

## Executive Summaries

### 2010-2011 Bursary Vacation Placements in Queensland

#### List of Executive Summaries

Student	Company	Page
<b>2008 Bursary Holders</b>		
Denduluri, Pavan (OUT)	Eraon Enerav	3
Hugall, Alexander (UO)	Powerlink Queensland	4
Lee, Harrison (QUT)	Aspec Engineering	5
Li, Tianya (QUT)	Powerlink Queensland	6
McVeigh, Dylan (OUT)	AEMO	7
Midgley, Jonathan (UO)	Oriain Enerav	8
Nakhla, Timothy (UO)	ENERGEX Ltd	9
Willis, Harry (UO)	Tarona Enerav	10
Winsor, David (UO)	Queensland Alumina Limited	11

<b>2009 Bursary Holders</b>		
Barns, Sarah (OUT)	Stanwell Corporation	12
Bartlett, Robert (UO)	ENERGEX Ltd	13
Bowen-Rotsaert, Alexander (UO)	Stanwell Corporation	14
Bokma, Benjamin (JCU)	Eraon Enerav	15
Chu, Anthony (UO)	Stanwell Corporation	16
Fox, Edmund (QUT)	Tarona Enerav	17
Harch, Carl (COU)	CS Enerav	18
Lewis, Steven (UO)	Tarona Enerav	19
McGrath, Tash (QUT)	Alstom Grid	20
Vasiliou, Christopher (QUT)	ENERGEX Ltd	21

2010 Bursary Holders		
du Plessis, Christopher	Eraon Enerav	22
Jackson, Tara	ENERGEX Ltd	23
Lecca, Vlad	CS Enerav	24
Lowrey, Matthew	PB Power	25
McAllister, Christopher	Eraon Enerav	26
Senadeera, Manisha	ENERGEX Ltd	27
Teiwani, Shiva	Aurecon	28
Zhang, Monan	Eraon Enerav	29



**STUDENT:** Pavan Denduluri (QUT)

**COMPANY:** Ergon Energy

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The purpose of this report is to detail my vacation placement during the summer of 2010/2011. As a part of the Australian Power Institute (API) Vacation Placement program, I am required to undertake vacation placement with one of the bursary partners. My vacation employment for the summer of 2010/2011 was at Ergon Energy, an electricity retailer at Maryborough.

Ergon Energy is an electricity distributor, retailer and generator and services around 680,000 customers– from the expanding coastal and rural population centres to the remote communities of outback Queensland and the Torres Strait.

My vacation work experience at Ergon Energy has provided me with an insight into operations and engineering from an electricity retailer’s viewpoint, as well as gaining valuable experience and interpersonal skills.

During the course of my employment, I was assigned two projects namely, the establishment of two new feeders and analysing the effects of photovoltaic (PV) systems on the electricity grid.

Though similar projects of this nature had been undertaken previously, there were a number of key challenges that needed to be addressed along the way. I found that the key components that helped to address these challenges were initiative, and communication.

My vacation work at Ergon Energy has been both enjoyable and beneficial. I had set out to meet certain initial expectations and after my three month stint, I can confidently say that I had come out as a more developed individual.

**STUDENT:** Alexander Hugall (UQ)

**COMPANY:** Powerlink Queensland



The purpose of this report is to examine and document my professional engineering practice undertaken at Powerlink Queensland from late November 2010 through February 2011. It will first examine the basis for university students completing professional engineering practice and the requirements involved, followed by a look at Powerlink Queensland's company background and the role that Network Field Services plays within Powerlink.

The main section of the report is an in-depth documentation of all the activities I undertook and the experiences I had whilst working at Powerlink. It includes work on a large number of different tasks, as well as site visits that I undertook from an observational perspective. I was also exposed to many aspects of the work undertaken at Powerlink, and was able to observe both the operations of the company under normal conditions and responding to crises such as natural disasters.

The report will then analyse the time spent working at Powerlink, explaining some of the decision making processes used for the tasks involved and the how the information used to make those decisions was attained. It will conclude with my evaluation of my time at Powerlink as a whole. This report is fully referenced (where needed) with a reference list provided at the end of the document.



**STUDENT:** Harrison Lee (QUT)

**COMPANY:** Aspec Engineering

In the summer of 2010-2011, I participated in a three month work experience program at Aspec Engineering, Brisbane.

During this three month work experience, I was placed in the Project Services Department as a junior engineer under the supervision of Mr. Mark Biggs and many others who provided tremendous help and guidance.

I was assigned three major tasks of which, activities included:

- Hay Point Coal Service Shiploader 1 & 2 Calculations
- Machine Data Sheet Development
- ASPEC Library Database Setup
- Software Trainings
- Port Waratah Model Development and Simulation

These activities have exposed me to various situations and enriched my experience that has both enhanced my study from Queensland University of Technology (QUT) and inspired further career motivation. From this work placement I have also developed greater technical knowledge, better work ethic, problem solving skills, time management and personal confidence. Furthermore, I realised that I needed improvement in the area, such as attention to detail. Overall, this work experience has reassured my career path as an engineer.



