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Change Management Is More Than Just Communications and Training

by Lisa Hahn

Over the past decade, change management has recently been a common practice when implementing new or enhanced systems or processes at companies. Prior to this change management was referred to as communications and training. After many failed attempts to implement change in an organization, it was found there is more to change management. Today, almost all new initiatives have some sort of a change management plan to ensure the benefits are realized from the business case.

What is change management? Wikipedia defines change management as a structured approach to shifting/transitioning individuals, teams, and organizations from a current state to a desired future state.

This article will focus on change management as it relates to Smart Grid implementations. Smart Grid is capable of transforming the utility to an entirely new, higher plateau of business performance. But "transformation" means change – changes to business and operations paradigms, business organization and processes, customer strategy, resource planning, energy management policies, engineering practices, reliability, safety management and regulatory compliance.

A change management plan includes understanding the change, taking ownership of the change, communicating the change, executing the change, and monitoring the change. Depending on the type of change, most change management plans are not a one-time process. It can be an iterative process depending on how well the change is implemented and accepted. Continued on page 3

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WECC Economic – to – Reliability

Power Flow Case Conversion

by Hamid Maghdan and Tom Gentile

Currently at some ISOs, RTOs, and utilities there may not be sufficient coordination between the transmission planning groups who setup and run economic planning models (Production cost models) and reliability models (Power flow models). The reliability and economic planning groups keep separate databases and use different assumptions and representations of the generation and transmission system. Continued on page 5

Letter from the President

Dear Colleague,

This edition of our Quanta Technology client newsletter, QT e-News, features articles by our staff on Smart Grid change management and interoperability standards, transmission planning and innovative generation planning tools:

Change Management – More than Just Communications and Training focuses on organizational transition issues for implementing Smart Grid systems.

NIST Smart Grid Interoperability and Cyber Standards, Testing and Certification – This is one of the key industry initiatives to facilitate efficient deployment of the technology.

WECC Economic-to-Reliability – Power Flow Case Conversion explores the WECC transmission planning process and modeling to enable closer regional system economic and reliability coordination.

Unique Software for Power System Planning – heuristic system planning tools to help developers and system planners to improve siting of new generation, optimize needed infrastructure support, and assess criticality of system bulk power elements.

In addition, we are sharing articles of client projects having special market interest, including progress on the pivotal Ontario CanSIA and Hydro One project to study grid impacts caused by inverter failures of photovoltaic energy sources.

As always, we hope you find these articles informative and encourage your suggestions for future topics.

Sincerely,

Damir Novosel – President

About Quanta Technology

Quanta Technology, LLC, headquartered in Raleigh, NC, is the expertise-based, independent consulting arm of Quanta Services. We provide business and technical expertise to energy utilities and industry for deploying holistic and practical solutions that result in improved performance. We have grown to a client base of nearly 100 companies and to an exceptional staff – now over 100 persons – many of whom are foremost industry experts for serving client needs. **Quanta Services, Inc.**, headquartered in Houston, TX (NYSE:PWR), member of the S&P 500, with 2010 revenue of $3.9 Billion, is the largest specialty engineering constructor in North America serving energy companies and communication utilities, according to McGraw Hill's ECN. More information is available at www.quantaservices.com.

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Change Management *Cont. from page 1 . . .*

Understanding the Change

Identify a Project Champion

The first step in a change management plan is to understand the change. Change can be viewed upon as positive or negative depending on whom you are talking to within the organization. Selecting a Project Champion or Executive Sponsor along with change leaders is critical to the success of any Smart Grid initiative. These individuals are the spokespersons for the project. They understand the need for change and can effectively communicate this across the organization.

Identify Business Areas Impacted

For Smart Grid, it is important to identify which business areas across the organization are impacted by the change. Change management activities will focus on working with these business areas to assure that they are well informed along with including them in designing, planning and developing of the Smart Grid implementation. The emphasis and goal is to develop ownership and buy-in with those impacted.

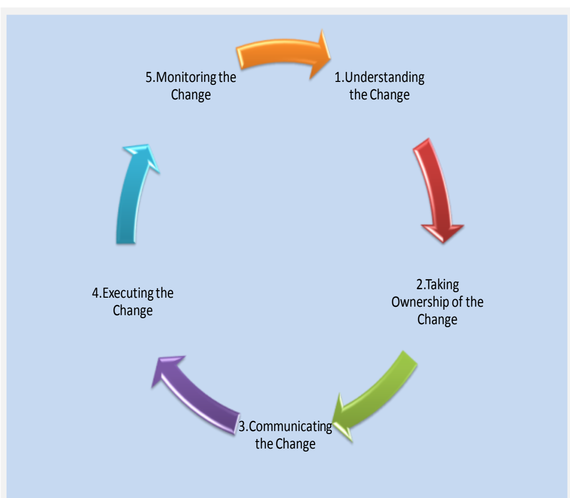


Figure 1. Change Management Process

Identify Business Process Changes

When beginning any new initiative, it is important to communicate the project benefits and business process impacts to those business areas affected by the change. Typically, workshops are used to develop the to-be business process maps and identify gaps for the organizations impacted. The as-is process maps can also be helpful in identifying gaps. All this information will be used in building effective training and implementation plans. (Refer to Figure 1 below.)

