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Ref: E.S. Cornwall Scholarship 2nd Quarterly Report period: October to December 2016
Research Theme: Asset Management Excellence

Dear Professor Bartlett,

Please find attached my second scholarship quarterly report covering the period of October to December 2016. The report provides an insight into my work experience at Electricity North West Limited (ENWL), a leading electricity distribution company based in the UK. The report covers the key learning through project works, observations, and interviews with leaders across ENWL.

Specifically, the following aspects are covered in the report:

- Observations on ENWL's business operation and example of good practices.
- Implementation of the common network asset indices methodology.
- Restatement of ENWL's network asset workbook restatement.
- Brief summary on the IEC Young Professionals Programme 2016.
- Updates on the work of CIGRE working group C1.34 (Asset Management).

The work experience has continued to provide me with a unique insight into the UK power industry and broadened my horizons. As discussed, a slightly variation on my work placement programme as I will continue to obtain work experience from ENWL during the 3rd quarter before moving on to EA Technology Limited to complete the 4th quarter placement.

On a personal note, the overall experience has been extremely rewarding for my personal growth as it has strengthened my mindset and capacity to become a change agent. On behalf of my family and I, thank you once gain for the scholarship committee's continuing support during this exciting period.

Yours sincerely,

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electricity north west

Bringing energy to your door

University of Queensland, Australia
E.S. Cornwall Memorial Scholarship

Asset Management Excellence
2nd Quarterly Report
October to December 2016

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E.S. Cornwall Memorial Scholarship
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1. Overview

During the second quarter of my scholarship placement with Electricity North West Limited (ENWL) – a Distribution Network Operator (DNO) based in the North West of England, I continued to witness and learn many aspects of ENWL's business operations. The placement has broadened my experience with a particular focus on gaining an appreciation on how a leading asset management organisation collaborates with its external stakeholders. I also continue to work with the asset management team to implement CNAIM software suite and embarked on the process of restating ENWL's Network Asset Workbook (NAW). The anticipated overall programme for my scholarship placement has been slightly amended as illustrated in Figure 1.

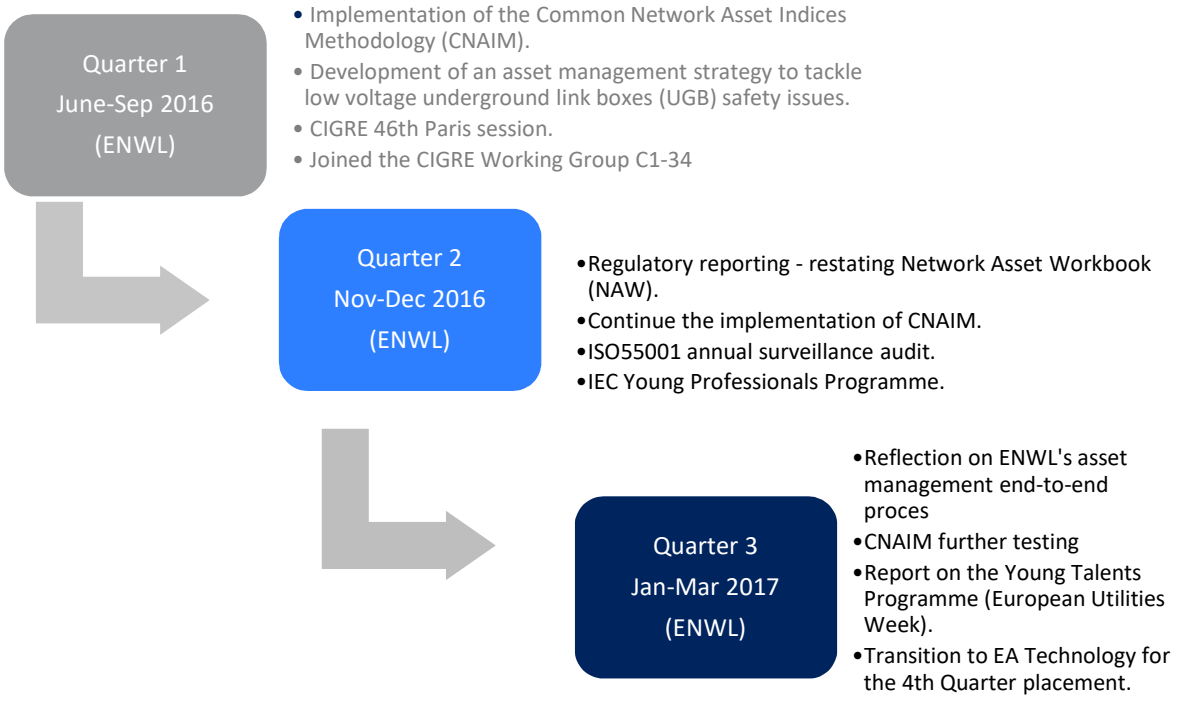

Figure 1 - Scholarship programme June 2016 - June 2017

The scope of learning during this quarter is heavily focused on the following areas of ENWL's business operations:

- Asset management strategy and linkages to their business plan.
- Continue observing their asset management approach to tackling nationwide safety issues on their LV underground link boxes.
- Understanding how ENWL's position to influence the UK common frameworks on assessing asset health indices.
- Relationship between ENWL and their external stakeholders – a special focus on dealing with the regulator (Ofgem) and regulatory reporting.
- General business operations and continuing to learn their organisational culture, processes, communications and management techniques.
- Transformation of the organisation through the new leadership.

The report provides some highlights in the following areas:

- Organisational restructure.
- Implementation of the CNAIM Software and re-statement of ENWL's Network Asset Workbook.
- ENWL's business operations and examples of good practice.
- Learning from the IEC Young Professionals Programme 2016
- Progress updates on the work of CIGRE Working Group C1.34.

2. Electricity North West – Organisation Updates

During the second quarter, I have observed a transformation of ENWL's organisation structure driven by the newly appointed CEO. As leadership is an integral component of Asset Management Excellence, thus, I took the time to monitor the organisation transformation as there are good lessons to be learnt. The new ENWL's organisation structure is illustrated in Figure 2.

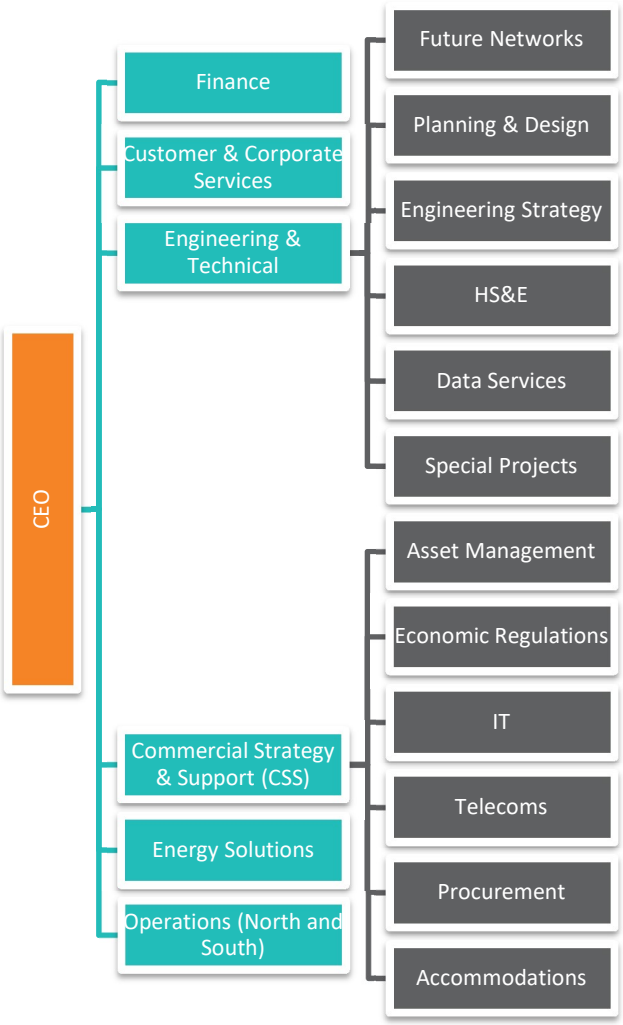

Figure 2 – ENWL's organisation structure (as at December 2016)

A number of observations are noted:

- A new directorate has been formed under the title of Engineering and Technical (ET). ET directorate has been established as the centre of technical excellence and to increase their capability on technical innovation. As ENWL is the only group of UK DNOs which own a single network operator license (out of 14 licenses), it naturally lacks power of economy of scale in comparison to the other DNO groups. The formation of ET as its own directorate will enable ENWL to focus on expanding their suite of technical innovation projects (through their Future Network Business Unit). To simply put, ENWL's key strategy is to punch above their weight.

- CSS directorate has been reformed to focus on providing internal business support (e.g. IT and accommodation), act as the main commercial hub as well as influencing external stakeholders (e.g. Ofgem) through economic regulation and asset management business units. A statement

used to describe the purpose of CSS Directorate "smart people doing smart stuff" provides an insight into ENWL's leadership style and their progressive people culture.

- Maintenance of asset data has become an integral part of the newly formed ET directorate. ENWL use an innovative approach to keep the communication dialogues open by adopting a cross-directorate collaborative platform using a committee structure: Network Data Governance and Assurance Committee (NDGAC). ENWL has recently created a position of Asset Data Manager (reporting to the Head of Asset Management) to providing stewardship, establishment and enforcement of data related policy and strategy. This demonstrates that data is an essential asset to ENWL.

