



Rob Hills

Editorial

2010 ended on a high note, with Beca named Company of the Year in the Deloitte/Management Magazine Top 200 Awards. The Beca Power Team is proud to have contributed to this success, and we continue to look at opportunities to provide award winning services to our clients in the Power Industry in 2011.

2011 has already thrown up some challenges to the Power Industry, including the tragic events in Christchurch and Brisbane. Our thoughts are with all those that have suffered losses. Beca has been working to help our clients get through this difficult time; and our Christchurch Power Team is grateful to Transpower for giving us the ability to resume our activities through temporarily relocating to the company's training facility in Islington Substation.

On a brighter note, the early part of 2011 has provided the opportunity to participate in several industry events on both sides of the Tasman. Firstly, being able to show our commitment to the development of wind energy in New Zealand through our silver sponsorship of the NZ Wind

Energy Conference and Exhibition held in April 2011. And secondly, our technical capabilities were highlighted through Colin Pearson, an Associate in our power systems engineering team, presenting his paper entitled "Wind Generation – A solution to Network and Grid Voltages" at the EECON National Conference held in Hobart, Australia, 7-8 April 2011.

In addition to wind, we continue to grow our work in other forms of renewable energy generation, providing project management and electrical and control systems engineering to projects in the hydro, solar, and geothermal industries.

We hope that you enjoy this edition of PowerTalk and look forward to working with all of our clients through 2011 and beyond.

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Company of the Year



Beca is proud to be named 'Company of the Year' in the 2010 Deloitte/Management Magazine Top 200 Awards, taking the top spot ahead of other finalists Ebos Group and Ryman Healthcare. The winners were announced 2 December 2010 in Auckland.

On presenting the award, judges said that Beca is "a world leader in its field, and an outstanding example of the kind of enterprise that New Zealand needs to deliver the country's economic future." Beca entered the awards for the first time in 2010.

Publisher of New Zealand Management Magazine, Toni Myers, said Beca's story was impressive. "Beca represents the new generation of intellectual and personal competency exporter that New Zealand

needs to diversify the country's export base from its current over-reliance on commodities-based income."

Beca's Chief Executive Keith Reynolds attributes our success to "great people, wonderful clients and doing some good stuff. From humble beginnings we've been growing, and over the last five years have doubled in our scale. So getting this kind of recognition is great for us. It's a tribute to our people and our clients."

The Deloitte/Management Magazine Top 200 Awards were established in 1990 and are run annually to recognise and applaud outstanding individual and management team performances among New Zealand's largest companies and trading organisations.

Designing reliable communications solutions



When it comes to communications technology, all our clients want the same thing: a stable, reliable and fast data network to operate their business. We believe the key to achieving this goal is managing the entire network process through one team with the ability and passion to take the helm and make your project goals their own.

Beca assembles an experienced, qualified team to provide solutions and services to meet the overall goal of each project. Our aim is to recognise communication and engineering industry best practice principles for project management while striving for innovation in implementation.

Offering a range of communications design solutions, incorporating fibre, wireless and legacy data networks, we provide a broad toolkit to help build a successful project. Our areas of expertise include telecommunications network and wireless systems planning, design and engineering, transmission switching systems and RF link budget and coverage analysis.

Two of our team members particularly well suited to working closely with our power industry clients are Kevin Brown and Guilly Teixeira.



A Beca Associate, Kevin specialises in communications, SCADA, control systems and instrumentation for power systems, and

has worked on many RTU projects and as standards advisor on Transpower's real-time systems working group. He has experience commissioning systems across Europe and Indonesia and has project managed many systems integration and design projects with Beca.

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As a Senior Communications and SCADA Engineer, Guilly specialises in electronics, digital signal processing, computer

and communications networks. Focusing on radio, wireless and SCADA solutions, Guilly has over 17 years' experience covering a wide range of technologies, equipment, projects, designs, training, testing and troubleshooting.

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Speedy design delivery a good start for Tarrone terminal station fast track programme

The Tarrone 500 kV terminal station will be constructed to provide a connection point in the Victorian Transmissions Network for the new Macarthur Wind Farm, to be located on the Victoria south western coastline. The site will comprise 140 turbines with a total generation capacity of over 400 MW.

Beca, as SP AusNet's preferred design service provider, was commissioned in October 2010 to prepare both the scoping study and complete the detailed design for the proposed greenfield terminal station.

