RECEIVED 2018 JUL 20 3:49 PM (E)

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

FORMAL CASE NO. 1130, IN THE MATTER OF THE INVESTIGATION INTO MODERNIZING THE ENERGY DELIVERY SYSTEM FOR INCREASE SUSTAINABILITY ("MEDSIS") IN THE DISTRICT OF COLUMBIA:

JUNE 27, 2018 TECHNICAL CONFERENCE
MEETING MINUTES

Meeting Commencement

The Public Service Commission of the District of Columbia's ("Commission") obtained an independent consultant, the Smart Electric Power Alliance ("SEPA"), who convened a technical conference on June 27, 2018, in the Commission's Hearing Room, to discuss: (1) the appropriateness of conducting a distribution system assessment; and (2) the appropriate working groups to establish in Phase 2 of the MEDSIS initiative, with an initial focus on the establishment of a working group to address viable non-wires alternatives to capital investments and a working group to define parameters for evaluating MEDSIS pilot projects. The technical conference convened at 9:30 a.m. and adjourned at 4:30 p.m. When each registrant arrived at the conference they selected a card from a shuffled deck. Each card had a number from 1 to 8 written on it. The number of the card selected was the participants break out group number. This approach was used so that all attendees could more easily provide input. SEPA provided a facilitator for every group. The breakout sessions were used to collect information, and the breakout groups were brought back together in the Commission's Hearing Room to review the input of all groups.

Attendees (see Attachment No. 1, Technical Conference Attendee List)

Technical Conference Discussion Format (see Attachment No. 2, Technical Conference Agenda)

Synopsis of Morning and Afternoon Session

A. Morning Session 1 - Introduction and MEDSIS Background

- The Commission started with a brief welcoming statement.
- Staff welcomed the audience and thanked attendees and provided a high-level background on the effort.
- SEPA started with a PowerPoint presentation **(see Attachment No. 3, Technical Conference Presentation)** and provided an overview of the objectives of the conference, which in summary are:
    - Determine the appropriateness of conducting a distribution system assessment in the District.
    - Determine the appropriate working groups to establish Phase 2 of the MEDSIS initiative
- SEPA walked through the full agenda for the conference
- SEPA provided the MEDSIS Vision Statement and explained how the efforts at the conference and at the working groups supported this vision.
- SEPA presented on the background of the MEDSIS initiative including: history, relevant orders, and interrelated cases.
- SEPA asked the audience to convey by show of hands who had NOT participated in the MEDSIS initiative. Approximately one quarter of in-person attendees were new to the MEDSIS initiative.
- SEPA provided a high-level background of all proceedings that have occurred as part of the MEDSIS initiative.
- SEPA introduced a summary of three interrelated cases to MEDSIS: FC 1144, Capital Grid Project; FC 1050 Interconnection; FC 1145 Power Line Undergrounding (PLUG)

B. Morning Session 2 - System Assessment Overview

- SEPA introduced Burns and McDonnell to present a summary of system assessments. The presentaton was given by Joey Nichols, Utility Consultant, Burns and McDonnell
- Burns and McDonnell presented a PowerPoint deck explaining a system assessment (**see Attachment No. 4, Burns & McDonnell Presentation**).
- Burns and McDonnell provided a summary of what a system assessment is and why one would conduct a system assessment.
- Burns and McDonnell summarized the foundation of the data-driven process of a system assessment. Burns and McDonnell introduced the following system assessment components: data collection and cleanup, model creation and cleanup, model tuning, initial analysis and need identification, project creation and evaluation.
- Burns and McDonnell walked through the inputs and analysis of a system assessment.
- Burns and McDonnell shared a recent system assessment example using a three-phase approach.
- Burns and McDonnell discussed the decisions that go behind a go/no-go for moving forward with a System Assessment. Depending on the scope, timeline, budget, project horizon, existing reporting and data, a system assessment may not be necessary or recommended stated Burns and McDonnell. Alternatives to systems assessments include: strategic pilots, constraints screenings and k-means cluster analysis, and a localized focused study.
- SEPA summarized the purpose of having an independent consultant present on a system assessment to create a level set for all participants and stakeholder moving into the breakout sessions.
- SEPA introduced Pepco to present a summary of an assessment of Pepco's system and system constraints given by Bryan Clark, Director of Utility of the Future, Pepco.
- Pepco provided a PowerPoint presentation explaining the data and tools Pepco uses to manage and assess its system (**see Attachment No. 5, PEPCO Presentation**).
- Pepco shared the following goals: insights on how Pepco plans, builds, and manages the distribution system.

- Pepco provided an overview of the District of Columbia's electric distribution system. Highlights include ~300,000 customers, 50 substations, 777 distribution feeders.
- Pepco discussed the complexity of the system and how they manage the system. Pepco provided a high-level overview of how Pepco manages their system and divides it into four topics: system design, infrastructure design, reliability, and new technology.
- Pepco noted aging infrastructure, emergence of new technologies, changes in customer expectation, reliability assurance and traditional regulatory obligations are the primary factors in Pepco's strategy to manage the best overall outcome on behalf of customers and ratepayers.
- Pepco stated the basis of the four components intersect at finding the appropriate business models to accommodate these growing needs.
- Pepco summarized the fundamental elements of the District's network, including the low voltage alternating current (LVAC) Networks. A typical network consists of up to 6 feeders. Pepco has 46,500 residential customers connected to a LVAC Network. These are examples of the networks that Pepco must update, study, and manage on a regular basis. Pepco has upwards of 50 LVAC Networks spread across the District.
- Pepco noted the networks closer to the heart of the District are underground LVAC networks and that farther out are overhead radial networks.
- Pepco provided a high-level overview of its system assessment processes: Reliability, Load Forecasting, and Control Center Operations.
- Pepco introduced its Distribution System Planning group's mission and role.
- Pepco presented an overview of its efforts on distributed energy resources (DERs) interconnection and how they are using new tools, techniques, and how resources are being added to their toolbox. Pepco noted it is considering all solutions to continue to deliver reliable and safe electricity to its customers, including non-wires alternatives (NWA).
- Pepco summarized the types of projects it has evaluated using DERs and NWA, including a deferral of an overhead substation in Maryland, a deferral involving one of the major transformer investments of a substation in planning phase, the use of non-wire solutions to expand the conservation voltage reduction scheme,

NWA to expand hosting capacity of closed feeders, and other storage projects across the District's system. Pepco noted NWA and storage act as another tool in the toolbox to modernize system.

