

Meeting Minutes

January 2021

GWAC Members

David Forfia, GWAC Chair

Ron Ambrosio, Independent Energy
Transformation Professional

Tanya Barham, Principal, Community Energy
Labs

Ron Bernstein, President, RBCG, LLC

Andrew Bordine, VP Energy Mkts & Innovation,
Anterix

Ron Cunningham, American Electric Power

Gerald R. Gray, Sr. Program Manager, Electric
Power Research Institute (EPRI)

Lorenzo Kristov, Principal, Electric System
Policy, Structure, Market Design

Stuart McCafferty, President, GridIntellect

Farrokh Rahimi, Senior Vice President, Open
Access Technology International, Inc.

Aaron Snyder, Director of Grid Technology
Consulting, EnerNex

Leonard Tillman, Partner, Balch & Bingham, LLP

GWAC Associates & Emeritus

Kay Aikin, Introspective Systems

Rahul Bahadur, Mgr. of Engineering, VMWare

Mark Knight, Burns & McDonnell

James Mater, QualityLogic, Inc.

Chris Villarreal, Plugged In Strategies

Ken Wacks, Home, Building & Utility Systems

GWAC Members and Assoc. not present

Stephen Knapp, VP Quality Assurance & Energy
Markets, Power Analytics Corporation

Jeff Morris, Energy Horizon Corp.

Mark Paterson, Strategen

GWAC Guests

Fatima Amara

Ward Camp

Toquica Cardenas

Alissa Carpenter

Ron Chebra

Larisa Dobriansky

Christopher Fleck

Michael Hammersley

Rachna Handa

Karan Kalsi

Ronald Kapavik

David Katz

Jaime Kolln

Eric LeCourtois

Carol Manson

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Steffi Muhanji

Seemita Pal

Rob Pratt

Gary Rafelson

GWAC Guests Con't.

Hayden Reeve

Aaron Smallwood

Abhishek Somani

David Toquica Cardenas

Wade Troxell

Mani Vadari

Mathew Wallace

Steve Widergren

David Wollman, NIST

PNNL Support

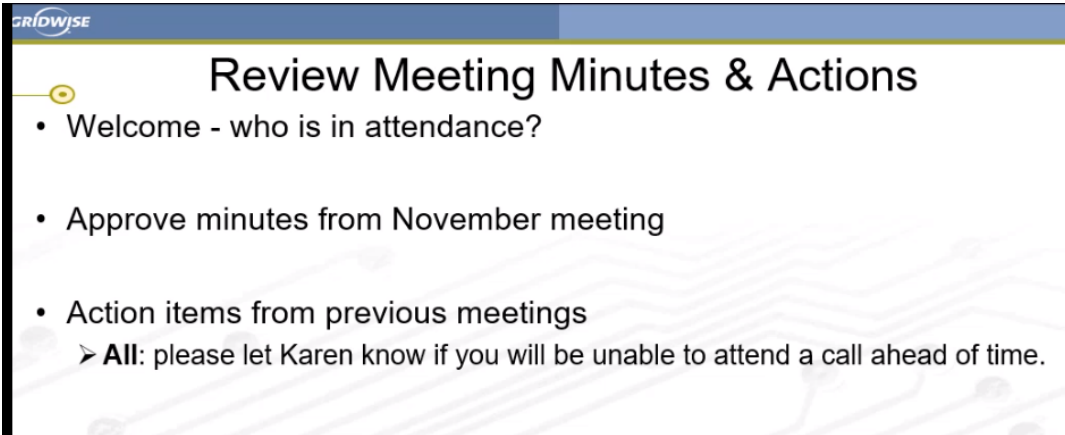
Karen Studarus, PNNL Administrator

Susan McGuire, GWAC Coordinator

Ron Melton, PNNL Administrator Emeritus

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The screenshot shows a presentation slide with the GridWise logo in the top left corner. The title is 'Review Meeting Minutes & Actions'. The slide contains a bulleted list of items to be reviewed during the meeting.

- Welcome - who is in attendance?
- Approve minutes from November meeting
- Action items from previous meetings
 - **All:** please let Karen know if you will be unable to attend a call ahead of time.

GWAC Administration

David Forfia opened the meeting once a quorum had been reached.

Karen Studarus asked if there is a motion to approve the November meeting minutes.

Ken Wacks commented that he had been contacted by a colleague who had said the minutes seemed to advocate for wireless technology. He said his colleague would like to present at a future meeting on wired technology.

David Forfia noted that GWAC had invited CTIA to give a presentation and comments expressed were from that organization.

Andrew Bordine gave a motion to approve the minutes and Ron Bernstein seconded the motion.

Gerald Gray and Farrokh Rahimi abstained from voting because they were not in attendance at the November meeting.

There were no objections and the minutes were approved.

