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Mr Simon Bartlett  
Chairperson  
E S Cornwall Scholarship Advisory Committee  
P O Box 1193  
Virginia QLD 4014

Dear Mr Bartlett

**E S Cornwall Memorial Scholar – Aidan Roberts  
First Quarterly Report**

Please find enclosed the second quarterly report for the E S Cornwall Memorial Scholarship for 2008-2010 which is a requirement set out in the scholarship rules (6).

The points of interest for the quarter are the Worst Served Customer and Business Carbon Footprint policy development, involvement with the Quality of Service, DPCR5 & Environmental Working groups, and a visit of Western Power Distribution.

I would welcome the committee's feedback and advice on the report, particularly concerning my proposed goals for the next quarter.

Yours faithfully,

Aidan Roberts

**Enclosures:**

**E S Cornwall 2009-10 Quarterly Report 2  
Appendix – Status Update on the UK Power Academy**

## 1 Introduction

My tenure of the E. S. Cornwall Memorial Scholarship is currently from October 2008 through to October 2010. The purpose of the proposed program is to gain experience in the areas of Smart Networks and Distributed Generation. In particular, I hope to gain an understanding of how these areas will impact and/or enable network operation & planning, energy & demand management, metering and carbon emissions. The proposed program is designed to give me experience with a regulator, a consultancy/research facility, a technology provider and a distribution network operator.

This report is the second of 6 quarterly reports required under the rules of the scholarship. The period of employment reported on is January 1<sup>st</sup> to March 27<sup>th</sup> which covers the second half of a planned 6 month placement.

My first placement was with Ofgem, the Office of Gas and Electricity Markets. The main objective of this placement is to gain regulatory experience with a particular interest in policies surrounding Smart Networks and Distributed Generation.

## 2 OFGEM

### *Work Experience*

The major piece of work undertaken in the first quarter of my placement with Ofgem was the development of the worst served customer policy and in particular, the publication of the proposed policy in the December policy document. Publishing documents is an important part of the stakeholder consultation process in any Distribution Price Control Review. Ofgem typically allows a number of weeks for formal responses to be submitted by stakeholders. These responses along with working groups, a Future Business Plan Questionnaire (FBPQ<sup>1</sup>), bi-laterals and informal consultations help in the development of the final proposals.

Ofgem will publish another Policy document<sup>2</sup> in May and the Initial Proposals document in July. The Final Proposals will be published by December 2009 and provided the proposals are accepted, will be effective from April 2011 onwards.

### *Worst served customer (WSC) Policy Development*

During the second quarter with Ofgem the majority of my time was involved with further development of the WSC policy. Over 3 months I was involved with

- Quality of Service (QoS) and DPCR5 working groups
- Bi-laterals

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1 The Future Business Plan Questionnaire (FBPQ) is a spreadsheet based questionnaire aimed at gathering important information about various aspects of DNO operations. It provides both historical and forecast Network Performance information along with various breakdowns of both Capital and Operating expenditure. Each revision of the FBPQ is developed in consultation with DNOs.

2 <http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrl/DPCR5/Documents1/Methodology%20and%20Initial%20Results%20document.pdf>

- Internal Discussions – Project Board, Directors, Sir Keith Stuart.
- Summary of December Consultation Responses
- FBPQ Analysis

The first QoS Working Group was held in January and was focused on clarification of the proposals in the December policy document. It was also a chance for DNOs to express some of their concerns with what was proposed. The working group was quite an effective forum and helped with further policy development by highlighting the sections of the proposal that were likely to get the most resistance. Similarly, it also showed which parts of the policy were likely to be accepted by DNOs and therefore required less focus in further policy development. From a DNO perspective, it helped them to determine what major points to put in their formal responses. The working group also provided a chance for the DNOs to ask any questions about how to populate the FBPQ.

The March QoS Working Group was timed to allow analysis of the December policy paper responses and the FBPQ. The analysis provided valuable information for further development of policies which were then presented in the working group. The WSC section of the FBPQ was developed to gather information on the types of schemes, the associated costs, the number of benefiting customers and the performance improvement of potential schemes. The March working group provided further feedback on the current form of policies to be then used to for further development for publication in the May document.

For both working groups, the DNOs were also given the opportunity to raise agenda items prior to the meeting. Those who did, were able to maximise the usefulness of the working group, as it allowed Ofgem representatives to both steer discussion and prepare relevant information beforehand. Some of the DNOs also gave brief presentations. These presentations helped facilitate discussion and were another simple mechanism for DNOs to raise areas of concern. Various actions were raised in each working group and responsibility for these actions was split between Ofgem and the DNOs. In my opinion, the DNOs who were willing to participate in these working groups before, during and afterwards often developed good working relationships with the regulator.

Some of the policy areas were perceived as beneficial to some DNOs and simultaneously not beneficial to others. These policy areas were often perceived as biased and resulted in lengthy discussions, often to no avail. These differences were often due to interpretation however some were unavoidable due to inherent DNO differences. The DNOs often arranged their own meeting just prior to the working groups. These meetings allowed the DNOs to develop a coherent and consistent message where possible and also allowed them to discuss the areas of conflicting interest. These lead up meetings were quite useful for DNOs and helped to maximise the usefulness of the QoS working groups for all parties.

