Together…Shaping the Future of Electricity
Together…Shaping the Future of Electricity

EPRI’s Mission

Advancing safe, reliable, affordable and environmentally responsible electricity for society through global collaboration, thought leadership and science & technology innovation
Three Key Aspects of EPRI

**Independent**
Objective, scientifically based results address reliability, efficiency, affordability, health, safety and the environment

**Nonprofit**
Chartered to serve the public benefit

**Collaborative**
Bring together scientists, engineers, academic researchers, industry experts
<table>
<thead>
<tr>
<th>Time</th>
<th>Agenda Item</th>
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<tbody>
<tr>
<td>9:30</td>
<td>Opening Plenary – Welcome and EPRI Overview</td>
</tr>
<tr>
<td>11:00</td>
<td>Break</td>
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<tr>
<td>11:30</td>
<td><strong>Cyber Security Track</strong></td>
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<td></td>
<td>Risk Management</td>
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<tr>
<td>13:00</td>
<td>Lunch</td>
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<tr>
<td>14:30</td>
<td>Security Posture Assessment for Operations Tech. &amp; Control Systems</td>
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<tr>
<td>16:00</td>
<td>Break</td>
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<tr>
<td>16:30</td>
<td>Improving NW and Sys Management for Substations &amp; Field Devices</td>
</tr>
<tr>
<td>18:00</td>
<td>Adjourn</td>
</tr>
<tr>
<td>9:00</td>
<td><strong>Wednesday April 29</strong></td>
</tr>
<tr>
<td>9:00</td>
<td>Centralized Threat Management</td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
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<tr>
<td>11:00</td>
<td>Cyber Security Closing Plenary</td>
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<tr>
<td>12:30</td>
<td>Take-away Lunch &amp; Transportation to Optional Tour</td>
</tr>
<tr>
<td>13:00</td>
<td>Tour of Gas natural Fenosa Control Center - Optional</td>
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</tbody>
</table>
Welcome & Introductions

- Name
- Title
- Company

What would you like to get out of this event?
Safety Moment

- Selfie Sticks – Be careful
ANTITRUST GUIDELINES for EPRI Meetings & Conferences. Apply to EPRI, its Members, funders, and advisers

EPRI’S PRIMARY PURPOSE

...to conduct research and development relating to the generation, delivery and use of electricity for the benefit of the public. EPRI advisory meetings are conducted to further that purpose.

YOUR ROLE AT EPRI ADVISORY MEETINGS

...to follow the meeting agenda and provide advice on EPRI’s RD&D program and how to make EPRI results most useful. Consult with your company counsel if at any time you believe discussions are touching on sensitive antitrust subjects such as pricing, bids, allocation of customers or territories, boycotts, tying arrangements and the like.

DO NOT DISCUSS

...pricing, production capacity, or cost information which is not publicly available; confidential market strategies or business plans; or other competitively sensitive information. Do not disparage suppliers and/or competitors of EPRI and/or EPRI Members and participants.

EPRI DOES NOT RECOMMEND

...the use of particular vendors, contractors or consultants for non-EPRI projects. EPRI will not promote or endorse commercial products or services of third parties. You must draw your own conclusions and make your own choices independently.
ANTITRUST GUIDELINES: Continued

BE ACCURATE, OBJECTIVE, AND FACTUAL

...in any discussions of goods and services offered in the market by others, including your competitors, suppliers, and customers.

DO NOT AGREE WITH OTHERS

...to discriminate against or refuse to deal with (i.e., “boycott”) a supplier; or to do business only on certain terms and conditions; or to set price, divide markets, or allocate customers.

DO NOT TRY TO INFLUENCE

...or advise others on their business decisions, and do not discuss yours (except to the extent that they are already public).

