**via email & Posting for Interested Parties, November 1, 2017**

**TO:** NAESB Board Retail Structure Review Committee (RSRC) Members and Retail Markets Quadrant (RMQ) Board and Executive Committee Members

**FROM:** Rae McQuade, NAESB President & COO

**RE:** Work Paper Packet – November 3, 2017

Dear All – In preparation for the Retail Structure Review Committee kick-off conference call, Cade Burks asked us to put together the following work paper packet. Please review the materials and bring any ideas or recommendations you may have for our meeting on Friday.

Thanks again for your commitment to the organization.

|  |  |  |
| --- | --- | --- |
| **Table of Contents** | | |
| **Item** | **Description** | **Page** |
| 1. | Board of Directors Meeting Minutes, September 7, 2017 | 2 |
| 2. | Retail Markets Quadrant (RMQ) Executive Committee Meeting Draft Minutes, October 25, 2017 | 12 |
| 3. | Retail Open Field Message Bus (OpenFMB) Update | 20 |
| 4. | Green Button Update | 21 |
| 5. | Retail State Working Groups Summary Status | 22 |
| 6. | Wind and Solar Energy Summary Status | 23 |
| 7. | RMQ Membership Data 2014 through October 31, 2017 | 27 |

October 25, 2017

**TO:** NAESB Board of Directors, Executive Committee (EC) Members, EC Alternates, and Invited Guests

**FROM:** Jonathan Booe, NAESB Executive Vice President & CAO

**RE:** Draft Minutes from the NAESB Board of Directors Meeting – September 7, 2017

**NAESB BOARD OF DIRECTORS MEETING & MEETING OF THE MEMBERS**

**Marriott Marquis Hotel, Houston, Texas**

**Thursday, September 7, 2017 – 9:00 a.m. to 1:00 p.m. Central**

**DRAFT Minutes**

1. **Administration and Welcome**

Mr. Desselle opened the meeting and welcomed the board members and guests in the room and on the phone. Mr. Booe provided the antitrust and meeting policy guidance and called the roll of the NAESB board members. Quorum was established. Ms. McQuade noted that Ms. York will be retiring from Tennessee Valley Authority in the fall and thanked her for her leadership within NAESB. She presented Ms. York with a plaque in recognition of her service, and Ms. York gave a few remarks of appreciation.

1. **Adoption of the Consent Agenda**

Mr. Desselle reviewed the consent agenda, which included the [agenda](https://www.naesb.org/pdf4/bd090717a.docx), the [draft minutes](https://www.naesb.org/pdf4/bd040617fm.docx) from the April 4, 2017 Board of Directors meeting and the 2017 [Wholesale Gas](https://www.naesb.org/pdf4/wgq_ec081717a1.docx), [Wholesale Electric](https://www.naesb.org/pdf4/weq_ec081517a1.docx) and [Retail](http://www.naesb.org/pdf4/retail_2017_annual_plan.docx) annual plans. Mr. Peress moved to adopt the consent agenda and Mr. Gallagher seconded the motion. The motion passed without opposition.

1. **Meeting of the Members and Strategic Session**

Mr. Desselle opened the meeting of the members and the NAESB strategic session. He introduced Dr. Tierney and each of the participants on the strategic session panel.  Ms. Tierney provided a [summary](https://www.naesb.org/pdf4/bd090717a1.pdf) of the National Academy of Sciences Report of Electric System Resiliency: Natural Gas and Electric System Interdependencies. After reviewing the findings, she recommended that NAESB continue to monitor for opportunities to support gas and electric market coordination, with the Federal Energy Regulatory Commission (FERC), through standards development or in a convening role. Following Dr. Tierney remarks, Mr. Desselle asked the panelists participating in the strategic session to provide their perspectives on the future of the energy markets and the role that NAESB could play in that future. Through the discussion, the following points on specific issues were highlighted.

Resiliency of the Grid

        NERC has been challenged by the DoE to take on resiliency as part of its mission.  Resiliency after cyber-attack is a very difficult scenario to plan.

* NAESB has been asked by the National Academy of Sciences to work with FERC on gas-electric market coordination to improve the resiliency of the grid. Resiliency is impacted by the lack of coordination.

Energy Water Nexus and Energy Data Nexus

        NAESB is a vanguard in the industry, and has an obligation to support the FERC and NARUC by identifying issues – at the very least.  It is important to national security.  In addition to the energy/water nexus, there is an energy/data nexus that is going to continue to require enhanced communication standards – even beyond what is currently communicated on the bulk electric grid.

Supply Chain

        To be resilient and respond to interruptions, the supply chain must be more interactive.

Gas-Electric Coordination

        Consider revitalizing the G-E Coordination effort, working in conjunction with FERC to harmonize system operations of the two markets.  The House Energy and Commerce Committee will review NAS report and determine if modifications should be made to the Federal Power Act.

        Don’t abandon the G-E Coordination groups within NAESB, include an item on the annual plan as provisional and monitor for opportunities to support activities.

        Recognize that the power grid is transforming dramatically and impacting all fuels used for power generation.  A more flexible delivery system for natural gas to support power generation is needed.

Gas Fired Power Generation

        Natural gas is crucial to power generation, and in some areas, there is opposition to much needed infrastructure, including opposition related to environmental concerns.  This is particularly evident in the New England market.

        The PJM incentive pricing for natural gas generation seems to be working and supporting effective capacity market design.

Renewables Generation and the Changing Resource Mix

        The economics of renewable generation (with or without subsidies) may be seriously impacting the structure of retail markets in competitive states.  Nevada’s use of affordable solar and storage is transforming the retail competition market.

        There are stranded costs and stranded resources issues to be addressed.

        Wind, as the most affordable of the renewables, will continue to have a transformative impact on the market

Distributed Energy

        NAESB should continue to monitor for standards development opportunities related to DER, specific to battery storage, microgrids and other technologies, and NAESB should pursue activities that will help to reduce the cost of base load.

Production and Distribution Systems

        Consider how NAESB standards could support production and distribution systems beyond current standards that only address the interstate pipelines (impacting 4% of generation).

Cybersecurity

        Cybersecurity concerns are pervasive and continue to be a top priority for the energy industry.

Electromagnetic Pulse Disturbances

        NAESB, and the industry, should monitor resiliency planning for electromagnetic pulse disturbances.

Potential Roles for NAESB

        NAESB does not need to comment on the subsidies battle occurring related to renewables, nuclear, and, potentially in the future, coal.

        NAESB should be on the sideline ready to assist related to resiliency, as there is already a lot of planning and coordination that occurs to ensure resiliency.  NAESB should be cautious not to advocate.

        The industry should not be antagonistic or reluctant to take steps to reduce GHG emissions, and NAESB should support such standards efforts.  The US could serve as a world leader for this moral and political imperative.

Mr. Desselle thanked the panelists for their participation, and the meeting of the members and the strategic session of the board was adjourned.

1. **Membership and Financial Reports**

Ms. McQuade reviewed the [membership](https://www.naesb.org/misc/membership_report_073117.docx) and [financial](https://www.naesb.org/misc/membership_financial_report_jun_2017.docx) reports for with the participants. She noted that Mr. Desselle will address some membership concerns for the RMQ in a later update, but stated that the membership and current budget are tracking in positive directions. She also noted that the Board of Directors will be required to review and approve the 2018 budget during the December meeting and that a Revenue Committee meeting would be scheduled prior to the meeting to review the expected revenue generation that will be included in the overall budget. She asked if there were any questions regarding membership or the finances. No questions were asked.

1. **Reports from Board Committees**

Managing Committee:Mr. Desselle stated that the Managing Committee met in August to discuss personnel matters and staff performance. All other communications took place via email.

Parliamentary Committee: Mr. Desselle reviewed the activities of the Parliamentary Committee. He provided an overview of the steps the committee has taken to develop modifications to the NAESB governance documents to address issues concerning how majority votes should be conducted by the Board of Directors. He presented the modifications offered by the Parliamentary Committee through their July 26, 2017 [proposed resolution](https://www.naesb.org/misc/parliamentary_committee_proposed_resolution_072617.docx), and asked if there were any objections to voting on the proposed resolution through notational ballot. No objections were offered, and Mr. Desselle asked the NAESB staff to issue a notation ballot on the proposed governance document modifications.

Revenue Committee: Mr. Desselle provided a report of the Revenue Committee activities since the last board meeting. He stated that the committee met in April and August to continue discussions concerning the publication cycles, communication efforts and the organization’s revenue generation.

Critical Infrastructure Committee: Mr. Burks stated that the committee had been reactivated in May to monitor the activities of Sandia National Laboratory (SNL) related to the surety assessment being conducted on the NAESB standards. He stated that the SNL staff asked NAESB staff to convene a meeting with a few of the NAESB standard subject matter experts to have a question and answer session. SNL staff has indicated that the surety assessment should be completed by the end of the year, and the committee will schedule any needed meetings after more information is provided.

Mr. Desselle stated that he is going to form a task force to review the current status of the RMQ and make recommendations to the Board of Directors to resolve the membership issues the quadrant is facing. Currently, the RMQ has 40 members, and the Bylaws require that each quadrant have a minimum of 40 member companies participating. He stated that he will work with Cade Burks to form and manage the task force.

**6. Project Discussions and Leadership Session Reviews**

Mr. Parker reviewed the discussions during the WGQ leadership meeting and noted that significant discussion surrounded the closing out of the items on the 2017 annual plan and the process for development of the 2018 annual plans. Specifically, he noted that the contracts subcommittee is in the process of completing the Mexican Addendum to the NAESB Base Contract for the Purchase and Sale of Natural Gas and that the WGQ Executive Committee will vote on the item in October. Ms. York provided a brief update of the activities of the WEQ Executive Committee and subcommittees and noted that the discussion during the leadership meetings focused on coordination efforts with NERC and activities related to cybersecurity. Ms. Do provided a review of the projects underway in the retail quadrant and noted that quadrant is committed to bringing in some new resources to support standards development.

