen@jhg.com.au frank.jansen@jhg.com.au
QLD / Australia Office address	Level 3, 1000 Ann Street, FORTITUDE VALLEY QLD 4006 Australia Ph: 61 7 38677000 Fax: 61 7 38677100
Website	https://www.johnholland.com.au/what-we-do/industry-sectors/power-energy/
Employees	3,000
Turnover $	4,000,000,000
Summary	Operating across Australia, New Zealand and South East Asia, John Holland is a fully integrated infrastructure, building and rail group. We offer our customers a total service solution across the project lifecycle, from feasibility, to design, construction, operations and maintenance. Our infrastructure expertise encompasses a variety of sectors including industrial and resources, non-process infrastructure, intermodal transport networks, rail, roads, marine, tunnelling, water, power and energy.
Relevant Project Experience	Project Year: 2004 Project Name: Cathedral Rocks Wind Farm, South Australia Client Name: Cathedral Rocks Construction and Management Pty Ltd (on behalf of Acciona Energy and Energy Australia) Brief Scope: Located in the remote area of the Eyre Peninsula, the Cathedral Rocks Wind Farm includes 33 wind turbines, generating 66 Mega Watts of clean energy and meeting the needs of approximately 35,000 households per year. John Holland, along with partners York Civil and National Power Services, delivered all electrical work, substations, earthworks, 40 kilometres of access roads, drainage installation, hard stands and concrete foundations, as well as the construction of the main control building. Project Value: AUD$15,000,000 Project Year: 2009 Project Name: BP Refinery Clean Diesel - Kwinana Client Name: Aker Kvaerner

Business Details	
	Brief Scope: John Holland was awarded the contract to construct a new diesel hydrotreater, namely Hydrofiner 3. It also includes the off-site piping and modifications to existing plants to enable low sulphur fuel. Project Value: AUD$10,000,000

4.18 JUSTSEN PACIFIC PTY LTD

Business Details	
ABN	77618233800[5]
Primary Contact	Thomas Strang e-mail : thomas@justsenpacific.com Phone : +61 (02) 6172 1488
QLD / Australia Office address	Not available
Website	https://justsenpacific.com/
Employees	Not available
Turnover $	Not available
Summary	Justsen Pacific designs, implements and services biomass energy boiler systems for both thermal energy and for the co-generation of electricity. Using Danish-made hardware with a 40+ year pedigree of consistent, high-uptime performance all over the world, Justsen is able to deliver you the level of dependability that any manufacturer must demand from their boilers. To prove this, we can extend the warranty on the energy system out to 10 years, providing you with a far higher level of comfort around reliability than can be found with any other manufacturer. We are also able to deliver the projects as turn-key or as Zero Capex Power Purchase Agreements, depending on what secures the optimal outcome for you, our client.
Relevant Project Experience	Not available

[5] JUSTEN Pacific pty ltd has been added to the report based on feedback from DSDMIP.

4.19 JUWI RENEWABLE ENERGY PTY LTD

Business Details	
ABN	42159228145
ICN Primary Contact	Peter Drager Business Development Manager Ph: 61 07 31946949 Mob: 61 04 32068155 Email: peter.drager@juwi.com
QLD / Australia Office address	
Website	http://www.juwi.com.au/solar-energy/epc/
Employees	1,800
Turnover $	1,000,000,000
Summary	Juwi Renewable Energy is an international company that provides Engineering, Procurement and Construction (EPC) services for utility scale solar PV and wind projects. The juwi group is the world's 2nd largest EPC of solar PV projects (1.35GW), Wind (1.5GW) and Bio Energy.
Relevant Project Experience	Project Year: 2009 Project Name: Costa Rica 50MW Wind Project Client Name: Project SPV Brief Scope: Location: Costa Rica Installed power: 50MWp Works: EPC, O&M Project Value: AUD$100,000,000 Project Year: 2010 Project Name: USA 60MW Wind Project Client Name: Project SPV Brief Scope: Location: Nebraska USA Installed power: 60MWp Works: EPC and O&M Project Value: AUD$100,000,000 Project Year: 2011 Project Name: Germany 71MW Solar PV Project Client Name: Project SPV Brief Scope: Location: Brandenburg, Germany Installed power: 71MWp Works: developed, structured finance, EPC, O&M Project Value: AUD$200,000,000

