NIST SMART GRID ADVISORY COMMITTEE (SGAC)

MINUTES OF APRIL 24-25, 2018, MEETING

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

GAITHERSBURG, MARYLAND

ATTENDANCE

NIST Smart Grid Advisory Committee Members
Centolella, Paul (Chair)
Cosgriff, Kevin
Fine, James
Gracio, Deborah K.
Grijalva, Santiago
Handley, Jason P.
Holland, Michael J.
Kiesling, Lynne
Lee, Audrey
McDonald, John D.
Sanders, Heather

NIST Staff
Anand, Dhananjay (DJ)
Bartock, Michael
Bilil, Hasnae
Boehm, Jason
Boynton, Paul
Di Menza, Konstantina
FitzPatrick, Jerry
Gopstein, Avi
Greer, Chris
Harary, Howard
Hastings, Nelson
Hefner, Allen
Holmberg, David
Kandaswamy, Anand
Lee, Kang
Marron, Jeff
Nguyen, Cuong
O'Fallon, Cheyney M.
Rhee, Sokwoo
Song, Eugene
Wollman, David

Others
Bannan, Christine, Electronic Privacy Information Center (EPIC)
Byrnett, Danielle, National Association of Regulatory Utility Commissioners (NARUC)
Villarreal, Chris, Plugged in Strategies
Wedin, Randy, Wedin Communications

Welcome and Introductions – *Dr. Howard Harary, Director, Engineering Laboratory and Dr. Chris Greer, Director, Smart Grid and Cyber-Physical Systems Program Office*

Dr. Greer called the meeting to order at 9:00 a.m. He welcomed the committee members, thanked them for their service, and reviewed safety details.

Dr. Harary also welcomed and thanked the committee.

Comments from the Chair – *Mr. Paul Centolella, Chair, NIST Smart Grid Advisory Committee*

Mr. Centolella asked each member and attendee to introduce themselves. He noted that this is an important committee and is also an important time for NIST and the electric power industry. We are seeing many changes in technology, business models, and regulations as states and utilities proceed with grid modernization. We may be approaching a number of tipping points.

Mr. Centolella raised two issues that he hoped would be included in committee discussions:

- Lots of distributed computing power is not being used.
- Resilience is an important issue, and it affects various regions differently.

He noted that we have a good agenda, and he is looking forward to lots of discussion and interaction.

Smart Grid and Cyber-Physical Systems Program Overview – *Dr. Chris Greer, Director, Smart Grid and Cyber-Physical Systems Program Office*

Presentation Summary – Dr. Greer presented an overview that provided context on what the committee did at its last meeting and what it hopes to do at this meeting. Dr. Greer reviewed some of the highlights of the committee's last meeting (August 2017). At that meeting, the committee had a robust conversation about how the smart grid sector is changing, and the committee decided to get back together sooner than a full year. After this review of the 2017 meeting, Dr. Greer outlined the agenda for the coming two days. The agenda is constructed to allow the committee to measure NIST's progress in the areas outlined at the 2017 meeting.

During the discussion, a Committee member noted that the EISA mandate lists "efficiency" as a goal for the electricity grid. He asked if there is a well-established definition of "efficiency." Dr. Greer replied that NIST is looking to the committee for its thoughts on this question. Congress did not provide a definition of efficiency in EISA, but Congress was thinking broadly about the term and listed other related goals such as economic growth, national security, reliability, and quality of life.

Another Committee member inquired about the timeline and milestones. What is the committee expected to accomplish by the end of its meeting tomorrow? And what are the overall timeline and milestones for the completion of the Framework and the EISA assignment?

Dr. Greer replied that NIST is seeking the committee's guidance on research strategy ("Do we have the right topics in our research portfolio?") and on the Framework. Dr. Greer announced that the timeline calls for a full draft version of Framework 4.0 to be available for public comment six months from now, with a final version to be published a year from now. The Framework is intended for the entire grid community, including vendors, utilities, regulators, and academics.

