

**Face to Face, San Diego - SDGE**  
**Meeting Minutes**  
**February 6 & 7, 2017**

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***GWAC Council Members***

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David Forfia, Director, Enterprise Architecture & IT Transformation, Electric Reliability Council of Texas (ERCOT)

Ron Ambrosio, IBM Distinguished Engineer and Chief Technology Officer for IBM's Smarter Energy Research (online)

Tanya Barham, CEO, Recess

Ron Bernstein, President, RBCG, LLC

Doug Houseman, Vice President of Technical Innovation at EnerNex, LLC.

Paul De Martini, Managing Director, Newport Consulting Group, LLC (online)

Lorenzo Kristov, Principal, Calif. ISO

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

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

Heather Sanders, Prin. Mgr., So Calif. Edison

***Members Not Present***

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Gerald Gray, Tech Exec, EPRI

Stephen Knapp, Exec. Director, Power Analytics Corp.

Tom Sloan, State Representative, State of Kansas

***GWAC Emeritus***

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Ken Wacks, Sensus Metering Systems

***GWAC Associates***

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Gordon Matthews, Technology Innovation, Bonneville Power Administration

Chris Villarreal, Dir. Policy, MN Public Utilities Commission (joined online)

***US DOE***

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Chris Irwin, DOE OE

***PNNL Support***

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Ron Melton, GWAC Administrator  
Susie McGuire, GWAC Coordinator  
Mark Knight, Chief Eng., PNNL

***Guests***

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Jason Anderson  
Richard Azer  
Tom Bialek, SDG&E  
Toby Considine  
Dave Hardin  
Dave LeVie (online)  
David Graham  
Andrew Nicholls (Online)  
John Holmes  
Tim Wolf  
Leonard Tillman

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***Day 1, Monday, Feb. 6:***

***Administrative***

At 9:00 am PST the GWAC the meeting opened.

David Forfia called the meeting to order at 9:08 PST.

Seating of new members. Ron Melton introduced Tanya Barham and Lorenzo Kristov. Tanya Barham, Lorenzo Kristov and Heather Sanders enthusiastically entertained the group with a rousing rendition of the GWAC Pledge song.

Proprietary information notice read by Ron Melton.

The January minutes will be sent to the council and put forward for approval at the next meeting.

Action: Farrokh Rahimi asked Ron Melton to send the ENA report and CSIRO reports to the council.

Ron Bernstein gave an overview of the Smart Grid/Interop talk at AHR Expo last week (Widergren, Kerbel, other).

Action: Susie will post the slides at the Grid Website (Ron Bernstein, requestor)

***Upcoming meetings:***

IEEE ISGT 4/23 DC. Followed by a 1.5 day technical program review of the DOE Transactive Energy project, hosted by Steve Widergren, PNNL.

GMLC Interop partners F2F Meeting

TES Conference June 13 – 15, Portland

Doug Houseman mentioned 2 meetings

Ron Bernstein introduced the panel on Smart Cities. The panel will explore new opportunities to work on.

Jason Alexander of Cleantech San Diego spoke first on Enivronmetal and Economic Susatinability.

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San Diego is in the top 3 California cities for Energy and Environmental sustainability. Jason is here to facilitate a conversation with 4 others from this area, Tim Wolf, Rick Richard Azer, John Holmes and David Graham.

Richard Azer with Black and Veatch runs smart infrastructure, more decentralized and more interconnected. The industry is moving away from large facilities (power plants and wastewater treatment). This involves networks and communications, working at the edge of technology. Stationary storage will be used to help manage demand and peak loads. EV charging networks are part of his organization's focus.

Tech Infrastructure layer includes data analytics, how components relate to each other and to the grid. Predicted analysis is one aspect.

Tim Wolf, Itron – provides smart metering for SDGE, with meters all over. Conductivity and data, convergence with smart grid and smart cities. At DistribuTECH they helped host a Smart Cities symposium that was packed. Utility specific and grid specific, tenders, municipal utility, increasing requirements including how to support the grid for cities. What is needed is a broad ecosystem of stakeholders who are looking at the industry needs and trying to provide solutions. Development needs to be more expansive. A shared data model with considerable thought given to consumer privacy, but aggregated data needs available to the network and with protection for PII.

