Notes for Affiliates Meeting, December 6, 2013

Attendees

Vikram EPG

Lori EPG

Jay Zarnikau

Bill Blevins

Milton Holloway

Michael Dittmer

Ken Murphy

Bill Bell

Walter Bartel

Steve Bezecny

Sean Mitchem

Bill Muston (phone)

Bob Davis

Paul Hudson

Robert Howden

Derek Mauzy Reliant

Paul Sweat NI

Bill Bojorquez (phone)

Milton kicked off meeting: After introductions, Break-out sessions were selected and locations. Context of meeting: CCET is 8 years old as a Texas non-profit with four original members. Since 2006, we have done a number of projects. In early years, we tried to collaborate with universities to meet ETF expectations through a MOU arrangement among universities. We had a university rep representing the university consortium on the board as an advisor director. That plan for coordination with the university group fell apart because the universities abandoned the MOU, but we continue to work with individual universities. We now have 20 members. Focus on new technology, with input on related policies. ETF and the ARRA were key developments that helped CCET get started on significant work. Texas was and is a good test bed for new technologies in smart grid. Early projects included new RTU from NI, Substation automation including PMU technology, DR project with about 500 customers in Oncor and CenterPoint. Now, we are engaged in ARRA $27 million project about wind integration (7 projects). Milton reviewed each of the 7 briefly. He reviewed the survey on the perceived value of the CCET work to CCET members. He asked the meeting participants to give some feedback via the survey. Consider both each company and the Texas market as a whole. Robert Howden reported the ETF is looking for new projects and CCET has a good reputation, so we have an opportunity, if we have a good project. Milton responded that he had met with ETF staff and is in discussion with TTU/GNIRE about a joint proposal.

Thought Leader presentation:

**Bill Blevins ERCOT Synchrophasor (SP) applications:** Bill reported that the CREZ projects led to looking into Synchrophasor technology. Using SP for operations has been a challenge. The outages around the country led to further interest in SP’s throughout the country. Many of the SP have been put in the wind generation area in Texas. We have about 55 PMU’s active. LCRA has a number of SP in addition. In 2012, we decided to upgrade the SP system at ERCOT. EPG was selected as having the best software for operations use. Signals are being sent back to TO’s as well. Training was held for ERCOT operators and TO operation personnel. SP will be used for Wide Area Monitoring, including Angular limits, Oscillation damping, Voltage deviations and Frequency deviations. SP gives the operators more time and information to prevent grid collapse. Most uses are analytical (backward-looking). SP are also used for model validation (not fully commercial). NERC is considering rules to require model validation by generators. SP could be the way to do that efficiently. SP are also being used for event identification. Some development of SP data needs to be done to make it easy for operators to use for EI. SP is also used now for post event analysis. Higher penetration of wind may be affecting Frequency control. An automated report already exits. SP could also be a back-up system for operator monitoring and control.

ERCOT has a SP task force operating under Reliability Task Force.

Paul Hudson asked if ERCOT and TDUs are starting to add line items in budgets to cover these activities – Bill Blevins says once the task force does its job, finishes the rules and guidelines, then it should happen. Vikram adds that we need standards for compliance – next step is how to use all this data in operations – one example is state estimator that was initially limited in its use, but now is very prevalent and has many uses

**Derek Mauzy, Reliant, on DR in Texas**. Many claims of DR have been made. Adding an elastic demand structure may be a benefit. DR could be a key contributor. Challenge is to make it happen soon. Enabling loads to participate in the market is an opportunity, he believes. The participation has to be economically rational. What are obstacles, what are drivers? Who has an interest in making it happen? Retailers, mainly, with generators and delivery companies to a lesser degree. Economic drivers tend to trump others. DR has a lot of promise, but timing is the challenge. Loads participating in SCED is primarily a process challenge. Once hurdles removed, economics will determine if it is successful. Incentives must be strong. Residential DR is at least 3 years away, in his opinion. There is a technology gap, but also a significant economic incentive gap. ERCOT’s ORDC may give 2 hour notice, which is an improvement, but day ahead would be the best.

**Bill Bell: Big Data and Data Analytics.** AMS was the first big data challenge. The next step is to apply analytics to all that data. No current technology exists, in spite of vendor claims. The objective is to deliver quickly (in some cases weeks), so clients can see the value. The process is to define, validate and deliver analytics – test a hypothesis to solve a problem. Right now they are focused on low hanging fruit so they can provide something quickly. They keep iterating through the three steps to improve the analytics and add new functionality, and a special focus area is in theft detection. Situational Awareness and Predictive Analytics are the current focus. Kenny wants the latter, especially in response to weather forecasts. He described 7 initiatives they have for 2013. See slides.