NIST FY2019 Budget Request – *Dr. Jason Boehm, Director, Program Coordination Office*

Dr. Boehm, Director of the NIST Program Coordination Office, briefed the committee on the NIST budget process. He discussed the current status of the FY2018, FY2019, and FY2020 budgets.

The FY2018 budget is over $1 billion and shows a significant increase from FY2017. The President's proposed budget for FY2019 shows very significant reductions, subject to action by Congress.

For more details, see Dr. Boehm's presentation.

During the discussion, Committee members asked how the advisory committee can frame the smart grid issue to resonate with the Administration. Dr. Boehm replied that smart grid is important for day-to-day commerce and for national security. Smart grid has been impacted by new technologies—including artificial intelligence, cybersecurity, new sensors, and the Internet of Things. Because funding for research extends over a number of years, stability of funding is important, and NIST needs to be able to plan accordingly.

A Committee member asked how NIST measures research productivity and impact. Dr. Boehm pointed to citation analysis, number of downloads of documents, adoption of use of NIST documents and frameworks, and use of NIST services. A webpage devoted to "Industry Impacts" can be found on the NIST website, and Smart Grid (Framing the Future of the Electric Grid) is among the approximately 50 impact areas discussed.

Another Committee member asked what avenues does NIST use for keeping Congress informed. Dr. Boehm replied that NIST provides briefings and invites Congressional staff for tours. NIST works with the Congressional committees involved with NIST's appropriations and authorizations.

Smart Grid Program Update and Research Portfolio Presentation – *Mr. Avi Gopstein, Associate Director, Smart Grid & Cyber-Physical Systems and Mr. Paul Boynton, Testbed Manager, Smart Grid and Cyber-Physical Systems Program Office*

Presentation Summary – Mr. Gopstein gave a presentation focusing on the common themes within NIST's smart grid research portfolio. (Research is one of the three main areas in the Smart Grid Program; the other two areas are coordination and experimental facilities.)

Mr. Gopstein spoke about recent progress and outcomes related to each of the four research themes—monitoring and control; cybersecurity; communications and timing; and operations and economics. Mr. Gopstein concluded by emphasizing three key points about the importance of NIST's research portfolio:

- Current research exploring complex issues reinforces the technical leadership and expertise of the NIST Smart Grid Program.
- Completion of the testbed and the beginning of research within the testbed are already allowing for a more integrated approach to research across many skillsets.
- The testbed is critical to the program's overall success.

Mr. Boynton provided an overview of the testbed. He reiterated the import role of collaboration across four of the five NIST Operating Units. The testbed, located in the basement of Building 220, comprises a smart grid testbed and a CPS testbed. It is designed and built to offer both flexibility and modularity. Mr. Boynton reviewed the lab's physical layout; power and communications networks; equipment; timing infrastructure; safety program; and construction timeline.

For more details, see Mr. Gopstein and Mr. Boynton's presentation.

During the discussion, a Committee member asked about the scale of power for this system. Dr. Hefner and Mr. Boynton replied that the power level is residential level, and there is also the capability of a power level (100 kW, 240/480 V) used by light industry or heavy commercial. The microgrid equipment can emulate full residential scale, light commercial scale, and campus scale (just the control aspects for the campus scale, so grid-facing will look like a campus).

Another Committee member asked what is being emulated. Dr. Hefner said that we will be looking at the point of interconnection to the microgrid and emulating grid-side when it connects to microgrid. Later we will also be looking at a distribution management system (DMS) and the control side of things.

Ethics Briefing – *Will Jacobi, Senior Attorney, Ethics Law and Programs Division, Office of the General Counsel, Department of Commerce*

Mr. Jacobi provided an ethics briefing by phone.

