

Meeting Minutes

Feb. 11, 2018 – F2F hosted by AEP, Tulsa, OK

GWAC Members

David Forfia, Director, Enterprise Architecture & IT Transformation, Electric Reliability Council, TX

Ron Ambrosio, Chief Scientist, Utopus Insights, Inc.

Tanya Barham, Director of Operations, PECl

Ron Bernstein, President, RBCG, LLC

Stephen Knapp, Vice President of Quality Assurance & Energy Markets, Power Analytics Corporation

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

Doug Houseman, Grid Modernization Lead, Burns & McDonnell

James Mater, Co-Founder and Director, QualityLogic, Inc.

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

Thomas Sloan, State Representative, State of Kansas

Leonard Tillman, Partner, Balch & Bingham, LLP

GWAC Members not present

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

Joe Hagerman, Deputy Chief Scientist, NRECA

GWAC Associates & Emeritus

Ron Cunningham, AEP, Meeting Host

Ken Wacks, Home, Building and Utility Systems

GWAC Guests

Trevor Gionet, Introspective Systems LLC

Dave LeVee, PwrCast

Stuart McCafferty, Black & Veatch

Aaron Synder, EnerNex

David Wollman, NIST

PNNL Support

Ron Melton, GWAC Administrator

Susan McGuire, GWAC Coordinator

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Ron Melton reviewed the agenda for the meeting.

Ron reviewed the details of the next TESC 19 meeting. Farrokh and Ron will break out of the Face to Face meeting for this call later today. Roseanne Jones of IEEE will be on the call.

GWAC administrative business

The meeting minutes from January have been distributed to the GWAC for review. Farrokh Rahimi sent in some comments and these have been incorporated to the master copy.

Leonard Tillman made a motion to approve the January GWAC online meeting minutes; Ron Bernstein seconded the motion to approve the minutes.

With no additional discussion, David Forfia asked if there were any objections and hearing none, asked for a vote. He announced the minutes were approved at 8:55am Central Time.

Review Action Items

Ron Melton still needs to talk with Jeff Katz about the white paper, that hasn't happened yet.

Ron Melton continued with the review of action items from the previous meeting.

Ken Wacks asked Ron to update the letter that Mark Knight had written regarding the TE Interoperability a couple years ago to serve as the transmittal for the TE Roadmap paper which is to be submitted for consideration to the IEC/ISO as an international paper. Ken is willing to then take it to the US meeting on March 5. Ken had emailed Mark's letter to Ron Melton to be edited to reflect that Ron is now the acting GWAC administrator.

Action Ron: To rewrite the letter about the TE Roadmap and send it to Ken Wacks

Ron Melton, Farrokh Rahimi and Dave Wollman will be at the ISGT meeting next week. Farrokh noted that there will be a Transactive Energy Blockchain panel on Monday and a tutorial on Sunday. On Wed. there is a resilience workshop and then a GWAC panel in the afternoon. Mark Knight will present on buildings as a resilience hub.

Ron reviewed the additional GWAC related meetings and noted to add the SEPA Grid Evolution meeting.

Ron reviewed the Grid 3.0 effort and provided some background. He would like to see GWAC continue to revive and support this effort.

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› Grid 3.0 Reminder / Refresh

- Grid 3.0 is an informal collaboration
- Grew out of discussions in 2014 / 2015 about refreshing SGIP technical agenda
- NIST hosted 2 day workshop in March 2015
 - Panel sessions followed by breakouts to identify desired grid future states
- Future states chosen for further efforts: Interoperability, architecture, communications
- One or more meetings held for each

Ron Melton made the comment that the Grid 3.0 is not a formal group and they meet as a subset of other meetings. He noted that Don VonDollen and Eric Guenther began the meetings in 2014 as a what's next for SGIP. Some one day workshops were held which began the effort. The focus was to determine the desired future grid states.

Grid 3.0 past minutes were reviewed.

Grid 3.0 Future States

1.0: Policy, Regulation & Business Model

- A) Develop and publicly document a well articulated, industry shaped consensus on future states of the electric power grid through a collaborative process
 - Issues
 - Wide range of opinions, vested interests and entrenched positions
 - Gridlock in the Federal Government
 - Lack of staff education in the Federal Government
 - Lack of a “burning platform” for moving a policy forward
 - Federal Spending Caps
 - As a means to provide policy makers, including Congressional staffers and members (Federal, state and local levels), with both process and understanding
- B) A clearly defined set of regulatory models with a clear understanding of the jurisdictions of the state and federal regulators
 - Issues
 - Lack of a coordinating organization to drive a spectrum of future regulatory models

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Some early meetings had had high attendance, around 200 people. At the time Smart Grid was still a controversial term. NETL was involved with it also.