Taking Ownership of the Change

Stakeholder Management

Now that the business areas impacted by the change have been identified, the next step is to develop a list of stakeholders from each area. Industry experience has proven that if the major process owners and stakeholders participate in the planning, design and implementation of a new technology, they will be empowered and motivated to make the implementation successful. (See Table 1. Stakeholder Management Plan)

Change Readiness Assessment

Since Smart Grid impacts so many business areas, a change readiness assessment is essential to assess the key Stakeholders' needs and identify possible issues and risks to the project. Focus groups are an effective way to bring business areas together to discuss the changes, get two-way feedback, identify potential issues, and ask how they want to be informed on project progress. The results from these meetings are used to prepare the assessment and develop a *communications* plan. The Stakeholder Management plan must be continually monitored to gauge key stakeholders' level of buy-in. (Refer to Table 1 below.)

Name	Title	Business Area	Current Buy-In 3-Support 2-Neutral 1-Oppose	Target Buy-In 3-Support 2-Neutral 1-Oppose
John Nelson	Mgr - Distribution Operations Center	Distribution Operations	2	3
Bob Smith	Director-Distribution Operations	Distribution Operations	3	3
Mary Allen	Mgr - Call Center	Customer Service	3	3
Sue Johnson	Mgr - Metering Services	Distribution Operations	1	3

Table 1 Stakeholder Management Plan

Change Management *Cont. . . .*

Communicating Change

Communications Plan

With the stakeholders and their expectations identified, a comprehensive communications plan should be developed to support the Smart Grid implementation. The overall goal of the communications efforts is to provide timely information to all targeted audiences while keeping them actively involved. Regular communication updates on the status should be initiated throughout the life of the project. Depending on the audience, communications can be periodic, regular, or on an as-needed basis. The communications plan is a living document and should be regularly reviewed, revised and adapted to support a successful Smart Grid implementation.

Communications Materials

A variety of communication materials can be developed to support the communications plan. Some examples of materials include press releases, employee newsletters, internet and intranet websites, collateral materials (fact sheets, posters, brochures, etc.), bill inserts, face-to-face discussions, employee/leadership meetings, and town hall meetings. The type of materials chosen depends on your stakeholders' expectations, your company's communications objectives, and the customers you serve.

Executing the Change

Workforce Transition

With the communications plan developed, the next step is to execute the change. The to-be process maps and gap assessments can be used to identify how employees are impacted by the changes. A staffing analysis should be completed to determine the tasks, skill sets and competencies required to support the Smart Grid implementation. The results of the analysis will help determine the staffing plan required to support the implementation. It is important to work with your company's Human Resources and Labor Relations departments to determine the options for executing the staffing plan. After the staffing plan is developed, an employee transition plan should be developed to leverage those impacted employees' experience and knowledge. A transition plan may include the following:

- Transitioning impacted employees to the newly created Smart Grid positions based on their skill level or encouraging them to apply to the new positions.
- Offering impacted employees the opportunity to shadow and/or investigate other positions.
- Offering training opportunities to impacted employees.
- Providing impacted employees an opportunity to support the Smart Grid deployment rather than using contractors.

Training Plan

The information gathered from the to-be process mapping, gap analysis, and staffing analysis should be used to identify the training required to implement the staffing plan. A comprehensive training plan will facilitate and support a successful Smart Grid implementation. The training plan should focus on developing the skills and knowledge needed to operate and maintain the Smart Grid implementation. For example, this may include the AMI meters, communication infra-structure, Meter Data Management System (MDMS), or Distribution Management System (DMS).

Monitoring the Change

Monitoring Performance and Success of the Implementation

As part of the change management plan, it is important to track and monitor the performance and success of the Smart Grid implementation. Key Performance Indicators (KPI), identified in the business case, should be monitored regularly to ensure the project is achieving and sustaining the expected Smart Grid benefits. Some examples of KPIs include operational savings, billing accuracy, billing estimates, one call resolution, safety measurements, and reliability indices (SAIFI, SAIDI/CAIDI, MAIFI, outage response time).

Summary

Change management is a critical aspect of any new initiative to ensure the business case benefits are realized. Developing a change management plan is critical to the success of any Smart Grid implementation as there are many changes to the utilities' business processes. An effective change management plan includes understanding the change, taking ownership of

Change Management *Cont. . .*

the change, communicating the change, executing the change, and monitoring the change. A change management plan is an iterative process to ensure the changes are implemented and accepted across the organization. It is important to understand that change management is more than just communications and training. Change management needs to be integrated with your Smart Grid implementation.

For further information, contact Lisa Hahn at: lhahn@quanta-technology.com

WECC Economic Reliability *cont. from page 1*

The reliability and economic planning groups keep separate databases and use different assumptions and representation of the generation and transmission system.

For example, the reliability model databases contain detailed information on the lower voltage interconnections for renewable resources and more granular representation of generation and load bus mapping. On the other hand, production cost models may use aggregated generating unit representation at plant level and in terms of transmission modeling more focused on major interfaces and regional transmission representations. Over the past few years there has been growing interest and increased efforts to facilitate coordination and sharing of information between the two planning groups to improve the quality of reliability and economic planning studies.