Research Presentation: Cybersecurity in Distribution System Communications – *Michael Bartock, Information Technology Specialist, Computer Security Division*

Presentation Summary – Mr. Bartock gave a presentation on a research project, "Cybersecurity in Distribution System Communications." Because securing grid-edge devices is critical to scaling control systems, this program outlines a strategy for decomposing system-level guidelines (found in NISTIR 7628) to device specifications. Mr. Bartock described two separate

projects as part of the overall cybersecurity effort: profiling performance of grid-edge devices and securing publish-subscribe communications. For the second project, NIST worked to include authentication and encryption in a Smart Electric Power Alliance (SEPA)-provided Open Field Message Bus (OpenFMB) implementation. He briefly described the goals, methods, preliminary results/outcomes, and next steps for the two projects.

For more details, see Mr. Bartock's presentation.

During the discussion, a Committee member noted that one of the major concerns about adding cybersecurity to grid-edge devices is the latency that is added to the communication of data and control signals. The impacts on price and performance are huge from a manufacturer's point of view.

Research Presentation: Quantifying Distribution Uncertainty – *Dr. Dhananjay Anand, Researcher, Smart Grid and Cyber-Physical Systems Program Office*

Presentation Summary – Dr. Anand discussed a project to validate approaches to mitigating the impact of stochasticity in future power systems. The project makes use of NIST's campus distribution circuit, looking in particular at the case of voltage regulation with high penetration of photovoltaics. He discussed the equipment and facilities available at NIST for this project. He discussed both the customer-facing and the grid-facing aspects of the problem. For the customer-facing problem, he outlined a control strategy involving model-free optimization. For the utility-facing issue, he outlined an approach for estimating flexibility margins for heterogenous Distributed Energy Resources (DERs), and he showed how different types of DERs have different flexibility domains.

For more information, see Dr. Anand's presentation.

During the discussion, a Committee member pointed out that one of the challenges of working with model-less controls is that the grid operates normally until there is a low-probability perturbation.

A Committee member pointed out that the issue of uncertainty is very important, and he wondered how regulators can deal with uncertainty. Another Committee member pointed out that it's important to look at uncertainty from a holistic point of view, not just device by device. Another Committee member thought the work was valuable because the equipment on NIST's campus mirrored that which is used at commercial and light-industrial customers in the field.

Research Presentation: NIST Role and Lessons Learned in IEC 61850 Plugfest – *Mr. Cuong Nguyen, Lead, Smart Grid Testing and Certification*

Presentation Summary – Mr. Nguyen gave a presentation about NIST's participation at the IEC 61850 interoperability plugfest held in New Orleans, Louisiana, last fall. The purpose of the plugfest was to identify issues related to the interoperation of IEC 61850-compliant substation automation equipment from different vendors.

This event provided an opportunity for NIST to be involved with industry in a setting involving real testing—an additional perspective to NIST's involvement with developing a framework for testing & certification. The results and lessons learned also inform NIST's ongoing research program.

Mr. Nguyen's presentation reviewed NIST motivations, the major project components, the involvement of multiple NIST operating units in the project, the test equipment provided by NIST, and the timing test observations.

For more information, see Mr. Nguyen's presentation.

During the discussion, a Committee member spoke about the importance of user groups and the need for more plugfests. He suggested that every utility needs to put specific plugfest-related questions into RFPs (requests for proposal) for vendors. Questions should include: In how many plugfests have you participated? Who else was there?

A Committee member said that, in China and Europe, IEC 61850 is a much-used standard for substations. In the U.S., however, adoption has been slower.

Another Committee member noted that Europe uses a turn-key approach to building substations, so one vendor can supply all the devices and ensure interoperability. In the U.S., on the other hand, we have adopted an approach where devices from a variety of vendors are selected and must then be integrated.

A Committee member said that many more utilities in North America are now using IEC 61850. Wide adoption is inevitable, but it will be a slower process.

A Committee member asked about the pace at which we can replace existing substations with IEC 61850. Another Committee member noted that we don't have to "replace" substations, but rather we can "enhance" substations with legacy-IEC 61850 hybrids. It is important to maintain backward compatibility.

