2016 EPIC Summer Workshop
Focus: Distribution Automation
Overview of Topics Presented

Demonstration Test Bed for Advanced Control Systems 9:40 - 10:00 a.m.
Christopher Clarke, Senior Engineer, SCE Advanced Technology

This project will leverage lessons learned from the Next Generation Distribution Automation – Phase 1 project performed in the first EPIC triennial investment plan period. This project will focus on integrating advanced control systems, modern wireless communication systems, and the latest breakthroughs in distribution equipment and sensing technology to develop a complete system design that would be a standard for distribution automation and advanced distribution equipment.

Remote Intelligent Switch 10:00 - 10:20 a.m.
Bryan Pham, Senior Manager, SCE Advanced Technology

SCE's current distribution automation scheme often relies on human intervention that can take several minutes (or longer during storm conditions) to isolate faults, is only capable of automatically restoring power to half of the customers on the affected circuit, and needs to be replaced due to assets nearing the end of their lifecycle. In addition, the self-healing circuit being demonstrated as part of the Irvine Smart Grid Demonstration is unique to the two participating circuits and may not be easily applied elsewhere. As a result, the Next-Generation Distribution Automation project intends to demonstrate a cost-effective advanced automation solution that can be applied to the majority of SCE's distribution circuits.

Distributed Optimized Storage – Consideration for Dual Use Operation 10:20 - 10:40 a.m.
Loic Gaillac, Senior Manager, SCE Advanced Technology

This field pilot will demonstrate end-to-end integration of multiple energy storage devices on a distribution circuit/feeder to provide a turn-key solution that can cost-effectively be considered for SCE's distribution system, where identified feeders can benefit from grid optimization and variable energy resources (VER) integration. To accomplish this, the project team will first identify distribution system feeders where multiple energy storage devices can be operated centrally. Once a feeder is selected, the energy storage devices will be deployed and tested to demonstrate seamless utility integration, control, and operation of these devices using a single centralized controller. At the end of the project, SCE will have established clear methodologies for identifying feeders that can benefit from distributed energy storage devices and will have established necessary standards-based hardware and control function requirements for grid optimization and renewables integration with distributed energy storage devices.

EPIC 1.01 Energy Storage for Market Operations 10:50 - 11:10 a.m.
Mike Della Penna, Senior Engineer - Reliability, Asset & Planning, PG&E

The objective of this project was to develop technologies and strategies for efficient and optimized bidding and scheduling of Energy Storage Technologies (ESTs) in California ISO markets and demonstrate those strategies using PG&E's existing Sodium Sulfur Battery Energy Storage Systems (NaS BESS). This presentation will include an overview of the project's accomplishments, industry-relevant findings, lessons learned and future plans after completion of the project.

EPIC 2.02 Distributed Energy Resources Management System (DERMS) 11:10 - 11:30 a.m.
Alex Portilla, DERMS Technical Lead – Emerging Grid Technology, PG&E

The objective of this project is to demonstrate new technology to monitor and control Distributed Energy Resources (DERs) to manage system constraints and evaluate the potential value of DER flexibility to the grid. The DERMS pilot will deliver the following: Drive learnings about the people, process, and technology needed to operate the high DER penetration grid of 2025; Create, test, and iterate on future DERMS requirements (e.g., communication requirements for PG&E and 3rd party owned DERs); Learn about business process change, and personnel skills and knowledge needed to implement DERMS; and Enable an informed choice for long-term strategic vendor in 2017 and beyond (pilot is not choosing the long term vendor). This presentation will include an overview of the recent accomplishments and industry-relevant findings, as well as future plans for the project and expected outcomes.

Integrated Distr. Energy Resources Management Systems 11:30 - 11:50 a.m.
CEC / UC Riverside

The objective of this project is to develop an Integrated Distributed Energy Resource Management System (iDERMS). The iDERMS will coordinate the operations of a large number of distributed energy resources. The distributed energy resources will be coordinated through a three-phase distributed optimal power flow algorithm and electricity market. For normal conditions, a virtual power plant will aggregate a large amount of flexible loads, renewable resources, energy storage systems, etc. In emergency conditions, a decentralized Volt-VAr control will provide dynamic distributed reactive power support to distribution grid through smart inverters. During restoration operations, a distribution network reconfiguration algorithm will use high levels of renewable generation to make the distribution network a self-healing grid.

Developing a Distribution Substation Management System 1:20 - 1:40 p.m.
CEC / Siemens Corporation

Demonstrate that it is possible to achieve a greater level of automation of the control of a smart grid by creating a knowledge model that is shared between grid substations and control centers. Specifically: (1) Develop a semantic model that integrates operational smart grid data and management data; (2) Demonstrate the value of the developed semantic model within an operational management interface that facilitates the local operational control of individual distribution substations; and (3) Demonstrate the value of the developed semantic model for automating operational control on a global level, across individual substations.

Substation Automation and Optimization of Distribution Circuit Operations 1:40 - 2:00 p.m.
CEC / UC Irvine

Establish the substation control capabilities necessary to manage distribution energy assets as a single unit in the context of a high-penetration of renewable power generation and the emergence of electricity markets. Specifically: (1) Maximize the penetration of renewable resources and distributed energy resources; (2) Develop and assess the viability of a retail electricity market. (3) Develop strategies for better distribution system management and use of smart grid technologies; and (4) Simulate and assess the deployment of fuel cells at the substation.

EPIC-1, Project 3: Distributed Control for Smart Grids 2:00 - 2:20 p.m.
Kelvin Ellis / SDG&E

The objective of this project is to test alternatives for communication and control across distribution system resources to ensure that devices operate in a complementary manner and ensure optimum distribution system performance, reliability, and stability. The project will test distributed control methods and approaches to control distribution circuit resources and integrate them as part of a unified control scheme with other higher-level control systems, such as the distribution management system (DMS). The project work will assess the scalability and performance of alternative control schemes.

EPIC 2, Project 2: Data Analytics in Support of Advanced Planning and System Operations
Yvette Oldham / SDG&E 2:30 - 2:50 p.m.

This project is designed to address the anticipated "data tsunami" associated with more widespread system monitoring and more widespread use of controllable devices in the power system. It will also help create better data management. It will demonstrate solutions for the data management issues and challenges expected to accompany the extensive amount of real-time and stored data being archived from field devices and identify the data mining procedures and the data-archiving methods, utilizing this data to improve power system operations. Solutions that are deemed to be best practices will be documented for use in improving the data management systems that support power system operations. The project results are expected to benefit SDG&E and other utilities.

EPIC 2, Project 4: System Operations Development and Advancement 2:50 - 3:10 p.m.
Marvin Zavala-Iraheta / SDG&E

The objective of this project is to support continued modernization of SDG&E's power system via demonstrations of improved capabilities in system operations. The project will demonstrate a systematic process for the realignment of operating practices with advances in technology, software and standards used in the power system. The realignment is broad, and will address system integration issues, training programs, worker skill sets, and workforce readiness.