I also participated in a general DPCR5 working group. These working groups were similar to the QoS working groups however they were open to all stakeholders. The working group had representatives from DNOs, consumer advocacy groups, environmental groups, power industry consultants, large customers and university researchers. There were separate breakout sessions focused on the three major regulatory themes: Networks, Customers and the Environment. The attendees were able to choose which breakout session to participate in. The breakout sessions gave attendees a chance to voice their opinions and ask any questions directly to the policy makers. They were also able to debate with other attendees. This working group was particularly interesting as it was quite evident which proposals were of interest to various stakeholders and why.

Along with external consultations, there were multiple internal consultations with all levels of

management. Internal consultations on policy development were most frequently with immediate line management. This was usually followed by further direction from senior management, namely the director of Electricity distribution and the Managing Director of Networks. There were also further consultations with the “Project Board”. The “Project Board” consisted of all the Directors from each directorate within Networks. The idea was to try and justify your policy areas to Directors that were more inclined to have more of the DPCR5 funding available for their own policy areas. The final internal consultation is with the Authority. Ofgem is governed by an Authority, consisting of non-executive and executive members. The non-executive Members represent a wide a range of experience and expertise, ranging from work in industry and social policy to the environment, finance and Europe. Executive Members consist of Ofgem’s Chief Executive and the Managing Directors of each division. The authority has the final say on the entire DPCR5 package. Ofgem also had an ex-authority member Sir Keith Stuart who often volunteered time to Ofgem to help give feedback on the kind of justification the Authority would expect before authorising policies. Unfortunately, I left Ofgem just before my area was up for review by the Authority, but apart from that, I gained exposure to all other facets of internal consultation.

#### *Central Networks (CN) Presentation- Smart Meters*

The UK government has indicated its intention to mandate the rollout of Smart Meters to all UK Energy Customers. During the January QoS Working Group, Central Networks gave a presentation on Smart Metering. The presentation covered the timeline associated with the rollout along with some of the implications from a DNO perspective.

During the presentation the following overview of developments was outlined:

- April 2006 – Government announced its intent to provide smart meters to all UK Energy Customers (White Paper)
- Q2-Q4 2007 – Consultancy (Mott MacDonald) advises the government that there is no business case for domestic Smart Meters. Estimated rollout cost of £20 billion. As a result, rollout delayed
- Q1-Q2 2008 – Suppliers place significant challenge on the estimated rollout figure. One supplier estimates £7-10 billion. Delays caused again as Government experiences contractual problems in appointing new consultants. The Structure Group appointed to advise on a communications, technology and rollout model.
- October 2008 - UK Government announces a mandate for Domestic Smart Meters. No rollout model specified initially. Two year preparation phase followed by 10 year rollout.
- Q1 2009 – Proposed date for further clarity on Rollout model and meter functionality for UK.
- 2020 – Completion of UK Smart Metering rollout.

The presenter noted that the proposed Smart Metering rollout was retailer led, with a focus on Automatic Meter Reading (AMR) functionality. The primary drivers were to replace the current method of estimated consumption for domestic customers and to promote energy efficiency. Therefore,

the initial DECC consultation proposed two levels of functionality that were predominantly focused on AMR, connectivity to an in house energy display, remote connection/disconnection and remote switching between credit and pre-payment meters. One of the major differences noted between Retailer and DNO led models concerns data requirements. Retailers would be more likely to poll data every day, week or month whereas a DNO could potentially require half-hourly intervals.

My initial impressions were that the DNOs had taken a back seat in the development of the Smart Meter rollout. As a result, the DNOs were only just realising that without an input into the meter specification they could potentially miss out on a range of potential applications. Furthermore, some of the safety issues associated with remote connection/disconnection were not highlighted in the consultation. At the time when the presentation was given, the initial consultation was closed and the DNO's had not submitted responses. Although they had missed the official consultation deadline, they were able to negotiate delayed submissions.

Some of the potential applications presented by CN were:

- Smart Grid
- Losses Measurement
- On / Off Notification (Ofgem DPCR5 Policy Paper)
- Load data – real time / planning
- Maximise Distributed Generation (DG)

To enable the applications stated above the meters would require the following functionality:

- ½ Hourly load data
- Voltage Reading
- On / Off Notification with time stamp
- 2 Way communication
- Ad hoc interrogation
- ½ Hourly data transmission
- Data Storage capability

CN noted that the inclusion of such functionality would drive high unit costs. They also appreciated that this level of sophistication would also require substantial communications capability and additional costs. They described the advantages and disadvantages of potential communication technologies, such as Radio/GSM and Power Line Carrier (PLC). It was noted that the Radio/GSM option was currently favored in the UK and would enable combination with network connectivity models and third party operation. The disadvantages were cost and difficulty with connectivity in some areas. The major advantage of the PLC option was existing communication medium (electricity network) which would provide future proof connectivity and potentially lower data costs. They noted however that the PLC

option would still require a Wide Area Network (WAN).

I found that the functionality and communication issues presented were similar to the dominant themes coming out of Europe, North America and Australia. However, the most significant problems concern the development of appropriate business cases and determining ownership. Depending on the meter functionality, large scale rollout could have benefits for a variety of stakeholders including retailers, network operators, generators, potential third party energy aggregators and consumers. To complicate this, different stakeholders typically require varying levels of meter sophistication. This poses a major problem in countries where the electricity supply industry has been unbundled, such as the UK. In vertically integrated environments this is less of an issue. In either case, the cost of additional functionality and integral communications infrastructure represent significant investments that need to be cost justified and paid for.

