



U.S. National Committee of CIGRE

Annual Meeting of Members

August 7, 2018

Portland, OR



Who Are We?

- PURPOSE To foster engagement and knowledge sharing among power system professionals globally to enable the sustainable provision of electricity for all.
- MISSION We contribute to the betterment of power systems by enhancing the expertise of the people within it.
- VISION To be universally recognized as the leading global organization for all aspects of electric power systems.



USNC General Meeting Agenda

- USNC President's Opening Remarks
- CIGRE International Update
- Awards & Recognition
- Nominations & Appointments
- Treasurer's Report
- Administrative VP Report
- Next Generation Network
- Technical Activities Report
- Future CIGRÉ and USNC Meetings
- Other Business & Discussion

D. Roop
M. Heyeck
E. LaRose
C. Root
C. Kelly
D. Roop
A. Olson
J. McDonald

D. Roop

USNC Members



CIGRE Organization (2018)

Officers

- President Rob Stephen (SA) to Paris 2020
- Treasurer Michel Augonnet (FR) to Paris 2020
- Technical Council Chair to Paris 2018
 - Mark Waldron (UK)
- Technical Council Chair at Paris 2018 to Paris 2022
 - Marcio Szechtman (BR)
- Secretary General Philippe Adam (FR) On-Going
- Steering Committee, Administrative Council
 - U.S. NC Rep Mike Heyeck to Paris 2020



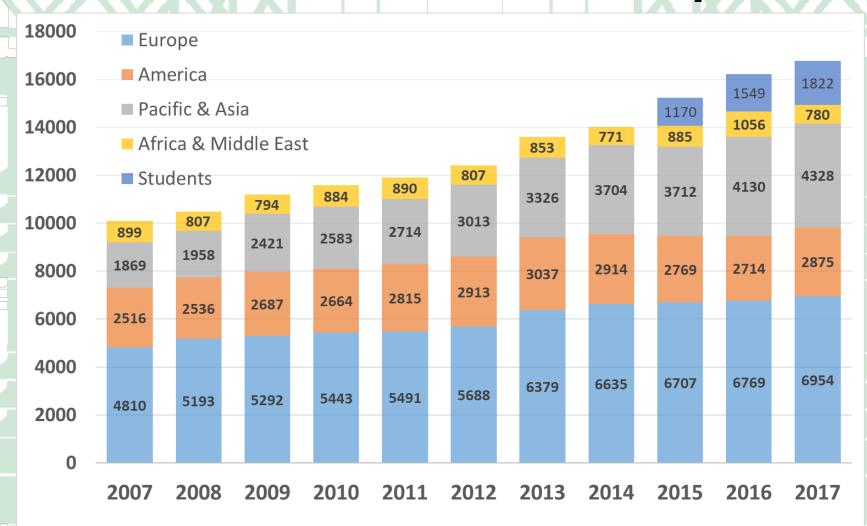
International Activities

- New Branding & Communications Effort to support CIGRE Strategic Plan and National Committees
 - Paris 2018 Opening Ceremony Inauguration with New Logo, Web Content, Video, Responsive Design for Varied Screens
 - Electra Renewal Digitization by 2019-2020
- Strategic Expansion into Distribution
- Statutes for Greater Succession for Officers
 - 4 Year Terms instead of 2 Years, unless AdCo Petition at 2 Years. May Extend to 6 Years (excluding President).

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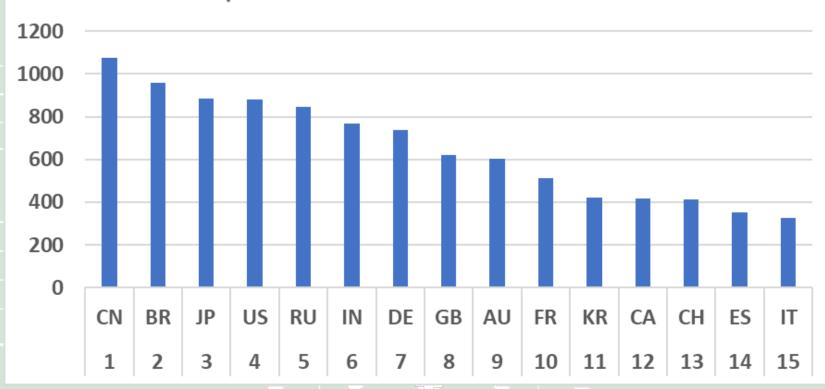
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2017 CIGRE Membership