Breaking down silos, data sharing, data assets, getting people to work together, those are barriers that must come down. Itron is putting more money in distributed intelligence – devices must have this capability. Data should be processed, analyzed at the edge, not funneled back to the home office. Battery powered sensors and devices with cloud access and each with strong security, are needed to enable this de-centralization.

John Holmes, UC San Diego, noted the increased collaboration with utilities including independents, communication advances to enable behind the meter resources to dispatch to the utility. Electric and transmission sector pipelines must be engaged with information from new devices. How the architecture evolves to enable seamless communications will be critical. The four primary areas are cyber, safety, sustainability, reliability and commercial innovation. San Diego has been a leader with the smart meter implementation and by dealing with demand,

David Graham, with the City of San Diego started their project with the need for efficiency and energy savings to help meet their fiscal budget. It was a bootstrap approach for city leaders. A practical approach was needed for the 3.3 million people in the area. Heavy military applications are also

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located in the area. Communications was enabled by the leading cell phone activities of Qualcomm as it served the local military population.

Some aspects; Platform in partnership with local stakeholders and consumers, open access for academia, industry and government; human centered design (listening to what people want); They had to identify strengths and weaknesses

The City held a block party to engage citizens on the implementation of new street lights. They asked for feedback from people about street lights. One element they wanted to gauge was to see if there was a fear of sensors and concern about privacy issues. They didn't find that. For example, people could benefit from say gunshot detection. They have employed the later in underserved communities through the use of block grants for funding. This is how they partner technology with people for a better community.

San Diego recognizes the importance of both economics and environmental aspects .

Chris Irwin noted the scalability issues that pervade the movement.

Tim Wolf commented on the scalability of transportation – San Diego has solar self-powered charging stations for EV.

John Holmes: Regarding energy and water, a third party may own and operate an asset. Pump and treat water losses can be mitigated. Energy loses 6 to 8% from generation to distribution. Fixing these losses, developing new apps and testing them is critical to scalability.

David Graham spoke about savings and scalability which can be resolved with higher infrastructure investments to bring the Grid, which is currently largely just as it was in the age of I Love Lucy (50s and 60s).

Doug Houseman asked about permitting.

Farrokh Rahimi asked a question regarding the response by John Holmes on resilience; approaches, and expensive fixes that can be mitigated by efficiency. This affects energy storage systems, meters, as well as resiliency. SEL is having a conference in the beginning of June on Behind the meter.

Richard Azer also said the smart city movement is still being put in place from the bottom up. He predicted that meters will bring continuity and organic growth.

David Forfia asked a question around ecosystem and platform, for both public and private platforms. For these for smart cities or the smart electric grid, how does the ecosystem get cultivated and grown? Is the answer in advanced metering and infrastructure?

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Tim Wolf: The challenge is the eco system. The hard work is there for standards the group. These kinds of changes take time.

Tanya Barham asked, about data concentration at the edge – sensors will break and will need to be fixed. How could a business model unite the ecosystem? She noted the echnology needs of end users. She is ecology minded and she has an EV, but she is limited by her city on how to charge her car. Her options are to park one mile away and walk with her child in the dark or run an extension cord across the sidewalk to her car. She has not been able to get a permit to install a charging system for her own use or how that could capture compensation from other users.

David Graham - EV infrastructure – San Diego didn't have enough charging stations. The utilities wanted to own the charging station infrastructure, and San Deigo recognized what the barriers were.

Jason Anderson commented that the partnership of public and private (utilities, academia) is key in breaking down these barriers.

James Mater there is confusion about the meaning of “platform” – in the smart cities ecosystem.

Richard Azer said there is not universal agreement on this meaing, but GE, Cisco, and the methodology used is what is meant by platform, and edge processing – shipping only what's needed back for analysis.

San Diego is a major user of solar electricty. The city has a simple training program for citizen solar users and then provides strong support on the back end.

Richard Azer said that the roadmap we have is really still in the strategic development phase; mapping out existing capabilities.

Jason Anderson is working with cities to plan, noted that 8 of 18 area cities have a climate action plan, smaller cities are tapping into pilot projects based on the leadership of large cities such as San Diego.