The smart metering consultation and policy development is currently the responsibility of the newly formed Department of Energy & Climate Change (DECC)<sup>3</sup>. On the 11<sup>th</sup> of May 2009, DECC published their latest Smart Metering consultation, which outlined proposals in two primary areas:

- The delivery model or market arrangements for meter installation and on-going management
- smart meter functionality

The consultation closes on the 3<sup>rd</sup> of August 2009. The details of this consultation and responses will be included in a future quarterly report.

### *Business Carbon Footprint (BCF)*

Toward the end of the 1<sup>st</sup> quarter, I asked my superiors if I could take on additional work closer to my areas of interest. In the current Ofgem structure, the incentives<sup>4</sup> of interest fall within the Environment team. Given the time limitations of my placement, it was difficult to find an area that I could make meaningful contribution to.

After some consideration, I was asked in February, to develop a Business Carbon Footprint (BCF) methodology and a corresponding reporting template. The idea of BCF reporting was proposed in the December policy document along with some high level suggestions on the scope of reporting and a potential league table. The scope of my involvement was to:

- Summarise the responses to the December Policy document
- Develop the Methodology for the BCF
- Develop a reporting template
- Develop a framework for the construction of a league table
- Prepare an Internal Paper covering the BCF proposals for discussion

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3 DECC was formed in October 2008 and brought together energy policy (previously with BERR - the department of Business Enterprise & Regulatory Reform) and climate change policy (previously with DEFRA).

4 The incentives of particular interest to me are the Distributed Generation (DG) Incentive, Innovation Funding Incentive (IFI), the proposed new innovation incentive, the Losses Incentive and the Business Carbon Footprint (BCF).

- Present the BCF Methodology and Reporting Template at the March Environmental Working Group
- Liaise with stakeholders as necessary

Community awareness of environmental issues, such as Climate Change, has increased in recent years. Political interest in the issue has now resulted in potential legal obligations in the UK. This has encouraged companies, including DNO's, to take proactive steps toward minimising their impact on the environment. A common approach to minimising impact is the reduction of Greenhouse Gasses (GHG), in particular Carbon Dioxide (CO<sub>2</sub>). The use of electricity is a major contributor to carbon emissions and as such there are potential implications for the Electricity Supply Industry (ESI), including DNO's. As a result, Ofgem proposed the BCF methodology and league table in the December policy paper.

Following the Energy Review<sup>5</sup> in 2006, the UK Government published a White Paper on Energy<sup>6</sup>, which outlined the UK's international and domestic strategies to address long-term energy challenges. The strategy also aimed to deliver on the four energy policy goals:

- put the UK on the path to cutting their carbon dioxide emissions by 60% by about 2050, with real progress by 2020;
- maintain the reliability of energy supplies;
- promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to improve our productivity; and
- ensure that every home is adequately and affordably heated.

One of the key elements of the strategy was to provide legally binding carbon emission targets for the entire UK economy. As a result, the Climate Change Bill was introduced in parliament on the 14<sup>th</sup> November 2008 and became law on the 26<sup>th</sup> of November 2008. The Climate Change Act<sup>7</sup> was the world's first long term legally binding framework to address the adverse impacts of climate change. The UK set the following, quite challenging, emission reduction targets against a 1990 baseline:

- GHG emission reductions through action in the UK and abroad of at least 80% by 2050
- Reductions in CO<sub>2</sub> emissions of at least 26% by 2020 (currently under review to reflect a move to total GHG emissions)

Under the Act, the UK government is committed to develop voluntary GHG reporting guidelines by October 2009. During liaisons with the Department of Environment, Food and Rural Affairs (DEFRA), I discovered that they were tasked with developing and publishing these guidelines.

Part of the methodology development required consultation with DEFRA, who currently publish a list of conversion factors<sup>8</sup> used to convert most emissions into a common base, equivalent tonnes of

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5 <http://www.berr.gov.uk/files/file31890.pdf>

6 <http://www.berr.gov.uk/files/file39387.pdf>

7 [http://www.opsi.gov.uk/acts/acts2008/pdf/ukpga\\_20080027\\_en.pdf](http://www.opsi.gov.uk/acts/acts2008/pdf/ukpga_20080027_en.pdf)

8 <http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm>

carbon dioxide (tCO<sub>2</sub>e). During discussions with the DEFRA, I discovered that they were tasked with developing the reporting guidelines for GHG measuring and reporting. DEFRA's methodology was aimed at all industries. Following on from the publication of the guidelines, DEFRA is also to review the effectiveness of this scheme and how it, and other GHG reporting schemes, could contribute to the achievement of UK's emission reduction targets. The findings of this review are to be submitted to parliament by the 1<sup>st</sup> of December 2010 and based on this review the decision will be made whether or not to make reporting mandatory from 2012. I arranged several meetings with a DEFRA representative and during these meetings we came to the agreement to align our methodologies wherever possible. From Ofgem's perspective, doing this would both encourage the DNOs to accept this voluntary reporting scheme and minimise any transition issues to a potentially mandatory scheme in 2012.