- Pepco discussed the several microgrid projects it is involved with in Maryland and in the District. Pepco noted it has been working with developers and stakeholders here in the District to develop microgrids.
- Pepco discussed the ongoing electric vehicle efforts and the awareness of the increased load projected from the onset of electric vehicles. Pepco noted the necessity of addressing electric vehicle infrastructure.
- Pepco noted virtual power plants and behind the meter solutions as ways Pepco can look for solutions to ensure the system remains safe and reliable and how it can work with stakeholders to bring potential projects to the table.
- Pepco stated it plans its distribution system to account for the increase in DER interconnection and continues to identify where DERs can be interconnected into its system.
- Pepco introduced the tools it provides to assist in incorporating more DERs including:
    - Hosting Capacity Maps: colors represent the capacity of each feeder, so customers and developers can make decisions about advancing certain projects. The map is publicly available on the Pepco website: https://www.pepco.com/MyAccount/MyService/Pages/MD/HostingCapacityMap.aspx
    - Restricted Circuit Maps: identifies areas where no additional DERs can be installed on the feeder without a distribution system upgrade. The map is publicly available on the Pepco website: https://www.pepco.com/MyAccount/MyService/Pages/MD/RestrictedCircuitMap.aspx
    - Solar Heat Map: includes information on active projects currently installed and pending installations in the queue. The map is publicly available on the Pepco website: https://www.pepco.com/MyAccount/MyService/Pages/MD/HeatMap.aspx

- Pepco also noted the Annual Consolidated Report (ACR) Docket "PEPACR" as an additional document that includes overviews of the system that is provided to the public on an annual basis. The report includes analysis on some of the District's worst performing feeders. The ACR is publicly available on the Commission's E-Docket System: https://edocket.dcpsc.org/apis/pdf_files/ee7d4baf-0df8-4994-ba31-f9f53c5731a9.pdf
- Pepco discussed recent audits to its system - two in 2013 from Siemens Reliability & Liberty Management of system planning and operating procedures. Siemens found that "Pepco is effective in planning its capital expenditures for substation and feeder investments to attend load growth". Liberty found "Pepco's distribution planning practice to be consistent with good utility practice".
    - Siemens audit report is publicly available on the Commission's E-Docket System: https://edocket.dcpsc.org/apis/pdf_files/8fb20783-3551-4b08-904b-e9affc43ec6c.pdf
    - Liberty audit report is confidential and not available to the public.
- Pepco provided a high-level overview of the annual Major Service Outage (MSO) Restoration Plan and monthly outage reports that are publicly available.
- Pepco introduced the two rate case dockets: Formal Case (FC) 1139 and 1150. The construction report includes project plans and budgets. The load forecasting methodologies have been submitted to the Commission for review.
- Pepco provided information regarding DER reports. Quarterly and annually, Pepco provides information about DER capacity. Pepco stated now as part of the notice of construction (NOC) filing in FC 1144, Pepco has provided more granular data showing Pepco's direct load control (DLC) customers by location/feeder and capacity. Also, as part of the NOC filing, Pepco exhibited that they now have capability to tie DLC to most locations and feeders in the District.
- Pepco discussed the reliability forecast report as another document providing transparency of the management of the system.

- Pepco closed remarks with discussing the transparency and openness it likes to achieve with regards to changing its business model and being the utility of the future.

C. Morning Session 3 - System Assessment Breakout Discussions

- SEPA introduced the facilitation portion of the day and the objectives for the breakouts as well as the 8 SEPA facilitators. The breakout groups left the Hearing Room and went to various areas to discuss the following three questions:
    - Question 1: What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?
    - Question 2: Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization decisions? If no, what is missing?
    - Question 3: Do you feel that a system assessment is needed for the MEDSIS initiative?

The following meeting minutes were recorded during the break out group discussion regarding the necessity of a system assessment. Each break out group discussion is presented separately. To reference the summary of each breakout groups, see ***Attachment No. 6, Breakout Groups Summary. The summary was presented in the Hearing Room when all groups were brought back together for the review.***

Breakout Group 1 Discussion

Name	Organization
Chinyere Osuala	EarthJustice
Brooke Smallwood	WGL Energy
Andy Haun	Schneider Electric
Andrew Levitt	PJM Interconnection
Edward Drew	Blue Pillar
Rajesh Lakhiani	Athena Power

- In response to the question "What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?":
    - Blue Pillar stated surprise at how saturated the circuits were to date. Blue Pillar believed Pepco provided a good overview of the system. Blue Pillar was concerned that Pepco didn't discuss the edge or behind-the-meter issues and believe there wasn't enough information about their plan to get control, measurement, and verification of those behind the meter assets. Blue Pillar noted that the understanding of conservation voltage reduction is to shave peak but can be used to also improve power quality.
    - Participant asking to be Anonymous expressed concern about how much is being spent on consulting instead of diverting those dollars into delivering on the technology.
    - Schneider Electric noted surprise that there is a restricted map for distributed solar and was concerned that the map may be overly-

conservative or depicts a high penetration. Schneider Electric noted that Burns & McDonnell didn't go very deep into how NWAs can play into the assessment. Schneider Electric expressed the need to have more information about the NWA before they could decide about the system assessment. Schneider Electric noted that Pepco provided a good presentation, and that what Pepco is doing to drive reliability and modernization activities was clear. Schneider Electric noted that what wasn't clear was what Pepco was doing regarding future opportunities with behind-the-meter solutions and grid edge solutions and thought Pepco could have provided more information there and additional assessment. Schneider Electric asked for clarification regarding what was driving this system assessment discussion? For example, was there a perceived customer issue that needed to be addressed? Schneider Electric noted that several million was pegged for the system assessment as part of the merger, but that the issue wasn't clear. Schneider Electric did not know if the assessment was meant to help with feeder issues, behavioral issues, etc. Schneider Electric noted that Pepco did not provide a non-major outages report and asked if there is a linkage between this report and NWA. Schneider Electric asked if the reliability is good enough and then from a sustainability perspective - what is the gap? Schneider Electric asked if how much additional renewable energy necessary per the public utility commission?