Another Committee member pointed out that one of the challenges with the legacy-IEC 61850 hybrid approach is how to train the workforce to deal with this conversion. Another Committee member pointed out that it is harder for the U.S. to deal with conversion because we have already moved from electromechanical controls to digital controls. We need to be able to integrate both within and outside the substation.

Committee Discussion – Research Objectives

During the afternoon working session on April 24, Committee members discussed the topic of research objectives, as well as other topics.

Committee members highlighted the following two fundamental engineering problems driving NIST research:

- Understanding the relationship between different research areas (e.g., measurements,

power electronics, controls, timing, markets) and how they interact, especially in systems with lots of distributed renewables and smart devices; and
- Understanding the advantages, disadvantages, and differences between centralized/hierarchical and decentralized/distributed systems as they apply to the smart grid. Related to this is the growing capacity of computing power in edge devices.

The committee members had several questions about the capabilities of the testbed. For example, they wanted to know about the testbed's power level, the types of emulation possible, the power electronics equipment, and the variety of smart inverters.

Areas that Committee members highlighted as important for lab-based research attention included the following:
- DERs, smart inverters, and power electronics;
- combinations of various sensors to understand the state of the system without deploying sensors everywhere at very high cost;
- microgrids—especially studying the point of common connection, as well as issues related to islanding, coordination, cost, and integration with the rest of the grid;
- various roles of storage in the grid;
- timing latency of data and control signals resulting from cybersecurity of edge devices;
- relationship of price and performance as it applies to adding cybersecurity in grid edge devices and at various layers of the overall grid;
- unintended points of cyber vulnerability induced by multiple systems/devices interacting together
- greater use of analytics to study smart sensors and to study the introduction of adversarial cyber threats into the system;
- systems-level or holistic approaches related to power systems, cybersecurity, and uncertainty;
- interactions of the electric system with other systems (e.g., water, smart transport, smart city, IoT, CPS) as it relates to interoperability and cybersecurity.

In the discussion of economic modeling and broader economic questions, Committee members highlighted the following areas as important:
- metrics for quantifying grid efficiency and resilience;
- value of interoperability;
- transactive energy;
- behavioral economics;
- growing number of asset owners;
- role of humans and community/social networks in interoperability;
- relationship between price and cost;
- modeling that relates to the shift from a cost-recovery focus to a value focus;
- transparency of data to the market and the role of aggregators;
- use of interoperability as a lens for studying emerging business models and market designs;
- "revenue-stacking," "multiple market streams," and "value-stacking" as related to DER and as concepts used by regulators; and
- market imperfections and aligning the incentives of users with the incentives of the system.

In the discussion of testing & certification, especially as it relates to interoperability, the Committee members highlighted the following topics:

- the value of interoperability plugfests to both vendors and utilities. One member suggested that plugfest participation should become one criterion in the request for proposal (RFP) process between utilities and vendors.
- the large gap between the number of smart grid standards and the number of testing & certification programs available for those particular standards. Committee members felt that it was important to focus on the standards that are most important for smart grid. It is not feasible to expect that every standard have a corresponding testing & certification program.

Committee members noted that there is a large discrepancy between the expansive scope of potential smart grid research topics and NIST's limited budget. They emphasized that it is, therefore, essential that NIST focus on high-impact areas for which it is uniquely qualified. In plainer language, the Committee said that "NIST can't boil the ocean," so it should focus on areas that are "NISTy," focused on measurement science, standards, and technology.

The Committee noted that NIST's research budget is small compared to the research budgets of other organizations and asked, what are the points of influence at which NIST's research is aiming? For example, dealing with the issue of technical uncertainty might unlock the ability of bigger forces to make progress.

Two different strategies for research prioritization were highlighted. In one strategy, NIST would optimize its research portfolio for the technical competence it already has and for the purpose of serving as a resource on which people can rely with respect to standards and measurement. In a second strategy, NIST would optimize its research portfolio so that it could have the maximum impact and leverage on the most important of the larger research efforts being tackled by other organizations.