Whilst the organisation restructure has provided a new and purposeful framework for its people to tap into cross-functional synergies, I have observed that the application of ENWL's leadership and their people's attitude are the key driving force to achieving organisational success. ENWL will be hosting a leadership forum (Jan 2017) aiming to bring together their leaders from all levels of business including the Executive Leadership Team (ELT), Senior Leadership Team (SLT) and Wider Leadership Team (WLT) to discuss their strategy moving forward through the RIIO-ED1 period. I look forward to reporting on some of the key points I pick up from attending this event.

3. Common Network Asset Indices Methodology (CNAIM)

3.1. Background and Updates

This section provides a progress update on the CNAIM implementation project which took place during the second quarter of my work experience. One of the tasks I have assisted ENWL to complete during this phase was the commissioning of the CNAIM software suite, performing functional tests to identify software defects, and final software commissioning by the relevant technical authorities. The overall project timeline is summarised in Figure 3. The project is continued to be led by the Asset Management team.

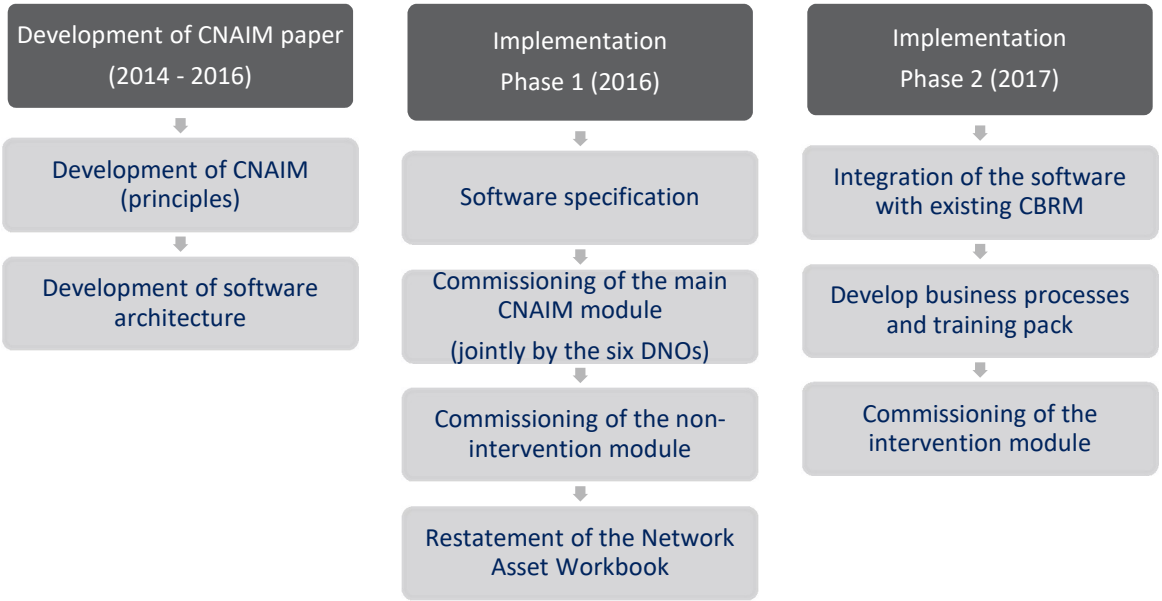

Figure 3 - CNAIM project implementation timeline

The following aspects are discussed in this section:

- Software commissioning strategy, building of asset models, and calibration.
- Challenges experienced and problem-solving approach employed.
- Transforming data into insight through the mapping and conversion of asset condition into asset risk matrices.

3.2. Commissioning Strategy

A robust strategy used to commission the software has been tailored based on the process management method known as PDCA (Plan-Do-Check-Act). The key objective of the commissioning process is to ensure that the software operates correctly and reflects the technical requirements stipulated in the CNAIM paper. The strategy has been simplified and illustrated in Figure 4.

Figure 4 - Software commissioning strategy

The key challenges observed during the process are highlighted in Table 1.

Key issues	Descriptions
Data Quality	Good quality data is essential to successful implementation of a decision support tool. Obtaining accurate asset data (asset information and condition) is a challenge for many modern asset management organisations. During the software testing phase, significant effort has been invested in the process of ensuring that the input data files have met the software specifications and good quality data is obtained from the database (Ellipse and Geographic Information Systems (GIS) and others).
Data Flow	The software has been built into three modules including 1) Data Loader, 2) Data Mapping and 3) CNAIM module (production of results). It is essential that robust test plans are utilised to ensure the input data are successfully loaded transformed and flow through the various elements (sub-systems). The software's characteristics are then compared with the known reference point (obtained from the factory environment) to decipher if the software operates as per its specification.
Efficiency Gain	Communication overhead is a significant aspect to give due consideration for a project of this nature. The project requires an extensive collaboration with internal and external stakeholders with a wide array of expertise. It is not a traditional engineering project. In-depth expertise from a wide array of expertise including software architects, data and IT experts, electrical engineers, business, regulatory and investment professionals were required to deliver desirable outcomes.
Software Defects	Once the software defects are found and rectified, techniques such as keeping good records and retesting are applied to the process to ensuring a full operability of end-to-end data flow and its appropriate impacts.

Table 1 - Key challenges experienced during the software commissioning process

3.3. Asset Model Build

The asset models within the software were built to reflect the requirements of CNAIM documentation and the Network Asset Workbook (discussed next section). Figure 5 provides a summary of the key asset categories. Each asset model was built to reflect the individual asset category, tested and verified separately. A number of input asset data files were shared between multiple asset models due to the commonality of the asset.

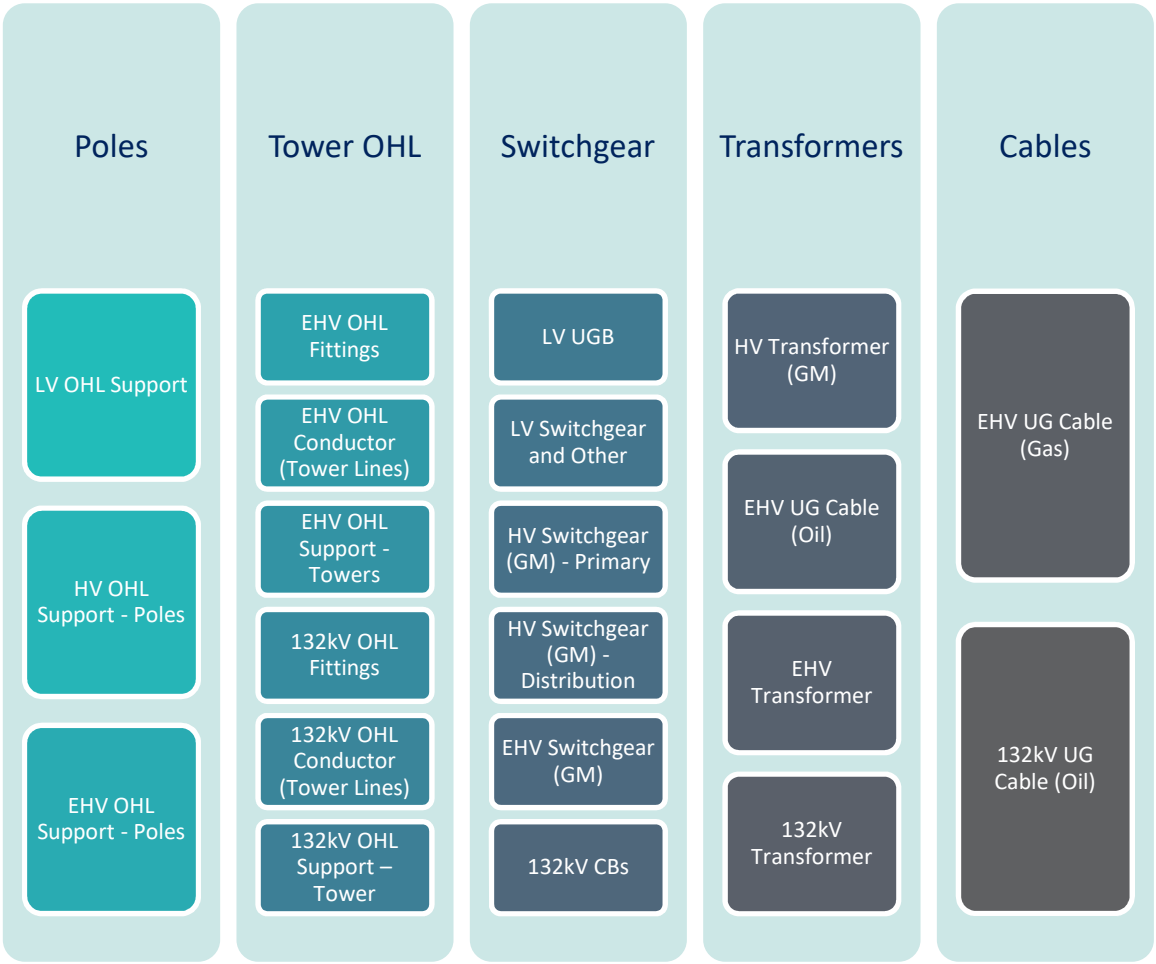

Figure 5 - Representation of asset models in the software

Overall, 25 asset models were created as the blueprint of the software suite. 21 asset models were fully built, tested and calibrated through a number of software defects identifications and rectifications by ENWL. Figure 6 and Figure 7 illustrate some of CNAIM software features:

