GridWise® Architecture Council

Meeting Minutes

May 18, 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

Ron Cunningham, IT Enterprise Architect, American Electric Power

Paul DeMartini, Managing Partner, Newport Consulting

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

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

Leonard Tillman, Partner, Balch & Bingham, LLP

GWAC Associates & Emeritus

Mark Knight, 1898 & Company

James Mater, Quality Logic

Jeff Morris, Schneider Electric

Ken Wacks, Home, Building & Utility Systems

GWAC Members and Assoc. not present

Rahul Bahadur, VMWare, Inc.

Andrew Bordine, VP Energy Mkts & Innovation, Anterix

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

Ahlmahz Negash, Sr. Engineer, Tacoma Power

Mark Paterson, CSO, Strategen

Aaron Snyder, Dir. of Grid Tech. Consulting, EnerNex

Chris Villarreal, President, Plugged In Strategies

GWAC Guests

Hyewon Chung

Marc Costa, the Energy Coalition

Larisa Dobriansky

Dave LeVee

Elizabeth Sisley

Aaron Smallwood, SEPA

David Wollman, NIST

PNNL Support

Susan McGuire, GWAC Coordinator

Ron Melton, Acting PNNL Administrator

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Chair David Forfia opened the meeting with quorum reached.

Ron Melton reviewed the agenda and noted that Ken Wacks will give his Liaison reports early because he has a conflict this morning.

ISO/IEC - Ken Wacks chairs the committee developing a family of international standards called the "Home Electronic System" (HES).

These standards cover networks, devices, and applications for home and buildings systems including energy management. This committee met every day last week including Sunday via Zoom.

Meetings will resume May 26 for a few more days. Discussions will focus on Energy Management, Gateway and Cyber Security, Interoperability and Energy Storage with good international participation. IREC - Customer Grid Edge Committee (Ken is the chair) meets every other Friday at 1:30pm ET. The next meeting is May 27. The focus last week was on the Modular Communication Interface for Energy Management (ANSI/CTA-2045 standard) and deployment in CA, OR and WA. They will continue with a discussion about interfacing with regulators state by state to set up an environment favorable toward DER especially solar installations.

The IREC CGE meeting is open to anyone and there is no cost.

Anyone interested in joining the International Standards Committee meetings can contact Ken Wacks at KenWacks.com for contact information.

David Forfia asked if there were any changes to the April Meeting minutes. Susie noted that changes were received regarding the Liaison report by Ken Wacks and those minor changes have been made.

David asked for a motion to approve the minutes and Farrokh Rahimi gave the motion and Gerald Gray seconded the motion. There was no further discussion and no objections were made. The April GWAC meeting minutes were approved.

Farrokh Rahimi asked who was planning to attend DistribuTech. Farrokh said that OATI would have booths at the conference and he would be available at the OATI booths. David Forfia, James Mater and Andy Bordine would be attending also.

Ron Melton asked who would be at the IEEE PES General Meeting and Farrokh Rahimi, Ron Cunningham, and Hayden Reeve, all noted they are planning to attend the meeting in Denver in July

Andy Bordine noted the EEI annual meeting in June and asked that it be added to the conference list.

Action: add EEI June meeting to the conference list for May. (done)

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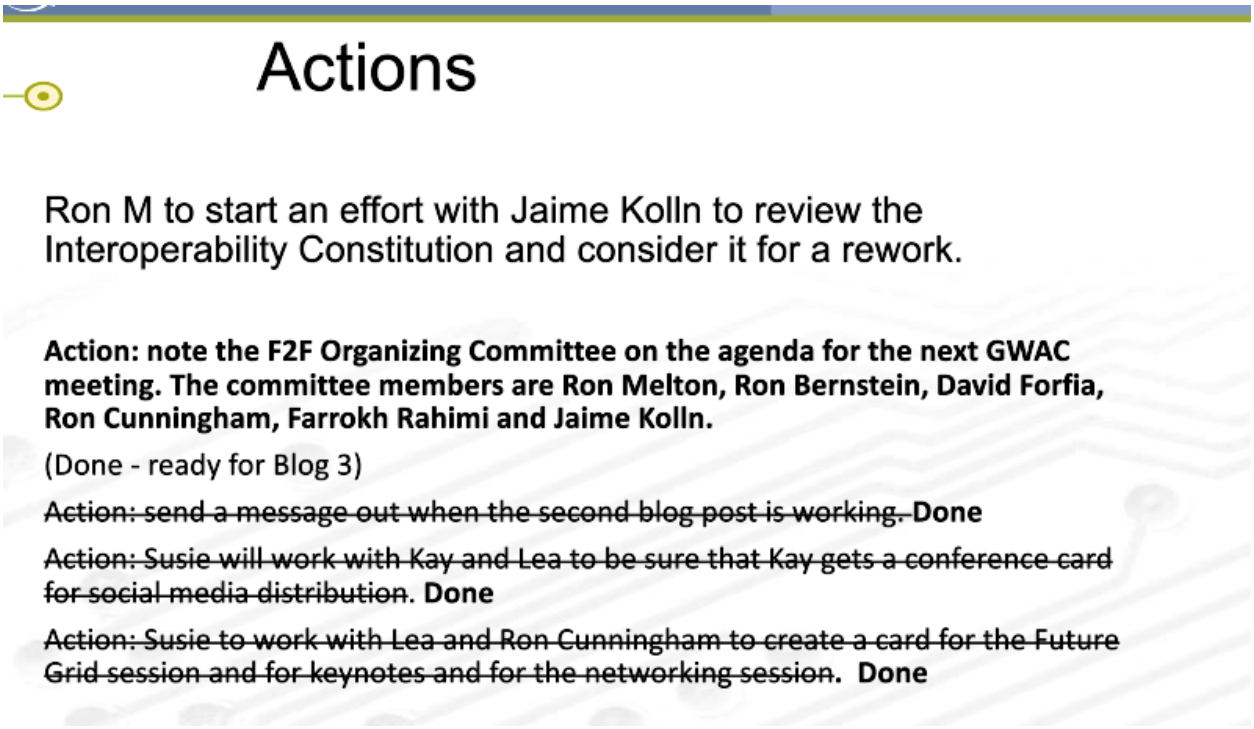