ASK

...for advice from your own legal department, if you have questions about any aspect of these guidelines or about a particular situation or activity at EPRI; or ask the responsible EPRI manager to contact EPRI’s Legal Department.
EPRI was Born in a Blackout

Founded in 1972 as an independent, non-profit center for public interest energy and environmental research

New York City, The Great Northeast Blackout, 1965
Our Members & International EPRI R&D Collaboration

- **EUROPE**
  - Belgium
  - Czech Republic
  - Croatia
  - France
  - Germany
  - Greece
  - Ireland
  - Italy
  - Netherlands
  - Norway
  - Poland
  - Slovakia
  - Slovenia
  - Spain
  - Sweden
  - Switzerland
  - United Kingdom

- **AFRICA**
  - Namibia
  - South Africa

- **SOUTH AMERICA**
  - Argentina
  - Brazil
  - Chile

- **NORTH AMERICA**
  - Canada
  - Mexico

- **AUSTRALIA**
  - Australia
  - New Zealand

- **ASIA**
  - Japan
  - South Korea
  - Malaysia
  - People’s Republic of China
  - R.O.C. Taiwan
  - Thailand
  - India

- **Middle East**
  - UAE
  - Saudi Arabia

- **EUROPE**
  - Belgium
  - Czech Republic
  - Croatia
  - France
  - Germany
  - Greece
  - Ireland
  - Italy
  - Netherlands
  - Norway
  - Poland
  - Slovakia
  - Slovenia
  - Spain
  - Sweden
  - Switzerland
  - United Kingdom

- **25% of EPRI Collaboration Membership is International – 34 Countries outside the US**
- **450+ Total Members with $380M Annual R&D Budget**
EPRI R&D Staff Collaborates with Worldwide Expertise

R&D Resources

- Universities
- National Labs
- Vendors
- Other R&D Entities

EPRI ~49%

Contracted ~51%

504 Total R&D Staff
~50% Hold Advanced Degrees (M.S., Ph.D., etc.)
214 Hired in Past 4 Years

INFORMATION, COMMUNICATION & CYBER SECURITY R&D

504 Total R&D Staff
~50% Hold Advanced Degrees (M.S., Ph.D., etc.)
214 Hired in Past 4 Years

People Are Our Main Asset

EPRI ICCS Team ~71%
Three Dimensions of EPRI’s Value

To provide value to the public, our members, and the electricity sector

Thought Leadership

Industry Expertise

Collaborative Model

Goals for Today and Tomorrow
Engage in Thought Leadership
Leverage our Collective Expertise
Benefit from our Collaborative model
(Financially and Intellectually)
About Our Research: Four Sectors

Nuclear

Generation

Environment

Power Delivery and Utilization
Information, Communication & Security are Enablers

Convergence of Electricity, Communications, Information and the Customer

Transmission, Distribution and Energy Utilization are KEY Drivers for ICCS Research
Power Delivery and Utilization Structure

Transmission, Substations and Grid Operations

Transmission & Subs
35 Overhead Trans
36 Underground Trans
37 Substations
162 HVDC Transmission

Operations & Planning
39 Grid Operations
40 Grid Planning
173 Bulk Power System Integration of Variable Generation

Distribution and Integrated Distributed Renewables

174 Integration of Distributed Energy Resources
180 Distribution Systems

Energy Utilization

1. Power Quality
18. Electric Transportation
94. Energy Storage & Distributed Generation
170 End-Use Energy Efficiency & Demand Response
182 Understanding Electric Utility Customers
199 Electrification for Customer Productivity

Information, Communication, and Cyber Security

161 Information & Communication Technology
183 Cyber Security & Privacy

Related Demonstrations
- Data Analytics
- OpenADR
- IEC 61850
- Augmented Reality
- Threat Analysis Framework
- Secure Remote Substation Access
- Field Area Networks

Strong Collaborative: ~150 members ~$100M Annual R&D Funding
Resources (Laboratories, Technical Staff) as Extensions of our Member’s Staff
EPRI Laboratory in Knoxville
Smart Grid – Efficiency – Renewables – Storage – Cyber Security
EPRI Laboratories in Lenox and Charlotte
High Voltage – High Current – Aging - Corrosion
The EPRI Advisory Structure