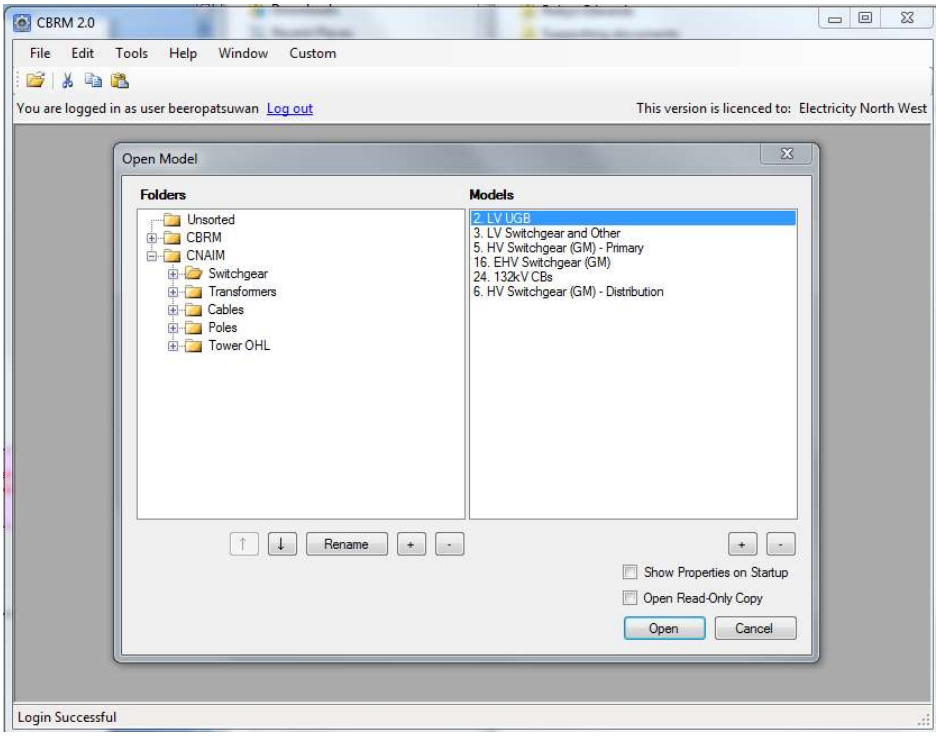

Figure 6 – CNAIM software suite (all asset models)

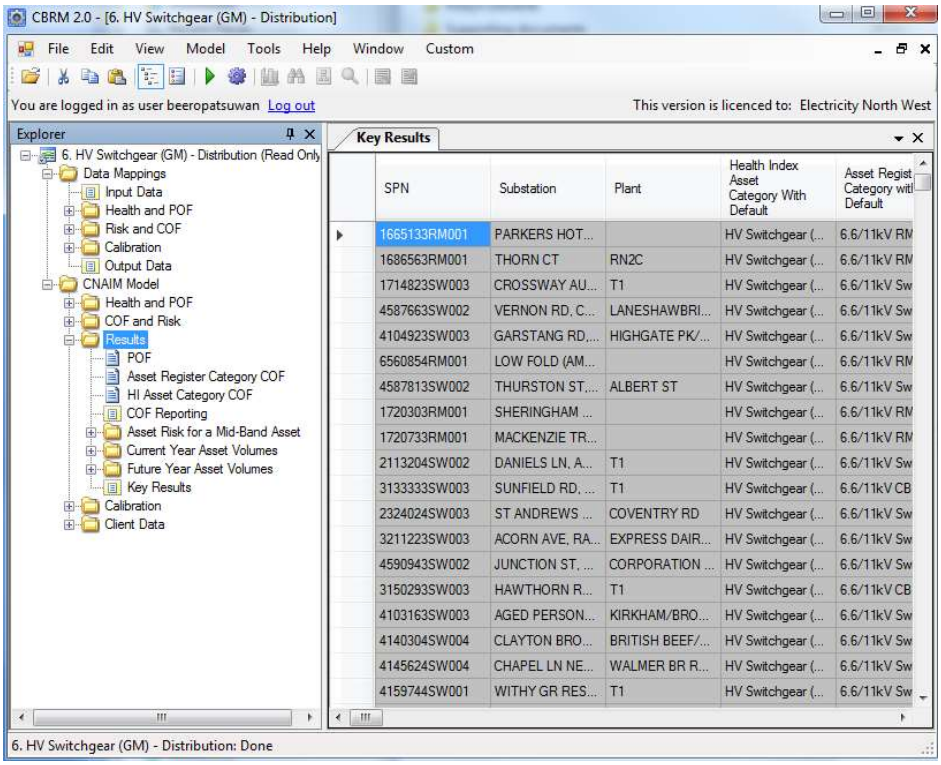

Figure 7 - CNAIM software suite: CM6 - HV switchgear distribution (specific asset model)

3.4. Model Calibration and Acceptance Test

The software has been calibrated through a number of tactical approaches as detailed in Figure 8.

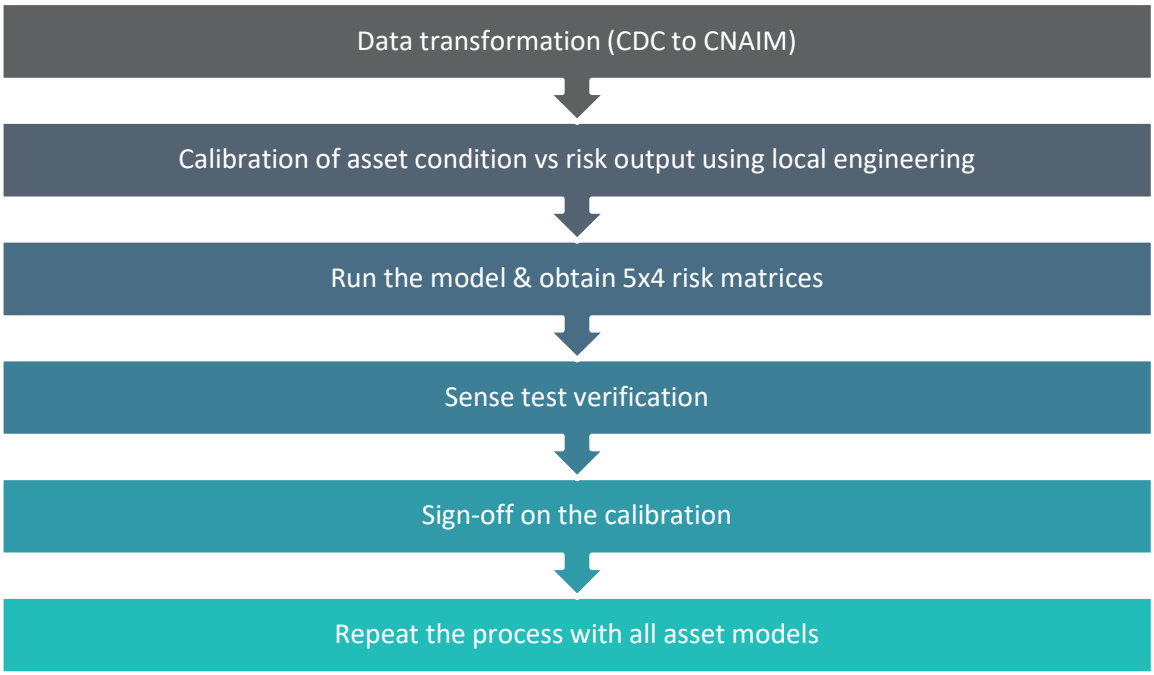

Figure 8 – CNAIM software calibration tactics

As discussed in the previous report, ENWL has an established framework to collect asset data for input into their existing CBRM asset models known as Condition Data Capture (CDC) through a number of question sets for various asset classes. These question sets are issued electronically to the operational frontline technicians (via their iPhone) based on a predefined asset inspection or planned maintenance programme. This phase of the project was an excellent opportunity to thoroughly perform the necessary calibration and ensure appropriate spread of the risk profiles applicable to all categories of assets.

The fundamental philosophy of the software test scripts was developed using the methodology agreed originally with the six UK's DNOs in collaboration with EATL. ENWL has purchased an add-on element referred to as "Data Mappings" which has been integrated into the main CNAIM software suite to provide ENWL with the flexibility in calibrating the data mapping (as discussed above) from existing CBRM inputs into CNAIM. A major focus of the software test is to ensure overall end-to-end IT systems stability.

The key scopes of the software testing phase are:

a) To verify that the model functionalities are stable during operation.
b) To verify the model functionalities can generate the health and criticality of assets in accordance with the CNAIM paper (i.e. ensure practice equal theory)
c) Ensure a complete asset data flow from the data files and CNAIM outputs.
d) Enable the calibration between CBRM inputs (existing asset decision support tool) to be mapped to CNAIM (new asset regulatory reporting tool) for optimum use.
e) Ensure the company's overall IT system is stable during CNAIM operations.

The testing philosophy (data flow) is illustrated in Figure 9.