**STUDENT:** Tianya Li (QUT)

**COMPANY:** Powerlink Queensland

Through the API Power Engineering Bursary Program, I was fortunate to gain vacation work experience with Powerlink at its Virginia office during the 10/11 summer holidays as a third year electrical engineering student. Placed in Main Grid Planning Team within the Network Development Department, I worked as a vacation student engineer under the direct supervision of Senior Main Grid Planning Engineer, Rodney Reuben and indirect supervision of Principal Engineer of Main Grid Planning, Cameron McLean. I was privileged to be assigned to work on the VSAT software implementation and benchmarking project, receiving guidance and support from my direct supervisor and other engineers. This report was written to demonstrate the quality of my work experience.

My main work responsibilities involved understanding voltage stability limits and their analysis techniques, understanding VSAT software, producing a basic step-by-step VSAT User Guide for setting up one grid section from scratch, assist in setting up configuration files for Powerlink's grid sections, aligning Powerlink's VSAT implementation with AEMO's VSAT implementation, benchmarking Powerlink's VSAT results with VSCE limit equation results, and documenting procedures and progress. Along with a few other vacation students, I was given the task of updating Powerlink's internal Glossary Wiki with new terms.

I found my work experience at Powerlink rewarding, valuable, challenging, and enjoyable. I was involved in meaningful and important 'real world' project work while working closely with experienced professional engineers and project manager. I gained better understanding of power engineering, especially in voltage stability assessment, power transfer limits in Queensland's network, and reactive compensating devices. I had exposure to industry softwares such as VSAT, PSSE and VSCE, and the limit equation derivation process. Throughout the software implementation and testing process, many errors and issues were encountered. Much of my work involved debugging errors, discussing with planning engineers to know of their design preferences and conventions, and keeping track of major decisions and progress. Through the problem solving process, I grew in the area of patience, perseverance and communication.

This placement gave me better appreciation of the relevance of voltage stability in the power transmission system as well as the important role of transmission planning engineers. I am grateful for this work experience at Powerlink as it better equipped me for my future power engineering studies and career.



**STUDENT:** Dylan McVeigh (QUT)

**COMPANY:** AEMO

With the help of the API, I undertook work experience at AEMO in the Planning Department. AEMO is the Australian energy market operator and during my placement I have learnt a lot about market systems, transmission planning, and power systems in general. Under the supervision of Frank Montiel, an assortment of tasks were undertaken throughout my placement, which were all interesting, challenging and rewarding.

Projects which I undertook included producing an updated edition of a companion CD which comes with the National Transmission Network Development Plan (NTNDP) and placing its contents online ([http://www.aemo.com.au/planning/2010ntndp\\_cd/home.htm](http://www.aemo.com.au/planning/2010ntndp_cd/home.htm)). With this, I oversaw the development of an interactive map showing details about the energy network and modelled network augmentation under possible future scenarios. This can also be found in the above link in the “Interactive Map” section in the side menu.

The final project which I worked on was the development of an automation tool which can create network constraint equations. These equations are used in dispatch algorithms to ensure system security.

Overall, this placement has been the best out of my two previous placements due to the fact that at AEMO I was always busy with my projects and always had something to do. This has made the placement most rewarding and fulfilling; gaining the highest amount of experience I could during my time there.

**STUDENT:** Jonathan Midgley (UQ)

**COMPANY:** Origin Energy



During my three month employment at Origin Energy, my technical understanding of the Coal Seam Gas industry has greatly improved. I now understand to a much greater extent the processes used to find, extract, process and sell CSG.

I worked within the Gathering and Development department of Origin Energy under the guidance of my supervisor, Ray Muscat. Although Origin is not a sponsor of the API, and the department I worked within is not directly involved with the generation of power or supplying the Australian market with electricity, I still feel that my placement was very beneficial. CSG is used to power the Darling Downs Power Station – a 630MW combined cycle generating enough power to supply the equivalent of 400,000 homes. By being part of the G&D team, I was helping to make a contribution to continuing the supply of cleaner fuels for Australia’s power generation.

My specific role within G&D was as an Engineer investigating the use of High Point Vents (HPVs) and Low Point Drains (LPDs). During CSG production, a CSG/water mixture is extracted from the well and passed through an initial two phase separator. The pressure of this separator is the driving force behind water transfer from the separator to the ponds via an underground piping and gathering network. The network generally follows the ground contours and due to inefficiencies in the separation process, the water discharge may contain entrained gas. Ultimately, gas accumulates in the pipeline forming gas pockets in the downhill sections of the network, causing a loss in available head and thereby reducing the overall efficiency. Removal of these gas pockets will result in a more efficient gathering network and allow for a possible reduction of pressure at the separator.

My task (along with a fellow Mechanical Engineering Student) was to investigate the current design used for HPVs, as well as several other possible new designs and make a decision as to which one was the best option. “Best option” was determined by an appropriate balance between cost, constructability, transportability, and effectiveness at catching gas bubbles. After many weeks of laboratory work at the University of Queensland, it was determined that the design currently in place worked very well, but that another, less complex design proved better results. A meeting with G&D Engineers was held and it was decided that the new design would be trialled at Origin’s Spring Gully CSG site. This new design is expected to drastically reduce costs, potentially saving millions of dollars.