2017 CIGRE equivalent membership Top 15 CIGRE National Committees





Awards & Recognition Committee

- Keith Lindsey Chair Lindsey Mfg. Co.
- Elizabeth LaRose Vice Chair GE Power
- Dick Wakefield Vice Chair Consultant
- Clark Gellings EPRI Consultant
- Mike Heyeck Consultant
- John McDonald GE Grid Solutions
- Rana Mukerji New York ISO
- Chris Root VELCO
- B. Don Russell Texas A&M University
- Virginia Sulzberger Consultant



USNC Attwood Associate Award

Citation –

"To honor the contributions and memory of Frederic Attwood of the USA, who, with J. Tribot Laspiere of France, foresaw the need for an international organization in the field of high-voltage power engineering and who became the first chairman of the U.S. National Committee upon the founding of CIGRÉ in the year 1921."





USNC Attwood Associate Awards – 2018

- Albert DiCaprio
- Michael L. Lamb



USNC Attwood Associate Awards – 2018

- Albert DiCaprio
- Michael L. Lamb
- Mark McVey



USNC Attwood Associate Awards – 2018

- Albert DiCaprio
- Michael L. Lamb
- Mark McVey
- Nenad Uzelac



USNC Philip Sporn Award — 2018

Citation –

"For cumulative career contributions to the advancement of the concept of system integration in the theory, design, and/or operation of large high-voltage electric systems in the United States."



USNC Philip Sporn Award — 2018

Ralph S. Gens



USNC Philip Sporn Award — 2018

- Ralph S. Gens
- Pouyan Pourbeik





"For outstanding leadership and continuing managerial, technical, and financial support of the activities of the U.S. National Committee and CIGRE over an extended period of time."

Outstanding Collective Member Award — 2018

Burns & McDonnell





USNC **Outstanding Collective Member** Award — 2018

S & C Electric





Awards & Recognition - 2018

- USNC Awards (2018)
 - Attwood Associate
 - Philip Sporn
 - Outstanding Collective Member
- CIGRE Awards (2018)
 - Distinguished Member
 - And More

CIGRÉ Distinguished Member Award – 2018

"A tribute to long-standing membership and active participation in and significant contributions to the development and work of CIGRÉ within CIGRÉ study committees and/or National Committees."

- Roger Dugan
- Mladen Kezunovic
- William Moore
- Andrew Ott
- Andrew Phillips



Awards & Recognition - 2018

- USNC Awards (2018)
 - Attwood Associate
 - Philip Sporn
 - Outstanding Collective Member
- CIGRE Awards (2018)
 - Distinguished Member
 - And More



Paris Recognitions

U.S. NATIONAL COMMITTEE MEMBERS



CIGRE Technical Council Award — 2018

Every Session year since 1994, Technical Council awards are granted to a few CIGRE Members as a reward for their active participation in the activities of the technical work of the Study Committees. Every two years, each Study Committee Chair puts forward one name from among members of his/her Study Committee or Working Groups. These proposals are approved by the Technical Council Chairman.



CIGRE Technical Council Award — 2018

U.S. National Committee Members Recognition

SC A3: Transmission & Distribution Equipment

Harley Wilson

SC B3: Substations & Electrical Installations

Mark McVey



CIGRE Honorary Member Award — 2018

Every Session year since 1992, the "Honorary Member" awards are granted to maximum ten members who have proven participation in CIGRE technical activities in a leadership role of CIGRE, and for members whose service of CIGRE has been judged exceptional



CIGRE Honorary Member Award — 2018

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Andrew Ott



CIGRE Medal - 2018

Every Session year since 2008, the "CIGRE Medal" is granted to maximum two members of CIGRE, in recognition of proven outstanding technical or engineering contribution to CIGRE and the engineering field, and proven leadership for the benefit of the organization.