- WGL Energy noted that the presentations were helpful to understand the process. WGL Energy asked what is the basis of having a system assessment for Pepco? WGL Energy asked what is the reasoning for a system assessment? WGL Energy noted that usually a merger results in an improvement, so what was the driver? WGL Energy asked if there was a need in 2015 for an assessment, is the need still there? WGL Energy noted that an assessment may no longer be necessary based on what Pepco and Exelon have already done. WGL Energy suggested that before an assessment is undertaken there should be a review of the problem statement.

- Participant asking to be Anonymous noted that there seems to be a disconnect between the presentations today and the questions discussed here now. The participant stated that it would have been good to understand the driver for the system assessment.
- Athena Power asked who is providing the hosting capacity maps and how are they developing that information?

- In response to the question "Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization Recommendations? If no, what is missing?":
  - EarthJustice noted that looking at the entire system, trying to figure out where DERs and EE can be deployed, which customers, which stakeholders (Pepco vs. others), looking at the entire system, there isn't sufficient information to make that determination. Doesn't have enough information about the sustainability of the system and what that looks like and need to get more information from Pepco and suppliers.
  - Schneider Electric noted that Pepco talked about the delivery systems but didn't talk about a sustainable energy system. A provision system needs to discuss generation, at the meter, and behind the meter assets. If talk about resiliency at the edge and behind the meter, want to know what the commission is thinking about on that issue. Schneider asked what the cost savings with a DER focused approach vs. a traditional approach are.
  - WGL Energy asked how to do we define reliability now vs. in the past? Reliability can now be bolstered by DERs/microgrid. The PSC should be asking for both reliability and resiliency planning from Pepco that is an integrated plan that explains cost benefits and tradeoffs for all options.

- In response to the question "Do you feel that a system assessment is needed for the MEDSIS initiative?":
  - Athena Power noted it was unclear how much funding is necessary for a system assessment. The system assessment would be roughly $8-30 million and only $4M allocated in the project. Athena Power doesn't want to spend the funds on the consultants, but rather the hardware

implementation. The original reliability issue was related to the derecho. Thinks that Pepco will improve as they are held to higher standards by Exelon.

- WGL Energy stated that there are many issues within Exelon (e.g., billing systems) companies in terms of integration. Pepco serves more than DC and they understand their system. Approving a merger would have been predicated on the utility understanding its system without having to do an independent study. Pepco doesn't need it and doesn't agree that they use ratepayer funding for the assessment. WGL Energy would rather see the funds used for DER opportunities and noted that Pepco's performance has improved in recent years.
- EarthJustice thinks that information gained through a systems assessment could be useful but not at this time.
- Schneider Electric stated it doesn't make sense to spend the funds until define the objectives of the work. Would rather see the funds used to analyze the goals and objectives of the commission. Unclear the motivation for the system assessment originally; was it related to the performance of Pepco? Has the past three years delivered sufficient improvement that an assessment was necessary.
- Blue Pillar stated that if any kind of system assessment is done on a more limited basis with a sample of circuits.
- WGL Energy noted that if there is a defined scope, then a more limited system assessment could be a good thing.

Breakout Group 2 Discussion

Name	Organization
Erick Karlen	Greenlots
Alan D. Lee	The World Bank
Alison Williams	Edison Electric Institute (EEI)
Stephen Swern	NV5 (AM only)
H.G. Chisell	Advanced Energy Group
Zach Dobelbower	DC Department of General Services
Torrey Beek	DC Department of Energy & Environment (DoEE)
Brian Caldwell	DC Attorney General's Office
Bryan Clark	Pepco
Jason Allnutt	IEEE (PM only)
Zach Wilson	New City Energy

- In response to the question "What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?":
    - EEI noted that the hosting capacity maps are helpful for considering NWAs.

- DC Department of General Services stated that a basic understanding of what an assessment is important to considering NWAs and creating a common knowledge and level setting amongst all stakeholders.
- Advanced Energy Group agreed that it is helpful to know what Pepco is doing in terms of visibility on the network and what their current NWA efforts are.
- DoEE noted that the time duration and range for option considerations are important to use when deciding how to move forward with assessing the situation. DoEE recognized that new technology and business practices are important considerations and noted that they should be interwoven into new plans.
- Greenlots introduced several questions with regards to the scope, budget, and time length of the system assessment. It noted that there seems to be other paths that the Commission should go down in the MEDSIS initiative.
- NV5 asked how the system assessment is different from system planning?
- DC Attorney General's Office noted that the presentations from Pepco and Burns & McDonnell were helpful in summarizing the information publicly available and where to get it. It was surprised with the amount of information that exists. It raised questions regarding the potential of conducting a bias study.
- The World Bank noted that the examples presented by Pepco on their ongoing efforts with deferrals and systems upgrades were helpful in that it showed that Pepco was thinking about it.

- In response to the question "Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization Recommendations? If no, what is missing?":
  - All stakeholders reached a consensus that it is more about transparency of available information rather than an information gap. All noted that more data is necessary to evaluate new investment decisions objectively. All stakeholders had a consensus that they wanted more clarity around

the roughly $22 million in the MEDSIS Pilot Project fund and if these monies would be used to fund the system assessment.

