

# ANNUAL MEMBERSHIP REPORT

# EUCG 2018



**EUCG**<sup>TM</sup>  
Your Energy Information Source

# ANNUAL MEMBERSHIP REPORT

## EUCG 2018

Dear EUCG Members,

We are pleased to write to you as the EUCG Board of Directors in this Annual Membership Report. We want to sincerely thank you, the membership of EUCG, for making 2018 another great year for the organization. Since its inception in 1973, EUCG has been a member-driven, non-profit trade association focused on serving all of our member companies. EUCG's vision is to be "the leading association of global energy organizations enabling our members to optimize resources, drive performance excellence and deliver value to customers." EUCG is committed to providing the industry's best data and benchmarking studies, which aid our members in making strategic decisions within their own organizations. We are grateful for your active participation, and hope that you have found this partnership beneficial.

In 2018, the EUCG board of directors and staff continued to work on the strategic initiatives from its updated strategic plan, constantly striving to provide deliberate benefits to our membership. This work will continue throughout 2019.

2018 was another strong year financially for EUCG. Our financial stability will allow us to continue to invest in member products and services that add value to your membership. As has been said many times, we understand that membership in EUCG is a business decision and, as such, we will continue to make sure that all members receive a positive return on that investment.

2019 promises to be an exciting year for EUCG and its committees. While many of our member companies belong to multiple committees at EUCG, not all do. As you read this report, be sure to look at all of the great works within all EUCG committees. As you value your specific committee membership, we are certain that your company could benefit from a broad membership in EUCG.

Thank you again for your support of EUCG in 2018 and we look forward to an exciting 2019. It is indeed our pleasure to serve you!

Sincerely,

### Your EUCG Board of Directors

**Stephanie Maggard**

**Jesse Medlock**

**Evelyn Grant**

**Matt Dau**

**Andrew Campbell**

**Stephen Thornton**

**David Ward, Jr.**

**Eileen Brannon**

**Chris Utracki**

**Steve Royall**

**Ruben Soto**

Since 1973, EUCG has brought utility companies together to participate in studies, learn from each other, and share best practices.

## EUCG Vision

The leading association of global energy organizations enabling our members to optimize resources, drive performance excellence and deliver value to customers.

## EUCG Mission

We promote end-to-end energy production and delivery excellence by:

- ▶ providing relevant, accurate and timely benchmarking information on cost and performance
- ▶ promoting outstanding cross functional networking opportunities
- ▶ establishing a forum for direct exchange of best practices and lessons learned



## BOARD OF DIRECTORS

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# NUCLEAR POWER

## NUCLEAR ENERGY

continues to be a reliable and safe supply of the largest clean-air energy source in the world. Nuclear energy output has increased each of the past five years utilizing the 448 nuclear operating units worldwide. Efficient operations of existing nuclear plants, along with construction

of new facilities, is essential to meet the increasing demand for dependable energy. Nuclear energy is a secure electricity source that is not subject to changing weather or climate conditions, unpredictable fuel cost fluctuations or over-dependence on suppliers.

Continued production of safe, reliable and cost effective nuclear energy are the cornerstones of the nuclear industry. The EUCG Nuclear Committee's Mission supports these efforts by providing members with timely, relevant and comprehensive cost data and the facility to network to resolve industry business operations financial issues with the goal of enabling sustainable performance improvements in nuclear power.

## Message from the Chair:

*With the competitiveness of today's energy markets, the Nuclear Industry is seeking innovative ways to gain efficiencies and reduce costs while continuing to deliver reliable energy around the world, thus sustaining economies and quality of life. To help with this endeavor, the EUCG Nuclear Committee continues to distribute valued added data and products to its members in a timely and accurate manner. In 2018, the EUCG Nuclear Committee accomplished the following initiatives as directed by the group's strategic plan.*

**1. Organization Sustainability:** Develop succession plans to ensure continued sustainability and effectiveness of the EUCG Nuclear Committee.

*This was accomplished by developing and providing to the EUCG Nuclear Committee members succession plan templates. These were available and utilized for compiling succession plans for Management Sponsors, Primary Representatives and Data Providers for use when transition occurs.*

**2. Data Improvements:** Improve database products and services to ensure effective usage, credibility and enhanced benchmarking efforts for member companies.

*The Capital Major Projects database was enhanced by including major system and component categorization to allow benchmark reports compiled by these components. Member companies have the ability to retrieve major project data by nuclear plants in a timely manner.*

**3. Member Company Satisfaction:** Ensure the Nuclear Committee is being attentive to the needs of its members by soliciting formal and informal input regarding committee products and services.

