GridWise® Architecture Council

Meeting Minutes

Feb. 16, 2022

GWAC Members

David Forfia, GWAC Chair

Kay Aikin, Founder, CFO, Dynamic Grid/Introspective Systems

Ron Ambrosio, Independent Energy Transformation Professional

Ron Bernstein, President, RBCG, LLC

Andrew Bordine, VP Energy Mkts & Innovation, Anterix

Ron Cunningham, American Electric Power

Gerald 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, Dir. of Grid Tech. Consulting, EnerNex

Leonard Tillman, Partner, Balch & Bingham, LLP

GWAC Associates & Emeritus

Rahul Bahadur, VMWare, Inc.

Mark Knight, 1898 & Co., Part of Burns & McDonnell

Jeff Morris, Schneider Electric

Ken Wacks, Home, Building & Utility Systems

GWAC Members and Assoc. not present

Ahlmahz Negash, Sr. Engineer, Tacoma Power excused

Mark Paterson, CSO, Strategen

Chris Villarreal, President, Plugged In Strategies

GWAC Guests

Paul DeMartini

Christopher Fleck

David Katz

Jaime Kolln, PNNL

Mark Knight, Emeritus

James Mater

Paul DeMartini

Seemita Pal, PNNL

Hayden Reeve, PNNL

Tim Schoechle

Jiri Skopek

David Wollman, NIST

PNNL Support

Susan McGuire, GWAC Coordinator

Ron Melton, Acting PNNL Administrator

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Ron Melton noted that the new GWAC website is live.

Agenda Feb. 16, 2022

Call to Order and roll call
GWAC Administrative Business
- Welcome
- Minutes
- Upcoming events
- TESC 2022 update
- Actions
- Knowledge Graphs Presentation – Ron Cunningham
- GWAC Projects Overview Chart review
  – Seemita Pal to give an update on the Grid Architecture white paper
- New GWAC Website
- Liaison Reports

David Forfia asked if there is a motion to approve the January meeting minutes. Ron Bernstein gave the motion and Ron Cunningham seconded the motion. David gave a motion to approve which was unanimous. The minutes were approved.

Lorenzo asked if the word Democratized has been added to the theme title of TESC 2022 as discussed at a previous GWAC meeting. Chris Fleck noted that Democratized is used on the conference website header.

Ron Melton said he just needs to change his slide. Ron Bernstein noted that the website seems to have the change throughout.

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TESC 2022 - Grid Architecture to Decarbonize, Distribute, and Decentralize the Grid

May 3 – 5, 2022 and Tutorials on May 2

- 34 Abstracts received
- Abstract review is complete
- Acceptance notices for papers out
- Acceptance notices for panel spots pending
- Sponsorships still available
- Registration opened on Feb. 15th
- Tutorials – TE and Grid Architecture – details in progress
- Keynotes – in progress

Website: https://ieee-tesc.org/

Actions

GWAC call for Candidates is open – GWAC asked to help recruit

- Call for Candidates at gridwiseac.org
- Application and information at the site
- Applications due by March 16, 2022

Ron M to start an effort with Jaime Kolln to review the Interoperability Constitution and consider it for a rework.

Roseanne to schedule weekly TESC22 organizing committee meetings (done)

Start a GridArch whitepaper work group – Seemita Pal, lead, participants Ron Cunningham, Ron Ambrosio, Larisa Dobriansky, David Forfia, Aaron Snyder

Ron Cunningham to give a talk at the Feb. GWAC meeting about Knowledge Graph

Ron Melton noted that he will be talking more with Jaime Kolln about a rework of the Interoperability Constitution.

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GWAC 2022 Call for Candidates

2022 GWAC Call for Candidates Now Open

- Expiring Terms
  - Ron Ambrosio
  - Andrew Bordine
  - Ron Cunningham
  - Farrokh Rahimi
  - Stuart McCafferty (will transition to emeritus)
  - Aaron Snyder
  - Leonard Tillman
- Non-Expiring Terms
  - David Forfia
  - Kay Aikin
  - Ron Bernstein
  - Gerald Gray
  - Lorenzo Kristov
  - Ahlmahz Negash

- Call for Candidates at gridwiseac.org
- Application and information at the site
- Applications due by March 16, 2022
- Selection Committee meeting will be scheduled in late March or early April
- GWAC slate confirmation will take place on special call before the April GWAC Web Meeting

Ron Melton noted that some candidate applications have come in. The new member selection committee will be meeting in March.