Business Details	
	Project Year: 2012 Project Name: India 10MW Solar PV Project Client Name: Project SPV Brief Scope: Location: Gujarat, India Installed power: 10MWp Works: structured finance, EPC, O&M Project Value: AUD$20,000,000 Project Year: 2013 Project Name: USA 15MW Solar PV Project Client Name: Project SPV Brief Scope: Location: Jacksonville Florida USA Installed power: 15MWp Works: EPC and O&M Project Value: AUD$30,000,000 Project Year: 2013 Project Name: Thailand 61MW Solar PV Project Client Name: Project SPV Brief Scope: Location: Kamphaengphet / Ubon (Thailand) Construction: 7 sites with capacity of 61MWp Works: EPC and O&M, Project Value: AUD$100,000,000 Project Year: 2014 Project Name: Malaysia 10MW Solar PV Project Client Name: Project SPV Brief Scope: Location: Location: Malaysia Installed power: 10MWp Works: EPC and O&M (Solar Carport) Project Value: AUD$30,000,000

4.20 NEW ENERGY CORPORATION PTY LTD

Business Details	
ABN	16139310053
ICN Primary Contact	Not available
QLD / Australia Office address	Unit 1, 12 Parliament Place, West Perth WA 6005 T: +61 8 9226 0722 F: +61 8 9481 8023 E: info@newenergycorp.com.au
Website	http://www.newenergycorp.com.au
Employees	Not available
Turnover $	Not available
Summary	New Energy is an Australian company developing innovative projects to make waste management and energy production more sustainable. We partner with industry and local government to recover energy from waste streams that would otherwise go to landfill. By diverting waste from landfill, our environmental impact is greatly reduced and a clean and renewable source of energy is created.
Relevant Project Experience	Project Year: 2017 Project Name: Pilbara, WA Client Name: N/A Brief Scope: Resource projects and population growth have put a strain on both power and waste infrastructure in the Pilbara. This project will help with both these issues by using commercially proven Entech waste to gas technology to recover energy from waste and by feeding the electricity generated straight into the North West Interconnecting System (NWIS) for use by the community and industry. Project Value: Not avaialble Project Year: 2018 Project Name: Perth Metro, WA Client Name: N/A Brief Scope: New Energy is investing in a waste to energy facility for the Perth region, to divert significant amounts of residual waste from landfill and to extract energy from the waste. This facility will use internationally proven combustion technology and become part of the new generation of alternative waste treatment in Perth, and part of the solution for sustainable waste management into the future. Project Value: Not available

4.21 OMEGA ENERGY PTY LTD

Business Details	
ABN	**OMEGA ENERGY PTY LTD**
ICN Primary Contact	Not available
QLD / Australia Office address	Omega Energy Pty Ltd PO Box 156 Carrington NSW 2294 (02) 4936 2438
Website	http://www.omegaenergy.com.au
Employees	Not available
Turnover $	Not available
Summary	Omega Energy (Omega) is an Australian renewable energy company. Omega's vision is to be a leading advanced resource recovery provider. Omega is utilising advanced thermal treatment technology enabling the delivery of one of the world's most advanced, environmentally sustainable, and commercially viable Resource and Energy Recovery facilities. Omega offers: -A viable Total Resource Recovery solution, closing the loop on recycling efforts and ending the reliance on landfills. -Affordable renewable energy supply that will not only ease the cost of electricity to communities but will also attract new industries, bringing with them new investment and jobs. -Recovery of valuable commodities.
Relevant Project Experience	Project Year: 2018 Project Name: Hunter Resource & Energy Recovery Facility Client Name: N/A Brief Scope: Omega Energy will deliver the Hunter facility as major part of the Hunter Industrial Ecology Park in Weston, the world's first dedicated resource recovery park. The facility will form part of an industrial ecology network that will ensure the optimisation of resources and minimisation of waste. The Hunter RER facility will have the ability to process a minimum of 150,000 tonnes per year. Omega Energy aims to use a diverse range of waste types from a diverse catchment area. Project Value: Not available

