Meeting Minutes March 19, 2025

GWAC Members

Ron Bernstein, GWAC Chair and President, RBCG, LLC (attended first part of the meeting)

Ron Ambrosio, Independent Energy Transformation Professional

Andrew Bordine, Sr. Practice Manager, Grid Automation, Actalent

Marc Costa, Dir. Policy Planning, the Energy Coalition

Yashar Kenarangui, Xcel Energy

Matt McDonnell, Current Energy Group, Managing Partner

Mark Ortiz, Lead Architect, Dist. Energy Sys., Schneider Electric

Aaron Snyder, Dir. of Grid Technology Consulting, EnerNex

Leonard Tillman, Partner, Balch & Bingham, LLP

GWAC Associates & Emeritus

Ward Camp, GWAC Emeritus Ron Cunningham, GWAC Emeritus Ken Wacks, GWAC Emeritus

GWAC Guest Speaker

Ron Ambrosio, GWAC

GWAC Friends

Don Hammerstrom, retired, PNNL

Jeff Katz, Consultant

James Orenstein, Trinity River Community Solar

Harry Peterson, Siloxit

Tim Schoechle, Colorado State Univ.

PNNL Support

Jaime Kolln, PNNL GWAC Administrator Susie McGuire, GWAC Coordinator Grace Borland, GWAC Financial Coordinator

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Agenda

Call to Order and Roll Call

Welcome

GWAC Administrative Business

- Introduce new GWAC member(s)
 - Yashar Kenarangui
 - Matthew McDonnell
- Minutes
- · Upcoming events
- GWAC Accomplishments
- Action Items

Guest Speaker - Ron Ambrosio - Building Back From the Future

Future Activities

- GWAC Strategic Outreach Plan
- AHR Expo
- Planning 2025 GWAC Tutorials

Work Product Status Reports

- Working Party Status Update
 - Grid Future State White Paper
 - Grid Arch for Regulators White Paper
 - Applying Grid Architecture Concepts to Bridge Back from the Future Grid
 - Grid Architecture Concept Model for Transportation Electrification
- Liaison Reports

New Business

Jaime Kolln noted that Ben Ealey will be the new liaison reporter for EPRI.

Ken Wacks asked to go early this morning with his Liaison report.

Jaime introduced the two newest Council members starting with Yashar Kenarangui.

Yashar is with Excel Energy's Innovation group where he has been for the past 3.5 years. He has worked in the past for engineering and consulting firms. His focus at Excel is on DER management in terms of use cases. This includes things like flexible interconnect, flexible energization, grid services from DER. In terms of technology, they are talking about DER management systems or terms, VPPs - virtual power plants, and gateway devices and their interface to the customer and most important the end-to-end integration of all these control systems. Yashar said this is where his interest in great architecture

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comes from – the desire to address questions like *where do these various control functions reside* and *how data exchanges are made between all these different platforms?*

Yashar said his goal as a new Council member is to collaborate with everyone to address some of these challenges amidst the uncertainties, including policy, economic factors and other factors that will shape the grid of the future. He is happy to be working with the Council.

Jaime also introduced Matt McDonnell and noted that he presented at the GWAC 24 Symposium.

Matt was introduced to the council sometime back. He brings regulatory expertise and experience, and he works on performance-based integration.

Matt said he had worked with the GWAC back in 2015 at the Transactive Energy Conference in Portland, Oregon. He was a Commission Council member for the Hawaii PUC at that time. He has some regulatory expertise. He understands the importance of regulatory frameworks and the need to adopt and evolve those for the purpose of facilitating a more decarbonized distributed grid that is truly integrating DER throughout.

He spent a lot of time at the Hawaii PUC leading policy initiatives. He focused a lot on smart inverter functionality, grid modernization needs in a very high DER grid. He spent the later part of his tenure there focused on performance-based regulation and better alignment of financial incentives for utilities to deliver the outcomes we need in a more contemporary electricity system.

He has carried those themes forward in the work beyond that at Navigant which now Guidehouse, and then during his tenure at Strategen where he helped to scale and grow the consulting team there while continuing to support states across a number of domains around themes that he cares a great deal about. Matt said he has had the opportunity to collaborate with various GWAC members both current and emeritus. He is really excited to be a part of GWAC. He said that the Council continues to advance really important work.