*This was accomplished through two methods. The Nuclear Committee conducted the biennial member satisfaction survey for all members by soliciting Management Sponsors and Primary Representatives. The survey results were provided to the members with Nuclear Committee Leadership formulating action plans to address the recommended initiatives. The second method was the expansion of the workshop forum sessions to allow more time for members to engage and discuss current nuclear industry issues and exchange innovative ideas implemented at their company.*

The EUCG Nuclear Committee is the most complete, accurate, and timely industry source for business operations cost data in the world. Data is provided directly by the operating company members and then reviewed and verified by industry peers before the final release. The EUCG Nuclear Committee continues to provide the following nuclear industry cost information to our members:

- 】 Nuclear Operating Cost which includes outage refuel details
- 】 Nuclear Capital Cost which includes major projects
- 】 Nuclear Staffing which includes regular employees and contractors
- 】 Nuclear Industry Benchmark data including the annual Chief Nuclear Officer and Standard Benchmarking reports

The initial release of previous year's reported data is available to the members in February and the comprehensive/detailed

data is available in May. Members also can initiate ad-hoc data requests as they may arise during the year to address special circumstances or situations for their company.

The EUCG Nuclear Committee continues to provide networking opportunities for members to interface with their peers and discuss emerging nuclear business operations issues or items. On a semi-annual basis, these issues are presented before an audience that consists of representatives from nuclear-operating companies in the United States, Canada, China, France, Mexico, Japan, Spain, and Brazil.

The challenge for 2019 for the EUCG Nuclear Committee is to provide information and data in a timely and innovative manner to the member companies in order to assist the nuclear industry in reducing costs and being competitive with other energy sources. This will help to ensure the long-term viability and effectiveness of nuclear operations in a safe and reliable manner.



## COMMITTEE MEMBERS

### NUCLEAR

**Ameren Missouri** | USA

**American Electric Power** | USA

**Arizona Public Service Company** | USA

**Asociacion Nuclear Asco-Vandellos** | Spain

**Bonneville Power Administration** | USA

**Bruce Power** | Canada

**Centrales Nucleares Almaraz-Trillo AIE** | Spain

**CNNC Nuclear Power Operations Management Co.** | China

**Comision Federal de Electricidad** | Mexico

**CHUBU** | Japan

**KEPCO** | Japan

**SHIKOKU** | Japan

**TEPCO** | Japan

**HOKKAIDO** | Japan

**TOHOKU** | Japan

**CHUGOKU** | Japan

**HOKURIKU** | Japan

**KYUSHU ELECTRIC** | Japan

**Daya Bay Nuclear Power Operations and Management Co.** | China

**Dominion Generation** | USA

**DTE Energy** | USA

**Duke Energy** | USA

**Electricite de France** | France

**Electrobus** | Brazil

**El Paso Electric** | USA

**Energy Northwest** | USA

**Entergy Nuclear** | USA

**Exelon** | USA

**FirstEnergy Nuclear Operating Corp.** | USA

**Horizon Nuclear** | United Kingdom

**Luminant** | USA

**Nebraska Public Power District** | USA

**NextEra Energy** | USA

**North Carolina Electric Membership Corporation** | USA

**Nuclear Energy Institute** | USA

**Ontario Power Generation** | Canada

**Pacific Gas and Electric Company** | USA

**PSEG** | USA

**South Carolina Electric & Gas** | USA

**Southern Company** | USA

**South Texas Project Nuclear Operating Co.** | USA

**Talen Energy** | USA

**Tennessee Valley Authority** | USA

**Wolf Creek Nuclear Operating** | USA

**Xcel Energy** | USA

## HYDRO POWER

harnesses the gravitational force of falling water. It is the most cost effective and the most benign mode of electric power generation. Its full life cycle greenhouse gas emissions (GHG) are as low as wind or nuclear power while the cost efficiency and power quality are unsurpassed by any other mode of generation. Water stored in a reservoir behind a dam acts like a battery; it is ready to use in a matter of seconds allowing Hydro plants to provide

# HYDRO POWER

energy at optimum times when required and, at times of excess energy on the market, pumping units can reverse the process by placing water back behind the dam. Among all generating technologies, Hydro units are the quickest to move up and down the load curve. As a result, hydropower is a key contributor to ensuring the reliability of electric systems. In general, hydropower is characterized by high value and low production costs.