Economic to Reliability Modeling Overview

WECC retained services of Quanta Technology to develop a process for creating reliability power flow cases from production cost simulation results for selected study hours. Using this process, 10 GE PSLF cases were developed based on the WECC 2020 production cost model simulation results for 10 selected hours for the year of 2020. For each selected study hour, PROMOD dispatch and power flow results were first converted into the GE PSLF format, a power flow case was then developed based on which a steady state solution was obtained, and the steady state power flow analysis was conducted to identify thermal and voltage violations as defined by applicable NERC Standards and common industry practice for a set of contingencies.

Challenges

The inherent discrepancies between a transmission security constrained production cost model such as PROMOD and a power flow model such as GE PSLF made the process of case conversion and obtaining a power flow solution to be a non-trivial task. Examples of the discrepancies include: (1) PROMOD is a transmission security constrained production cost software, providing an optimal solution for real power injections, High Voltage Direct Current ("HVDC") line flows and phase shifter angles, using a DC/linear power flow solution technique. Therefore, PROMOD simulation results may not be sufficient for defining reactive components or voltage magnitudes, which are essential for the GE PSLF non-linear numerical process. (2) PROMOD solutions are optimized based on partial and approximate sets of transmission constraints and not all facilities ratings are modeled in PROMOD simulation. As such, there were numerous overloads on some transformers and lines, often causing divergence of the GE PSLF numerical process.
There were 4 major challenges in the case conversion process.

(1) In general, production cost models emphasize optimum commitment and dispatch of generation resources subject to generating operating characteristics and limited transmission constraints to minimize cost of serving load. Reliability models usually emphasize detailed modeling of transmission components but very little to no modeling of generating unit operating constraints.

(2) Because of the inherent modeling difference explained in (1), even though both models use the same exact network topology and characteristics, each model has a different representation of the

WECC Economic Reliability *Cont. . . .*

system (i.e. data for simulation). For example, different level of aggregation of generators and load, DC power flow vs. AC power flow solution approach, single hour snapshot vs. multi hour or more specifically 8760 hourly simulation and so on.

(3) In addition to data differences, starting from a single power flow case to develop the 10 power flow cases with very different conditions selected from the production cost simulation (i.e. PROMOD) was very challenging. The difference in load, generation, voltage and reactive schedules, along with seasonally-switched devices significantly made it difficult to solve the converted power flow cases.

(4) Another difficulty was to deal with the inaccurate reporting of the necessary power flow data by "the power flow output feature" of the latest version of PROMOD. Incorrect power flow and dispatch results had to be extracted from other reporting feature of PROMOD and be further processed to be used in building the power flow model. For example, plant and transaction dispatch schedules, which were aggregated in PROMOD input data model had to be disaggregated manually.