- DoEE asked if Pepco could provide comments on data transparency.
- Pepco stated that most of the time it is not data that is in question, it is strategic information. Pepco stated that it must be careful about sharing this information to ensure everyone is being treated fairly with enough transparency while maintaining a secure system. Pepco stated that it is pro decarbonization but currently costs of DER NWAs are not low enough to get scale to solve problems. Pepco noted that most NWAs fail cost benefit analysis and that this is important when evaluating projects to ensure reliability, safety and economics.
- The World Bank brought up that there were no DERs or EV charging locations on any of the maps that Pepco presented. The World Bank identified that there was no information touching on forecast changes and systematic wide factors on the demands.
- DoEE noted that the District's system is ready to take on grid modernization. DoEE stated a concern in how business model changes and considerations are going to affect the MEDSIS initiative. DoEE mentioned that it is unclear how the information provided by Pepco regarding NWAs is publicly shared externally. DoEE raised the concern of the difference between analyzing the technology combinations and the financial impacts, and what is shared publicly.
- DC Department of General Services noted that the information provided by both presentations did not feel equal. DC Department of General Services specifically noted that information regarding NWA analysis was covered by Pepco but not Burns & McDonnell.
- NV5 stated that there is sufficient information and there is a clearly comprehensive process that is going on. NV5 noted that Pepco is positioned well to undertake the process.
- DoEE stated that it is not clear how Pepco's advanced metering infrastructure (AMI) or data capabilities are incorporated into existing capabilities. DoEE mentioned that it is difficult to identify NWA opportunities and would like to see more clarity between the noticed of

construction (NOC) recently filed in FC1144 Capital Grid Project that is confidential and not available to the public.

- The World Bank asked about alternatives to system assessments and stated that it would be helpful to make an informed decision if more alternatives were provided.
- NV5 noted that Burns & McDonnell didn't make a strong case for doing a 10% analysis for system but stated if the data is good enough, perhaps it would be a good idea to conduct a targeted study.
- EEI stated that it believed the presentations today were intended as a comparison to other jurisdictions.
- DoEE brought up its concern with a targeted study noting that the challenge is that all circuits are not created equally and that it is hard to generalize about load growth and constrained areas without a holistic system assessment.
- EEI stated that there is a need for system assessment in need to reference other states.
- Advanced Energy Group asked Pepco in the breakout group to identify the missing pieces based on what was presented as a system assessment and what Pepco currently has in place.
- Pepco answered and stated that a system assessment would be redundant based on the level of info that is publicly available. Pepco stated that it is willing to make the appropriate information available should it exist as part of existing process as a new requirement. Pepco noted that the stakeholder collaborative process will get it down the road quicker to substantive and meaningful projects. Pepco mentioned that projects will require assessments including time and load forecast data and cost-level analysis. Pepco noted that given the above, the system assessment is redundant – there is enough available information.
- The World Bank asked specifically about what problem the system assessment is trying to solve. The World Bank stated that there is additional information required on top of a specific substation study, including neighborhood needs, for example.

- Pepco stated that the system assessment is costly, and the funds can be devoted to actual project development.
- DC Attorney General's Office asked how many pilot projects were undertaken as separate of system assessment and noted that that a system assessment may be redundant and operating in parallel to other efforts.
- Advanced Energy Group asked if Pepco can enact pilot projects on its own, without Commission approval, through the money received through the merger.
- Pepco replied that the projects must be approved by the Commission.

- In response to the question "Do you feel that a system assessment is needed for the MEDSIS initiative?":
  - EEI stated that it does not support the system assessment mentioning the following reasons: time wasted, predetermined objectives and data complications.
  - Advanced Energy Group stated it is in favor of an alternative that's not being proposed, drawing from information revealed by Pepco to determine what is missing and what is the cost of obtaining what is missing.
  - DC Department of General Services stated that pilot projects can act as an alternative to the system assessment, specifically a pilot project that addresses reliability or constraints on the grid locally.
  - Pepco stated that the system assessment being discussed is not necessary and noted that the need and the definition of a system assessment is unclear.
  - Greenlots stated that the system assessment would stop pilot development and the working group process.
  - The World Bank asked for a clarification about who was advocating for the system assessment.
  - SEPA clarified that the Commission wanted stakeholder input on the appropriateness of conducting a system assessment.
  - DoEE asked the question, what do we need to know to move forward in the MEDSIS initiative?

- Pepco stated that developing the working groups is the first step to identifying any gaps in information and data of the system. Specific working groups can work to identify the information needed to move forward with the DC grid modernization effort.
- DC Department of General Services noted the advocacy for a system assessment within the community and noted the accessibility or inaccessibility of requested information as a driver for decision makers.
- The World Bank asked who would do the system assessment?
- Advanced Energy Group replied that they believe Burns & Donnell would be contracted to do the assessment as they don't have any contractual work with Pepco
- DC Attorney General's Office stated how it is important to understand the goal of spending money, having a long-term vision, and what to do once the money is gone.
- Greenlots noted that the pilot projects are exactly that – projects to use funding to inform Pepco's future filings with how it's going to spend ratepayer funds. Greenlots mentioned, in other words it is seed money to get that thought process forward to inform broader grid modernization efforts.
- DoEE noted that with the changing distribution system – with the inclusion of DERs – there should be a focus on ensuring the system can handle it. DoEE noted that the information to do so is available but it is not organized.
- Advanced Energy Group mentioned the importance of including resiliency and decarbonization into the pilot project process to animate the market.
- DC Attorney General's Office asked how the pilot projects are evaluated at the end of the day? How do we measure successful pilot project?
- Advanced Energy Group asked if there was scoring method in place already for pilot projects.
- NV5 noted that it will be fluid with working groups.
- SEPA replied that there will be a working group specific to developing the parameters for evaluating pilot projects.

- The World Bank stated that it does not see a strong case made for conducting a system assessment. The World posed the question on how to ensure the quality of an alternative of a system assessment.