CIGRE Medal - 2018

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Clark Gellings



Nominations & Appointments Committee

- Chris Root Chair VELCO
- Chris Kelly National Grid
- Damir Novosel Quanta Technology
- Mark McGranaghan EPRI
- John McDonald GE Grid Solutions



USNC Vice Presidents (Chairs of USNC Committees) Nominations for Term Ending Through 2019

- Keith Lindsey (Lindsey) Awards & Recognition
- Mike Beehler (Burns & McDonnell) Marketing & Membership
- Chris Root (VELCO) Nominations & Appointments
- Amanda Olson (Burns & McDonnell) Next Generation Network



USNC Officers

Term Ending (TE) Through 2018:

- David Roop (Dominion Energy)- President
- Mike Heyeck (USNC) Past President
- Don Russell (TAMU) Secretary; VP, Administration-Secretariat
- Chris Kelly (National Grid) VP, Treasurer
- John McDonald (GE Grid Solutions) VP, Technical Activities



Cigré Executive Committee as Members at Large Term Ending 2018

William Ball (Southern Company)	Dr. R. Ramakumar (Oklahoma State University)
Richard Kirkland (Leidos)	Stewart Ramsey (Varney & Associates)
Jaime De La Ree (Virginia Tech)	Gregory Reed (University of Pittsburgh)
Valentine Emesih (Centerpoint Energy)	Paul Roskilly (Siemens Energy Management)
Clark W. Gellings (USNC)	Donald Russell (American Transmission Company)
Patrick Hogan (PG&E)	Erik Takayesu (Southern California Edison)
Elizabeth LaRose (GE Power)	Sunil Talati (DNV-GL)
Yilu Liu (University of TN & Oak Ridge Nat Lab)	John Paserba (Mitsubishi Electric Power Products)
Aaron Lewis (Black & Veatch Corp)	Longya Xu (Ohio State University)
Kevin Rapp (Cargill)	

Cigré Executive Committee as Members at Large Term Ending 2017

Khalid Al-Olimat (Ohio Northern University)	Tomas Leander (ABB, Inc.)
Shay Bahramirad (Commonwealth Edison)	Mark McGranaghan (EPRI)
Samuel Barnes (Commonwealth Associates, Inc)	Rana Mukerji (NY-ISO)
Sanjay Bose (ConEdison)	Damir Novosel (Quanta)
Robert W. Bradish (American Electric Power)	Andy Ott (PJM Interconnection, LLC)
Carl Bridenbaugh (First Energy Corporation)	Tim Qualheim (S&C)
Mark Caskey (Sharyland Utilities, LP)	Richard Shaheen (BPA)
Clayton Clem (Tennessee Valley Authority)	Eric Stein (Exelon)
Terence Donnelly (Exelon)	Demetrios A.Tziouvaras (Schweitzer Engineering)
Wayne Galli (Clean Line Energy Partners, LLC)	Edvina Uzonovic (WPI)
Tom Galloway (NATF)	Gordon van Welie (ISO-NE)
Randy Grass (Power Engineers)	Peng Zhang (UConn)
Scott Homes (Smart Wires)	

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USNC - 2017 Finances

Revenues:

- Individual Memberships
- Collective Memberships
- Corporate Sponsorships
 Paris Reception, Grid of the Future & Colloquium
- Conference Income
 Annual Mtg., Paris, Grid of the Future & Colloquium

Expenses:

- Dues to Paris Office
- Administration/Operations
- Conferences
- Travel
- Marketing

\$120,500.00 \$79,350.00

\$157,500.00

\$123,750.00

Revenue Total: \$ 481,100.00

\$77,261.86

\$81,619.65

\$132,344.98

\$27,165.26

\$41,172.49

Expense Total: \$ 359,564.24



USNC – Financial Summary – 2017

(audited and closed)

	Budget	<u>Actual</u>
Revenues	\$ 463,100.00	\$ 481,100.00
Expenses	\$ 440,372.00	\$ 359,564.24
Net Income	\$ 22,728.00	\$ 121,535.76