The majority of DNOs welcomed the idea of introducing a BCF methodology as many were already involved with other emission reporting schemes and some accounted for the majority of their BCF already. As some of the DNO's are owned by foreign companies, some of them were also involved with other international schemes. Some of the existing schemes are:

- Carbon Reduction Commitment (CRC)<sup>9</sup>
- UK Emissions Trading Scheme (UK ETS)<sup>10</sup>
- European Union Emissions Trading Scheme (EU ETS)<sup>11</sup>
- Climate Change Agreements (CCAs)<sup>12</sup>

Ofgem proposed to base its BCF methodology largely on the GHG Protocol (GHGP). The GHGP is an international standard that guides the development of GHG inventories. The scope of captured emissions can differ depending on organisational structure and the chosen consolidation approach. The GHGP is discussed in further detail in the next section.

The idea of this BCF reporting scheme was to capture all GHG emissions associated with DNO operations. One of the DNO's used a business model which essentially meant that operation of their network was carried out by a contractor. The inclusion of contractor emissions was a considerably contentious issue throughout the development of the methodology. The main concern with including contractor emissions (and some other emission categories) was proportionality, i.e. ensuring that the costs of monitoring and reporting did not outweigh the benefits. Many of the DNOs felt that their contractors would be reluctant to include emission monitoring as it would incur additional costs and was not specified in their current contracts. From Ofgem's perspective, the emissions of activities associated with day-to-day operation of the network should be captured regardless of if they were outsourced or not. If the emissions were not included, this would require recalculation of the baseline whenever activities were outsourced or vice-versa. Furthermore, these emissions often represented a significant contribution to the overall BCF. This issue was difficult to deal with as no financial incentives were offered initially through the price controls. This meant that initially, the only benefits would come from "real" savings brought about by understanding and mitigating any additional inefficiencies that were made apparent through emissions monitoring.

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9 <http://www.defra.gov.uk/environment/climatechange/uk/business/crc/index.htm>

10 <http://www.defra.gov.uk/environment/climatechange/trading/uk/index.htm>

11 <http://www.defra.gov.uk/environment/climatechange/trading/eu/index.htm>

12 <http://www.defra.gov.uk/environment/climatechange/uk/business/cca/index.htm>

Another issue was the fact that the majority (almost 97%) of a DNO's BCF is a result of distribution losses. Under typical materiality thresholds, the rest of the DNO's emissions were insignificant compared to the losses. Furthermore, the losses incentive already existed and has a considerable financial incentive attached to it. For these reasons it was difficult to agree on a set of minimum reporting requirements that was proportional, consistent, and indicative of their complete BCF.

The development of the methodology and reporting template was valuable experience even though it was quite demanding due to the short time frame and my lack of experience in this area. Undertaking this task gave me exposure to UK carbon emission reduction policies and some of the potential impacts on DNOs. It also gave me an insight into the full extent of carbon emission sources within a DNO along with other businesses. An example of emission sources with a DNO are given in the next section in Table 1.

As mentioned earlier, the major emission category is Losses, which under the GHGP can be attributed to a DNOs carbon footprint. Losses aside, the major emission categories are Transport and the consumption of electricity and gas. As the government has recently committed to long term emission reduction targets, DNOs could potentially face the difficult task of reducing emissions. This gives further validation to the development of Smart Grids/Meters and Distributed Generation as these areas could potentially offer the best solution to reducing emissions associated with distribution losses. Furthermore, by creating GHG inventories, the DNOs will be in a better position to both understand and reduce the GHG emission from the all activities associated with the operation of electricity networks.

### *The Greenhouse Gas Protocol (GHGP)*

The GHG Protocol was formed in 1998 by the World Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). The primary objective of the GHGP was to establish an international set of greenhouse gas GHG reporting and accounting standards for businesses and to promote the adaption of the standard.

The standard covers the six of the major greenhouse gases in the Kyoto protocol:

- Carbon Dioxide CO<sub>2</sub>
- Methane CH<sub>4</sub>
- Nitrous Oxide N<sub>2</sub>O
- Hydroflourocarbons HFC
- Perflourocarbons PFC
- Sulphur Hexaflouride SF<sub>6</sub>

The first GHG Protocol Accounting and Reporting Standard (GHG Protocol Corporate Standard) was published in September 2001. The standard was adapted by businesses, non-government organisations and governments around the world. The BCF methodology and reporting template that I developed was based on the revised edition of the GHGP Corporate standard which was released in April, 2004.

The GHGP is based on the following five principles<sup>13</sup>:

- **Relevance** – “Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users – both internal and external to the company.”
- **Completeness** - “Account for and report on all GHG emission sources and activities within the chosen inventory boundary. Disclose and justify any specific exclusions.”
- **Consistency** - “Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.”
- **Transparency** - “Address all relevant issues in a factual and coherent manner, based on a clear audit trail.” Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.”
- **Accuracy** - “Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.”

The GHGP suggests two approaches for consolidating an organisation’s emissions, the “equity share” or the “control” approach. Under the “equity share” approach, a company accounts for GHG emissions from operations according to its share of equity in the operation. Under the “control” approach, a company accounts for 100% of the GHG emissions over which it has control (either financial or operational). The “control” approach seems to be the most appropriate approach, given the nature of DNOs. Control can then be further defined in terms of “operational” or “financial” control.

