



**An Update on the Multi-Year DMD/TMD Demonstrations on “Data & Analytics”** **April 2015**

**ABOUT THE NEWSLETTER**

The EPRI *Data Analytics and Applications Demonstration* newsletter provides updates on EPRI’s “Data Analytics” demonstrations—the Distribution Modernization Demonstration (DMD) and Transmission Modernization Demonstration (TMD). These initiatives identify and analyze data-oriented applications and support infrastructure through collaborative demonstrations around the world. Contact Doug Dorr (DMD) ([ddorr@epri.com](mailto:ddorr@epri.com)) or Alberto Del Rosso (TMD) ([adelrosso@epri.com](mailto:adelrosso@epri.com)) with comments.

*If you or a colleague would like to be added to or removed from the mail list, email Lori Warneke [lwarneke@epri.com](mailto:lwarneke@epri.com).*

**EPRI Perspective**

Data and analytics are the new enablers for the smart grid. The electric power industry is progressing toward more diverse activities around data-driven decision making. Some consider this a disruptive change, while others embrace the change as the evolution of the smart grid. There are dozens of areas where improved grid visibility achieved through data analytics is going to re-script the way electric utilities view and manage their end product. This newsletter is designed to provide updates on a selection of interesting and evolving topics associated with analytics of the electric power system.

EPRI’s DMD/TMD data analytics initiative is about getting more value from data and sharing the most beneficial examples. The work leverages EPRI and industry subject-matter experts, and documents successful data-driven use cases. It also identifies new and innovative applications of data analytics and develops frameworks customized for leading practices in utility analytics. The benefits will include more value from data sets such as better decision making and coordinated demonstrations on many types of data sources and applications with less duplication of efforts.



**TECHNOLOGY TRANSFER AND INDUSTRY COORDINATION**

**Industry Lead Advisors Identify the Importance of Solid Data Analytics Business Case**

The EPRI Information and Communication Technology (ICT) Advisory Committee has identified data analytics as one of the five priority areas that will be incorporated into the ICT research strategy and roadmap. The ICT met at the EPRI Sector Council meetings in Phoenix, Arizona, on March 5, 2015, to map out and discuss desirable power system information and communications future states. Related to the topic of data analytics, there was consensus among committee members that one of the most important future states is having a solid analytics (business case) model. This model should assist in analytics investment planning, and identify the most valuable opportunities to leverage technology and

visualization tools. The ICT advisors felt that a structured approach for assessment and monetization is needed as the industry moves to more and more data driven decision making.

There were also two significant gaps identified by the advisors. The first gap was the need for utility specific data governance models that better align with utility based business objectives and promote sponsorship at the right levels within the organization. The second gap was data interoperability which is an essential for virtually all future analytics objectives. With the input and guidance of the ICT advisors, EPRI will be working toward aligning project and program research objectives to address the gaps and move the industry forward toward the goal of a smarter electric power grid.

One observation from the Sector Council was that the Data Analytics Initiative for Transmission and Distribution—TMD & DMD—is doing some of the early work toward analytically driven future states from a practical implementation standpoint. The outcomes will provide knowledge and learning to inform the strategic roadmap and EPRI’s research programs.

## **Recap from the Utility Analytics Summit**

EPRI convened a one-hour panel session on data mining and use cases at the Utility Analytics Institute’s (UAI) Utility Analytics Summit last month in Phoenix, Arizona. The overall goal of the Summit was to provide a forum to increase knowledge about how utility analytics are being applied and how they can be used to produce substantial business value. This year’s Summit was co-hosted by the Salt River Project and Arizona Public Service with 256 participants, of which 61% were utilities and 18% were solution providers.

The EPRI panel session vetted the DMD data repository that will support use cases for electric service providers. Session panelists included industry recognized experts, William Bell of CenterPoint Energy, Bobby Besharati of Pepco Holdings, and Raiford Smith of CPS Energy, with EPRI’s Doug Dorr serving as Moderator. Key takeaways from the panel as well as the conference sessions included:

- A library of common use cases and supporting datasets will be valuable to understand the capabilities of solution providers and will assist in supporting the use of data analytics in the power industry.
- An industry-wide data analytics use case repository is helpful to document industry challenges and standardize the data driven method(s) to solve them.
- A prioritization of use cases based on ease of implementation versus the benefits achievable helps utilities to determine the best path forward in their respective data analytics roadmaps.
- One example of successfully using predictive analytics is a use case presented by SRP to monitor generation at its 20 power plants. Key takeaways included: the importance of communication between stakeholders; a plan to start small, prove, then grow; and the importance of making sure all stakeholder questions are vetted during the process.
- A useful quote on analytics from one of the presenters on the subject of analytics investment: Followers tend to focus on cost, whereas leaders focus on strategic outcomes.
- An overall takeaway for the Summit is the continually observable differences among utilities with regard to their adoption of analytics and which use cases are of highest value to each of them.



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### Welcome New DMD Members

Four new members have joined the DMD efforts: Central Hudson, Con Edison, PEPCO, and SMUD. This brings the overall membership in the project to 18. We expect this to result in an even more diverse selection of data-oriented demonstrations and data-driven use cases.

### DMD Application Highlight

#### *Southern Company is developing methods to leverage disparate data sets to monitor and assess the health of non-communicating devices and oil circuit reclosers*

The past maintenance practice of operating distribution assets to failure is giving way to preventative and predictive maintenance practices. The keys to this transition are the advent of the sensorized distribution grid and the ability to transmit operational data as well as asset health information from these sensors to the management systems.

Modern smart grid device controls and relays provide advanced capabilities such as embedded current and potential transformers that enable continuous monitoring of the power flow and the quality of power being supplied to end users.



