AGL HALLETT 2 WIND FARM

DEVELOPER / OPERATOR : AGL Energy Limited MAIN CONSTRUCTION COMPANY : Suzlon Energy Australia Pty Ltd **OWNER: Infrastructure Capital Group** LOCATION: Hallett Hill, SA **PROJECT END VALUE: \$166 Million CIVIL WORKS: Built Environs** ELECTRICAL WORKS: Consolidated Power Projects (CPP) **CIVIL DESIGN CONSULTANT: URS**



W inds of change are hitting the energy sector, and Suzlon Energy Australia Pty Ltd has the resources, skills and capabilities to harness them.

Gujarat region, where 14 years ago the Tanti family built wind turbines to provide reliable electricity for their textile manufacturing business. They subsequently bought the turbine IP from Sudwind, a German turbine manufacturer with a substantial R&D workforce. In 2004, Suzlon globalized, and today has established business units across the globe in the North and South Americas, China, Europe, Asia and Australia.

"We came into the Australian market at a gloomy time," said Suzlon This year, AGL will "turn the key" on the 71.4MW AGL Hallett 2 Energy Australia's Chief Operations Officer, Chris Judd. "The Federal Government's MRET policy, to obtain 2% renewable energy production

by 2010 was already largely met and as a consequence there was not much of a driver for industry. It was a leap of faith for the business and the team to make the company a success."

Suzlon in Australia is part of a global company with roots in India's In December 2005, AGL Energy Ltd - Australia's largest private owner, operator and developer of renewable energy assets - awarded Suzlon their first EPC (engineer, procure and construct) contract to deliver AGL's Hallett Wind Farm project located on Brown Hill range in mid north South Australia. Officially opened in June 2008, this 94.5MW sustainable power plant was the first of the Hallett group of 5 wind farms in the region that AGL is developing.

> Wind Farm located on the Hallett Hill ranges, also built by Suzlon and comprising 34 Suzlon S88_2.1MW wind turbine generators. "AGL's

faith in us was warranted and has paid off," said Chris Judd. Hallett 1 main transformer substation, electrical feeder systems above and below ground that link the turbines to the substation, plus long term service and maintenance of the entire wind farm. The high voltage substation takes the 33 kV reticulation or collector system power within the Windfarm and steps it up to the relevant transmission line voltage at the point of connection into the national grid. The 33kV reticulation power is stepped up from the 690V power produced by the turbines via a kiosk transformer at ground level adjacent to the base of each turbine. Material quantities used during construction of the wind farm included: 130km of high tension cables for rock anchor footings, 17km of rock trenching for the 33kV reticulation, 3,400m3 of concrete, 5,800 tonnes of steel for the 80metre towers, 17 km of underground cables, 10 km of overhead cables. More than 1200 truck movements to deliver in excess of 10,350 tonnes of cargo. The embodied energy of the whole wind farm will be paid back by the turbines' output within about five months.

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is performing well, whilst Hallett 2 will be safely delivered on schedule and within budget. The AGL Hallett 2 Wind Farm comprises 34 Suzlon S88-2.1MW wind turbines, spreading 10 kilometres over the Hallett Hill range. It will generate enough power to supply around 45,000 average households a year, while saving over 200,000 tonnes of greenhouse emissions per annum. Each turbine has a hub height of 80metres, a maximum blade tip height of 124 metres and a swept area of 1.5 acres. Suzlon's overall scope of work included the design, manufacture, shipping, installation and commissioning of the wind turbines, the overall wind farm layout, turbine micro siting, design & construction of 18km of new access roads, design and installation of a 275/33kV

EMPOWERING THE FUTURE



An estimated 180 workers were directly involved in constructing the AGL Hallett 2 Wind Farm. These were drawn from Suzlon's onsite project management and installation teams, along with balance of plant subcontractors - Built Environs for Civils works and Consolidated Power for Electrical works, and their sub-tier contractors, haulage contractors, and the many additional staff and suppliers employed offsite.

"There are significant spin offs to associated Australian industries from our operations, providing local content in areas such as tower fabrication, heavy haulage, road and foundation construction, port operations, electrical component supply such as tower and reticulation cabling, kiosk transformers and bottom cabinets. These include RPG Australia, fabricators of steel towers in Adelaide and Dalby, and Schneider Electric in Benalla who have a full production line manufacturing the step-up kiosk transformers used at wind farms.