The GHGP introduces the concept of “Scopes” to help delineate direct and indirect emissions. The three defined scopes are:

- Scope 1 – Direct GHG Emissions
- Scope 2 – Electricity Indirect GHG Emissions
- Scope 3 – Other Indirect GHG Emissions

Irrespective of the chosen consolidation approach, Scope 1 & 2 emissions are to be reported separately at a minimum. Scope 3 covers any additional/optional reporting that is considered to be of significant importance to the organisation. Categorising emissions as either Scope 1 or Scope 3 emissions can vary depending on the chosen consolidation approach and the operational boundaries. Some examples of emission categories and their respective emission Scopes is given in Table 1.

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13 <http://www.ghgprotocol.org/files/ghg-protocol-revised.pdf>

Category	Sub Category 1	Sub Category 2	Sub Category 3	Scope 1	Scope 2	Scope 3
Electricity & Gas	Buildings					
	Substations					
Operational Transport	Passenger	Road	Cars			
			Vans			
		Air	Helicopter			
	Freight	Road	Van/Light Commercial			
			Heavy Goods Vehicles			
		Rail				
		Air	Domestic			
			Short-Haul			
			Long-Haul			
Business Transport	Passenger	Road	Cars			
			Vans			
			Taxis			
	Rail					
	Air	Domestic				
		Short-Haul				
		Long-Haul				
Fugitive Emissions	SF6					
	HFC					
	PFC					
Fuel Combustion	Diesel					
Contractor Emissions	Operational Transport					
	Fuel Combustion					
Losses	Distribution Losses					

Table 1: Typical DNO Emissions and Respective Emission Scopes

Table 1 shows typical emissions associated with the operation an electricity distribution network. The emission categories were developed to align with the GHG conversion tables published by DEFRA. The three columns on the left represent the three emission categories defined by the GHGP. The highlighted fields indicate the Scope that covers respective emission category. For example, the electricity and gas consumed at “Buildings” and “Substations” are both Scope 2 emissions. The emissions from “Operational Transport” and “Business Transport” categories are a result of fuel consumption. Fuel combustion is an example of Direct GHG emission and hence is typically reported in Scope 1. However, the vehicles used in transport may or may not be owned by the company. Therefore, depending on the chosen consolidation approach, organizational and operational boundaries, emissions from non-owned vehicles may also be reported against Scope 3.

## *Other Experience*

### *Introduction to Finance – Internal Course*

In February, I attended a single day internal course, Introduction to Finance. The course was not a typical commercial finance course, but instead focused on finance at Ofgem. The course covered a wide range of topics including how funding is received by Ofgem. It also covered corporate governance and the role of delegated authorities and public accountability.

The course was quite informative and gave me some insights into the how Ofgem receives its funding. It was also interesting to understand how public budgets are determined and what measures are in place to ensure appropriate expenditure.

### *WPD – Distribution Management Centre/Control Centre / Contact Centre Visit*

Toward the end of January I had the opportunity to visit to Western Power Distribution (WPD) in Cardiff, Wales. WPD operates in two distribution network areas, southern Wales (WPD South Wales) and in the south west of England (WPD South West).

I was accompanied on the visit by several other new Ofgem employees. Over the first day we were given an overview of their contact centre and central control centre. On the second day we were given an overview of their operational structure and a tour of one of their distribution management centres. Whilst on the visit, a QoS colleague and I were also given initial training on CI<sup>14</sup> & CML<sup>15</sup> data audits. The visit was aimed at giving new Ofgem employees, with a non-technical background, a brief overview of a distribution network operator. These visits were offered and organised by WPD and were seen as a good will gesture by Ofgem. They also provided WPD an opportunity to “educate” the regulators who sometimes had very little practical knowledge about the industry they were regulating.

### *IET – UK Power Academy*

Shortly after finishing with Ofgem I had the opportunity to meet with Bill Fenton, the Manager of the Power Academy. In 2004, the Institute of Electrical Engineering (IET) established the UK Power Academy. The primary objective of the academy was to address the projected skill shortage in the electricity supply industry.

I was asked by the Scholarship committee to provide a status update on the UK Power academy on behalf of the Australian Power Academy. This report is attached in the Appendix.

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14 CI – Customer Interruptions – Reliability Index representing the average number of customers per 100 customers interrupted (similar to SAIFI in Australia).

15 CML – Customer Minutes Lost – Reliability Index representing the average duration of an interruption per 100 customers (similar to SAIDI in Australia).

### *Goals achieved & Looking Forward*

The major objectives of my first placement were to gain regulatory experience and to gain exposure to policies related to my areas of interest. My continued involvement with the WSC policy development has given me an exposure to many of the processes and phases involved with policy development. I joined Ofgem after the Initial Consultation document was published and I am not able to see the policy through to Authority approval and ultimately inclusion in the total DPCR5 package. Given that the DNOs were relatively accepting of the proposal presented in the March working group, I feel that I was involved with the core development of this policy. Furthermore, I feel that I have gained an understanding of the preceding and subsequent development phases.

The second objective was to gain exposure to policies related to my areas of interest. Unfortunately due to time restrictions, I was unable to be involved directly with policy development in many of my areas of interest. However, I did gain an understanding of the mechanics of some of the important incentive frameworks and was able to be directly involved with the development of the BCF methodology and reporting template. Involvement with the development of the BCF provided exposure to important UK climate change policies which are often seen as drivers for Distributed Generation and Smart Grids/Smart Meters. I was also able to gain some insight into the implications of Smart Meters for a DNO from a Quality of Service perspective.