With this semi-sensorized distribution grid, utilities can now gain intelligent insights into even the less sophisticated non-communicating devices, such as the service transformer and the oil-circuit reclosers (OCRs). The service transformer now has at least one sensor—the smart meter—which monitors its conditions. The AMI system can provide insights into the types of loads connected, overload conditions, approximate in-service age, and other operational and maintenance aspects associated with the service transformer.

As part of the DMD Initiative, Southern Company will be demonstrating the concept of leveraging disparate data sets to assess the health of non-communicating devices and oil circuit reclosers. Currently, Southern Company performs maintenance on each OCR every five years, regardless of whether it has operated 2 times or 200 times. Their desire is to transition from this calendar based maintenance to a condition-based maintenance schedule. Parameters such as the number of operations, as well as the magnitude of the fault current of each operation will be leveraged to assess the health of the device. AMI meter and Outage Management System data will be leveraged to determine when an OCR operates. The fault current magnitude at the OCR will be determined by marrying the fault current magnitude data from the upstream SCADA devices and the data from the Distribution Management System fault current analysis tool. These unique pieces of data will then be used in an asset management algorithm to determine how each fault and operation impacts the overall life of the OCR and to predict the optimal time to implement needed maintenance or replace the asset.



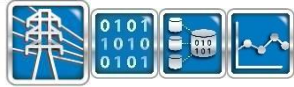
## Welcome New TMD Members

Salt River Project (SRP) has recently joined TMD. SRP provides electricity to approximately 900,000 customers in the Phoenix area. SRP’s focus area on data analytics includes asset optimization, performance monitoring, and risk management, with a cross-cutting approach across all assets. SRP and the EPRI TMD team are currently in the process of identifying an applications candidate for demonstration in the area of asset management analytics.

## TMD Demo Activities

Five demonstrations are currently underway or in the kickoff stage in the Transmission Modernization Demonstration project. These demonstrations have diverse objectives and approaches. Nevertheless, all of them involve the use and integration of multiple data sources, and they are being conducted on a sufficient scale to extrapolate results to full system deployment. The demos underway include:

Project title	Host Utility	Objective/Description
Transmission Monitoring, Diagnostics, and Visualization	Southern Company	Develop a data infrastructure for transmission systems that is scalable and integrated sufficiently to allow for analytics to be automatically performed resulting in actionable information. The tool will be used to take mitigating measures or to enhance system performance, efficiency, and reliability.
Network Model Management	American Electric Power	Streamline the processes that AEP uses to manage data from its network models by introducing a Network Model Management architecture, which will facilitate the organization and management of information from all of the network models.
Synchrophasor Event Analysis and Retrieval System (SPEARS)	Bonneville Power Administration	Develop a centralized Synchrophasor Event Analysis and Retrieval System (SPEARS) that automatically reads the log entries from different event detection applications, retrieve the appropriate data sets, and perform the correct analysis techniques, producing a report with all of the relevant information from the system event.
Transformer Command and Control	New York Power Authority	Demonstrate the ability to provide a command and control function that can be translated from the defense industry to the civilian power utility industry, with the objective of mitigating and eliminating damage to transformers. The solution uses technology by mPrest Systems Ltd., integrated with EPRI’s Power Transformer Expert (PTX) software, and a set of rules developed by NYPA.
Automatic Fault Location	Various	Develop and demonstrate an on-line automatic fault location system intended for systems operators and protection engineers. The system will automatically transmit data from intelligent electronic devices (DFR, digital relays, etc.) triggered by faults in the transmission grid to a central server. It will then calculate the distance to the fault and conduct further analysis such as root cause, protection response, equipment malfunction, etc. Once the analysis is complete, it will dispatch the results to appropriate staff through selected communications means.



**Overall Deliverables Summary**

To date, twenty documents have been developed to articulate progress within the DMD and TMD projects. All deliverables are available from the EPRI website by going to the **Program 180 Cockpits** tab and selecting Supplemental Project **S\_DMD/TMD**. The newsletters and other public documents can be found on the Research tab at <http://smartgrid.epri.com>. For project member assistance with downloading, please contact [askepri@epri.com](mailto:askepri@epri.com).

**KEY DATES**

**DMD and TMD – Member/Advisor Updates**

**Spring 2015 Data Analytics for Distribution and Transmission Modernization Member Advisory Meeting, May 19<sup>th</sup> and 20<sup>th</sup> in Atlanta, GA**

Please join us in Atlanta, Georgia for the Spring 2015 Data Analytics for Distribution and Transmission Modernization Advisory Meeting hosted by Southern Company and Georgia Power. A block of rooms is available at the Marriott Marquis until April 27 at a rate of \$151 per night plus applicable taxes. The Advisory Councils review the progress of ongoing research and demonstrations within this collaborative research area, identify emerging areas of interest, and prioritize the research efforts to meet the data and analytics related needs of the electric power industry. The meeting also provides an excellent opportunity to exchange information and experiences with your industry peers and to identify analytics and data related opportunities for your company. DMD/TMD members can register for the meeting on the EPRI Cvent calendar at [www.epri.com](http://www.epri.com). For additional information, contact Lori Warneke, (865) 218-8174, [lwarneke@epri.com](mailto:lwarneke@epri.com).

**Fall 2015 Data Analytics for Distribution and Transmission Modernization Advisory Meeting, October 26<sup>th</sup> and 27<sup>th</sup>, EPRI, Charlotte, NC – Watch for more details in the next newsletter.**

The full DMD TMD calendar for 2015 is shown in the following table.

Meeting/Webcast - 2015												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>DMD Update</b>		●		●				●				●
<b>TMD Update</b>	●		●				●		●		●	
<b>DMD/TMD Member Face-to-Face Meeting</b>					●					●		