**7. Old and New Business**

Mr. Booe provided an update of the regulatory activities of the organization and continued communication with the Department of Energy, the FERC, the NARUC, and NERC among others. Mr. Booe thanked Mr. Lauby for his leadership and continued focus on the coordination between NERC and NAESB, and noted that Mr. Boswell will be receiving a meritorious service award from ANSI for his work to support the continuation of the incorporation by reference process by the federal government. Mr. Booe also thanked the representatives from CENEGAS for their participation in the meeting and future engagement in the organization. Mr. Cuzella provided brief comments on the activities of the Office of Indian Energy and Economic Development within the Department of the Interior and stated that he looks forward to coordinating with the NAESB in the future. Mr. Desselle gave the panelists and invited guests an opportunity to provide any closing remarks.

**8. Adjourn**

The meeting adjourned at 11:48 am Central.

| **9. Board Attendance** | | **Attendance** |
| --- | --- | --- |
| **Wholesale Gas Quadrant Producers Segment** | | |
| Mark Stultz | Senior Vice President – Regulatory Policy and Communications, North America Gas and Power, BP Energy | In Person |
| Y.J. Bourgeois | Manager Regulatory Affairs - Marketing, Anadarko Energy Services Company | In Person |
| Mark A. Zdenek | Manager Gas Scheduling & Operations, ConocoPhillips Company |  |
| Randy E. Parker | Upstream Commercial Resources, Exxon Mobil Corporation | In Person |
| **Wholesale Gas Quadrant Pipeline Segment** | | |
| Richard Kruse | Vice President –Regulatory and FERC Chief Compliance Officer, Spectra Energy Corp |  |
| Kim Van Pelt | Manager of Regulatory Reporting and Compliance, Boardwalk Pipeline Partners, LP | In Person |
| Millie S. Moran | Vice President, U.S. Commercial Operations, TransCanada Pipelines USA, Ltd | In Person |
| Ronnie C. Hensley II | Regulatory Compliance Manager, Southern Star Central Gas Pipeline | Phone |
| Gene Nowak | Vice President – Transportation & Storage Services, Kinder Morgan Inc | In Person |
| **Wholesale Gas Quadrant Local Distribution Company (LDC) Segment** | | |
| Karl Stanley | Vice President, Major Accounts & Commercial Operations, NiSource | Phone |
| Mike Novak | Asst. General Manager, National Fuel Gas Distribution Corporation | Phone |
| Dennis Gee | Principal Regulatory Analyst – Core Gas Supply Dept., Pacific Gas and Electric Company | Phone |
| Craig Colombo | Energy Trader III, Dominion Energy Inc. | Phone |
| Tim Sherwood | Vice President – Gas Supply Operations, Southern Company Gas | Phone |
| **Wholesale Gas Quadrant End Users Segment** | | |
| Willis E. McCluskey | Senior Fuel Supply Analyst, Salt River Project Agricultural Improvement & Power District | Phone |
| Scott Wright | Executive Director Strategic Planning, Midcontinent Independent System Operator, Inc. | Phone |
| Valerie Crockett | Senior Program Manager – Regulatory & Policy, Tennessee Valley Authority | In Person |
| Paul Zhang | Financial Trading Desk Head, Florida Power & Light Company |  |
| N. Jonathan Peress | Director, Energy Market Policy, Environmental Defense Fund, Inc. | In Person |
| **Wholesale Gas Quadrant Services Segment** | | |
| Keith Sappenfield | Project Manager and Principal, Environmental Resources Management | Phone |
| Ginger Richman | Vice President, NJR Energy Services | In Person |
| Greg Lander | President, Skipping Stone, LLC |  |
| Rakesh Agrawal | Executive Vice President, Blackstone Technology Group, Inc. |  |
| Sylvia Munson | Owner, Sylvia Munson - Consultant | In Person |
| **Retail Energy Quadrant Electric Utilities Segment** | | |
| Brandon Stites | Director - Electric Distribution Design, Project Mgmt & Federal Energy Solutions (Virginia/North Carolina), Dominion Energy | Phone |
| Dennis Derricks | Director Regulatory Policy and Analysis, Wisconsin Public Service Corporation | Phone |
| Stuart Laval | Director, Technology Development, Duke Energy Corporation | Phone |
| Debbie McKeever | Market Advocate, Oncor Electric Delivery Company LLC | Phone |
| **Retail Energy Quadrant Gas Market Interests Segment** | | |
| Alonzo Weaver | Vice President of Engineering and Operations, Memphis Light, Gas & Water Division (APGA) |  |
| Dave Darnell | President & CEO, Systrends USA | Phone |
| Leigh Spangler | President, Latitude Technologies LLC |  |
| Scott Mosley | Physical Trading, SouthStar Energy Services LLC |  |
| **Retail Energy Quadrant Electric End Users/Public Agencies Segment** | | |
| Tobin Richardson | President and CEO, ZigBee Alliance |  |
| Robert G. Gray | Executive Consultant, Arizona Corporation Commission |  |
| James P. Cargas | Senior Assistant City Attorney, City of Houston | In Person |
| Susan Anthony | Market Support Services, Electric Reliability Council of Texas, Inc. (ERCOT) | In Person |
| **Retail Energy Quadrant Electric Service Providers/Suppliers Segment** | | |
| Barry Haaser | Executive Director, Green Button Alliance | Phone |
| Wendell Miyaji | Vice President - Energy Sciences, Comverge, Inc. |  |
| Larry Lackey | Director Cybersecurity and Standards Development, Open Energy Solutions, Inc. | Phone |
| J. Cade Burks | President, Big Data Energy Services | In Person |
| **Wholesale Electric Quadrant Transmission Segment** | | |
| Alex DeBoissiere | Senior Vice President – Government Relations, AVANGRID |  |
| Cameron Warren | Manager, Operations Engineering, Entergy Services, Inc. | Phone |
| Adrianne Collins | Transmission General Manager, Southern Company Services, Inc. |  |
| Robert King | Manager, Transmission Policy & Strategy, Bonneville Power Administration | In Person |
| Armando Rodriguez | Sr. PM, Transmission Policy & Grid Resiliency, Tennessee Valley Authority | Phone |
| Mike Anthony | Manager – Tariff Administration and Business Services, Duke Energy Corporation |  |
| **Wholesale Electric Quadrant Generation Segment** | |  |
| Brad Cox | Vice President – Markets & Compliance, Tenaska, Inc. | In Person |
| Derek Mauzy | Principal, Innovation and Competitive Intelligence, NRG Energy, Inc. | In Person |
| Wayne Moore | Vice President - Operations Compliance Officer, Southern Company Services, Inc. | Phone |
| William J. Gallagher | Special Projects Chief, Vermont Public Power Supply Authority | In Person |
| David Canter | Manager, RTO & Public Policy, American Electric Power Service Corp. | Phone |
| Kathy York | Senior Program Manager – Bulk Power Regulatory, Tennessee Valley Authority | In Person |
| Lou Oberski | Director NERC Reliability Compliance and NERC Policy, Dominion Resources Services, Inc. |  |
| **Wholesale Electric Quadrant Marketers/Brokers Segment** | | |
| Andrea Sanders Brackett | Senior Manager, Cybersecurity Governance, Policy and Standards, Tennessee Valley Authority | Phone |
| Rebecca Johnson | Transmission Advisor, Western Area Power Administration | Phone |
| R. Scott Brown | Market Initiatives and Analysis – Exelon Corporation, Exelon Generation Company, LLC |  |
| Roy True | Director of Regulatory and Market Affairs, Alliance for Cooperative Energy Services Power Marketing LLC (ACES) | In Person |
| Timothy Gerrish | Director of Origination – Energy Marketing & Trading, Florida Power & Light Company | Phone |
| Michael P. Ward II | Director of System Operations, Seminole Electric Cooperative Inc. |  |
| **Wholesale Electric Quadrant Distribution/Load Serving Entities (LSE) Segment** | | |
| Bruce Ellsworth | New York State Reliability Council | In Person |
| Mark G. Lauby | Senior Vice President and Chief Reliability Officer, North American Electric Reliability Corporation | In Person |
| Nelson Peeler | Vice President - Transmission System Planning and Operations, Duke Energy Corporation |  |
| Paul McCurley | Director, Energy and Power Division and Chief Engineer, National Rural Electric Cooperative Association | In Person |
| David Crabtree | Director - Federal Regulatory Affairs, Compliance & Transmission Policy, Tampa Electric Company | Phone |
| **Wholesale Electric Quadrant End Users Segment** | | |
| Lila Kee | Chief Product Officer and Vice President of U.S. Business Development, GMO GlobalSign, Inc. | Phone |
| Jerry Dempsey | Sr. Vice President; Business Development, Sales and Marketing, Open Access Technology International, Inc. |  |
| **Wholesale Electric Quadrant Independent Grid Operators/Planners** | | |
| Ed Skiba | Consulting Advisor Standards Compliance, MISO | In Person |
| Nicholas Ingman | Director of Market Operations, Independent Electricity System Operator (IESO) | Phone |
| Stu Bresler | Senior Vice President, Markets, PJM Interconnection, LLC | Phone |
| Gregory Campoli | Manager, Reliability Compliance and Industry Affairs, New York Independent System Operator, Inc. (NYISO) | Phone |
| Joel Mickey | Director of Market Design and Development, Electric Reliability Council of Texas, Inc. (ERCOT) | Phone |
| Michael Desselle | VP & Chief Compliance and Administrative Officer, Southwest Power Pool | In Person |
| Robert Ethier | Vice President Market Operations, ISO New England, Inc. |  |
| **Wholesale Electric Quadrant Technology and Services** | | |
| E. Russell Braziel | President, RBN Energy, LLC |  |
| David A. Wollman | Deputy Director, Smart Grid and Cyber-Physical Systems Program Office (NIST Engineering Laboratory), NIST | Phone |
| Jim Buccigross | Vice President - Energy Industry Practice, 8760 Inc. |  |

| **10. Other Attendance** | | |
| --- | --- | --- |
| Name | Organization | Attendance |
| Kyle Abell | MISO | Phone |
| Leonard Ashley | MISO | Phone |
| Linda Benally | APS | Phone |
| Jonathan Booe | NAESB Office | In Person |
| Bill Boswell | NAESB General Counsel | In Person |
| Lorraine Cross | Cross & Company | In Person |
| Jerry Cuzellas | US Department of Interior | In Person |
| Edgar De Leon | CENEGAS | In Person |
| Mary Do | Latitude Technologies | In Person |
| Regina Ibargauengoytia | CENEGAS | In Person |
| Wayne Gardner | WE Gardner Company | In Person |
| Mark Gracey | Kinder Morgan | In Person |
| Archie Hickerson | Southern Gas Company | Phone |
| Shelia Hollis | Duane Morris | In Person |
| Nicole Lopez | Kinder Morgan | In Person |
| Elizabeth Mallett | NAESB Office | In Person |
| Marcy McCain | Spectra | Phone |
| Steve McCord | Columbia Gas Transmission LLC | In Person |
| Rae McQuade | NAESB Office | In Person |
| Fabiola Peto | CENEGAS | In Person |
| Josh Phillips | SPP | In Person |
| Alan Pritchard | Duke Energy | Phone |
| Denise Rager | NAESB Office | In Person |
| Deepak Raval | NiSource | Phone |
| Narinder Saini | Energy | In Person |
| Timothy Simon | TAS Strategies | In Person |
| Lisa Simpkins | Exelon | Phone |
| Dr. Susan Tierney | Analysis Group | Phone |
| Michael Tita | FERC | Phone |
| Mark Thomas | MISO | Phone |
| Veronica Thomason | NAESB Office | In Person |
| Caroline Trum | NAESB Office | In Person |
| Jill Vaughan | Court Reporting | In Person |
| JT Wood | Southern Company | Phone |
| Pat Wood | Wood3 Resources | In Person |