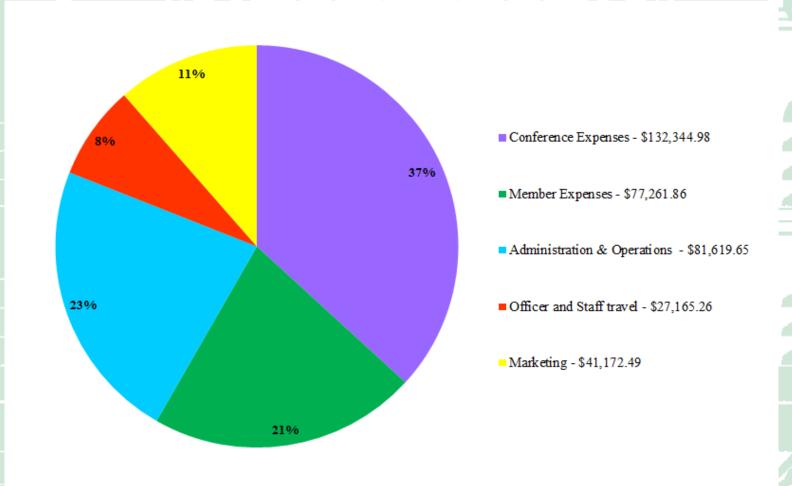
Investments:

Certificates of Deposit:

\$ 266,571.70



2017 Expense Breakdown





USNC Membership

	2014	2015	2016	2017	<u> 2018^</u>
			5-1/	XX	
Individual	528	525	608	548	622
"Collective"	39	45	57	55	51
Principal	(24)	(27)	(29)	(26)	(25)
Sustaining	(7)	(5)	(5)	(8)	(8)
Patron	(8)	(8)	(9)	(8)	(5)
Educational		(4)	(14)	(13)	(13)
		* 2018 Data a	as of July 23, 2	2018	

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Collective - Members 2018 (to date)

Patron Members (5)

AEP Service Corporation Dominion Energy

EPRI GE Power

Tennessee Valley Authority

New York ISO

Sustaining Members (8)

Burns & McDonnell Commonwealth Associates, Inc.

ConEdison ISO New England, Inc.

Lindsey Manufacturing Co. National Grid USA

S&C Electric Co.

cigré Collective – Members 2018 (to date) Principal Members (25)

Black & Veatch

Cargill

First Energy Corp.

Leidos

Mitsubishi Electric Power Products

North American Substation Services

PECO Energy

PJM Interconnections

Power Line Systems

Quanta Services

Sediver USA

Southern Company

VELCO

Bonneville Power Adm.

Commonwealth Edison

Hunt Power

Minnesota Power

MPR Associates, Inc.

Pacific Gas & Electric Co.

PingThings

POWER Engineers, Inc.

PSC North America

Schweitzer Engineering Laboratories

Siemens Energy, Inc.

Vanry + Associates



Educational Members (13)

Clemson University Kansas State University Missouri University of Science & Technology Ohio State University Ohio Northern University Oklahoma State University Texas A&M University University of Pittsburgh University of Puerto Rico - Mayaguez University of Tennessee **USACE Library** Virginia Polytechnic Institute and State University Washington State University





Next Generation Network (NGN)

What Wenbers are Saying

CIGRE NGN has created a community of young professionals who a ... very dedicated ar sometivated by the very dedicated.

The connection to technical experts from around the world offers significant benefits and perspectives.

...share our perspectives, support each other, and teach each other valuable technical and non-technical things...



Next Generation Network (NGN)

Activities

CIGRE Working Groups

Collaborate with world class experts on groundbreaking initiatives

Paris Session

 U.S. and Russia are collaborating to organize the young member activities and booth for the 2018 Paris Session

Paper Competition

- Recognize early career accomplishments
- Prizes for winners including free Paris registration and travel stipend

GOTF Symposium

Sponsored events for technical development and networking

Webinars

• Learn about varying power system and leadership topics



Next Generation Network (NGN) Mentor Group Feedback

"I feel that my technical background is good enough to understand, criticize, and raise questions. However, when it comes to experience, I am a graduate student with about 5 years of industry experience, while other group members have at least 15+ years of experience. I prefer to think that everybody starts one day, and this is my turn. I am glad for having this opportunity to be exposed to a worldwide group of experts in the field."