Ron Melton reviewed outstanding action items.

Ron Melton introduced Paul De Martini who presented a talk on "Considerations for a More Distributed Future by the Pacific Energy Institute, a think tank that Paul started in 2020 for thought leadership on a more distributed future. GWAC familiar include key participants are Mark Paterson, GWAC and Jeff Taft, PNNL retired.

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Paul

New think tank that he created.

Paul De Martini

Paul De Martini is the Executive Director of the Pacific Energy Institute. Paul is a leading expert on the business, policy and technology dimensions of a more distributed power system. His extensive writings and consulting work have influenced industry transformation efforts in Australia, Canada, and across the US.

Paul was previously the Chief Technology & Strategy Officer, Energy Internet of Things at Cisco Systems and Vice President, Advanced Technology at Southern California Edison. He was a visiting scholar at Caltech (2012-2020), 2016 Cazier Resident Practitioner at Pardee RAND Public Policy School and Fellow at Wharton Business School (2003-2009).

Paul holds an MBA, University of Southern California, BS, Applied Economics, University of San Francisco, and Certificate in Technology Management from Caltech. He is a California state certified Electric System Operator and a senior member of IEEE-PES.

Brief of his career.

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Pacific Energy Institute

Addressing the need for independent, informed and balanced perspective on the complex issues related to a more distributed electric system.

We seek to change the conversation by drawing upon leading insights from across the Pacific Rim, to inform decision makers in the transformation of electric networks.

Distilling this rich set of provincial, country and regional insights into actionable strategies that can facilitate policy, business strategy and regulation worldwide.

Our tailored research and analytic approach is based on sound system engineering and economic principles that shape simpler, practical solutions to achieve sustainable outcomes.

www.pacificenergyinstitute.org

- We strive to translate complex, difficult issues into simplifying strategies that facilitate sustainable outcomes.
- We challenge conventional thinking with innovative solutions that strive to simplify the complexity.
- We present credible and practical perspectives on the potential role of distributed resources, electrification and electric networks in our society.
- We seek creativity and open innovation with a diversity of leading researchers, thinkers and practitioners across the world.