Trevor Gionet posted a link to a paper on this: Smart grid initiative PowerPoint. Link to “Laying the Groundwork: Smart Grid Basics at <http://www.ncsl.org/print/energy/Bane4-24-08.pdf>

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Looking at future states in the early meetings, topics such as architectures and operability, were among the technical focus. They looked at what type of capabilities and awareness would be needed.

Ron Melton noted that now that SGIP is gone and it's not certain if SEPA will continue this effort. Doug Houseman noted that he and David Wollman had tried to line up groups that are active in the topical areas and could lead the effort.

Ron Melton thought that the GWAC members could make a strong contribution to a renewed Grid 3.0 effort. He added it to the agenda to get everyone up to date on the current Grid 3.0 direction. He said that GWAC could lead this effort but noted that at this time Grid 3.0 is an informal coordination and collaboration with people from various organizations. There is a larger set of interested people and also a leadership group that meets every other week. There are two Grid 3.0 email lists; the leadership group is about 20 people, and then then the larger group. Aaron Synder mentioned that Eric Guenther had organized a Grid 3.0 meeting in 2016 shortly before he passed away. Don Von Dollen championed it after that and more recently Ron Melton has taken it back up.

James Mater asked who is driving the effort and putting up funds. Ron said that PNNL has supported the last meeting as a subset of a GWAC meeting, and he had support for the GWAC efforts from Chris Irwin, DOE. He said that it is an opportunity to shape future direction and to have GWAC associated with it.

Ron asked David Wollman how NIST views Grid 3.0. Dave said in the beginning a path was needed for driving momentum and it was found to be a useful communications channel and a chance to check in with peers. If a driver emerged and a sponsor that would be acceptable to NIST.

Ron said that he couldn't really answer James question to say if it was a sustainable effort. James said he would like to find the next interesting opportunity on behalf of his company. He would look at it in terms of what needs to be developed in the next 5 years, and how to fill in the interoperability in terms of standards and regulations. Ron Melton noted that DOE, NIST and EPRI all have efforts to support forward thinking and likewise does FERC, BPA, Edison, AEP, ERCOT, and Utopus.

Typically there are some specific areas such as Interoperability that still need attention. Stephen Knapp agreed with Ron Melton and had asked if the DER penetration landscape has changed, are we looking at lessons learned and inclusion of the new regulatory landscape? Ron Melton said he thought we should shake the dust off past efforts and account for things like faster than expected penetration growth. Stephen asked how to interpret reliability and potential end user outcome from a cost perspective – those answers would be his focus.

Lorenzo said he would add; how do we flip from viewing DER as users of the system to being resources that can provide Grid services? He said this has been important in Europe. Dealing with transmission, distribution, and who manages these, as well as control paradigms, and services provided (ie: voltage control) would be relevant topics. He said also to think of things that become DER revenue streams. Stephen and Ron Melton agreed with Lorenzo. Ron Melton said some of these issues are addressed by DOE in its current GMLC projects. Lorenzo added DER, and customers behind the meter. Stephen is working on penetration behind the meter and the unrecognized loads and resources that utilities don't

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have a handle on. Stephen also asked about the new settlement dynamics that utilities and regulators have to start looking at. Stephen noted that Incentive Contracts are an issue as well.

Stephen also said that one of the biggest issues with Grid 3.0 are finding what issues should be interoperability standards. He noted that one might say “anti-interop” – barriers to entry for a small company. He noted it would be good to clarify interoperability.

Ron Melton said the gaps are where involved organizations can step in and find their action from the discussions. DOE has been undertaking grid arch projects – higher resilience work. Stephen said with those who are interested- we should look at the intersection of the groups and where is the commonality to help to find the answers.

Ron Melton said that looking at different directions – not just the popular trend is how to find the future state.

Ron Cunningham said that for AEP, they look where to put their limited dollars because as a utility they want to use their leverage. To operate equipment they have to justify the expense so that they can charge customers for the maintenance of the equipment.