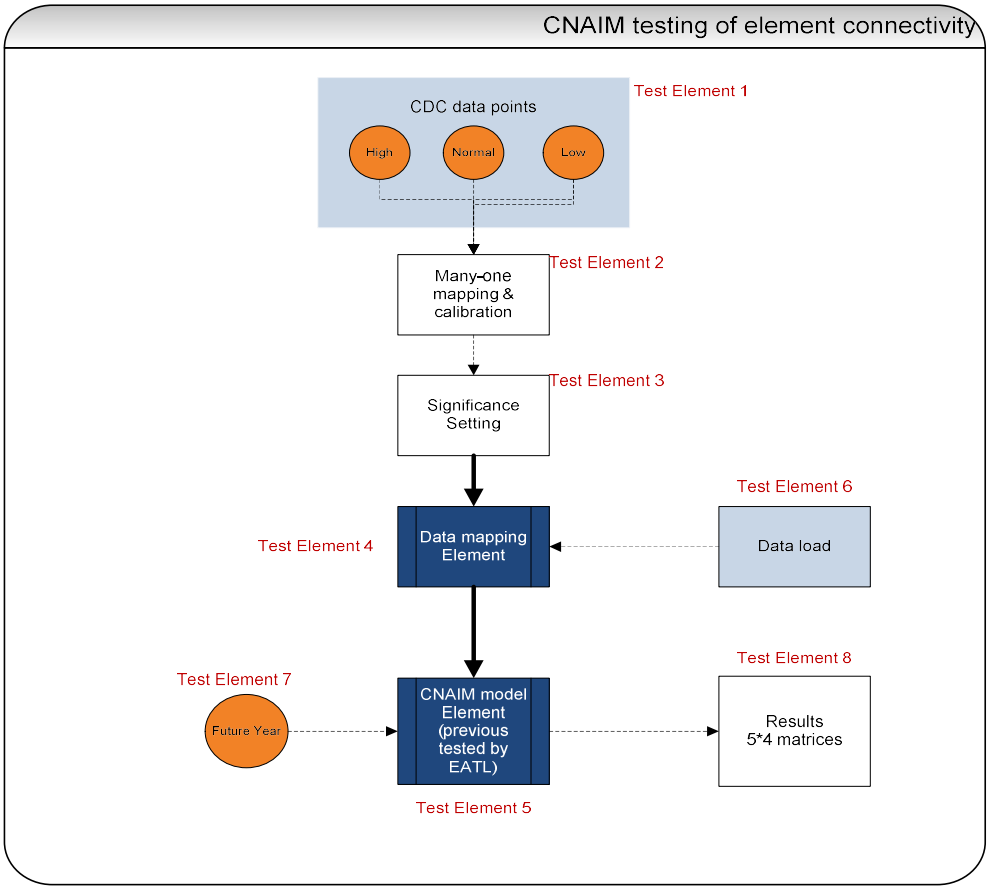

Figure 9 - Testing philosophy (end-to-end)

3.5. Key Learnings

I have summarised the key learnings during the course of working on this project:

a) Gained an insight into how ENWL utilise a decision support software to model asset risk and justify its asset management and investment strategy.
b) Gained an appreciation of ENWL's road map and approaches to utilise this tool as a navigating assistance to reach commercially sound investment decisions.
c) Appreciate the growing needs for asset management organisations to investment in acquiring and maintaining asset data. No tools are effective without the use of good quality data.
d) Gained a deeper understanding of the process to commission a risk-based asset modelling software in paralleled with understanding of ENWL's working culture, people, team dynamic and processes.

4. Network Asset Workbook (NAW)

4.1. Background

This section provides an overview on the process to restate the Network Asset Workbook (NAW). NAW is a series of workbooks issued by Ofgem comprised of key elements associated with asset risks which UK DNOs are required to set out and achieve as part of the Network Asset Secondary Deliverable Output for RIIO-ED1. The original NAW was submitted during the RIIO-ED1 Final Determination in 2014. As a result of the introduction of the common methodology to assess asset risk, DNOs are required to resubmit their NAW. In simpler terms, this effectively means that DNOs are required to transform their company specific asset risk into a common asset risk using an agreed "converter" to enable a better comparison to be made by Ofgem against other DNOs. All DNOs are require to restate their NAW when there a change has been made in the CNAIM paper.

4.2. Process to Restate NAW

A high-level overview on the process which has been adopted to restate NAW is illustrated in Figure 10.

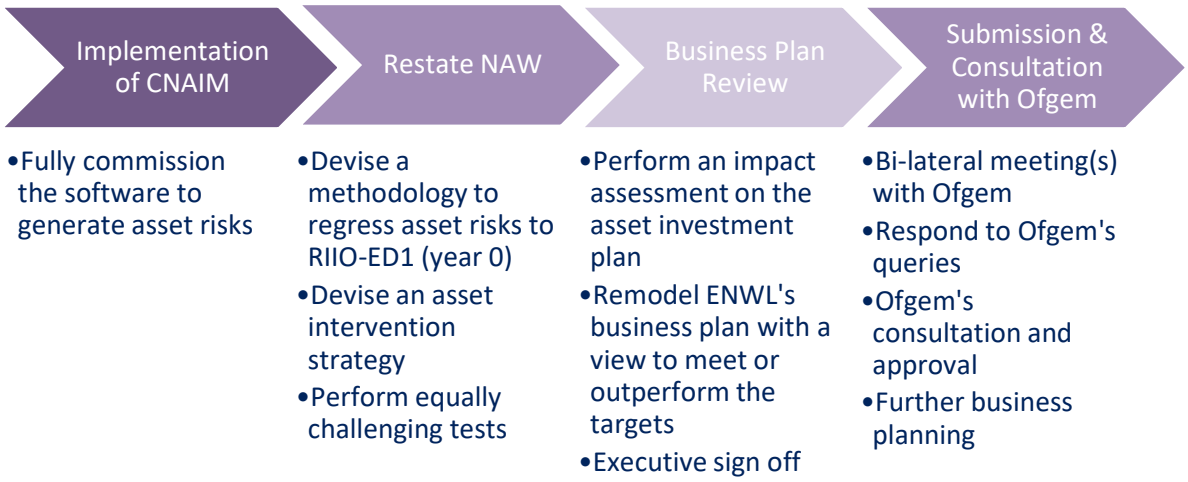

Figure 10 - Network asset workbook restatement process

4.3. Key Principles

This section provides a summary of the key principles relating the restatement of NAW.

a) Asset risk matrices

The software output produces a series of 5x4 matrices which represent ENWL's asset risk profiles. The information can then be used for asset investment planning and programming optimisation where decisions can be made based on a structured risk-based approach.

Figure 11 and Figure 12 illustrate the asset volume at varying degrees of health and criticality which are spread over the 5x4 risk matrices (demonstrated as a heat map). The figure highlights the profile volume of asset risk spread for HV transformer and HV switchgear with the asset condition forecasted to year 8 (i.e. the end of RIIO-ED1 period at year 2023). The results can be remodelled using statistical techniques to provide further insight into the company's overall asset risk profile.

Asset Register Category	CI / HI Y8	HI1	HI2	HI3	HI4	HI5	Total
HV Transformer (GM)	C1	950	150	89	352	36	1577
HV Transformer (GM)	C2	6757	704	630	5194	204	13489
HV Transformer (GM)	C3	628	51	50	786	13	1528
HV Transformer (GM)	C4	8	3	3	12	0	26
HV Transformer (GM)	Total	8343	908	772	6344	253	16620

Figure 11 – Example of a risk matrix for HV transformer asset volume*

Asset HI Category	CI / HI Y8	HI1	HI2	HI3	HI4	HI5	Total
HV Switchgear	C1	2585	2111	581	1491	330	7098
HV Switchgear	C2	10851	3431	754	4385	831	20252
HV Switchgear	C3	1054	475	106	559	125	2319
HV Switchgear	C4	290	74	24	139	22	549
HV Switchgear	Total	14780	6091	1465	6574	1308	30218

Figure 12 – Example of a risk matrix for HV switchgear volume*

**these values are indicative*

b) Data regression technique

Once the latest (October 2016) set of asset data has been obtained, they are transformed into asset risks matrices (using the software suite). The results are then adjusted to reflect the true starting position (Year 0), mid-point (Year 4) and end-point (Year 8) of the RIIO-ED1 period. I was able to help the team devise a data regression technique to create a baseline asset risks for NAW, i.e. creation of the asset risk "Without Intervention" profile for ENWL over RIIO-ED1 period.

c) Adoption of PoF values for all assets using asset failure rates made available by all UK DNOs. CoF values are generated from the software using key parameters such as customer numbers, maximum demand etc. which are DNO specific. The PoF and CoF values are used to calculate the risk point profile for each asset class. Effectively, these risk point profiles are then used as a "scale" to compare the asset risk level between individual asset classes. Figure 13 illustrates the risk point profiles of HV transformer, HV switchgear and 132 kV underground cable asset categories. It is interesting to note that worst possible risk point for each asset is located at H5-C4 cell which is shown in £. To illustrate the point in a simplistic way, Asset Investment Managers may opt to replace a deteriorated HV Transformer in cell HI5-C4 as opposed to a HV switchgear in an equivalent cell if the expenditures for both assets are similar. This is one way to optimise the network investment profile by maximising the risk return for the same investment expenses.

ASSET CATEGORY		Risk Score Ranking £ per asset				
		H1	H2	H3	H4	H5
HV Transformer (GM	C1	30	46	79	129	535
	C2	42	66	113	185	764
	C3	63	99	169	277	1146
	C4	106	165	283	462	1910

ASSET CATEGORY		Risk Score Ranking £ per asset				
		H1	H2	H3	H4	H5
HV Switchgear (GM) Distribution	C1	23	36	62	101	417
	C2	33	52	88	144	596
	C3	50	77	132	215	894
	C4	83	129	220	360	1491

ASSET CATEGORY		Risk Score Ranking £ per asset				
		H1	H2	H3	H4	H5
132kV UG Cable (O	C1	2636	3924	6938	11237	26357
	C2	3765	5606	9912	16052	37652
	C3	5648	8409	14868	24078	56478
	C4	9413	14015	24779	40131	94131

Figure 13 - Asset risk point profiles for transformer, switchgear and cables models*

**these values are indicative*

d) A similar approach as highlighted in (a) is applied to create another profile called "with investment" (with intervention) for all assets for the entire RIIO-ED1. During the process, I have gained a deeper understanding of the mechanical process required to formulate an asset intervention strategy to optimise the company's investment in reducing the asset risk. Figure 14 illustrates the risk delta concept comparing the network risk "with" versus "without investment". The risk delta concept enables DNOs to formulate an asset intervention strategy to meet and outperform its agreed target with their stakeholders.