pacific energy INSTITUTE

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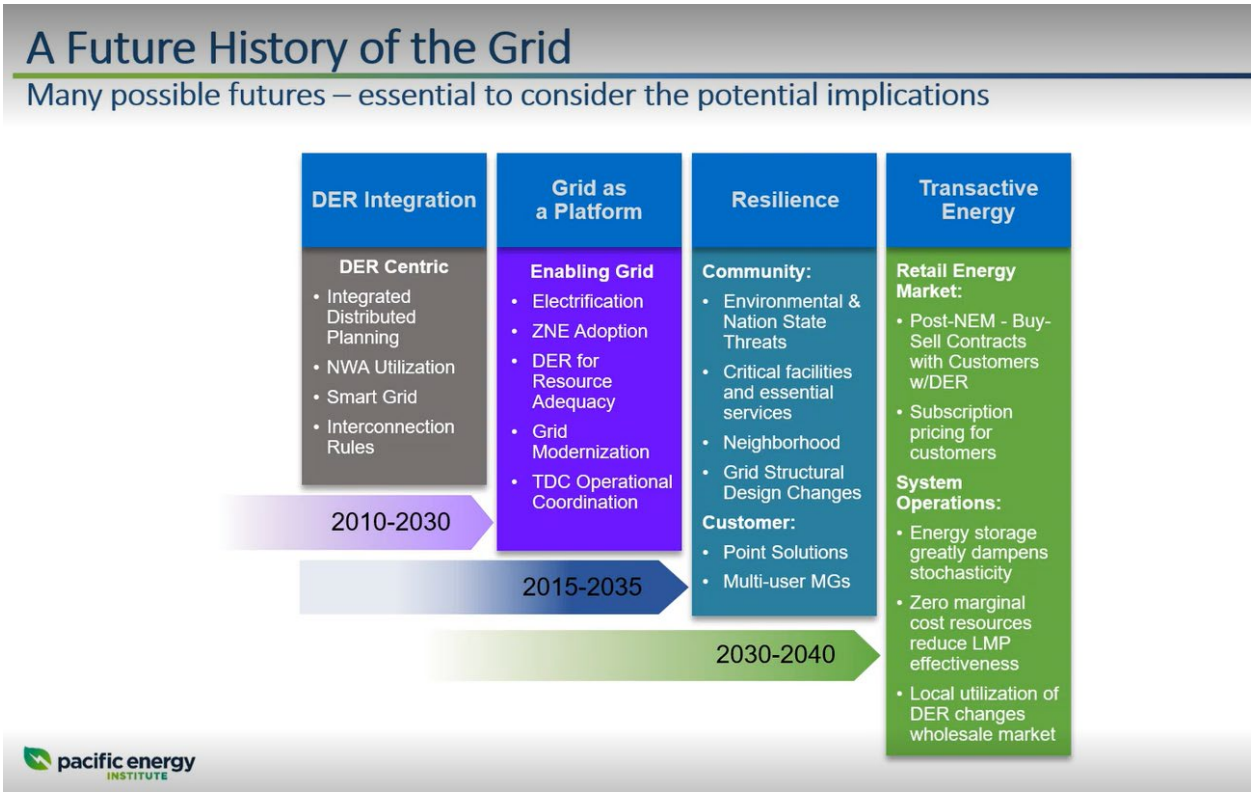
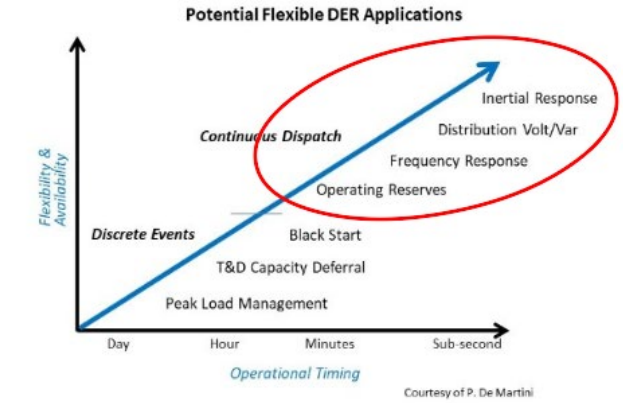


Gerald Gray had a comment on demand response and the need for greater detail and noted that EPRI has observed how demand response is designed by various groups around the world. The challenge that they have seen is not the specificity, but the implementation and execution of the services have been very difficult to use. For the ease of use once it is defined, they see various implementation. Where utilities have designed a demand response service, maybe at the request of regulators, they see large loads and they have decided it is too complex and they have dropped out of it. So even where there is an uptick people drop off. This is an example of what is and isn't working in DER.

Paul replied by going to the slide shown below. He said he sees what Gerald says is an example of being disruptive to the customer which he had mentioned. He said that many demand response programs are pretty crude in how they track change reductions. Many residential programs use three day baselines which is not adequate. He said approaches need to be more imperceptible. We need capabilities that do not disrupt the customer. There are opportunities to think about more advanced and autonomous operations.

Grid Needs & Customer Empathy Considerations

"Customer centricity has not been the focus of rate design. Cost centricity has been the driving philosophy. That's why enrollment rates are minuscule." Ahmad Faruqui



Paul noted that engaging with customers should not disrupt their personal life, which these charts represent.