Chair David Forfia asked GWAC if some people want to create a new group and perhaps develop a final draft for review and then send it out for feedback. This would be a new task for a small group.

David suggested they do it maybe as a framework, and make it more audience friendly. David asked for volunteers to identify a deliverable. Stephen Knapp agreed to step up and work with Ron Melton to create a deliverable. Lorenzo Kristov, Trevor Gionet, Leonard Tillman, and Dave LeVee came forward.

Dave LeVee said that he came from a capital recovery standpoint. Ron Melton said that Dave’s perspective is down the road a bit. Ron took the action to define what the next step is for the volunteer group.

Ron said GWAC could produce it and contribute it to the Grid 3.0 initiative, but if it was found that there is no value to it they would then move on. David Forifa noted that he would like this to become a GWAC publication. Lorenzo asked if there is something we can look at regarding Grid 3.0 – David said it’s in the background as interoperability.

Action: Ron to work with the volunteers Lorenzo Kristov, Trevor Gionet, Leonard Tillman, and Dave LeVee to identify the next steps in Grid 3.0 as a GWAC activity. (Suggested steps: create a framework, identify a deliverable).

David said the question is – is there a deliverable that this group can produce as a starting point.

Ron Bernstein said he would like to understand the overarching set of work items for the GWAC. He said GWAC seems to do a bottom up approach. He asked how Grid 3.0 intersects with TE and with Interoperability. How does it fit into the big picture?

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David Forfia replied that there is the council's work and then there is the work of individual council members for ancillary work. He said that with smaller groups things can get finished more quickly. With items for the whole council there are many reviews and much time needed can be in excess of a year.

Ron Bernstein said it would be nice to have a single slide power point that shows what efforts are underway and in what order of priority.

David Forfia noted that Ken Wacks will present soon in Austin as a representative of the GWAC and that this is good for visibility of the group.

Ron Melton said he understood Ron Bernstein's perspective and the need to prioritize.

Ron Bernstein suggested that such a slide be presented at the beginning of the GWAC meeting on this. Also, it could be on the agenda and then say how the agenda items relate to the GWAC efforts as a whole so that everyone has a good understanding of the direction of the council. For documents in progress we could give a status update and what is still needed.

Ron Melton noted that GWAC efforts are open to all who are interested, not just the GWAC members. Feedback can come from interested participants who have followed the effort.

David gave an example of a request for a paper that came from John Caskey to Mark Knight that after the Grid 3.0 fall workshop in DC. A small group got together and worked on the paper over the holidays to get it done by the deadline.

David Forfia asked Ron Melton what GWAC is expected to support to meet the expectations of the DOE and of Chris Irwin. Ron replied that there is a deliverable for example for the TESC19 noted in a PNNL DOE program. So some GWAC efforts are very formal.

Ron Bernstein asked for more information about this type of thing and Ron Melton noted that he has not informed the council about the DOE deliverables. Everyone fully agreed that this would be important and they would appreciate understanding the commitment expected by the DOE of the GWAC.

Action Ron Melton: Inform the GWAC about DOE expectations and deliverables for the GWAC

Liaison Reports

Dave Wollman – NIST - An Executive Order was signed yesterday on Artificial Intelligence, which includes direction to NIST on supporting technology standardization for AI and related activities. (Other agencies included in the executive order, of course, NIST is just one agency mentioned.)

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In addition, the NIST Smart and Secure Cities and Communities Expo has been rescheduled to July 10-12 in Washington, due to the shutdown.

Ron Bernstein – IOT model – how to lead to better decision making – 4 tiers – to prepare and present information. Better decision making through AI. This might be a new place for GWAC to define smart grid with AI.

Ron Bernstein – ASHRAE and CTA have new initiatives relating to advancing AI and Machine Learning leveraging control networking using an IOT model. The Focus is on how to lead to better decision making. Also efforts to advance the development of device and equipment profiles utilizing the four tier system architecture defined by ASHRAE. This might be a new place for GWAC to define smart grid with AI and overlap the interoperability.

Farrokh Rahimi – IEEE: A reminder of the IEEE ISGT meeting next week. There will be a Demand Response tutorial on Sunday, a Transactive Energy Blockchain panel on Monday, a Resilience workshop on Wednesday and a GWAC panel Wednesday morning with Mark Knight, Ron Melton, Farrokh, Ron

Mark will present on buildings as a resilience hub in the afternoon on another session along with Farrokh, Ron Ambrosio, Gerald Gray and Ron Bernstein.