John Holmes said we need to look at domain specific barriers, and the lack of uniformity in grid management, and noted that a bottom up management grid is a major barrier.

David Graham said that smart city work is limited by privacy issues. Graham said we have capability but are not using event based capture of events. Survellience capability may be available, but will not be used. San Diego will turn on capabiliies as the policy addresses them. David noted that more survellience is used in Europe.

Ron Bernstein took a brief poll of attendees, they appreciated this informal panel discussion Smart Cities. He would like to see a Smart City panel (silo interoperability) at TES 17 and asked the panel participants if they would like to join it as a face to face or online.

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Jason Anderson and David Graham expressed interest in participating. Other participants also indicated agreement.

David Graham said he sees the Grid as the nervous system of a community.

Richard Azer noted that as additional players enter the grid network operations management becomes more complex.

End Panel – break

Ron Melton: The Roadmap document has been sent out to those registered for this Face to Face meeting last week. There are three main tracks. The prompting motivation for the roadmap “what will it take to deploy TE systems at scale?”

Each track has a summary, and three Tracks or swim lanes.

Ron reviewed the Roadmap Track Definitions.

Ron Bernstein asked about loads and Ron confirmed that our GWAC DER definitions includes loads. But from a buildings perspective DER has a different meaning. He expressed that not knowing the language can be a barrier to integration of diverse sets of people in the industry.

Doug Houseman felt that the way we are using DER is really DG – Distributed Generation. He feels that the language should be cleaned up to be more consistent across the board.

**Panel: More than Smart** – California Initiatives Panel with Heather Sanders and Paul DeMartini.

Lorenzo Kristov, CA ISO, has a talk that will be referenced.

Lorenzo Kristov’s talk is titled “integration of distributed energy resource aggregations into ISO Markets and Operations”

Matthew Tisdale on the phone (former advisor to a regional congressman) and is with the “more than smart” California Initiative

Lorenzo Kristov noted the idea of stacked revenue stream, the customer is the bottom layer, the top layer is wholesale market and transmissions. There is not much definition for the middle layer.

When customers decide to change how they use energy it is a bottom up activity. He asked why do end users (consumer, factory, university campus, housing development) need energy?

Less regulatory control, means quick growth and adoption.

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FERC NOPR from Dec 2016 seeks to remove barriers to wholesale market participation by storage and DER aggregations

Kristov reviewed new NGOs, with examples of proxy demand response (PDR).

ISO filed Distributed Energy Resource Provider (DERP), a market participant that aggregates DER. Diverse resources don't all have to be the same thing, but once agreed to will provide multiple DER aggregations.

Minimum Distributed Energy Resource Aggregator (DERA) size is .5MW, and maximum is 20MW if aggregating across multiple p-loads.

Value for multiple use applications.

Heather Sanders presented.

Valuation – qualitative benefits of stacks.

Utility perspective, Tom Bialeck asked “are Utilities really looking at integration?” People are quickly adopting new technologies and yet policies are not written to address them. Multi-use applications are really a challenge for utilities. For example a 20 MW storage device – how to integrate it with the market? With current rules it may not be able to be accommodate. Challenge is from location specific support – maybe not enough land for setting up support capability. Suppliers, such as software providers for the utility may not have a suitable product that could download the data. Once a need is established can we look at DER as a solution. Voltage is another challenge, such as the inverter needed to manage the load.

New equipment and capability to manage new services is a challenge to utilities, investment is required and knowledge about how much coverage is required.

New York is going after a market not as TE first but as how do you get DERS where and when you need them?

California started with integrated analysis for regulation DERs as alternative solutions. A deferral framer, various projects were needed from circuit breakers to substations. They identified which ones are most needed first and assessed how much time will be needed to build them. They carefully looked at what full scope of the project was. Through planning there will be guidelines to govern how the commission will evaluate good candidates for deferrals. For example when the local nuclear plant is retired adjustments to the market will be needed to meet demand. They worked with ISO to note expected peaks and valleys.