"Suzlon is totally customer focused on both the turnkey delivery of sustainable power plants, and the provision of ongoing service and maintenance to maximise availability and efficiency of the wind farms. The design life of the wind turbines is 20-25 years; ideally we seek to maintain the turbines through the wind farms' lifetime; this is however subject to our clients extending the initial 5 year Service and Maintenance agreements via options."

Suzlon employs and trains locals in the areas where projects are located for long-term roles as service and maintenance technicians. Suzlon also own their own fleet of cranes, maintenance vehicles and heavy transport ensuring that any major maintenance activities can be carried out at the earliest possible opportunity.

"We have a commitment to creating sustainable jobs in regional areas and retaining a workforce which can provide ongoing service and maintenance to the wind farms. We embrace the opportunity to become involved in the local communities where we work, generating new jobs that bring dollars into those towns. As active members of the communities, we sponsor local organisations and events, provide talks to interested school and community groups and appear at agricultural shows and open days," explained Chris Judd.

There is also substantial regional spending by the construction and installation crews from Suzlon and its subcontractors, which again is an important economic benefit to the local communities." AGL recently awarded Suzlon the EPC contract for their third wind farm in this region, the 132MW AGL Hallett 4 Wind Farm located at North Brown Hill, which will comprise 63 Suzlon S88_2.1MW turbines.

In addition to AGL's Hallett Wind Farms, Suzlon has been contracted to deliver and maintain Snowtown and Clements Gap Wind Farms in South Australia, and the Capital Wind Farm near the ACT border in New South Wales. Collectively these wind farms will generate over 700MW of renewable energy directly into the national grid.

"We are open to hearing from people who have viable opportunities," said Chris Judd. "We are well placed to connect people with such opportunities to the relevant people to enable power to be generated in regional communities. Wind power is now a mainstream form of electrical generation. The industry is here for a long time to come, it is mature and is now being recognised as such by the wider electricity industry.

In pursuit of our objective to "Power a Greener Tomorrow" Suzlon's values and operations reflect the triple bottom line: social, environmental and financial."

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CHARGED WITH CRUCIAL TASKS

The talents of Consolidated Power Projects Australia (CPP) The kiosk transformers were installed and commissioned by CPP ensure that the power generated at AGL's Hallett 2 Wind Farm actually gets into the National Electricity Market (NEM) grid. It's a job they have an extraordinary depth of experience with, having designed and constructed more than 170 High Voltage substations and associated electrical infrastructure projects in the last 13 years.

As an electrical engineering company, they specialize in the design and construction of electrical infrastructure (up to EHV) for Power distribution and transmission companies, industrial and mining companies and owners and developers of renewable energy projects. They offer a complete and detailed engineering service which incorporates primary and secondary electrical plant, along with associated civil and mechanical components such as access roads, buildings, steelwork and equipment foundations.

For AGL's Hallett 2 Wind Farm project CPP were assigned a subcontract by Suzlon Energy Australia with responsibility for the design, construction and commissioning of the 275/33kV substation, 8,000 linear metres of 33kV overhead line arranged as 2 x double circuit lines from the substation to the 4 collector circuits of the wind farm and 16,000 linear metres transformers at the base of each turbine.

along with the low voltage, protection and control cable connections from the kiosk transformer to the turbine bottom controller.

CPP's scope also covered the supply, installation and commissioning of the wind farm fibre optic network consisting of approximately 19,000 metres of direct buried 12 core and 24 core fibre optic cable.

"Our core business is essentially the design and project management of electrical infrastructure projects. Our site construction works are complimented by the use of dedicated sub-contractors with whom we have formed strong relationships over the last 5 years," said Project Manager Steve Drefke.

"Our sub-contractors are supported by our own construction management team along with the commissioning which is also completed in house. We have adopted this project structure for a number of clients both in South Australia and Victoria and we have found this to be the most effective way to deliver projects such as the AGL Hallett 2 Wind Farm.