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Grid Resilience with Growing Deployment of Distributed Energy Resources

Wednesday, 20 February 2019
11:00 AM-12:30 PM

Session Chair: Ron Melton,
PNNL
ron.melton@pnnl.gov

Session Chair: Mark Knight,
Burns&McDonnell

In October 2018 the GridWise® Architecture Council (GWAC) convened a workshop to discuss grid resilience in the presence of growing penetrations of distributed energy resources (DER). This workshop built on work undertaken by the U.S. Department of Energy's Grid Architecture project to develop a reference architecture for a high resilience grid. This panel will provide a recap of the workshop and a roundtable discussion of the key points and results of the workshop by several of those who attended.

- 2019ISGT0337, TBA
R. MELTON, PNNL
- 2019ISGT0338, TBA
F. RAHIMI, OATI
- 2019ISGT0339, TBA
R. AMBROSIO, Utopus Insights
- 2019ISGT0340, TBA
R. BERNSTEIN, RBCG

Grid Connected Buildings as a Transactive Hub

Wednesday, 20 February 2019
1:30 PM-3:00 PM

Session Chair: Farrokh
Rahimi, OATI
Farrokh.Rahimi@oati.net

Integrating smart buildings and the smart grid using transactive energy as a core component provides building owners, system integrators, and suppliers with a great opportunity to provide enhanced services. As more building products become "grid aware" and "IoT aware" the opportunity to leverage their intelligence and capabilities is growing. More end devices can provide direct impact into the usage and coordination of distributed energy resources. Connecting these typically disparate systems into a common infrastructure using open interoperable concepts will provide greater costs savings, energy reliability and resilience, and easier management. This panel session will feature subject matter experts presenting these core concepts along with practical use cases and illustrative examples.

- 2019ISGT0254, Evolution of Grid Modernization and Associated Challenges/Opportunities
R. AMBROSIO, Utopus Insights
- 2019ISGT0256, Using Transactive Energy/Markets to Integrate DER
M. KNIGHT, Burns & McDonnell
- 2019ISGT0290, How Buildings Can Play a Central Role As Transactive Hubs,
G. GRAY, EPRI
- 2019ISGT0296, Evolution of Smart Buildings and Grid Edge Technologies
R. BERNSTEIN, RBCG

Ron Melton told the group that he will become the chair of IEEE PES Smart Buildings, Loads and Customer Systems Committee – he is not sure what is needed but he will involve GWAC with the efforts. He also noted that GWAC members lead other SEPA working groups including Architecture (himself), TE (Mark Knight), Cyber (NIST) Certification (Cuong Nguyen, NIST).

Stuart McCafferty – Toni Giroti came up with an Energy Blockchain Consortium, EBC certification and training to be block chain certified. The first training session was at DistribuTech earlier this month. There were 40 to 50 people in the training. It was well done. They are establishing use cases and work groups. They followed the organizational structure of SGIP. Stuart was a trainer for it. He is a member of EBC.

James Mater – suggested to add Open ADR to the meeting list – they are starting services in open ADR to standardize it. This might be a significant protocol to incorporate transactive energy.

Action: Ron M will add open ADR to the list with James Mater as the liaison.

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Dave LeVee said that Chris Villarreal is at an NARUC meeting this week.

Dave suggested that Open FMB might be another group to keep an eye on.

James Mater suggested that UCA might be another one – they have activities with CIMS.

Ron Melton talked more about CIM in light of what he has learned from the ADMS project at PNNL – the ISO/IEC problem with CIM. There are several tools being developed in the CIM users group. Many of these tools are open source, but not all. Ron noted that ISO/IEC has claimed some of the tools and wanting to license them to people. This will create a huge battle in the CIM community.

David Wollman noted that IEC owns published docs related to the CIM. He noted that if CIM is used through the UML model, different vendors take turns. IEC wants to claim this also. He said that he was speaking as the board of UCA and noted that this can be a real problem.

Ron Melton answered several people about the changes to the GWAC Liaison list and said that it can be dynamic to allow intermittent reporting of groups such as Open FMB, CIM, UCA and ADR.