Ron Bernstein noted that the member service dates are not right on the website.

Conferences and Events (**Bold** = GWAC speakers, blue = complete)

- Smart Energy Summit, Feb. 28 – Mar. 4, 2022, Dallas, TX
- NARUC Winter Policy Summit, Feb. 13 – 16, 2022, Washington DC
- EPRI's Electrification 2021 Meeting (F2F), March 14, 2022, Charlotte, NC
- Grid FWD, April 19-20, 2021, Seattle, WA
- **IEEE ISGT 2022, New Orleans, LA; April 24 - 28, 2022 – face to face format** ← **NEW Dates and location**
  - GWAC Speakers: Kay Aikin, Farrokh Rahimi
- IEEE PES T&D, April 26 – 28, 2022, New Orleans, LA
- IEEE Rural Electric Power Conference REPC, Cleveland OH, May 17 – 20, 2022
- **TESC2022; May 3 – 5, Virtual**
- DistribuTech 2022 – May 23 - 25, 2022, Dallas, TX (date change)
- IEEE PES General Meeting, Denver, CO, July 17 – 21, 2022

Kay noted that she will not be speaking after all for ISGT because of the date change.

Kay could attend if presenting but now with other panelists gone, she will not attend.

Farrokh noted that prerecording is a possibility.

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James Mater noted that the EPRI meeting dates were recently changed to June 28 - 30 still in Charlotte

Action: Update the conference slide. (done)

Lorenzo said that Farrokh is leading a panel at ISGT that he is on as a presenter.

James Mater said he could go if there is a blank spot to fill in. Farrokh offered to have him put a panel together, they will talk offline.

Farrokh noted that the TESC abstract review is now complete.

TESC 2022 - Grid Architecture to Decarbonize, Distribute, and Decentralize the Grid

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Website: https://ieee-tesc.org/

Session chairs are still discussing the panel composition.

Paper rejections are scheduled to go out.

Ron Bernstein noted that some of the Organizing Committee has met with Lea Provost, the IEEE promotion expert and she will have some performance tracking measures.

Ron Bernstein showed the group the social media cards that GWAC group and others can use to promote the meeting. He explained that as Session Chairs register a social media card is created for them.

The TESC 2022 Conference registration has opened. Ron Melton will put the link onto the site.

Ron Melton confirmed with others that keynotes arrangements are in progress.

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Ron M. noted that the DOE OE assistant secretary confirmation hearing was held last week. If confirmed Chris Irwin would like to have her be the keynote speaker otherwise it will be Chris Irwin.

Workshop on Test Session Interactive Transactive Energy

March 3, 9:00-10:00 AM EST

Register Now

Lea Provost
Sr. Program Manager
IEEE

TESC 2022 Transactive Energy Systems Conference and Workshop www.ieee-tesc.org

Ron Bernstein presented the social media card. He said that Lea just needs the name, title and photo for the presenters and the card will be created for them as they register.

The link will pop up on the registration page.

Action: Susie to set up a TESC Organizing committee meeting next Monday (Roseanne will be out). The usual group will meet at the usual time. (done)

Lorenzo said we had talked about adding Democratize to the Conference theme. On one of Ron M. slides today he saw the word Decentralize used instead.

Ron M. noted that Karen is out for an indefinite amount of time. Ron M is taking over as PNNL administrator at this time after talking with Hayden Reeve, the PNNL project manager for GWAC.

Ron Melton noted that he will follow up on Karen's action to talk more with Mark Knight about the future direction of GWAC discussions with Chris Irwin. Mark Knight noted that he had some things that he wanted to get caught up on with Ron as well. They will schedule some time to talk offline.

TESC 2022 Registration link direct to dot.com:
https://tesc.ieeepesreg.com/Index2_SSO.asp?ThisPerson=

Ron Melton introduced Ron Cunningham who will present on Knowledge Graphs which is something he has presented to the SEPA Grid Architecture working group.

Knowledge Graph presentation by Ron Cunningham, "Knowledge Graphs, What are They?"