-Marcos Netto, Working Group Corresponding Member





Next Generation Network (NGN) Paper Competition









Next Generation Network (NGN) Grid of the Future

- NGN Activities (organized by Chris Mertz and Alyson Rossini)
 - Breakfast
 - Dinner
 - Competition
 - Tours



Next Generation Network (NGN)

2018 Executive Committee

Position	Name	Company		
Chair	Mandy Olson	Burns & McDonnell		
Communications Secretary, newsletter, website	Kyle Thomas	Dominion Energy		
Events Grid of the Future, international colloquium	Chris Mertz Alyson Rossini	Dominion Energy Leidos		
International Collaboration	Josh Snodgrass Jessica Lau	POWER Engineers NREL		
Marketing Marketing plan, materials	Yazan Alsmadi	AEP		
Membership University outreach, tracking	Jessica Haines	First Energy		
Mentoring Working group correspondence	Jessica Lau	NREL		
Professional Development Paper competition, Webinars	Saeed Kamalinia Jon Marmillo	S&C Electric Genscape		
Social Media	Nikia Munson	POWER Engineers		
Webmaster	Chris Mertz	Dominion Energy Page 50		



Technical Activities Committee

- USNC Representatives to CIGRÉ Study Committees & Appointment Dates
- USNC Papers for the 2018 Paris Session (NCA, IA, AA)
- USNC Synopses Selection Process
- GOTF Paper Submission and Evaluation
- Working Groups/Task Forces Member Selection Process
- CIGRE WG and Convener Origins
- Ladies in CIGRE WGs Origins
- Ladies WG Convener Origins

U.S. Representatives to CIGRÉ Study Committees & Appointment Dates

- A1-Bill Moore (EPRI) 2014
- A2-Mike Lamb (Dominion Energy) 2018
- A3-Albert Livshitz (CE Power) 2018
- B1-Mohammad Pasha (United Illuminating) 2014
- B2-Jennifer Havel (BPA) 2014
- B3-John Randolph (PG&E) 2012
- B4-Neil Kirby (GE Grid Solutions) 2018
- B5-Rich Hunt (GE Grid Solutions) 2016

U.S. Representatives to CIGRÉ Study Committees & Appointment Dates

- C1-Jeff Palermo (PJP Consulting) 2016
- C2-Todd Ramey (MISO) 2018
- C3-Vacant
- C4-Theo Laughner (PowerGrid-RX Inc.) 2014
- C5-Adam Keech (PJM Interconnection) 2014
- C6-Jason Taylor (EPRI) 2016
- D1-Andrew Phillips (EPRI) 2012
- D2-Galen Rasche (EPRI) 2012

U.S. Additional Members to CIGRÉ Study Committees & Appointment Dates

- A1-Hugh Zhu (Doble Engineering) 2018
- A2-Luiz Cheim (ABB) 2018
- A3-None
- B1-Rusty Bascom (Electrical Consulting Engineers) 2018
- B2-Doug Proctor (Proctor Engineering) 2018
- B3-Cliff Thompson (NA Substation Services) 2018
- B4-David Roop (MEPPI) 2018
- B5-Mladen Kezunovic (Texas A&M University) 2018

U.S. Additional Members to CIGRÉ Study Committees & Appointment Dates

- C1-Russ Gentile (Sargent & Lundy) 2018
- C2-None
- C3-Regina-Guofang Gao (ABB) 2018 (Observer)
- C4-George Gela (Berkshire Electric) 2018
- C5-None
- C6-Sundar Venkataraman (GE Power) 2018
- D1-Bill Larzelere (Evergreen High Voltage) 2018
- D2-None



Papers – 2018 Session National Committee Allotment (NCA)

TYPE OF ALLOTMENT (NCA, AA, IA)	STUDY COMMITTEE	PREF. SUBJECT (PS1, PS2, PS3)	TITLE OF THE SYNOPSIS	AUTHORS	
NCA	A1	PS1	Hybridizing Gas Turbine with Battery Energy Storage: Performance and Economics	N.W. Miller, J. Heinzmann, J. Frasier	
NCA	A2	PS1	Design of Insulated Cables to Reduce Gassing Issues in Power Transformers	D. Vir, T. Golner	
NCA	B2 & C3	JPS B2 & C3	Mitigating Temperature Risk with Engineered Surface Coatings	G.C. Baker	
NCA	B5	PS1	IEC 61850 R-GOOSE Applications to Load Shedding Under System Emergency Conditions	A. Apostolov	
NCA	C2	PS1	The Role of Fast Frequency Response in Low Inertia Power Systems	D. Stenclik, M. Richwine, N. Miller	
NCA	C2	PS2		D. Anderson, M. Meng, A. Bose, C. Hauser, T. Gkountouvas, K. Birman, E. Litvinov, X. Luo, F. Zhang	
NCA	C4	PS1	On Steady-State Voltage Standards with High-Penetration of Distributed Energy Resources	J. Peppanen, J. Taylor	
NCA	C4	PS2	Optimal Placement of Line Surge Arrestors Based on Predictive Risk Framework Using Spatio-Temporally Correlated Big Data	M. Kezunovic, T. Dokic, R. Said	
NCA	D1	PS3	The Asset Health Center, Implementation of Online Monitoring and the Grid of the Future	R. Cornell, J. Llavona, K. Zellers, A. Sutliff, P. Chung	
NCA	D2	PS3	A Hybrid Communications Network Approach for Advanced Applications on the Modern Grid	JP.H. Knauss	