Dave Wollman said that he missed a demo at DistribuTech on adopting open FMB, and peer to peer communications testing, there was a wireless demo (presented by Stuart LaVal, Duke). He said it was very well received. If anyone else attended it he would be interested in hearing more about it.

White Papers –

Ron Melton told everyone that he is trying to come up to speed on the two GWAC white papers.

One of them is a smart buildings as transactive hubs white paper. Mark Knight, Ron Cunningham, Gerald Gray, Ken Wacks, Robert Burke, Joe Hagerman and Ron Bernstein have contributed to it. Ron asked if there are any others are contributing to it, please let him know.

Ron Bernstein said that he knows more about this paper. He said that Mark Knight was trying to pull the effort together. Ron Bernstein noted that the last call was in October or November. A new leader is needed. Joe Burke was going to be actively involved with it. Ron Bernstein said that Ron Melton, himself and Joe Hagerman should discuss it further and maybe Mark Knight. Then they can set a completion date and next steps.

Action Ron to set a meeting with Ron Bernstein and Joe Hagerman on the smart buildings as transactive hubs white paper.

Farrokh Rahimi said that this paper is in line with a panel he has organized next week at ISGT with Gerald Gray, Ron Bernstein, Mark Knight and Joe Hagerman.

Ron Bernstein also noted that GWAC presented on this topic at the ASHRAE/AHR expo last month.

Ron Melton said that Tanya should be involved and she said that she agreed.

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Ron Bernstein said that the paper is very loosely coupled to smart buildings and transactive hubs but is more smart buildings and smart grid. The building was talked about as the point of interaction but no discussion of interoperability or meters. He noted that there is still a lot of room to define a smart building as a transactive hub. With the hub being the focal point – the question is will it be an IOT server, open ADR server, Alexa, Google Play or what?

Ron Ambrosio asked if this was discussed last month. Ron Melton said there was an email sent out about it.

Tanya noted that she and Lorenzo Kristov have been developing a workshop for TESC19 along the lines of this topic, but the discussion is not highly technical.

The other white paper

Stephen Knapp, Rahul Bahadur and others are listed on Mark Knight's notes to Ron Melton for this paper. Rahul said they now have the 4th version of the paper almost complete. The next step has been delayed but the paper's title is "*Economic, resilience, and reliability of TE systems.*" Rahul will follow up with everyone on the committee. They should have something ready soon for review by the council – it should be ready by mid-March for review. Once the next set of edits is complete it can be put on the GWAC Sharepoint as a draft.

Farrokh Rahimi would like to find out more about the direction of this paper. Ron Melton said he thought this paper is coordinated with the PNNL Valuation work on Resilience. Farrokh said he thought so too and that Mark Knight had listed 6 or 7 related use cases. Rahul said that the use cases referred to the TES white paper from 2016 where use cases were used with valuations.

Ron Melton said he was referring to a PNNL TE project effort on valuation being conducted by Trevor Hardy. He said that he was happy to hear how far this paper has progressed.

Ron Bernstein asked about the Interoperability Maturity Model, IMM paper. Ron Melton said it is a document (more than a white paper). It was written for a specific purpose on a PNNL GMLC project.

Ron Melton said the white papers might be a genesis for a document. White papers are typically specifically focused and shorter than a document would be.

Rahul Bahadur said that Valuing Control is a broad paper – and in the future it can be followed up with more detail of the economics side and the resilience side.

Dave Wollman asked how does TE contribute to resilience. Is it through controls and response? This may not be captured in the paper yet. He said that he thought the team is still working on the abstract of the paper.

Ron Cunningham asked if TE contributes to resilience, and he asked how are we are going to leverage long term assets?

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Rahul Bahadur, in reply to Dave Wollman, said the paper has moved beyond the abstract. They are not taking each topic and making a definition for each one but they are defining a resilient and reliable grid and the economic factors. This will lead to more detailed papers later on.

Ron Melton noted that it is 5 minutes until the lunch speaker in Tulsa. He noted that he and Farrokh Rahimi will go offline to take an ISGT coordination call. Then after that will be a TESC19 call at 1:00pm and he will rejoin and lead that discussion. Ellen Anderson of the University of Minnesota and Roseanne Jones of IEEE will join the call.

TESC19 Planning Call with IEEE and U MN

Roseanne with IEEE let Ron Bernstein, David Forfia and Ron Melton know that there is a contract ready to be signed and once it is then a deposit will be made into the conference account.

