

# BUSINESS AND TECHNOLOGY STRATEGIES (BTS)

## SUBJECT MATTER EXPERTS

\*Jim Spiers, Russell Tucker, Craig Miller, Paul McCurley, Venkat Banunaryanan, Tim Heidel, Paul Breakman, Alvin Razon and Keith Dennis can address questions on all topic areas.

### Analytics, Resiliency & Reliability

*David Pinney, Alvin Razon*

- Dynamic and Static Modeling
- Volt-VAR Optimization, Solar, DR, and Storage Planning Models and Innovative Co-op Deployments
- Cost and Engineering Analysis of Distributed Energy Resources
- Software Development and Database Design

*Madelyn Roche*

- Co-op Distribution Data
- G&T Co-op Data
- G&T Equity and Capex Survey

*Michael Leitman*

- Demographic Analysis
- Co-op Economies & Development
- Policy & Regulatory Analysis

### Broadband Infrastructure Development

*Paul Breakman, Russell Tucker*

- Business models and solutions
- Technology plans, roadmaps
- Broadband Due Diligence
- Resources and tools
- Advanced communications infrastructure solutions
- Economic analysis

### Cybersecurity

*Cynthia Hsu*

- Cybersecurity Self Assessments
- Cybersecurity Training

*Andre Joseph*

- Ethical Hacking
- Secure Network Configurations
- Secure Software Development
- Vulnerability Assessments
- Architecture Risk Analysis

*Thomas Gwinn*

- Cybersecurity for Industrial Control Systems

*Tony Thomas*

- Cybersecurity for Industrial Control Systems
- Cybersecurity and MultiSpeak Standard

*Patti Metro*

- Cybersecurity and Reliability Standards

### Distributed Energy Resources

*Brian Sloboda, Michael Leitman, Kaley Lockwood, Jan Ahlen, Keith Dennis*

- Beneficial Electrification
- Measurement and Verification
- Pre-Pay Programs
- Electric Vehicles
- DSM Business Models (direct load, behavioral, time of use rates)
- Home Automation:
- Role of EE/DSM in meeting Environmental Objectives

*Michael Leitman, Kaley Lockwood, Jan Ahlen, Paul Carroll, Doug Danley, Dale Bradshaw*

- Solar PV Technical and Economic Assessment
- Energy Storage Systems, Current State and Future
- Renewable Generation and Integration
- Developing Solar Strategies
- The Consumer-Centric Utility
- Co-op Renewable Resources

*Debra Roepke, Kaley Lockwood, Doug Danley, Paul Carroll*

- SUNDA/Co-op Solar

*Robert Harris, Thomas Gwinn*

- DER Interconnection and Operation Standards

### Generation, Environment & Carbon

*Dan Walsh, Dale Bradshaw*

- Asset Management
- Carbon capture & utilization
- Multi-pollutant control technologies for power plants
- Impact of cycling on power plants
- Integrated Test Center— Carbon (ITC-C)
- 111-D and Future of Power Plants
- EPA MATS Mercury Air Toxics Standards
- EPA RHR Regional Haze Rule
- EPA CCR Coal Combustion Residuals
- EPA ELG Water Effluent Limitation Guidelines
- EPA 316(b) Cooling Water Intake Structures
- Fast and flexible generation options
- Utility scale energy storage
- Natural gas-fired combined cycle gas turbines
- Utility scale wind energy
- Utility scale solar energy

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### Generation, Environment & Carbon cont.

*Lauren Khair, Michael Leitman*

- Policy & Data Analysis
- EIA-860: Annual Generator Report Data
- EIA-861: Annual Electric Power Industry Report Data
- EIA-923: Power Plant Operations Report Data
- Co-op Generation Resources

*Katherine Loving*

- Geographic Information Systems (GIS)
- Spatial Data Analysis

*Joseph Goodenbery*

- Economic Modeling
- Policy Impacts
- Levelized Cost of Energy

### Resource Adequacy & Markets

*Paul McCurley, Patti Metro*

- Resource Adequacy
- Power System Planning and Operations
- Electricity Markets
- RTOs/ISOs
- Reliability

*Lauren Khair*

- Economic Modeling
- DOD Service Support
- EIA: Short Term Energy Outlook Forecasts
- EIA: Annual Energy Outlook Projections
- Energy Imbalance Market (EIM)

*Joseph Goodenbery, Michael Leitman*

- Economic Modeling and Forecasting
- Market Fundamentals
- Economic Drivers of Co-op Performance
- Policy & Regulatory Analysis

### Sourcing Strategies

*Paul Breakman, Lauren Khair*

- Sourcing and procurement solutions
- Approaches and methods
- Technology considerations
- Lessons learned, case studies

### Transmission & Distribution

*Alvin Razon, Tom Lovas*

- Energy Storage Systems Technology
- Impacts of High-Penetration Solar
- Smart Grid Demonstration Project
- Substation of the Future
- Technology Developments – T&D Systems
- DER Economics and DSO Considerations
- Unmanned Aerial Vehicles
- Conservation Voltage Reduction
- Distribution Optimization

*Tony Thomas, Thomas Gwinn, Alvin Razon*

- Product Quality and Reliability Benchmarking
- Utility Automation Systems
- Communication Networks
- MultiSpeak®
- Cyber Security for Industrial Control Systems

*Patti Metro*

- NERC Regulations and Standards
- FERC/NERC Grid Reliability Standards, Compliance and Enforcement
- Rural Utilities Services (RUS) and NRECA Transmission & Distribution Engineering Committee (TDEC)
- Avian Issues
- Geomagnetic Disturbance (GMD) and Electromagnetic Pulse (EMP)