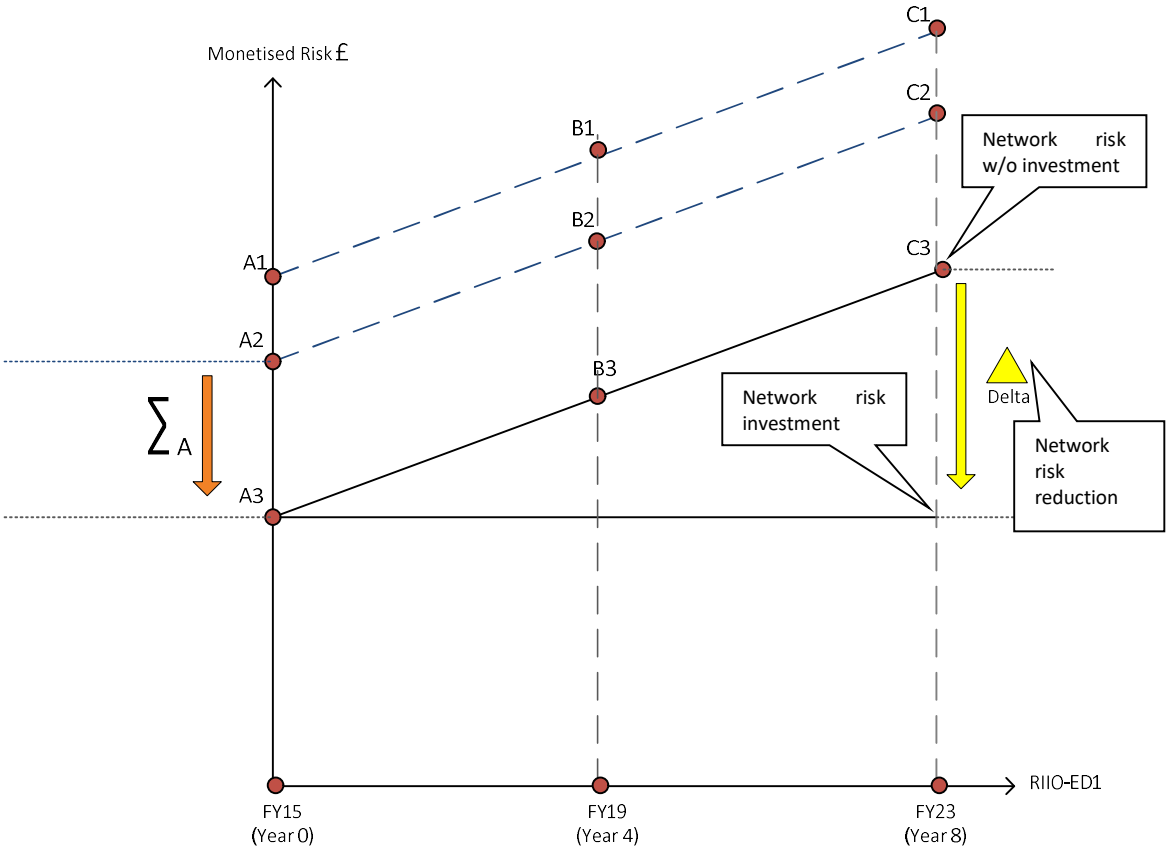

Figure 14 - Risk delta profile for an entire population of network assets

Points	Description
A1	The risk value as a result of loading the latest current data-set at Y0 (start of RIIO-ED1)
A2	Point A1 adjusted for the actual number of assets connected to the network at FY16 total asset count (31/03/2016).
A3	Point A2 value post-adjustment for assets which have been replaced, refurbished, fully decommissioned (with no replacement or added to the network) since the beginning of RIIO-ED1, FY15 total asset count (31/03/2015).
B1-B3	Similar concept as point A1, A2 and A3 with asset risk forecast to Y4 (mid of RIIO-ED1)
C1-C3	Similar concept as point A1, A2 and A3 with asset risk forecast to Y8 (end of RIIO-ED1

Table 2 - Key points in the risk delta profile

e) I also had opportunities to write process documents for governance purposes and reflect on my understanding of the subject. Figure 15 illustrates the key components required to resubmit the NAW. Understanding of how the various sub-systems are integrated to build a complete system is a critical element of a good asset management company. ENWL has a strong emphasis on this.

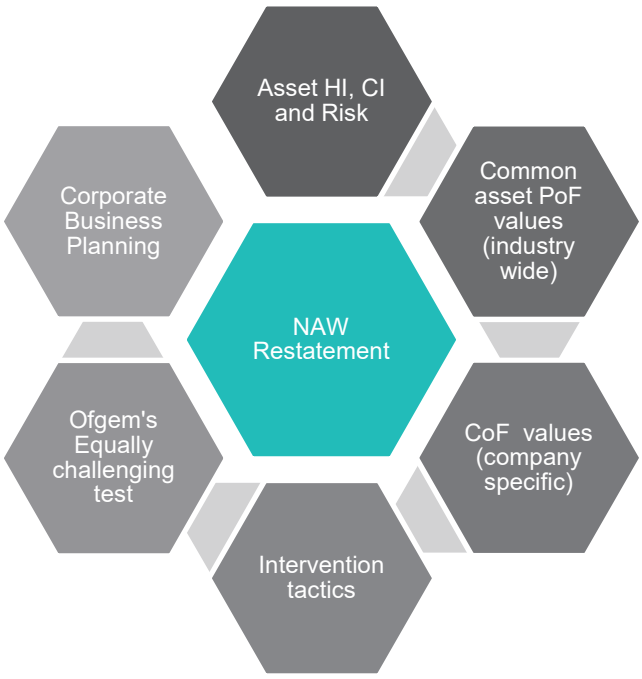

Figure 15 - NAW restatement essential elements

4.4. Key Learnings

a) Risk-based asset management

- Gained a better understanding of how asset risk can be modelled using an asset decision support tool.
- Appreciate the process in turning asset condition data into meaningful information for regulatory reporting and as the baseline for asset investment planning.
- Understanding the risk points profile for the various types of EWNL's electrical assets.
- Gained an insight into how each category of assets in varying voltages level make up the total network risk.

b) Optimising asset management

- Gained an insight into how this work can potentially be linked to risk optimisation asset management software to drive more efficiency in the business.
- Gained an understanding of how risk points are spread out amongst each asset category and their relationship – a basic algorithm of the risk optimisation engine.

c) UK regulator

- Gained a better understanding of how the regulator (Ofgem) tests the UK DNOs restated NAW. A specific focus from Ofgem to ensure the resubmitted proposal is as "Equally Challenging" to the original proposal. Effectively, all UK DNOs are signing up for new contracts with Ofgem which present opportunities and threats.

- Gained a better understanding on Ofgem's reviewing and approval process through observations of bilateral meetings and conference calls in collaboration with all UK DNOs.

d) Business planning

- Gained an understanding of what the Monetised Risk Delta (MRD) means to the business, investors, regulators and the customers. Effectively, the calculated MRD represents a real asset risk reduction to the business in £ per annum. A Cost Benefit Analysis (CBA) can be performed using a range of finance techniques such as NPV analysis to gain a true insight into the potential return for medium-term investments in asset intervention.
- I am aiming to understand the process of how the NAW outcome will be translated into an achievable programme of work and what this means to the wider business during the third quarter.

e) Appreciate the level of significant interest from the regulators and utilities across Europe to adopt a similar network asset risk benchmark approach. An excellent opportunity to collaborate with the project team and gain a practical insight from the industry innovators.

Figure 16 - Bob Wells (ENWL's asset risk management expert) and the project team

5. ISO55001 Surveillance Audit

5.1. Background

During the course of the second quarter, I had an opportunity to attend ENWL's annual ISO55001 surveillance audit session. The objective of audit is to determine conformity of ENWL's asset management system and its ability to ensure applicable statutory, regulatory and contractual requirements are met. It is also to provide ENWL an opportunity to identify areas for potential improvement – a critical component of a leading asset management organisation.

The session was conducted over the course of four days based in ENWL's Preston Office covering various aspects of asset management systems. The scope of the audit comprises of the examination of processes, policies, systems, programmes and local expert knowledge relating to the management of the electricity distribution in the North West of England.

The scopes of the audit were mainly adopted from the principle of ISO55001. Discussion topics are very useful for young engineers and asset management professionals to appreciate the overall end-to-end asset management systems. The discussion themes are illustrated in

Figure 17.

Figure 17 – Themes of ISO55001 surveillance audit

5.2. ENWL's Asset Management Journey

ENWL has taken a proactive approach to becoming a leading asset management organisation. ENWL has become certified to the PAS-55 standard in 2006 after an initial mandate by Ofgem for all UK DNOs to demonstrate their asset risk compliance. The certificate is recertified every three years with an annual surveillance audit conducted by an external accredited auditor. I have gained a better appreciation on how a company should demonstrate their asset management competency by means of being ISO55001 accredited. The competency is essential to demonstrate to the stakeholders (e.g. shareholders, regulators and customers etc.) that the organisation is operating in an efficient manner and integrated with a line of sight from top management to the detailed operational. Figure 18 provides a summary of ENWL's journey towards becoming ISO55001 accredited.