**November 1, 2017**

**TO:** NAESB Retail Quadrants Executive Committee and Interested Industry Participants

**FROM:** Caroline Trum, NAESB Deputy Director

**RE:** Retail Markets QuadrantExecutive Committee Meeting Draft Minutes

**NORTH AMERICAN ENERGY STANDARDS BOARD**

**RETAIL MARKETS QUADRANT**

**EXECUTIVE COMMITTEE MEETING**

**Wednesday, October 25, 2017**

**DRAFT MINUTES**

**1. Welcome**

Ms. Do called the meeting to order and welcomed the Retail Markets Quadrant (RMQ) Executive Committee (EC) members, alternates and other participants. Ms. Trum delivered the NAESB antitrust guidelines and meeting policies reminder and called the roll. Quorum was established for the quadrant.

Ms. Do thanked Ms. Hogge, Mr. Oberski, Mr. Tomlinson, and Dominion for hosting the meeting.

Ms. Do thanked the resigning RMQ EC members: Ms. Ray with Alabama Power, Mr. Precht with Baltimore Gas & Electric, Mr. Villarreal with the Minnesota Public Utilities Commission, and Mr. Zhou with Ernst & Young. She welcomed the new RMQ EC member, Mr. Wood with Southern Company Services, and new RMQ EC alternates, Mr. Lawrence with Duke Energy and Mr. Brundage with Southern Company Services.

1. **Consent Agenda**

Ms. Do reviewed the consent agenda with the participants, which included the adoption of the [agenda](https://www.naesb.org/pdf4/ec102417a.docx) and the approval of the [draft meeting minutes](https://naesb.org/pdf4/retail_ec022217dm.docx) from the February 22, 2017 meeting. Mr. Watson moved, seconded by Mr. Laval, to adopt the consent agenda. The motion passed a simple majority vote without objection.

1. **Review and Consider for Vote the Recommendation to Support R17004 – Request to make corresponding modifications as necessary to REQ.13, REQ.17 and REQ.20 to complement modifications made to WEQ-015, WEQ-018, and WEQ-020**

Ms. Do asked Ms. Trum to review the [recommendation](https://www.naesb.org/member_login_check.asp?doc=r17004_rec.docx). Ms. Trum stated that the request was submitted by the co-chairs of the WEQ/RMQ Demand Side Management and Energy Efficiency (DSM-EE) Subcommittee to make any necessary changes to REQ.13, REQ.17 and REQ.20 to complement modifications made to WEQ-015, WEQ-018, and WEQ-020. As part of the 2017 WEQ Annual Plan, the subcommittee was tasked with modifying WEQ-015, WEQ-018, and WEQ-020 to update references to NERC terminology and NERC Reliability Standards. Standards Request R17004 was submitted to ensure consistency between the complementary WEQ Business Practice Standards and RMQ Model Business Practices. As a result of the changes made to the WEQ Business Practice Standards, the subcommittee modified REQ.20 to replace references to the term “NERC Control Area” with the term “NERC Balancing Authority Area.” No formal comments were received during the comment period.

Ms. Trum noted that the WEQ Executive Committee adopted a similar recommendation modifying the WEQ Business Practice Standards during its meeting on the previous day.

Mr. Watson moved, moved, seconded by Mr. Lackey, to adopt the recommendation. Ms. Do asked if there were any questions or comments on the recommendation. None were offered. The motion passed a super majority vote. [Vote 1]

1. **RMQ Leadership Discussion**

Mr. Booe stated that during the September 7, 2017 Board of Directors meeting, the chair of the Board of Directors, Mr. Desselle, reactivated the Retail Structure Review Committee. The Board of Directors originally created the committee in 2005 to incorporate the retail markets into NAESB, and the committee was reactivated in 2012 to address the merger of the Retail Electric Quadrant and Retail Gas Quadrant. Per NAESB Bylaws, the minimum threshold for quadrant membership is forty, and the RMQ has forty members. Mr. Desselle has directed the committee to investigate a sustainable solution for the quadrant. Mr. Burks, the RMQ Vice Chair, will serve as chair of this named committee.

The first meeting of the Retail Restructure Review Committee will be held on November 3, 2017. A follow-up meeting has been scheduled for December 1, 2017. The committee will discuss both short-term and long-term issues impacting the RMQ as well as potential solutions. Topics of discussion are likely to include the leadership gap, the current business model, potential outreach efforts, quadrant structure and composition, and potential standards development work to support retail gas markets as well as the recent shift in the retail electric markets to renewables, microgrids, and distributed energy resources.

Mr. Booe noted that when the retail quadrants were first established, one of the goals was to use NAESB to develop EDI standards that would be broad enough to support all customer-choice jurisdictions. He stated that at the request of Ms. Do, NAESB staff has begun to reach out to the various state EDI working groups. Some of these state working groups have expressed interest in utilizing NAESB for EDI standards development, and NAESB is continuing discussions with them to determine how the organization can best support their EDI activities.

Mr. Laval stated that one area of continued growth for the quadrant could be OpenFMB. The OpenFMB architecture could be an important part of grid interoperability and resiliency; however, lack of compatibility with commercial suppliers and technology is hampering the adoption of the OpenFMB framework. He explained that for OpenFMB to be effective there has to be interoperability at the hardware, software, and telecommunication levels. Currently, a number of technology suppliers that represent compliance with OpenFMB do not meet the requirements established by the OpenFMB Model Business Practices.

The Smart Grid Interoperability Panel (SGIP), an original contributor to the NAESB OpenFMB standards development effort, has now merged with the Smart Electric Power Alliance (SEPA). SEPA is working to develop a certification process that would incorporate compliance testing. Recently, the Department of Energy (DoE) has awarded grant money to several grid modernization laboratories to develop OpenFMB compliance testing. The RMQ OpenFMB Model Business Practices could be included as conformance profiles in the compliance testing and certification process. By including compliance testing in the certification process, manufacturers and technology suppliers would have to demonstrate that their product is compatible. A certification program would enable utilities to more widely adopt OpenFMB by allowing utilities to include OpenFMB certification as a requirement in any request for proposals (RFPs).

Mr. Laval stated that while the grid is interconnected, there is still a lack of integration as a lot of equipment tied to the grid is not coordinated. He noted that the Institute of Electrical and Electronic Engineers (IEEE) is in the process of revising its 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems. These updates will provide new functionalities regarding interconnection and interoperability but will not address integration issues.

Mr. Booe stated that NAESB has reached out to SEPA leadership to discuss the relationship between the organizations and OpenFMB. SEPA could potentially act as a user’s group to discuss issues and identify requirements for additional standardization, with the standards development work being addressed through NAESB’s ANSI-accredited standards development process. Mr. Booe stated that uncertainty of the roles between NAESB and SEPA has been one obstacle to completing the RMQ 2017 Annual Plan item directing the development of additional cybersecurity standards for the OpenFMB Model Business Practices. He noted that another obstacle moving forward with additional OpenFMB standards development would be subject matter expertise. While there are a several NAESB members that are involved in OpenFMB implementation, most of those entities only participate in the WEQ. Mr. Laval agreed and identified Duke Energy, Entergy, Avista Corporation, Xcel Energy, and Arizona Public Service Company as NAESB members that are also pursuing OpenFMB implementation.

Mr. Watson suggested NAESB participate in public utility commission staff subcommittee meetings held in conjunction with NARUC meetings. Mr. Booe stated that NAESB has participated in the NARUC Committee on Gas in the past. Mr. Watson noted that NAESB may also want to reach out to the NARUC Staff Subcommittee on Electricity as some areas of potential standardization, such as solar integration, impact all jurisdictions, not just customer choice states. He stated that a staff member in his office chairs the NARUC Staff Subcommittee on Electricity.

Mr. Booe stated that in regards to Green Button, NAESB recently executed a memorandum of understanding (MOU) with the Green Button Alliance. The MOU defines the roles of each organization and ensures that the NAESB Energy Services Provider Interface (ESPI) Model Business Practices are a part of any certification program developed by the Green Button Alliance. The Green Button Alliance has committed subject matter expertise for ESPI standards development efforts and is working with the OpenADE Task Force to submit a request for updates to the ESPI Model Business Practices. The Ontario Ministry of Energy, which is in the process of joining NAESB, has also committed to participating in ESPI standards development and expressed interest in co-chairing the ESPI Task Force. Recently, the Ontario Ministry of Energy sent NAESB a letter encouraging the organization to move forward with allowing the ESPI schema to be an open source document. Mr. Booe stated that while this strays from NAESB’s business model, NAESB leadership is considering moving forward with the request due to the MOU assurances that entities pursuing Green Button certification through the Green Button Alliance will be required to purchase the ESPI Model Business Practices.

Mr. Burks explained that two objectives of the Retail Structure Review Committee are to increase membership and facilitate a better understanding of how the quadrant can support the retail markets. One potential area for growth for the RMQ could be the establishment of a segment to support the renewables sector. The committee may also discuss open source materials and how this issue can be addressed through the NAESB business model. Additionally, the committee will explore ideas to help be more supportive of state level regulatory bodies. Mr. Booe also noted that there is an immediate need within the RMQ to increase those participating in leadership roles within the RMQ EC and subcommittees. Mr. Burks agreed, stating that the Retail Structure Review Committee will be discussing solutions to address both the short-term and long-term needs of the quadrant.