I also feel that I have gained a keen understanding of the relationships between regulators and DNOs. In my opinion, regular consultation with regulators and active participation in these consultations is key to raising awareness of potential/current issues and developing mitigation strategies and/or solutions. Although the regulators may not understand the technicalities of some issues, they can often be easily educated about any potential implications. In my experience, albeit limited, I get the impression that it is sometimes perceived as necessary to not be forthcoming, particularly when “errors” are discovered in previously submitted regulatory information. I feel that this is sometimes not the best course of action as it often does not solve the problem but rather delays it or develops new problems. I think the best course of action is to be open with the regulator and offer potential solutions. When requested, the swift provision of information/data sets is also a good way to be cooperative. To avoid misinterpretation, it is also worthwhile to provide clear documentation for the submitted data and make someone available for any further queries.

### *EA Technology Ltd*

On the April 20<sup>th</sup>, I will be starting my new placement with EA Technology. EA Technology is a Power Asset Management Consultancy based in Capenhurst, United Kingdom. I have secured a 6 month contract over which I hope to gain experience working for a consultancy in the Private sector. I will also gain relevant experience in my areas of interest through involvement with a number of projects and workshops that are listed below:

- IEA<sup>16</sup> Implementing Agreement on Demand Side Management - Task XIX - Demand Response and Energy Saving

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16 International Energy Agency – An intergovernmental organisation which acts as the energy policy advisor to its 28 member countries.

- Microgrids.- STP<sup>17</sup> Module 5 – Stage 2
- Investigating the impacts of Electrification of Transport (EoT)
- IEA ENARD<sup>18</sup> - Smart Grid Information sub task
- IEA ENARD Annex I - Workshop on Communications & Control, Visby, Sweden 5<sup>th</sup> - 7<sup>th</sup> May 2009

The list above highlights some of the projects and workshops/conferences that I will be involved with. EA Technology is involved with a number of other projects that are of interest. Although my time may be focused on the projects listed above, I hope to be involved with or at least gain exposure to, other projects of interest.

#### *ENERGEX Ltd - Study Tour*

ENERGEX Ltd has graciously provided financial support for me to conduct several Study Tours throughout my tenure. The ENARD Workshop that I will be attending in May presented an opportunity for me to arrange some additional visits. Following the workshop, I have also been invited to attend the Executive committee (ExCo) meeting. There is a Technical Visit planned after the ExCo meeting to the first ever HVDC Light link which was constructed on the Island of Gotland. In addition to the ENARD activities, I have arranged the following visits:

- Karl Elfstadius – Group Senior Vice President - Head of Smart Grid, ABB
- Lars Nordström – Professor and Head of Swedish Centre of Excellence in Electric Power Engineering - KTH (University of Technology Stockholm)
- Morgan Andersson – Managing Director, Elforsk

These visits should provide a great opportunity to talk to Swedish companies about their interpretation of what a Smart Grid is and what trials and/or Research & Development activities are currently being undertaken.

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17 Strategic Technology Programme (STP) - Program setup by EA Technology to coordinate R&D activities for UK DNOs.

18 ENARD - IEA Implementing Agreement on Energy Networks Analysis, Research and Development

### **3 Appendix**

**A Status Report**  
**on**  
**The United Kingdom's**  
**Institute of Engineering and Technology**  
**Power Academy**



## Introduction

In 2004 the Power Academy was established to by the IET<sup>19</sup> along with power companies and universities. The Academy was set up to help address the projected skill shortage in the Electricity Supply Industry (ESI). The Academy attempts to attract new talent into the ESI by providing financial support and workplace mentoring. Although the package is primarily focused at the undergraduate level, there are also measures in place to raise awareness amongst high school students.

## The Scholarship Package

The scholarship package consists of a bursary, book allowance, contribution to fees when joining the sponsoring company, paid vacation training and an annual summer seminar. The details of the current scholarship package are given below in Table 2.

Package Item	Value	Details
Bursary	£2,200	- Paid on acceptance or Autumn term depending on if the scholar is new or returning - Reviewed each year in April
Academic Support Allowance	£220	- Prior authorisation of spend from company - Paid on Receipts
Summer Placement Salary	£15,000	- Upper Salary limit (pro rata) - Reviewed each year in April
Summer Placement Minimum Term	8 weeks	
Accommodation		- Reasonable support to be given by companies who require Scholars to be based in higher than average cost of living areas eg. London - Where scholars are required to change location for a short period in their placement, normal company provisions to apply
Paid Visit home		- Discretionary, to be applied by the Company depending on where the placement is and where the Scholar lives
Paid Leave	4 days	

Table 2: 2009 Scholarship Package

There are no obligations for the scholarship recipients to join their companies. Therefore, the success of the scheme is heavily reliant on the relationship that is built between the scholar and the sponsoring company. Since its inception, the Academy has recognised the importance of this relationship and encourages regular communication between the company and the scholar. It has also been noted that the one of the major contributors to a successful relationship is the provision of challenging summer placements with the sponsoring company.