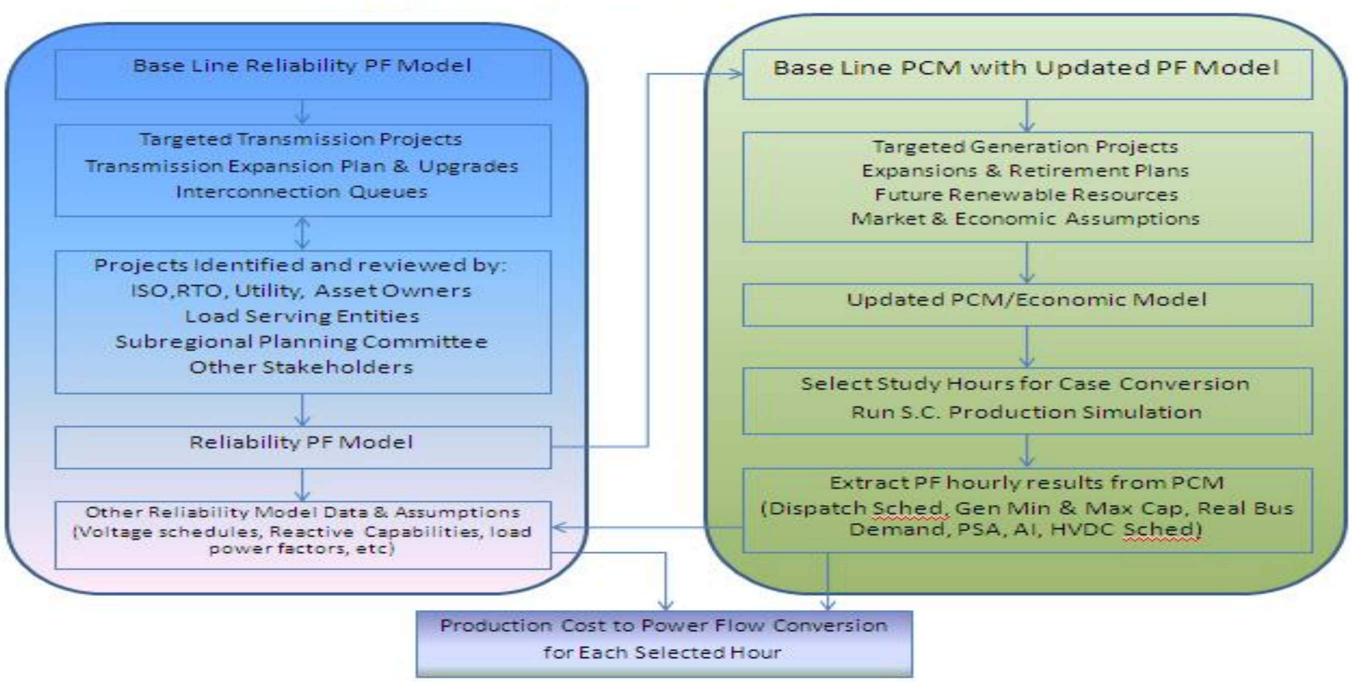
Essential Assumptions

Not all the required data for converting a production cost model case to a power flow case can be obtained from the production cost model output results. The required power flow data that could be obtained from the production cost model output include generation dispatch schedule (MW), generation maximum and minimum capacity, bus demand, phase shifter angle, area interchange, and HVDC schedule. The reactive load and generator data were obtained from the originating power flow case, processed, and used to compute required reactive data. Reactive load at each load bus was calculated based on the active load and load power factors of the corresponding bus in the originating power flow case or other reference cases, if available. For incremental generators only modeled in the production cost model, the reactive capabilities were calculated assuming certain Qmin/Pmax and Qmax/Pmax ratios.

These ratios were based on the production cost model defined Pmax value and generator types.

In this WECC study, both interruptible demand response and non-interruptible demand response were modeled as generators in the converted power flow cases with no reactive capabilities.

PCM to PF Case Conversion Process



Unique Software for Power System Planning

by Len Januzik

Much of the work we do at Quanta Technology is at the leading edge of power system engineering practice, and that often means no available packaged software will provide analysis we need to complete a study. So, from time to time, we have to develop tools for our own use. Often, we go through several stages of improvement before we are satisfied with the results, and in most cases, we are never truly done with the algorithm or the tool built around it, but constantly evolving it to better suit our needs.

Advantages of Formalized Tools for Advanced Analysis

We develop these tools out of necessity – so that we can perform the computations needed in our work. In addition, although it can seem inefficient at the time, in every case we "formalize" the new computerized tool we develop: we give it a name, go through a review process, test it to assure it is both legitimate and accurate, and document its program code and the instructions and guidelines for using it. This extra effort assures quality and consistency of results, and provides unambiguous documentation about how the results were obtained. In addition, we then have the tool available for future studies – we often encounter new problems in our work, but we seldom encounter a problem only once. In this way, Quanta Technology has developed a library of leading-practice analytical tools that we can use again in future studies. Among those we have developed recently for Transmission System Planning are:

Site Identification Tool for Electric System Analysis (SITES)

SITES is a heuristic algorithm that finds the best locations on the grid to consider for new generation resources. It was designed to utilize a standard power flow output and finds optimum locations based on factors such as injection size, congestion, topology and deliverability, to name a few. SITES can cover very large areas of interest in a short period of time and produces tabular and graphical contoured output showing the best and worse places to connect. Continued on page 8

WECC Economic Reliability *Cont . . .*

Gradual Case Solving

A gradual case solving procedure was used to convert the production cost model generated results to reliability cases and obtain steady state solutions. Reviewing the process and methodology used to convert the 10 cases and perform steady state analysis, one can say that the gradual case solving approach makes it possible to convert a power flow case to another power flow case with substantially different system conditions. The gradual case conversion allows us to review system conditions at each step and identify critical spots and mitigate stress at different parts of the system.

Findings and Conclusion

Being focused on the regional transmission capabilities and not monitoring all transmission elements, the economic simulation may cause numerous overloads on transformers and lines carrying additional power dispatched by the economic simulation. The study has shown the significance of proper selection of an originating base case. Many modeling deficiencies that may not be essential for the originating case itself may become very important in the process of case conversion. In conclusions, improved coordination of modeling assumptions between different Transmission Planning groups will be very helpful and beneficial for the decision makers to make assessment of future transmission alternatives based on the analyses performed using consistent assumptions and database from the economic and reliability point of views.

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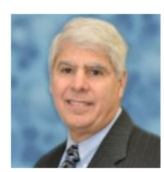

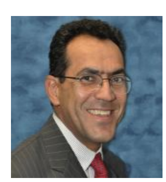

Unique Software *Cont. . . .*

System Optimization Tool (SOT)

SOT can perform System Optimization Studies using linear optimization to determine generation deliverability, feasible combinations of generator dispatch, and maximum import/export capability based on user defined constraints. These constraints can include directional flow-gate loading, minimum/maximum contributions of designated resources, participation weighting, and sensitivity to system load levels or cross system bias.

The Sub-Hourly Model (SHM)

SHM is a dispatch model that was developed to simulate the minute by minute changes in generation from variable resources. It is intended as a medium level view of system operation and has the ability to fill in missing unit data based on generic information. It utilizes unit ramp rates (up and down), on/off cycle times, minimum loading levels and forced outage rates and high density wind values. It respects system operating margins (up and down) as well as reliability must run designations.