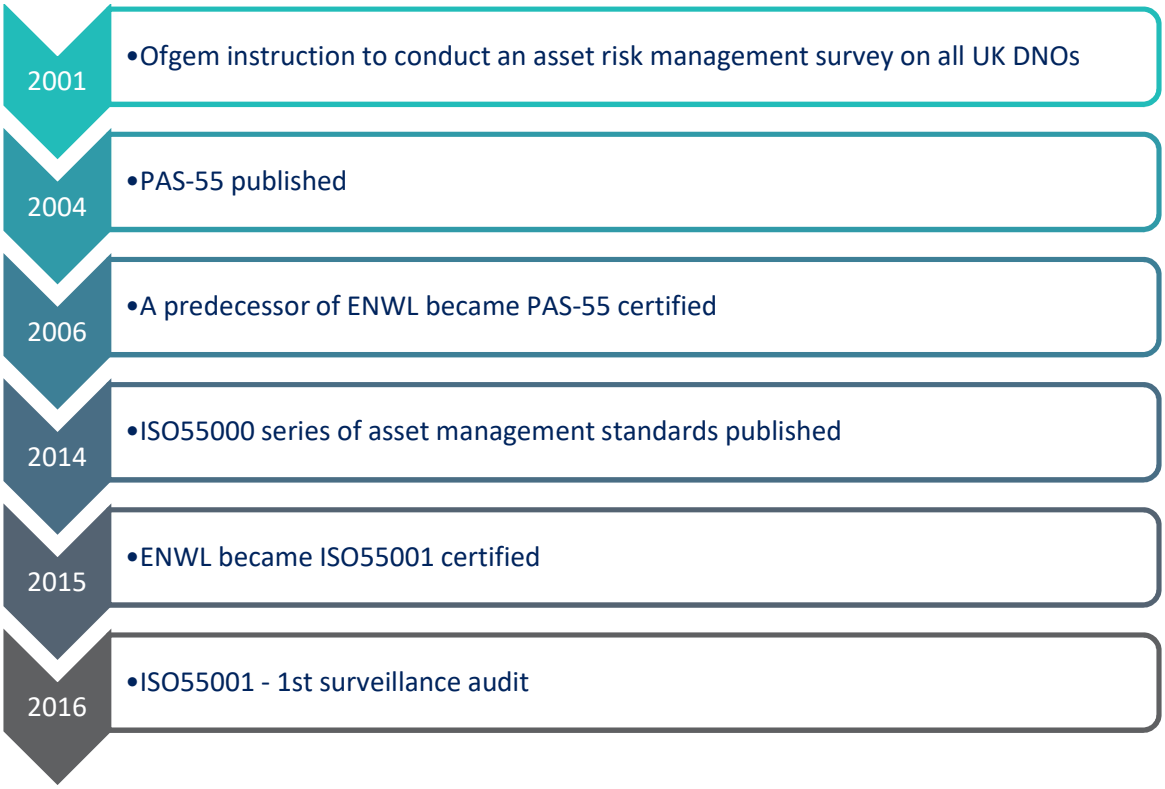

Figure 18 - ENWL's Journey to become ISO55001 accredited

5.3. Key Learnings

The session has provided me with a better understanding of ENWL's business operations and specific knowledge on how ENWL performs the following:

a) develop asset management strategies based on the company's overall goals,
b) translate their strategy into policies, processes and procedures, thus linking with the programme of work,
c) engage with a wide range of internal stakeholders to understand their roles and requirements,
d) communicate to stakeholders (both internally and externally),
e) interface with their contractors so that they understand what is required from them and they can help to develop the way we work together for mutual benefit,
f) manage risk through the company risk register and new measurement of network risk by adopting software suite such as CNAIM,
g) continue to innovate (Future Networks department) with a clear sense of direction through their innovation strategy,
h) demonstrate their leadership commitment to the wider staff across the business.

I thoroughly enjoyed the audit session as it provides a helicopter view of the business in operation with many opportunities for participants to dive into any areas of concern or interest. I have become more aware of many good things that ENWL is doing well across the business. The session also provides an opportunity for the key subject matter experts across ENWL to present a high-level view of how their responsible business functions operate and how it fits into the overall organisation. I met many key representatives (~20 members of staff) across ENWL's business functions which provide a useful networking platform.

6. Business Operations

This section provides some of my observations on good practices which ENWL demonstrated during the second quarter:

6.1. Leadership Commitments

a) Roadshow by the ELT led by ENWL's CEO aiming to engage and inspire its people across the company. This is a useful session to help their staff better understand EWNL's vision and strategy moving forward.
b) Senior management taking the time out to visit each business functions prior to the Christmas break to provide insight and their view on the topical business issues. One of the topical issues in the UK is how ENWL should gear up to transform from a DNO to a Distribution Services Operator (DSO). This is an innovative approach by EWNL through "hands-on" management.
c) A strong focus by the leadership team to keep things (such as the business process) simple. It is essential that large Australian DNOs such as Energex learn from this approach as "simplicity" demonstrates "clarity".
d) I have observed that there is a significant level of corporate leadership training deployed to their wider leadership teams which has firmed up their leadership commitment to develop more leaders rather than managers.

6.2. Asset Management

a) A structured documentation hierarchy which provides a clear visibility to their asset management approach through Strategic Asset Management Plan (SAMP), Electrical Policy Documents (EPD), Code of Practices (CoP), and Business Processes (BP). The amendments of these documents are also subjected to robust governance controlled by their internal Technical Policy Panel (TPP).
b) I participated in numerous asset management strategy sessions which have helped me to appreciate how ENWL intends to transition through the asset management's maturity scale with a particular focus on optimising the network asset risk.
c) A wide range of discussions and a communication campaign concerning their strategy for winter preparedness and flood resilient planning incorporating learning from Storm Desmond and Storm Eva which have caused significant disruptions to the people of North West of England in late 2015 and early 2016.

6.3. Safety and Communications

a) ENWL has dedicated a weekly management teleconference to discuss health and safety issues. The aim of this is to ensure that all WLTs are engaged with all safety matters across the business and able to articulate these issues to their direct reports in an effort to improve their safety performance.
b) ENWL utilised YouTube and other social media to engage internal and external stakeholders on a wider range of initiatives, innovation projects and safety campaigns. This is a good approach to reach out and being visible to external stakeholders.
c) ENWL uses a regular weekly communication from the top management to cascade the key messages directly to all staff.

6.4. Leading the industry

ENWL is leading the industry in many ways as demonstrated by a number of events which I have observed over the second quarter:

a) ENWL has hosted a visit from a group of DNOs in Pakistan to learn all about ENWL's business. A range of topics including an introduction to the electricity industry in the UK, regulatory environment, changes in the industry, local climate and how ENWL is using innovation to meet these challenges. The group also discussed best practices on a number of subjects including quality and safety systems.

b) A group of DNOs in Denmark has invited the ENWL's asset management team to give a presentation on the asset risk management and the creation of the Common Methodology. This is another example of how other DNOs are looking to ENWL for examples of best asset management practices.

c) ENWL has a cohort role in organising the Low Carbon Networks and Innovation Conference with the Energy Networks Association (UK). The conference is recognised as a UK leading forum on smart grid and provides opportunity for attendees to explore the key learnings from electricity and gas network innovation projects. As ENWL cohort the conference, I was able to examine many interesting presentations and appreciate the wider arrays of innovative projects across the UK power industry.

7. CIGRE Working Group C1.34

A progress has been made in the work of CIGRE working group C1.34 (Asset Management). The work stream of shared self-assessment against the requirements of ISO 55001 has taken off. A number of good industry-specific guides to the implementation of ISO55001 (reference materials) were obtained which enabled the members to gain an appreciation of best practices from other industries. A list of potential participating DNOs and TSOs from across the globe has been established. The survey questions were drafted which have been tailored to the power industry. Figure 19 illustrates the progress made on the self-assessment survey questions.

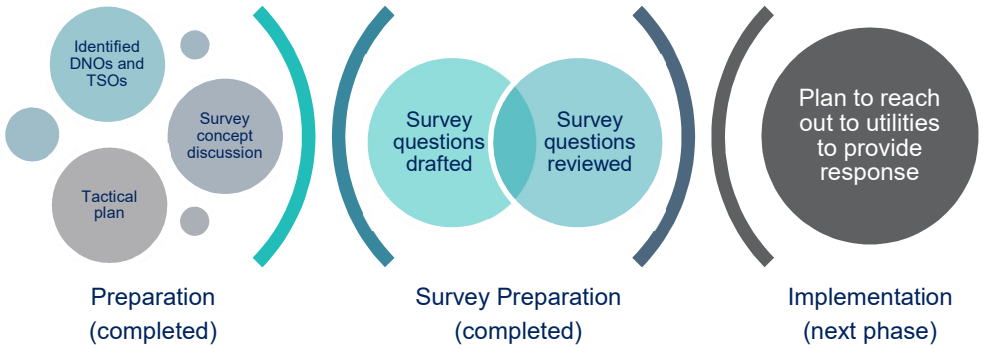

Figure 19 - CIGRE WG C1.34 (progress report)

The ISO55001 implementation guideline is also being developed with a specific focus on the power sector. The first drafted of the guideline is expected to be ready by June 2017 with a view to be finalised towards the end of 2017.

8. IEC Young Professionals Programme 2016

8.1. Background

During October 2016, I had an opportunity to attend the International Electrotechnical Commission (IEC) Young Professionals Programme which is held in conjunction with the IEC General Assembly (GM) on an annual basis. The 2016 IEC GM in Germany has been the largest meeting within the IEC's history. Nearly 450 sessions have been held during the General Meeting. During the main week, Management Boards, Young Professionals (YPs) and Technical Experts held their meetings. The German National Committee has used an innovative approach and named this event "Connecting Communities – Reinvent Standardisation". This is an event concept characterised by communication and innovation through a disruptive era in the power industry.

8.2. IEC Young Professionals Programme

The IEC Young Professionals Programme was developed as a platform for the IEC and its National Committees to reach out to the younger generation of electrotechnical experts, managers and leaders to encourage their long-term participation in standardisation and conformity assessment activities. This helps guarantee continuity in the availability of high-quality experts, enabling the IEC to maintain its focus on responding to market needs on a long-term basis. 75 YPs from 41 countries were presented at the workshop this year. At the workshop, YPs learnt about the IEC and its standardisation and conformity assessment work. They discovered how the IEC approaches emerging trends and technologies and also learnt about the importance of having balanced representation in the National Committee structure. YPs also participated in various sessions such as observation at the Standardization Management Board, observation at a technical committee meeting, simulation of a technical committee, industry visits, numerous breakout and interactive sessions to provide YPs with opportunities to share their thoughts and views on the future of the IEC. Some highlights during the general assembly are shown in the following figures.

