EUCG
2016
ANNUAL MEMBERSHIP REPORT
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

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It is our pleasure to write to you as the EUCG Board of Directors in this Annual Membership Report. We want to start by extending our sincere thanks to our outgoing board members including President George Sharp, Fossil Committee Chair Ed Taylor, and the Technology Solution Committee Chair Jacque Fuller. Their dedication of time, energy, and talents helped to build a better EUCG. We want to extend a special thanks to George Sharp for his six years as President of EUCG. George was a steady, guiding hand for the organization who helped to build consensus while always making sure that EUCG was going forward and fulfilling the mission of EUCG. He challenged the board members, staff, and membership to take EUCG to new and exciting heights and we all rose to the occasion.

We also want to sincerely thank you, the membership of EUCG for making 2016 a great year for the organization. EUCG, as a nonprofit, exists to serve you and without you it could not exist and succeed. In 2016, from your work and efforts, EUCG committees generated products and services that were truly outstanding. EUCG is committed to providing the industry’s best data and benchmarking studies which will aid our members in making strategic decisions within their own organizations. We are grateful for your active participation.

One of the main functions of the EUCG Board of Directors is to set the strategic direction of the organization with a look toward the future. To this end, the EUCG board of directors began a strategic planning process at the Fall workshop in New Orleans. The work on the plan will continue in 2017 and we will keep you informed of the outcomes. One of the new initiatives in 2016 was to formally create a Solar Committee. Member companies that had an interest in solar had been meeting informally. However, the EUCG board believed that formalizing this group under the EUCG committee structure was very important for our organization and our member companies. Please contact the EUCG staff offices for additional information or if you want to know how to get involved in this exciting new committee.

EUCG continues to be financially on very solid ground. This stability will allow us to continue to invest in member products and services that add value to your membership. 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. We are sound and well-positioned to continue to deliver added value to our members. Our financial stability will allow us to continue to make prudent investments in member products, programs and services.

While many of our member companies belong to multiple committees at EUCG, not all do. We encourage you to take a look at the work products in all of our committees which are highlighted in this report. We are certain you will find value in them. We know your company stands to benefit from a broad membership in EUCG.

Thank you again for your support of EUCG in 2016 and we look forward to an exciting 2017. It is indeed our pleasure to serve you!

Sincerely,

Your EUCG Board of Directors

Stephanie Maggard
Jesse Medlock
Evelyn Grant
Kathy Shoopman
Waco Bankston
Stephen Thornton
David Ward
Eileen Brannon
Chris Utracki
Steve Royall

Since 1973, EUCG has brought utility companies together to participate in studies, learn from each other, and share best practices.
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 to enable sustainable performance improvements in nuclear power.

**Message from the Chair:**
In the changing Nuclear Industry, where new plants are coming on line and some older plants are being decommissioned, the EUCG Nuclear Committee continues to deliver relevant valued added data and products to its members in a timely and accurate manner. In 2016 the EUCG Nuclear Committee accomplished the following initiatives as directed by the group’s strategic plan.

1. **Data Access/Management:**
Provide EUCG NC members with efficient access to workshop information, survey access, and governance and supporting documentation.

_This was accomplished by designing and implementing the Nuclear Document Library which provides members with direct access via the committee website to past workshop presentations, ad-hoc surveys, committee reports, governance documents and supporting information. The Nuclear Document Library has provided members with timely and effective access to committee information._

2. **Data Security and Confidentiality:**
Develop and maintain a comprehensive security framework that assures EUCG data and products are being stored, accessed and used in an authorized manner.

_This was accomplished by validating all EUCG NC databases conform to industry cyber security standards. Completed documentation and review of all data storage and accessibility along with creating a Business Impact Analysis template for consistent and future security assessments._
3. EUCG NC Sustainability:
Ensure the Nuclear Committee and the Nuclear Leadership Team has the appropriate and sustainable succession plans.

This was accomplished by developing and communicating the EUCG Nuclear Committee Succession Plan procedure for utilization by both the Nuclear Committee and member companies to ensure long-term committee effectiveness and member engagement.

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 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 have the ability to request ad-hoc data requests for special situations that may arise during the year.

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 and also from nuclear operating companies in Canada, France, Mexico, Japan, Spain, China, and Brazil.