Papers – 2018 Session International Allotment (IA)

TYPE OF ALLOTMENT (NCA, AA, IA)	STUDY COMMITTEE	PREF. SUBJECT (PS1, PS2, PS3)	TITLE OF THE SYNOPSIS	AUTHORS	
IA	А3	PS3	Performance Evaluation of CO2/Fluoronitrile Mixture at 63kA Short Circuit Current Level in Metal Enclosed (GIS and Dead Tank) High-voltage Circuit Breakers	V. Hermosillo, C. Gregoire, D. Vancell, J. Ozil, G. Gaudart	
IA	A3	PS3	Vacuum Generator Circuit Breaker as a Reliable SFe Alternative with Reduced Life Cycle Costs for Power Plants up to 400 MW	P. Leufkens, R. Nayar, K.R. Venna	
IA	B2	PS1	Reliability Based Transmission Capacity Forecasting	J. McCall, R. Bliss, D. Nadeau	
IA	B2	PS2	Test Results to Confirmation of Minimum Vegetation Clearance Distance (MVCD) Standards	A.J. Phillips, R. Lordan, C.S. Engelbrecht	
IA	B4	PS1	Linking DC Macrogrids to Underlying AC Systems	L.O. Barthold, D.A. Woodford, M. Salimi	
IA	В4	PS1	Converting Regional EHV AC Transmission to HVDC	C. Lockwood, N. Koehler, B. Mehraban, R. Adapa, M. Salimi, F. Gomez, D. Woodford	
IA	B4	PS3	Refurbishment Strategies for Conventional SVC Stations Utilizing Modern Control Cooling and Thyristor Valves and Selective Main Circuit Replacements	M.A. Reynolds, B.C. Furumasu, A. Laughlin, R. Thorton, R. Broberg, A. Samadi	
IA	B5	PS1	Developing a Unified Protection System: Philosophy, Short Circuit Software and Wide Area Protection Coordination Study	D. Novosel, D.G. Hart, S. Alaeddini, M. Malki, M.A. Al-Tukhaifi, S.M. Bamasak, M.T. Al Saba, H. Bin-Mashni, P.F. McGuire, D.C. Coleman, S. Aquiles, Z. Schreiner	
IA	C5	PS1	Efficient Customer Aggregation using a Receding Horizon Optimization	A.J. Lamadrid, T. Mount, W. Jeon, H. Lu	
IA	D1	PS2	A Rigorous Ageing Program for Ester/Cellulose Liquid Immersed Transformer Insulation Systems	R.P. Marek, J. Tenney, I. Atanasova-Hoehlein, H.M. Wilhelm, L. Lewand	



Papers - 2018 Session

Additional Allotment (AA)

TYPE OF ALLOTMENT (NCA, AA, IA)	STUDY COMMITTEE	PREF. SUBJECT (PS1, PS2, PS3)	TITLE OF THE SYNOPSIS	AUTHORS	
AA	A1	PS3	Forensic Analysis of Gas Turbine-generator Shaft Failures due to Possible Subsynchronous Resonance	J.D. Galvez, M.D. Urbina, D.J. Mader, J.B. Wisniewski	
AA	A2	PS2	Machine Learning Tools in Support of Transformer Diagnostics	L. Cheim	
AA	A2	PS3	100 Year Transformer	R. Fenton	
AA	В3	PS1	138kV / 34.5kV Substation Design	V. Westfallen, M.R. Ahmed, G. Bolotin, N. Burica, B. Desai, C. Johnson, J. Meier, A. Mirza, C. Pytel, S. Sidime, A. Vennergrund, F. Luedtke, M. Mondello, J. Stamatopoulos, P. Tyschenko	
AA	В3	PS2	Developing and Using Justifiable Asset Health Indices for Tactical and Strategic Risk Management	S. Rhoads, J. White, T. McGrail	
AA	B5	PS2	Functional Testing of Digital Substations Based on IEC 61850 Process Bus	A. Apostolov	
AA	C1	PS1	Trends in Transmission Planning Uncertainty and the Impacts and Value of Leveraging Flexible Investment Strategies and Technologies	M. Longoria, T. Bloch-Rubin, J. Erwin, E. Fan, A. Martin, T. Nudell	
AA	C1	PS3	Introducing an Automated Analysis Tool and Reproducible Workflow to Streamline Reliability Planning with Heterogeneous Investment Options	T. Nudell, E. Fan, A. Martin	
AA	C6	PS1	Distribution System Operator Cost Assessment	E.A. Paaso, S. Bahramirad	
AA	C6	PS2	Benefit Cost Analysis of Battery Energy Storage Systems to Defer Distribution Capacity Upgrades on Utility Distribution Systems	E.A. Paaso, S. Bahramirad	