Matt thanked GWAC for having him join and said he is happy to be a part of the team.

Jaime Kolln said he is looking forward to working with Matt and noted that he has already been participating on the Grid Architecture for Regulators paper.

Chair Ron Bernstein gave a motion to approve the February GWAC meeting minutes. Ken Wacks noted that he had sent in two minor edits in related to his February Liaison report which have been made.

Ron Ambrosio seconded the motion to approve the meeting minutes as amended.

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Date	Event	Location	Attend	Speaker	Торіс				
Mar. 19-20, 2025	RE+ Microgrids	New Orleans, LA	Kay Aikin		policy meeting on 3/18				
Mar. 24, 2025	Smart Energy Consumer Collaborative Consumer Symposium Paired with PMLA	Dallas, TX	Jeremy Roberts		Shaping the Future: Consumers and the Energy Movement				
Mar. 24 - 27, 2025	DistribuTECH	Dallas, TX	Forfia, Rahimi, Kolln, Yashar Kenarangui						
Mar 25, 2025	Green Button Alliance's Annual General Meeting	Dallas, TX	Jeremy Roberts						
Mar. 25-26, 2025	Smart Energy Summit	Dallas, TX	Ken Wacks		Co-located with DTECH				
April 14 – 17, 2025	IEEE Energy & Policy Forum	Washington DC			Formerly ISGT North America				
April 15 – 17, 2025	Microgrid Knowledge Conference	Dallas, TX							
May 6-8	V2G Energy and Policy Forum	San Ramon, CA	Jaime Kolln						
July 17 – 20, 2025	NARUC Summer July 27 – 30, Boston, MA	Boston, MA	Kay Aikin		Shape the Future of Utility Regulation				
July 27 – 31, 2025	IEEE PES General Meeting	Austin, TX	Farrokh Rahimi, Jaime Kolln, Lorenzo <u>Kristov</u> , Kay Aikin						
Sept. 8-11, 2025	RE+	Las Vegas, NV	Jaime Kolln		GWAC Tutorial on Monday, Sept. 8				
Oct. 22-24, 2025	ASHRAE Building Decarbonization Conference	Chicago, IL							

Jeff Katz provided a link about an internship/training for people who work in cyber for the power industry. It points to a set of lunch and learn modules hosted by the Strategic Partnership for Industrial Resurgence at Stony Brook University.

https://www.stonybrook.edu/commcms/spir/lunch_and_learn/%20Energy%20CyberLearn%20Internship

Jeff also provided a link to the North American Power Symposium, NAPS meeting in October 2025, to be held in Hartford, CT (2 links): <u>https://uconnuecs.cventevents.com/event/4237392d-5faf-41f5-b4bc-4c742975e40d/summary?tm=V5t5RT-rLxBQxxKKIsQzQQVp9IcAKLMsL4C9dcLwzYY</u>

https://uconnuecs.cventevents.com/event/NAPS25/summary

Jeremy Roberts provided a link to the upcoming video presentations that are part of the Green Button Alliance that will be held during the DistribuTech Conference in Dallas, Texas. One of the presentations is an interview of DOE's Chris Irwin by Jeff Katz:

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Green Button Alliance 2025 Annual General Meeting https://the-gba.org/2025-agm Tuesday at DISTRIBUTECH in Dallas 10:30am (right-after the DTECH Keynote) Open to the Public; Free to Attend Featured Speaker: Chris Irwin (recorded)

Liaison Report – Ken Wacks

Ken Wacks- ISO/IEC update: The ISO/IEC committee that Ken chairs recently published four standards on the gateway, located between a home or building and the outside world. New features include cyber security protection following the principals of privacy-by- design. They are also developing standards for networked fitness equipment.

They have scheduled Zoom meetings during the weeks of April 7 and June 23 with participants from around the world. They will feature internationally recognized experts from the Americas, Europe, Asia, Australia and Africa.