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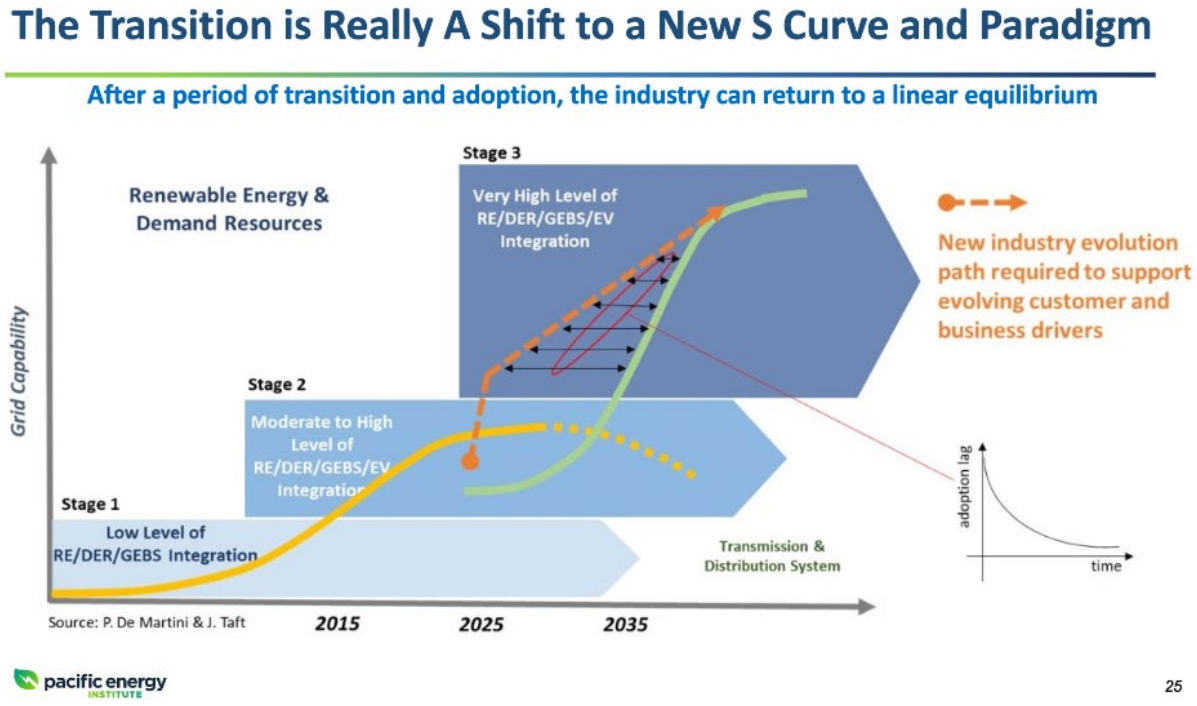


Larisa Dobriansky asked about regulatory reform coming into play and influencing new structural outcomes. She said NY has a system that identifies barriers but most use fragmented approaches to incentives. She asked if regulatory reform can be a means for more constructive change and needed investments.

Paul replied saying the simple answer is yes and he gave some examples including better architecture which is noted on the second "S curve." He commented about how work such as the work at PNNL and Sandia can inform regulators and he also noted the complexities of investment decisions.

Larissa commented on some of the barriers and fragmented approaches to incentives and compared this to the past revolution in the telecommunications industry where technology outpaced regulation and, in the end, resulted in a lot of litigation. She is hoping that kind of situation can be avoided and she feels we have the capability to do that in the electricity sector.

Paul mentioned a couple of white papers coming out soon including one by Mark Paterson, GWAC, on institutional transformation. There is another paper by Eric Ackerman and John Caldwell, which is in final draft and available soon on stress testing the regulatory compact.

Related chat post:

[10:48 AM] Kay. Aikin (Guest)
I think what as an industry we are missing are the lessons from the software industry and proper software architecture principals (encapsulation, loosely coupled systems), graph (fractal structures),

object orientation, microservices. The software industry and the internet has generally got this right but in the utility industry the push back to these ideas is intense.

James Mater about stage 2 metrics such as with So Cal Edison, where would they be with regard to stage 2. He also asked if Paul sees vendors working on stage 3 that we will be needing.

Paul said that with these three stages which he developed about eight years ago, the transition from stage 2 and stage 3 with battery storage is going to be at about 30%. He said it isn't just about grid impact but it also is about business processes and participation and also regulatory and related issues. He said Southern Cal Edison is now at the top of the yellow S curve and noted their paper on reimagining the grid that is an articulation similar to the green S curve on the graphic. They are designing a pathway to that green S curve. There is more to be done. He suggested looking at their reimagining the grid paper.

James said it's more than penetration of renewables that defines grid capability. If utilities had a model that they could look at and put in parameters, like a maturity model, that would be really helpful for utilities.

Paul said he hasn't looked at what level of penetration you need to get to the second S curve.