4.22 PYROCAL PTY LTD

Business Details	
ABN	35600067730[6]
Primary Contact	James Joyce, e-mail: james.joyce@pyrocal.com.au
QLD / Australia Office address	Pyrocal Pty Ltd 27 Heinemann Road, Wellcamp QLD 4350 Australia e-mail : enquiries@pyrocal.com.au
Website	https://www.pyrocal.com.au
Employees	Not available
Turnover $	Not available
Summary	Pyrocal is a private company that offers systems for the thermal upgrading of biomass residues and man-made wastes. Typical outcomes from our systems are energy in the form of heat, steam, hot fluids or electricity, and carbon products such as biochar, bio carbon, fuel briquettes, filter carbons and activated carbons. Pyrocal designs, builds and installs Pyrocal CCT systems (previously known as the BiGChar technology). The development of our technology commenced in 2009 and since that time over 20 systems have been implemented across eight countries. We are located in Toowoomba, Queensland.
Relevant Project Experience	Voyager Craft Malt project- The Pyrocal CCT system was selected to provide the heat source for kilning. Locally sourced walnut shells provide the biomass for the Pyrocal CCT system to generate the energy. This is achieved without burning fossil fuels. Conveniently, the process also results in biochar that is on-sold for a wide variety of uses. THE RESULTS: Voyager Craft Malt commissioned the larger of their two existing malting systems in September 2016. This malting system is integrated with the Pyrocal CTT system on site which provides ~500kw of heat for malt kilning needs. The net annual savings are $54,000 or a 60 percent reduction in heat costs, compared to using LPG. Voyager are looking to expand production by upgrading with a second CCT system or replacing the existing system with a higher output model.

[6] PYROCAL PTY LTD has been added to the report based on feedback from DSDMIP.

4.23 RCR TOMLINSON LTD

Business Details	
ABN	81008898486
ICN Primary Contact	Mr Leon Griffiths Proposals Manager Ph: 61 8 93558133 Fax: 61 8 93610724 Mob: 61 4 18928747 Email: leon.griffiths@rcrtom.com.au leon.griffiths@rcrtom.com.au
QLD / Australia Office address	29 Breene Place MORNINGSIDE QLD 4170 Australia Ph: 61 07 32494828 Email: bradley.clark@rcrtom.com.au
Website	www.rcrtom.com.au
Employees	3,600
Turnover $	1,500,000,000
Summary	RCR is an ASX-listed company with a long and proud heritage and a culture of innovation. We use our significant technical intellectual property to provide a comprehensive range of engineering and infrastructure solutions from design to manufacture, construction, installation, maintenance and repair services. From our origins in 1898, RCR has grown to become one of Australiaâ€™s most diversified engineering and infrastructure companies, using in-house expertise to provide a comprehensive range of solutions for our customers.
Relevant Project Experience	Project Year: Not available Project Name: Yaloak Wind Farm Client Name: Pacific Hydro Brief Scope: RCR with its joint venture partner WBHO Infrastructure was awarded a contract with Pacific Hydro for the Balance of Plant (BOP) works for the 30MW Yaloak South Wind Farm in Victoria. The scope of work includes engineering, procurement, construction (EPC) and commissioning of the BOP works for Yaloak Wind Farm which comprises site access roads, hardstands, fences, drainage, wind turbine foundations, substation, electrical reticulation and control system. Project Value: Not available Project Year: Not available Project Name: Sun Metals Solar Farm