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Tanya Barham asked Heather Sanders about consumer solar - Whether people are taking energy off the grid or putting energy on, the DER is important but they are not ready to go to dynamic pricing. This is a very complex issue, more use of solar affects the price structure. Tanya Barham asked how if consumers are going to help the industry with sustainable solutions, how can they be accommodated? Heather said this is one of the problems utilities are dealing with.

#### Afternoon

Ron Bernstein noted that during recent bad weather events end users primarily wanted electric power to be able to charge their cell phones so they could connect with family.

Doug Houseman noted that not every consumer has the financial means for resiliency.

Tanya Barham asked about financing streams in each Track of DER.

As the Tracks were discussed Tanya Barham asked if they were identified by characteristics or by metrics? This created much discussion – triggers, indicators and characteristics.

Gordon Matthews asked if Track one is too squishy and for Track 2, what about impact? Measurable aspects of various activities that do no harm and could be tested in the open market.

Ron Melton said not every organization will be at the same place at the same time. Some groups may not progress beyond Track one.

Gordon Matthews commented that Track 3 is operational, Track 2 is management, Track 1 is a change but not very perceivable.

Lorenzo Kristov considered the idea of indicators or characteristics, and said if we specify a number of variables in each Track that have differences it would help. Also, he sees a fourth criteria could be needed.

Ron Melton reviewed the Track attributes: DER (DR, DS and DG) penetration (even if quantitative), value determination which is multi-faceted, how DER is used, and the impact on operations and stakeholders. Additional Candidates: customer experience and organizational capacity, impact on non-participants.

Shuli Goodman commented that when she thinks about roadmaps she thinks about capability and maturity models. She sees some things missing, such as the customer experience – she emphasized the need for customer adaptation and organizational capacity to support them. The utility industry is moving into digital which is just now being implemented, so the capacity may not be there. She said as the system goals shifts, it will drive development.

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Farrokh Rahimi noted the difference in business impact versus operational impact.

Doug Houseman noted that operations are waiting for the protection system to reset itself after an outage. He wanted to note that a Track attribute should look at the impact on operations and stakeholders and ask what is it actually doing, the impact. One example would be the destruction of a microwave oven or even a transformer.

Tanya Barham asked what are the intrinsic aspects of nature and nurture with the outcome and development from each Track to the next?

Lorenzo Kristov said that with proper rules for managing a community resource, to get everyone doing something and avoid exploitation problems.

Ron Bernstein cited Track Attributes - likes adoption better than penetration and also would like to introduce terms breadth and depth. Also commented that he doesn't understand the attribute "how DER is used"

Mark Knight noted that the Tracks were introduced at a TE meeting held at General Electric.

James Mater noted in the keynote session at SPI in Vegas in Sept - the speaker noted a grid envisioned with DER being the driving force around grid. Is Track 3 really a major paradigm shift? It could be a clarifying driver.

Paul DeMartini stated that Track 3 is a hybrid model when we look at where assets are going to be, with centralized and distributed resources (community based), that range of resources.

Lorenzo Kristov stated that once you get to Track 3 with significant adoption rates, you have the possibility –it forces the utility to adapt to the changing market. It becomes more complex as you move through the Tracks. The utility would learn to balance the resources because it becomes a necessity.

James Mater asserted that Track three the tipping point.

Paul DeMartini commented that really Track 2 is the tipping point, and Track 3 is *past* the tipping point as Ron said. Rooftop solar is being adapted quickly in California. When you are in Track 2 you have to start quickly moving and scaling to Track 3.

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***Day 2, Tuesday, Feb. 7:***

2 minute presentations from breakout groups

Group 1: Gordon Matthews, Doug Houseman, Tanya Barham

Group 2: Ken Wacks, Dave Hardin, Leonard Tillman will increase value by generic products, standardization driver, operational disturbances functions require stability...integrate energy from various sources, smaller carbon foot print

Group 3: James Mater, Lorenzo Kristov, Shuli Goodman, see flip charts

Group 4: Mark Knight, Farrokh Rahimi, Ron Bernstein, Steve Widergren. L

**GMLC Interop Session – Steve Widergren**

**Steve’s slides for this GWAC meeting were sent to the GMLC council and to Registered Attendees for the Face to Face Feb 6 & 7 in San Diego.**

Ron Bernstein asked if Steve would be socializing the GMLC Interop review meeting slated for the week

Steve would like to do an info graphic – single page summary

Meeting location is still TBD, if we could find a host that would be helpful or a convenient location idea.