Vulnerability Assessment Tool (VAT)

VAT applies a heuristic algorithm that identifies the most critical buses in the bulk power system under study. It uses a traditional power flow output as its principal data source and ranks the entire range of nodes under study from most to least critical based on an index derived from several factors.

These factors include:

- Congestion
- Voltage Stability
- Deliverability
- Critical load - including other infrastructures
- Substation physical content
- Injection size

The VAT software program can analyze a very large area of the country in a relatively short period of time (a few minutes) and produce both tabular and graphical output. Uses include meeting CIP and TPL standards compliance, asset allocation – investment strategy, operational risk assessment, and physical risk assessment. It provides a consistent method of comparing the criticality of facilities across numerous electric systems.

These four tools are only a few of those we've developed at Quanta Technology so that we can better do the studies we carry out for customers. None of these tools is commercial grade software and Quanta Technology does not sell software tools. However, we often share these tools with customers and provide support. Our viewpoint is that in time commercial software vendors will expand their offerings to cover any new areas needed, and in the meantime our computerized tools provide a useful bridge to application of cutting edge methods.

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A Case Study: Acceleration of Smart Grid Interoperability and Cyber Security Standards and Certification

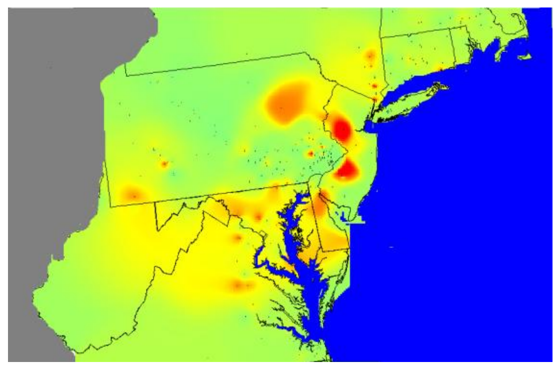
by Carl Wilkins

In the Spring 2011 issue of our newsletter I described our work with the National Institute of Standards and Technology (NIST) to support their effort to "coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems…" Awarded in October 2010, this engagement allowed Quanta Technology to demonstrate the value of having an organization that can not only develop and coordinate standards, but actually engage industry stakeholders to bring standards to the point of adoption in record time.

The intention was to accelerate the development of the interoperability framework and model standards that would promote the rapid development of the Smart Grid. The task was important as the DOE funded billions of dollars in Smart Grid Investment Projects that will eventually lead to broad industry acceptance and adoption, and ultimately lower long-term investment resulting from harmonized industry standards.

This project has the potential of affecting nearly 75 smart grid standards in the US and internationally which will have an impact on the entire utility industry.

I would like to share a case study as part of this project. Quanta Technology was asked to develop extended Phasor Measurement Unit – Phasor Data Concentrator (PMU-PDC) communications methods that will establish common methods and protocols to enable interoperability of PMU's and PDC's from different vendors. Also working with the North American SynchroPhasor Initiative (NASPI), Quanta Technology advisors were asked to develop requirements suitable for inclusion in a guide being developed by the Institute for Electrical and Electronics Engineers (IEEE). In addition, Quanta Technology was asked to develop requirements, testing and certification approaches, calibration and test guidelines for Phasor Measurement Units (PMUs) and Phasor Data Concentrators (PDCs). Both of these formidable tasks were completed by Quanta Technology in close cooperation and collaboration with the NASPI Performance and Standards Task Team (PSTT).



Let's take a closer look of how this happened for IEEE Guide C37.244 and IEEE GuideC37.242. Quanta Technology historically has been a very active member of the PSTT making technical contributions like many of the other members. However, after being engaged by NIST to support the PSTT by leading the development of PMU-PDC standards and testing guidelines, Quanta brought the combined experience of its key advisors to bear on the challenge. Under the leadership of PSTT co-chairs Vahid Madani, PG&E and Damir Novosel, Quanta Technology developed a plan to accelerate the development of the respective guide and standard.

But let's put this in perspective. Traditionally, the standards development and standards approval process is managed by a volunteer community of technical experts, and have established a protocol. This can take years from the time a new committee is formed to the time the standard is drafted, debated, balloted and ratified. Unfortunately, this pace is inadequate if you have an industry sitting on capital waiting to make an investment decision. Moreover, the need is more acute when

A Case Study: Acceleration Smart Grid *Cont. . . .*

industry is waiting for standards that directly impact the design, engineering, and procurement process for large-investment technologies such as smart meters or phasor measurement units.

Quanta Technology advisors Yi Hu, Vasudev Gharpure and Farnoosh Rahmatian began to fast track the development of methods and testing methodology for interoperation between IEC 61850 and IEEE 37.118 / IEEE 1815 devices and systems. Concurrently, they identified gaps and solutions to improve the standards near completion. Their specific activities produced a PDC Functional Requirements Guide, a SynchroPhasor System Communications Guide and a PDC Test Guide.

Under the leadership of the PSST co-chairs, the committee was able to accomplish the following activities in unprecedented time. In Table 1, the first draft was introduced in January 2011, passed PSTT review in June 2011 and expected to be completed in January 2012. The total duration was one year. I suspect there are not many standards that are drafted and approved in the span of one year.