Moving from a conception to a concept model Ron C. said that he has used knowledge graphs to show background tooling and illustrate the content to show the model noting that you can put code behind it and run it as a model.
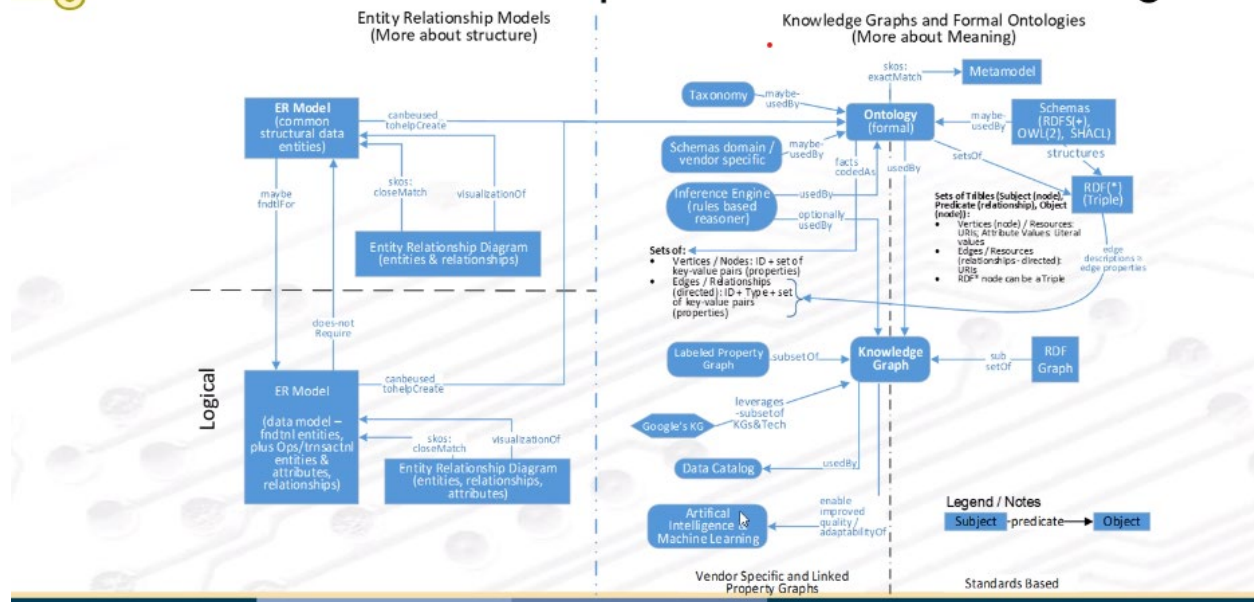
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Ron C. noted that knowledge graphs actually date back to the 1970s applying graph theory to knowledge in a paper published by the US Army. He said that Symantec web tooling came along in the early 2000's.

Ron Cunningham's presentation is on GridArch. If you don't have access and are a SEPA member Ron Cunningham can send you a site link or if you are not let him know and he will send a copy to you. He noted that citations are provided in these papers.

Similar work to Knowledge Graphs also took place in AI and human learning and cognition, and natural language processing. Here is a link to Schema Theory, an example from Jeff Pankin, one of the leading researchers:
http://web.mit.edu/pankin/www/Schema_Theory_and_Concept_Formation.pdf

Ron Melton noted that GridArch.org is still the primary GWAC Sharepoint site.

He said that the GWAC Teams site is experimental for GWAC but he encouraged GWAC members to try the site. PNNL is moving to Teams.

GWAC Projects

Project	Grid Arch for Regulators	Grid Architecture White paper	TESC2022 Conference	Grid Future States	GWAC Blog Content and Review Committee
Scope	Applying Grid Architecture in the Policy & Regulatory Arenas	An introduction to Grid Architecture – including best practices and real-world examples.	Annual GWAC sponsored conference focused on Transactive Energy and related topics	Update Grid 3.0 Future States	Decarbonization, GA for Policy
Audience	Policy makers	Geared to stakeholders who aren't familiar with grid architecture	Decision makers, solution providers, labs, academics, policy, solution providers	Industry Stakeholders	
Status	Abstract in development		Finalizing keynotes and panels	Started in January. Now meeting regularly. Coordinating with GMLC Grid Architecture results	Group: Stuart McCafferty, Ahlmahz Negash, Larisa Dobriansky, Ron Bernstein, Tonya Barham, Rahul Bahadur, Leonard Tillman, David Katz, Tim Schoechle, Heather Donaldson
Actions	Group: Lorenzo Kristov, Larisa Dobriansky, Kay Aikin, Farrokh Rahimi, Chris Villarreal, Mark Paterson, Karen Studarus		Promote conference,	Working group is gathering inputs and organizing material and has a work plan	
Leadership		Seemita Pal, PNNL	GWAC members on the OC	Ron Cunningham	??
	Lorenzo Kristov				

Ron Melton resumed the meeting and asked about the blog site - should Stuart still be the POC for the blog site an emeritus GWAC. Kay said she will probably take over the blog group but will check with Stuart.