IREC - Ken chairs the Customer Grid Edge (CGE) Committee at the Interstate Renewable Energy Council (IREC). Many speakers topics concern distributed energy resources located behind the power meter (solar and wind generators, storage batteries, EVs, power conversion, etc.). The featured speaker for March 28 is the CEO of Energy Cloud, speaking on indoor air quality and energy management.

The meeting will be at 1:30pm Eastern Time and is free to attend. Search the web for IREC CGE. Anyone interested can sign up online.

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Guest Speaker : Ron Ambrosio, GWAC Member, Independent Energy Transformation Professional





Ron is a senior technical executive and software architect with a focus on technology, business and policy issues related to energy transformation in the electricity industry. 40 years of software engineering experience in distributed embedded systems and their integration with enterprise computing environments (IoT), and 20 years of experience specifically in the energy transformation space.

Began working with the U.S. Department of Energy (DoE) in 2000 on the planning, collaboration and workshops that led to the creation of the DoE GridWise initiative in late 2002, and later on the planning and launch of the GridWise Alliance industry consortium in 2003. Selected in 2004 to sit on the 13-member DoE GridWise Architecture Council; served as Chairman of the Council in 2009 and 2010, and continues as a member.

https://www.linkedin.com/in/ronambrosio/

GridWise® Architecture Council

Back From the Future: Reaching the Vision of Tomorrow's Grid

[presenter(s)] GridWise Architecture Council

> Webinar [month] [date], [year]



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Ron Ambrosio noted that the Back from the Future work group will be scheduling presentations in the near future. He said the talk won't be kept on the GWAC website. But the presentation will be available on the GWAC Teams site for use by potential presenters.

Jaime Kolln said that Ron Ambrosio and Rahul Bahadur have done a great job pulling the team together to develop this slide deck. It will be available for Council to use in their own presentations as well. He thanked them for their work.

GRÍDWISE

Creating a Vision

What will the future hold for power grids?

- What is achievable, believable, and acceptable?
- What are the market conditions needed to get across the bridge?
- What step changes are needed to get there?
- Who are the targeted stakeholders of change?
- What's beyond the 25-year event horizon? 50-year? 100-year?

The Three 'Ds' – Guiding Principles

Decarbonization	Address the crisis of climate change by removing fossil fuels as a source of energy. Create policies and implement strategies to incentivize the growth of carbon-free sources in a sustainable manner.			
Decentralization	Develop operational, market and planning strategies and policies to maximize power system and societal benefits of distributed energy resource technologies and end-use customer participation in system operation and energy markets.			
Democratization	Ensure that policies for decarbonization and decentralization embody energy justice principles, with emphasis on the ability for local authorities, communities and customers to participate in the planning, deployment, ownership and economic operation of electricity assets, to achieve an equitable distribution of energy, economic, health and other benefits across all segments of society and the planet in general.			

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The work group hypothesized a future grid, there are many theories, this is just one:

• The Future – 25-Year Event Horizon Example

A Stake in the Ground: At least 50% believable, achievable, and acceptable

- 90% reduction of fossil fuel as primary energy source
- Grid architecture shifts to primarily distributed system
- Grid upgrades focus on DERs and bulk generation as equals
- Transactive Energy common across all customer segments
- Safe fusion-based energy sources demonstrated
- No coal-based energy sources on US Grid
- Natural gas source reduced by 50% from 2020
- Grid load increases by 80% or more!
- Continued electrification of buildings, cities, transportation