Breakout Group 3 Discussion

Name	Organization
Frann Francis	AOBA
Anjali Patel	DC Office of People's Council
John MacGregor	DC Climate Action
Ethan Holmes	Pepco
John Slocum	Exelon
Lily Wang	Exelon
John Young	DC Sustainable Energy Utility (DCSEU)
Ronald Bethea	Positive Change Purchasing Coop
Rachel Gold	American Council for an Energy-Efficient Economy
Yohana Mariam	DC Office of People's Council
Mishal Thadani	District Solar

- Group 3 discussed all three questions concerning the systems assessment at one time. Group 3's discussion included:

- AOBA noted that with the capital grid project filing coming, it would be good to get all the information gathered in one place and more holistic in approach. AOBA asked how does it tie in to what is happening through MEDSIS?
- OPC asked what is included in the scope of the assessment and suggested a need to do more holistic problem solving.
- OPC noted that the report format for hosting capacity provided by Pepco is useful but could be more user friendly.
- DC Climate Action noted that Burns and McDonnell's presentation was hardware oriented but mentioned business processes. Hardware is only part of the issue. Important to capture barriers and incentives for consumers to participants.
- Pepco noted the cost of the system analysis and the amount of information available to consumers and market players. Focus on the need to add more DER on the system without compromising the reliability of the grid.
- Exelon noted that understanding the hardware needs is valuable. That level of information about Hosting Capacity.
- DCSEU noted that energy efficiency, Storage, and demand response are listed under DER - and asked how the uses are being framed for these (are we classifying them)
- Positive Change Purchasing Coop noted that there is no budgeting for community engagement (DOE has $30Million for other solar programs but nothing for roof repair for weatherization) Positive Change Purchasing Coop expressed the need to be sure we are taking care of low income. And asked what's in the spending plan for low to moderate income residents of DC? Need to make sure we are considering social equity and community engagement and need an overall assessment on impacts to these expenditures on the rate payer
- American Council for an Energy-Efficient Economy did not find the information helpful in addressing the questions about non-wires alternatives. Understanding what processes Pepco uses was helpful. It would be helpful to understand what a system assessment is versus what

Pepco is currently, in order to clarify what the gap is between what is already being done and what is needed to support non-wires alternatives and grid modernization decisions.

- District Solar noted that some of the resources that were shared and posted to the public, but the information is not user friendly or actionable (basically still require engineering study). Need to determine use cases of the system assessment

Breakout Group 4 Discussion

Name	Organization
Samir Succar	ICF International
Clark Pierce	Landis+Gyr
Bicky Corman	EKM Law
Mike House	AECOM
Natasha Rao	Environmental Defense Fund
Larry Martin	GRID2.0
Robert Cain	Washington Gas

- Group 4 discussed the first two questions concerning the systems assessment. Group 4's discussion included:
  - EKM Law mentioned that Pepco is simultaneously entertaining accelerated movement on electric vehicles (EVs.
  - GRID2.0 expressed skepticism of the need for a system assessment with stating that an assessment could clarify how MEDSIS could meet DC's needs and goals.

- Participant asking to be Anonymous stated that a system assessment can allow a holistic view from a system design perspective but prefers to see more details about the benefits and costs of conducting such an assessment. Specifically, the participant noted that the benefit increment or the additional value of the assessment is unclear.
- EKM Law noted that there was already system assessment data and tools available.
- AECOM agreed that there are no quantifiable benefits for an assessment and noted it is unclear about the additional benefit it would provide.
- Landis+Gyr noted that the assessment could offer a holistic benefit. Landis+Gyr recommended that Pepco share its system design criteria and asked how the MEDSIS initiative would account for this (criteria).
- EKM Law asked if there was any precedent for doing a similar assessment and if there was cost/benefit analysis conducted.
- GRID2.0 noted that the DOEE report on non-wires alternatives for the Mount Vernon substation will be informative to the MEDSIS process and introduces the need for finding a third-party evaluator of such NWA projects. The Mount Vernon case study could be an effective study to consider when moving forward with MEDSIS initiative.
- AECOM noted that resilience and sustainability metrics would help to inform future considerations for MEDSIS pilot programs with non-wires alternatives.
- GRID2.0 mentioned that the District is typically long on goals and very aspirational when it comes to its goal setting.
- Landis+Gyr stated that a 75MW renewable energy goal from the Commission could derive for the metrics.
- AECOM noted that private sector clients are eager to move forward with pilot projects without further studies, and that the market is ready to deliver a range of good project ideas to the Commission for consideration. EKM Law agreed and does not want to delay the process any further with a system assessment.
- GRID2.0 noted that a system assessment could be considered to target pilot projects which could gather data to inform the assessment.

GRID2.0 also noted the importance of conducting focused analysis on the Mount Vernon Square & Synapse/DoEE study, including the parts of the study where there are disagreements.

- The study can be found here: http://www.synapse-energy.com/sites/default/files/Mt-Vernon-Substation-17-105-17-047.pdf

- Landis+Gyr mentioned that the assessments could be additive to the pilot process and holistic approach and could be considered within the working group process.

- In response to the question "Do you feel that a system assessment is needed for the MEDSIS initiative?":
  - Landis+Gyr stated that some system assessment is needed but it should be targeted.
  - AECOM noted that there is no tangible benefit for a system assessment as proposed by Burns and McDonnell as compared to that which is already available from Pepco. ICF International stated that there is no tangible benefit indicated for a system assessment over Pepco's existing data.
  - Washington Gas stated that there is not enough information to justify it.
  - Environmental Defense Fund abstained from deciding.
  - EKM Law stated that until there are criteria and/or a cost-benefit provided, there is not enough information to justify a systems assessment.
  - GRID2.0 stated that a system assessment is not appropriate unless a justification for it is made.