The Hydroelectric Productivity Committee's (HPC's) mission is to assist member companies in achieving operational excellence by providing relevant, accurate, and timely benchmark information on cost, performance, and best practices. The HPC is currently comprised of 18 international organizations (see figure 1 and list on page 7). Members of the HPC benefit from networking with professionals in engineering, operations, accounting, and management positions at hydro utilities. The total capacity of plants operated by EUCG HPC utilities is over 100,000 MW, from which more than 400 power plants are reported annually in the HPC database (see figures 2 and 3 on page 7).

## Looking Back on 2018

### HPC has Three Main Strategic Focus Areas:

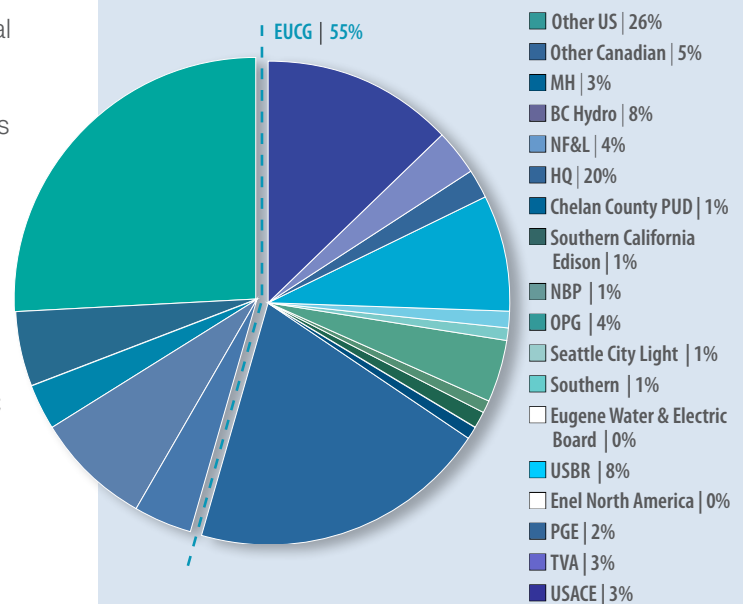
1. To continually improve the quality and usefulness of HPC cost and performance data.
2. To provide effective products and forums to help members optimize plant operations.
3. To grow EUCG HPC coverage of the hydropower sector in terms of both installed capacity and number of member utilities.

### The Committee had Significant Accomplishments in all Three of These Areas:

#### To mention a few:

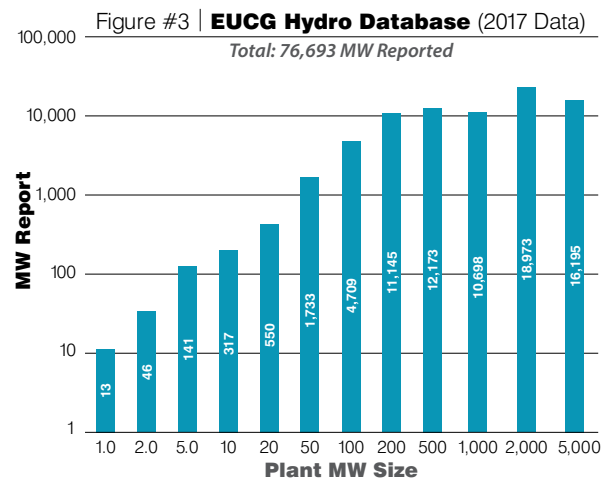
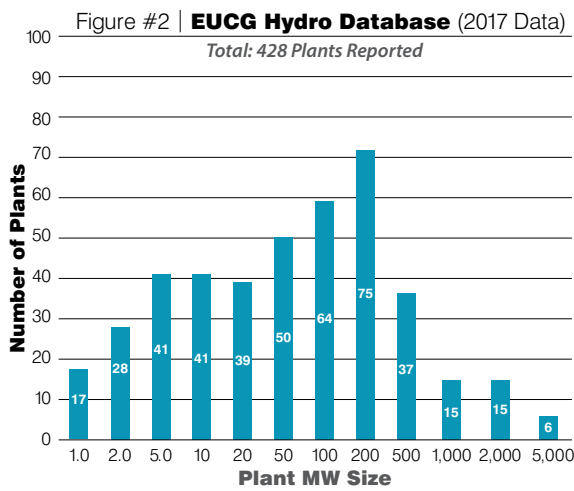
- ▶ The annual Peer Data Review was carried out July 2018 in Atlanta, GA. It successfully identified and corrected data submission errors and ensured HPC data for 2017 was complete, consistent, and accurate.