Ron B. noted that Stuart's very first blog is up on the site.

Ron M. said additional blogs can be posted now. Kay said that she will move forward on that and will take over the Blog content for GWAC.

Ron C. noted that Future states will be part of the TESC meeting and Ron C. is developing a panel for that. Regular meetings are being held for this paper.

Aaron Snyder, Tim Schoechle, Chris Fleck, Dave Wollman are interested in getting copies of the presentation today from Ron Cunningham.

Action: send a copy or summary of the talk out with the meeting minutes for Feb.

Grid Architecture for Regulators - Kay Aikin filled in for Lorenzo and said that they are following the SEPA effort to tie in and develop the panel for TESC 2022.

Ron noted that if people are on GridArch.org please be careful using the site so as not to delete items. If you see any problems with the site, please let Ron Melton and Susie McGuire know.

⊙ Grid Architecture White Paper

- Added the Mission and functions of GWAC
- Made the connection between GWAC and the reason for discussing the topic of Grid Architecture
- Sections except the one detailing stakeholders' perspectives written up
- Working group meeting
  - Tentative date/time: March 3rd from 10am-11am
  - Document will be emailed in advance of the meeting
  - Need inputs on the stakeholder perspectives
  - How do you envision using grid architecture concepts/methodologies based on the introductory details on this topic?
  - Title recommendations (Current title is "A Practical Introduction to Grid Architecture: Stakeholders' Perspectives")

Seemita Pal, PNNL, has added some grid architecture language as advised by GWAC. The stakeholders section has some of what is needed but more input is needed for this section.

Most of the sections have been updated but the Stakeholders section needs more input from the GWAC. She is planning to have a meeting on this topic with interested GWAC members.

Action: Think of how grid architecture concepts and methodologies can be used from your perspective. Seemita would like to collect everyone's feedback.

Susie will schedule a meeting to review the white paper and think of next steps. We will include those who have volunteered and we will include the GWAC and Associates. Seemita has a file to send out to the group.

Those who have expressed interest already are Ron Cunningham, Ron Ambrosio, David Forifa, Kay Aikin, Larisa Dobriansky, Ahlmahz Negash, Aaron Snyder, Tim Schoechle, and David Wollman.

Ron M. noted that we may be able to have a F2F GWAC meeting this fall if the pandemic continues to decline. He asked people to think about where to have it - it would be a 2 day meeting with a theme.

Several said they were still hoping to go to Ron B's house. Ron B. review the idea and will get back to the group. Ron B. noted that the SDGE conference facility may also be available for the meeting. It is near Ron B.'s home and he could offer a social event.

Tom Bialek has retired but Ron B. has another contact for SDGE. Ron B. will contact them and see if that is a possibility. Their criteria is that the meeting be regarding power and energy.

Action: Susie - add to the next (March) meeting agenda

Ron A. will send Susie an email about a GWAC updated website correction.

─⊙ Liaison Reports –

- National Institute of Standards & Technology (NIST)– David Wollman
- Electric Power Research Institute (EPRI) – Gerald Gray
- Institute of Electrical & Electronics Engineers Power & Energy Society - Farrokh Rahimi
- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)– Ron Bernstein
- International Organization for Standardization, and International Electrotechnical Commission
  – (ISO/IEC JTC 1/SC 25) Home and Buildings Standards – Ken Wacks
- Interstate Renewable Energy Council (IREC)– Ken Wacks
- Smart Electric Power Alliance (SEPA) – Aaron Smallwood
- Energy Blockchain Consortium (EBC) – Tony Giroti
- Nat'l Assoc. of Regulatory Utility Commissioners (NARUC) – Chris Villarreal

Liaison Reports

Dave Wollman - NIST has put 2 items in the chat:

NIST update: Our activities in smart connected systems go beyond smart grid and IoT and include more communications-focused efforts. For example, 5G/6G networks, and the need to assure quality of service for various applications. NIST researchers in this area have paper End-to-End Quality-of-Service Assurance with Autonomous Systems: 5G/6G Case Study, recently published by the IEEE Consumer Communications & Networking Conference. In this, NIST researchers have developed a framework, which allows autonomous, subordinate networks to achieve greater coordination among themselves. Specifically, the framework involves an algorithm that allows the networks to negotiate local, needed data amounts. This algorithm also enables these subordinate networks to exchange their estimates regarding overall, global constraint functions. NIST researchers demonstrated the algorithms using numerical studies.