Mr. Booe stated that NAESB has also reached out to ERCOT to engage them on this issue. Ms. Anthony said that ERCOT is having internal, preliminary discussions regarding actions and ideas.

Mr. Watson stated that NAESB may want to consider reorganizing the RMQ segment structure to ensure proper representation of the retail markets and potentially attract new members. Mr. Miyaji noted that while RMQ membership has been impacted by industry consolidation, in the past, RMQ membership has fluctuated based on the standards development activities of the quadrant. He suggested that metered batteries and photovoltaic (PV) solar could be areas of standards development that might attract new members. Mr. Booe stated that as renewable sources of energy generation are in the initial stages of use, the industry has an opportunity to address coordination issues as these resources are being developed.

Mr. Smith stated that ISO New England is interested in pursuing interoperability at the meter level wherein the meter serves as the interconnection point between a retail customer and a distribution system. He noted that as the industry moves towards real-time pricing, there will be an increased demand for overall interoperability.

Ms. McKeever stated that she has some ideas to share with the Retail Structure Review Committee but could not attend the upcoming meeting. Mr. Booe stated that he would reach out to her and that NAESB staff would be happy to work with anyone to develop a work paper on any thoughts they may have if they cannot attend the meeting.

1. **Subcommittee/Development Updates**

Triage Subcommittee

Mr. Booe stated that since the last meeting, there have been two triage dispositions. The first [disposition](https://naesb.org/pdf4/tr080317disposition.docx) assigned Standards Request R17004 to the RMQ. The second [disposition](https://naesb.org/pdf4/tr092617a.docx) assigned five requests to the WGQ.

Business Practices Subcommittee (BPS)

Ms. Do stated that the subcommittee last met on October 24, 2017 to review the proposed 2018 RMQ Annual Plan.

BPS Registration Agent Task Force (RATF)

Ms. McKeever stated that the task force has not met since the last RMQ EC meeting.

Information Requirements and TEIS (IR/TEIS) Subcommittee

Ms. Do stated that the subcommittee is still working on the technical implementation for RXQ.14, RXQ.24, and REQ.27. She noted that the subcommittee is in need of additional technical subject matter expertise to continue standards development efforts regarding these model business practices as well as the remaining annual plan items assigned to the subcommittee.

Glossary Efforts

Ms. Do provided the update. The subcommittee will continue to meet as necessary.

Demand Side Management and Energy Efficiency Subcommittee (DSM-EE)

Ms. Trum provided the update. The subcommittee last met on August 31, 2017 to vote out the recommendation in support of Standards Request R17004.

Energy Services Provider Interface (ESPI) Task Force

Mr. Booe stated that the NAESB office will work with the task force co-chairs to schedule a meeting of the subcommittee once there are updates to be made to the standards.

OpenFMB Task Force

Mr. Laval provided the update. He stated that the task force will meet to discuss proposed enhancements to the standards once the relationship between NAESB and SEPA is established.

1. **Adoption of the 2017 RMQ Annual Plan Adopted by the Board of Directors on September 7, 2017**

Ms. Do reviewed the [2017 RMQ Annual Plan](https://www.naesb.org/pdf4/retail_ec102517w1.docx). Items 3.a through 3.e were marked as completed and their completion dates changed to 2nd Quarter, 2017. The completion date for Item 4.a was changed to 2018. Additionally, the ESPI Task Force was added to the RMQ Subcommittees list and the Smart Grid Standards Development Subcommittee was removed. Mr. Burks, Mr. Coffin, and Mr. Lackey were added to the RMQ Subcommittee leadership roster.

Mr. Lackey moved, seconded by Mr. Laval, to adopt the annual plan as [revised](https://naesb.org/pdf4/retail_ec102517a1.docx) during the meeting. The motion passed a simple majority vote.

1. **Adoption of the Proposed 2018 RMQ Annual Plan Adopted by the Annual Plan Subcommittee on October 18, 2017**

Ms. Do reviewed the [proposed 2018 RMQ Annual Plan](https://naesb.org/pdf4/retail_ec102517w2.docx). The completion dates for Items 1.a through 1.f were updated. Several items included as part of Annual Plan Item 3 were removed as these items were completed in 2017. The status of new Annual Plan Items 3.b and 3.c was updated to “underway.” Mr. Lackey and Mr. Coffin were added to the RMQ Subcommittee leadership roster.

Ms. McKeever moved, seconded by Mr. Lackey, to adopt the proposed annual plan as [revised](https://naesb.org/pdf4/retail_ec102517a2.docx) during the meeting. The motion passed a simple majority vote.

1. **Publication Schedule Review**

Ms. Rager provided the update. The [WGQ](http://www.naesb.org/misc/wgq_publication_schedule_ver3_2.doc) published Version 3.1 on September 29, 2017. The publication date for Version 3.2 is to be determined. The WGQ EC will consider one recommendation and five minor corrections during its meeting on October 26, 2017. The [WEQ](http://www.naesb.org/misc/weq_publication_schedule_ver3_2.doc) is scheduled to publish Version 3.2 on December 8, 2017. The WEQ EC approved four recommendations, one no action recommendation, and one minor correction during its meeting on October 24, 2017. If the four recommendations proposing standards development are ratified, they will be included in the upcoming WEQ publication. The next publication for the [RMQ](http://www.naesb.org/misc/retail_publication_schedule_ver3_3.doc) will be Version 3.3. The publication date is to be determined. The recommendation adopted by the subcommittee during this meeting will be incorporated into the publication schedule should it be ratified.

1. **Board of Directors, Board Committee, and Regulatory Updates**

Mr. Booe provided the updates.

NAESB [membership](https://www.naesb.org/misc/membership_report_093017.docx) information is included in the meeting materials. The RMQ is currently at forty members, but the Ontario Ministry of Energy is in the process of joining the quadrant. In total, the RMQ has lost five members this year; however, Ernst & Young has recently expressed interest in rejoining the quadrant. The WEQ and WGQ have both seen net increases in membership this year. The meeting materials also include the membership volatility chart, the meeting analysis statistics, and information on product access and waivers. Mr. Booe asked that all members review their membership contact information and send any updates to Ms. Rager.

The Board of Directors last met on September 7, 2017 for the annual strategic session and meeting of the members. The strategic session featured a panel discussion regarding the direction of the energy industry and the impact to NAESB. Panelist included former FERC Chairman Pat Wood and Ms. Sheila Hollis. During the meeting, the Board of Directors approved modifications to the NAESB Certificate of Incorporation regarding majority voting. The modifications will allow for the Board of Directors to act as a unit with weighted voting to prevent one quadrant from dominating the others.

The Strategic Plan Ad Hoc Task Force will next meet on November 17, 2017. The task force will review the comments made by panelist during the strategic session of the Board of Directors to determine how to translate those comments into standards development activities or the strategic direction of the organization. The task force will also review the proposed 2018 Annual Plans for each quadrant to make sure the plans are consistent with NAESB’s strategic direction. Next year, the task force will begin preparing for the development of the 2019 – 2021 NAESB Strategic Plan.

The Revenue Committee will next meet on November 17, 2017. During the meeting, the committee will review the 2018 budget as well as the communication activities with external organizations, including meetings with regulators and involvement with NARUC. The committee will also review revenue tracking for the 2017 budget.

The Parliamentary Committee will next meet on November 17, 2017. The committee will begin its effort to review the NAESB Governance Documents to ensure consistency and consider the incorporation of past Board of Directors resolutions.

The Critical Infrastructure Committee has been asked to track the activities of the surety assessment being conducted by the Sandia National Laboratories. The committee held an initial meeting in May and will be scheduling a follow-up meeting to review the scope of work document for the surety assessment provided by Sandia National Laboratories.

The Managing Committee met in August to discuss staffing and other organizational issues.

On October 2, 2017, NAESB submitted a [status report](https://naesb.org/pdf4/ferc100217_naesb_pfv_status_report.pdf) to the FERC regarding the Parallel Flow Visualization effort. The report was drafted in coordination with NERC and the Eastern Interconnection Data Sharing Network.

On September 29, 2017, NAESB filed an [informational report](https://naesb.org/pdf4/ferc092917_wgq_version_3.1_filing.pdf) with the FERC regarding the publication of Version 3.1 of the WGQ Business Practice Standards.

On August 24, 2017, NAESB sent letters to [Mr. K. John Holmes](https://naesb.org/pdf4/naesb_letter_response_NAS_report_082417_holmes.pdf) and [Dr. M. Granger Morgan](https://naesb.org/pdf4/naesb_letter_response_NAS_report_082417_morgan.pdf) in response to Enhancing the Resilience of the Nation’s Electricity System Report developed by the National Academy of Sciences. The report asked NAESB to work with FERC to identify and address gas-electric harmonization issues. The letter thanks the National Academy of Sciences for considering NAESB and indicates that NAESB will follow FERC direction on this issue.

On August 23, 2017, the Department of Energy released a [Report to the Secretary on Electricity Markets and Reliability](https://naesb.org/pdf4/doe_staff_report_elec_markets_reliability_aug_2017.pdf) and published a [cover letter](https://naesb.org/pdf4/secretary_state_perry_grid_study_cover_letter_0823_2017.pdf) regarding the study from Secretary Rick Perry. FERC has now issued a [Notice of Proposed Rulemaking](https://www.ferc.gov/media/headlines/2017/2017-3/10-04-17.pdf) in Docket No. RM18-001in response to the report.

Mr. Booe stated that before the end of the year, NAESB will make an additional informational filing with the Commission regarding the publication of Version 3.2 of the WEQ Business Practice Standards.

1. **Other Business**

Mr. Booe stated that the [FERC Forms Subcommittee](https://www.naesb.org/misc/weq_wgq_ffs_update_100517.docx) has not met since the previous RMQ EC meeting. The subcommittee is waiting for action by FERC staff to develop additional documentation.

Mr. Booe stated that the WGQ EC will be considering recommendation proposing a [Mexican Addendum](https://www.naesb.org/misc/mexican_markets_update_101517.docx) to the NAESB Base Contract for Sale and Purchase of Natural Gas during its meeting on October 26, 2017. NAESB also continues discussions with the Comisión Reguladora de Energía (CRE) about how the organization can support Mexican market activities. Mr. Booe indicated that he had delivered a presentation titled *Outlook – Industry Standards development for the Smart Grid* during the Smart Grid Congress Latin America 2017.