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Conferences and Events

(**Bold** = GWAC speakers, **blue** = complete since last GWAC meeting)

- **AHR Expo 2021, Chicago, IL, cancelled**
- **ASHRAE Virtual Winter Conference, Feb. 9 – 11, 2021**
- **IEEE ISGT 2021, Washington, DC, February 16 – 18, 2021 – now Virtual**
- IEEE PES General Meeting 2021, July 25-29, 2021 Virtual
- Solar Power International (SPI) Sept. 20-23, 2021 New Orleans, LA (SPIE affiliated)
- **TESC2022 – May 2022**

GWAC Related Events

Andrew Bordine noted the NARUC Winter Policy Summit scheduled for early February which will be virtual. He noted that there will be a discussion on broadband which might interest GWAC. He said that Feb. 8 - 11 are the main dates. <https://www.naruc.org/meetings-and-events/naruc-winter-policy-summits/2021-winter-policy-summit/agenda/>

Ron Melton noted that the IEEE ISGT panel sessions will need to be watched in advance and then the Q&A portion will be live during the conference.

Ken Wacks suggested adding the Smart Energy Summit scheduled for Feb. 23, 24 and with three additional dates throughout the year. The meeting will be a total of 5 days from Feb. through October 2021. He also said ParksAssociates.com has the agenda posted.

<http://www.parksassociates.com/events/smart-energy-summit>

Action: Add the Smart Energy Summit (Feb. 23, 24, April 28, Aug. 4, Oct. 27, 2021) to the conference and events list (complete)

David Forfia gave the SEPA meeting link <https://sepapower.org/events/>

Ron Bernstein said the Georgia Bar Association is having an annual information exchange and they asked him to speak on Interoperability and automation for buildings and grid cybersecurity. He will give an hour-long presentation on integrated buildings and automation. They are looking at the legal aspects of it including intellectual property and how to manage processes when breached. Privacy data and even operations of facilities and systems breaches are of interest - hardware, software, procedures, recent

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hacks included. They are looking at corporate level responses. It is scheduled to be the 2nd week in Feb. The discussions will include privacy and security issues.

Hayden Reeve noted that there is a BTO report that he was involved in that Ron Bernstein may find interesting and relevant to the talk. It pertains the cybersecurity landscape for BTO. They worked with the real estate cybersecurity consortium. Ron was interested. Tanya Barham expressed her interest also. Here is the link for it:

<https://www.energy.gov/sites/prod/files/2020/05/f74/bto-pnnl-29813-securing-buildings-cyber-threats-051420.pdf>

He also gave a link to the real-estate cyber consortium (RECC) Their website is pretty much unmaintained now (<http://re-cc.com/>) and the discussion is driven on their LinkedIn group.

Kay Aikin noted that currently in Maine they are having meetings regarding regulatory reform and rate design that may be of interest to GWAC. They are looking at topics including dynamic pricing, working with utilities and stakeholders on rate design and regulation among other things. They are talking with ISO New England on bring LMP points all the way to substations. They are looking at state initiative to building dynamic hosting maps and Interconnection processes for smart sidings of renewable energy systems. Also, dynamic pricing on the distribution grid. Many things are starting to come together, and utilities are involved in a top to bottom remake of regulation and rate design.

Farrokh Rahimi asked about the LMPs from ISO new England - he said they only go down to transmission substations. He asked if they are taking it from there to the distribution substations?

Kay said that is the discussion that they are having right now. It would be a joint jurisdiction between the distribution utilities and the ISOs to do that, but the ISO is on board with exploring it and so are the distribution utilities located in Maine. They are looking at ways to provide flexible pricing to smaller projects.

Kay said that distributed utilities and ISOs are involved. They are looking for ways to provide more flexibility on pricing to smaller solar storage projects down on the distributed grid itself. They have 2 gig watts of interconnection requests right now on a 2-gigawatt peak grid and currently 70% of their substations can't take any more distribution. So, they are spending a lot of time for no effect. So, the state PUCs are looking at ways to building a more dynamic rate structure and ways of incentivizing smart development.

Tanya Barham commented that Oregon is not as advanced as Maine, but they are getting started. She said their PUCs are at the most basic level. She said the meetings are public. Kay said they can talk about it - if Tanya could connect him to the right people, he would be willing to help. She said that while she is not central to the proceeding, she will try to facilitate some networking. They are running it for stakeholder engagement currently. The utilities control the process and discussions right now.

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She is working with the Oregon Solar Energy Association on the regional Northwest Power plan. It has been interesting to see what their model is producing for the next 25 years with the changes in policies around renewable generation, load growth for EVs, general growth and electrification and how that is impacting the surpluses and curtailments. It includes the effect of climate change on temperature, with renewables.

The system is curtailing renewables all the time with a lot of negative pricing. She sees similarities with what Mark Paterson talked about for Australia. A lot of opportunities for our community regarding transactive energy and dynamic pricing to integrate more renewables. This is also an open process. If anyone wants to attend, please let her know and she will get you more information.