Other useful questions that can help NIST in setting research priorities are the following:

- Because there are so many interfaces for interoperability in the smart grid (between domains, devices, layers, actors), how can you crystallize your priorities to focus on the key interfaces?
- What is the confusion in the sector that NIST can help clarify?

Stakeholder Engagement – *Dr. David Wollman, Deputy Director, Smart Grid and Cyber-Physical Systems Program Office*

Presentation Summary – Dr. Wollman gave a presentation on stakeholder engagement. He discussed the following aspects of stakeholder engagement: motivations for smart grid stakeholders; engagement with governmental stakeholders, standards development organizations, and other categories of stakeholders; types of stakeholder engagement; and purposes of stakeholder engagement.

Dr. Wollman pointed out that in the early years of NIST's smart grid involvement, there was

more urgency for stakeholders to be engaged, and there were more financial resources for facilitating engagement. In today's environment, how can NIST leverage a broader community to achieve objectives?

For more information, see Dr. Wollman's presentation.

During the discussion, a Committee member reported that his conversations with others in the industry suggest that there is a growing gap (a gap formerly filled by the Smart Grid Interoperability Panel or SGIP) that needs to be filled. The Committee discussed how the best work done by SGIP (and the most engagement of stakeholders) was when it was free for organizations to participate. That SGIP model, however, isn't sustainable in the current environment.

A Committee member said that we today have online tools that might help. Dr. Greer said that NIST has had some experience using virtual groups (and online tools) to develop frameworks (e.g., for the CPS Framework and the IES-City Framework). This way of working is most effective when the desired outcome is very well-defined and limited, and when you are working with a very focused timeline.

A Committee member suggested the importance of having engagement with storage associations and automobile/transport groups.

A Committee member pointed out that new players (e.g., electric vehicle manufacturers) might now be interested.

A Committee member asked if we should revisit Domain Expert Working Groups (DEWGs).

A Committee member said that the U.S. industry needs leadership. It's as if the sector is remodeling without an architect or blueprint. NIST could contribute to that function (i.e., be the architect with a blueprint) for the U.S., because, in the Committee member's view, nobody else has embraced that function.

Dr. Wollman pointed out that NIST is leveraging the ongoing work, including work on architectural concepts, of DoE's Grid Modernization Laboratory Consortium (GMLC).

A Committee member said that there must be a value proposition before a stakeholder will get involved. NIST should facilitate the interface between architecture and interoperability.

Day 1 Wrap Up – *Dr. Chris Greer, Director, Smart Grid and Cyber-Physical Systems Program Office*

Looking toward tomorrow's discussion, Dr. Greer asked members to give some thought to the value proposition. We want to express it in the Framework.

He asked the Committee, when thinking about the themes for the Framework (e.g., cybersecurity, operations, economics), to not only think about what has changed but also how the

stakeholder list has changed. Who are the new stakeholders? Examples of new stakeholders are in areas such as storage and aggregators, and others who are pursuing new business models and opportunities.

End of Day One

The committee adjourned for the day at 5:00 p.m.

April 25, 2018

Call to Order – *Dr. Chris Greer, Director, Smart Grid and Cyber-Physical Systems Program Office*

Dr. Greer called the meeting to order at 8:45 a.m.

Interoperability Framework Themes and Reference Cases – *Mr. Avi Gopstein, Associate Director, Smart Grid & Cyber-Physical Systems*

Presentation Summary - Mr. Gopstein gave a presentation on the current status of Framework 4.0. Based on discussions with stakeholders in recent months and the discussion held at the August 2017 Advisory Committee meeting, NIST has identified the following four observations shaping Framework 4.0:

1. Grid architectures are changing (driven by technology and policy).
2. No single architecture is "correct."
3. NIST scientists and engineers are not architects.
4. Changes will impact four thematic areas—cybersecurity, economics, operations, and testing & certification.