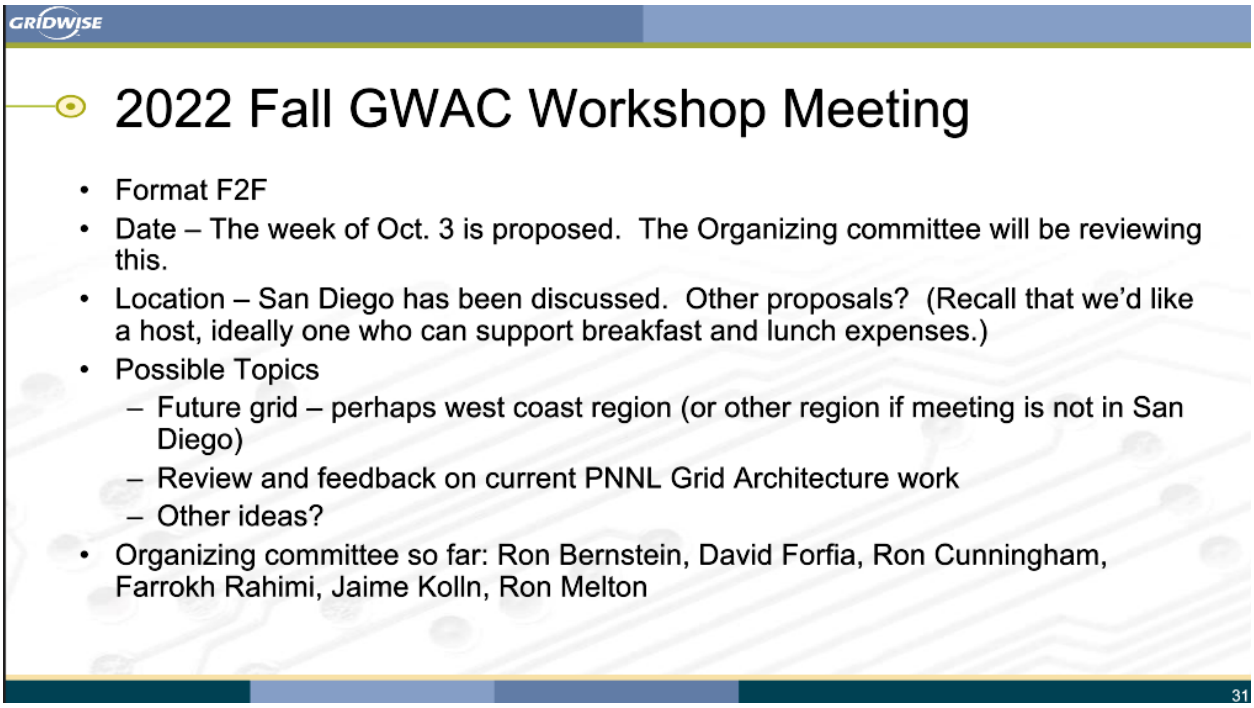
Jeff Morris asked about a reference to parse how digitized some distributed utilities are under with regard to substation interconnections with customers? The challenge we have whether it's a building platform microgrid or optimization EV charging - we are connecting to an analogue circuit on the other side of the interconnection…regardless of the tariffs you adopt they have no way to see this in real time.

Paul replied that for context stage 3 it is a highly transactive system and it's not just having high amounts of solar, battery, and so on, it's that plus with both distribution and bulk power systems, transacting energy across the distribution system not just at the bulk power system, it's also at the edge. He gave some examples. Stage 3 gets very sophisticated as you get further up the curve. You would need to have situational awareness on both sides of the meter, on the customer side and the grid side with more automation and more a sophisticated protection scheme.

Related chat post:
[10:58 AM] Larisa Dobriansky (Guest)
Dobriansky: Also, Paul, just a note that the DC Dept of Energy and Environment also has taken your graph stages and mapped out for the DCPSC what kinds of investments will be needed for each stage to meet DC's climate, clean energy and energy efficiency mandates to support each level of DER market penetration in the District. With that mapping, GRID2.0 matched the nature of the investments at each stage with the kinds of regulatory reforms needed to remove/minimize legacy regulatory barriers; level the playing field for all resources; and capture the value of new resources. The existing model for such regulatory reform/investment transitioning is the NY REV.

Larisa asked about the slides form Paul's talk and Paul said that they can be shared with the GWAC.

Action: Share Paul's slides with the GWAC (done)



Ron Melton noted that the F2F is tentatively planned for Oct 3 in San Diego. It will likely be Future Grid Oriented and will involve grid architecture work including process review.