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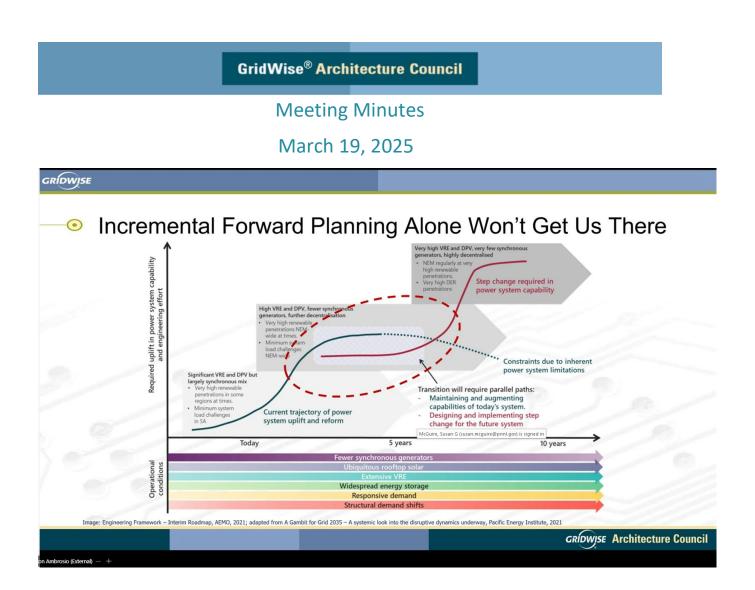
GWAC Vision/Future States Assessment

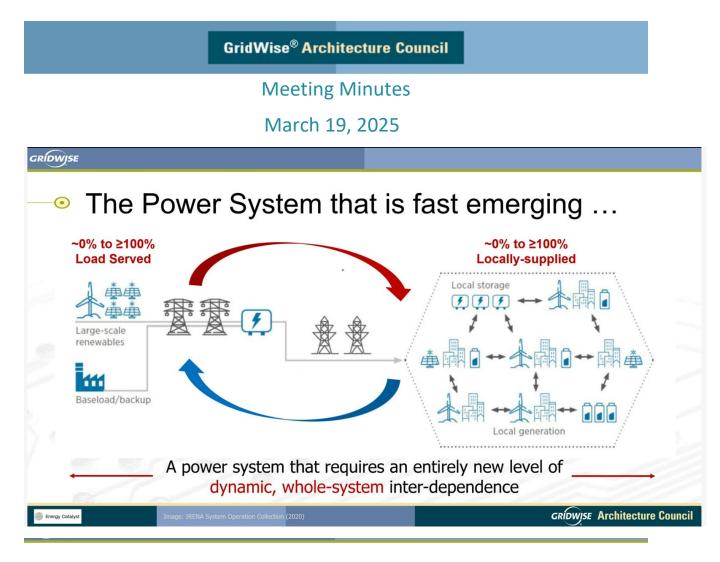
Objectives: to identify

- Stakeholders' visions/future states
 - Similarities
 - Differences
 - Divergence
 - Stakeholder impacts
- Architectural challenge categories
 - What grid architecture structural and technical challenges must be addressed?

Stakeholder Organizations

- CSIRO (Commonwealth Scientific and Industrial Research Organisation) Future Grid Forum
- DOE (Department of Energy) Office of Electricity
- EPRI (Electric Power Research Institute),
- GridWise Alliance
- IEEE (Institute of Electrical and Electronic Engineers)
 USA
- IESO (Independent Electricity System Operator)
- NIST (National Institute of Standards and Technology)
- **PEI** (Pacific Energy Institute)
- UTC (Utility Technology Council)





• Critical issues that Grid Architecture can identify

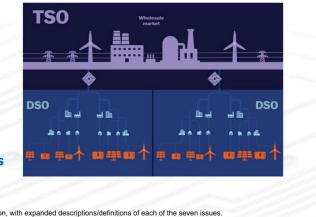
Architectural Issues that negatively impact the Operability, Resilience & Cost-Efficiency of a decarbonizing Grid

- 1. Tier/Layer Bypassing
- 2. Coordination Gapping
- 3. Hidden Coupling

Energy Catal

- 4. Latency Cascading
- 5. Computational Time Walls
- 6. Cybersecurity Structural Vulnerabilities

7. Back-end Integration Constraints



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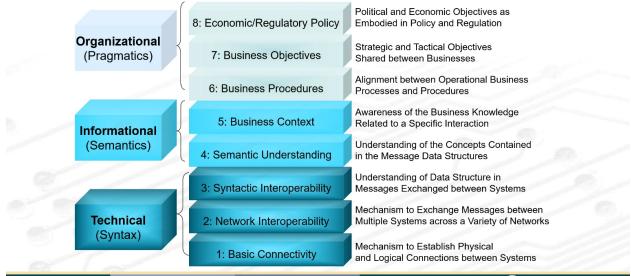
Javier Zarracina and Vox.com