"Generally the biggest challenges with a wind farm relate to of 33kV underground reticulation cable connected to the kiosk geographical location and the topography of the wind farm sites, given that our scope includes the digging and backfilling of

thousands of metres of cable trench and the installation of overhead powerlines in what can be very steep terrain. Other challenges relate to managing the supply of plant and materials which have relatively long lead times.

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"CPP employs a range of engineering staff which gives us the capability of providing in-house design for all facets of a project such as the AGL Hallett 2 Wind Farm. We provide design services for civil, primary, secondary protection and control, SCADA and earthing, which is further complimented by our own drafting team."

CPP has also been engaged by Suzlon Energy Australia to complete the AGL Hallett 4 Wind Farm located on the North Brown Hill range. They will again complete the connection point for ElectraNet, including a tower cut in to the existing 275kV transmission line.

Other projects that CPP has completed in the last five years include the Portland Wind Energy Project for Pacific Hydro in Victoria and numerous high voltage installations for ElectraNet in South Australia and Jemena in Victoria. They also did the greenfields design and construct of Clarinda 66/22 kV substation and the design and construct for the Frankston 66/22 kV substation for United Energy Ltd (Melbourne),

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upgraded the Oakleigh 66/11 kV Zone substation for Alinta Asset Management, and designed and constructed the Westgate 66/11kV substation for CitiPower (Melbo

CPP also recently completed the Clements Gap Wind Farm project for Pacific Hydro in South Australia, which included the design and construction of the 132kV transmission line and connection point for ElectraNet.

CPP is ISO 9001 accredited by way of its parent company, Consolidated Power Projects International. Their Adelaide based management team has between them over 150 years experience in electrical installations, and 45 of their 52 staff are electrical engineers or technical experts

In-house equipment includes state of the art software such as SCADA, CAD, SES CDEGS Earthing Design software and AGi32 Lighting Design software. Their hardware includes Earth grid injection/resistivity test equipment and Omicron 258 test kits.

CPP is looking to continue their growth, and recently opened an interstate office with the intent of expanding their expertise into New South Wales and Queensland

ALLTHREAD PRODUCTS: AUSTRALIAN-MADE, TRIPLE CERTIFIED QUALITY

hether a project goes according to plan can be influenced by nuts and bolts details, specifically, whether those nuts and bolts meet the required mechanical standards. If they don't and were imported, it can cause months of costly delays.

Allthread Ind P/L supply Australian made, independently quality tested thread rolled products. Their products are triple tested in Australia by NATA certified quality assurance screening. For AGL's Hallett 2 Wind Farm, Allthread supplied over 10,000 foundation bolts. These M42 bolts can exceed 3 metres in length, and are an integral part, connecting the tower and the foundation pad.

"We're an Australian manufacturer, which has both challenges and benefits," said Allthread spokesman David Jeffers. "One of the challenges as an Australian manufacture is to have the opportunity to quote a project in the first place. Products have often been treated as generic, price is the focus, with little or no points of differentiation considered. Quality all too often is assumed, with many importers relying on quality documents from the overseas manufacturer."

There is however an emerging concern amongst major stakeholders in large projects who have started taking more ownership of quality. As they ask for a higher degree of local testing at Australian NATA facilities, this has exposed weaknesses in product supply and compliance for some product has found to be wanting. "As an Australian manufacturer, our challenge was to bring the local supply chain together and integrate the quality control process. Our product is more than the bolt, it is the quality assurance," said David.

"Local manufacture offers a timely product with flexibility within lead times. If we detect problems and issues, we have the procedures to rectify the problems. It is important quality assurance happens throughout the whole manufacturing process. Ultimately when we supply product on site, we can verify that product is up to standard. There are no surprises which cause costly delays."

To meet the demands of the AGL Hallet 2 Wind Farm, Allthread drew on the strong relationship formed with companies that individually bring their own expertise while adopting an understanding and connection with the final product and its application.

One Steel supplies the feed stock, from Whyalla and rolled in Newcastle, and close cooperation has resulted in a competitive local product produced to Allthread's specified tolerances, supplied with mill certificates from One Steel's NATA accredited testing facilities.