Mr. Booe stated that Sandia National Laboratories has indicated that the [surety assessment](https://www.naesb.org/misc/surety_assessment_update_100417.docx) is on track to be completed by the end of the year or early next year.

The [2018 meeting schedule](https://naesb.org/pdf4/retail_ec102517w3.pdf) is now posted.

Mr. Watson asked if the RMQ EC will continue to hold in-person meetings. Mr. Booe responded that the executive committees will typically meet in-person if there is a voting item. He stated that in the past, if there has not been a voting item, the executive committees have typically opted to cancel the meeting in an effort to conserve resources.

Ms. Do expressed congratulations to Ms. York who will be retiring later this year and stepping down as WEQ EC Chair. She thanked Ms. York for her leadership over the years in NAESB.

1. **Adjourn**

The meeting adjourned at 12:48 PM Eastern on a motion by Mr. Watson, seconded by Ms. McKeever.

1. **Attendance**

|  |  |  |  |
| --- | --- | --- | --- |
| **Retail Electric Utilities Segment** | | **Attendance** | **Vote 1** |
| Lincoln Wood | Product Manager, Southern Company Services, Inc. | By Phone | In Favor |
| Stuart Laval | Director, Technology Development, Duke Energy Corporation | In Person | In Favor |
| Patrick Eynon | Supervisor, Transmission Services Business Center, Ameren Services Company |  |  |
| Debbie McKeever | Market Advocate, Oncor Electric Delivery Company, LLC | By Phone | In Favor |
| **Retail Gas Market Interests Segment** | |  |  |
| Mary Do | EDI Developer, Latitude Technologies, Inc. | In Person | In Favor |
| **Retail Electric End Users/Public Agencies Segment** | |  |  |
| Susan Anthony | Market Support Services, Electric Reliability Council of Texas (ERCOT) | By Phone | In Favor |
| Sam Watson | General Council – North Carolina Utilities Commission rep. National Association of Regulatory Utility Commissioners (NARUC) | In Person | In Favor |
| Doug Smith | Technical Manager, Market & Resource Administration, ISO New England, Inc. | By Phone | In Favor |
| Robert G. Gray | Executive Consultant, Arizona Corporation Commission |  |  |
| **Retail Electric Service Providers/Suppliers Segment** | |  |  |
| Wendell Miyaji | Vice President – Energy Sciences, Comverge, Inc. | By Phone | In Favor |
| Donald F. Coffin | Technical Manager, Green Button Alliance | By Phone | In Favor |
| Larry Lackey | Director Cybersecurity and Standards Development, Open Energy Solutions, Inc. | In Person | In Favor |

| **Other Participant Attendance** | | |
| --- | --- | --- |
| **Participant** | **Organization** | **Attendance** |
| Jonathan Booe | NAESB | In Person |
| J. Cade Burks | Big Data Energy Services | By Phone |
| Valerie Crockett | TVA | In Person |
| Denise Rager | NAESB | By Phone |
| Veronica Thomason | NAESB | In Person |
| Caroline Trum | NAESB | In Person |
| Jill Vaughan | Court Reporter | In Person |
| Kathy York | TVA | In Person |

##### October 31, 2017

**TO:** Board Retail Structure Review Committee

**FROM:** Elizabeth Mallett, NAESB Deputy Director

**RE: Open Field Message Bus (OpenFMB) Update**

Open Field Message Bus (OpenFMB) Model Business Practices

Frequent conference calls between the NAESB staff and the Smart Electric Power Alliance staff are ongoing. The Smart Electric Power Alliance, previously the Smart Grid Interoperability Panel, has expressed an interest in providing a certification program for entities seeking to implement the OpenFMB Framework. Most recently, the discussions have focused on the role that the Smart Electric Power Alliance will have with respect to the OpenFMB effort and the possibility of a Memorandum of Understanding (MOU) mirroring the MOU recently signed between NAESB and the Green Button Alliance. Developed in response to Standards Request R14008 submitted by Duke Energy in 2014, OpenFMB leverages a non-proprietary and standards-based reference architecture platform, which consists of internet protocol networking, Internet of Things messaging protocols, and standardized common semantic models, to enable communications and information exchange between devices on the electric grid.

Additionally, NAESB has taken on an advisory role with the initiative to develop an OpenFMB test harness through the Department of Energy’s Grid Modernization Laboratory Consortium (GMLC). The GMLC was established as a partnership between DOE and the national laboratories to collaborate on the goal of modernizing the nation's grid. The project seeks to increase the resiliency of distribution systems through the flexible operation of DER and Microgrid assets. Utilizing Open FMB, the effort will coordinate centralized utility systems with decentralized DER and Microgrid assets.

In the last quarter of 2017, the NAESB Open Field Message Bus (OpenFMB) Task Force anticipates scheduling a kick off meeting to begin discussion on updates to the RMQ.26 Open Field Message Bus (OpenFMB) Model Business Practices. Additionally, the task force will address an item added by the RMQ Executive Committee to examine the cybersecurity aspects of OpenFMB. As you may remember, the OpenFMB Model Business Practices were ratified by the NAESB membership on March 7, 2016 and subsequently published in Version 3.1 of the NAESB RMQ Business Practice Standards on March 31, 2016. Co-chaired by Joe Zhou of Ernst & Young and Stuart Laval of Duke Energy, the NAESB OpenFMB Task Force previously focused the initial model business practices on grid-edge technology, with three microgrid use cases serving as drivers for the effort – Microgrid Optimization, Microgrid Unscheduled Islanding Transition, and Microgrid Island to Grid Connected Transition. Since the publication of Version 3.1, additional OpenFMB use cases addressing DER Circuit Segment Management, Circuit Segment Optimization, Microgrid Unscheduled Islanding, Microgrid Reconnection, etc. have been developed.

As noted above, the OpenFMB Task Force will soon begin the evaluation of additional use cases for further model business practices development. The next Open FMB Task Force conference call will be announced by the NAESB office. As always, this conference call is open to any interested parties.

##### October 31, 2017

**TO:** Board Retail Structure Review Committee

**FROM:** Elizabeth Mallett, NAESB Deputy Director

**RE: Green Button Update**

After a succession of coordination calls taking place over several months, NAESB and the Green Button Alliance (GBA) have executed a memorandum of understanding (MOU) to define the relationship that the two organizations will share concerning NAESB REQ.21 ESPI Model Business Practices (ESPI Standard) and the Green Button Certified Download My Data, Connect My Data, and other future GBA certification programs. As you may remember, the ESPI Standard serves as the critical foundation for the Green Button. By providing an industry-standard XML format for energy usage information and a data exchange protocol, ESPI allows for the automatic exchange of a retail customer’s energy usage information between their designated data custodian, i.e. utility, and an authorized third-party service provider.

Per the MOU, NAESB will attach the Apache 2.0 open source license to the XML Schema contained in the ESPI Standard. Additionally, NAESB will host the related XML files on its site. In exchange for these actions on NAESB’s part, the MOU commits the GBA to utilize its resources to update the ESPI Standard and require valid, legal access to the ESPI Standard as a condition of certification for any current or future Green Button certification programs. The signing of the MOU dovetails nicely with the soon to be announced ESPI Task Force kick off meeting. During that meeting, the participants will review the ESPI Standards and incorporate any potential updates.

Additionally, NAESB is furthering the Green Button conversation with the Ontario Ministry of Energy. Recently, the staff of the Ontario Ministry of Energy initiated informal conversations with the NAESB staff regarding the continued expansion of the Green Button in their jurisdiction. In 2012, the Green Button was introduced to Ontario with the support of the Ministry of Energy. The Green Button initiative was promoted in Ontario’s 2013 *Long-Term Energy Plan* as a way to give consumers access to their electricity consumption data. Most recently, *Ontario’s Five Year Climate Change Action Plan 2016-2020* committed to expanding Green Button province-wide to let “Ontarians access and share their data on electricity, natural gas and water consumption in a secure, standardized electronic format.” The Ontario Ministry of Energy has previously utilized the ESPI Standard within a reference architecture guide for Green Button implementation in its jurisdiction. In the past years, NAESB has helped facilitate the participation of over seventy-seven Ontarian utility companies in the Ontario Green Button program and looks forward to further efforts to support the Ontario Ministry of Energy initiatives.

Led by a 2011 White House call-to-action, the Green Button Initiative challenges utilities across the country to provide their customers with easy and secure access to their energy usage data via a “Green Button” on their websites. Launched in 2012, the Green Button Initiative is a response to that White House call to action that has led to over 150 utilities and service providers committing to providing more than 60 million U.S. households (altogether 100 million people) with access to their own Green Button energy data. In Canada, more than half of Ontario-based consumers, totaling 3 million residences and businesses now have access to their Green Button data.

**via posting**

**TO:** Board Retail Structuring Review Committee (RSRC) and Interested Industry Participants

**FROM:** Elizabeth Mallett

**RE:** Retail State Working Groups Summary Status

**DATE:** October 31, 2017

**RETAIL STATE WORKING GROUPS SUMMARY STATUS**

At the request of Mary Do, RMQ Chair, NAESB staff has reached out to the leaders of the Illinois, Ohio, New York, New Jersey, Connecticut, Massachusetts, and Maryland Electronic Data Interchange (EDI) Working Groups. Additionally, NAESB Staff compiled a list of vendors/suppliers who participate in the various state working groups. The results of the conversations with the state working group representatives are detailed in the charts below:

Connecticut: Amy Velez (Energy Services Group), Daryush Donyavi (Eversource), and I spoke about the basics of NAESB and participation within the Connecticut working group. Amy noted that the CT EDI guides are not housed in one location and have not been updated regularly. They saw no issues with NAESB hosting a link to the CT documents, but noted that their documents would need to first be posted online. They discussed potentially having the PURA host the documents for this purpose.

Illinois: Patrick Eynon (Ameren), Mary Do (Latitude Technologies), and I held a call on October 12, 2017. Patrick stated it was fine for NAESB to link to the Illinois working group papers. Mary suggested an FAQ document for suppliers on the NAESB page as well. Torsten Clausen from the Illinois Commerce Commission has agreed to remove the NAESB Model Business Practices from the ICC website.