A significant challenge ahead for the EUCG Nuclear Committee is to determine and implement a consistent and thorough decommissioning data collection process. This will benefit the sharing of information between those members currently involved with plant decommissioning efforts with those members that are still in the planning stage for their operating units.
HYDROPOWER harnesses the gravitational force of falling water. It is the most cost effective and 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 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 the key contributor ensuring the reliability of the electric systems. In general, hydropower is characterized by high value and low production costs. Hydropower creates economic growth and contributes to the wealth of nations. Hydroelectric Productivity Committee’s (HPC’s) goal is to assist member companies in achieving operational excellence by providing relevant, accurate, and timely benchmark information on cost, performance, and best practices. The Committee is currently comprised of representatives from 18 international organizations from which 17 are plant operating utilities (see figure #1). Members of the committee strongly benefit from networking with the diversity of professionals who come from engineering, operations, accounting and management ranks. Total capacity of plants operated by EUCG HPC associated utilities is now well over 100,000 MW from which 518 plants (about 81,000 MW) are reported in the HPC database (see figures 2 & 3).
Looking Back on 2016

HPC has Three Main Strategic Focus Areas:
1. To continually improve HPC database functionality
2. To provide effective products and forums helping members to optimize plant operations
3. To grow EUCG HPC coverage of 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:
- Database content increased from 455 to 518 plants reported for 2015. The additions were made in all plant size categories. The total capacity of reported plants crossed above 81,000 MW.
- Peer Data review was carried out in July 2016 (Denver, CO). It was a successful meeting that further improved the process of ensuring data quality and data consistency.
- Earlier in 2016, the second HPC Annual Report was issued. As with the first one, this report contained detailed information on Hydro plant costs and performance as well as information on trends and benchmarks. 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 plants performance. This methodology developed by EUCG allows quantifying (and removing impacts) from the economies of scale without step changes in benchmarks at peer group boundaries as normally done in traditional approaches. In addition, it quantifies the tradeoffs between plant MW size and the number of units providing an insight into Hydro plant design. 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 papers. Worth mentioning are papers that sum up industry experience such as Automation of Hydro Plants, Use of Unmanned Aerial Vehicles, review of Work Management Systems and Public Safety Metrics.

The Year Ahead

The Committee has an ambitious agenda for 2017. It will continue on the path of data quality improvement and at the same time enhance 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 2017 is the ever growing issue of integrating intermittent renewables 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.

Hydro Committee Members

Bonneville Power Administration | USA
Electricity Supply Board | Ireland
Enel Green Power | USA
Eugene Water & Electric Board | USA
Exelon Power | USA
Hydro Québec | Canada
New Brunswick Power | Canada
Oak Ridge National Laboratory | USA
Ontario Power Generation | Canada
Pacific Gas & Electric Company | USA
Seattle City Light Company | USA
Southern California Edison | USA
Southern Company | USA
Statkraft Energi AS | Norway
Tennessee Valley Authority | USA
U.S. Army Corps of Engineers | USA
United States Bureau of Reclamation | USA
Volta River Authority | Ghana

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 on the web. Significant effort is given to maintaining high data quality. Peer data audits are conducted each year which results not only in better data quality but also builds better understanding of the reporting methodologies different utilities.

Data quality is achieved through:
- Automatic data validity checks
- Peer data audit meetings
- Educated users (data audit meetings are the best learning experience)
- Continuous improvement of reporting standards
- Web access with quick turnaround time
- Centrally controlled web site 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. Another perhaps not immediately apparent advantage, is the fact that by being involved in production and audit of the information, committee members get a much better feel for what the performance numbers really mean and what the trends and sensitivities to other parameters (e.g. scale of operations) are. The Committee endorses give-to-get principles by which one has to contribute in order to receive corresponding information from other members.
FOSSIL POWER

Generation challenges continued to increase in 2016. The clean power plan, Coal combustion Residuals Rule, the update of the steam electric effluent limitation guidelines, MATS, future regulatory uncertainty and increasing capex costs are creating significant changes in the Fossil generation market. These regulations coupled with the increasing impact of renewables and low natural gas prices continue to challenge Utilities in long term strategic portfolio planning. Those factors coupled with the general economic condition and the lack of load growth in many areas is also a strong contributor.