Figure #1 | **EUCG Hydro (2018)**  
EUCG Associated Hydro Utilities in NA = 100 GW  
North America Total Hydro Capacity = 180 GW



### EUCG Hydro Outside North America

Enel Chile = 8.0 GW Enel Peru = 0.5 GW  
Meridian NZ = 1.2 GW



- Earlier in 2018, the fourth Hydroelectric Productivity Committee (HPC) Annual Report was issued. It contained detailed information on Hydro plant costs and performance as well as information on trends and summary statistics. The report is only available to the contributing members in accordance with Committee's give-to-get principles.
- Continuous benchmarking methodology was used effectively in the evaluation of leading plant performance. This methodology, developed by EUCG HPC, accounts for economies of scale to put hydro plants of all sizes on a level playing field, eliminating the need to separate them into peer groups as is normally done in traditional approaches. In addition, it quantifies the tradeoffs between plant MW size and the number of units providing insight into the O&M requirements of different Hydro plant designs. In simple terms, this methodology eliminates factors that are outside plant management control, leaving cost performance measures more directly linked to what management can in fact be held accountable for.

- Spring and Fall Workshops delivered many interesting presentations, including those that reviewed industry experience on topics such as surveying Condition Monitoring programs, Unit Loading Optimization Software, Asset Management program best practices, and achieving O&M cost reductions.

### The Year Ahead

The Committee has an ambitious agenda for 2019. It will continue on the path of data quality improvement while simultaneously enhancing value-added analyses. The plan is to further explore the synergy of collaboration with Oak Ridge National Laboratory. One area targeted for such development is ability to evaluate impact from locational labor or material price indices (which, similarly to economies of scale, are not under management control). Another topic the Committee will continue to pursue in 2019 is the ever-growing issue of integration of intermittent renewable and their impact on hydro plant operations and costs. This is all in addition to the routine tasks such as documenting industry performance, trends and benchmarks in the HPC Annual Report.

## COMMITTEE MEMBERS

# HYDRO

- Bonneville Power Administration | USA
- Chelan County PUD | USA
- Enel Green Power | USA
- Enel Green Power | Chile
- Enel Green Power | Peru
- Eugene Water & Electric Board | USA
- Hydro Québec | Canada
- Meridian Energy Limited | New Zealand
- New Brunswick Power | Canada
- Oak Ridge National Laboratory | USA
- Ontario Power Generation | Canada
- Pacific Gas and Electric Company | USA
- Seattle City Light Company | USA
- Southern California Edison | USA
- Southern Company | USA
- Tennessee Valley Authority | USA
- U.S. Army Corps of Engineers | USA
- U.S. Bureau of Reclamation | USA

## BENEFITS OF MEMBERSHIP

Benchmarking is the main activity of the Committee. It is accomplished through:

- Annual cost and performance reports
- Web based access to database for standard and custom reports
- Staffing and safety survey reports
- Ad hoc surveys run in response to member needs
- Discussions, presentations and networking opportunities at the spring and fall workshops.

Cost and Performance data is collected in the HPC Database accessible to members through the EUCG Member website. Significant effort is given to maintaining high data quality. Data is peer reviewed each year which results not only in better data quality but also a better understanding of the reporting methodologies different utilities use.

Data quality is achieved through:

- Automatic data validity checks

- Peer data audit meetings
- Continuous improvement of reporting standards
- Web access with quick turnaround time
- Centrally controlled website and data security
- User-friendly interface that evolves with users' needs
- Very, very low cost of service

Two semi-annual workshops, held in spring and fall, provide the opportunities to discuss issues and practices with peers. One of the key competitive advantages of HPC membership is the committee's flexibility to address different topics and the speed with which one can obtain information directly from the source. The Committee endorses give-to-get principles by which one has to contribute in order to receive corresponding information from other members.



## Challenges to **FOSSIL POWER**

generation continued in 2018. The Clean Power Plan, Coal Combustion Residuals Rules, the updated steam electric effluent limitation guidelines, MATS, future regulatory uncertainty, and increasing capex costs are creating significant changes in the fossil generation market. These regulations, market pressures, and the ever-increasing impact of renewables, combined with low

natural gas prices, continue to challenge utilities in long-term strategic portfolio planning. General economic conditions and the lack of load growth in many areas are also strong contributors to the challenges faced by generators. In many areas of the country, our regulated footprint will have flat (or possibly slightly negative) load growth for the near future. That reduced demand puts cost pressures on all fossil facilities.