Maryland/Pennsylvania Brandon Seigel (Intelometry), the contact for the Maryland EDI Working Group, indicated over the phone that the ratification structure of NAESB was the main issue that prevents the working groups from working under NAESB. For example, he stated that a participant in CA should not have input on the processes that NJ uses. He stated that Mike Novak had previously spoken with the groups and came to a similar conclusion.

Massachusetts: Monica Neibert (ESG), Juliana Griffiths(National Grid), and I spoke about the basics of NAESB, participation in the working group, and Juliana stated that NAESB can add a link to the National Grid site for EDI transactions to the NAESB site. Monica noted that NAESB’s help would be appreciated with the EDI implementation. I also spoke with Daryush Donyavi on September 12, 2017 and called into the September 12, 2017 and October 18, 2017 MA meetings.

New Jersey: Jacqueline Galka (BPU), the contact for the New Jersey EDI Working Group, does not want NAESB to attend working group calls. She is open to a conference call later in the year to further discuss the topic of how NAESB can participate/help to support the working group.

New York: Rebecca Sweeney (Dept. of Public Service New York) emailed that she spoke with Mike Novak: “the Chair of the EDI Business/Technical Working Group, who gave me a brief history of NAESB’s previous offer to help support NY’s EDI standards. He explained the decision was made several years ago for New York to have its own working group under the leadership of himself and Kim Wall. We appreciate you reaching out for potential coordination efforts with the working group. At this point in time we are going to keep the current structure in place, but I will be sure to keep your contact information and this potential coordination in mind for the future.”

Ohio: Joe Lindsay (Intelometry) noted that the membership fees within NAESB are a barrier to membership, as several working group members are third parties who have no other business reasons to join NAESB. He stated that Mike Novak had previously spoken with the groups and came to the same conclusion. NAESB staff called into the August 22, 2017 OH EDI Meeting.

##### November 1, 2017

**TO:** All Interested Parties

**FROM:** Caroline Trum, NAESB Deputy Director

**RE:** Wind and Solar Energy Summary Status

Several months ago, the Western Electricity Coordinating Council (WECC) approached NAESB regarding potential standards development to support commercial related issues involving solar generation and interconnection. WECC is currently involved in activities of the NERC Inverter-Based Resource Performance Task Force established by the NERC Operating Committee in June 2017.[[1]](#footnote-1) This group is specifically charged with exploring performance characteristics of utility-scale inverter-based resources, such as solar and wind, directly connected to the bulk power system and considering potential standards development to address controls of inverter-based resources. Although this current NERC effort is focused on a very specific, technical issue impacting reliability, WECC has indicated an interest in NAESB considering the development of business practices and stated that the organization could likely provide subject matter expertise. Additionally, WECC identified several of its members as also being closely involved with and participating in solar issues, including NAESB members Pacific Gas and Electric Company, NV Energy, Tucson Power, Arizona Public Service Company, and divisions of Xcel Energy.

In response to this initial membership interest, and in recognition of the 2017 RMQ Annual Plan Provisional Item regarding the potential development of model business practices to support renewable portfolio programs, NAESB undertook an effort to research the current state of the renewable generation market. Below is information on renewable development, relevant FERC regulations supporting wholesale renewable generation, the industry organizations that support the renewable industry and issues that have been identified by these organizations.

Given the relatively recent and rapid expansion of utility renewable capacity and regulatory factors encouraging its continued development, there is likely an emerging need for industry standardization. FERC and state-level regulatory bodies have already established regulations and policy guidelines, and NERC is beginning to address technical issues around renewable generation. As there is now a strong regulatory framework related to distributed energy resources, and the industry is potentially undertaking reliability standards development, the time may be ripe for NAESB to begin addressing commercially focused standards development regarding renewable generation and interconnection issues. By leveraging the activities and resources of industry trade associations and organizations, NAESB could build upon the initial membership interest in solar and explore opportunities for standards development regarding renewable generation.

Drivers of Solar and Other Renewable Development

The solar market is divided into three segments: utility, residential, and non-residential which is comprised of commercial, industrial, and community solar installations. The solar utility market accounted for the largest growth in capacity last year, with utilities responsible for the installation of almost three-fourths of new solar capacity.[[2]](#footnote-2) Currently, the Public Utility Regulatory Policies Act (PURPA) is the biggest driver for utility solar expansion. California has long led the way, with legislation in the early 2000s requiring 20% of electricity retail sales be served by renewable energy resources by 2010.[[3]](#footnote-3) In October 2015, California enacted additional legislation to require retail sellers and publically owned utilities to procure 50% of their electricity from renewable energy sources by 2030.[[4]](#footnote-4) New York, Oregon, and the District of Columbia have all recently expanded mandates for renewable electric generation as well.[[5]](#footnote-5) Additionally, an increasing number of utilities, particularly those in the southeast, are expanding their solar capacity to hedge against natural gas pricing.[[6]](#footnote-6)

FERC Regulations Supporting Renewable Expansion

In 2005, FERC issued Order No. 2006 *Standardization of Small Generator Interconnection Agreements and Procedures*.[[7]](#footnote-7) The order paved the way for the expansion of wholesale renewable generation by requiring that should certain conditions be met, small generators with a capacity of twenty megawatts or less be provided interconnection services. As part of the order, the Commission required all *pro forma* open access transmission tariffs (OATTs) be amended to include a *pro forma* Small Generator Interconnection Agreement (SGIA) and a Small Generator Interconnection Procedure (SGIP) document.

The *pro forma* SGIA contains the term and conditions under which the transmission provider must provide interconnection service to the small generating facilities. The SGIP establishes the review process for evaluating an interconnection request to determine the impact the proposed interconnection will have on the transmission provider’s system and identify any new equipment and/or modifications needed to accommodate the proposed interconnection. The SGIP was modeled after FERC’s Large Generator Interconnection Procedure (LGIP), and its development relied heavily on comments and proposals from the National Association of Regulatory Utility Commissioners (NARUC). Like the LGIP, the SGIP provides for a four-step study process including a scoping meeting, feasibility study, system impact study, and a facilities study. In addition to this process, the SGIP also established a fast track process for qualifying generating facilities. This process forgoes the typical study process in favor of using proscribed technical screenings to identify any potential reliability or safety issues.

The Commission further modified the *pro forma* SGIA and SGIP as part of FERC Order No. 792 *Small Generator Interconnection Agreements and Procedures*, issued in 2013.[[8]](#footnote-8) The purpose of the modifications was to accommodate the significant expansion in smaller generation, particularly solar, in the years since the issuance of FERC Order No. 2006. This expansion was mostly attributed to a focus by the states in fostering the growth of renewables. Overall, the modifications increased efficiency in the study and fast track process and provide greater clarity and transparency in the interconnection provider’s determinations regarding the impact of the proposed interconnection. Additionally, the Commission made revisions to explicitly include energy storage devices as a small generating facility.

Under the changes as part of FERC Order No. 792, transmission providers are required to provide, upon request, a pre-application report containing a list of identified, readily available information about system conditions at the proposed interconnection. With respect to the fast-track process, the Commission broadened the applicability of qualifying generating facilities. The Commission also provided for a supplemental review process following the failure of a fast track screening and proscribed the reliability and safety screenings to be performed as part of this review.

Since the issuance of FERC Order No. 792, the Commission issued two additional orders, both in 2016, further revising the *pro forma* SGIA. As part of FERC Order No. 827 *Reactive Power Requirements for Non-Synchronous Generation*, the Commission eliminated a previously in place rule exempting wind generators from reactive power requirements.[[9]](#footnote-9) In FERC Order No. 828 *Requirements for Frequency and Voltage Ride Through Capability of Small Generating Facilities*, the Commission enacted revisions to require small generating facilities to have ride through capabilities for abnormal frequency and voltage events.[[10]](#footnote-10) Prior to this order, there had been no prohibition on the automatic disconnect of a small generating facilities from a transmission provider’s system or equipment during such occurrences. As part of the order, the transmission provider is required to establish ride through standards and guidelines for the small generating facilities consistent with those applicable to other comparable generating facilities in the balancing authority area and Good Utility Practice. These ride through requirements established parity between small generating facilities and large generating facilities and helped to mitigate reliability risks that could be exacerbated by a large number of small generating facilities disconnecting during an abnormal frequency or voltage event.

Industry Organizations and Potential Standards Development Areas

As noted below, there are several industry trade associations and organizations that have laid the groundwork for identifying business-related standardization issues and could serve as a resource for gathering needed subject matter expertise.

The Smart Electric Power Alliance (SEPA) is a non-profit organization that works with electric power stakeholders to address issues affecting the growth and utilization of smart energy. The organization has over 1,000 members including over 500 electric utilities. SEPA has developed several issue statements regarding distributed energy resources and utilities that could be addressed through standards development. These include: (1) cooperation and engagement among utilities, technology providers, and energy service providers; (2) increased transparency from utilities regarding costs and benefits of the deployment of distributed energy resources; and (3) safeguards to ensure non-utility ownership models of distributed energy resources have equal and open access to the interconnection process, including clarity of information from grid operators on deployment preferences and transparency on the costs and benefits of the services provided.

The Solar Energy Industries Association (SEIA) is an industry trade association focused on advocacy and education of issues impacting the solar industry, including the expansion of markets and removing market barriers. SEIA has over 1,000 member companies positioned throughout the solar market. As an organization, SEIA has long been focused on interconnection issues regarding solar and was the driving force behind the FERC rulemaking proceeding that resulted in FERC Order No. 792. SEIA has identified several issues that could be addressed through standards development, including: (1) streamlining the interconnection process at the state level by providing transparency regarding costs and timelines and standardizing forms and documentation; (2) resolution of interconnection seams issues to allow for the better integration of distributed energy resources into the grid; and (3) the need for data transparency to help modernize and improve system planning, including better access by non-utilities to data about distribution system capabilities and needs to aid in the non-utility’s evaluation of pursuing distributed energy interconnection opportunities.