Table 2 shows some of the requirements and specifications that served as a base for the IEEE C37.244 Guide for PDC Requirements for Power System Protection, Control, and Monitoring.

The draft Guide is availability to vendors and users now, and initial balloting and publication are expected in January 2012 and May 2012, respectively. We expect to see compliant PDCs and systems available in the first quarter of 2012.

Furthermore, work continues on IEEE C37.242 which addresses the synchronization, testing, calibration and installation of PMUs. This guide is a combination of NASPI and PSTT guides. The system test and calibration for laboratory and field applications were updated to comply with IEEEE C37.118 enhancements. It addresses the overall accuracy and availability of the

	First draft	Available for IEEE C37.244	PSTT Review	IEEE Guide Complete
NASPI PSTT PDC Guide	1/2011	5/2011	**6/8/2011**	
IEEE C37.244 Guide		Start 5/2011	**6/8/2011**	1/2012
IEEE PDC Standard				Start 1/2012

Table 1 Timetable for IEEE C37.244 Guide Development

	Time alignment: Wait Time, Buffer Time, Data Processing Time Data re-sampling and filtering issues and impact on accuracy Data Validation
Non-core Functions	Data storage, Event detection, Gateway
Major Communication Needs and Requirements	Data flow management: late, lost and missing data, data quality marking System configuration management
Test Techniques to verify core Functional Requirements	Capacity limitations / determination Comparative measurements (using reference PDC)

Table 2. Requirements and Specifications for IEEE C37.244

A Case Study: Acceleration Smart Grid *Cont. . . .*

time synchronization system, including instrumentation channel characteristics, errors, GPS-equipment characteristics and system communication errors.

Again, IEEE C37.242 was started on a fast track in 2010, balloted in September 2011, and final release is expected in December 2011. This guide will help users with interoperability testing and installations immediately.

As one can see, Quanta Technology and members of the PSTT accelerated the development of smart grid standards and completed the process in less time that one would have expected under normal circumstances. Undoubtedly the same objective would have been achieved by the standard setting organization, but the question is whether it would have been accomplished in the same time period. How was the PSTT able to accelerate this particular set of standards? First, subject matter experts with support from Quanta Technology responded in a timely manner to industry demand for standards. Second, the PSTT is comprised of the key stakeholders who were engaged from the onset, and given quick turnaround to their comments. Third, Quanta Technology accelerated the process by leading by example and dedicating its expert advisors to the task.

This case study demonstrates technical excellence when combined with an industry perspective can result in unprecedented execution and results.

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News Release

Quanta Technology to Participate in Photovoltaic Connectivity Study for CanSIA and Hydro One – Ontario, Canada

Concern is currently widespread throughout Ontario regarding the constraints limiting solar photo-voltaic (PV) from connecting to the electrical grid system for projects equal to or less than 500 kW. Many solar industry participants have had connection applications rejected or are experiencing delays regarding the connection of their projects.

In response, CanSIA (an organization that represents PV solution providers in Ontario) along with other industry stakeholders, are conducting a third-party study to address the various technical issues regarding the connection of solar PV to the Ontario electrical grid with specific focus on short circuit impacts. A Project Steering Committee (PSC) co-chaired by CanSIA and Hydro One, and including other solar energy participants and stakeholders, has been created to assist in directing and funding the study. Quanta Technology has been selected as the third-party consultant.

The objective of this initiative is to conduct a third-party study that will explore the impact of connecting solar PV inverter based generation to the electrical grid, equal to or less than 500 kW per installation, to understand the technical challenges for both utilities and developers, and to explore possible solutions related to those technical challenges. Quanta Technology has developed a simulation tests bed and an extensive test plan to examine and verify fault current contribution of the PV inverter products based on precise transient simulation models from seven major PV inverter manufacturers. After characterizing the fault contribution, a series of impact studies and sensitivity checks will be performed on a benchmark distribution system to determine effects such as fault type, fault location, system topology, change in parameters and many others.

News Release *Cont. . . .*

Once the study is completed, the Ontario solar industry, working with stakeholders, will use the information provided in the final study report to discuss and explore the implications of solutions that could potentially allow more projects to connect to the Ontario grid without compromising transmitter and Local Distribution Company (LDC) equipment ratings, safety, reliability and power quality.

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International Update

Quanta Technology Europe

After the presentation on battery storage and STATCOM with an emphasis on improving and facilitating integration of wind power into distribution grids at the CIRED 2011 Conference in Frankfurt in June, Quanta Technology Europe engaged in a market review of the next step in the Substation Automation standard IEC 61850 Edition 2. We've been discussing the views, expectations and requirements on next generation communication and testing issues with several utilities deploying or starting to deploy the IEC 61850 standard. A specific topic of interest is the timing of when and how to start using the so-called process bus, the interface between the primary process and the secondary equipment and the next level of interoperability requirements.

We have been discussing transmission system issues like the impact of HVDC Convertor Station impact when adding interconnections to a HV grid. Roadmapping, development and planning of future HV grids, taking into account the growing number of interconnections and integration of renewable energy sources, both on and off shore and roadmapping, system design and project planning for a Phasor Measurement Network to gather Wide Area SynchroPhasor Measurement Data. On the distribution side we keep following up on our work on impact analysis of for instance self-healing concepts of smart grid and impacts of charging of electrical vehicles related to different levels of penetration.