Note: Detailed version of this slide is included in Backup section at the end of the presentation, with expanded descriptions/definitions of each of the seven issues

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GWAC Interoperability Framework



Relevance to Grid Architecture

- The GWAC Interoperability Stack is an important tool when applied to Grid Architecture
 - It provides a framework for identifying System Qualities & Properties of the Grid at all levels
 - Technical, Informational and Organizational
 - It defines key points of interaction/interoperability/integration
 - It allows experts to work within their domain, and understand the impact across the entire stack
 - Together with the NIST Smart Grid Model, they provide a consistent approach to design validation

Ron A. said that the presentation template is for those planning to give a talk at a future meeting. Ron is not sure that it should be put on a publicly available external site; it is designed to be a webinar presented by those familiar with GWAC. Ron A. will share it with Tim Schoechle who is very interested in it and asked to review it.

Tim said he wanted to read through it and provide a review of it as someone who works with these issues every day.

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Jaime said we need to put this through PNNL information release before we release it.

Ron A. said it is currently stored on the GWAC Teams site.

Ron B. said there are some sensitives with some points, and he will review those topics with Ron A. Ron appreciated that and was hoping to get that kind of feedback.

Ward Camp said that at the recent NARUC meeting he saw the prioritization again of coal plants in the new administration as one example of changing priorities.

Jaime Kolln recognized that Ron and Rahul have done a great job pulling the team together to develop this deck. It will be available for Council to use in their own presentations as well.

Rahul and Ron have done a great job pulling the team together to develop this deck. It will be available for Council to use in their own presentations as well. Thanks Ron, Rahul, and GWAC!

Jaime is excited about a webinar. We can start looking at when to host a webinar targeted to specific audiences.

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GWAC Strategic Outreach Plan

- Events
 - RE+ Las Vegas
 - Other presentation?
- Guest speaker recordings continue to be developed and published to YouTube
- Outreach through conference presentations
 - Slide deck developed with template and GWAC outreach slides.
 - Share the deck for "Building Back from the Future".
 - NARUC meeting colocation?
- Other organizations to "cross-pollinate" ideas with.
 - Identify liaison volunteers, e.g. INCOSE

Jaime asked if anyone was still working with the GridWise Alliance.

Ron A. said he used to meet with them but not much lately.

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He said they have been asking about our use of the GridWise term and trademark. He noted that PNNL has the legal authority of the trademark.

Ron A. said the current GridWise Alliance doesn't really understand the genesis of GWAC.

Jaime said he would like to find a GridWise Alliance representative for the Liaison report.

Jaime is also hoping to find a rep from INCOSE.

Action: Try to find GWAC Liaisons from both the GridWise Alliance and from INCOSE.

Jaime reminded everyone that the presentation that Ron A. gave today was similar to what was given at AHR in February this year by the Council. Jaime noted that the talk was well attended and well received, and he thanked all the participants.

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Title: GWAC Presents: Impacts of Building Decarbonization & Electrification on the US Power Grid **Description:** This seminar will provide the audience with a comprehensive understanding of the US power grid architecture principles & how the changes in the built environment are impacting grid services. We will discuss the impacts of decarbonization and electrification on the grid and the impacts of growth of distributed energy resources (solar, wind, micro and nano grids). Attendees will learn from experts in the design and implementation of smart building management systems that have the ability to directly integrate with grid services, incentives, and AI applications.





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RE+ 2025

- Next event is in Las Vegas, September 8-11
 - Discussing Monday F2F and GWAC/SEPA Tutorial with Aaron Smallwood
 - Followed by a GWAC + SEPA Mixer!!!???



Jaime talked recently with Aaron Smallwood, and RE+ is proceeding with our GWAC tutorial and F2F reservation. GWAC will have a mixer and SEPA is working to find some sponsorship for it. The mixer will be on Monday, the first day of the conference and it will be open to everyone. GWAC representatives can talk with attendees and explain who they can get involved.