Having an opportunity to learn how fossil industry professionals from all regions of the country are navigating the rapidly-changing utility business is invaluable. The **EUCG Fossil Generation Committee (FGC)** provides regular occasions for members to meet with subject matter experts to learn best practices, and to participate in benchmarking studies that demonstrate how other companies address common industry challenges. The committee maintains databases of standard cost and performance metrics, updated annually, for both conventional steam EGUs and CC/CT plants. Members can also sponsor surveys focused on topics of special interest, such as commercial availability, inventory management, cycling costs for combined cycle plants, and lock-out/tag-out procedures.

The FGC Committee announced three **Fossil Best Practice Award winners** at the Fall 2018 Workshop:

› Tennessee Valley Authority for their work in using employee ideas to reduce costs—an excellent example of putting People First, providing recognition for employee-led efforts that significantly reduced costs.

- › Korea East-West Power for their innovative efforts in use of virtual reality tools for training, and to reduce human performance errors as well as drone usage to inspect equipment.
- › Pacific Gas and Electric for their lone worker safety program. This effort included creation of a decision-making tool to ensure lone worker safety and resulted in a significant reduction in overtime call outs.

In addition to benchmarking opportunities, the FGC provides several opportunities to learn best practices. In 2018, the Spring and Fall EUCG workshops featured presentations and member-led panels on safety case studies, utilizing the power of learning teams and creating a change management culture. FGC members learned about employee-driven safety programs, work management best practices, cost reduction methods for combined cycle and coal facilities, valve maintenance best practices and metrics for the changing energy market.



**Looking to 2019**, the committee will focus on creating a long-term strategic roadmap and on reviewing the annual cost and performance databases to ensure continued relevancy. In addition, committee workshop presentations and survey results will be available to members in a searchable, web-based resource library.

EUCG Spring Workshop topics under evaluation include operator training program best practices, asset management best practices, supervisor in the field program, cybersecurity programs, monitoring and diagnostic centers, PDM best practices, continuous improvement programs, plant closure and transition from coal to combined cycle.



## COMMITTEE MEMBERS

### FOSSIL

**Ameren Missouri** | USA  
**Austin Energy** | USA  
**CMS Energy** | USA  
**CPS Energy** | USA  
**DTE Energy** | USA  
**El Paso Electric** | USA  
**Hawaiian Electric** | USA  
**Israel Electric** | Israel

**Korea East-West Power Co., Ltd.** | South Korea  
**Lower Colorado River Authority** | USA  
**NB Power** | Canada  
**Omaha Public Power District** | USA  
**Owensboro Municipal Utilities** | USA  
**Pacific Gas and Electric Company** | USA  
**PSEG Fossil** | USA

**Salt River Project** | USA  
**Southern California Edison** | USA  
**Southern Company** | USA  
**Tennessee Valley Authority** | USA



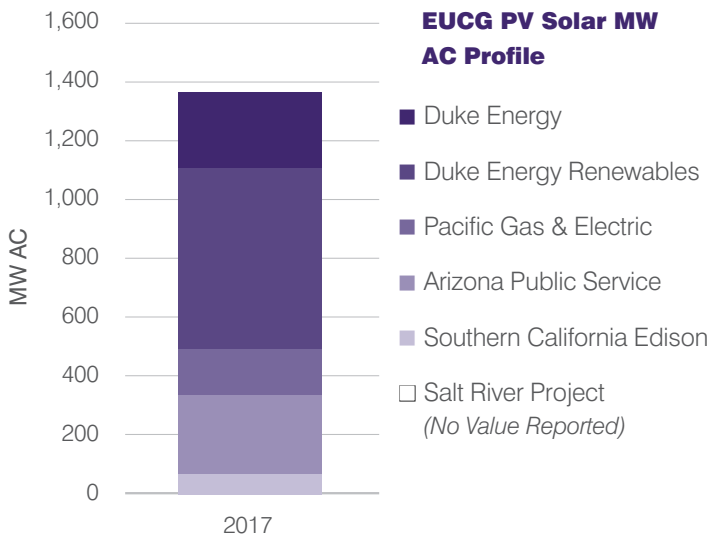
**PV SOLAR COMMITTEE**

was first established in early 2017. The original members, Pacific Gas & Electric, Southern California Edison, Arizona Public Service, and Salt River Project all met in California to start a Solar benchmarking working group. Unbeknownst to us, seventy five

percent of our original group already participated in EUCG benchmarking with other generation assets Hydro and Fossil. Once understood, we proceeded to establish a Solar Committee at EUCG.