Currently, SEIA is undertaking an effort to develop a series of white papers exploring pertinent issues regarding the growth of distributed energy resources and opportunities to modernize the electric utility grid. In September, SEIA released the third paper in this series, titled *Hosting Capacity: Using Increased Transparency of Grid Constrains to Accelerate Interconnection Processes*.[[11]](#footnote-11) The paper discusses the need for increased transparency in system planning tools through the use of hosting capacity – the amount of distributed energy resources that the electric distribution system can accommodate without significant grid upgrades.[[12]](#footnote-12)

SEIA has several resources that could be utilized to assist in any NAESB standards development undertakings. SEIA has dedicated staff positions for federal, state, and regulatory liaisons. Additionally, SEIA has an ad hoc Transmission Working Group that serves as a forum to discuss electric transmission matters such as variable resource integration, open access policies, and transmission planning and cost allocation issues and a PURPA Working Group that works on state and federal PURPA issues.

SEIA has also entered into a formalized partnership with several industry organizations operating at the state level, including organizations in Arizona, California, Florida, Georgia, and Texas. The California affiliate, the California Solar Energy Industries Association (CALSEIA), has specifically worked to help create legislation promoting competitive markets and the removal of barriers to entry. These affiliations with organizations directly involved in the ground level work at the states could serve as a resource in gaining subject matter expertise should NAESB undertake any retail standards development efforts.

The Interstate Renewable Energy Council (IREC) is a 501(c)(3) non-profit organization that works to forward renewable energy use through education, regulatory reform, and workforce development. They coordinate various industry stakeholders and work to gather subject matter expertise to develop best practices and standards. IREC has developed Model Interconnection Procedures it makes available to states as they create and revise their own rules. IREC is currently engaged in a number of states through involvement in regulatory proceedings or to provide technical expertise, including California, Maryland, Minnesota, and New York. While NAESB would not want to overlap any areas of best practices or standards previously addressed, IREC could be a resource to help identify additional state level issues that could benefit from further or additional standardization as well as provide any needed subject matter expertise. IREC receives both public and private funds, including corporate sponsorships from NRG, SolarCity, and Green Mountain Power.

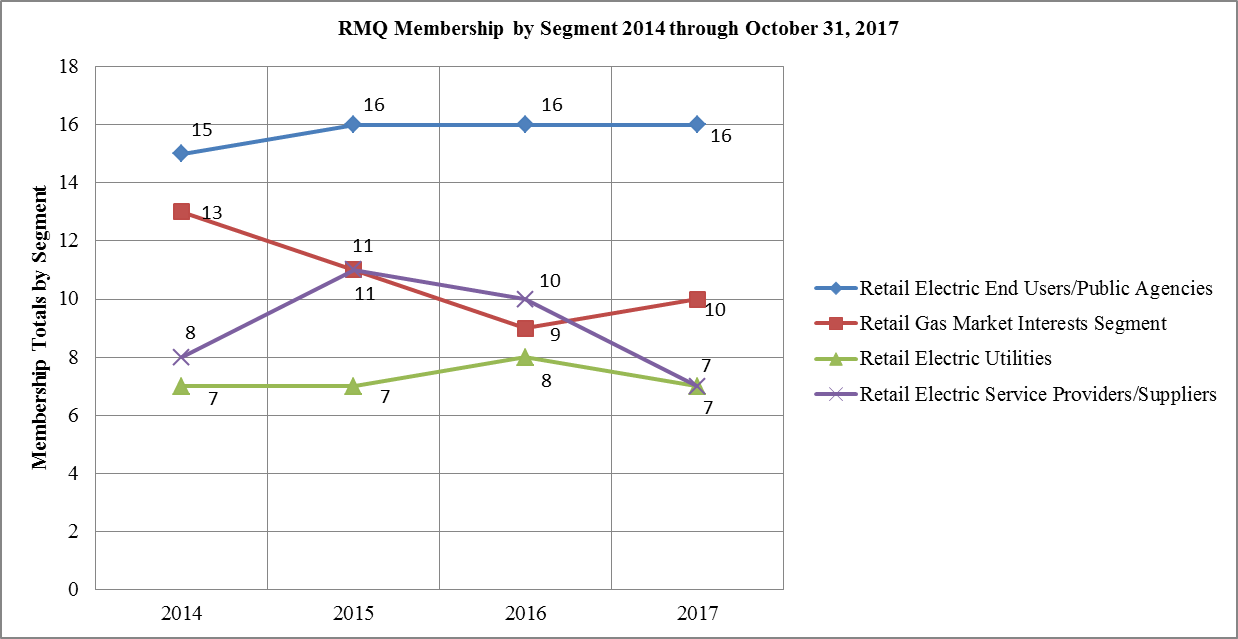
The American Wind Energy Association (AWEA) is a trade association for the wind industry. The association is comprised of wind power project developers and manufacturers, utilities, policy advocates, and research organizations. AWEA has several standing committees to identify and address issues at both the state and federal level such as the Transmission Committee which focuses on issues like efficient grid operations, the interconnection queue process, and the integration of renewable generation and the Policy Committee which focuses on federal and state legislative issues. Of note, AWEA is an ANSI-accredited standards developer. For now, its Wind Standards Committee has undertaken standards development efforts on more technically-related wind-industry standards such as small wind turbine performance and safety and recommended practices for wind turbine structures and offshore compliance.

**NAESB RMQ Membership Statistics – Changes by Quadrant for 2017 as of October 31, 2017**

|  |  |  |
| --- | --- | --- |
| **NAESB Membership Report – RMQ Quadrant/Segment Membership Analysis** | | **Number of Members** |
| **RMQ Segments** | **TOTAL** | **40** |
|  | Retail Electric End Users/Public Agencies | 16 |
|  | Retail Gas Market Interests Segment | 10 |
|  | Retail Electric Utilities | 7 |
|  | Retail Electric Service Providers/Suppliers | 7 |
|  |  |  |

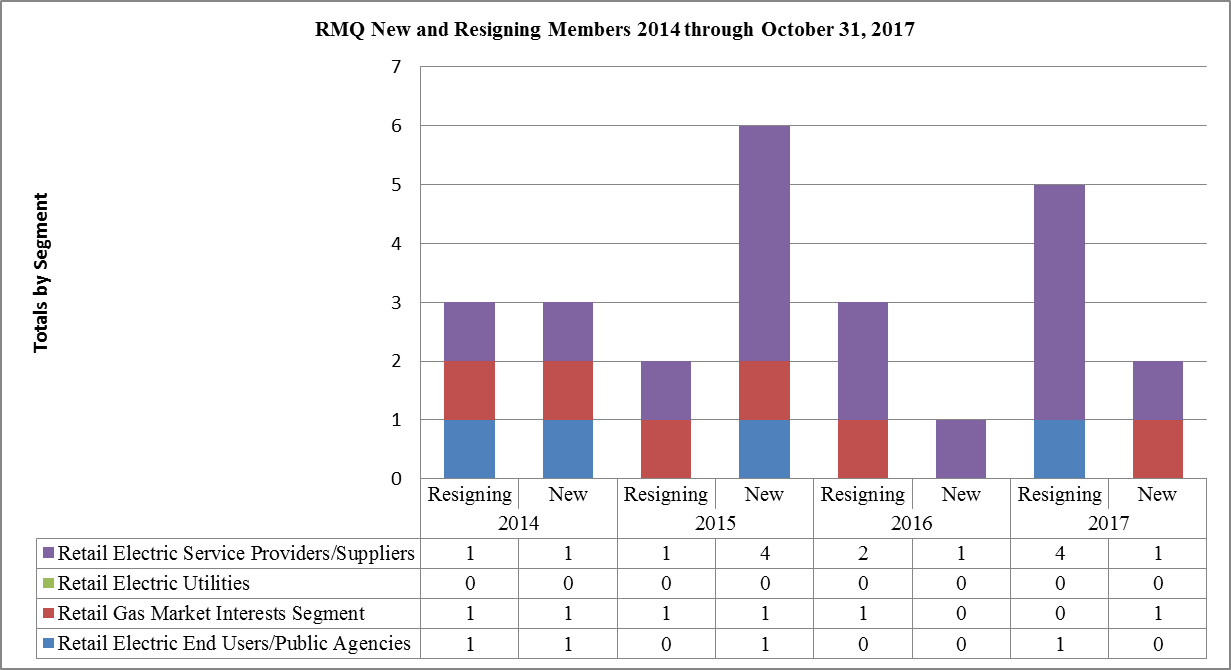
**NAESB RMQ Membership – 2017 New and Resigning**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | |  | |
|  | New Members:  1-Open Energy Solutions, Inc. (Retail Electric Service Providers/Suppliers)  2- Gas Natural Servicios, S.A. de C.V. (Retail Gas Market Interests) | **2** | |
|  |  |  | |
|  | Member Resignations:  1-Southern Company Services (Retail Electric Service Providers/Suppliers)  2-Baltimore Gas and Electric (Retail Electric Utilities)  3-ABB Ventyx (Retail Electric Service Providers/Suppliers)  4-Just Energy (Retail Electric Service Providers/Suppliers)  5-Ernst & Young LLC (Retail Electric Service Providers/Suppliers) | 5 | |
|  |  |  | |
| **TOTAL** | **New Members:** | **2** | |
|  | **Member Resignations:** | **5** | |
|  |  | |  | |



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **2014** | **2015** | **2016** | **2017** |
| Retail Electric End Users/Public Agencies | 15 | 16 | 16 | 16 |
| Retail Gas Market Interests Segment | 13 | 11 | 9 | 10 |
| Retail Electric Utilities | 7 | 7 | 8\* | 7 |
| Retail Electric Service Providers/Suppliers | 8 | 11 | 10 | 7 |
| **Total** | **43** | **45** | **43** | **40** |

\* *Increase in the Retail Electric Utilities Segment is due to reclassification of Duke Energy Corporation from the RMQ, Retail Gas Market Interests Segment*



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2014** | | **2015** | | **2016** | | **2017** | |
|  | Resigning | New | Resigning | New | Resigning | New | Resigning | New |
| Retail Electric End Users/Public Agencies | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| Retail Gas Market Interests Segment | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| Retail Electric Utilities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Retail Electric Service Providers/Suppliers | 1 | 1 | 1 | 4 | 2 | 1 | 4 | 1 |
| **Total** | **3** | **3** | **2** | **6** | **3** | **1** | **5** | **2** |