David Katz noted that he sent two PDF files to Susie and Karen that may be relative to GWAC. It's an ICF report on the impact of DER and what the Ontario IESO are doing in Transactive Energy.

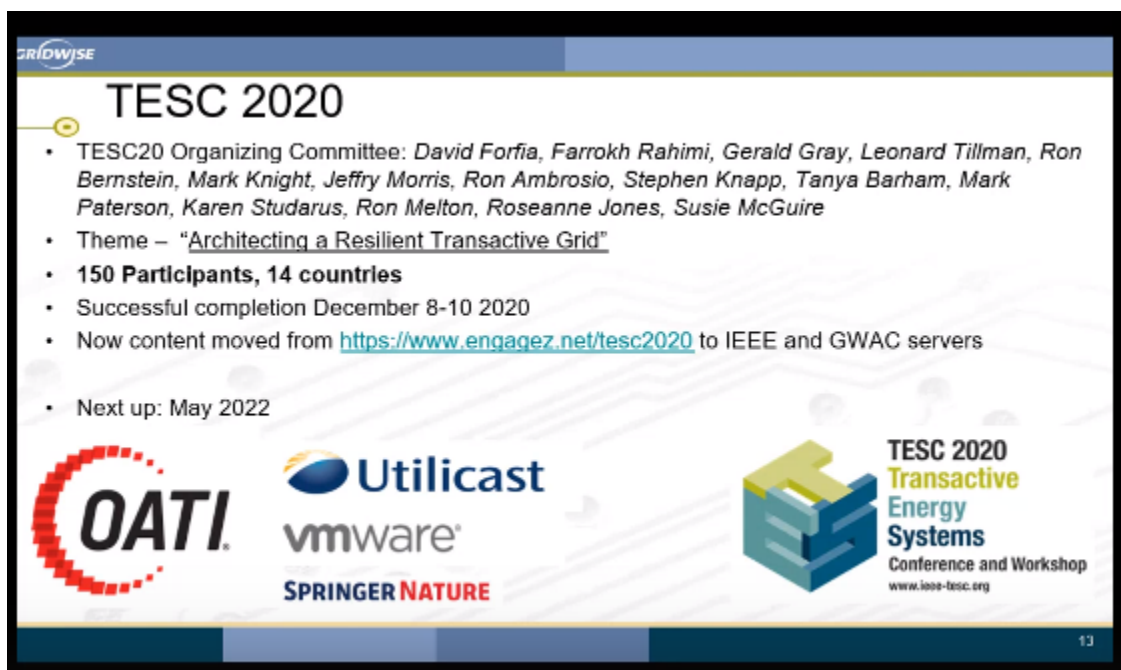
Action: Post the ICF files from David Katz with the January notes

TESC Conference

Karen said the TESC organizing committee has identified May 2022 as the next meeting date.

The TESC 2020 conference material is archived and will be released soon in the IEEE Resource center. Ron Melton said to expect it to take quite some time to get posted there.

Karen thanked the GWAC TESC 2020 Organizing Committee for their contributions to the conference which has was a success.



The slide features the GridWise logo in the top left corner. The main title is "TESC 2020". Below the title is a bulleted list of information about the conference. At the bottom, there are logos for OATI, Utilicast, vmware, and SPRINGER NATURE on the left, and a 3D block logo for TESC 2020 Transactive Energy Systems on the right. The slide number "13" is in the bottom right corner.

TESC 2020

- TESC20 Organizing Committee: *David Forfia, Farrokh Rahimi, Gerald Gray, Leonard Tillman, Ron Bernstein, Mark Knight, Jeffry Morris, Ron Ambrosio, Stephen Knapp, Tanya Barham, Mark Paterson, Karen Studarus, Ron Melton, Roseanne Jones, Susie McGuire*
- Theme – "Architecting a Resilient Transactive Grid"
- **150 Participants, 14 countries**
- Successful completion December 8-10 2020
- Now content moved from <https://www.engagez.net/tesc2020> to IEEE and GWAC servers
- Next up: May 2022

OATI **Utilicast** **vmware** **SPRINGER NATURE**

TESC 2020
Transactive
Energy
Systems
Conference and Workshop
www.ieee-tesc.org

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The Council New Member Nominations Committee will meet later this week to select a new GWAC slate and then present to the GWAC for confirmation.

The TESC 2020 conference material is archived and will be released soon in the IEEE Resource center. Ron Melton said to expect it to take quite some time to get posted there. He said that Roseanne Jones will let us know when it is available.

Karen said that if council members would like a copy of some of the material please let us know because it has been archived. She thanked the sponsors again for their support.

Ron Melton said that Power and Energy Society members may be able to see the materials at no charge. It will be in the IEEE Resource Center. If you are a member log in and see if there is or is not a charge.

Farrokh Rahimi said that one paper did not participate in the live WebEx so it was considered disqualified by IEEE so they will not include them in the Resource center. But the 13 papers will be placed in the Resource Center. He noted that the Resource Center fee is different for IEEE members and non-members.