MillTech perform the heat treatment, perhaps one of the most critical processes. They are based in Newcastle, and have recently installed the only Induction Quench & Temper line outside of the USA and Europe. This production line incorporates in-line crack testing as part of the manufacturing process, and every product batch is further tested by Bureau Veritas for mechanical properties

Bureau Veritas are an international organisation founded in 1828 in Belgium, whose reputation for truth in testing is so well-regarded, they are in both the French national dictionary and the Websters Dictionary. They have over 850 offices and laboratories in 140 countries, 50 of those offices in Australia and New Zealand, offering materials testing and health, safety and environmental auditing and certification across all major industries.

Allthread specialise in thread-rolled products, a procedure recommended for all high-end applications as the thread is more integral than machine cutting and often expressed as a chipless thread. At the completion of the thread rolling Allthread have samples from every batch they produce tested by Bureau Veritas to certify the batch meets AS 4291-1 for mechanical properties, and also magnetic particle tested for surface irregularities and further crack testing.

"For the wind farms every bolt we produce is marked with a batch number which gives full traceability through manufacturing all the way back to OneSteel," said David. "In construction time is money: sourcing products from Allthread offers a form of Risk management to the project without sacrificing quality assurance to the often fluid or changing demands to design and supply within the construction period."



Allthread regularly supply product across Australia, NZ and PNG, some current projects to take advantage of Allthread's certified quality include the Worsley Aluminium smelter in Colley WA for BHP and Newcastle Coal Infrastructure Groups new port loader which they supplied with embedded items.

Their threaded products range in size from 5mm thread up to 120mm, and they are also developing relationships with other manufacturers which allow them to deliver complete embed packages. "We are continuing to work to bring a fragmented supply of other Australian manufacturers lines and products to civil companies in a coordinated way," said David.

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AUSTRALIAN NATIONAL CONSTRUCTION REVIEW

STEEL AT THE CUTTING EDGE

fter over two decades in business, local Adelaide business, Adelaide A Profile Services, has its gaze set firmly on the future. Now, with 31 employees working from its brand new premises in Lonsdale, Adelaide Profile Services has come a long way from its modest but solid beginning in 1982.

Now the largest sole profile cutting business in South Australia, Adelaide Profile Services commenced operation with only one machine. Adelaide Profile Services has built up a reputation as a quality supplier

Quality products need quality steel. That's where XLERPLATE® - reflected in the range of industries it supplies, such as construction, heavy engineering, agriculture, mining, automotive, and special purpose comes in. Supplied by Australia's largest steel producer, BlueScope Steel, XLERPLATE® is a brand of high quality hot rolled plate steel. machinery applications. Gordon says that availability and consistency are the key benefits of "Our philosophy has always been: 'Customer service comes first'," says using XLERPLATE®. "It's a very reliable product and the quality and Gordon Smith, Manager of Adelaide Profile Services. It's a philosophy consistency is always good" he says. "The fact that it's Australian steel that's paid off. is also important. As an Australian company, we are very proactive in supporting local product. A good supplier is critical to our business," The new state-of-the art premises covers approximately 5000 sqm. With adds Gordon. "Product must be delivered on time, or it affects our service levels to our customers."

eight profile cutting machines, 4 surface grinders, and a new two-story office building, the new site has resulted in a quantum leap in productivity XLERPLATE® is a brand of high quality hot rolled steel product and operational efficiency. "The new premises benefits our customers from BlueScope Steel. XLERPLATE® and BlueScope are registered greatly," according to Gordon, customer service, product availability, and quality are the key values that underpin Adelaide Profile Services' trademarks of BlueScope Steel Limited. (ABN 16 000 011 058) operations. "Customer service is paramount at Adelaide Profile Services. It's all about giving the best value to our clients. Focus on maintaining For more information visit www.xlerplate.com.au product availability and quality of finished products," says Gordon.

APS approach to training staff, from sales and marketing personnel, to programme writers, to workshop staff, has also contributed to the company's success. "Employees are given hands-on, in-house training, that is specifically geared to our operations and systems," explains Gordon. "We've always invested a lot in research and development," he

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adds. "We are committed to staying at the cutting edge of technology, and we are always looking at improving our systems and equipment."

According to Gordon, versatility is also a key component of Adelaide Profile Services' approach to its work. "We can do anything from barbecue plates to a 5000 tonne ship. Our major clients are all from really diverse sectors of industry, such as the automotive industry, agriculture, mining and defence."

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