She has approved a down payment for the food and beverage contract.

Ron Melton asked Roseanne about the conference registrar selection – they went with dot.com and have their statement of work. It is being reviewed by IEEE.

Regarding MCE (management conference services) – two proposals are being reviewed and she will get this back to Ron and David soon.

Ron Melton asked about paper format required by IEEE; so far he has advised people to use the two column IEEE format with a 5 page limit.

Roseanne said she will double check but she thinks it is a 5 page limit. Since the plan is not to print the maybe the page limit should not be a restriction. Roseanne will check on this and get back to Ron.

Ron Bernstein noted that he and David Forfia now have access to the bank account and debit card. Ron has set up Quick Books to manage it. Roseanne noted to him that the payment has not yet gone out for the McNamara Room at U MN but once the contract is approved she will do it. Her plan is to pay directly to U MN and it will hit the general ledger. Ron Bernstein will ask her later how to account for it since it is not coming out of the conference bank account.

Farrokh Rahimi asked about conference registration. Ron Melton said it's not on his agenda but he would like it to be included.

Roseanne will check her previous notes with Mark about IEEE Explorer – Ron Melton thought he had heard that the papers would not be posted there. Roseanne said in that case they will be posted in the PES resource center she thought and she will get back to Ron Melton about this.

Ron Bernstein asked if he could record the talks and post them on his company site. He also was wanting to know if he could post the slides or a link to the slides. Ron Melton asked Roseanne about this. She thought that there would need to be paperwork signed that presenters know that they are being recorded. Ron Bernstein noted that it is for audio only. Ron Bernstein told Roseanne that we

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would like to have the slides and the audio located together. Roseanne will check into this and get back to Ron Bernstein.

Ron Melton asked Roseanne if the papers will be available for the general public. She said they maybe free for a short period of time, and free to PES members, but others might have to pay to see them. She will get back to Ron Melton on this.

Ron Melton asked about the budget. Ron Bernstein said that there is a list of registration fees at different levels. Ron Bernstein said that he was not sure if GWAC members get a discount or waived registration fees. Roseanne said that usually there is a limit of how many comped registrations there can be.

James Mater said that normally we ask all GWAC members to pay their registration. Ron Melton said it would be different now with IEEE, or maybe the organizing committee could get comp registration.

Roseanne said that presenters could be given a discount but that would be up to the organizers. She said PES speakers do not get a discount. She said if someone comes in just to give a keynote address and then leave, they would not be charged for registration.

Ron Bernstein said that he doesn't have all the Portland budget information from past conferences.

Tanya asked if that could be put on the Sharepoint site. She said that she and Lorenzo might want to look at past sponsorship. She asked if sponsors would then get a discount on registrations. Could sponsorships and registrations could be packaged together.

Ron Melton noted that in the past a few registrations were included for sponsorship. But he cautioned that we need to be sure that we can meet the budget for this meeting. IEEE has approved the budget as is so changes could be problematic.

Roseanne said that Maureen Dalton is the IEEE Marketing Manager and she puts together sponsorship packages for IEEE; she will be invited to then next meeting and she may have some materials for us.