Adapting the architectures being developed by others, NIST has focused on four scenarios, or reference cases, that will help inform the exploration of information exchange for the four themes in Framework 4.0.

The four scenarios or reference cases are the following:

- legacy utility communications
- high-DER penetration communications
- microgrid architecture communications
- hybrid structure communications

These four examples are not "architectures," but rather they are diagrams that represent four different configurations of actors, devices, and domains. They are used in Framework 4.0 to explore, analyze, and flesh out the following four Framework themes:

- cybersecurity
- economics
- operations
- testing & certification

For more information, see Mr. Gopstein's presentation.

During the discussion, Committee members offered a number of suggestions for refinements to the conceptual model and the four example scenarios, including the following:

- add certain interactions among specific domains, actors, and devices;
- highlight the different roles and functions of storage, including the possibility of adding a "storage" domain;
- change the title of the "advanced bulk grid architecture communications" scenario to "advanced hybrid architecture communications" in order to preclude misunderstandings;
- consider whether to emphasize functions, ownership, or location in the scenarios;
- consider whether to emphasize "coordination/control" before considering "communication" in the scenarios;
- change the word "generation" to "resources";
- consider how to display the range of options, functions, and locations of microgrids, including their management and ownership;
- consider architectures developed by other organizations beyond PNNL;
- consider and integrate the work of the Grid Modernization Laboratory Consortium (GMLC);
- make sure that images and icons in the conceptual model are generic (not identifiable with any particular organization);
- make sure that the word "substation" is displayed (and not just implied); and
- consider the need for frameworks for each layer in a layered architecture and the need for layered analysis.

Framework Theme: Cybersecurity – *Jeff Marron, Information Technology Specialist – Security, Information Technology Laboratory*

Presentation Summary – Mr. Marron discussed ways in which the Cybersecurity Framework (CSF) can be used to analyze cybersecurity risks in the smart grid, such as through the development of CSF profiles for the four Framework scenarios. He also said that increased DER assets will raise some new cybersecurity issues and risks.

For more information, see Mr. Marron's presentation.

During the discussion, Committee members raised the following issues requiring greater attention and understanding:

- the relationship between physical security and cybersecurity;
- the interactions of multi-stakeholders;
- the impact of cryptography and cybersecurity measures on latency;
- the importance of considering how actors change in the various scenarios;
- the importance of "security by design." (How do we bake security into standards?)
- the importance of analytics, and the need to consider it up front;
- the challenge of dealing with legacy systems, including new risks introduced by connections to IoT devices and networks;
- the importance of considering business aspects of cybersecurity so that cyber risk doesn't become "the tail that wags the electric sector dog";
- the possibility of "mosaic effects" with cyber and information. (In a "mosaic effect," a

piece of information may not be listed as "confidential," but when you make it available, it can be linked with other "non-confidential" info to come up with information that should be considered "confidential"); and
- the risks introduced as a result of the increased load coordinated by similar devices in a large number of premises (e.g., smart thermostats). (There is a danger of an "energy flash mob" creating problems by curtailing a large load all at once through social media.)

Framework Theme: Operations – *Mr. Avi Gopstein, Associate Director, Smart Grid & Cyber-Physical Systems*

Presentation Summary – Mr. Gopstein discussed operational issues that are being affected by the increased movement of sensing, actuation, and control towards the grid edge. Issues include the benefits and risks of shared infrastructure, increased need for predictability, and diversified ownership.

For more information, see Mr. Gopstein's presentation.

During the discussion, Committee members raised the following issues:
- increased need for predictability—both physical and communications
- in the aggregator model, the utility talks to aggregator (and not to the customers)
- reliability is being pushed to the edge (and the edge is not necessarily owned or operated by the utility). Nonetheless, the utility still has responsibility according to NERC; and
- concepts about the interface between transmission and distribution need to be refined (maybe not just one definition). Sometimes now there is transmission direct to the edge.