Business Details	
	Client Name: Sun Metals Corporation Brief Scope: RCR delivered a 124MWac solar power plant with over 1 million thin-film PV modules for Sun Metals Corporation under an EPC contract, to supply power to Sun Metals' Zinc Refinery near Townsville, QLD. The solar farm covers up to 120 hectares of land and will be connected into Sun Metals existing 33/132kV substation. RCR's scope of work includes engineering, procurement, construction and commissioning of the complete solar power station Project Value: Not available Project Year: Not available Project Name: Gannawarra Solar Farm & Energy Storage System Client Name: Edify Energy Pty Ltd Brief Scope: The Gannawarra Energy Storage Project will extend the performance of the Gannawarra Solar Farm to a combined 50MWac solar with 25MWac/50MWh of battery storage. RCR's scope of work includes the engineering, procurement, and construction of the balance of plant which includes installation, testing and connection of the harmonic filters and state-of-the-art Tesla battery system for the Project. Project Value: Not available Project Year: Not available Project Name: Darling Downs Solar Farm Client Name: APA Group Brief Scope: The Darling Downs Solar Farm will have an initial generating capacity of approximately 110MW. RCR's scope of work includes engineering, procurement and construction (EPC) and commissioning of the solar farm, including associated substations and grid connection works. The installation of the solar infrastructure will create up to a 200 Ha solar footprint. The award, valued at approximately $175 million, is the culmination of an ECI process which included preliminary design and engineering work Project Value: Not available Project Year: Not available Project Name: Broken Hill Solar Farm Client Name: First Solar/AGL Brief Scope: The Broken Hill Solar Plant is a 53 MW solar PV power station located five kilometres southwest of Broken Hill. RCR completed the installation of PV panels, testing and commissioning of the DC and AC plant, including the thin film PV modules. RCR also completed the detailed civil and trenching works, AC/DC/Communication cable installation, terminations and earth grid works, in addition to installing 40 inverter stations, two switchrooms, SCADA and OEM buildings. Project Value: Not available

Business Details	
	Project Year: Not available Project Name: Biomass - Nestle waste to energy Client Name: NA Brief Scope: RCR designed a new energy efficient combustion method using coffee bean waste to generate power to roast the coffee beans in a biomass fired steam boiler plant Project Value: Not available

4.24 RICARDO ENERGY & ENVIRONMENT

Business Details	
ABN	17 625 088 646[7]
Primary Contact	David Woolford
QLD / Australia Office address	Level 1, 37 Merivale Street, South Brisbane, QLD 4101, Australia
Website	https://ee.ricardo.com/
Employees	Approx. 3000
Turnover $	c. £352m
Summary	Ricardo is a global engineering, technical, environmental and strategic consultancy business. We also manufacture and assemble niche, high-quality and high-performance products. Our ambition is to be the world's pre-eminent organisation focused on the development and application of solutions to meet the challenges within Transport & Security, Energy, and Scarce Resources & Waste
Relevant Project Experience	Project Year: 2017 ongoing Project Name: F4C Client Name: DfT Brief Scope The Future Fuels for Flight and Freight Competition (F4C) was launched in April 2017 by the Department for Transport (DfT) to promote the development of an advanced low carbon fuels industry within the UK, including supplier capabilities and skills in relevant technologies, while maximising value for money for the taxpayer. Ricardo EE is managing the project. The F4C will provide up to £20 million in capital grant funding over 3 years (2018-21). Through the scheme, DfT aim to increase domestic production of advanced low carbon fuels capable of tackling emissions from the hard-to-decarbonise aviation and HGV sectors in pursuit of long-term UK decarbonisation targets. The F4C will also provide up to £2 million of Project Development Funding in 2017-18 to support the development of proposals. Ricardo will be progressing seven plants thought the feasibility stage in total, the largest of these waste to fuels plants is 300,000 – 500,000 tonnes per annum. Project Year: 2018 ongoing Project Name: WtE Plant Takeover Client Name: Confidential Brief Scope : Ricardo is providing technical support to assist with the commissioning and takeover of a number of the UK recent gasification projects. Ricardo's appointment to these

[7] RICARDO ENERGY & ENVIRONMENT has been added to the report based on feedback from DSDMIP