Steffi Muhanji said she attended the first day and was told that she would have access to the tutorial materials.

Ron Melton said the materials are posted in the IEEE Resource Center. If you attended, you probably contacted Latoya Gourline with IEEE. Contact her to ask how you can get a copy of the slides. Ron M. thought that a copy would be sent to the tutorial attendees.

Karen asked Steffi to let her know if that doesn't work.

David Forfia commented that it was a very engaging conference. All moderators, presenters and authors did a great job and put in a lot of effort. He also thanked Ron B. for his assistance in compiling the MP4s for presentation.

Ron Ambrosio said he might be interested in doing that task in the future for the group.

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Future Grid

GRIDWISE

Electric Industry Visions – Statements of the Future White Paper

- Continues discussions carried over from Grid 3.0 group that took place during last GWAC F2F meeting
- Working Group: Cunningham, Studarus, Ambrosio, Forfia, Melton, Wollman, Bordine, McCafferty, Kristov
- Meeting twice monthly (or more often as needed)
- Status
 - Foundational Session of TESC2020 complete
 - Framework built to compare Future State Visions, 4 compared
 - Now:
 - More Future States Parsed
 - Better Visualizations
 - Mid Year White Paper Targeted

Karen asked Ron Cunningham to speak to the status for the white paper on future grid.

Ron Cunningham noted that content was gathered from the foundational session Q&A. They are invigorating the core team to complete the task and deliver a white paper which is targeted for mid-year. The group is adding content and source material and contemplating some visualizations. They are hoping for a road map for the transition to identify some architectural gaps. The group had their first meeting a week ago to move this task forward.

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Other Pending Actions

- Action: Ron M and Gerry will follow up on synergy between architecture and EPRIs Use Case Capability Model and CIM usage in GridAPPS-D
- Action: Ron M and Ron B to discuss opportunities for SBATH and publish SBATH
- Action: If allowed, distribute the CTIA Smart Cities playbook to the GWAC
- Website Refresh
 - Significant delay
 - Under budget
 - Pulled in some ringer developers to do the PHP search and get this across the finish line
 - Ready for final review by Council Members Feb 4, 2020
- TE FAQ long form – committee finished with their work, on gridarch.org, to feature on website
- Traditionally Face to Face in February...change next month's virtual format?

Website Refresh

Karen gave a status on the GWAC website refresh. She said they will need a PHP developer to fix search capabilities. Despite the delay the task is still on budget. GWAC can expect a demo of the new website on Feb. 4. If you are interested in attending that please let Susie know.

Action: GWAC to review the demo of the website refresh tentatively planned for Feb. 4. Ron Ambrosio and Tanya Barham would like to participate.

Now that TESC20 is over Ron Melton and Gerry Gray will follow up on a planned discussion about architecture and EPRIs Use Case capability model and CIM usage in GridAPPS-D and a possible synergy there.

Ron Melton and Ron Bernstein will talk more regarding opportunities for the SBATH paper. Smart buildings and customer systems could be part of an IEEE subcommittee on smart buildings and customer systems technical committee in SBLCS. They may be able to add to efforts in this area, although this committee which is somewhat dormant now but will get going again soon.

Ron Bernstein noted the Virtual ASHRAE conference is going on this week. Earlier this week he attended the 7.5 Smart Grid committee meeting for ASHRAE. He has formally joined the committee and he did share the SBATH paper with them. They asked if GWAC could present a seminar at the summer conference (virtual). Ron B. agreed that it was a good idea. He suggested that Ron M. and any other interested GWAC members get together and record a 20 - 30-minute talk for it followed by a Q & A. Ron M. said if it is virtual, he would be happy to help and to team with another GWAC person. Farrokh Rahimi said he would be happy to help. (Smart Buildings as a Transactive Energy Hub)