Other upcoming Interoperability related meetings:

March 14 (noon) Eastern partners meeting

April 18 – 21, GMLC peer review Wash DC

April 23 – 216, IEEE ISGT meeting in Wash DC

May 8 – 10, 1.5 day GMLC Interoperability technical review meeting

**Doug Houseman referred the group to the IEEE committee – Intelligent and Emerging Technology Coordination Committee <http://www.etcc-ca.com/>**

Online attendees for Steve’s Interop meeting: David Narang, NREL,

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In person, Mark Knight, Farrokh Rahimi, Ron Bernstein, Doug Houseman, Chris Irwin, Tanya Barham, Gordon Matthews, Toby Considine, Dave Hardin, Ken Wacks, Leonard Tillman, James Mater, Lorenzo Kristov, Shuli Goodman, David Forfia, Ron Melton

Link to GMLC website: <https://gridmod.labworks.org/projects/interoperability>

Ron mentioned that Rob Pratt has also has a GMLC project that relates to the development of a generic DER with battery like capabilities.

Steve's presentation gave an overview of the strategic vision document and the development of the maturity process roadmap process which created by David Narang. David expressed the desire for strong stakeholder involvement and noted that the goal is to understand where we are, what our target is and to identify the gap. David said there would be several options regarding the roadmap direction, which is where feedback will be really important. Chris Irwin asked if the message could be simplified for communicating to stakeholders.

They are defining the overall process to produce a time line with milestones and calibration for implementing in a specific scenario. The toolkit will depend on the roadmap direction. The roadmap describes the toolkit, and the two page summary will help to identify what has been planned so far. Steve explained the methodology.

Shuli Goodman said she felt that the document will help people understand the different states and layers. Some groups may choose more rigid systems and what level of IMM will help them. Stakeholders are not all decision makers, not all have the same level of influence, it would be good to differentiate stakeholders to get input coming at the appropriate level. David Narang would like to talk with Shuli further. She suggested a stakeholder map to evaluate their ecosystem and build out so that the correct level of communication is occurring to enable project leaders to strategically invest their time with key people, rather than the "loudest" people.

Mark Knight gave an overview of the progress that has been made – "IMM in a nutshell"

Where does IMM fit in with this process? Stakeholders need to have some idea of how to measure. He is working on descriptions of various maturity models. Stakeholders may have varying levels of maturity that they are working to. He presented a maturity model grid.

#### 4 key areas of partner involvement

- Tech meeting
- DER ecosystems and communities for DER integration
- Product review feedback

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- Outreach opportunities, articles, webinars, meeting presentations

Hour 2

Steve presented another talk

Mark Knight also presented another talk.

Question by Chris Irwin: What is the most successful use of the maturity model process used anywhere on earth.

Mark Knight replied that CMI is one that many people are familiar with. Mark said that the ISO process is a maturity model process. Steve Widergren and Ron Melton agreed.

Chris Irwin question to Shuli Goodman – she gave the example of a failure - Microsoft was trying to release a new version and they didn't use IMM, the programmer team size had ballooned – they added people to fix bugs but really they were creating more bugs and more complexity. So they then streamlined their team and clarified practices.

Steve noted classic Japan auto manufacturing models which was then applied to software

Tonya Barham commented that it was difficult for her to follow all of the materials presented today.

Mark Knight offered to speak to her or any other participants more in depth offline.

Ron Bernstein noted that he only followed about 30% of the material but that the longer you participate the more you start to pick up. He noted the council has been in existence for 12 years and is thus very experienced in the terminology, and very familiar with current industry problems and research.

Ron noted some related topics:

- IMM update
- Reliability and Resilience Valuation
- TES Roadmap gaps
- March 16 discussions on T&D interface, adaptability and flexibility, market evolution

Doug Houseman talked a bit about outages to compare impacts for residences versus businesses, hospitals, manufacturing, etc. and how to value the monetary losses or the risk of human health and safety.