SP AusNet's key driver for this project was to deliver an operating 500 kV terminal station in time to enable the Macarthur Wind Farm to connect to the Victorian 500 kV transmission network.

Given the tight deadlines imposed, Beca developed a design delivery strategy that enabled early design concept finalisation, followed by the release of early works packages to enable SP AusNet to procure installation contracts in an early and prioritised manner. The first of these was the civil bulk earthworks package, which was issued for review within one month of Beca being commissioned. The 'For Construction' package was issued in late February 2011.

A key success factor in Beca's design delivery methodology has been early engagement with a shortlisted contractor so design innovation and constructability could be well addressed in the design.



The design team has been resourced from expertise across the Beca Group, enabling 'best for project' skills to be applied. Engineering teams from Melbourne, Brisbane, Sydney and Auckland were able to pull together to form a seamless delivery team that has to date resulted in delivery of design packages ahead of schedule. Civil, structural, buildings and primary design packages have all been issued for construction, with secondary due to be delivered in mid-May.

A key feature of the Beca design process was the delivery of a 'frozen' concept design to the client within two weeks of award.

This concept design stage enabled the 'locking down' of key design decisions and identification of project risks early enough in the design process so SP AusNet could take timely corrective action with reduced design cost and programme impact.

The 500 kV substation environment presents significant technical challenges in which the Beca team is building an established track record.

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Meeting your needs with comprehensive power metering services

Beca Power understands the importance of accurate power system metering to our power generation and retail customers. If the metering data is not

accurate, revenue streams are not accurate and, if it doesn't comply with electricity rules and codes, companies can be liable for fines and penalties.

Beca's comprehensive range of services is based on many years of metering experience in New Zealand and Australia. These range from initial conceptual designs to the writing of specifications and tender evaluation as well as commissioning and on-going support for metering hardware and data retrieval systems.

Our metering experience covers items from the current and voltage transformers to the meters and their interfaces to a wide area network. Our software experience covers items from simple numeric data retrieval to systems that suit multiple meter types. Beca has worked with a number of data retrieval systems to ensure that the resulting configurations are fully compliant with the relevant electricity rules and codes.

Our metering staff have provided ongoing support for clients and have undertaken work associated with reserve generation and new thermal and wind power sites.

Recent projects include upgrades of metering and metering data retrieval systems (MV90) at all of Contact Energy's generation sites as well as upgrading metering data retrieval systems (Stark RT) at all Meridian Energy and Genesis Energy generation sites.

The team also recently provided detailed design of the metering for a new generation plant at Stratford (Contact Energy) and also for one at West Wind (Meridian Energy) in New Zealand.

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Knowledge sharing – recent conferences and papers

New Zealand Wind Energy Conference and Exhibition 2011, 11-13 April (Wellington Town Hall)

Beca was pleased to be a Silver Sponsor for this conference. Peter McCafferty (General Manager – Power) chaired the session: 'Integration and transmission stream: Grid connection', while Bruce Kiddle (Business Development Manager – Geospatial), chaired the 'Development stream: Wind farm design and civils' session.

EECON 2011 Conference, 6-8 April (Hobart)

Colin Pearson presented his paper *Wind Generation – A Solution to Network and Grid Voltages*. Meridian Energy's new 64 MW Te Uku wind farm generates more energy than the local distribution network load, so has the potential to radically change the power flow. This presentation showed Te Uku's capability to optimise 33 kV network and 220 kV grid voltages with reactive power flow; and to minimise losses across the full generation range including zero generation, variable network load, and while there are circuit outages in the 33 kV network or 220 kV grid.

Felicity Galluzzo (Senior Protection & Control Engineer for Melbourne's power team) chaired the session: 'Energy Market Operation'.

Asia Pacific Power and Energy Engineering Conference, 25-28 March (Wuhan, China)

Wellington Power's Shreejan Pandey is a co-author of a paper presented at this conference: *An Economic Comparison between Grid Based and Isolated Rural Electrification in Nepal*. The paper compares costs and benefits of rural electrification (RE) by grid expansion with isolated micro hydro schemes, the two most commonly implemented RE methods in Nepal.

The paper presents a simple comparison methodology that can be used at a national level to invest in the most economically efficient rural electrification option. Such economic comparison at an early stage of a RE project can contribute in making the best use of scarce technical and financial resources. In a broader national context, it could positively impact the socio-economic development of Nepal.