I would like to extend my gratitude to Origin Energy and Ray Muscat for the opportunity presented over the 2010-2011 Vacation Engineering Student Program. My research, time management, budgeting and organisational skills have benefited greatly from this position, and I hope to have the chance to work for Origin Energy again in the future.

**STUDENT:** Timothy Nakhla (UQ)

**COMPANY:** ENERGEX Ltd



This report is a summary of my vacation experience over the 2010/11 summer break at the distribution utility, ENERGEX. I was placed in the Network Development Planning team in the Network Capital Planning unit. This team contains planning engineers that create development plans to ensure network capacity and reliability requirements are met.

My time was spent assisting Benson Heng and Andrew Hewitt through my placement period. I spent my time working on two separate threads: I completed some simple planning projects and updated the planning spreadsheet.

With the planning projects I was given a few projects to develop, come up with options and a cost analysis. I also updated completed reports with the latest costing and load forecast. I also spent some time updating the substation spreadsheet tool that is used in this department. I updated switchgear ratings, feeder ratings and importantly, updated the substation transfer capabilities of the bulk supply substations.

I thoroughly enjoyed my time at ENERGEX and I am now more motivated to continue my studies in the power industry. I have also accepted a thesis topic from ENERGEX in the area of IEC61850.



**STUDENT:** Harry Willis (UQ)

**COMPANY:** Tarong Energy

This report provides a record of the vacation experience that I undertook as part of the API Power industry bursary program over the 2010-2011 summer holiday period. For this period I was fortunate enough to work with Tarong Energy Corporation at Tarong Power Station, around 200km outside of Brisbane.

While at Tarong Power Station I worked in the Engineering Services group with the Electrical, Instrumentation and Control team. For a few weeks, I worked in the Generation Operations Production Maintenance group who were responsible for maintenance and repairs of Electrical/Electronic equipment. For the rest of the time I worked in the Engineering Services team.

One of the main tasks I completed with Tarong Energy was to produce an EDSA model of Tarong North Power Station. This model, produced using 'Paladin DesignBase' software, used data available from the station's single-line diagram and engineering reports to predict fault currents in the stations distribution system. These fault currents were to be used to perform an arc flash intensity study which would help determine the safety of electrical work at various locations points in the distribution system.

With the Operations group I designed and built a testing device to test the 'snubber' circuits that protect Thyristor packs which provide a DC voltage for the generator field windings. I also produced some revisions for the Maintenance Procedure document. Previously it was possible that some failure modes of the snubber devices would not be detected, so the new test that I designed was targeted specifically at those failure modes.

Along with these tasks I went on many excursions around the plant, visited Tarong North Power Station, and performed other miscellaneous tasks.

I gained a lot of knowledge during my time at Tarong Power Station and I would recommend it to other students.



**QUEENSLAND ALUMINA  
LIMITED**

**STUDENT:** David Winsor (UQ)  
**COMPANY:** Queensland Alumina Limited

During the 2010/2011 summer vacation period I had the privilege of working for Queensland Alumina Limited (QAL). QAL is an alumina refinery in Gladstone, Queensland which processes bauxite from Weipa to produce alumina, which is then sent to a smelter to produce aluminium. The process used at QAL to extract the alumina is the Bayer process. The Bayer process has four distinct steps: digestion, clarification, precipitation and calcination. QAL currently produces 4 million tonnes of alumina a year making the plant one of the largest alumina produces in the world.

QAL has a vast and varied electrical network with state of the art electronics to switchgear and cables that is up to 40 years old. Powerlink's 132kV lines feed QAL as its primary power however the plant has the ability to produce its own power up to 30 MW. I was positioned in the electrical and instrumentation technical support team. My team's main role was to keep all the electrical systems working efficiently and up to Australia and QAL standards.

I worked on three main projects and several smaller side tasks. My first project raw materials workshop lighting involved finding a suitable method of rectifying lighting blackouts of a workshop due to power surges caused by unloading machinery. My second project was to design a method to decommission and replace a rare Siemens circuit breaker so it can be used for spare parts or a replacement in high priority areas of the plant. The third major project involved writing construction specifications for the installation of residual current devices (RCD's) on all general purpose outlets (GPO's) on site that are not currently protected.

Throughout my placement I have gained several valuable skills that have furthered my academic and professional engineering skills.



**STUDENT:** Sarah Barns (QUT)

**COMPANY:** Stanwell Corporation

During my three-month placement with Stanwell Power Station, I was able to improve my understanding in a wide range of areas relating to engineering within the power industry, in particular at the generation level. I was placed within the Asset Services Projects Group.

My primary role over the course of my placement was to work on a number of ongoing modifications to the industrial fans on each of the four units. This included increasing the replacement interval on FD fan bearings, designing a stand to support ID fan shafts during overhauls and investigating the replacement of the deteriorating FD fan silencers.

The aim of this report is to provide an outline of my experiences throughout my time at Stanwell Power Station and to demonstrate how the position benefited my professional development. This included an improvement of my technical knowledge, particularly with respect to working with Australian Standards as well as non-technical aspects such as communication skills and developing an understanding of corporate processes and procedures.