Jaime asked if anyone has some ideas and interest about sponsorship please talk with Jaime and Ron Bernstein and they will get in touch with Aaron Smallwood about it.

If you are interested in attending and have travel constraints or need helping help getting rooms at a good rate, please reach out to Jaime or Susie.

GWAC F2F – Spring 2025

Jaime asked about the GWAC F2F at PNNL in April.

Aaron Snyder said he has already booked his hotel.

Ron A. can't make it in May, June or July due to a family issue.

Jaime suggested doing a Doodle Poll with April and May dates.

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Jaime also mentioned holding a GWAC meeting during the NARUC meeting

Mark Ortiz is interested, and he will try to offer us a place to meet through his company. They have a hub and a couple of labs. The Andover Microgrid lab is in downtown Boston. He cautioned though that hotels are quite high in Boston in Summer.

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Kay is not on today.

May for a F2F is more realistic.



Grid Architecture for Regulators

- Team members: Lorenzo Kristov, Kay Aikin, Larisa Dobriansky, Jeff Morris, Mark Paterson, Farrokh Rahimi, Chris Villarreal, Ron Bernstein, new: Peter Fitzgerald, Marc Costa, Shawn Chandler
- White paper will be aimed primarily to GWAC community:
 - Document experiences, observations & lessons learned from the use/non-use/value of Grid Architecture in policy & regulation venues
 - Provide a basis for strategies to promote Grid Architecture among policy makers
 - Paper will be a living document, starting with a few initial case studies and adding new case studies as available
- Initial case studies
 - U.S. FERC Order 2222
 - State Xcel Minnesota rate case; CPUC High-DER docket
 - Municipal Portland Maine
 - International Ontario, Canada
- Tentative target date: Someday in the future...

Lorenzo Kristov said this slide is a little out of date, he can provide a newer one. The group is meeting twice a week. The group has come together about high level ideas of the paper.

The goal is to provide real life examples and to address issues that regulators are actually dealing with. The intent is to provide helpful guidance and support for regulators for decisions they face rather than talk abstractly about Grid Architecture. He also said regulators have a hard time retaining the term "Grid Architecture." Generally, they are interested in the technology, but they forget it after the meeting.

Each meeting they discuss a particular issue. One recent example is for the proliferation of DER deployment how will third parties want to invest? How do they get information about grid capability on capacity in different areas and how to design the product so that it will be the greatest benefit.

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More substantive discussion is needed before they decide what the final report will look like.

Lorenzo said he is encouraged by the enthusiastic discussions .

They will put together material based on discussion topics. They will incorporate written materials into the report. People have been enthusiastic.

Jaime suggested some templates.

Marc Costa said some analogies would also be helpful. Something to help legislators describe topics about energy. Like "chives on a baked potato."



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Applying Grid Architecture Concepts to Bridge Back from the Future Grid

Building on the previous GridWise Architecture Council work products, this document attempts to provide a rationale for operators, planners, developers, integrators, and policy makers to explore a Bridge Back from the Future approach to develop transition plans the grid of the future as described in the future states. This paper will include discussions of motivating participation of customer owned assets and opportunities for avoided costs by working toward a long-term vision rather than only short-term needs. This document will be completed in FY25.

Schedule: 1) Mark is currently editing based on committee's input in last meeting 3) Revised Draft version 2 – shared at the March 6th meeting

- Committee : **Mark Paterson**, Marc Costa, Ron Ambrosio, David Forfia, Kay Aikin, Lorenzo Kristov, Farrokh Rahimi, Aaron Snyder, Shawn Chandler, Nicholas Domich
- 2:00 PM PT/ 5:00 PM ET Thursday 2 times 1st and 3rd Thursday of the month

Ron Ambrosio said that Mark Paterson is doing a rewrite on the white paper to make it more concise, and to delete some of the repetitveness. His goal is to have it ready in time for the next call in about a month. Jaime said that Kay had mentioned some repetitiveness.

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Grid Architecture Concept Model for Transportation Electrification

Analyze various visions of the electrification of fossil fuel-based systems and identify areas where GWAC concepts could provide architectural value to bridge and coordinate between customer and grid objectives. Electrification will introduce dependencies such as those seen in the transportation sector due to electrification. Grid Architecture will be used to describe the touchpoints (for example through sector coupling) that will require collaboration. GMLC reference cases will be included. This activity will take place in FY24 and be completed FY25.