North American Energy Standards Board Membership List

As of October 31, 2017

**RMQ Membership Roster – Sorted Alpha by Organization Name**

|  |  | **Organization** | **Seg[[13]](#footnote-13)** | **Contact** |
| --- | --- | --- | --- | --- |
| Retail Markets Quadrant (RMQ) Members: | | |  |  |
| 1 |  | Ameren Services Company | u | Patrick Eynon |
| 2 |  | American Public Gas Association (APGA) | g | Alonzo Weaver |
| 3 |  | Arizona Corporation Commission | e | Robert G. Gray |
| 4 |  | Big Data Energy Services | s | J. Cade Burks, Jennifer Teel |
| 5 |  | California Energy Commission | e | Melissa Jones |
| 6 |  | California Public Utilities Commission | e | Marzia Zafar |
| 7 |  | CenterPoint Energy Houston Electric, LLC | u | John Hudson |
| 8 |  | City of Houston | e | James P. Cargas |
| 9 |  | Comverge, Inc. | s | Wendell Miyaji |
| 10 |  | Dominion Energy | u | Brandon Stites |
| 11 |  | Duke Energy Corporation | u | Dan Jones, Stuart Laval |
| 12 |  | Electric Reliability Council of Texas, Inc. (ERCOT) | e | Susan Anthony |
| 13 |  | Gas Natural Servicios, S.A. de C.V. | g | Alberto Alberto Alfaro |
| 14 |  | Green Button Alliance | s | Barry Haaser |
| 15 |  | Intelometry, Inc. | s | Raymond W. Anderson |
| 16 |  | ISO New England, Inc. | e | Doug Smith |
| 17 |  | Latitude Technologies LLC | g | Leigh Spangler |
| 18 |  | Maryland Public Service Commission | e | Dan Hurley |
| 19 |  | Minnesota Public Utilities Commission | e | Robert Harding |
| 20 |  | National Association of Regulatory Utility Commissioners | e | Sam Watson |
| 21 |  | New Jersey Board of Public Utilities | e | Cynthia Covie, Lauren Mattox |
| 22 |  | Oncor Electric Delivery Company LLC | u | Debbie McKeever, Chris Rowley, Debra Anderson, Mark Carpenter |
| 23 |  | Open Access Technology International, Inc. | s | Michelle Coon |
| 24 |  | Open Energy Solutions, Inc. | s | Larry Lackey |
| 25 |  | Pennsylvania Office Of Consumer Advocate | e | Tanya J. McCloskey |
| 26 |  | Pennsylvania Office of Consumer Advocate | g | Tanya J. McCloskey |
| 27 |  | Pennsylvania Public Utility Commission | e | Lee Yalcin, Jeff McCracken |
| 28 |  | Philadelphia Gas Works | g | Eloise N Young |
| 29 |  | Public Utilities Commission of Ohio | e | Amanda Stallings |
| 30 |  | Public Utility Commission of Texas | e | Therese Harris |
| 31 |  | Southern Company Services, Inc. | u | Lincoln E. Wood |
| 32 |  | SouthStar Energy Services, LLC | g | Michael Braswell, Joseph C. Monroe |
| 33 |  | Sprague Operating Resources LLC | g | Paul Scoff |
| 34 |  | Systrends USA | g | Dave Darnell |
| 35 |  | UGI Utilities, Inc. | g | Angelina Borelli |
| 36 |  | Vermont Public Service Board | e | Mary Jo Krolewski |
| 37 |  | WEC Energy Group | g | Tom Aridas, Ken Thiry |
| 38 |  | Wisconsin Public Service Corporation | u | Dennis Derricks, Ken Thiry |
| 39 |  | Xtensible Solutions LLC | s | Shawn Hu |
| 40 |  | ZigBee Alliance | e | Tobin Richardson |

North American Energy Standards Board Membership List

As of October 31, 2017

**RMQ Membership Roster – Sorted by Segment**

|  |  | **Organization** | **Seg[[14]](#footnote-14)** | **Contact** |
| --- | --- | --- | --- | --- |
| Retail Markets Quadrant (RMQ) Members: | | |  |  |
| 1 |  | Arizona Corporation Commission | e | Robert G. Gray |
| 2 |  | California Energy Commission | e | Melissa Jones |
| 3 |  | California Public Utilities Commission | e | Marzia Zafar |
| 4 |  | City of Houston | e | James P. Cargas |
| 5 |  | Electric Reliability Council of Texas, Inc. (ERCOT) | e | Susan Anthony |
| 6 |  | ISO New England, Inc. | e | Doug Smith |
| 7 |  | Maryland Public Service Commission | e | Dan Hurley |
| 8 |  | Minnesota Public Utilities Commission | e | Robert Harding |
| 9 |  | National Association of Regulatory Utility Commissioners | e | Sam Watson |
| 10 |  | New Jersey Board of Public Utilities | e | Cynthia Covie, Lauren Mattox |
| 11 |  | Pennsylvania Office Of Consumer Advocate | e | Tanya J. McCloskey |
| 12 |  | Pennsylvania Public Utility Commission | e | Lee Yalcin, Jeff McCracken |
| 13 |  | Public Utilities Commission of Ohio | e | Amanda Stallings |
| 14 |  | Public Utility Commission of Texas | e | Therese Harris |
| 15 |  | Vermont Public Service Board | e | Mary Jo Krolewski |
| 16 |  | ZigBee Alliance | e | Tobin Richardson |
| 1 |  | American Public Gas Association (APGA) | g | Alonzo Weaver |
| 2 |  | Gas Natural Servicios, S.A. de C.V. | g | Alberto Alberto Alfaro |
| 3 |  | Latitude Technologies LLC | g | Leigh Spangler |
| 4 |  | Pennsylvania Office of Consumer Advocate | g | Tanya J. McCloskey |
| 5 |  | Philadelphia Gas Works | g | Eloise N Young |
| 6 |  | SouthStar Energy Services, LLC | g | Michael Braswell, Joseph C. Monroe |
| 7 |  | Sprague Operating Resources LLC | g | Paul Scoff |
| 8 |  | Systrends USA | g | Dave Darnell |
| 9 |  | UGI Utilities, Inc. | g | Angelina Borelli |
| 10 |  | WEC Energy Group | g | Tom Aridas, Ken Thiry |
| 1 |  | Big Data Energy Services | s | J. Cade Burks, Jennifer Teel |
| 2 |  | Comverge, Inc. | s | Wendell Miyaji |
| 3 |  | Green Button Alliance | s | Barry Haaser |
| 4 |  | Intelometry, Inc. | s | Raymond W. Anderson |
| 5 |  | Open Access Technology International, Inc. | s | Michelle Coon |
| 6 |  | Open Energy Solutions, Inc. | s | Larry Lackey |
| 7 |  | Xtensible Solutions LLC | s | Shawn Hu |
| 1 |  | Ameren Services Company | u | Patrick Eynon |
| 2 |  | CenterPoint Energy Houston Electric, LLC | u | John Hudson |
| 3 |  | Dominion Energy | u | Brandon Stites |
| 4 |  | Duke Energy Corporation | u | Dan Jones, Stuart Laval |
| 5 |  | Oncor Electric Delivery Company LLC | u | Debbie McKeever, Chris Rowley, Debra Anderson, Mark Carpenter |
| 6 |  | Southern Company Services, Inc. | u | Lincoln E. Wood |
| 7 |  | Wisconsin Public Service Corporation | u | Dennis Derricks, Ken Thiry |

1. The NERC Inverter-Based Resource Performance Task Force page can be accessed at the following link: <http://www.nerc.com/comm/PC/Pages/Inverter-Based-Resource-Performance-Task-Force.aspx> [↑](#footnote-ref-1)
2. Wood Mackenzie, Limited/SEIA US, Solar Market Insight Report 2016 Year in Review [↑](#footnote-ref-2)
3. California Senate Bill No. 1078 available at the following link: <http://www.energy.ca.gov/portfolio/documents/documents/SB1078.PDF> and California Senate Bill No. 107 available at the following link: <http://www.energy.ca.gov/portfolio/documents/documents/sb_107_bill_20060926_chaptered.pdf> [↑](#footnote-ref-3)
4. California Senate Bill No. 350 available at the following link: <http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350> [↑](#footnote-ref-4)
5. U.S. Energy Information Administration: <https://www.eia.gov/todayinenergy/detail.php?id=29492> [↑](#footnote-ref-5)
6. Wood Mackenzie, Limited/SEIA US, Solar Market Insight Report 2017 Q2 [↑](#footnote-ref-6)
7. FERC Order No. 2006 is available on the FERC website at the following link: <https://www.ferc.gov/EventCalendar/Files/20050512110357-order2006.pdf> [↑](#footnote-ref-7)
8. FERC Order No. 792 is available on the FERC website at the following link: <https://www.ferc.gov/whats-new/comm-meet/2013/112113/E-1.pdf> [↑](#footnote-ref-8)
9. FERC Order No. 827 is available on the FERC website at the following link: <https://www.ferc.gov/whats-new/comm-meet/2016/061616/E-1.pdf> [↑](#footnote-ref-9)
10. FERC Order No. 828 is available on the FERC website at the following link: <https://www.ferc.gov/whats-new/comm-meet/2016/072116/E-11.pdf> [↑](#footnote-ref-10)
11. SEIA’s *Hosting Capacity: Using Increased Transparency of Grid Constraints to Accelerate Interconnection Processes* is available at the following link: <https://www.seia.org/sites/default/files/2017-09/SEIA-GridMod-Series-3_2017-Sep-FINAL.pdf> [↑](#footnote-ref-11)
12. *Id.* [↑](#footnote-ref-12)
13. The segment abbreviations are: **RMQ**: u – retail electric utilities, g – retail gas market interests, e – retail electric end users/public agencies, s – retail electric service providers/suppliers. **WEQ**: m – marketer/broker, d – distribution, i – independent grid operators/planners, t – transmission owner, e – end user, g – generator, ts – technology/services. **WGQ**: s – services, pl – pipeline, l – LDC, pr – producer, e – end user. [↑](#footnote-ref-13)
14. The segment abbreviations are: **RMQ**: u – retail electric utilities, g – retail gas market interests, e – retail electric end users/public agencies, s – retail electric service providers/suppliers. **WEQ**: m – marketer/broker, d – distribution, i – independent grid operators/planners, t – transmission owner, e – end user, g – generator, ts – technology/services. **WGQ**: s – services, pl – pipeline, l – LDC, pr – producer, e – end user. [↑](#footnote-ref-14)