Drury substation switched on and ready to go

Beca's Power team has recently completed work on a 220 kV switching station in Drury, south of Auckland.

The station is part of a series of North Island Grid Upgrade projects, intended to help provide greater security of supply to the Upper North Island. The initial purpose of the new switching station is to allow for more efficient use of the existing overhead lines, allowing for an additional 150 MW of transmission capacity to Auckland.

The Beca team worked closely with Transpower throughout the project, and implemented a number of key changes that improved the installation and allowed the substation to be commissioned ahead of plan.

Our role was to provide the complete civil and electrical design, from the solution study stage through to detailed design and construction support, as well as designing both the switchyard and control room to recently updated seismic design standards.

Because of the tight timeframe for the project it was essential that Beca respond to construction queries as quickly as possible. To achieve this, our engineers visited the site frequently during construction collaborating closely with Transpower and the contractor to meet the project objectives.

A number of the design elements were applied to the Transpower system for the first time, including the implementation of software interlocks and a number of innovative cost saving solutions in the switchyard. This required close collaboration between our designers and Transpower's engineering team to ensure that the desired outcome was achieved.

Drury substation is the first of a number of similar substations being installed by Transpower. The lessons learnt from the design and installation are being applied across a number of projects to help Transpower and their designers to further optimise the design to meet Transpower's requirements.

"The project was completed within budget and ahead of our original timeline (October 2010), thanks to the excellent work of the project team, our contractors and the co-operation of the local community."

Mike Carter, Transpower
– General Manager Grid Projects

From Transpower's Grid newsletter – Issue June 2010

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New Faces: New Zealand



Phil Young
Technical Director

Phil brings many years' technical and managerial experience to the Wellington Power team. His strong project management skills and his engineering expertise will greatly benefit the team. Phil has held front end/detailed design, associated type registration support, engineering and commissioning roles for both oil and power industry projects. He has built the capability to be able to execute a variety of roles to help successfully deliver major multidisciplinary projects.

Phil will focus on continuous improvement for the team's project management procedures as well as assisting with technical aspects of the team's project portfolio.



Gideon Strydom
Senior Protection Engineer

Gideon has wide experience in Protection Devices for most network applications from many different manufacturers. He has worked in generation, transmission, distribution and industrial systems on their Electrical Protection and Control Systems in a career spanning 20 years. He brings to the Auckland team experience in protection, SCADA and revenue metering and has the understanding to integrate this equipment in modern ethernet networks.

Gideon worked for Eskom in South Africa in commissioning protection systems and then continued his career in New Zealand with Alstom contracting to gain local application knowledge. He then worked for HV Power as product support engineer for products in protection, SCADA, metering, transformer monitoring and control, substation hardened ethernet and GPS timesynch. Due to this wide range of experience, he has been exposed to many protection and control systems used in many different philosophies and applications. He will now be concentrating on settings, application and design drawing.



Mostafa Nazih
Senior Power Systems Engineer

Mostafa is a Substation Design Engineer who has worked with Electro-Technique Group in Egypt (design/build company specialising in the power sector) and DAR Engineering in Saudi Arabia, working primarily on EPC based projects and responsible for substation design up to 380 kV.

His six years' experience in substation design has given him the ability to work autonomously on projects, interest and capability in design and power system studies, a team and outcome focus and project management skills that make him an asset to the Wellington team.



Miguel Tamame
Transmission Line Engineer

Miguel has spent the last few years building experience as both a site engineer on some large infrastructure projects as well as transmission and distribution power lines design. He brings both these site and technical office perspectives to his role, contributing new ideas to solve the technical challenges.

Miguel will be based in Wellington and focusing on technical design, understanding the client's needs from the early stages of a project and working on meeting them until its final detailed solution.



Jon Goodfellow
Transmission Line Engineer

His sound mechanical engineering design experience with large power companies in the UK and New Zealand makes Jon an important asset to the power team. Since joining Beca in Auckland last year, Jon has worked on the BPE-HAY A&B Lines Reconducting Project, which involved upgrading two 120km lines. He was responsible for all aspects associated with the lines design and analysis for the upgrade. He is currently part of the team for the NAaN Penrose Substation Works, working on the detailed design report outlining the diversion of the OTA-PEN A and OTA-PEN B lines to accommodate the 220 kV ring bus extension at Penrose Substation.