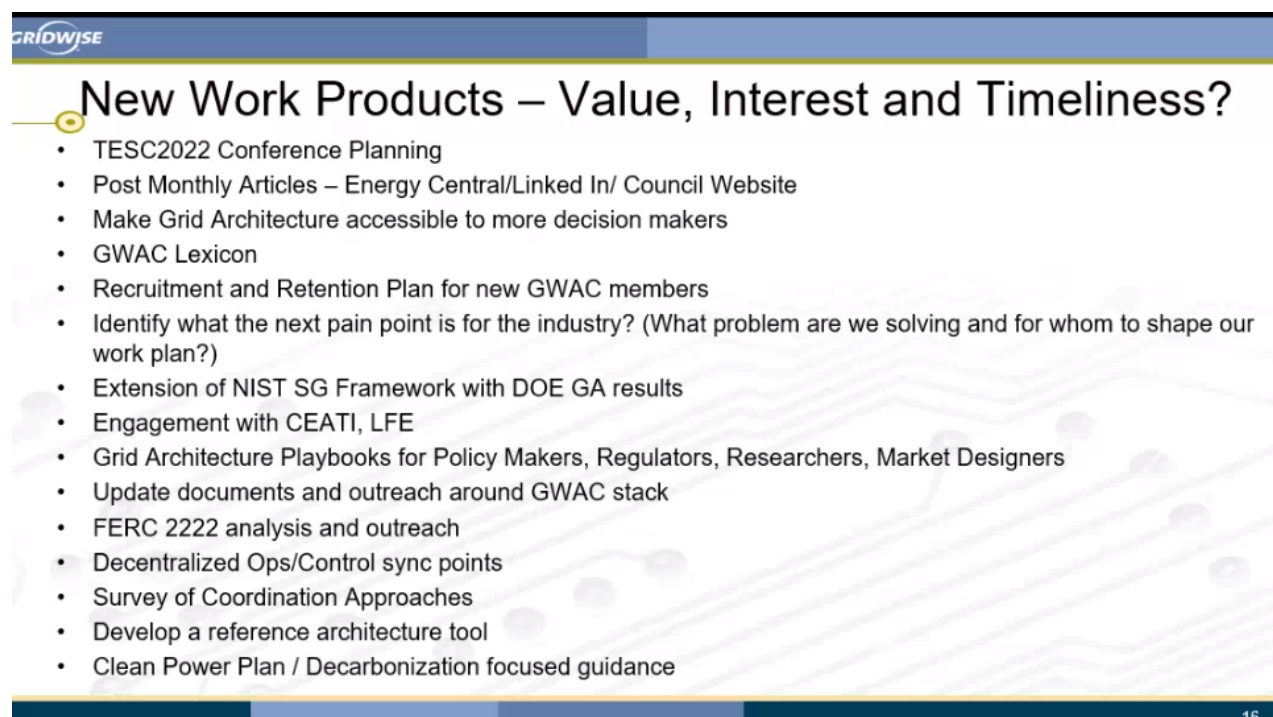
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David Forfia suggested using a format like what Chris Irwin put together for the DOE keynote at TESC20.

Ron B. also suggested that they keep the content and graphics generic so that it could also become a short publication in an online publication or trade magazine for further promotion.

Action: Ron B., Ron M., and Farrokh Rahimi to discuss developing a paper based on SBATH for the ASHRAE summer virtual conference and for other uses in other locations.



New Work Products – Value, Interest and Timeliness?

- TESC2022 Conference Planning
- Post Monthly Articles – Energy Central/Linked In/ Council Website
- Make Grid Architecture accessible to more decision makers
- GWAC Lexicon
- Recruitment and Retention Plan for new GWAC members
- Identify what the next pain point is for the industry? (What problem are we solving and for whom to shape our work plan?)
- Extension of NIST SG Framework with DOE GA results
- Engagement with CEATI, LFE
- Grid Architecture Playbooks for Policy Makers, Regulators, Researchers, Market Designers
- Update documents and outreach around GWAC stack
- FERC 2222 analysis and outreach
- Decentralized Ops/Control sync points
- Survey of Coordination Approaches
- Develop a reference architecture tool
- Clean Power Plan / Decarbonization focused guidance

Karen created the New Work Products list from input gathered at GWAC meetings in October and December based on discussions for new directions for the GWAC. She asked the group to discuss their interest in leading any of these items and if they are interested to please contact her. Comments and feedback about new activities are welcome.

Regarding the list of activities for GWAC - Karen said that the Future States white paper is in progress. TESC 2022 planning for the date of May 2022 should begin soon, a new organizing committee will need to be formed. Monthly articles by GWAC has been proposed and these could be based on previously published documents and graphics. Jeff Taft's work in architecture could be a starting point.

David Forfia suggested scheduling more guest presenters at GWAC meetings in 2022.

Karen suggested that more Grid Architecture materials for decision makers would be helpful, making the analogy of trail maps to the existing geological survey.

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GWAC Lexicon development was suggested.

Ron Cunningham suggested creating more guidance for new GWAC members to come up to speed on the GWAC. Tanya agreed that this is needed.

Ron B. suggested a GWAC intro video. He said it could be basic, such as where to find things.

Ron A. said it could give a little history and mention the DOE support.

Task Suggestion: Create an introductory video for GWAC new members and participants

Karen also suggested a bit on forward looking activities by GWAC.

David Katz gave a link to a Forbes article about China's new weapon saying, "link to a recent article from a former SGIP member concerned about EMP and asked about GWACs interest in this -

<https://www.forbes.com/sites/jamesconca/2020/06/25/china-develops-first-strike-capability-with-electromagnetic-pulse/?sh=4864b508e190>

Ron Cunningham and Farrokh Rahimi both emphasized that the new FERC order gives utilities, particularly distribution utilities and platforms a lot to do before the order goes into effect. The ISOs/RTOs will have to do compliance filing by July 19, 2021.