...on behalf of its members, energy stakeholders, and society
Program Committee Participation Requires One to Wear Many Hats

- **Provide oversight to EPRI Programs**
  - Guide the research
  - Monitor/assess research progress & completion

- **Provide input for planning and prioritization**
  - Review and advise on multi-year roadmaps
  - Assist in planning program deliverables
  - Prioritize annual scope based on available funding

- **Encourage applying EPRI results**
  - Connect to potential users of the research
  - Identify and recommend potential advisors in your organization
  - Mentor colleagues how to leverage EPRI participation
  - Inform your leaders and executives - value of EPRI Research

Consider industry perspective along with the needs for your utility
Celebrating Successes
Where do I start?
Getting to the Member Center – www.epri.com

- www.epri.com
- Members click on “Go To Member Login”
- Members who aren’t yet registered can register from here by creating an account
Cockpit Landing Page

Components of each Cockpit Landing Page

- Overview
- Contacts
- Research Results
- Research Support
- In Development
- Project Status Updates
- Announcements
- Meetings & Webcasts
- Committees
- Popular Downloads
- Project Sets
- Projects
- Supplmental Projects
- Collaboration

Program 183: Cyber Security and Privacy

Cyber/physical security and data privacy have become critical priorities for electric utilities. The evolving electric sector is increasingly dependent on information technology and telecommunications infrastructures to ensure the reliability and security of the electric grid. Cyber security measures must be designed and implemented to protect the electric grid from attacks by terrorists and hackers. These measures must also strengthen grid resilience against natural disasters and inadvertent threats such as equipment failures and user errors.

Research

- Cyber Security and Privacy Newsletter, April 2015
- Multi-Year Cyber Security tabletop exercise plan
- Cyber Security tabletop exercise player handbook
- Cyber Security tabletop exercise after action report and improvement plan
- Cyber Security tabletop exercise facilitation plan and master scenario event list

Meeting & Webcasts

- Information, Communication, and Cyber Security (ICCS) European Engagement 26-Apr-2015 Summit

Project Status Updates

- December 2014 Status (201 KB)
- 2015 Portfolio
  - 2015 Research Portfolio (40 KB)

Announcements

- Cyber Security Advisory Meeting Materials now Available by Galen Rasche
  The presentations given at the Cyber Security Advisory Meeting in Phoenix held earlier this month are available. Materials can be downloaded from this link. If you have any issues downloading them, read more.
- EPRI Cyber Security and Privacy Advisory Meeting - March 2-4, 2015 - Phoenix, AZ by Galen Rasche
  183 Advisors. We wanted to reach out to you to make sure you have received an invite for the upcoming EPRI Cyber Security and Privacy Advisory Meeting in Phoenix March 2-4, 2015. Some advisors did not
Mark Your Calendar
Upcoming EPRI PDU Advisory Meetings in 2015 & 2016

Program Meetings: October 5-7, 2015
Council Meetings: October 7-8, 2015
Baltimore Marriott Waterfront
700 Aliceanna Street
Baltimore, Maryland 21202
[Baltimore Marriott Waterfront]
Group Rate: $225

Council Meetings: February 24-25, 2016
JW Marriott Austin
110 East 2nd Street
Austin, TX 78701
[JW Marriott Austin]
Group Rate: $219

Information & Communication Technology Program (161)
- Don Von Dollen, Sr Program Manager

Cyber Security and Privacy Program (183)
- Galen Rasche, Sr Program Manager
Our Collective Purpose from Chauncey Starr, EPRI Founder and First CEO

- Excerpt from letter to CEO of Southern California Edison & Carolina Power & Light (now Duke Energy), May 12, 1972

Returning to the technological purposes of EPRI, one of our great problems nationally is to bridge the gap between research concept and commercial availability of advanced technological systems. I conceive that EPRI could become a sponsor or participant with manufacturers, utilities, and government agencies to stimulate the development of such commercial processes and hardware.

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