



# SMART GRID CENTER

TEXAS A&M ENGINEERING EXPERIMENT STATION



## Annual Report

### September 2017 - August 2018

The annual activities of the Smart Grid Center (SGC) endorsed by the Advisory Board had a four-fold purpose: 1) Finalizing the development of Membership Agreement of the Center; 2) Moving the Experimental Open Source Ecosystem (EXPOSE) platform from its temporal location to its final location hosted at the Center for Infrastructure Renewal (CIR) at the RELLIS Campus of Texas A&M System; 3) Conducting relevant strategic research projects while educating students; and 4) Developing training and workforce development courses.

#### Developing a Smart Grid Center Membership Agreement

To engage Members, such as utilities vendors and non-profit organizations focused actively on improving the power grid, a Membership Agreement has been developed with assistance from the Advisory Board Members and TEES

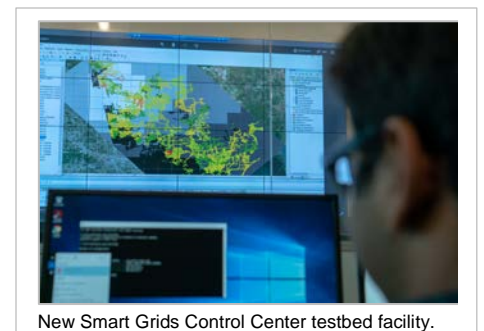
Intellectual Property Licensing Office. It has been vetted by legal teams of industry partners and it will be available for the prospective members of the Center to sign.

#### Moving the Experimental Open Source Ecosystem (EXPOSE) Platform to Final Location

The novel EXPOSE platform, that integrates large-scale testbeds at virtual and physical levels to mimic new grid control solutions at various spatial and temporal scales, has been relocated to the [Smart Grids Control Center](#) hosted in the Center for Infrastructure Renewal (CIR) building at RELLIS Campus of Texas A&M. This new facility provides a world-class environment for research, teaching, training and workforce development.

#### Strategic Project Focus Areas

Synchrophasors and synchronized sampling technology for T&D applications;



New Smart Grids Control Center testbed facility.

Cyber-physical security with emphasis on interactions between different critical infrastructures; Big data including weather impact analyses integrated into GIS framework; Flexible loads, including on-site energy storage and distributed generation at different scales; Renewables forecasting with focus on solar and wind generation at different voltage levels; Future whole sale ancillary service products and retail market participation strategies; Synthetic grids.

Smart Grid Center founded in August 2012

**The Center focused on developing its membership agreement, attracting potential members, moving the EXPOSE platform to CIR, comprehensive large-scale testbeds, and strategic projects.**

### New Large-Scale Research Project

“US-India Collaborative for Smart Distribution System with Storage (UI-ASSIST)” lead by Washington State University in collaboration with Drs. Mladen Kezunovic, Chanan Singh, and Miroslav Begovic (ECE, TAMU), and more from other organizations. DOE awarded \$7.5 Million to US partners for a 5-year project starting in October 2017.

### New Advisory Board Members

- Mr. Bill Ablar, VP, Commercial Development & Innovation, Entergy Corp.
- Dr. Kevin Nowka, then Director, IBM Research – Austin (resigned to join ECEN faculty)
- Mr. Gary Racliffe, VP, Smart Grids, ABB Group – North America
- Mr. Cameron Smallwood, CEO & General Manager, United Cooperative Services

Information on all current Advisory Board (AB) Members can be viewed at <http://smartgridcenter.tamu.edu/sgctamu/index.php/advisory-board>

### Advisory Board Meetings

- The 9<sup>th</sup> AB meeting was held at TAMU, College Station, TX, on Oct. 6., 2017;
- The 10<sup>th</sup> AB meeting was hosted by CPS Energy in San Antonio, TX, on Jan. 25., 2018;
- The 11<sup>th</sup> AB meeting was held at CIR, Bryan, TX, on May 7, 2018. It included a tour organized by the Center Directors with a demonstration by Dr. Kate Davis, and graduate students.

May 7, 2018



Demonstration for Advisory Board members and guests at the Smart Grids Control Center.

Visitors included H.E. Essa Bin Hilal Al-Kuwari, Eng., President, Qatar General Electricity & Water Corporation (KAHRAMAA) and Chair of the SGC-Q Steering Committee, Dr. Shmuel Oren, Professor, University of California – Berkeley, and Dr. Glauco Taranto, COPPE / UFRJ, Rio de Janeiro, Brazil. The PUC Commissioner DeAnn T. Walker and her staff also attended.

### Publications

Research results were published in 17 peer-reviewed papers, 1 book and 2 book chapters, and 14 conference publications by faculty at SGC main campus.

SGC-Qatar faculty and staff published 4 peer-reviewed papers, 1 book chapter, and 20 conference publications.

Reference information may be viewed and some publications can be downloaded at the Center’s websites.

### SGC Websites

Expertise of collaborating faculty members, information of industry partners, faculty activities, related publications, news and more can be viewed at <http://smartgridcenter.tamu.edu>.

For the SGC-Q, news and information on people, projects and publications are posted at <http://www.sgc-q.com>.

### Sixth Smart Grid Workshop

“Smart Grids Big Data” workshop was held on May 8, 2018. The invited talk was given by Todd Horsman from CPS Energy. Four panels and six focus groups facilitated discussions. Graduate students presented their research results using posters.

May 8, 2018



Sixth Smart Grid Workshop, College Station, TX.

More than 140 attended including 55 students, 14 postdocs and research staff, 48 faculty members, and 15 representatives from industry (ABB, CNP, EPG, ComEd, Esri, GE, Landis+Gyr), government entities (NREL, PNNL), and non-profit organizations (EPRI, ERCOT). NSF Travel grant was awarded to 38 participants.

### Twelve IEEE CPE-POWERENG Conference

This event of the IEEE Industrial Electronics Society was held in Doha, Qatar on April 10-12, 2018.



### Training

- Webinar sponsored by PSERC was presented by Dr. K. Davis: “Online Intrusion Tolerance and Response in Power Systems” on January 23, 2018.
- SGC-Qatar conducted 3 training events and a webinar:
  - “The Hazardous Areas Classification and Intrinsic Safety for a Safe Workplace Short Course”;
  - “The Fundamentals of Electricity and Electrical Safety in the Workplace Short Course”;
  - “Electrical Transformers and Switchgears; Faults, Inspection, Testing, Maintenance and Trouble Shooting”.
  - Webinar sponsored by IEEE was presented by Dr. H. Abu-Rub on May 31, 2018: “Future Grid Paradigm – Smart Grid Architecture”

### Expanding the SGC Portfolio

New collaborating faculty members joined:

- Kate Davis (Associate Professor, Electrical & Computer Engineering)
- Thomas Overbye (Professor, Electrical & Computer Engineering)

### Future Plans

- Recruiting the SGC Members;
- Enhancing testbeds for research, education, and industry training;
- Expanding the SGC Advisory Board;
- Organizing short courses;
- Hosting the First IEEE International Conference on Smart Grid Synchronized Measurements & Analytics (SGSMA) in May 2019;
- Organizing workshops and tutorials associated with SGSMA 2019;
- Hosting many visits from industry and government organizations.