Action: Susie to schedule a meeting of the Fall F2F planning committee

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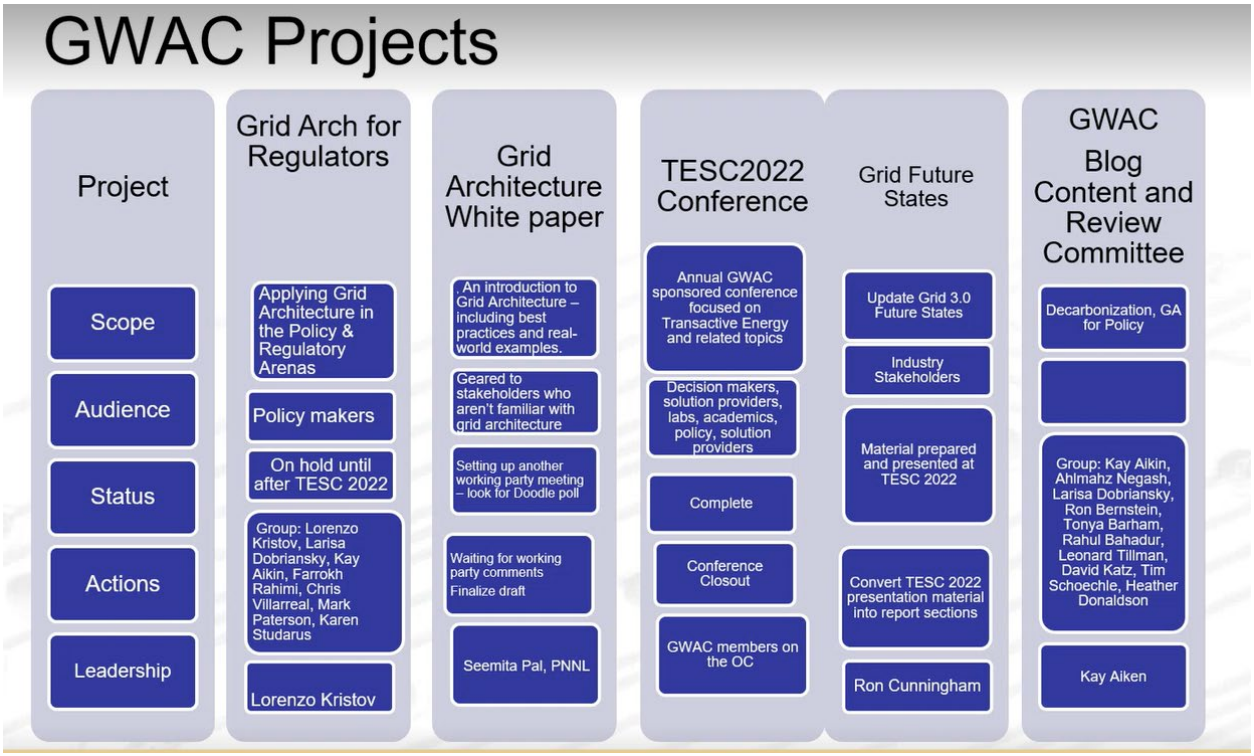

Activity Matrix

Ron Cunningham said the group is finishing the White Paper and they will leverage the feedback from the TESC 2022 conference. They will then go through the vetting process and get the paper out later this year. It is close to being done. The group will meet tomorrow.

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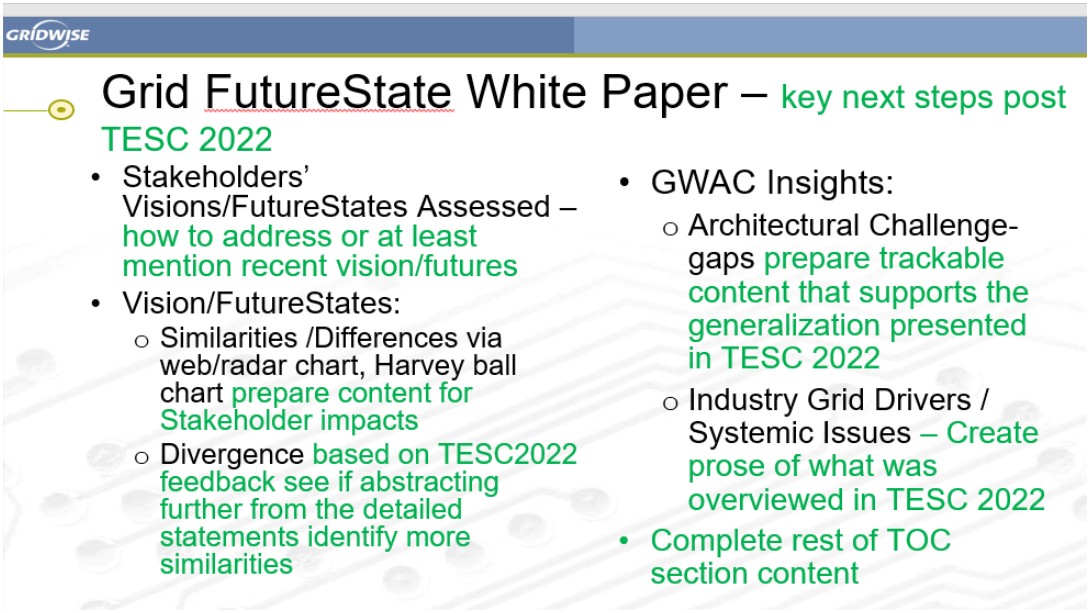


The next blog entry is ready. Kay will get information to Susie and she will get it posted on the website.

Action: Kay and Susie to collaborate on the next blog post for the website.

Seemita will be scheduling another meeting soon with the Grid Arch Working party.