**STUDENT:** Robert Bartlett (UQ)

**COMPANY:** ENERGEX Ltd



This report outlines the experience gained in the power industry, as an API bursary holder during the summer vacation period following my second year of engineering studies at the University of Queensland. During a five week period, I was fortunate to work for ENERGEX in the position of Student Engineer within the System Engineering Group within the Network Systems Development Department where I gained a range of experience on electricity distribution.

My main role at ENERGEX was to investigate the need to fit vibration dampers to distribution conductors. It has been found, through research and experience, that it is important to fit dampers if there is conductor Aeolian vibration. Aeolian vibration causes fatigue failure of the conductor. Aeolian vibration occurs predominantly from laminar winds, long conductor spans and a tight strung conductor. Laminar winds are steady and non-turbulent winds with speeds between 0.5 and 7 m/s. I investigated the geographical factors which contribute to the occurrence of laminar winds.

I researched the different types of dampers available with emphasis on the Spiral Vibration Damper and the Stockbridge damper. I investigated the various conductor types in use on ENERGEX lines as Conductor type and diameter also affect the occurrence of Aeolian Vibration. This is due to factors such as the different self-damping properties of different conductor types. I also performed research on the number of dampers required. As with longer spans, with regard to energy dissipation, either more dampers or more efficient dampers should be used.

I interacted with the damper manufactures to get a comprehensive understanding on the application of dampers. Once I had completed all my research, I supplied suggestions to update the current ENERGEX overhead design manual with more specific instructions for damper application.

Working with ENERGEX has provided me with a diverse and intense learning experience on electricity distribution. I have gained specific knowledge on conductor vibrations and vibration damping. I have gained priceless experience working in the field and interacting with many experienced and knowledgeable engineers and technical experts.



**STUDENT:** Alexander Bowen-Rotsaert (UQ)

**COMPANY:** Stanwell Corporation

During my three month vacation placement at Stanwell Corporation Limited, a Queensland Government owned power Generation Company, I was very fortunate to be placed in the Business Development team, where I was exposed to commercial engineering projects. In particular I was involved with the Burdekin Hydro Feasibility Study team. However, I also assisted in the Coal Supply Chain Analysis of Stanwell Power Station.

This report details:

- The background information regarding the company and power industry, as well as information on the aforementioned projects.
- The roles and responsibilities I undertook, as well as the methodologies required to complete these tasks.
- The experience of working in a professional environment and the lessons learned during this placement.

My time at Stanwell has given me an insight into the role of engineers in the power industry, and in particular their roles in establishing and maintaining generation capacity. Some of the key lessons I learnt include:

- The broad nature of mechanical engineering means these engineers can fulfill roles that may not 'traditionally' fall within their disciplines.
- The scope and consequences of engineering work in the commercial world is not always appreciated within the boundaries of university.
- Sometimes there is no exact answer to particular problems, and assumptions and estimations must be made to make the best approximation possible.

The opportunity to observe and participate in commercial and industrial relations, job organisation, maintenance, safety and environmental procedures from the viewpoint of the general workforce was a truly rewarding experience and very valuable preparation for a career as an engineer. I feel that having completed this placement, I am better equipped to continue my study and seek future employment in the power industry.



**STUDENT:** Benjamin Bokma (JCU)

**COMPANY:** Ergon Energy

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Between November 2010 and February 2011 I completed twelve weeks of vacation work at Ergon Energy in the Solar Cities Department in Townsville under the supervision of Ian Cruickshank, Manager of Solar Cities. During this period considerable time and effort was spent and contribution made to various data analysis projects including analysing the peak demand and total energy use for residences on Magnetic Island. My overall aim has been to better understand the power industry, especially the renewable energy sector, and how engineers work within this industry.

The Solar Cities Project is a partly industry and partly government funded initiative, designed to reduce overall energy consumption and to reduce peak demand. I worked with the team assisting with data analysis, energy assessments and with community engagement. My time at Ergon Energy was highly beneficial to the development of my engineering skills, knowledge and practical application, particularly in power engineering.

One project that I worked on was analysing consumption data from holiday units on Magnetic Island to determine the effects of several initiatives of the Solar City Project. This was to provide information that would be useful when planning further initiatives and highlighted the importance of monitoring and reporting in the project environment.

Another project that I was involved with was analysing the energy consumption data from one of the Ergon buildings on the island. The supply voltage for the building was changed from 240 V to 230 V and the analysis was conducted to establish if this had any effect on the energy consumption. It was found that the energy consumption was reduced by 4% after changing the voltage to 230 V.

Working on the Solar Cities Project has given me the opportunity to learn about many of the components of distribution networks as well as gaining an understanding of the power industry as a whole. It has also shown me how Engineers operate within a large organisation and how projects are managed when several departments are involved. My skills in data analysis have improved over this time as this was my main responsibility. I was also frequently able to practice my reporting and written communications skills.