Naser Hosseini
Senior Power Systems Engineer

Naser has valuable experience in design, procurement and construction of high voltage AIS (Air Insulation Substations) and GIS (Gas insulation Substations) up to 400 kV voltage level. During the last five years in particular, he was employed as High Voltage Design Manager for a large EPC contractor in Iran, working on more than 28 projects from the tender stage to high voltage detail design as well as electrical installation testing and commissioning and as built documents.

He has worked on international projects in the Middle East and Africa with diverse, multi-disciplinary groups of engineers; and has led a high voltage team. Naser's ability to design a wide variety of high voltage substation configurations up to 400 kV, experience in power system studies and knowledge of procurement and construction procedures for large projects makes him a valuable addition to the Auckland team.



Luke Mainwaring
Power Systems Engineer

Luke is a chartered electrical engineer with fourteen years of experience in heavy industry. His interesting route through engineering began as an electrical apprentice in the Steel Industry, where he continued as an electrician, a sponsored student through university, a post graduate engineer, an intermediate engineer, and now a chartered Power Systems engineer at Beca, based in Auckland.

Luke has technical knowledge as well as the practical experience to back it up. He has worked with varying types of currents and voltages, carrying out various projects from concept to completion. His knowledge in all aspects of substation design, including primary, secondary, protection and SCADA will be of great value to the team. Luke is particularly keen to work in High Voltage Distribution and apply his skills and experience to major projects in the future.

New Faces: Australia



Lee McMillan
**Technical Leader -
 Power Systems**

Lee has been exposed to a range of industries since commencing his career 14 years ago. As a consultant, he has worked with power, water and rail utilities; generators; mining operations; chemical processing plants; metal refineries; and materials handling and storage. His skills include design management, power systems analysis and design, earthing/lightning system design and commissioning and electric and magnetic fields. While he is also passionate about client relationship management, Lee's main focus will be on providing technical leadership for the Power Systems team in the Melbourne office.



Maan Al-Asad
**Senior Transmission Line
 Engineer**

Maan relocated from Wellington to Melbourne in January to lead the growth of the transmission lines business in Australia. This will help to increase our service offering, enabling us to stay in close contact with our existing clients and enter into relationships with new ones.

He will be building the Transmission Line team, creating further opportunities for the wider Power team members to work on projects across the Tasman, broaden the team's experience and face new and exciting challenges with existing and new clients.



Alan Goodridge
Senior Design Manager

Alan Goodridge joined our team in Melbourne, where he is managing the primary team. His main focus will be the successful delivery of large multidisciplinary projects.

Alan has over 20 years' experience, gained in working for Tenix, Vestas and SKM. He has experience in the design management and primary design of distribution, wind farms, industrial, mining and water projects. Alan is currently working on the 500 kV Tarrone Terminal Station for SP AusNet as Work Package Manager for the primary, as well as assisting with project management.



David Coignet
Electrical Designer

David Coignet has recently joined our secondary team in Melbourne.

With a background that includes more than three years as a qualified electrical draftsman with Aurecon, his experience extends to HV/LV where he has helped with primary and secondary drawings in a wide range of different projects. David is currently working on Hazelwood power station bus protection replacement.



Jason Hu
**Power Systems
 Engineer**

Jason is skilled in all aspects of power systems engineering including electronics, automation systems, industrial power supply, power system analysis, renewable energy systems and electric utility engineering. He is also familiar with a range of software applications for the power industry.

His six years' with a major Australian power corporation provided valuable opportunities to use his technical expertise, skills and knowledge to deliver engineering design, estimating, project management and consulting products and services associated with transmission stations. He has also been seconded to major terminal transmission line and underground power cable projects.



Nicholas Craig
Design Manager

Nick is a passionate Queenslander with a wide variety of skills, ranging from secondary design to project management. He and his wife recently returned from a two year overseas stint, working in the UK and Canada. He has experience in protection and telecommunication design, substation construction, project 'optioneering' and multidisciplinary project management.

Nick has helped multiple small 100 kW renewable generators connect to the distribution network, all the way up to 100 MW+ renewable generators connecting to the transmission network. He enjoys working in the power industry, and believes in continuous improvement. He will be focused with helping achieve on-time delivery of multidisciplinary power projects with Beca.



New Zealand

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 Wellington
 New Plymouth
 Christchurch
 Tauranga
 Hamilton

Dunedin

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 Brisbane
 Melbourne
 Sydney
 Adelaide
 Wollongong

Indonesia

Jakarta
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China
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