Karen noted energy and urgency around the new FERC order 2222. She asked if there is time for GWAC to react to it.

Gerry Gray said one of his EPRI colleagues has been having regular meetings on the impact of 2222. He has some ideas to help utilities in this space such as creating test scripts and test harnesses. The business requirements gathering is just the first step - there is a lot to do and the work will go on for some time. Everyone is welcome to attend and discuss. He listed a link for the meetings.

WEBCAST INFORMATION

When: Recurs Weekly: Tuesday, May 12th, 1:00 p.m. Eastern

Duration: 1 Hour

WebEx Link: [Join the Meeting](#)

Meeting Number: 618 165 963

Meeting Password: npUHvpwP752

US Toll Free: 1-855-797-9485

US Toll: 1-415-655-0002

Access Code: 618 165 963

Video Address: 618165963@epri.webex.com

Karen asked about hosting a virtual Face to Face meeting in February - should we change the format for next month. The consensus was to leave the meeting as is.

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Chris Villarreal: Compliance is due in July. Then RTOs go to implementation after approval. Whatever gets done after RTOS are completed goes to the states. It will be a lot of work but mostly done at the state level under their jurisdiction. Time is a factor and so is the audience. There is some thinking we could all do about the pathway and the audience that we are speaking to.

Karen concluded that the timeliness and audience will determine what is needed.

David Forfia said it may tie into Grid Architecture work and longer-term tasks. Many of us will get pulled into this for their “real jobs.” He said the focus of the GWAC has been for longer-term tasks. Perhaps how 2222 will affect things in the long term.

Ron Melton suggested thinking in terms of “beyond FERC Order 2222.”

Stuart McCafferty noted that DSO has been a topic for GWAC. Could be if we do something it would be how are all the pieces interconnected?

Ron A. agreed the topic may need to be beyond grid architecture and to look at what the next pain points are.

Ron M. said GWAC might consider leap frogging DSO and beyond. He mentioned that the Grid Architecture working group at SEPA is preparing a 20 or so page Grid Architecture Primer. He wants to be coordinated with the GWAC so that the efforts are complementary and not duplicated or perhaps do a joint effort. He wants to be sure we stay coordinated.

Karen asked about the primer - what is it regarding, what is scope? Ron M. said he has what he needs to set up an outline and get the work group started and then he will reply to her on this. It could even be a joint effort with GWAC.

Action: Ron Melton to get back to GWAC about the SEPA working group on the Grid Architecture and how it can be complementary to GWAC work products.

Tanya Barham said she is 100% on decarbonization - Stuart McCafferty said that goes for him as well.

Tanya said that she and Lorenzo are also working on a decarbonization initiative for California. Also, on a collaboration with California, Washington, and Oregon on grid interactive connected buildings as a chance to balance excess in renewable production to avoid the duck curve. She noted that the duck curve is something she is really involved with and would love to be engaged in that area with GWAC. She provided a link: <https://www.buildingdecarb.org/>

James Mater provided a link also: <https://www.postcarbon.org/> and

David said the TESC 2022 conference planning is a given from Karen’s list. The date chosen is May 2022.

Ron M. suggested that to prepare for TESC 2022 we should soon work on the IEEE request form and coordinate that with Roseanne Jones. Then next we can identify a conference chair and treasurer for submission to IEEE. Getting this in early will lay the groundwork for conference planning

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Action: Karen, David Forfia and Ron Melton to start the IEEE request form for TESC 2022

Karen noted a lot of enthusiasm today in the chat window regarding a possible white paper on decarbonization. Tanya, Kay, Rahul, David Katz, Stuart McCafferty, and Larisa Dobriansky are very interested in decarbonization.

Gerry Gray suggested that he invite someone from EPRI's low carbon research to speak to GWAC on the decarbonization effort. Tanya said yes please join us - a team seems to be flowing. Gerry said he is not working on the effort himself, but he knows people who are, and he can link them to the GWAC or to the new group.

Action: Decarbonization work group to be formed. Schedule a presentation at a GWAC meeting by an EPRI invitee from their low carbon research group. Gerald Gray will invite EPRI.

Stuart said a lot of funds will be flowing soon in this area. Particularly on DER integration and on a DC backbone. Maybe we can outthink what will be happening because of the new flow of government funds. That might be a driver to the selection process. No vision yet on the end state, this should be long term.

Karen emphasized the need for GWAC to be looking far out on the horizon rather than at immediate interests. She said it should be broad interest and long term.

Ron Ambrosio said maybe look at near term and long term as bookends.

Stuart said the efforts will be in transportation, communication, and the power grid.

Gerry said electrification is another major area.

James said the list is missing electric vehicles. He sees a problem regarding charging and discharging.

Rahul said he is interested in Grid Architecture and Decarbonization. He will circle back on scope and time based on initial discussion.

Karen called attention to social media - we need a point of contact to showcase good GWAC content on LinkedIn for example. David Forfia said he would take that on as GWAC Chair. He suggested aiming for 12 and settling for 6 articles.