I also had the opportunity to talk with one of the previous scholars. This particular scholar had been sponsored during their 3<sup>rd</sup> and 4<sup>th</sup> year of university and undertook a summer placement with the sponsoring company between these years. The scholar was offered a job with the sponsoring company

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<sup>19</sup> The Institute of Engineering & Technology (IET) was known as the Institute of Electrical Engineering (IEE) when the UK Power Academy was established.

upon graduating but turned it down. The primary reason for not accepting the job was based on the vacation placement. The placement was not challenging and involved lot of desk based paperwork. The scholar recalled learning quite a lot during their placement however felt as if the most important learnings were not achieved. By the end of the placement the scholar felt that they had no idea what their job might be like upon graduating and what career opportunities were available. Furthermore, the scholar felt that there was very little communication with their supervisor throughout the placement.

Each year the scholarship recipients are invited to attend a Summer Seminar and Dinner. The seminar is typically hosted by an academy partner, on a rotational basis. The summer seminar is an opportunity for current scholars to meet each other and hear keynote presentations from industry experts. Some of the scholars are also invited to give presentations. The seminar is also host to the Annual Essay Competition with awards given for first and second place. Last years winners were invited to the IET Annual dinner. First place also received a place on the Annual Anglo/German/Russian Energy Seminar which was held at the European Academy Otzenhausen in Germany.

### *Power Academy Partners*

The Power Academy has numerous partners ranging from ESI companies, universities and institutional bodies. The number of partners has grown steadily since 2004, which reflects the importance of the Academy. The current partners are given below in Table 3.

Company	Universities	Institutions	Sector Skills Councils
ABB	Cardiff University	The IET	Energy & Utility Skills
AREVA T&D	Imperial College London		
Atikins	Queen's University, Belfast		
CE Electric	University of Bath		
E.ON UK	University of Manchester		
EA Technology	University of Southampton		
EDF Energy	University of Strathclyde		
Jersey Electricity			
National Grid			
NIE			
Rolls Royce			
RWEpower			
SSE			
Scottish Power			
Siemens			
UKAEA			
United Utilities			
Western Power			

*Table 3: UK Power Academy Partners*

## *Management*

The IET hosts and manages the Academy and also acts as a professional and neutral advisor. In addition, the academy is supported by the Energy & Utility Skills which is the Sector Skills Council for the Power Academy.

There is also a Power Academy Executive that consists of university, industry and IET representatives. The major role of the Executive is:

- To agree the overall strategic direction of the Power Academy
- To approve the criteria and selection process of new partners
- To provide strategic guidance to the IET in respect of all policy issues referred to it either by the Power Academy Council or the IET
- To monitor the overall effectiveness of the management and administration
- To agree any changes to the scholarship package

The day-to-day quality, effectiveness and delivery functions of the Academy are managed by the Power Academy Council. The council consists of representatives from each academy partner.

There is also a University Peer Group focused on driving the performance of the academy's university partners. This group consists of a representative from each university partner along with an IET representative.

## *Statistics*

Over the past 4 years the UK Power Academy has been growing with recent additions to partner companies and partner universities last year.

The scholarships offered by companies went to students studying at a range of partner universities. The breakdown of students by their partner university is shown in Table 4.

University	Year Joined Scheme	Number of Scholars					Total
		2004	2005	2006	2007	2008	
Cardiff University	2006	n/a	n/a	7	7	5	19
Imperial College London	2006	n/a	n/a	11	3	9	23
Queen's University, Belfast	2004	2	11	4	2	1	20
University of Bath	2008	n/a	n/a	n/a	n/a	5	5
University of Manchester	2004	17	9	8	7	5	46
University of Southampton	2004	5	6	3	8	8	30
University of Strathclyde	2004	17	15	14	16	24	86
<b>Total</b>		<b>41</b>	<b>41</b>	<b>47</b>	<b>43</b>	<b>57</b>	<b>229</b>

Table 4: Number of Scholarships offered by University

Table 5 displays the number of scholarships offered each year by the respective companies.

Company	Year Joined Scheme	Number of Scholars					Total
		2004	2005	2006	2007	2008	
ABB	2005	n/a	1	2	2	3	9
AREVA T&D	2005	n/a	0	2	2	2	6
Atkins	2005	n/a	0	2	2	2	6
CE Electric	2004	2	1	3	1	1	8
E.ON UK	2004	8	9	5	9	11	41
EA Technology	2004	1	2	1	1	0	5
EDF Energy	2004	6	7	9	8	7	37
Jersey Electricity	2005	n/a	0	0	0	0	0
National Grid	2004	15	3	7	5	14	44
NIE	2005	n/a	2	3	2	0	7
Rolls Royce	2007	n/a	n/a	n/a	3	3	6
RWEpower	2008	n/a	n/a	n/a	n/a	5	5
SSE	2004	1	1	1	1	1	5
Scottish Power	2004	3	3	4	2	2	14
Siemens	2005	2	8	5	2	2	19
UKAEA	2007	n/a	n/a	n/a	1	2	3
United Utilities	2004	2	2	2	1	0	7
Western Power	2004	1	2	1	2	2	8
<b>Total</b>		<b>41</b>	<b>41</b>	<b>47</b>	<b>43</b>	<b>57</b>	<b>229</b>

Table 5: Number of Scholarships offered by Companies

The UK Power Academy scholarships are highly sought after and each year there are a significant number of applicants. The applicants range from first to final year students and in 2004 there were also applicants who were not at university yet. Table 6 shows a breakdown of scholarship applicants by university, university year, sex and degree.