Business Details	
	projects is testimony to the high regard in which they are considered in being able to deal with multi-layered technical problems. Ricardo was contracted by a large financial consortium to provide technical due diligence services for the technical, commercial, operational and construction elements to purchase an 875,000 tpa EfW plant in the UK. The work provided the detailed analysis required to inform an investment decision in the order of £1.2bn. Project Year: 2017 ongoing Project Name: WtE Plant Takeover Client Name: Confidential Brief Scope: Ricardo was contracted by a large financial consortium to provide technical due diligence services for the technical, commercial, operational and construction elements to purchase an 875,000 tpa EfW plant in the UK. The work provided the detailed analysis required to inform an investment decision in the order of £1.2bn. Project Year: 2017 ongoing Project Name: Waste to fuels Client Name: Confidential developer Brief Scope: Ricardo is providing Owner Engineer and Technical Advisor services for the engineering, procurement and construction of a 250,000 tpa waste to fuels plant in the UK. The scope of works includes planning, permitting, technical, commercial, contracting and construction advice.: Project Year: 2018 ongoing Project Name: Waste to fuels Client Name: Confidential UK Local Authority Brief Scope: Ricardo is providing Technical Advisor and due diligence services for the procurement of a waste to energy plant in the UK with an electrical output of 12MW. The scope of works includes review of the technical, commercial and financial aspects of the project to inform the investment decision in the project Project Year: 2016 ongoing Project Name: Owner's Representative Client Name: Waste Energy Partners Brief Scope: Ricardo provides Owner's Representative services to the developer in support of a medical waste treatment facility. The plant will incinerate highly infectious yellow bag clinical waste and use a novel form of autoclave (a continuous feed steam treatment system) to treat non-hazardous orange bag clinical waste. This project consists of the normal range of Owner's Engineer technical services including specification and contract drafting, design review, on site

Business Details	
	supervision, witnessing of commissioning and testing and operational monitoring through to late 2019. Project Year: 2018 Project Name: Technical Advisor Client Name: Advanced Plasma Power Brief Scope: Ricardo is providing technical and commercial advice for the procurement of a 100,000 tpa waste to fuels plant. The scope of work included a review of the operational and capital cost models along with the financial model. The review developed the early feasibility work into a detailed analysis of all assumptions used to underpin the investment case, ranging from fixed revenues and costs as well as development, construction, commissioning cost analysis and a strategic review of EPC procurement. Project Year: 2018 Project Name: Technical Advisor Client Name: Confidential UK Investor Brief Scope: Ricardo completed a technical review to inform the investment decision of a combined heat and power plant in Ireland. The review analysed two distinct technical solutions to determine the best economical and contractual solution that could be delivered within the project timescales. Project Year: 2018 Project Name: Technical Advisor Client Name: Environment Agency Brief Scope Ricardo was engaged by the UK Environmental Regulator to conduct a technical review of the conditions and operational effectiveness of current and future EfWs in the UK to meet the IED Regulations: Project Year: 2014-15 Project Name: Technical Due Diligence Client Name: Confidential UK Investor Brief Scope: Ricardo provided full technical due diligence on an operational 4MWe hazardous waste pyrolysis plant. The study considered the full range of risks associated with purchase of the plant and also developed a schedule of takeover tests to ensure that the plant was meeting its performance requirements at the point of hand over. This was proceeded by an initial high-level review of the technical documentation and key financial model assumptions to inform a go/no-go investment decision. The work included a site visit and interviews with key staff. Project Year: 2018 Project Name: WtE market feasibility study