**STUDENT:** Anthony Chu (UQ)

**COMPANY:** Stanwell Corporation

During my 12-week vacation work experience with Stanwell Corporation Ltd. (Stanwell), I was able to gain valuable insight into an engineering design project within the generation sector of the power industry. Based in the Brisbane Corporate Office, I worked in the Business Development Team and was assigned to the Wandoan Power Project. This is a multi-proponent 'clean coal' or carbon capture and storage (CCS) project, involving Stanwell, General Electric (GE) Energy, and Xstrata Coal.

My work placement with Stanwell was an enlightening experience, which provided me with a better understanding of the whole power industry in general, and highlighted some of the upcoming opportunities and challenges specific to the generation sector. In particular, I now have a more informed view on the portfolio of energy solutions required to address ever-increasing energy demands in a carbon-constrained future.

As the primary objective of my work assignment, I was tasked to perform a review on the global status of coal-based, large-scale power generation projects with CCS integration, and to present my findings in a report. Specifically, the report provides an assessment on the relative maturity and commercial viability of the carbon capture technologies currently available. Under the guidance and collaboration with a senior engineer, the document was completed for submission and serves as an appendix to the Wandoan Power Project's accelerated pre-feasibility report.

The following report summarises the specific tasks assigned to me during my work placement, noting the challenges encountered and the outcomes achieved from using technical knowledge and analytical skills that are required in the engineering profession. As a result, I feel that I am better prepared to undertake further studies and employment opportunities in engineering, having improved report writing skills, research methodologies and the ability to critically assess presented information.

I would like to take this opportunity to thank the Australian Power Institute, Stanwell and the team at Wandoan Power for providing an informative and interesting work placement.



**STUDENT:** Edmund Fox (QUT)

**COMPANY:** Tarong Energy

Over the 2010/2011 Christmas holidays, I was employed by Tarong Energy Corporation. This Queensland Government owned company is responsible for supplying roughly one quarter of electricity to Queenslanders and employs around 570 people. I was positioned at Tarong Power Station in the engineering sector and was given several jobs that were relevant to an Engineering student. With direction and guidance from many engineers and technicians along the way, in particularly my supervisors – Russell Vorpagal and Brett Taylor, my placement was an excellent learning curve that that was thoroughly enjoyed.

Upon completing induction, introductions and tours I was assigned the task to compile a cost analysis report for the addition of pumps and pipe work between the two ash pits. This report highlighted the increases in efficiency if changes were made to current pumping system while bringing attention to safety concerns and other important engineering concepts.

I also worked on several excel spreadsheets used to maintain records for each generator, giving indications on how they running with regards to emissions, oil usage, temperature and other such variables. The previous system involved many steps and took a considerable amount of time to generate a weekly/monthly report. I altered the spreadsheets, making them more automated and easier to use.

I was also assigned several smaller tasks including determining the maximum load grates within the turbine hall can withstand, writing up a proposal for the addition of an oil/water separator in the wash-down bay and taking pulverised fuel samples from the mills. I was also fortunate enough to visit the Wivenhoe Hydro Station and participate in a tour of the plant. It was very interesting noting the similarities and differences from a coal fired power station.

My time at Tarong Power Station was a very informative and enjoyable three months. The chance to work alongside engineers, technicians and tradespeople gave me much insight into the career path I am following as well as highlighting the many responsibilities that come with it.



**STUDENT:** Carl Harch (CQU)

**COMPANY:** CS Energy

For my second placement as an API Bursary holder I returned to CS Energy Callide Power Station to work as a Mechanical Engineer, however, not only for the vacation period but for a total of just over seven months as my vacation placement leads on into my Co-op placement as a part of my university course where I work for the first semester of my third year.

I really enjoyed my first vacation placement here and I learnt a lot which helped in my decision to return. I felt that because of my previous experience I would be able to quickly and effectively move into my position without requiring most of the inductions and introductions, and with extended placement time I would be able to use my time efficiently and complete some larger projects.

This has proved to be the case so far, after three months of placement, I currently have a number of projects that I am working on including pressure vessel registration, lubrication schedule modification and update, water valve model and high concentration slurry disposal plant KKS identification label installation. Finding all of the pressure vessels and water valves and the required information on them proved a challenge and has helped me extensively learn the plant and where things are located, and also learn the computer management systems and how best to find things on them.

I feel I have developed a good understanding of the power generation industry through working with the Mechanical Engineering department, Projects department, Environmental department, Maintenance teams and contractors. I am extremely grateful for my opportunity to engage in this placement at CS Energy Callide Power Station, it has been very rewarding and worthwhile and I feel I will now be able to use the experience I have gained and things that I learnt in my future studies and engineering endeavours particularly in the power generation industry.



**STUDENT:** Steven Lewis (UQ)

**COMPANY:** Tarong Energy

As part of my mandatory work experience requirements, I took part in 3 months of vacation employment in the Engineering Services department at Tarong Power Station. In this time I have been exposed to many facets of working as an engineer, and taken part in a number of projects. This report has been prepared for the purpose of providing insight into my experiences and what I have gained as a result.

The work I took part in related primarily to the coal handling plant of the station. Some of the main projects I was involved in were:

- Daily pulveriser performance spreadsheet.
- Pulverised fuel flow balancing and monitoring methods research.
- Replacements for aging eddy current coupling conveyor drives.