Breakout Group 5 Discussion

Name	Organization
Rhoda Alale	BioSmart Solar

Jeremy Bedine	GridLion
Nicholas Bihun	New Columbia Solar
Dave Borden	Washington Gas & Light (WGL) (AM Only)
Shalom Flank	Urban Ingenuity
Bart Krishland	New Columbia Solar
Nina Lobo	Groundswell
Robert Robinson	Consumer Utility Resource Board of DC (DCCUB) (AM Only)
Bianca Smith-e-Incas	BioSmart Solar
Mark Thomson	ThinkEco
Thomas Weaver	Prospect Solar (AM Only)

- In response to the question "What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?":
    - All stakeholders had a consensus that they liked to see Pepco acknowledge stakeholder input and that NWA is still a new concept for many.
    - ThnkEco noted that they have been involved in NWA for ConEd in New York. ThinkEco noted that there was great ground work done in New York. ThinkEco cautioned once you get into defining the details what is needed for NWA that it is a long process. ThinkEco added that many have withdrawn projects because the load forecast shifted in New York and wanted to ensure that DC would not mimic New York.
    - DCCUB noted that FC1144 is extremely important to understand and incorporate into the MEDSIS initiative, specifically how construction

projects are evaluated based upon the least cost. DCCUB mentioned that Pepco's project within FC1144 are not supported by facts. DCCUB referred to the Synapse/DoEE study on how DERs can reduce load and be developed in lieu of capital investments. DCCUB stated that the customer perspective is that Pepco wants to use cost recovery to make money. DCCUB mentioned that it knows DER and demand management and can help develop projects cheaper than Pepco. DCCUB asked how do we transform a utility centric power delivery to be more customer facing? DCCUB alluded to the fact that customers are not involved in the planning process and described the need for a roadmap that includes questions we want answered to achieve the vision.

  - The study can be found here: http://www.synapse-energy.com/sites/default/files/Mt-Vernon-Substation-17-105-17-047.pdf

- GridLion noted that BG&E seems to be taking a stance that things can be solved by adding another distribution line and that reliability is their focus.

- In response to the question "Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization Recommendations? If no, what is missing?":
  - 8 stakeholders in the group felt that there was sufficient information to begin the MEDSIS initiative.
  - 3 stakeholders did not have an opinion.
  - Some in the group felt that the Burns & McDonnell presentation was still focused from the perspective of a utility and didn't consider other things like policy and new developments that need to happen. Examples were efficient requirements for Green Buildings, EVs, etc.

- In response to the question "Do you feel that a system assessment is needed for the MEDSIS initiative?":
  - 3 stakeholders believed a system assessment was needed
  - 4 stakeholders said NO to a system assessment

- 4 stakeholders were unsure as they missed the presentations this morning or were just not sure.
- ThinkEco stated that no further assessment is needed but needs to be prepped with immediate hiring needs of Pepco as the MEDSIS initiative moves along.
- DCCUB noted that all stakeholders need to be cautious that Pepco just wanting to spend money.

Breakout Group 6 Discussion

Name	Organization
Eugene Imhoff	GRID2.0
Andrea Harper	Pepco
Joey Nichols	Burns & McDonnell
Stephen Lassiter	Sunrun
Erica Weyer	Sierra Club
Guy Warner	Pareto Energy
Sylwia Bialek	NYU Institute
Ross Kiddie	West Monroe Partners
Alex Lopez	Oracle Utilities
Al Roark	ABB (AM Only)

- In response to the question "What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?":
    - ABB noted Pepco's hosting capacity maps and available information on restricted/available circuits/substations for DER integration and a better understanding of its sophisticated systems.
    - Oracle Utilities agreed that hosting capacity and transparency into data is extremely important.
    - Pepco added that it has already streamlined its interconnection process and continuously looks for ways to streamline and improve the process.
    - West Monroe Partners noted an understanding of the LVAC network and distribution systems is a start.
    - Pareto Energy raised a question regarding the interconnection docket and the cost of a full versus alternative system assessment or study.
    - Sunrun also noted informing interconnection and viewing costs of interconnection as helpful information when considering non-wires alternatives.
    - GRID2.0 noted understanding what is restricting Pepco from reaching the utility of the future - and raised this as the most important piece of information when considering NWA. He also asked if Pepco would be able to be a power supplier and the question if they should be or not.
    - Sunrun posed the question of frequency and funding behind the studies and maps which Pepco presented in the morning session. Pepco responded with noting the studies are often funded by the ratepayers.

- In response to the question "Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization Recommendations? If no, what is missing?":
    - Pareto Energy noted the engineering-based system assessments lack institutional design and innovation. He elaborated by noting that these institutional considerations include a better understanding of demand side and end-use consumption and generation. He noted that this

information would allow an integrated community energy system (ICES) energy design.
  - Oracle Utilities raised a question about the role of the DCSEU.
  - Burns and McDonnell stated that B&M has conducted a targeted pilot on a representative of 64 feeders for a large utility company.
  - Pareto Energy stated utility approval of interconnection as a gap.
  - West Monroe Partners agreed that there is a gap in load forecasting and wants to know more about the state of Pepco as the utility of the future.
  - Pepco mentioned its Direct Load Control (DLC) Program as an effort.
  - Pareto Energy noted that Pepco's DLC Program is limited.

- In response to the question "Do you feel that a system assessment is needed for the MEDSIS initiative?":
  - All stakeholders had consensus that a system assessment was not needed under the assumption that the cost of the system assessment would be bared by MEDSIS Pilot Project funds.
  - West Monroe Partners noted that a basic system assessment is needed to understand the system unless Pepco can answer the gaps he has or if it would be part of a Utility Distribution Integration Resource Planning (DIRP) effort.
  - GRID2.0 agreed with the call to have Pepco answer questions or include an assessment in a utility DIRP.
  - Oracle Utilities noted a system assessment is not needed if the funds to pay for the assessment came out of the MEDSIS Pilot Project fund.
  - Pepco noted that a system assessment is not needed for the MEDSIS initiative and referred to the ongoing efforts Pepco is undertaking, including those presented in the hearing room by Bryan Clark.
  - GRID2.0, Sunrun, and Sierra Club stated they all were in agreeance that a system assessment funded by the MEDSIS Pilot Project fund is not completely necessary.