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A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
REVENUE								EXPENSE						
2	Registration Fees	\$ 120,550.00						Management Services	\$ 10,000.00	estimate	(placeholder for unforeseen admin expenses)			
3	Conference sponsors (top tier \$5000)	\$ 10,000.00						Registration Expense	\$ 12,000.00	estimate				
4	Conference Sponsors (lower tier \$2500)	\$ 10,000.00						Promotion	\$ 2,000.00	estimate				
5	Table tops for exhibitors (10 @ \$250)	\$ 2,500.00						Conf. Program Print	\$ 1,000.00	estimate				
6	Day 1 coffee breaks (3 @ \$10 x attendees)	\$ 1,200.00	early, mid morning, and early afternoon					Day 1 coffee breaks	\$ 1,200.00					
7	Day 2 and Day 3 coffee breaks (4 @ \$10 x attendees)	\$ 16,800.00	breakfast, morning, lunch, mid afternoon					Day 2 and Day 3 coffee b	\$ 16,800.00					
8	Continental breakfast on Days 2 and 3 (\$30 ea)	\$ 12,600.00						Continental breakfast	\$ 12,600.00					
9	Lunch on own (not provided)	\$ -						Lunch	\$ -					
10	Poster session plus social (\$30 per head)	\$ 6,300.00	day 2 evening					Poster session plus social	\$ 6,300.00					
11	Tutorial	\$ 8,250.00	(40% of tutorial revenue goes to presenters)					Tutorials	\$ 3,300.00					
12	Total Conf. Revenue	\$ 179,950.00						Exhibits/Vendors	\$ -					
13	IEEE PES Goal (Expenses plus 20%)	\$ 142,560.00						Rooms and A/V	\$ 43,600.00					
14								Administration	\$ 5,000.00		(placeholder for UMN charges and A/V variation)			
15	REGISTRATION FEES								Photographer	\$ 5,000.00	estimate			
16	Non Members, members, and Society Members								Total Conf Expense	\$ 118,800.00				
17		Quantity	FEF	Budget				PES Target Profit	\$ 23,760.00					
18	In Advance							Best Case			Sponsorship Goals			
19	IEEE PES Member - Full Conference	70	\$ 475.00	\$ 33,250.00				Expense	\$ 106,920.00		Day 1 coffee break 1	\$ 400.00		
20	IEEE Member (Other than IEEE PES) - Full Conference	40	\$ 550.00	\$ 22,000.00				Revenue	\$ 179,950.00		Day 1 coffee break 2	\$ 400.00		
21	Non-IEEE Member - Full Conference	40	\$ 710.00	\$ 28,400.00					\$ 73,030.00		Day 1 coffee break 3	\$ 400.00		
22	IEEE PES Student Member - Full Conference	5	\$ 225.00	\$ 1,125.00				Worst Case			Day 2 coffee break 1	\$ 2,100.00		
23	IEEE Student Member - Full Conference	5	\$ 300.00	\$ 1,500.00				Expense	\$ 130,680.00		Day 2 coffee break 2	\$ 2,100.00		
24	IEEE Life Member - Full Conference	5	\$ 400.00	\$ 2,000.00				Revenue	\$ 143,960.00		Day 2 coffee break 3	\$ 2,100.00		
25	State and Federal Gov't Employee	5	\$ 475.00	\$ 2,375.00					\$ 13,280.00		Day 2 coffee break 4	\$ 2,100.00		
26	IEEE PES Society Member - One Day		\$ 180.00	\$ -				Assumptions			Day 3 coffee break 1	\$ 2,100.00		
27	IEEE Member - One Day*		\$ 255.00	\$ -				Cup of coffee	\$ 10.00		Day 3 coffee break 2	\$ 2,100.00		
28	Non-IEEE Member - One Day		\$ 420.00	\$ -				Table for exhibitor	\$ 250.00		Day 3 coffee break 3	\$ 2,100.00		
29	IEEE PES Student Member - One Day		\$ 75.00	\$ -				Breakfast per head	\$ 30.00		Day 3 coffee break 4	\$ 2,100.00		
30	IEEE Student Member - One Day		\$ 300.00	\$ -							Table tops for exhibitors	\$ 2,500.00		
31	IEEE Life Member - One Day		\$ 150.00	\$ -							Continental breakfast Day 2	\$ 6,300.00		
32	State and Federal Gov't Employee - One Day		\$ 180.00	\$ -							Continental breakfast Day 3	\$ 6,300.00		
33	Tutorial - Half Day	30	\$ 195.00	\$ 5,850.00										

Actions from the last meeting:

Ellen was to check with Kim Long, U MN Logistics – she hasn't gotten an answer from her yet.

Ellen asked Ron if he could tell her what the meeting support person would do and what he is looking for it would help her. Ron said that he doesn't have a list of duties yet. Roseanne will get something from the MCE that might help. Ron Melton said that local logistics support person might be to field questions that come up during the conference and possibly other duties.

Ellen has not talked to her technical contacts. She asked what they what they would be asked to do. Ron said that would be up to her. He thought if there was a Science and Engineering person who wanted to help with the technical content and technical committees that could be beneficial.

Ron has started to reach out to local industries in the Minneapolis area. He said that U MN technical staff might be able to help get sponsorship. He said that the budget shows different levels of sponsorship.

Ellen will talk with some department contacts about all of this and get back to Ron.