Task Action: David Forfia will lead the social media effort to get 6- 12 highlights posted on GWAC this year

Tanya said that David could use the marketing template that she and Mark Paterson had prepared for the TESC 2020 organizing committee noting that could help David organize the content online.

David said he would be interested in it and said that he will take the task to complete the form for IEEE for TESC 2022. He would like to see 6 things posted on GWAC letterhead to get out this year.

Ron B. agreed this would keep the interest level high.

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Kay asked about the Survey of Coordination approaches on the list.

Ron Cunningham thought that Lorenzo Kristov had first proposed the survey. He said it could start as an introductory blog and evolve from there. Kay agreed to talk more with Lorenzo about it.

Karen referred to the breakout session notes and said it was proposed as a survey of international T&D coordination approaches.

Lorenzo Kristov joined the meeting and said GWAC can start simple and see what the interest is.

Karen gave a recap of the discussion so far for Lorenzo.

David Forifa told Lorenzo that a Video editor and Treasurer for TESC 2022 is needed. Lorenzo will consider this.

Lorenzo is involved in a couple projects to look at FERC 2222. There is a section at the end of the order on topics that are out of the scope. We might look at that list. He said FERC 2222 is just a slice of the big picture. GWAC may want to look more closely at some of the topics that are beyond the scope of the order. GWAC is often looking at the nuts and bolts of how things work.

Lorenzo said that a Grid Architecture Playbook for Policymakers.... is also on the proposed list and he wondered who would be interested in that.

Kay Aikin said it might be just Kay and Lorenzo who would participate on that one.

Karen said there may be others with energy on that one and it may parallel some of SEPAs work. Andy Bordine said he is also interested, and he thought Stuart had some interest. He sees some new funds coming for this as well.

Stuart McCafferty asked if anyone on GWAC has done some work on digital twin. David Katz has and would be happy to reach out to him on digital twin for buildings. Stuart said everyone seems to have their own opinion about it.

Ron B. has some interest and experience here in the buildings area more on the practical side such as things that can link to buildings including semantic tagging of digital information. He noted that he has been invited to participate in a Digital Twin consortium for ASHRAE 223 on concept of virtualized real time data. He said there have been some misnomers. He agreed that definitions including the area interoperability between grid systems and customers standards for customers.

Tanya Barham asked a bit more about it. Stuart said there are many flavors of this including 3-dimensional, translator, simulation, and other types. He thinks the industry is stuck on stop because of the disagreement over the definition.

Ron B. commented on the number of committees that are trying to create new standards - maybe six of them doing this without interacting.

Larissa, Ward, Lorenzo, Tanya were also interested in digital twin.

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Larisa Dobriansky addressed Tanya Barham in the chat; “in connection with CA’s Advanced Energy Communities Initiatives, I’ve been focusing on how electrification, digitalization and microgrids can shape decarbonization strategies. Would like to provide input along these lines for the effort. Would this be of interest?”

Larisa addressed Lorenzo in the chat; “I’d be interested in delineating some focal areas for GWAC based on the “out of scope” FERC topics, especially looking at what’s coming down the pipeline at FERC (in which I’ve been involved.” Would like to discuss with you.

Ron Cunningham said digital twin needs to be able to change over time with the needs of the grid. The domain or organization looking at it are looking from their own perspective.

Stuart said he agreed most with Ron Bernstein’s vision of it.

Ken Wacks said digital twin is like IoT - it covers a lot of ground. It can be used by architects, engineers, and operations people.

Ron A. said the term is overloaded. At the heart is an application that deals with the physical world. How you deal with it, simulation, standardization, or sensors will vary by industry and maturity level. A generalized definition should be the first step and would help to find commonality.

Gerry asked if there is a form of digital twin that does not involve some aspect of simulation?

Stuart said that Schneider Electric has one that only involves attributes.

Karen brought the digital twin discussion to a close by asking for it to move to committee – what can we do, what should we do on this topic.

Alex Papalexopoulos - He said they have a project now with his organization in the EU that is like our DOE to develop a digital twin for buildings using sensors and software simulations to come up with the energy footprint of buildings and they call it twin energy. They have been working on it for 7 to 8 months. He has materials that he can share with GWAC. He agreed that depending on the application you can have digital twin without software and simulations.

David Forfia suggested moving on with the meeting to finish the agenda.

Task Action: Stuart McCafferty agreed to follow up on digital twin with a follow up committee meeting. He will copy Karen on the invitation. Larissa, Ward, Lorenzo, Tanya were also interested in digital twin. Ron Cunningham, Ron Bernstein might also be interested.

Task Action: Regarding the Grid Architecture Playbook, Kay was very interested but so was Lorenzo. It was agreed that Lorenzo will take this one this and will do a one-pager to get things started. Kay, Andy, Rahul, Tanya, and Larisa are also interested. They can draft something quick and draft a proposal for how to proceed. They will invite Karen also.