Business Details	
	Client Name: Confidential developer Brief Scope: Ricardo was contracted to a European developer interested in developing a high throughput WtE facility in the UK at an identified location. The developer first needed to assess what waste (either RDF or unsorted residual waste) was available in the area, both from municipal and C&I sources. Ricardo undertook a detailed assessment of waste arisings in the area and its likely characteristics, as well as an assessment of existing waste management infrastructure (all types, including WtE) in the area, municipal and commercial waste contracts within a two-hour road catchment of the site. We also undertook a detailed assessment of gate fees for various treatment technologies Project Year: 2017 Project Name: WtE market feasibility study Client Name: North Lincolnshire Council, UK Brief Scope: Study to determine the feasibility of an WtE facility as a means of energy recovery from residual MSW produced within the Local Authority area. The study is considering parameters including technology, plant capacity and plant configuration. These scenarios will also consider opportunities to provide energy to the adjacent British Steel Scunthorpe Steelworks to deliver mutual benefits for the council and British Steel. The programme of work for this study includes an appraisal of the waste market in the area of the proposed plant and financial analysis to assess the benefits offered by such a scheme. Project Year: 2017 Project Name: WtE feasibility Client Name: Luton Borough Council, UK Brief Scope: Feasibility study for an WtE plant to supply both heat and power into Luton Airport, London (using waste from the airport supplemented by other local waste arisings). The study examined a number of waste treatment options, ranging from a small incinerator operating on hazardous waste (CAT1 international food waste arisings and other low volume hazardous wastes), anaerobic digestion, through to a larger WtE plant that would need to capture waste arisings from a larger area to the north of London. Ricardo advised on relevant issues such as stack height, planning and waste supply contracts. Project Year: 2016 Project Name: Procurement Support for Waste Treatment Client Name: Slough Borough Council, UK Brief Scope: As technical advisor, Ricardo provided technical support into the development of contract documents for the procurement of treatment services for seven different material streams. The support included dialogue, evaluation and specification preparation utilising the Competitive Dialogue procedure.

Business Details	
	Project Year: 2015 Project Name: Technology fore-sighting and options study (WtE focus) Client Name: Birmingham City Council (BCC), UK Brief Scope: Ricardo was appointed to assist BCC examine waste treatment best practice and provide technology fore-sighting prior to the expiry of the current waste management contract for the city in 2019. For the first task, we assisted with compiling case studies of novel and innovative waste management techniques, especially those that deliver added impacts such as community benefits, job creation, community energy and those that are most relevant to a large city such as Birmingham. For the second stage of the project, we assisted with a horizon scanning exercise, to compile a comprehensive list of current and emerging waste treatment technology, focusing on WtE. This complemented other inputs on prevention, reuse and recycling. In a third phase, we are now assisting with the procurement options study, providing specialist advice on WtE economic assessment and risks. Project Year: 2014-2015 Project Name: Transaction Adviser to Develop a Feasibility Study and Support Procurement of WtE PPP on behalf of the City of Johannesburg (CoJ) Client Name: City of Johannesburg, South Africa Brief Scope: The CoJ appointed Transaction Advisers, funded through GIZ, led locally by Aurecon and an international team of Ricardo advisors to develop a feasibility study and support the procurement of Alternative Waste Treatment Technologies (AWTT). The AWTT facility(s) will divert waste from landfill disposal, generate renewable energy and create jobs. The Ricardo Energy & Environment led on reviewing and updating of the project feasibility study in relation to waste treatment technologies; advising on waste characterization studies and findings; developing guidance on technology specific site requirements; and delivering advisory support on Procurement of a PPP contract for the provision of the AWTT. A key part of our advisory support was inputting in to the financial modelling, in particular to develop assumptions, risk analysis and sensitivities of the PPP structure Project Year: 2015 Project Name: Waste Market Assessment Client Name: Confidential Client Brief Scope: Detailed market due diligence for a Spanish investor looking to enter the UK gasification market. Following the high-level market research completed in 2014, a more detailed review of the local waste market was required, including a waste supply due diligence report for the benefit of the lenders. This scope of works included review and advice on potential waste suppliers, development of relationships with potential waste suppliers, a waste supply logistics study and waste supply technical due diligence. Project Year: 2015