The mission of the EUCG Solar Committee is to maximize the safety, efficiency, reliability, and value of large scale Solar PV technology through standardization of O&M best practices and performance measures.

The Solar Committee captures and shares existing O&M best practices through regular contact and benchmarking among utilities to maximize the safety, effectiveness, and value of PV technology.



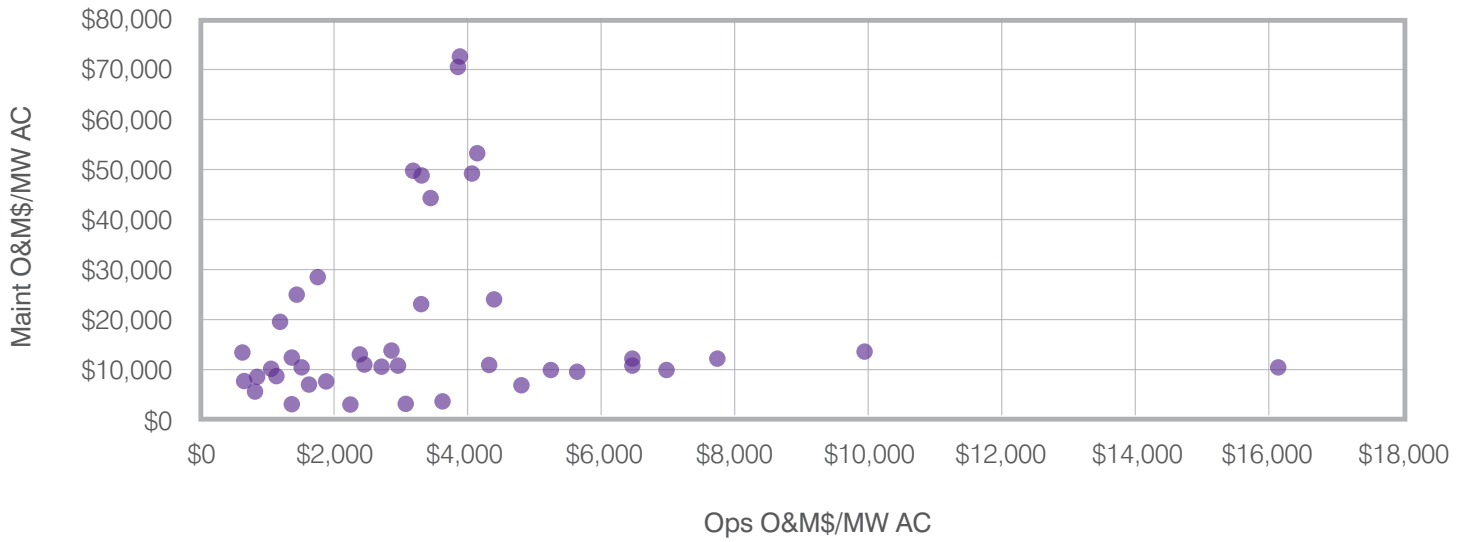
The Photovoltaic (PV) Solar Committee hosted its first meeting at the EUCG Spring Workshop held April 23-25 at the Hyatt Regency San Antonio in San Antonio, TX. This meeting of electric utility leaders in the solar energy field is the first of its kind, and provided otherwise unavailable opportunities for benchmarking, troubleshooting, and networking.

At the Fall 2018 Workshop in Denver, Colorado, the committee was presented with its first glance at an overall solar fleet financial and operational performance, providing an exciting comparison of how the plants stacked up against each other. Its much-anticipated analysis drove many discussions and best practices.

**2018 was the first complete year as a committee and several objectives were accomplished:**

1. Established a first of a kind PV Solar Benchmarking Committee
2. Completed the EUCG Solar Committee website
3. Developed a comprehensive cost and operational performance database
4. Successfully hosted EUCG's PV Solar Committee Spring and Fall Workshops
5. Increased membership base by 870 Megawatts AC.

### All Plants - 3 Year (2015-2017) Continuous Benchmark



## COMMITTEE MEMBERS

### SOLAR

- Arizona Public Service | USA
- Pacific Gas and Electric Company | USA
- Salt River Project | USA
- Southern California Edison | USA
- Duke Energy Renewables | USA
- Duke Energy | USA

## OUTLOOK

Our continued focus will be; sharing best operations and maintenance practices, addressing and solving industry common issues, increase safety while maintaining system reliability, integrate new technologies such as battery

storage, and preparing ourselves for future energy demands. EUCG PV Solar Committee Members look forward to strengthening partnerships and creating new ones with EUCG and its members.