Within many areas of the country, our commercially generated footprint will have potentially flat (or possibly slightly negative) load growth for the near future. That reduced demand puts cost pressures on all utility owned facilities. The impact of renewable generation places greater emphasis on generation flexibility, number of cycling events, capacity factor and added costs associated with increased maintenance frequency.

The opportunity to discuss these issues with other professionals in fossil generation and to share best practices is an important tool to have available when confronting these and other challenges facing the fossil industry. The EUCG Fossil Productivity committee provides regular opportunities to meet with other industry professionals to learn best practices and to participate in benchmarking which provide members with opportunities to learn ways to improve from other professionals who are experiencing the same challenges. The EUCG Fossil Productivity Committee provides several different types of opportunities to learn best practices and in all areas of fossil plant operations and maintenance.

Each year, the committee performs annual surveys for standard operating metrics as well as specialized surveys which are of interest to our members. The annual surveys are used to identify best performers who are then invited to share their methods with committee members at the semi-annual EUCG conferences.

In addition to benchmarking opportunities, the EUCG Fossil Productivity Committee provides several different opportunities to learn best practices. The spring and fall EUCG conferences in 2016 saw member led panels focused on Cycling Costs for Combined Cycle Plants, Cross-Training Strategies, Real-Time Performance & Diagnostic Monitoring Centers, Contractor Safety, Transition from Lagging to Leading Indicators, Using Tableau for Performance Dashboards & Cost Reporting, Benchmarking Strategies, Unit Operation in a Changing Market, Managing Reliability for Transitional Units, Energy Isolation Incidents, Leadership Development Strategies, After-Action Reviews for Projects, Combined Cycle...

**In looking to 2017,** the committee will be focused on creating a long term strategic roadmap. EUCG Spring Conference topics under evaluation include Boiler tube failure survey, Safety case studies, Unit retirement decisions & strategies, Cross-functional T&D session: Ancillary services values, Asset retirement obligations, Simple-cycle CT reliability, Attrition planning for full or partial plant shutdown, Future of EPA regulation of fracking & the impact on natural gas power plants, NERC-CIP protection strategies (physical), MATS performance survey, Cross-training/retraining plant personnel to transition from coal to combined cycle, maintenance strategy survey, power plant flexibility enhancements, environmental challenges, knowledge transfer strategy and tools and operator training.

**Example of operating costs of combined cycle facilities with varied operating profiles from peaking to base loaded**
SOLAR POWER is the conversion of sunlight into electricity. It’s the cleanest and most abundant renewable energy source available. As a result, Photovoltaic (PV) Solar technology has experienced a rapid growth and is predicted, by the International Energy Agency, to reach 3,000 GW globally or 11% of projected global electricity by 2050.

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

We will capture and share existing O&M best practices through regular contact and benchmarking among utilities to maximize the safety, effectiveness, and value of PV technology.

Message from the Chair:

I’m very excited to introduce the “New” PV Solar Committee (PVSC) to EUCG’s family of electric utility members. Our core team with a combined 61 yrs of experience, have made great progress in the standardization of PV Solar performance measures. We’re committed to building new partnerships and strengthening existing ones by leveraging our diverse backgrounds and experiences to improve the PV Solar community.

Upcoming Solar Member Benefits:

- Benchmarking
- Standard KPIs enable consistent utility benchmarks
- Relevant peer groupings
  - Ground Mount
  - Commercial & Residential Rooftop
  - Small, Medium, and Large Scale Solar
- Financial and plant performance data instructions guide
- Two Semi-Annual Conferences
- Data review workshops focused on data integrity & member continuity
- Performance Analytics and Reporting
O&M Best Practices
- Share knowledge to optimize Asset Management
- “Leading Performer” presentations and best practices forum
- Maximize and leverage new and existing technologies
- Improve safety, efficiencies, and value of PV technology
- Continuous improvement driven

Cost and Performance Data
- Member anonymity
- Centrally controlled web site and data security
- Web based access to database for custom reporting

2016 Highlights
- The original core team agreed to join EUCG
- Proposal for “New” user group approved by EUCG Board of Directors
- The PV Solar Committee was announced at the Fall Conference in New Orleans
- Elected chairs were voted in and organizational chart was established

PV Solar Committee Members
- Arizona Public Service | USA
- Pacific Gas & Electric | USA
- Salt River Project | USA
- Southern California Edison | USA

Outlook
Our outlook will be focused on a successful launch and implementation of EUCG’s newest user group, the PV Solar Committee (PVSC).