Toby Considine asked what does the lack of resilience cost. He noted that there are places where microgrids are in effect and people will pay a premium for that service.

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David Forfia gave an overview of SGIP outreach Grid Modernization for utilities only – where similar utilities took a couple sessions to just establish a common language amongst themselves.

SEPA Merger – SGIP had 6 staff, and with SEPA, another non-profit might have some efficiency by merging.

James Mater said maybe a “dumbed down” version of the decision maker’s checklist might be beneficial.

Ron Bernstein asked about a Grid operating system – how does one interact with a utility to help define this.

Doug Houseman – replied to explain some work he has done to define what a grid management system might look like – there are up to 19K non-technical requirements. It’s a non-trivial project.

Doug also has a ten question interoperability document to help evaluate where a company is at.

Dave Hardin said that the stakeholder population for grid has recently increased considerably.

Shuli Goodman said that TE seems like an industry that is moving quickly from physics based to more digital, and that transactional software needed to execute the vision is substantively different. She noted that the phenomena of digital energy devices are to electricity like fiber optics and CBMA to the telecom industry. When people started talking about CBMA, it took about 15 years to get there. The value that software can bring to electrons could look radically different in 15 years than it does now – it will be a disruption at an organizational level.

Lunch

**Mark gave an overview of TES conference for 2017**

A program committee is needed for a review of abstracts and papers for the meeting agenda.

Bryce Yonker has prepared the budget information. It has been sent to the organizing committee.

James Mater asked about the budget and was nominated to the organizing committee. James would like to get a few more SGNW people on the committee to help with sponsorship.

TES 2017 theme: Maximizing your value: what can TES do for you?” It has tracks – 4 including one by NIST – TE energy challenge summit

Doug – could the opening keynote really ask a question that would get people to attend the keynote? And could we get software industry involvement to try to solve some of these challenges?

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Chris Irwin wants to be sure that Joe Hageman's staff are aware of the TESC 17. Ron suggested that Joe's PI's submit abstracts. Chris asked that GWAC actively seek to engage them.

Ron Bernstein asked if it would make sense to have a DOE overview at the meeting.

Chris said they could do that if convenient. We could go over the overview but didn't want to upstage the GWAC and its sponsors for the meeting.

Lorenzo asked about government examples.

Chris Irwin - In a vertically integrated market how do you ...the California one is important – he needs a couple regional flavored examples

Leonard Tillman noted that the epicenter of the conference could move east a bit.

Doug Houseman mentioned the Lancaster organization. He said they are familiar with TE. He said small groups in California wanted more transparency than their current bill, they wanted to not have to react to the utility and they wanted to do everything their way and not pay for it. He noted differences among groups that don't have full time energy manager's vs those that do. A company such as Nike because they are not a tech business, they are a consumer manufacturing business. This could be a good draw of a diverse audience.

Lorenzo suggested Sonoma County.

Chris Irwin asked how TE adapts to define transmission. How do I adapt challenges to my mission? Chris thought Lorenzo and Paul DeMartini could give vision to TESC.

James said that Bryce has contacts at Nike. Nike could give a sustainability talk and be a sponsor.

Gordon Matthews suggested the PNNL WSU UW battery/grid demo to be a teaser before a session.

TE enables water heating as a storage technology – as a hook like wind investments.

An enticing lunch could be a draw to the meeting.

Ron thought keynotes could help people see the future of TE – a future vision.

Doug said we should look at ISGT papers – some invited and some not and then create a panel around what is submitted to the meeting.

Gordon gave out a name – Ron jotted it down.

James Mater – maybe a senior person from CC in California?

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DSX projects – Ron – Jay Bartlett of Hawaii.

**Closing**

Ron thanked Ron Bernstein for suggested the San Diego location and San Diego Gas and Electric for providing the space and the nice lunch.

Doug Houseman suggested the next F2F location might be a company in Detroit that runs all on DC. They are NEX or NEXT. It has meeting rooms and an auditorium. Also the home of EMERGE a standards organization. It's a very modern, innovation place outside downtown Detroit.

Ron said GWAC will have a meeting in Portland the day before the TESC 17.

Ron, Doug Meeting adjourned at 2:19pm PST