**Sean Mitchem Micro-grids:** A system which can operate in parallel or independently from the power grid. That’s how our power systems started, but big generation, standardization and REA. Keys to success are transmission length, generation source and economics. Military is heavily investing in micro-grids. Renewables integration is also an interest. Fort Bliss is grid-tied microgrid and always-on, and El Paso Electric can interact with them. Smart grid, energy storage and other new technologies are enabling MG’s. Benefits to utilities: Islanding, congestion management, peak load managing, mitigate outages, reduce transmission need, increased distribution of generation. Utility concerns: Control, reliability, security, standards, revenue protection. Typical generation for MG are renewable combined with diesel gen sets, but this is more for islanding and backup power. Storage would be used more with more MG’s, especially those that integrate renewables.

**Milton Holloway discussed energy storage**. One big driver for storage in Texas is the large amounts of wind, currently and in the future. A Key driver is also natural gas price. Battery storage prices, if they come down, could change the strategies. Fast acting versus long duration is a challenge. FRRS is also driven by higher wind penetration. He compared thermal storage versus fast response storage. Market protocols are required to enable storage options. That takes time and getting consensus. ERCOT is doing some of that now. PV systems will also drive the need for more storage.

**Bob Davis: Other sources for Future Trends** **and Issues:** Bob did some background research and in person interviews with Tom Reddick, with EPRI strategic planning. 10 Themes identified (see slides). Major outages like storms (Sandy), Zero carbon initiative, Wind, solar, and other intermittent generation, Resource adequacy, electric vehicles, rate regulation (decoupling), skilled labor shortage, Big data, and others were listed. Tom feels solar will be a major issue in the next few years.For analytics, he showed innovative rate regulation whereby data analytics enable non-traditional metrics. The goal is to get away from regulated pricing and reward utilities by other means rather than infrastructure and throughput. For electrification of transportation, it’s not just PEVs but larger entities like port of Houston, etc.

**Break-out group results**:

**DR: Derek Mauzy**: He reported driving issues: AMI existence makes a lot possible. The structure of the market (Capacity Market). Competitive market creates different drivers. Economic issues (value) and the lowering costs of technology are becoming positive drivers.

CCET’s strengths: broad spectrum of participants, even ERCOT.

CCET is not in leading role, but in a supporting role.

CCET can lead in information sharing and building consensus. Another possibility is to develop a vision (consensus) for DR road map in Texas. Probably need a lot of support. A big job.

CCET could build a test bed to test technology that enables DR, in coordination with other groups like PSI. Cooperative effort would be beneficial.

How can we advance technology, recognizing that companies are competing, even within CCET. We would have to advance technology in a way that does not require companies to compromise their strategies. Paul says roadmap would work if ERCOT and DSWG supported it, and the results were focused by ERCOT on protocol changes.

**Paul Sweat reported on Energy Storage**: Few applications due to cost. Costs are improving. Many projects throughout the country, but what’s needed is storage that serves multiple uses. We should look for areas that are not being covered, but would benefit Texas, from an operational or cost benefit. Perhaps look for new applications of existing installations. Renewable targets exist, so how can we help make them more cost effective (multiple uses for installations). There are many stakeholders. CCET is in a unique position to act as demonstration location (real world applications). ORNL may be looking at distributed storage but they aren’t working with a utility so they may be interested in entity like CCET supporting field demonstration. Sean added that many storage companies are starving for someone who can demonstrate it, and provide them data so they need a utility willing to support it. CCET can provide a leading role, depending on the project.

**Data Analytics Michael Dittmer**: 3 possible target areas. 1. Better weather prediction, for power system needs, and especially for improved crew dispatch and prepositioning in advance of severe storms. Weather stations are not necessarily available in utility areas nor do they provide the necessary resolution. Need outage prediction, restoration prediction, to a detailed level. Weather forecasts need to be designed specifically for the challenges utilities face (i.e. predicted lightning strikes) versus rain, temperature drop, etc. of typical forecast. Resource prediction for an incoming storm to a detail level has not been completed. Several attempts have been made. It takes a lot of work to build the model, so maybe multiple participants (like CCET) it might get further along. Fault wave identification has been done, but only at a superficial level. Need a computer based solution.

2. If ERCOT demands it, the TDUs have to respond quickly and turn off meters. However, the AMI systems cannot respond as quickly as ERCOT wants now. The speed to the meter and the acknowledgement is a money propostion – and TDUs are only acknowledging a small percentage of the PONs. One way to improve is to enhance communications but this is expensive. If ERCOT wants/needs it, CCET may be able to help determine how to do that cost effectively. 3. Smart switching needs to be enabled and data needs to be identified that helps make that a practical reality. Advanced analytics are needed.This encompasses automated switching around faults to minimize consumer disruptions, better fault characterizations, and better feedback to crews on which lines are hot and not.

**Micro-grids, Sean**: Not easy to identify as a marketable product that we could expand. Interest in redundancy and reliability, esp. after big storms. Cyber security might also be a driving force. Declining cost of technology is helping encourage micro-grid. Low cost power is a de-incentive.