Framework Theme: Economics – *Dr. Cheyney O'Fallon, Economist, Applied Economics Office*

Presentation Summary – Dr. O'Fallon discussed five key aspects of the interoperability value proposition:
1. Interoperability and specificity
2. Interoperability and customer empowerment
    a. Better information for customers
    b. Ease integration of new equipment into existing markets
    c. Informational improvements may contribute to greater customer agency
3. Complexity and cost structures
    a. Transaction costs are rising in salience
4. Testing and certification
5. Trust and assurance
    a. Uncertainty impacts investment decisions

He also discussed a number of known gaps that merit further research and analysis.

For more information, see Dr. O'Fallon's presentation.

During the discussion, Committee members raised the following issues:
- different stakeholders will have different value propositions for interoperability;

- regulators are now paying increased attention to the concepts of "revenue-stacking" and "multiple value streams";
- it is important to understand how demand responds to price;
- networks have physical flow and relationships, but they also have economic flow and relationships;
- it is difficult for a vendor to quantify the costs and benefits of interoperability (as compared to no or limited interoperability); and
- should the issue of who owns the devices and systems be a primary consideration in the Framework.

Framework Theme: Testing & Certification – *Dr. Eugene Song, Electronics Engineer, Smart Grid and Cyber-Physical Systems Program Office and Mr. Cuong Nguyen, Lead, Smart Grid Testing and Certification*

Presentation Summary – Dr. Song and Mr. Nguyen said that fewer than 25% of standards regarding smart communication protocols have complete or even initial work on testing & certification. They discussed how an interoperability profile (i.e., a well-defined subset of the standard) can allow the interoperability gap to be narrowed.

For more information, see Dr. Song and Mr. Nguyen's presentation.

During the discussion, Committee members raised the following issues:

- when creating interoperability profiles, it is important to prioritize the focus on the most important standards;
- there is a range of different types of testing & certification done by different organizations (e.g., utilities, vendors, or third-party);
- private industry, government, NIST, and regulators may each have different roles and perspectives;
- what is the appropriate role of government in testing & certification; and
- standards are important, but they don't ensure interoperability. How much should we focus in this Framework on standards vs. interoperability? We need to use a more generalized approach and not say we need this or that standard.

Workshops and Stakeholder Engagement – *Mr. Avi Gopstein, Associate Director, Smart Grid & Cyber-Physical Systems*

Presentation Summary – The purpose and goal of Framework 4.0 is to reach consensus on a common set of concepts and language for the smart grid sector to use as it continues to evolve and transform. In order to reach this consensus, the feedback of stakeholders will be extremely important. NIST is in the process of planning and scheduling a series of workshops in the coming months that will bring together various stakeholder groups to discuss, improve, and refine draft chapters of Framework 4.0.

The timetable is completion of a draft Framework to be released for public comment in six months, and publication of the final version of Framework 4.0 thereafter.

For more information, see Mr. Gopstein's presentation.

The committee discussed plans for workshops and stakeholder engagement.

Chair Session – *Mr. Paul Centolella, Chair, NIST Smart Grid Advisory Committee*

The committee discussed next steps and established two subcommittees:

- The Long-term Subcommittee (informally known as the Technical Subcommittee) will include John McDonald (chair), Paul Centolella, Kevin Cosgriff, Deborah Gracio, Santiago Grijalva, Jason Handley, Audrey Lee, and Heather Sanders.
- The Short-term Subcommittee (informally known as the Engagement Subcommittee) will include Heather Sanders (chair), Paul Centolella, James Fine, Jason Handley, Michael Holland, Lynne Kiesling, and Audrey Lee.

Public Comments

A representative from the National Association of Regulatory Utility Commissioners (NARUC) stated that she echoes many of the members' comments. NARUC will help with organizing the four regional workshops.

Close

The meeting was adjourned at 3 p.m. on April 25, 2018.