Erasmus Bridge, Netherlands

Conferences Activities

We have been working on our wind integration paper "*Large Scale Renewable Energy Integration: Recent Experiences in the USA.*" for the Solar and Wind Integration Workshops in October in Aarhus, Denmark: www.windintegrationworkshop.org

And we are preparing the panel sessions on Distribution Automation and Wide Area Measurement, Protection and Control for the ***IEEE-ISGT*** in early December in Manchester, UK: www.ieee-isgt.cu

Distribution Automation Panel details: Managing Next Generation Distribution Systems

In order to successfully implement Demand Response (DR) and Demand-side Management (DSM) applications, as well as to integrate with Plug-in Electric Vehicles (PEVs) and other Distributed Energy Resources (DERs), effective distribution system

International Update *Cont. . . .*

management functions should be addressed together as an overall integrated enterprise application. Considering all types of "resources" at the distribution system level as a whole, the DR and DSM applications can be seen as virtual energy resources that can be used to balance demand and supply and to hedge operation risks. The DER and PEVs are physical assets that supply (or consume) the actual electrical power. Integration of all these energy resources together is one of the major challenges in the future smart grid scenarios.

In this panel session, we will discuss the trends and requirements for managing next generation distribution systems from solution providers and utilities point of views. Grid operators have to manage next generation distribution systems that include the new resources by using advanced information systems, such as advanced metering infrastructure (AMI), distribution management systems (DMS), Energy Demand Management Systems (EDMS), outage management systems (OMS) and connected to geographical information, etc. Nevertheless, effective communication that transfers control signals and measurement values are essential. Integrated operational procedures also have to be implemented.

WAMPAC Panel details**: **Wide Area Measurement integration into Grid Operations

Increased complexity in operating the power grid has emphasized the need for advanced applications in wide area monitoring, protection, and control (WAMPAC) systems. To meet this need, an increasing number of utilities, independent system operators and transmission organizations around the world have been deploying SynchroPhasor measurement technology and associated applications. The objective is to provide time-aligned, higher-resolution, and more accurate data to system operation and reliability engineers to improve wide area grid visibility, overall system performance and customer service, as well as wide-area coordination with neighboring systems. Deploying SynchroPhasor technology involves gathering, time-aligning, and structuring data from Phasor Measurement Units (PMU's) through a fast and reliable communication network for visualization and engineering of control applications, and for integration with existing systems such as EMS/SCADA to become an integral part of grid operations. Besides WAMPAC, some utilities are also considering the use of SynchroPhasor technology for monitoring and control of highly intermittent and variable distributed energy resources.

This panel session will review today's technology and the roadmap process to deploy SynchroPhasor measurement, and present project experiences from America and Europe. The success of deployment depends on applying the measurements into the daily grid operations and planning process. A well prepared and thought-through roadmap, application development plan, and training set-up for knowledge transfer are some key aspects. The application selection and associated benefits, the optimal locations of PMU's based on application requirements, communication infrastructure, and specific grid configuration will be addressed as well as fulfilling the applications' performance requirements and PM-Network performance criteria.

Hope to meet with you at one of these events during the rest of the year. If you have any questions related T&D Consulting topics which you would like to discuss with any of our experts, please feel free to contact us.

Bas Kruimer - QT Europe

Report on Latin America and Caribbean Activities

Effective August 2011, David Elizondo has accepted increased responsibilities within Quanta Technology to lead the business plan for the Latin America and the Caribbean market areas. David Elizondo will exploit its passion for electric power systems developed during 10 years in the USA and 7 years in Mexico.

The business plan considers the strategic intersection between the market needs of each country in the region and the areas of technical excellence developed in Quanta Technology. To initiate our marketing and business efforts in the Latin America region, Quanta

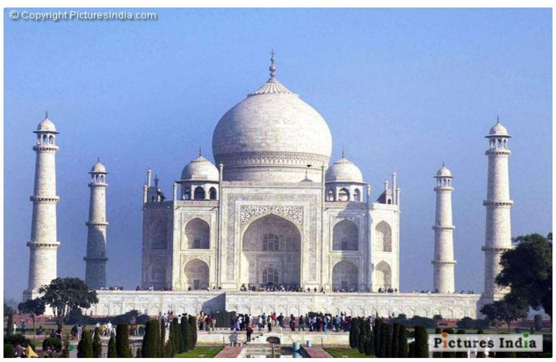
International Update

Cont. . . .

Technology will participate with a 45 minute presentation in the coming 2011 IEEE PES Conference on Innovative Smart Grid Technologies, October 19-21, 2011 in Medellin, Colombia. The Quanta Technology presentation is titled: "Challenges and experiences in protection of interconnected electric power systems" and will be presented by David Elizondo.

Please join us in the coming IEEE meeting in Medellin, Colombia to talk about opportunities in which Quanta Technology could share its knowledge to the Latin American Region!