James Mater said he can’t take on a task in EV right now.

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Task Action: Beyond FERC 2222 and the out of scope activities - Lorenzo said Larisa might be willing to start this one with a paragraph on what GWAC might do on that topic.

Task Action: Survey of Coordination - Kay will start this task. Lorenzo would like to be involved.

Decarbonization Task - Tanya suggested pushing this one out. Kay, Tanya, and Larisa are very interested as a future activity. Kay offered to co-chair saying that it seems that coordination, architecture and decarbonization all seem to flow together in the same effort as to where will we be five years from now. Stuart and Kay would like to help. Larisa said she is still interested - she is working on California initiatives. Tanya said she might have more time after April. Kay and Stuart may be able to get this one started.

Task Action: Kay and Stuart to start the Decarbonization Task with Tanya and Larisa helping when they can.

David asked if we missed anything that would be on the DOE program manager's radar.

Karen said these items are on the radar of our DOE contact.

Liaison Reports

— Liaison Reports

- NIST – David Wollman
- ISO/IEC JTC 1/SC 25 – Ken Wacks
- SEPA – Aaron Smallwood
- EPRI – Gerald Gray
- ASHRAE – Ron Bernstein
- IEEE PES – Farrokh Rahimi
- EBC - Ward Camp
- NARUC – Chris Villarreal

David Wollman - NIST is finishing the process of addressing the feedback on the 4.0 Smart Grid Interoperability Framework V. 4.0 and are going through an internal review of the document. In the chat he added a NARUC has published a cyber security document that draws from concepts supported by their cooperative agreement: <https://pubs.naruc.org/pub/73C0CA00-155D-0A36-31DB-ABA572C6A65F>

Ken Wacks - ISO/IEC - they are developing world standards on home and building systems including applications spanning energy management. They have many new developments in energy management

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in homes and apartment buildings with applications of Cyber security and artificial. There are 2 new proposals that came through just today. Their next meetings will be the last two weeks in April. There will be no live meetings until at least May.

Please let Ken know if you have ideas for standards or reports and he will move it forward on behalf of GWAC.

Aaron Smallwood - SEPA - highlights of research - tomorrow they have a TV miniseries on Vehicle to Grid Integration. Tomorrow is season 1, episode 2. Last fall they released a multi-client study on integrated distribution planning. On Jan. 27 SEPA and Southern California Edison will host a webinar to review the study. The study is published and available to the public from their website.

Last fall they did their inaugural utility transformation challenge. We believe this is one of the most comprehensive assessments on grid modernization and utility clean energy. SEPA is on target to release it this spring.

A case study of this to be released later this month. They will release a report in early spring, and they will have this on their website. In 2021 the Grid Evolution summit will be virtual again this July. NA smart energy week is planned to be in person in New Orleans in September depending on the status of the pandemic at that time.

EPRI Gerald Gray - no updates He is interested in the FERC order and decarbonization discussion.

Ron Bernstein - ASHRAE; Consumer Technology Association, CTA and Lonmark. Ron is giving two papers at ASHRAE this week. He is giving two papers on building automation related to building integration.

Both ASHRAE and CTA are interested in energy conservation and cyber security for building systems to communicate with the outside world. Both meetings are concentrating on energy conservation and cyber security as they relate to how building systems communicate to the outside world. There is a lot of discussion about what that means. There was a request for speakers to talk about Open ADR. He gave James Maters name for that as a possible speaker. Ron would be happy to follow up with him on that. He is also talking about core reliability and systems and how they interact with enterprise applications.

Ron answered a question by David Katz: ASHRAE work combines haystack, brick and is trying to implement something into BACnet 135 to produce something that can be used in the HVAC world.

Farrokh Rahimi -IEEE said speaking opportunities and papers are needed for the ISGT meeting that he had mentioned. The IEEE general meeting is in July and will also be virtual. The agenda is being developed but there will be sessions on TE. The IEEE PES effort is underway.

Ward Camp - EBC - no updates

Chris Villarreal - NARUC National council on electric policy meeting was held in Dec. Chris put a link to the presentations in the chat. One session will need to be redone. It was a success. Next meeting will

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be in Sept. 2021. The topic will be “planning.” It will build on topics that the group has been discussing for the last several years. Expect a call for abstracts to come out in February.

At the NARUC meeting in Feb. 11 there is a free workshop, no need to register, the NARUC NAZIO task force will be releasing material they have worked on for the last 2 years. The task force brought in several states and Lorenzo has participated - there are 5 possible approaches that were developed. They will offer guidance to the states on integrated system planning. It is free to attend. NARUC next session will be in mid-July in Denver. May or may not be virtual.

There is a John Hopkins study coming out on TE.

David Forfia noted that the next meeting will be Feb. 17.

He asked for a motion - Leonard, Ron B.

No objections to ending on time.

David wished everyone a happy new year and a happy inauguration day.