Figure 20 - IEC Young Professionals Batch of 2016 from 41 countries

Figure 21 - Australian delegation at the IEC General Assembly led by Dr Bronwyn Evans (CEO of Standards Australia)

8.3. IEC Masterplan

A very innovative session was held during the IEC YPs Programme. YPs were asked to provide input on the future masterplan which clearly demonstrates that the IEC is very serious about bringing new and fresh ideas to formulate their medium-term strategy. A number of very interesting discussions are highlighted as follows:

- The use of new media to promote work and enable more effective collaboration. Overhaul platforms to truly facilitate digitalisation of standards and using technology to connect information in timely and meaningful ways. The YPs refer to this concept as the Wikipedia model.
- Simplification of international standard development process so that IEC can become more agile and better adaptation to fast growing technologies.
- New financial model to generate more revenue. The YPs also tossed up the idea of making IEC standards available for everyone.
- A true harmonisation with non-IEC bodies for a deeper level of industry collaboration.

Figure 22 illustrates a group of IEC YPs who participated in the IEC masterplan development session at the reinvention laboratory (a stage theatre concept developed by the German National Committee to the IEC to maximise the level of collaboration).

Figure 22 - IEC master plan development session with the IEC Young Professionals

8.4. IEC Project Work

The opportunity to be in Europe as an E.S. Cornwall Scholar has provided me with a greater flexibility to contribute to the work of leading non-profit electrotechnical international organisations such as IEC and CIGRE. A key summary of my contribution to the work of IEC is detailed below:

a) Assisted the IEC to coordinate the IEC Young Professionals Programme 2016.
b) Led the discussion on a number of breakout and interactive sessions.
c) Identified potential synergies between IEC and CIGRE in the area of Asset Management through a newly established IEC Technical Committee 123 (Standardisation of the management of assets in power systems). The research of CIGRE working group C1.34 can be fed directly to this new IEC forum.
d) Led the IEC technical committee simulation session using the theme, *Electronic Baby Robots*. Refer to the presentation attached for further information.
e) Present at the International Cooperation for Education about Standardization (ICES) on the subject: Perspective on Academic institutions and Universities. Refer to the presentation attached for further information.

Figure 23 - IEC YPs Programme breakout session

9. Conclusion and Future Direction

Being part of ENWL's asset management team has continued to provide me with an excellent learning opportunity to understand the key characteristics of a leading asset management organisation. A number of key conclusions during the 2nd quarter are summarised:

a) Whilst the E.S. Cornwall scholarship has provided me with the opportunity to work with a leading power company, there is a significant opportunity for Australian young power engineers to enhance their professional development through participations with reputable global non-profit engineering organisations. Being based in the UK has given me a good platform to do so.

b) ENWL has a strong commitment from its leaders to become a progressive organisation. This is an essential element for any asset management organisations aiming to become ISO55001 accredited. Becoming an efficient asset management organisation should be a goal and being accredited should be treated as a reward.

c) Many good ideas and examples are best learned from doing and being part of the leading organisations. The hands-on observations have helped me to gain a good grounding of how a leading asset management company operates.

d) I have gained a better appreciation of ENWL's strong ties with the regulator, UK DNOs and industry forums such as ENA (UK).

Moving forward, my scholarship placement plan has been amended to allow me more time to learn from ENWL. I will be focusing on gaining insight into the following business aspects:

a) Translating the asset management strategy into tactical planning through the programme of work. Draw conclusions on what the implementation of CNAIM means to ENWL and the UK power industry. Provide some thoughts on its potential to impact the wider power industry at a global level.

b) ENWL's business plan development as a result of NAW restatement work.

c) Gain better understanding on the development of telecommunications asset management.

d) Heading out to sites (weather permitting) to appreciate ENWL's electricity network from a practical point of view.

e) Provide a report on my experience of the European Utilities Week's Young Talent Programme 2016.

I am aiming to bring all the above learnings together with a view to provide my final recommendations to the broader Australian power industry in the future scholarship quarterly reports.

10.Acronyms

ACRONYMS	DESCRIPTIONS
AM	Asset Management
CBRM	Condition Based Risk Management
CDC	Condition Data Capture
CIGRE	International Council on Large Electric Systems
CNAIM	Common Network Asset Indices Methodology
COF	Consequence of Failure
COP	Code of Practice
DNO	Distribution Network Operator
EATL	EA Technology Limited
ELT	Executive Leadership Team
ENA	Energy Networks Associations
ENWL	Electricity North West Limited
FTES	Full-Time Employees
GEMA	Gas and Electricity Markets Authority
GIS	Geographic Information Systems
GWH	Gigawatthour
HSE	UK Health and Safety Executive
ICES	International Cooperation for Education about Standardization
IEC	International Electrotechnical Commission
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
KM	Kilometer
KV	Kilovolt
LV	Low Voltage
MV.A	Megavolt amperes
NAW	Network Asset Workbook
NCSS	Network Commercial, Strategy and Support
NDGAC	Network Data Governance and Assurance Committee
NTTS	Network Strategy & Technical Services (NTTS)
OFGEM	Office of Gas and Electricity Markets (UK)
OHL	Overhead Line
PDCA	Plan-Do-Check-Act
POF	Probability of Failure
RIIO	Ofgem's price control framework first implemented in 2013
RIIO-ED1	1st price control for electricity distribution companies under the RIIO framework
SLC	Standard Licence Condition
SLT	Senior Leadership Team
TSO	Transmission Services Operator
UGB	Low Voltage Underground Board (Link Box)
WLT	Wider Leadership Team
YPS	Young Professionals

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Simulation Session
Mock Standard Development

Young Professionals Workshop 2016
Frankfurt, Germany
11 October 2016

Beer Opatsuwan

IEC 80th General Meeting Frankfurt 2016

IEC International Electrotechnical Commission

Content

1. Session Overview
2. End-to-End Process
3. Rules of Play
4. Team Structure
5. Session Debrief

Session Overview

Product

Electronic Baby Robots - EBRs

Critical Assumption

You are an expert in robotics.

Session Overview

Missions:

1

Represent your nominated mock National Committee

2

Collaborate to reach consensus outcomes

Session Overview

Consensus:

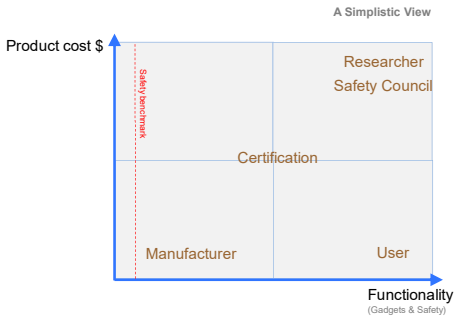
Session Overview

You will simulate one of these characters:

A	National Research Council (NRC)
B	National Association of Robotic Manufacturers (NARM)
C	National Safety Council (NSC)
D	National Certification Body of Robotics (NCBR)
E	National Robotics Users Group (NRUG)

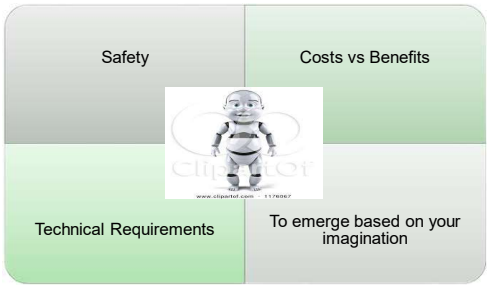
Session Overview

Characteristic of the mock representatives

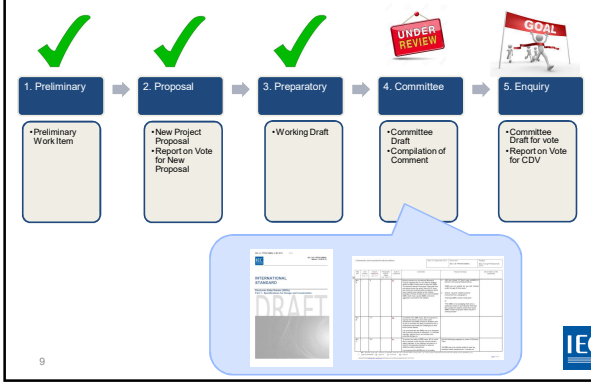


Session Overview

Discussion Themes:



End-to-End Process



9

End-to-End Process

Comments received from YPs regarding:

"IEC mock Standard CD YPP2015EBRs"

Before	After
• 4 comments to kick off your creativities	• 111 comments received • Wide range of complexity and depth. • ~3 days required to review the comments (assume 10 mins per comment)

Rules of Play

Participate

Collaborate

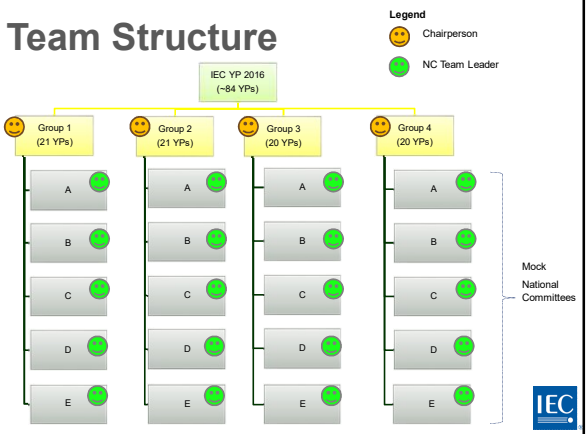
(☺)

Have Fun

Time to be present

Why do you need to be at the negotiation table?

