Smart Grid Center

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Director

Smart Grid Workshop
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Vision

....to position the Texas A&M University System (TAMUS) and the State of Texas (State) as global leaders in education, research, and public service in the modernization of the electricity system...

Mission

... to form a competitive multidisciplinary and interdisciplinary environment to advance efficient use of electric energy and modernization of the electricity grids.
Strategy

**Portfolio**
All things “Smart Grid”

**Focus**
Large research project

**Impact**
Local, State, National, Global

**Participation**
Interested faculty, students, research staff and professionals

**Collaboration**
Government organizations, vendors, universities, utilities
Organization

9 Industry members
2 universities
20 researchers
$2 million over 5 years

35 industry members
13 universities
100 researchers
$10 million over 2 years

3 partners
1 university
15 researchers
$4.1 million over 3 years

8 partners
3 universities
30 researchers
$5.4 million over 3 years
Status
TEES center
Approved by BoR
August 3, 2012
Activities
Since 2009
Faculty Participants
Dwight Look: ECEN 24, Other 11
Other Colleges: 10
Graduate Students: over 150
Areas of Interest

Complex systems
Critical Infrastructures, Integration, hierarchy,

Power grids
Current grids, mega grids, microgrids, specialized grids

$C^3$
Computational complexity, communications, control

Related Issues
Education, policy, economics, environmental, societal
Future Electricity Grid
Custom Electricity Grids

- Subsea power grid
- Space power
- Military microgrids
- Ship power
- Off-shore wind
Enabling Technologies

Power electronics

Information processing

Sensor networks

Energy Storage

Communications

Visualization
Study Framework
Integrative View

- Electricity Production & Consumption
- Transportation System
- The Built Environment
- Computer Information services

Image courtesy DOE
Integration Goals

Integrating smart, wise, intelligent, future, modern, perfect, empowered
Outline

Smart Grid Center
Research Focus
Faculty resources
Collaboration
FYI
Faculty Resources
Electric Power and Power Electronics

- Robert Balog, PV integration
- Karen Butler-Purry, Shipboard systems
- Mark Ehsani, Mechatronics, vehicles
- Prasad Enjeti, Power quality,
- Garng Huang, Stability
- Mladen Kezunovic, Protection and Control
- Don Russell, Monitoring
- Chanan Singh, Reliability
- Hamid Toliyat, Machine control
- Le Xie, Wind integration
Outline

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Collaboration: Present

- NSF I/UCRC (EV-TEC):
  - Data Hub (Q2 2013)
  - EV Impact on Power grid (Q2 2013)
  - NSF CORBI (Sept 2012-Aug 2013)
- NSF I/UCRC (PSerc), Q2 2013:
  - The next generation EMS Design, T-45
  - Data Mining from PMU measurements, S-44
- DOE/PSerc (Q1, 2013)
  - Hierarchically Coordinated Protection
  - Synchrophasor technology and applications
- PSerc (Q2, 2015)
  - Systematic integration of large data sets for improved decision making
Collaboration: Future

- NSF I/UCRC (EV-TEC):
  - Two new proposals
- NSF I/UCRC (PSerc):
  - Four new proposals
- Integrative Data Exploration Analytics-IDEA (Resubmission)
- Mathematical Multifaceted Integrated Capability Center (resubmission)
- Predictive Risk-Based WAMPAC Data Analytics (resubmission)
- Smart Energy Campus Initiative
- NSF ERC
Outline

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Smart grid center:

http://smartgridcenter.tamu.edu/sgc/

EV-TEC:

http://ev-tec.org

PSerc:

http://www.pserc.org

ARPA-E:

http://smartgridcenter.tamu.edu/ratc/

Smart Energy Campus Initiative:

http://smartgridcenter.tamu.edu/seci/
Together - building a prosperous future

where energy is clean, abundant, reliable, safe, secure and affordable