Business Details	
	Project Name: Waste treatment options appraisal, feasibility assessment Client Name: East London Waste Authority (ELWA), UK Brief Scope: Study to provide technology fore-sighting for waste management and an options appraisal for waste treatment solutions in East London. Two key options for the future of waste management in East London were identified by ELWA through workshops and stakeholder engagement. To enable this early option development work to progress to a point where a full feasibility study can be performed, ELWA commissioned Ricardo to undertake a waste treatment technology fore-sighting exercise, leading to the development of shortlisted suitable waste treatment options for East London, and subsequently an appraisal of the selected options and identification of potential sites. The solutions considered the local context for acceptability and calculated lifecycle costs for each option to enable the identification of the options that would provide best value for money for ELWA. Ricardo also identified suitable policies that would support the preferred solutions. Ricardo is currently assisting ELWA to finalize the site selection process. Project Year: 2008-2013 Project Name: Food waste treatment, with energy recovery, procurement t Client Name: Rhondda Cynon Taf, Merthyr Tydfil and Newport City Borough Councils, UK Brief Scope: Support for the procurement of a kitchen waste treatment contract for an Anaerobic Digestion facility, with energy recovery, using the competitive dialogue process. Involved the development of the technical contract documents right through to the evaluation of tenders. The hub is part of the Welsh Government Waste Infrastructure Procurement Programme which won the 2013 'Collaborative Procurement Initiative of the Year' award in the Government Opportunities Excellence in Public Procurement annual awards. The anaerobic digestion facility has now been constructed and takes food waste from homes and businesses in the region to generate one mega-watt of green electricity for the grid and a nutrient-rich fertilizer for farmland. The electricity generated is sufficient to power around 2,250 homes. Project Year: 2016- ongoing Project Name: Waste to Energy, Expert Witness Client Name: Confidential Brief Scope: Ricardo specialists are providing expert opinion in relation to issues at a complex large waste facility currently under construction in the UK. A key part of the facility is a gasification process in which refuse derived fuel (RDF) will be treated to generate energy via a steam turbine and generator, i.e. advanced conversion technology (ACT) Waste to Energy. We are reviewing process; mechanical and electrical issues associated with the design of the ACT plant and also issues with the site-wide odour control system to provide expert opinion on the causes of construction delays and increased costs Project Year: 2016

Business Details	
	Project Name: Waste to fuels, Technical Due Diligence (2016) Client Name: Confidential Brief Scope: Ricardo Energy & Environment has provided due diligence for a Mongolian developer on a range of Japanese waste treatment technologies during 2016. The developer intends to implement the technology in Mongolia through future assistance from the ADB. The technology review included: • Plastics to diesel; • Sub critical hydrolysis (conversion of waste to a waste 'coal' or fertilizer); • Water / fuel emulsion technology. The project comprised of a review of the proposed Japanese technology and also a comparison to other waste to fuels technologies, considering a broad range of waste to diesel technologies from other suppliers in Asia, the EU and US. The project additionally included an assessment of more conventional waste treatment technology such as Waste to Energy and Anaerobic Digestion that might be appropriate for deployment in Mongolia. Project Year: 2015 Project Name: WtE (Gasification) Plant, Technical Due Diligence) Client Name: Confidential Brief Scope: Independent review of the technical assumptions within a developer's financial model for a proposed gasification plant in the north of England. The review was provided under the assumption that there will be no (or very different) financial incentives for its proposed Advanced Thermal Treatment (ATT) facilities due to the delays announced by the UK Department of Energy and Climate Change (DECC) on Round 2 of the Contract for Difference (CfD) scheme. As part of this assessment Ricardo also assisted with a sense-check of the calculations within the financial model.

4.25 THYSSENKRUPP INDUSTRIAL SOLUTIONS (AUSTRALIA) PTY LTD

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Website	www.thyssenkrupp-industrial-solutions-australia.com
Employees	19,000
Turnover $	200,000,000
Summary	Thyssenkrupp Industrial Solutions combines our plant engineering and construction expertise within our Process Technologies and Resource Technologies business units. Process Technologies is focused on engineering, procurement and construction for chemical, refinery and other industrial plants, while Resource Technologies offers a comprehensive product portfolio and a wide sales and service network to customers in the mining, cement, mineral processing and materials handling industries. As part of our transition into a diversified industrial group, we have combined our technological knowhow and unique engineering, design and construction services in chemical, petrochemical and industrial plants with expertise in bulk materials handling and minerals processing. With high-quality engineering at the core of our business, thyssenkrupp Industrial Solutions offers project management capabilities, expertise in systems integration, procurement and supplier management. Our companies in Australia provide seamless end-to-end project management and engineering service offerings to customers, leveraging a vast technology portfolio that guarantees maximum productivity and cost-efficiency. The business employs 19,000 people in 70 countries around the world and ranks among the world's leading plant technology companies, with decades of experience gained in building more than 5,000 plants.
Relevant Project Experience	Project Year: 2017 Project Name: Tableland Green Energy Power Plant Client Name: MSF Sugar Pty Ltd