2018 Synopses Selection Process

- 1. 47 Abstracts Received and Forwarded to USNC Study Committee Reps for their Advisory Committee Review
- 2. Abstracts Reviewed and Scored with Following Criteria:
 - Relevance to SC Preferential Subjects
 - Technical Content
 - Clarity of Synopsis
 - Avoid Commercialism
- 3. Abstract Recommendations Combined and Overall Ranking Created with the Following Criteria:
 - Balance Between SCs and Preferential Subjects
 - Highest Recommendations of Reviewers
 - International, National and Additional Commitment Allotments Requirements
- 4. 30 Synopses Submitted to Paris; 27/30 (90%) Accepted for 2018, 93% for 2016, 87% for 2014, 83% for 2012 Page 59



CIGRE USNC 2018 Grid of the Future (GOTF) Paper Process

- Call For Papers
 - Theme: Technology for the 21st Century
 Electric Utility
- No Abstract Step Full Papers Only Submitted by July 27, 2018
- Use Paper Preparation Template



GOTF Paper Evaluation Process

- Submitted Papers Forwarded to USNC Study Committee Reps for their Advisory Committee Review
- Evaluation Criteria
 - Novel and Innovative Technical Content (Concept with Implementation Results)
 - Clarity of Paper
 - No Commercialism
 - Adherence to Required Formatting (Use Paper Preparation Template)



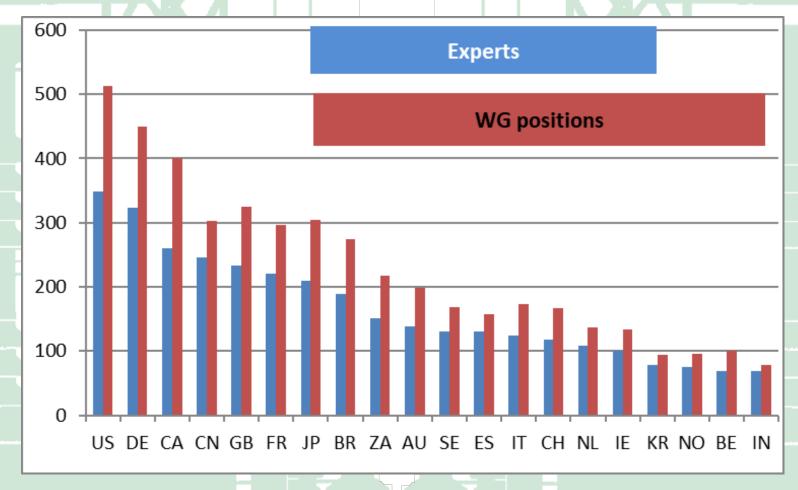
Working Groups/Task Forces Member Selection Process

- Interested candidates must have Individual Member dues paid and send CV
- Obtain email address for new WG Convener and submit candidates' CVs directly to Convener
- Request Convener to confirm candidates' membership
- If no USNC candidates interested in a new WG, will ask new WG Convener for knowledge of US experts, and will contact them to see if they are interested in joining
- If more than two candidates are interested in same WG, set up a "shadow WG" within the USNC