•15-20 page whitepaper

•Committee: Jaime Kolln, Ron Cunningham, Farrokh Rahimi, Mark Ortiz, David Forfia, Aaron Snyder, Lorenzo Kristov, Bhaskar Mitra, Paul DeMartini, Shawn Chandler

•1:00 PM PT/ 4:00 PM ET, 2nd and 4th Tuesday of the month

Ron Cunningham said the next meeting is next week. He said there have been some assignments. They are putting together the key concepts that they want to carry forward. He noted that with this paper they will not get into the design concepts, they need to stay at the higher level.

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Liaison Reports

- NIST David Wollman
- Green Button Jeremy Roberts
- EPRI Ben Ealey
- IEEE PES Farrokh Rahimi
- ASHRAE, DLC (Design Lights Consortium) Ron Bernstein
- ISO/IEC, IREC Ken Wacks
- SEPA Aaron Smallwood
- NARUC Jeff Morris
- Are there other organizations we should be hearing from?

Liaison reports

NIST – Dave Wollman is not on the call today.

Jereme with Green Button said they are now in phase 2, working with fake data for now. They will host a meeting at 10:30am on Tuesday at DistribuTech and it is their annual meeting. Everyone is welcome, reach out to Jereme for more information. Even if you don't register, they will still let you in.

Jereme gave a link to the Green Button meeting website. The home page includes some recorded talks for the meeting including an interview with Chris Irwin conducted by Jereme Roberts:

Green Button Alliance 2025 Annual General Meeting <u>https://the-gba.org/2025-agm</u> Tuesday at DISTRIBUTECH in Dallas Featured Speaker: Chris Irwin (recorded)

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Ward asked about the platform.

Jeremy replied that they are building a new platform from scratch. National Grid has a platform and Con Edison.

Ward said the green button platforms are not standard or uniform.

Jeremy said there were some proposals to do regional platforms, but funding was an issue.

IEEE – Farrokh reminded everyone of the IEEE Energy & Policy Forum to be held in Washington DC the week of April 14. Farrokh will not be participating in that one.

The IEEE PES General Meeting will be held the week of July 17 in Austin, Texas.

ASHRAE - Ron Bernstein is coauthor for a new article in the ASHRAE Journal on building automation and cyber security concerns. Jim Butler with Cimetrics is the co-author, he is an IT and Cyber Security expert. They are trying to elevate industry on concerns about integration both internally and externally to other services like grid services.

GWAC members who attended the AHR Expo GWAC Panel met with some of the Design Lights Consortium group in Orlando in February. Design Lights Consortium recently released a toolkit. It highlights the energy efficiency side of integrating both of HVAC and lighting systems and what the opportunities are for advancement there.

ASHRAE Journal article on Cybersecurity: https://www.ashrae.org/technical-resources/ashrae-journal

DLC HVAC-Lighting Tool Kit: https://designlights.org/resources/reports/nlc-hvac-integration-toolkit/

SEPA - Ron Ambrosio gave an update about SEPA. He and David Forfia are both on the Research Advisory Council. He said that the Grid Architecture work group is going well. Ron Cunningham leads a working party on developing a transactive energy ontology. A lot of the work is based on the Council's work in that area.

SEPA has been trying to cross fertilize the various working groups to get more engagement across the board and it helped membership and involvement.

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Upcoming GWAC Meetings

Date	Topic or Speaker	Format	Other
March 19 th , 2025	Monthly GWAC	Virtual	Teams
April 16 th , 2025	Monthly GWAC (not F2F)	Virtual	Teams
May 21, 2025	TBD as virtual or F2F?		

Jaime Kolln noted that the GWAC April meeting may be a Face-to-Face meeting.

The GWAC May meeting will be scheduled soon.

Jaime noted that more GWAC monthly Speakers are needed, if you have ideas please contact him.

Chair Ron Bernstein thanked the new members for joining the meeting and all the attendees and adjourned the meeting.