Category	Number of Applicants				
	2004	2005	2006	2007	2008
Cardiff University			42	25	24
Imperial College London			24	19	32
Queen's University, Belfast		48	19	13	18
University of Bath					17
University of Manchester	36	36	43	24	34
University of Southampton	17	24	28	29	20
University of Strathclyde	58	76	88	78	100
Pre-University applicants	64				
First year applicants	25	117	161	110	131
Second year applicants	9	28	49	38	70
Third/Final year B Eng applicants	10	18	25	31	33
Fourth/Final year M Eng applicants					6
Fifth/Final year Bachelor M Eng applicants	3	21	9	9	5
Male	101	164	218	170	224
Female	10	20	26	18	21
B Eng	36	74	99	58	68
M Eng	75	110	145	130	177

Table 6: Breakdown of Scholarship Applicants

### *Power Academy Australia*

In August 2007 the IET Power Academy expanded their scholarship program to Australia. As with the UK Academy, this program was established to tackle the perceived skill shortage of electrical engineers.

The scholarship package is aimed specifically at students who specialise in Power Engineering. The financial support is only given in the final two years and the package includes, a bursary/book allowance, payment of university fees and 13 weeks of paid vacation placement with their sponsoring company.

The Academy has both industry and academic partners:

- International Power
- Loy Yang Power
- TruEnergy
- Snowy Hydro
- Energy Australia
- Electranet
- Origin Energy
- Babcock & Brown Power
- RMIT University
- Curtin University of Technology

- The University of Adelaide
- University of Wollongong
- The University of Newcastle

The scholarships offered in 2009 are given below in Table 7.

Category	Scholarships 2009
International Power	8
Loy Yang Power	1
TruEnergy	1
Snowy Hydro	1
Energy Australia	2
Electranet	1
Origin Energy	1
Babcock & Brown Power	0

Table 7: Power Academy Australia Scholarships Offered in 2009

### Conclusions

The primary objective of the program was to address skill shortages in the Electricity Supply Industry. Therefore, I think the true success of the scheme can be measured by the number of graduate placements with sponsoring companies. Table 8 below shows the number of graduate placements each year since the Academy's inception.

Company	Year Joined Scheme	Number of Graduate Placements					Total
		2004	2005	2006	2007	2008	
ABB	2005	n/a	2 (+1)	2	2	3	9
AREVA T&D	2005	n/a	0	2	2	2	6
Atkins	2005	n/a	2 (+2)	2	2	2	8
CE Electric	2004	2	1	3	1	1	8
Central Networks / E.ON UK	2004	8	9	5	8 (-1)	11	41
EA Technology	2004	1	1 (-1)	1	1	0	4
EDF Energy	2004	6	7	9	8	7	37
Jersey Electricity	2005	n/a	1 (+1)	0	0	0	1
National Grid	2004	15	5 (+2)	7	5	14	46
NIE	2005	n/a	0 (-2)	3	2	0	5
Rolls Royce	2007	n/a	n/a	n/a	3	3	6
RWEpower	2008	n/a	n/a	n/a	n/a	5	5
SSE	2004	1	1	1	1	1	5
Scottish Power	2004	3	3	4	2	2	14
Siemens	2005	0 (-2)	8	5	2	2	17
UKAEA	2007	n/a	n/a	n/a	1	2	3
United Utilities	2004	2	2	2	1	0	7
Viridian	n/a	n/a	2	n/a	n/a	n/a	2
Western Power	2004	1	1 (-1)	1	2	2	7
<b>Total</b>		<b>39</b>	<b>45</b>	<b>47</b>	<b>43</b>	<b>57</b>	<b>231</b>

Table 8: Number of Placements with Partner Companies

Unfortunately, the information available did not have sufficient detail to track individual scholars from university to graduate placement. Therefore, the highlighted fields in Table 8 indicate specific years where the number of graduate placements does not match the number of scholarships awarded by the respective company. The value in parenthesis shows the difference, e.g. in 2004 Siemens awarded 2 scholarships but did not have any graduate placements. These differences could be explained by scholarships for non-final year students or cases of graduates taking placements with other partner companies that are not their sponsoring company. In either of these cases, the scholarship program would still be deemed a success. The only real failure, would be if a sponsored student gained graduate employment outside the ESI.

There also appears to be some data errors, for example, the total number of scholars gaining graduate placements is slightly higher than the number of scholarships awarded. However, these discrepancies aside, some general observations can be made. Each year, apart from 2005, the majority of sponsoring companies have gained the same number of graduate placements as scholarships awarded. This suggests that the majority of scholarships are awarded to final year students. By this measure, the UK Power Academy appears to be a success. However, with the information available, it is still difficult to gauge whether the existence of the program has been able to attract new students into the Power industry that would have otherwise entered other sectors.

Overall, since the Power Academy was established in 2004, it has experienced substantial growth. The number of sponsoring companies has almost doubled and the partner universities have also experienced a similar increase. The attraction of new high profile companies and university demonstrates the perceived importance of the academy to industry and academia. Furthermore, the continuation of support from these partners is evidence of general satisfaction with the rewards of participation.