Team Structure



Group 1

Chairperson: Alan Sellers

Jie Yuan	A
David Elmiger	A
Tomasz Koeber	A
Markus Zimmer	B
Ricardo Luis Nava Garibay	B
Nguyen Trong Manh	B
Maria Lucia Scarpello	C
Nicola Barabas	C
Ruben Gaitan Ortiz	C
Gabriel Krescanko	C
Vitali Zubko	D
Benjamin Goy	D
Deog-Jun Gwon	D
Andrei Zalogin	D
Nitin Marjara	E
Gaetano Pecoraro	E
Andrew Northup	E

Room: Solar

Group 2

Chairperson: Jan Daem

Ahmed Abdel Azim Hemait Alla Abdel Aal	A
Catherine Ngetich Jumba	A
Nevin George	A
Fatima Ahmed Khalil Alkhoori	A
Gerald Sterrer	B
Xiaonan Shi	B
Zakaria Naimi	B
Eduardo Gomes	C
Yuki Kishimoto	C
Bakolas Bill	C
Björn Flach	C
Siarhei Nazaranka	D
Marc Fengel	D
Chan-keun Park	D
Vladan Radosavljević	D
Alexandra Price	E
Tan Seh Wee John	E
Zahangir Hussain	E
Vu Hai Duong	E

Room: Stratus

Group 3

Chairperson: Konika Banerjee

Akshay Ahuja	A
Melissa Sánchez Vázquez	A
Panita Meananeatra	A
Jesse S Jur	A
Pavel Řehák	B
Aniket Lewarkar	B
Sebastian Gerber	B
Riikka Liedes	C
Chris Abuga Ototo	C
Abhishek Wali	C
Nima Sadr-Momtazi	C
Jemima Jackson	D
Alessio Ramieri	D
Samir El ferrai	D
Ladda Inthongchuay	D
Polad Zahedi	E
Bader Al-Hammad	E
Roberto Fernandez	E
Edward Hong	E

Room: Sirius

Group 4

Chairperson: Alexander Wigg

Xiang Wang	A
Astrid Aanestad	A
Daniel Goodger	A
Piotr Komor	B
Aleksei Koriakin	B
Mercy Tshivhilinge	B
Caner Bakırlı	B
Carlos Sebastián Rezk	C
Lauri Holopainen	C
Low Pek Jun	C
Mohammed Alsharif	C
Hartmut Johann Popp	D
Jorge Hernán Gutiérrez Gallego	D
Hiromi Tobita	D
Magnus Hansen	D
Søren Hadberg	E
Nor Iratul Munirah Binti Mazani	E
Rao Yimin	E

Room: Plenary

Let's collaborate

My Expectation

Votes

Should the mock standard be progressed to the next stage?

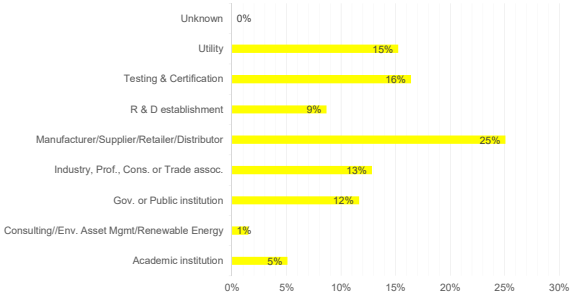
1. Accept	• Number of YPs =
2. Accept *(with modifications)*	• Number of YPs =
3. Reject	• Number of YPs =

Thank you

International Cooperation for Education about Standardization (ICES)
IEC General Meeting
2016-10-10
Frankfurt - Germany

International Electrotechnical Commission

IEC YP Programme



From 2010-2015 - 335 YPs from 44 countries

Overview

1. Background of the IEC Young Professionals (YP) Programme
2. Case study (project 1): Opportunities in education & research
3. Case study (project 2): University outreach
4. Learning and ideas
5. Moving forward
6. Q&A

Presenters:
Fatima Alkhoori (UAE)
Leo Ohtsuka (Japan)
Beer Opatsuwan (Australia)

IEC YP Programme

Benefits to industry

1. Tap into YPs mind, energy, and creativities
2. Test and validate ideas through YPP network
3. Break through industry's "status quo" through YPs vision
4. Tap into a **formal succession plan** for knowledge transfer from experts to YPs
5. Build industry leaders
6. Generates ideas, enthusiasm, motivation and inspiration
7. Fast-track access to the world of standardization

IEC YP Programme

Criteria	Details
Objectives	To encourage YPs at the start of their electrotechnical careers to participate in IEC work
Who	Young managers, engineers, technicians aged 20s to mid-30s
What	Learn about IEC inner workings Build professional network Develop leadership skills on standardization
How	Annual workshop during IEC General Meetings

Transform young electrotechnical professionals into tomorrow's leaders

IEC YP Programme

IEC YP Projects

- YPs are encouraged to develop skills by working on a wide range of projects.
- 2 out of 12 projects have been related to the Academic sector:
  1) Opportunities in Education and Research (2012)
  2) University Outreach (2015)

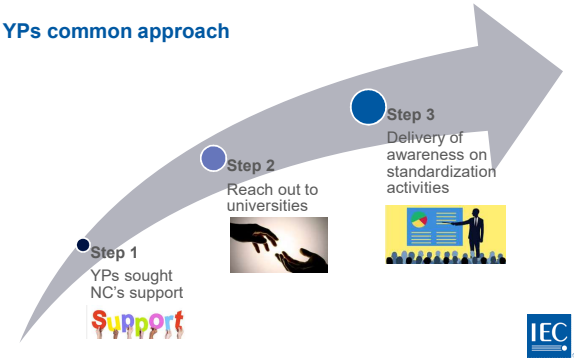
Opportunities in education

Learning (Project 1)

1. Support university courses by providing materials and networking with the educators
2. Industry experts as guest lecturers
3. A webpage on Standards Developing Organizations' (SDOs) website dedicated for university students
4. Information events for students.
5. Projects suitable for university students by Technical Committees
6. Innovative collaboration from university, industry and SDOs

University outreach project

YPs common approach



Opportunities in education

Perspectives from YPs

1. Craft an education module on standardization and research portal through SDO's academia webpages
2. Work with educators to build curriculum
3. Build an education library on standards information and make it available to educators for use in their teaching
4. Encourage research topics and student papers with a strong emphasis and linkage to standardization

University outreach project

Outcomes

- Around 249 students and 16 professors attended
- 6 YPs gave lectures at various universities across the globe.

Country	YPs Lead	Universities
Malaysia	Yau Chau Fong	UTAR
Brazil	Mauricio Wahast Avila	PUCRS & UFSC
Japan	Leo Ohtsuka	UEC
USA	Ryan Franks	University of Maryland
India	Mandar Sinnarkar	Vishwakarma Institute of Management
Canada	Ryan Nicoll	University of Victoria

University outreach project

Motivation

Objectives

- To integrate standardization activities into universities' R&D
- To promote the understanding of standardization in universities

Why universities and not companies ?

- University students will perform a wide variety of occupations and roles in the future.
- Suitable for expanding the range of standardization activities

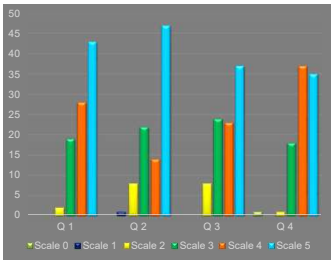
University outreach project

Highlights

University outreach project

	Survey questions
1	Have you become interested in IEC activities by participating in this lecture?
2	Would you like to get involved in IEC activities in the future?
3	Do you think that international standardization is important for our society?
4	Would you want to use international standardization activities for your business/professional activities in the future?

Feedback from students



Scale 0 = low; Scale 5 = high

Ideas from YPs

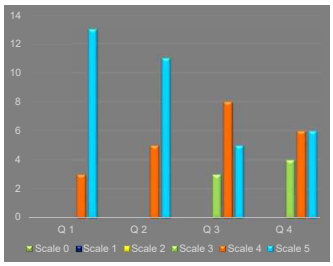
Learning from the project

1. Best practices from most active countries such as Korea
2. Encourage countries to develop a national standardization education strategy
3. New Standards marketing strategy
4. Building cooperative networking with the education community
5. Education syllabus needs to be reviewed

University outreach project

	Survey questions
1	Have you become interested in IEC activities by participating in this lecture?
2	Would you like to get involved in IEC activities in the future?
3	Do you think that international standardization is important for our society?
4	Would you want to use international standardization activities for your business/professional activities in the future?

Feedback from professors



Scale 0 = low; Scale 5 = high

Ideas from YPs

Putting Standards context into a holistic picture

Standards

Technology innovation	Economy advancement	Best practice	Leadership

University outreach project

Brazil experience

Feedback from students

- Lack of knowledge on conformity assessment
- Interested in themes relating to internationalization and market access
- Many questions regarding study programmes that support the entry into the IEC

Feedback from professors

- Concerned by the lack of interest of young engineers in this subject
- Suggested developing local programmes similar to IEC YP, because today in Brazil that access is only available to those who live in Sao Paolo
- Suggested that these lectures must be made each year

Moving forward

Plan	• WSC should continue its Academia activities • IEC should continue to gather input from its YPs • Survey students • Create awareness
Deployment	• Interactive workshop for university students. • Online courses • Competitions • Other ideas
Support	• Seek and support ambassadors for standardization

Moving forward

In the words of Henry Ford:

"Coming together is a beginning;

keeping together is progress;

working together is success."

Feel free to contact us for further discussion:

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International Electrotechnical Commission