Business Details	
	Brief Scope: In May 2017, construction started on the $75 million green energy power plant at the Tableland Mill. It will turn 100 per cent renewable sugarcane fibre known as bagasse, into green energy. Once the plant comes online in mid-2018, it will produce 24 megawatts of electricity - enough to power 26,280 homes - which is the entire population of the Tableland region. Thyssenkrupp Industrial Solutions (Australia) were appointed EPC (Engineering Procurement and Contractor) partner in October 2016. Project Value: Not available

4.26 UGL ENGINEERING PTY LIMITED

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Website	www.ugllimited.com
Employees	1,500
Turnover $	2,000,000,000
Summary	UGL is a leading provider of SMP, EI & C Construction Services, power generation, transmission and distribution solutions. With a long history of construction and maintenance capability coupled with extensive engineering and design expertise, UGL has proven itself by delivering and maintaining highly technical and complex projects within mining, minerals processing, oil and gas and power generation sectors.
Relevant Project Experience	Not available

4.27 WBHO INFRASTRUCTURE PTY LTD

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Website	www.wbho.com.au
Employees	9,000
Turnover $	550,000,000
Summary	WBHO Infrastructure is a diversified engineering and infrastructure provider. Within Australia and internationally, we deliver multidisciplinary projects across numerous sectors, including transport, mining infrastructure, airports, commercial, retail and residential building, telecommunications, energy, and ports & marine. WBHO works with clients, stakeholders, communities and consultants to deliver projects throughout Australia. The company has offices in Brisbane, Melbourne, Perth and Sydney, employs over 400 people and owns a 400-strong mobile plant fleet, giving it the capacity to self perform large-scale projects throughout Australia.
Relevant Project Experience	Project Year: 2014 Project Name: Nyngan Solar Plant Client Name: First Solar Brief Scope: Construction of 250ha power station - the largest solar farm in the southern hemisphere. This project is 10 times bigger than the current largest solar plant in Australia. It will be 102 megawatts and involves approx 1.4 million solar pv panels. - Joint Venture with sister company Probuild Civil Project Value: AUD$30,000,000 Project Year: 2017 Project Name: Yaloak South Wind Farm Client Name: Pacific Hydro Brief Scope: When completed, the development will be one of the closest wind farms to Melbourne, and will be capable of producing enough electricity to power 15,700 homes and abate approximately 70,667 tonnes of greenhouse gas pollution per year. Project Value: Not available

Business Details	
	Project Year: 2017 Project Name: Byford Solar Farm Client Name: WestGen Brief Scope: Upon completion, the 30MW Solar Farm will span over 75 hectares and generate around 80,000MWh of electricity per year for the south-west integrated system (SWIS). Project Value: Not available Project Year: 2018 Project Name: Stockyard Hill Wind Farm Client Name: Goldwind Brief Scope: WBHO is delivering the civil and electrical Balance of Plant works for Goldwind Australia's 530MW, 149-turbine Stockyard Hill Wind Farm, located 35km west of Ballarat in Victoria. Upon completion in 2020, the wind farm will be Australia's largest, with the potential to power 340,000 homes annually. Scope of works includes: 350,000m2 of hardstand construction; 30km external roads upgrades and 105km internal roads; three substations; 250km of cabling and 11km of overhead transmission line. Project Value: AUD$200,000,000

APPENDIX G – DEFINITIONS

Engineering, Procurement and Construction (EPC):

Under an EPC contract, the principal or owner enters into a contract with the EPC contractor, who will, in turn, enter into various subcontracts with subcontractors for the performance of specified portions of work. They will be responsible for not only the engineering aspects of the project, but also procurement of equipment and design and construction of the facility, plant or project.

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