*Robert Harris, Thomas Gwinn*

- IEEE 1547– DER Interconnection
- National Electrical Safety Code
- National Electrical Code
- System Planning
- Rural Utilities Services (RUS) and NRECA Transmission & Distribution Engineering Committee (TDEC)

*James Carter, Nick Klein, Ron Watson*

- Treated Wood Poles and Crossarms
- Wood Preservatives
- Pole and other utility wood product inspections
- RUS wood product specifications
- General wood treatment processes and related business

# BUSINESS AND TECHNOLOGY STRATEGIES (BTS)

## WORK GROUPS

BTS Work Group	Work Groups	Mobile Phone	Email
<b>Analytics, Resiliency &amp; Reliability (A/R/R)</b>	David Pinney- Lead Venkat Banunarayanan Paul Breakman Paul Carroll Robert Harris Lauren Khair Michael Leitman Tom Lovas Katherine Loving Alvin Razon Madelyn Roche Tony Thomas	607-339-3506 703-907-6129 703-907-5844 301-785-0337 571-205-3189 703-907-6845 703-907-5864 907-345-5116 703-907-5833 703-907-6248 703-907-6147 703-850-4718	david.pinney@nreca.coop venkat.banunarayanan@nreca.coop paul.breakman@nreca.coop paul.carroll-contractor@nreca.coop robert.harris@nreca.coop lauren.khair@nreca.coop michael.leitman@nreca.coop tom.lovas-contractor@nreca.coop katherine.loving@nreca.coop alvin.razon@nreca.coop madelyn.roche@nreca.coop tony.thomas@nreca.coop
<b>Cybersecurity (CS)</b>	Cynthia Hsu- Lead Robbin Christianson Thomas Gwinn Tim Heidel Adaora Ifebigh Andre Joseph Lauren Khair Robert Larmouth Patti Metro Craig Miller Alvin Razon Tony Thomas Russell Tucker Maureen Gatti Robert Gibson	703-907-6663 703-907-5842 703-304-4796 703-907-5646 703-907-5849  703-907-6845  703-907-5817 703-626-9683 703-907-6248 703-850-4718 703-907-5823 703-907-5853 240-463-4503	cynthia.hsu@nreca.coop robbin.christianson@nreca.coop thomas.gwinn@nreca.coop tim.heidel@nreca.coop adaora.ifebigh@nreca.coop andre.joseph@nreca.coop lauren.khair@nreca.coop robert.larmouth-contractor@nreca.coop patti.metro@nreca.coop craig.miller@nreca.coop alvin.razon@nreca.coop tony.thomas@nreca.coop russell.tucker@nreca.coop maureen.gatti-contractor@nreca.coop bob.gibson-contractor@nreca.coop
<b>Distributed Energy Resources (DER)</b>	Brian Sloboda - Lead Kaley Lockwood - Second Jan Ahlen Venkat Banunarayanan Paul Breakman Keith Dennis Michael Leitman Deb Roepke Dale Bradshaw Paul Carroll Doug Danley Robert Gibson	703-946-2812 703-907-5623 703-907-5859 703-907-6129 703-907-5844 571-289-5615 703-907-5864 703-907-5841 423-304-9284 703-907-6548 703-907-6549 240-463-4503	brian.sloboda@nreca.coop kaley.lockwood@nreca.coop jan.ahlen@nreca.coop venkat.banunarayanan@nreca.coop paul.breakman@nreca.coop keith.dennis@nreca.coop michael.leitman@nreca.coop debra.roepke@nreca.coop dtbradshaw@electrivation.com paul.carroll-contractor@nreca.coop doug.danley@nreca.coop bob.gibson-contractor@nreca.coop
<b>Generation, Environment &amp; Carbon (G/E/C)</b>	Dan Walsh- Lead Lauren Khair - Second Venkat Banunarayanan Paul Breakman Katherine Loving Michael Leitman Madelyn Roche Dale Bradshaw	571-205-7112 703-907-6845 703-907-6129 703-907-5844 703-907-5833 703-907-5864 703-907-6147 423-304-9284	daniel.walsh@nreca.coop lauren.khair@nreca.coop venkat.banunarayanan@nreca.coop paul.breakman@nreca.coop katherine.loving@nreca.coop michael.leitman@nreca.coop madelyn.roche@nreca.coop dtbradshaw@electrivation.com
<b>Transmission &amp; Distribution (T&amp;D)</b>	Robert Harris- Lead Thomas Gwinn Patti Metro Alvin Razon Brian Sloboda Tony Thomas Tom Lovas	571-205-3189 703-304-4796 571-334-8890 703-907-6248 703-946-2812 703-850-4718 907-345-5116	robert.harris@nreca.coop thomas.gwinn@nreca.coop patti.metro@nreca.coop alvin.razon@nreca.coop brian.sloboda@nreca.coop tony.thomas@nreca.coop tom.lovas-contractor@nreca.coop
<b>Resource Adequacy &amp; Markets (RA/M)</b>	Michael Leitman - Lead Allison Hamilton - Second Jan Ahlen Venkat Banunarayanan Paul Breakman Keith Dennis Joseph Goodenbery Thomas Gwinn Lauren Khair Patti Metro Madelyn Roche Dan Walsh	703-907-5864 703-907-5824 703-907-5859 703-907-6129 703-907-5844 571-289-5615 703-907-5893 703-304-4796 703-907-6845 571-334-8890 703-907-6147 571-205-7112	michael.leitman@nreca.coop allison.hamilton@nreca.coop jan.ahlen@nreca.coop venkat.banunarayanan@nreca.coop paul.breakman@nreca.coop keith.dennis@nreca.coop joseph.goodenbery@nreca.coop thomas.gwinn@nreca.coop lauren.khair@nreca.coop patti.metro@nreca.coop madelyn.roche@nreca.coop daniel.walsh@nreca.coop