Along with a number of minor projects, these allowed me to make use of theory learnt at university, develop new skills, and gain a more in-depth knowledge for a variety of areas. In addition, I have been able to make the most of opportunities to improve my personal and organisational skills.

Working in a power station has allowed me to gain a more detailed awareness of the entire generation process. In addition, through discussions with colleagues and general research I have gained some insight into how the National Electricity Market operates, and how electricity is eventually distributed to customers. This has given me a greater appreciation of the power industry as a whole.

From this experience, I have had the opportunity to develop not only my technical skills, but also my personal and organisation skills. I believe that I have made the most of this chance, and have become a much more valuable employee as a result.

**STUDENT:** Tash McGrath (QUT)

**COMPANY:** Alstom GRID

Over the summer break of 2010/11, I was lucky enough to be employed by Alstom GRID as a student engineer, working at the Rocklea factory in the Industrial Engineering Department. This employment gave me invaluable experience in both the operations of an efficient engineering department and the operations of a large factory. I was also lucky enough to witness the production of Power Transformers across all stages of construction.

From the first minute of working at Alstom, it became evident how much time and effort goes into keeping a factory as large as the Rocklea site up to date with modern and efficient machinery and work practices. With a late running project having the potential to cost the company many millions of dollars, it is paramount that any undertaken projects run on time and to plan and it is the role of the Industrial Engineering Department at Alstom to ensure that happens. For this reason, my desk was immediately full of projects to design safe working practices for recent new machinery into the factory.

These safe working practices (called Work Instructions) were my main tasks whilst employed at Alstom and involved acquiring knowledge of the workings of the equipment, the required EHS for using the equipment safely and the most practical uses for the equipment. They also required the development of short, efficient instructions and corresponding photos so as to relay the required information to the reader in the most effective way. They provided me with invaluable real life knowledge of manufacturing processes and health and safety standards as well as skills in the writing of workplace standards and protocols.

This reports aims to relate in detail my time spent employed at Alstom and the work and projects undertaken as well as the experience and knowledge gained through working at such a large and profitable company.

**STUDENT:** Christopher Vasiliou (QUT)

**COMPANY:** ENERGEX Ltd



This report summarises my experience during my vacation employment with ENERGEX in the 2010/11 summer. I was placed in the Distribution Planning Department of the Network Capital Planning group. This department deals with the assessment of loads on ENERGEX's 11kV distribution network and planning of any augmentation that needs to be made to the network to cope with these loads and ensure that the network remains reliable and cost effective.

My primary task was to complete the DINIS cleanse project which aimed to resolve all discrepancies between DINIS, a program which models ENERGEX's 11kV network, and the actual network.

Through my work, and the exposure I had to the work of the rest of the Distribution Planning team, my technical understanding of the distribution network in South East Queensland has grown significantly. I also have a better understanding of the importance of planning, particularly in large engineering projects.

I enjoyed my time spent working at ENERGEX and am grateful to both ENERGEX and the Australian Power Institute for providing these valuable work placements.



**STUDENT:** Christopher du Plessis (QUT)

**COMPANY:** Ergon Energy

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Power companies who transmit, distribute and maintain low to high voltage equipment have a large responsibility in society. They are expected to maintain a high standard of work, they are prepared and well equipped to maintain their infrastructure and ensure that power remains on for customer in the network. Ergon Energy is no exception, they maintain excellent standards in such areas and their substation design team can be considered a vital contributor towards maintaining these excellent standards. This report aims to describe the steps involved in undertaking EMF studies in substation design and how these studies contribute to the excellent standards that Ergon holds for its assets.

Power engineering is part of a diverse discipline of the engineering profession. It is challenging, unique, and can be considered a flexible career. Power engineers have the option of specializing in a single area of work or gaining a broader experience, this would depend on their position. Ergon is an excellent example of a company who values what is most important, their employees; they understand that if their employees aren't satisfied then how can their customers be? This was one of the most significant impressions they have made on me as a university student, not only did they impress me they treated me as a valued member of the team. Forgetting the fact that I had only completed one year of university, I was offered the best resources, access to professionals with unique backgrounds and given opportunities to contribute to their excellent standards of workmanship, professionalism and integrity. I was responsible for conducting an Electromagnetic Field (EMF) study on the Cairns North substation, which had been built before EMF studies were a requirement of Ergon. These studies are an initiative of Ergon to understand the EMF produced by their substations and lead to low EMF substations.

Problems included IT issues with programmes etc and assumptions made during the building of the substation in the programme. Twice the CDEGS programme used to build the substation model needed to be rebooted, however fortunately Ergon has suitable teams who help workers to solve such problems. The assumptions were difficult at first because a level of understanding was required in order to make them. My job was to first learn and understand the basics of the substation in order to efficiently conduct my work. Conduits, conductors, clearances, earthing, High voltage, loads etc were all a part of the learning process and proved to be challenging as a first year student who had only touched on the basics of electrical engineering. It is strongly recommended to anyone to first grasp concepts and communicate with your supervisor; he or she will know better than anyone what you will require in order to conduct your work. But the most important part was that my supervisor guided me to find the solution myself, to use the problem solving skill I learnt at university to understand concepts and solve problems.