Synthesis of the 2017 review

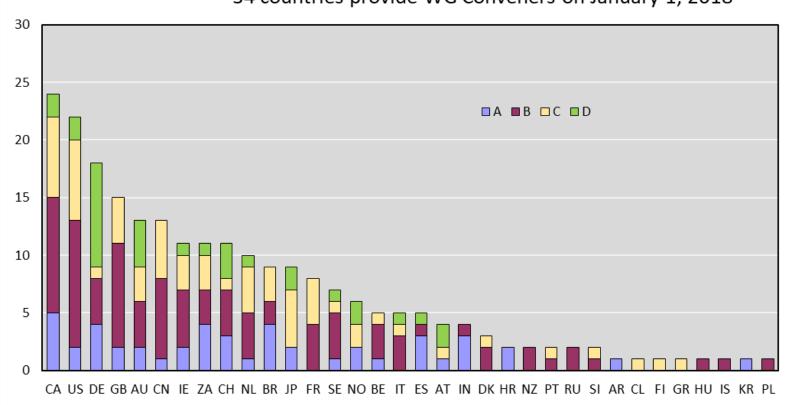
20 first countries





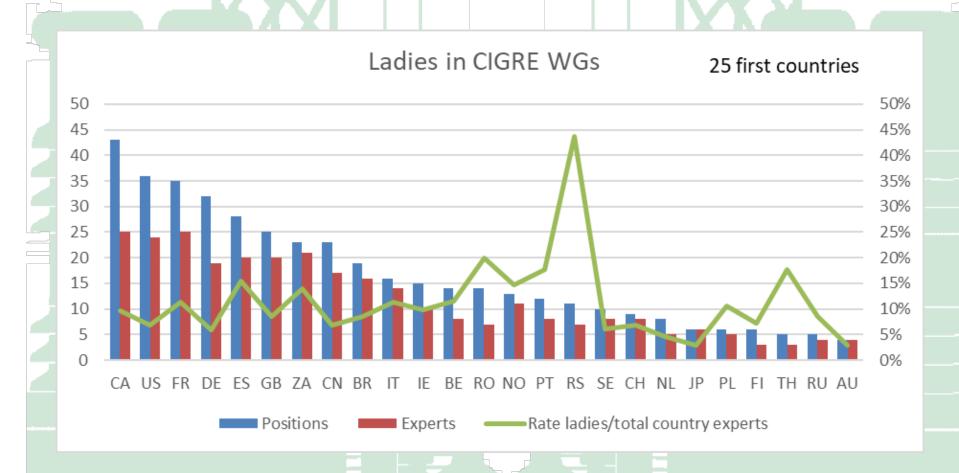
Working Group Conveners' origins





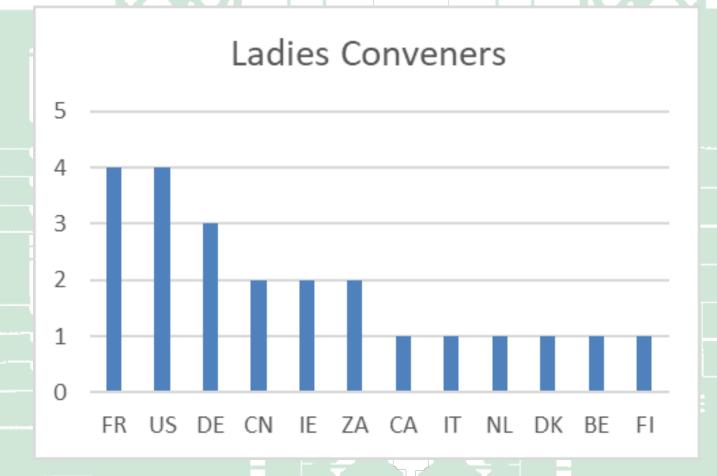


Place of Women in CIGRE





Place of Women in CIGRE





Future CIGRÉ Meetings

2018 Events

CIGRE Paris Session – August 26 – 31

Registration closes August 10, 2018

GOTF – Washington, DC, October 28 – October 31

Paper Submittals Due

(Host – Dominion Energy)

REGISTER AT cigre-usnc.org



What Can You Do?

- Become active in working groups!
 - Need Distribution Expertise as we expand in this area
- Invite a colleague to Join!
- Become a Collective Member
- Become a SPONSOR
 - GOTF
 - Paris



Big thank you!

Sharon Loe Jessica Meadors

"The voice of CIGRE to our membership"



Discussion

USNC – CIGRE Membership & Guests