David Elizondo, Ph.D
Caribbean and Latin America



International Report – India and Indian Subcontinent

Quanta Technology has been aggressively pursuing business on the Indian Subcontinent. In the last few months we have been actively involved in the India Smart Grid Reverse Trade Mission (RTM) funded by the United States Trade and Development Agency (USTD. Along with our sister Quanta company - PAR Electric, we recently demonstrated Quanta's Meter Deployment Management (MDM) efforts in Boulder City to delegates and executives from a variety of utilities in India. Additionally, we have been actively pursuing opportunities with the Ceylon Electricity Board in Sri Lanka on a Solar Interconnection opportunity with respect to Pre-feasibility and feasibility studies, EPC services, O&M and Real Time Monitoring services. There is also significant effort being placed toperform Grid Impact Studies in shared cooperation by Quanta Power Solutions, India and Quanta Technology in the Philippines and Malaysia.

Srijib Mukherjee, Ph.D, P.E.
Director, India Operations

Srijib Mukherjee
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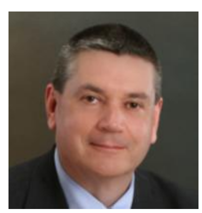

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And We're STILL Growing – As Usual

Welcome, Mike DeCocco

Mike DeCocco has joined us as Director of Human Resources. Mike has 30 years of HR experience including 20 years in the Electrical Equipment Industry, having worked for multinational companies such as General Motors, ABB and Quintiles. Most recently, Mike was the Vice President of HR for Sensus, a global metering systems company, headquartered in Raleigh. He has a BS in Criminal Justice from the University of Dayton, an MBA from the University of North Carolina at Chapel Hill and is certified as a Global Professional in Human Resources.

Mike will help Quanta Technology build a performance-focused organization that attracts, motivates, recognizes, develops, rewards and retains the resources and talent it needs to achieve its strategic objectives. He plans to utilize his skills and experience to build and deliver effective development initiatives including career development, management development, performance, and a succession planning processes. He will work out of the Raleigh office.
Welcome, Mike!

Recognitions

**As we grow, our leadership grows through hard work and valuable performance.
We congratulate them all on their Achievements**

And speaking about international experience, we are pleased to announce that Hans Candia is now Sr. Director, Quanta Energized Services. Our Energized Services area is rapidly expanding in the international arena as well as here in the states. **Congratulations, Hans**!

In the summer edition, we introduced Bryan Gwyn as a welcome addition to the Quanta Technology Family as a Senior Director of the Protection & Control Asset Management Business Area. In addition to this, because of his extensive international experience, Bryan is also taking on the role of Senior Director of International Business. He replaces Hans Candia, who has recently taken over our Energized Services Practice. Our new division of Protection & Control Asset Management continues to develop. Further details of the is exciting new area for us will be detailed in the Winter edition of our newsletter – Stay Tuned. **Congratulations, Bryan!**

Mike Marshall has been promoted to Director-Asset Operations in the Operations & Design Business Area. Since the beginning of this year Mike has been leading a team within this Business Area focused on engineering and operational analysis of utility infrastructure. Under Mike's leadership the team has shown continuous improvement in the development of new work opportunities. Mike's, and his team's, focus on providing our customers with value added service across all our Business areas represent the type of leadership we value within Quanta Technology. **Congratulations, Mike**!

Dr. John Wasilak has been named Director of Marketing. As we grow, Marketing has become more vital to Quanta Technology's success. John is leading the effort to advance our marketing efforts. **Congratulations, John**!

Recent QT Publications

"A Framework for Assessing the Impact of Plug-in Electric Vehicles to Distribution Systems"
By L. Xu, M. Marshall, L. Dow

"A Novel Approach for Evaluating the Impact of Electric Vehicles on the Power Distribution System"
By L. Dow, M. Marshall, L. Xu, J. Romero Agüero, H. L. Willis

"Assessing the Impact of Electric Vehicles on the Electric Distribution System"
By L. Xu, J. Wang, M. Marshall, J. Romero Agüero, L. Dow, M. Montoya

"Dynamic Impact Studies for Integration of Large (Utility-Scale) Solar PhotoVoltaic Systems onto Distribution Systems"
By F. Katiraei, A. Yazdani, F. Jahanbakhsh, J. Romero Agüero,

"Steady State Impacts and Benefits of Solar Photovoltaic Distributed Generation on Power Distribution Systems"

www.quanta-technology.com

Please Join Us

North American Generator Forum
October 17-18, 2011 Atlanta, GA David Hilt

Solar and Wind Integration Workshops
October 24-26, 2011, Aarhus, Denmark Bas Kruimer / Don Morrow / Tom Gentile

Application of Synchrophasor Technology
November 2-4, 2011, Las Vegas, NV Yi Hu, Vasudev Gharpure

Spatial Electric Load Forecasting for Power Delivery System Planning
November 8-9, 2011,* San *Antonio, TX Lee Willis

Modern Power Delivery System Planning
November 9-10, 2011, San Antonio, TX Lee Willis

IEEE-ISGT Europe
December 5-7, 2011, Manchester, UK, Bas Kruimer / Damir Novosel / Edwin Liu

Utility University (at DistribuTECH)
January 22-23, 2012, San Antonio, TX

DistribuTECH
January 24-26, 2012, San Antonio, TX

IEEE meeting in Medellin, Colombia

Details to be posted at **www.quanta-technology.com**