**STUDENT:** Tara Jackson (UQ)

**COMPANY:** ENERGEX Ltd



After the first year of my Engineering Degree at the University of Queensland I completed 5 weeks of work with ENERGEX. During this time I was placed with the Distribution Planning team of which their responsibility is to plan upgrades and changes to the 11kV network of South East Queensland.

The main task I was given was assisting with the 'Dinis Cleanse Project' which involves syncing information used on various programs by the ENERGEX staff. I also went on substation and site visits, assisted in completing a Project Report and attended group meetings. During this time I learnt the importance of some systems and procedures used by the Distribution Planning team to plan upgrades to the network to improve over utilisation and poor reliability.

Through my Vacation Work with ENERGEX I have gained vital knowledge about the power industry, which will be of great assistance to me in the future. It was interesting to see the workings behind South East Queensland's Power Grid and learn about basic electrical concepts and different circuits used for various environments. I also learnt of some of the problems that the power industry is set to face, including rising costs and visual appeal.

I am very grateful to everyone involved with the API Bursary Vacation Work for giving me such an invaluable experience. My placement with the Distribution Planning team has significantly increased my understanding of what I will later encounter as an Electrical Engineer.



**STUDENT:** Vlad Lecca (UQ)

**COMPANY:** CS Energy

This report summarises the nine week Vacation Employment that I was involved in at Swanbank Power station during the summer of 2010-2011. Included is a brief background presentation of my employer, CS Energy and of Gas Turbine Combined Cycle Power plants, with a more specific focus on Swanbank's E station on which all of my tasks and projects were based around.

At Swanbank I was assigned the position of Apprentice Engineer and was given a variety of tasks that have helped gain a better understanding of Real World Engineering, Operational Health and Safety and Technical Skills. The main tasks I performed whilst at Swanbank were Engineering Design related projects, maintenance work, Drafting using CAD software and Data Basing.

In essence my time at Swanbank has been an excellent learning experience that has taught me invaluable life lessons about the Power generation industry, engineering work ethics and work culture, which I would never have learned at University.

**STUDENT:** Matthew Lowrey (CQU)

**COMPANY:** PB Power

As part of the Australian Power Institute's (API) Bursary Program I was provided with the opportunity to complete a three month work placement with the multi-national engineering consultancy Parsons Brinckerhoff Pty Ltd (PB). During this placement over the summer University break period of 2010/2011 I worked in the Power Networks division of the Energy, Mining & Industry Group.

The purpose of this report is to communicate the learning outcomes of this placement for my own reflection, use as part of my Professional Development and for evaluation purposes by the Bursary Partners.

Although working under Malcolm Busby in Power Networks, I was exposed to many different projects through tasks performed for a variety of specialists throughout the Power group. This was one of many examples of learning on the same point – the need for cross specialisation collaboration regardless of geographical or cultural separation.

Another challenge that featured across all tasks was trying to understand specifics within the terms of the project whole. This was required in order to complete tasks with greater clarity and thus higher quality. The main tool used to improve my understanding of the project whole was communicating with my colleagues when a point of understanding was missing. In this area PB's work culture shines as my colleagues were more than happy to assist me in clarifying and elaborating on any technical or non-technical issue I had.

Specific tasks completed included compiling data from an Engineering Services Report in order to assist in identifying a tripping issue at the Ranger Uranium Mine, project administration duties for the construction of a transmission line in Papua New Guinea, providing assistance with due diligence for the Solar Flair Alliance's solar thermal project being put to tender, compiling and manipulating reliability data about a group of power plants to be purchased and producing a scope of works document for a Waste Water Treatment Plant upgrade.

The experience as a whole was highly valued because it allowed me to gain an initial understanding of what power engineering is like in a consultancy. Further, thanks to the assistance of Malcolm and others my technical knowledge and general knowledge of power engineering has greatly increased and given me a more tangible foundation for my university studies.



**STUDENT:** Christopher McAllister

**COMPANY:** Ergon Energy

**everything in our power**

For a period of 13 weeks over the James Cook University end of year holidays, I was employed by Ergon Energy Corporation Limited, in the Generation Technical Services workgroup as an Engineering Vacation Practice student. I was based at the Kenny Street Depot in Cairns, where the primary focus is on Isolated Power Stations in Queensland, and the Torres Straight Islands.

During my time with the work group, I was given a number of projects to work on which were interesting, challenging, and also relevant to my mechanical engineering studies. Some of these tasks were:

- The design of mounting brackets to the engine manifolds.
- Report writing.
- Writing a precision and accuracy standard for workshop projects.
- Emergency procedure for gas pipeline faults.
- Background study of gas and steam turbines in preparation for Barcaldine trip.
- Effectiveness of GenSet acoustic dampening canopies and insulation.
- A root cause analysis on an alternator fault.
- Oil mist investigation to reduce effects of environmental emissions.
- Attending concept meetings.
- Design specifications for universal beams.
- Background study of welding to assist in bracket designs.
- Procurement of documents and information.
- Design and drawings for an alternator skid augmentation.
- Attending weekly team work meetings.