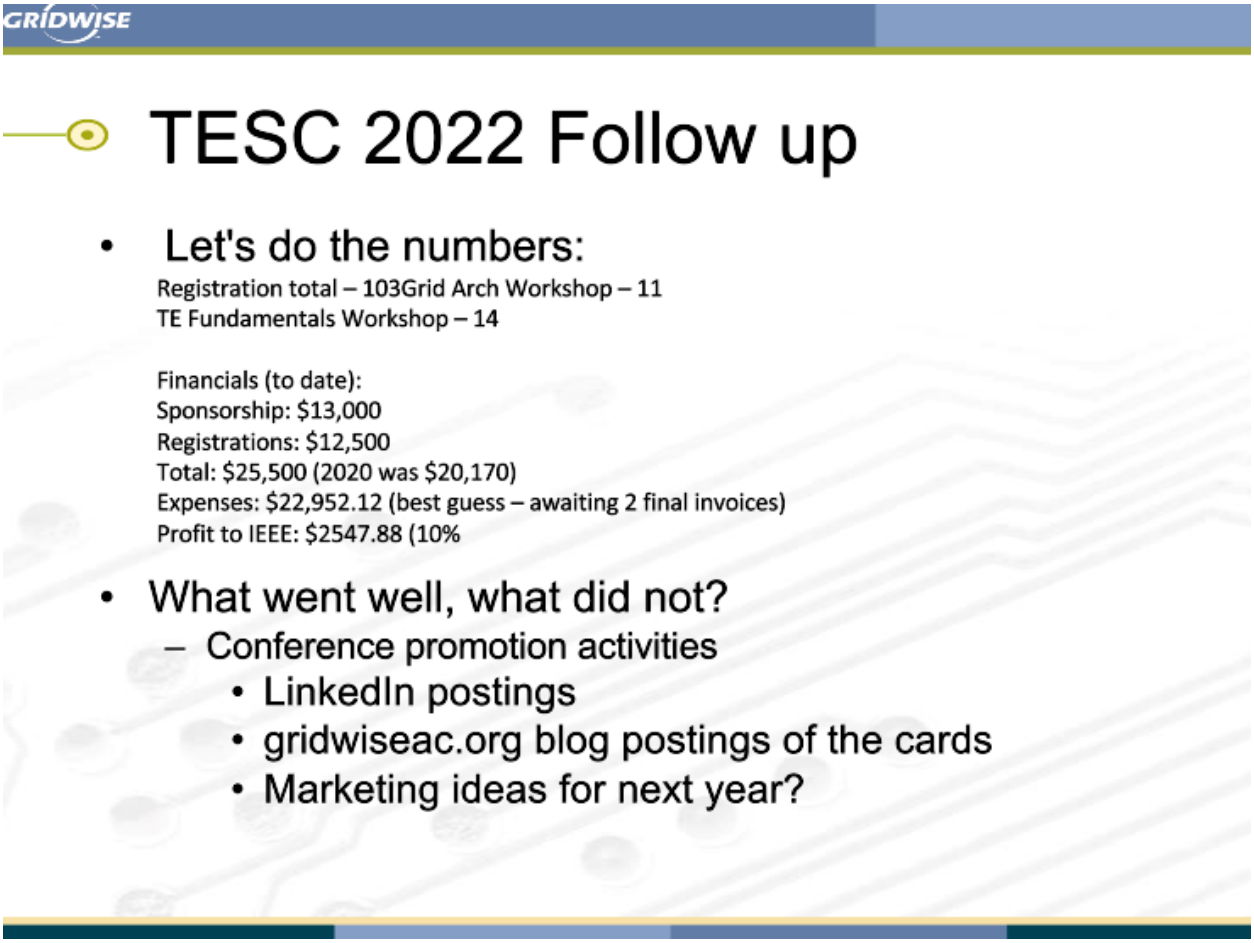
The companion doc, the SEPA Grid Architecture primer will be published soon.

David Forfia noted that the primer is an excellent resource and he recognized Seemita's efforts to pull this together from the SEPA work group and bring the group together.

Ron M. noted that Lorenzo was unable to attend today but he will be resuming work with the Grid Architecture for Regulators group.

Jeff Morris asked to be invited to the Grid Architecture and Regulators group.

Action: Susie to let Lorenzo Kristov know that Jeff Morris would like to be included in the Regulatory work group meetings. (Done).



Ron M. gave the final 2022 TESC numbers summary, Ron Bernstein was not available.

Ron thanked the TESC 22 Sponsors for their strong support for this event. This really made a show of support for the conference.

Ron said that participants had given good feedback as to the quality of the meeting.

Farrokh said that he liked spatial chat for the poster presentation sessions. The poster session had very active participation. He said that it really is a good benefit to virtual meetings.

Farrokh asked about Xplore. He completed the paperwork. Now the papers need to be uploaded.

Susie will talk with Roseanne Jones at IEEE about this.

Action: Susie contacted Roseanne and she is working with Farrokh on actions needed for Xplore.

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David advised the group to start planning the next TESC conference as early as possible. He also noted that if the conference will be held in person even more time will be needed that with a virtual conference. Next May is only 11 months from now.

Ron Melton expressed hearty appreciation to everyone who helped with this year's meeting.