# TRANSMISSION & DISTRIBUTION

Every facet of modern society depends on it. **DELIVERY.**

Our customers depend on safe, reliable and cost-effective delivery of power.

**TRANSMISSION** Bulk Power Systems and **DISTRIBUTION** Grid Systems get it done for millions of our customers throughout the world, no matter the generation sources. The technical challenges of keeping the T&D grid up and providing high power

quality at a low price are significant.

As, in some instances, the mix of generation changes and supply becomes more distant relative to load, the challenges can only grow. This is compounded by the increasing pressures to keep overall costs low, and counter pressures to modernize and harden the grid, and causes the sharing and identification of better practices among utility peers to be abundantly important.

T&D Benchmarking is vital to our overall industry and the individual participating utilities. The ability to partner and collaborate among industry participants to identify better practices presents unique opportunities for the T&D Utility community as compared to other industries. Herein lies the value of participating with the EUCG T&D Committee. The T&D member community allows us to leverage better practices and benchmarked data across the member utilities, as well as engage and expand our community network in a secure environment free of third-party influences. To the extent that we can acknowledge and leverage this advantage, our companies, employees, and the customers we serve will reap the benefits.

The efficiencies and discipline required to deliver energy in an expanding and changing environment while controlling costs, maximizing reliability and maintaining employee and public safety, mandate that we collaborate and work together to identify and propagate that next “great idea” that will transform some aspect of our business practices so that the next incremental improvement is realized.

As a member, not only will you have access to current members and their practices, you will have access to more than a decade of best practices presentations. Data is available on a “give-to-get” basis.

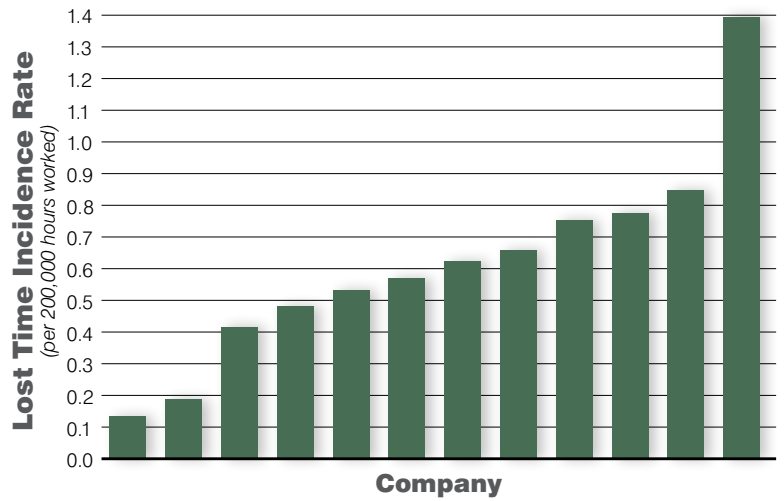
In 2018, the T&D Committee members continued work from 2017 on refining the T&D Safety, System Reliability and Cost data sets. Potential leading indicator metrics within the Safety arena were distributed to member utilities via the annual study. The Transmission focused Cost Study was rolled out to member utilities in 2018. Continued refinement of this study is underway through 2019. Growing these particular studies will be the Best in Class. As always, members can be sure that all databases are and will continue to be professionally managed and protected.

The spring and fall workshops provided platform for members to present better and best practices on the following topics:

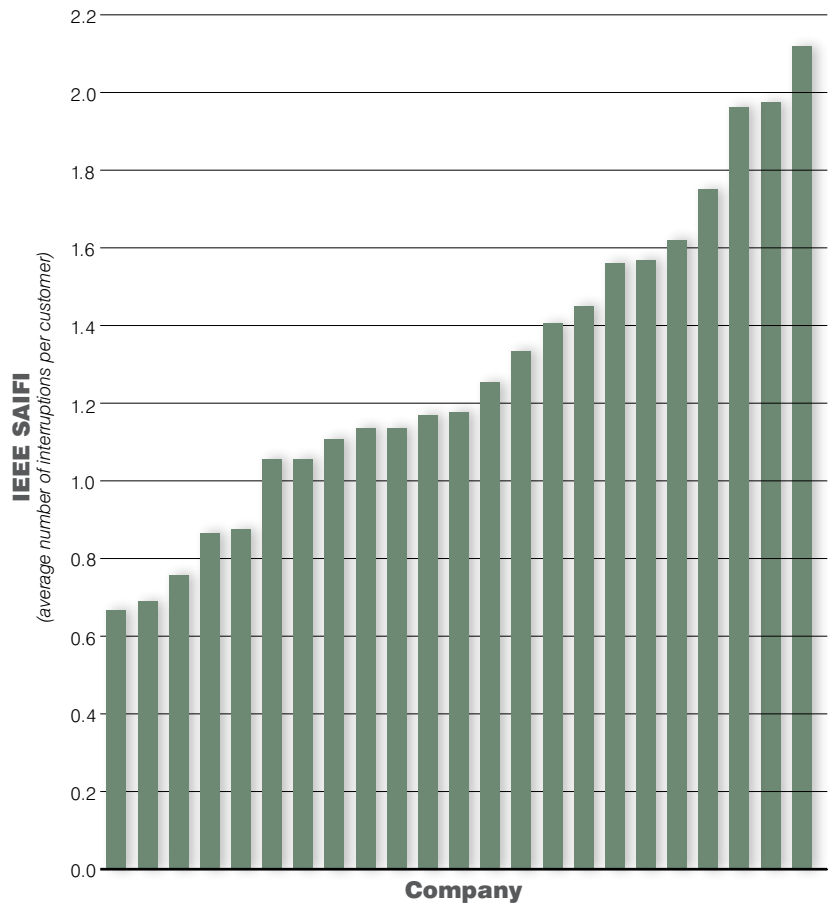
- › Innovation Platforms at the Enterprise level
- › Public Safety Education Venues
- › Customer facing smartphone apps that interface with Operations
- › Storm Restoration-Puerto Rico post-Hurricane Maria
- › T&D utilization of UAVs (unmanned aerial vehicles)
- › Study on cost effective Electromagnetic Mitigation
- › Intern Recruitment Programs
- › Leadership Development Programs



**Distribution** (no meter readings)



**IEEE SAIFI**



## COMMITTEE MEMBERS

**T&D**

Alabama Power | USA

American Transmission Company | USA

Baltimore Gas & Electric | USA

CenterPoint Energy | USA

ComEd | USA

Exelon Corp | USA

Hawaiian Electric | USA

Israel Electric | Israel

National Grid | USA

Oncor Electric Delivery | USA

PECO | USA

Pepeco Holdings | USA

PSEG | USA

Southern California Edison | USA

Tennessee Valley Authority | USA

# EUCG WORKSHOPS

This year, EUCG had two productive workshops for our valued member companies. Our workshops have become “can’t miss” member events that deliver significant educational, training, and networking opportunities. We are so pleased that

EUCG’s member companies continue to recognize the value of the collaboration and best practice sharing that takes place at our workshops, and the far-reaching benefits that result in the workplace.

EUCG stayed inland in 2018, holding its workshops in colorful San Antonio, Texas in the middle of its annual Fiesta celebration, and at the base of the beautiful Rocky Mountains in Denver, Colorado.

Our Spring Workshop was held in April in San Antonio at the Hyatt Regency San Antonio. We were pleased to have Bob Edwards aka the HOP Coach as the Keynote Speaker. Edwards presented the keynote address, and discussed Human and Organizational Performance in the workplace, the importance of recognizing the inevitability of human error, and encouraged employers to consider ways to build systems that are more error tolerant. The committee sessions and presentations were top-notch and the networking and best practice sharing were second to none.

In September, we headed west to the Grand Hyatt Denver in Denver, Colorado. The workshop kicked off with a relevant general session featuring a presentation by keynote speaker Juan Torres on the work of the National Renewable Energy Laboratory on cybersecurity and natural disasters. The networking dinner event,

held at the Colorado Rockies baseball game, provided attendees an opportunity to enjoy the beautiful late summer weather and celebrate a home team win. At dinner, members were able to continue to enhance their networks and relax among new and old friends.



Going forward in 2019, we will continue to raise the bar on our workshops and ensure that they deliver content you desire and can act upon to improve your company's strategies and results. We will also continue to enhance our execution of all of the operational aspects of the meetings. In April 2019, we will be returning to the Hilton St. Petersburg Bayfront in

St. Petersburg, Florida. We will then travel back to the Big Easy, New Orleans, Louisiana and host our Fall Workshop at the Hilton New Orleans Riverside! So, please join us in 2019 to learn, network, and better prepare for success in the future.

## FUTURE EVENTS

**EJCG**

### **2019 SPRING WORKSHOP** **Hilton St. Petersburg Bayfront**

April 7-10, 2019  
St. Petersburg, FL

### **2019 FALL WORKSHOP** **Hilton New Orleans Riverside**

September 15-18, 2019  
New Orleans, LA





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