Breakout Group 7 Discussion

Name	Organization
Jay Frankhouser	EnerSys
Patti Boyd	DC Sustainable Energy Utility (DCSEU)
Matthew Bearzotti	Sierra Club
Ken Boley	pdvWireless
Adrienne Mouton-Henderson	DC Office of People's Council (OPC)
Noel Rivera	Pepco
Jason Cumberbatch	DC Office of People's Council (OPC)

- In response to the question "What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?":
    - Sierra Club stated surprise to hear that system assessments were not needed. They had anticipated a pitch from Pepco
    - EnergSys stated they were also very impressed by Pepco's presentation and the tools that already exist
    - OPC stated it had used the tools Pepco offered in the past and was interested in greater availability of data. Specifically, OPC expressed interest in a targeted localized assessment which may or may not lead to local pilot projects that can mitigate system upgrades.
    - Pepco stated being very interested in pursuing new technologies and business models, including projects that defer system upgrades.

- OPC indicated that it gets questions from consumers regularly regarding system upgrades, outages, and other questions about their local power grid from Pepco customers.

- In response to the question "Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization Recommendations? If no, what is missing?":
  - All the stakeholders agreed that few other utilities provide the level of system data.
  - OPC stated that there is sufficient information from Pepco. However, OPC stated that accessing the data, and interpreting the information is challenging.
  - EnergSys stated that it believes there are many similar scenarios / locations that replicate each other across the city. And thus a full assessment is not warranted. However looking at groups of areas that mimic others may be a good way to replicate successful DER projects.
  - PdvWireless believes an appropriate question maybe "Is there the right data for individuals to do their own assessment?
  - OPC mentioned that most stakeholders have their own technical consultant who does an assessment based on available data. OPC believes a separate assessment would stifle the proceeding. It also indicated there is a need for a rate design working group as well as a working group designed to synthesize the existing assessment data that Pepco provides, and repackage into a form that is easily accessible to the public.
  - PdvWireless asked the question as to if cyber-security is a portion or focus area of the MEDSIS vision statement

- In response to the question "Do you feel that a system assessment is needed for the MEDSIS initiative?":
  - All stakeholders agreed that an assessment is not needed before pilots. Group agreed there is plenty of available data that can be used to select several local pilot projects and that down the road, a full

assessment may be needed, but not at the current time in the MEDSIS Initiative.

- PdvWireless stated belief that there is enough information to select pilot projects in each ward. After the pilots, a more thorough assessment may be needed to determine how to scale the pilots across the system.
- DCSEU mentioned that Pepco does this type of assessment on a regular basis.

Breakout Group 8 Discussion

Name	Organization
Jim Taylor	Siemens
Dave Schatz	ChargePoint
Dave Wright	Groundswell
"Bob" (Robert) Burkhardt	pdvWireless,
Edward Yim	DC Department of Environment & Energy (DoEE)
Ernest Jolly	DC Water and Sewer Authority (DCWASA)
Nina Dodge	DC Climate Action
Chet Warner	Pareto Energy
Rhoda Alale	Center for Environmental Health / BioSmart Solar Project Inc.

"Terry" (Terence) Hill	Passive House Institute US

- In response to the question "What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?":
    - DCWASA noted that a detailed update on what the wired conditions are is extremely helpful. It also noted that an understanding of the current state (e.g. where we are, what are we looking to do) serves as a resource & resistance to the MEDSIS initiative. It believes if there is an investment made, they would want to use the asset.
    - DoEE stated that the presentations seemed to be about the general purpose of a system assessment, and because they were too broad and general, they are not providing the type of information that could help think about NWA.
    - DoEE mentioned that framework is lacking that would help determine what type of a system assessment is needed. If the system assessment is to generally figure out whether the system is safe and reliable, we probably would not need one because Pepco's reliability and safety records are good. But what is needed is a more targeted, problem-based assessment. DoEE noted that examples would be independently evaluating hosting capacity of feeder groups, or network equipment protection schemes assessment, or communications capability for interactivity. But figuring out which ones would be necessary requires that we all have a common vision about what kind of capabilities and standards we want the grid to have. But we are not having that conversation. DoEE mentioned the need for the Commission's vision to be translated into measurable criteria and into a roadmap for attaining those criteria.
    - DoEE raised a concern whether the right questions were being asked and what the end objectives on the system are.

- DC Climate Action noted guiding principles and the purpose of MEDSIS as key points of interest to understand the investment in public interest. It mentioned that the public good aspect needs to be addressed. It posed the question of sustainability needing to be addressed and wants to ensure the initiative reflects the District's climate policies, reductions in emissions and energy efficiency benchmarked to 2050 targets.
- DC Climate Action noted system enhancements, reliability, and modernization over payout to investors as helpful topics that were covered.
- DC Climate Action likes the system assessment tool to get towards the goal of increased sustainability. It also stated interest in the pilot and targeted types of system assessments to meet specific needs along the grid.
- Siemens noted the assessment alternative project.
- DC Climate Action suggested a 7 circuit-type assessment investment in lieu of a $5 million-type assessment investment. It also believed that there is no such thing as an objective assessment. It offered the thought of using the assessment as a tool to get going in the positive direction and not object to anything else other than that. It brought up the open non-wire alternative case (Capital Grid Project) in Mt. Vernon and that there is already been a system assessment developed by Pepco in many of the hot spot areas of the District, but the effort may not be extensive enough.
- DC Climate Action stated the importance of goal setting of the Commission with advisement from different third-parties rather than the utility.
- Center for Environmental Health discussed concern about sustainability to biological sustainability.
- pdvWireless noted concern about the grid's ability to interconnect DERs.
- Siemens asked the question how is the investor-owned utility (IOU) mandated to function? Siemens noted that the IOU may need to change its business models to fit the vision statement.

- ChargePoint stated that electrification of the transportation sector - including transit and light duty - should be considered in the planning process.
- DCWASA stated their concern that Pepco focuses more on projects of reliability & sustainability rather than DER-related projects.