Ron noted that the SEPA Grid Arch (Smart Buildings and Loads) subcommittee for IEEE, Masoud leads it currently. There will be a meeting of the group at the upcoming IEEE PES General meeting next week.

Action: Ron will get the time of the SEPA Grid Arch subcommittee meeting to Farrokh and to anyone else who is interested.

Ron noted that for the GWAC June meeting Melanie Johnson, USACE is scheduled to speak to the group on Microgrids. Ron Bernstein has invited her to speak.

Marc Costa with the Energy Coalition will speak at the GWAC meeting in July. He will give us a summary from the IAEA meeting that he will attend before then in Europe.

Regarding the next TESC Face to Face meeting, Marc Costa said if the meeting goes to California, he will help us to try to find a venue. He would be happy to be included in the planning meetings to help out as needed.

Action: add Marc Costa to the GWAC F2F planning meeting. (Done)

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

NIST - David Wollman got their newsletters so that they are webpages.

He had several updates and provided the links. He noted to Ron Melton that bifacial means both sides.

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NIST update: Our latest NIST Smart Connected Systems Division newsletter is available at https://content.govdelivery.com/accounts/USNIST/bulletins/316578e

One item to note is "NIST Launches Photovoltaic Array to Research Distributed Energy Resources on Grid" – we have now commissioned a bifacial research PV array on our Gaithersburg MD campus, with some technical details in the newsletter article.

Also, our newsletter repository is now at https://www.nist.gov/ctl/smart-connected-systems-division/smart-connected-systems-division-newsletters

NIST Smart Connected Systems Newsletter - May 2022

EPRI - Gerry Gray - EPRI has launched a three-year climate initiative. The website is located at https://www.epri.com/READi

The Launch was April 28th. He provided a link to the press release for it as well.

- Press release: https://www.epri.com/about/media-resources/press-release/5gC3CMLgFkSucyyVUD6Gsh
- For more information, please contact ClimateREADI@epri.com

Farrokh noted that Ron already mentioned the IEEE PES General meeting in Denver in July. IEEE Has been involved with blockchain in energy and TE is an important part of that. There are some position papers that Farrokh was involved with. They call it BCETE, a Blockchain Enabled Transactive Energy initiative. Ron and Farrokh are both involved in this. The Blockchain Energy Standard, P2418.5, is under Smart Buildings, Loads Custom Systems. There is another initiative that is ending and they are looking for new ideas. TE is an important part of it and also Grid Architecture.

Ron Melton said that if people are interested in hearing more on this topic, we should be able to arrange a presentation by one of the leads of the IEEE blockchain efforts. Perhaps for August or September.

Action: Possible speaker from SEPA on future blockchain and TE related initiatives (Aug, Sept)

Gerald add that there is another IEEE blockchain related standardization effort had crossed his desk. It is 4207 he thought. He thought it was related to GWAC work. Farrokh said it sounds like Interoperability. It would review standards and see to what extent Blockchain could be aligned with it and with BCTE activities.

Marc Costa asked also if there are international participants on this effort.

Farrokh said that PES is international but they are not doing standards. IEEE is working on standards.

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Ron noted that P2418.5 is now an individual standard and is under the buildings and loads group, it's no longer an entity standard. So individuals can be involved now and there are international participants.

Gerald added that EWF is based in Berlin Germany. The number of use cases being developed in Europe is probably a year ahead of US projects. They have invested heavily in pilots.

Ron M. noted that Umit Cali is from Europe. Farrokh said he is at a University of Technology in Norway but he also has had work in Germany and previously he was at NCSU.

Ron M. noted that there will be an ASHRAE meeting in late June in Toronto. GWAC will be sending David Forfia and Ron B. to this conference to give a talk on Smart Buildings as a Transactive Energy Hub if all the PNNL approvals come through.

SEPA - Aaron Smallwood noted that SEPA has released a decarbonization paper which talks about the different levels of decarbonization. Key factors to foster interregional collaboration. It is a summary of coordinated efforts with some new ways to think about this. They also are starting the 2nd Utility Transformation Challenge and they have published a blog about it. It is informed by a survey they had done. The Energy IOT report has also come out.

Aaron also announced that in June the results of a multiyear NIST SEPA effort for EV fleet charging using 2030.5. It will be published next month. It talks about groups of charging stations.

https://sepapower.org/resource/tiers-of-electricity-decarbonization/

https://sepapower.org/resource/coordinating-for-transmission-development/

https://sepapower.org/knowledge/previewing-the-2022-utility-transformation-survey/

https://sepapower.org/resource/cybersecurity-guide-for-securing-energy-iot-interactions-with-the-power-grid/

https://sepapower.org/resource/ev-fleet-managed-charging-use-case/

Ron M. thanked everyone for attending today.

David noted that the next meeting will be June 15. He asked for a motion for adjournment and Farrokh gave the motion and Ron Ambrosio seconded the motion.

David thanked Paul De Martini for his presentation today and adjourned the meeting.