Another activity area is manufacturing, including AI – increasingly used to aid analysis and decision-making – and there is the need to evaluate these tools with respect to their utility and value. NIST researchers recently published a Procedural Guide for System-Level Impact Evaluation of Industrial Artificial Intelligence-Driven Technologies: Application to Risk-Based Investment Analysis for Condition Monitoring Systems in Manufacturing in the *Journal of Manufacturing Science and Engineering.* The procedure focuses on evaluating condition monitoring systems, used to identify problems – faults, defects – in a system/process, and thus reduce their risks. This case study is intended to serve as a basis for evaluating other industrial artificial intelligence tools.

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NIST will also host the Standards and Performance Metrics for On Road Autonomous Vehicles Workshop, March 8-9, 2022. The virtual workshop will solicit stakeholder input regarding key areas in which NIST can apply its technical expertise to advance on-road, autonomous vehicles. Attendance is free and open to the public. Registration is required and can be done online.

Gerald Gray - EPRI noted that the Electrification meeting has moved to June as noted earlier on the conference slide. He had no other updates.

Ron Melton for Farrokh Rahimi IEEE: reminder IEEE PES General Meeting will be held July 17 -21, 2022 in Denver, CO

Ron also noted that Steve Widergren will step down as editor in chief of PES magazine. If anyone is interested in taking that over please let Ron M or Farrokh know. Steve has someone in mind but they might need help in taking this on. It is a good opportunity for someone.

Ron Bernstein informed the group that GWAC has resubmitted for the summer conference. ASHRAE summer Toronto Canada in June 27-29.

Consumer Technology Association has a new activity that Ken is the chair for and Ron is helping regarding end to end device and cyber security measures. This may relate to TE and reliability that GWAC has discussed.

Ken said they are still seeing if there is enough interest to make a new group go. CTA is working with NIST to coordinate cyber security efforts. They are aligning with goals of the current US Administration.

Cyber Security in ASHRA and CTA is an important topic. How requirements will be met including some of the NIST requirements are of interest.

Ken ISO IEC and IREC:

The ISO/IEC committee focus is on standards for homes and buildings. Tim Schoechle is leading a gateway subcommittee to use the gateway as the inter-connection among networks in the home, building and to the outside world, and as a locus for interoperability, cybersecurity and as a platform for hosting apps.

We are developing standards for energy management for houses, apartments and applications of AI to energy management

The next series of meetings begin the week of May 9 by Zoom and will be two to three hours per day beginning at 10am EST. It may continue into the next week, still to be determined. Contact Ken if you are interested. https://kenwacks.com/ Guests are welcome.

IREC - Customer Grid Edge meets every 2 weeks. They are doing sessions on issues regarding the installation of solar panels, inverters and systems for solar power. They have presentations by experts in the field, a licensed installer and speaker with decades of experience and also as an educator in the

field. The next meeting is Feb 25, 2022. They will continue with Solar Power and the move on to regulation and how solar energy and utility energy integrate.

SEPA - David Forfia for Aaron Smallwood; a new SEPA publication on Tiers of Electricity Decarbonization was recently published https://sepapower.org/resource/tiers-of-electricity-decarbonization/

Solar Power International is now RE+ Power and is scheduled for Sept. 19 - 22, 2022 in Anaheim CA at the Anaheim Convention Center. https://www.re-plus.com/power/

RE+ Northeast will be held in Boston, MA Feb. 22-23, 2023, https://re-plus.events/northeast/

Ron Melton said he has been in touch with Chris Villarreal and he is doing well.

Paul DeMartini noted that the NARUC meetings are this week. Chris is likely at NARUC.

Pacific Energy Institute is getting good traction in Australia with the Grid 2035 paper. It was referenced by their Australian Energy Market Operator their roadmap for the future.

Paul noted that the group just added a new advisory board member, Lynne Gallagher, the CEO of Energy Consumers Australia.

David Forfia asked for a motion to Adjourn the meeting.

Kay Aikin gave a motion to adjourn and Ron Ambrosio seconded the motion. There were no objections.

The next GWAC Meeting is Wed. March 16 at 10:00am