CCET diverse membership could provide valuable input. CCET probably has limited opportunity (little interest by utilities). No project ideas. Maybe one customer (military base, or large industrial complex).

A challenge is the varied definitions of a micro-grid. More research into where are the benefits/downsides to micro-grids might be valuable to CCET members.

To some extent, micro-grids are coming, utilities need to understand them, understand where they are going and the implications to the ERCOT market. CCEET could possibly help with that.

For utilities, what does a micro-grid do to a utility? Is there an opportunity as well as a challenge?

Paul thinks that more storage will be tested in CA due to RPS, and this will drive microgrids as well, so there are areas in CA and East Coast that are more interested and concerned than TX.

**Synchrophasors**, **Vikram**: key drivers are resource mix (more renewables). Loads are changing due to modern technology (and models are no longer valid). Standards development will almost certainly occur (NERC will likely start this soon).

SP investments have been made. Now, the challenge is how to use the data. 5 key anchors: 1. Making use of the data in operations requires high data quality and integrity (and redundancy). 2. Training must occur so operators know what they have and how to use it, and there are no simulators yet. 3. Applications for SP data must be developed, to a high quality and consistent values. Frequency response monitoring is a prime example, along with dynamic voltage management and Fault-Induced Delayed Voltage Recovery (FIDVR). 4. Redundancy for failover, especially for production level is a need. Some work has been done, but more is needed. Back-up technology for existing SCADA systems to support EMS. 5. Cyber Security needs to be fully developed for SP systems.

Value drivers: transmission dynamic management, reliability, capital investment analysis. Use SP data to evaluate what are the best choices and identify weak areas of vulnerability, market efficiency could be improved.

CCET has credibility with ERCOT and even nationally. We have a good track record. Facilitation of a large group of participants in a large project (like CCET has done with the DOE project).

Ideas: Test bed, pulling together diverse parties to get solutions that might not otherwise have been done. For any project, need SMEs (TDUs and ERCOT), testbed (TDU), and solution providers – CCET can always knit this group together

CCET may be in a leading role, depending on the project. SP may help us understand how new technology wind farms, for example, will behave on the grid as compared to existing ones. We should also expect the NERC standard for model validation by generators will be coming.

Frequency response evaluation is not now a routine evaluation for new generation. SP could help provide that analysis. Ancillary Services can be better evaluated and analyzed with SP technology.

Holloway Adds: 7 projects we have are ARRA driven and we will report what they require. There are 130 total ARRA projects. DOE is not looking at the CCET project value to the ERCOT market, so we should go the extra step to evaluate what the possible benefits of the ARRA work is to the Texas market. We should also glean the other ARRA projects to see if there are discoveries or breakthroughs that might benefit the ERCOT market.

Holloway stated the CCET Executive board meeting on the 16th. Where does CCET go from here? Is there a place for CCET and the value add not available from another organization? Any general comments would be appreciated.

Paul Hudson asked what the members feel about this organization. Lorie from McAfee said they are getting a lot of practical experience and exposure, they are learning a lot by being in the field and executing their products. Pre-commercialization involvement is of real value. Lorie added that CCET is different from PSI, SGIP, GWA because the membership is unique and valuable. Paul Sweat said similar points. Involvement with potential clients in the Texas market is of value. Representation for all the key types of stakeholders is unique to CCET. Demonstration projects in conjunction with research labs projects could be a key opportunity for CCET. The key stakeholders in CCET are the ones that make or break any new technology (ERCOT, CenterPoint, Oncor, etc.) Being able to interact with all of them at once is of great value. (Vikram) CCET provides vehicle to bring together lots of partners along with key stakeholders like ERCOT and TDUs at least in TX – and then find a way to propose efforts to DOE, ETF or others for funding. Sean (SwRI) said they are not aware of other entities like CCET. They see value in interactions with key potential clients and some technology partners (NI). Most DOE grants require utility involvement, cost share, etc. that CCET can provide. CCET can distribute cost share among several members, benefiting all. GNIRE and Texas Tech are interested in further collaboration as being mutually beneficial. Commercialization is becoming a key requirement, and CCET can bring that to the table. Walter (CNP) said the ability to get this group of key stakeholders together is a challenge without CCET. Transaction cost is lower with CCET. Utilities alone are difficult to get involved, especially in new technology. Would there be value to adding generators to CCET? It might be more difficult to get consensus on projects. We may need to find project ideas that appeal to coos and munis. We also should get more university involvement. We should look at membership fees to facilitate start-up companies to be in CCET. Could we be more of a Texas Market ambassador, letting others outside of Texas know what the market is like and what are the opportunities.

Holloway stated that the meeting content would be summarized and provided to the Affiliate members and to the CCET Board of Directors.