As Chair of Publications Farrokh Rahimi suggested they decide if there will be papers and talks or just papers, or posters; this position will help gather submissions and down select. Roseanne will get some information back to the committee.

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Ron Melton noted that the theme of the conference is “TES in a Participatory Grid – a Framework for the Future,” is the theme of the conference.

Ron reviewed the agenda outline draft that he created. These details are not in conference proposal.

Ron noted that there are two parallel tutorials planned. Registration is open for all 3 days – Monday, Tuesday, and Wednesday. Tutorials are separate from the rest of the conference.

Roseanne thought that people would be able to sign up the day of the conference. There will be someone on sight who can take credit card payments for tutorial registration. This information was appreciated by the GWAC.

Ron went over his draft conference outline which is based on the Portland event. There are some options shown for Day 2.

Farrokh asked if there would be a paper session or if they could be shown as posters? He said that one hour would not be enough for a paper session. Farrokh also noted that on Day 2 by the end of the day some people will be leaving which might upset authors.

Ron Melton asked if a plenary session is needed on Day 2. It was also noted that on Day 1 the plenary session would need more than 30 minutes.

Doug Houseman asked what topics would be highlighted in this conference and said that this might help us know how much time is needed. Ron Melton said the topics of the panels would lead into the workshops. He said this format has given us good feedback in the past. People have appreciated the ability to contribute toward the topical areas from the panels. Ron noted that this format was handled differently in Boston.

The GWAC foundational session will likely be focused on the TE Framework and the white papers.

Farrokh Rahimi said that he would like to see a plenary speaker on day 2.

☉ Transactive Energy Systems in a Participatory Grid - A Framework for the Future

- Tracks (normal GWAC plus some variation incl resilience)
 - Regulatory and Policy (1)
 - Business Models and Value Realization (1)
 - System Design and Architecture (1)
 - Physical & Cyber Technologies and Infrastructure (1)
 - Resilience (1)
 - Visions for Participation (1)

Tutorials proposed were reviewed, from Ron’s slide, above.

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Ron Melton thought that the area that Tanya and Lorenzo's tutorial might align with is "Visions for Participation" and Tanya agreed.

Ron Melton said that additional fine tuning for morning sessions on the first day are needed.

Farrokh Rahimi is the technical program chair will work offline with Ron on the technical details.

Ron Melton said would work also with Ron Bernstein on TE 101, which would expand a bit from the one done in Boston.

Ron Melton suggested that PNNL Valuation methodology could be one tutorial and PNNL staff could do it. This might be in lieu of a blockchain tutorial.

James Mater suggested that LO3 could do a blockchain tutorial. Tanya suggested Paul Heitmann as a speaker. Ron Melton had concerns that it might become a sales pitch. Leonard Tillman said it should be presented fairly generic to be valued. James said maybe something that ties Blockchain to TE would be good. David Forfia noted that Ward Camp would be at the meeting tomorrow and might have some ideas for it.

Gerald Gray has EPRI work on block chain that he proposed to use for this tutorial. Ron noted that it would be a lot for him to cover the whole four hours.

David Wollman sent the link to a recent NIST publication on blockchain (in manufacturing context) <https://nvlpubs.nist.gov/nistpubs/ams/NIST.AMS.300-6.pdf>

Toni Giroti asked what GWAC would want to do on Blockchain. Ron Melton said that by bringing it up in this conference is to put some water on the hype and extraordinary claims about block chain and show how it's separate from TE. Ron said he would probably list TE and Blockchain in that order. He has talked with Gerald Gray on this as a way to inform people and to counter some of the hype. He said if people took TE 101 before this one it would be helpful.

Tanya said that Richard Shandross had given a very even handed presentation at another IEEE conference. She suggested getting him to be a presenter.

Ron Melton noted the considerable interest in the Blockchain tutorial and said that he would like to get this interest back when Gerald Gray is on the call and then continue this discussion.

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—⊙ Tutorials

Morning

- TE 101
- Ron Bernstein & Ron Melton (?)

Morning

- Community Energy & TE
- Tanya Barham & Lorenzo Kristov

Afternoon

- Smart Building, Smart Cities and TE
- Ron Bernstein & ?

Afternoon

- Blockchain and TE
- Gerald Gray & ?

Or

- PNNL Valuation Methodology

Ron Bernstein sent a link to his company website where past TESC presentations are located:

www.rb-cg.com/GWAC