A successful launch will deliver all of the major milestones identified in our implementation schedule, including membership growth through solicitation of existing EUCG members who own PV Solar and existing contacts.

Our goal and expectation is to participate in 2017’s Spring Conference at the capacity of a new user group.

Again, we look forward to growing our partnership with EUCG and its members.
H owever and where ever the power is generated, it still must be delivered to your customers. For many, this will be over hundreds of miles across the Bulk Power System to local Distribution Systems. The technical challenges of keeping the grid up and providing high power quality at a low price are significant. As the mix of generation changes and supply becomes more distant relative to load in some instances, the challenges can only grow. Add to this the pressures to keep overall costs down with counter pressures to harden and modernize the grid and the need for benchmarking and identification of better practices becomes abundantly clear.

T&D Benchmarking is vital to both our industry overall and the individual participating utilities. Our ability to partner and collaborate among industry participants to identify better practices presents unique opportunities for us as compared to other industries. To the extent that we can acknowledge and leverage this advantage, our companies, our employees and the customers we serve will all 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 such that the next incremental improvement is realized.

The true value of participating with the EUCG T&D Committee is the leveraging of data across the member utilities, along with opportunities to network and share ideas.

As a member, you do not just have access to current members and practices; you will have access to more than a decade of practices presentations. Data is available on a give-to-get basis.

Our T&D Safety and System Reliability data sets continue to evolve and improve. We have recently reopened our Transmission Cost and Reliability Study. Growing this particular panel will be the Best in Class. As always, all databases are and will continue to be professionally managed.
TRANSMISSION & DISTRIBUTION

**Lost Time Incidence Rate**

*Distribution (no meter readings)*

**IEEE SAIFI**

*IEEE SAIFI (average number of interruptions per customer)*

**T&D Committee Members**

- American Electric Power | USA
- American Transmission Company | USA
- Baltimore Gas & Electric | USA
- CenterPoint Energy | USA
- ComEd | USA
- Duke Energy | USA
- Georgia Transmission Corp. | USA
- Ghana Grid Company | Ghana
- Oncor Electric Delivery | USA
- PECO | USA
- Pacific Gas and Electric Company | USA
- PSEG | USA
- Salt River Project | USA
- Tennessee Valley Authority | USA

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**Company**

**Lost Time Incidence Rate (per 200,000 hours worked)**

**IEEE SAIFI**

Company
In 2016, EUCG had two wonderful workshops for our member companies. Our workshops have become “can’t miss” member events that deliver significant educational, training, and networking opportunities. While other associations have seen attendance dropping, EUCG’s workshops have maintained their attendee numbers while also increasing in educational quality. EUCG’s members continue to see the value in the networking opportunities and knowledge gained from attending EUCG’s workshops and bring solid information back to their jobs and to their companies.

We listen to our membership and have continued to select desirable locations for the workshops. Our Spring workshop was held in April in St. Petersburg at the Hilton St. Petersburg Bayfront. The soothing waterfront views provided a stimulating and productive experience for attendees. The committee sessions and presentations were top-notch and the networking and best practice sharing were second to none. We want to thank Duke Energy for their role as host utility.

In September, we returned to the exciting city of New Orleans at the Hilton New Orleans Riverside. This workshop saw the continued increasing collaboration among committees. The joint session on cyber security with speakers from the FBI of New Orleans was attended by all committees. The networking dinner event, held at the National World War II Museum, was a great opportunity for members to tour this world famous museum. At dinner, members were able to continue to enhance their networks and relax among new and old friends.
Going forward in 2017, we will continue to raise the bar on our workshops to ensure 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 2017, we will be heading to the Marriott Charleston in Charleston, South Carolina. We will then travel west to Portland, Oregon and host our Fall Workshop at the Portland Marriott Downtown Waterfront, following an East to West conference rotation. These unique cities will diversify our conferences and will aid in creating continuous beneficial workshops. So, please join us in 2017 to learn, network, and better prepare for success in the future.