I was also given the opportunity to travel out to the Barcaldine Power Station in Central Queensland, which was a great experience where I learnt a lot about the power generation industry.

Over the 13 weeks that I was with Ergon Energy I have gained invaluable insight and experience in the power generation industry and mechanical engineering in general.

At Ergon Energy I was able to improve my communication skills, by attending weekly meetings, writing reports, creating drawings, having to work with a variety of people, and dealing with other businesses outside Ergon Energy. I have become competent using AutoCAD in two and three dimensional drawing. I have also learnt how to use Google Earth as a mapping tool, as well as to store information about company assets. I am now proficient at reading and interpreting design drawings, as well as creating my own to a workshop construction/fabrication standard.

All of this has allowed me to understand where I need to focus my studies, and had put me in good stead for my second year, and further studies.

**STUDENT:** Manisha Senadeera (QUT)

**COMPANY:** ENERGEX Ltd



During the 2011 summer break, I was presented with an opportunity to undertake vocational employment with ENERGEX at the new corporate office in Newstead.

I was assigned to working with the Systems Engineering Department, an area that specialised in the development of technical standards for the electricity and telecommunications networks, technical specification and evaluations for network plant and materials and construction of network design solutions.

Currently, a large problem facing the power distribution industry are the hazards imposed by a high resistance or open-circuited neutral conductor which can expose the public to potential voltage shocks. The task I was assigned to complete during the course of my employment was to compile a report that sought to investigate methods of identifying and locating neutral faults on the low voltage network allowing for quick and efficient resolution of the issue, thus reducing the chances of an electric shock hazard developing on the community.

My time at ENERGEX has been both an enjoyable and educational experience as I have become more conscious of the power industry's presence around me while also deepening my understanding of the technical aspects of its operation on the low voltage network. Undertaking the report, has further allowed my technical writing abilities to develop, an important skilled required as an engineer.

With the knowledge gained throughout my stay at ENERGEX, it will allow myself to be a step ahead of my university class mates as I have had a firsthand insight into the field of power engineering while also having learnt information that may otherwise be unobtainable through my university degree.

**STUDENT:** Shiva Tejwani (UQ)

**COMPANY:** Aurecon

During the summer of 2010-2011, I was employed as a vacation student in Aurecon's Brisbane energy section. Most of my time was spent in the area of electrical protection.

Over this period I was exposed to several projects in both the industrial and power utility sectors.

One project I worked on was producing RSRs (Relay Setting Requirements) for a 33/11 kV suburban zone substation. When commissioned, the new substation will assist surrounding substations which were otherwise being pushed towards maximum capacity.

This entailed examining protection line diagrams, panel diagrams showing the 11 kV feeder routes, producing Visio diagrams and protection settings using grading curves and hand calculations. Once approved, these settings will be applied and recorded in the utility's document management system.

Another project I was involved with was a major upgrade at a central Queensland coal terminal. For this project I used fault study results and anticipated load data to produce grading curves.

My final task during my placement at Aurecon was reading a paper on Arc flashes and presenting the main points to a group of electrical engineers, who plan to incorporate a study in their ongoing projects.

I enjoyed my experience with Aurecon and have gained useful knowledge in several subjects of electrical engineering. These skills will help me tremendously with further study and placements.

I would like to thank Mr. Alan Buttery, Mr. Leo Alix, Mr. Matthew James, and Mr. Stefan Istratescu for providing me with constant support throughout my time at Aurecon.



**STUDENT:** Monan Zhang (UQ)

**COMPANY:** Ergon Energy

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The 2010-11 vacation placement report outlines my responsibilities whilst working at Ergon Energy, and the invaluable knowledge and industry experience I gained there. I worked twelve weeks at the Network Data Department in Cairns, which is responsible for maintaining the data quality for all Ergon assets. I was also fortunate enough to be given the opportunity of working another week on the research and analysis of different types of energy storage in the Technical Development group, which is responsible for alternative energy supply solutions. During the total of thirteen weeks work period at Ergon, I was for the first time exposed to the manufacturing side of the Electricity and Power Industry, and my knowledge of power engineering has significantly advanced beyond the basic level.

With over 4,500 employees and a service area that covers 97% of Queensland, maintaining the data quality of Ergon's electricity distribution network is essential because of its integration and widespread use across the organisation. As distribution asset data is manually stored in several databases for use in various applications, discrepancies between databases are possible. Therefore, I was assigned two projects with the goal of improving the data quality across different databases. The first project was focused on the investigation of a list of substations existing in one database but missing in another, with the resolution to make the data from both of the regularly-used databases align with what was expected in the real world. The second project had the aim of fixing connectivity issues between existing substations and feeders. Both of the projects were completed with the satisfaction of my supervisor.

Working in the Network Data Department has given me a great opportunity to learn about how different electrical components operate across an entire distribution network. Even though I only worked at the Technology Development group for a week, I had a great time working with many power engineers as a team, and I had lots of fun looking into new and future technologies within the power industry.

I appreciated the opportunity given by API Bursary program that allowed me to have a balance between constructive theory in university and tangible, on-ground work experience within a large power distribution company like Ergon Energy.