- In response to the question "Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization Recommendations? If no, what is missing?":
  - DCWASA stated that to move forward with DC grid modernization, the end goal objectives - such as specific capacity and performance goals - must be clearly defined.
  - pdvWireless stated that DER small pilot studies could be used to make grid modernization recommendations into the future. Small pilot studies are best-practice to enable proper projections of DERs and teach us how to understand the trends on use of electricity.
  - DoEE stated that the District completely lacks a roadmap for grid modernization, and the District has no idea what the measurable capabilities and standards that a modernized grid in DC should have.
  - DoEE noted that the Commission's vision must be translated into specific functionalities, capabilities, and standards. DoEE mentioned that without doing this work first, we would be putting the cart before the horse.
  - DC Climate Action noted that to answer this question properly, a clearly defined description of DC Grid Modernization must be developed. For example, defining what a modernized grid looks like in terms of substation zones, equipment, capabilities, health effects, and how it meets community needs.
  - DC Climate Action stated that more focus and information surrounding sustainability and climate change may benefit from a targeted assessment on lowering emissions.
  - ChargePoint stated that available information is missing important data components on electrification and other parts that are limiting the ability

for industry to leverage access to the grid. For example, economic interplay, interconnection, and forecasting.

- In response to the question "Do you feel that a system assessment is needed for the MEDSIS initiative?":
  - All stakeholders agreed that there was no need for a full-system assessment but MEDSIS would benefit from some portion of a system assessment.
  - DoEE specifically asked if the answer could be nuanced to say that a certain type of assessment (e.g. hosting capacity) for a part of the system is needed? DoEE stated concern about being forced to choose, but if it were to choose, it would answer that a full system assessment is not needed.

D. Morning Session 4 - System Assessment Overview

- SEPA brought the groups back to the hearing room to lead a facilitated discussion related to the results from each breakout group.
- The results from individual breakout sessions have been summarized by SEPA **(see Attachment No. 7, Breakout Groups Summary)**
- SEPA provided the results of the 2nd and 3rd question. SEPA determined that the majority of stakeholders believed there was enough information available and that an assessment was unnecessary at this time.

E. Afternoon Session 5 - Working Group Introduction and Breakout Discussion

- SEPA started the afternoon session on slide 40 of the PowerPoint presentation introducing the working group introductory discussion **(see Attachment No. 3, Technical Conference Presentation).**

- SEPA began with a quick review of the past 3 workshop meetings, town-hall meeting, staff report, vision statement, and pilot project parameters to introduce the working group topic and breakout session.
- SEPA noted, based on their understanding of MEDSIS, stakeholder priorities, and needs within the District, a strawman for the MEDSIS working groups for discussion. SEPA proposed the following groups for breakout discussion:
  - Pilot Project Definition
  - Distributed Energy Resources (Non-Wires Alternatives)
  - Utility Distributed Integration Resource Planning (DIRP)
  - Customer Protection
  - Microgrids
  - Future Rate Design

- The various stakeholders went back to the same breakout groups they were assigned in the morning. SEPA facilitated the groups using the following questions for discussion:
  - Question 1: Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?
  - Question 2: If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.

The following meeting minutes were recorded during the break out group discussion regarding the MEDSIS working groups. Each break out group discussion is presented separately. To reference the summary of each breakout groups, ***see Attachment No. 6, Breakout Groups Summary***

Breakout Group 1 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
  - PJM Interconnection stated the following topics needing to be addressed: implementation of IEEE standard 1547 and DER ride-through

requirements in DER interconnection rules, data accessibility – and transparency – segmented by stakeholders, aggregation vs. disaggregation of data

- Blue Pillar stated the following topics: data availability, information required to run internet of things (IOT) system behind the meter.
- WGL Energy noted that DC has been a leader of the smart city concept, but it needs to be addressed within a working group to answer the question of what that actually work for DC in terms of microgrids, ecodistricts, city emergency planning, and generation registries
- Schneider Electric stated the following topics needed to be addressed: sustainability objectives, KPI and metering, and general data protection regulations (GDPR).
- EarthJustice stated the following topics needing to be addressed: affordability objectives (e.g. someone's bill should not be X% of their income), targeted energy efficiency programs and efficient placement of distributed generation.
- Athena Power noted that the metrics for CAIDI and SAIDI should be used to dictate where investment should be directed. Athena Power mentioned that data transparency and what information is currently out there should be considered as a main topic.
- All stakeholders agreed that data availability, microgrids, sustainable objectives, and the role of the utility are all important topics for the working groups to cover.

- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":
  - Schneider Electric stated that microgrids and NWA/DERs are very similar and noted that the working groups should differentiate between grid-scale vs. distributed DERs. Schneider Electric also noted that grid modernization financing options should be a topic of working groups to target the $21M against the existing investment projects to prevent redundancy and ensure that they are unique/not going to be done

otherwise. Schneider Electric noted that if the Utility DIRP working group topics could be part of the DER or microgrid working groups while EVs should be considered in a separate group.

- WGL Energy stated the importance of having a working group focused on resiliency; the DER working group could have several committees.
- Athena Power stated the importance of having reliability/resiliency, power quality, and DER interconnection.
- EarthJustice mentioned several potential working groups it would like to see: customer protection, end user affordability, value of DER, methodology for cost-of-service within an affordability group.
- PJM Interconnection believed the NWA could go into planning working group and likes each of the six proposed working groups offered by SEPA. PJM Interconnection recommended that DER should be defined in advance. PJM Interconnection stated the option for industry led subcommittees that are not facilitated by the staff. PJM Interconnection recommended working groups provide a potential mechanism to tackle more specific issues like IEEE 1547 (smart inverter) and referenced MD PC44 (smart inverter subgroup; part of the DER Interconnect working group) and CA.
- Blue Pillar had no suggestions but is not impressed with the ones proposed. Blue Pillar recommended that Pepco representative should participate in each working group along with a PJM participant. Blue Pillar also stated that EV working group should be created.
- All stakeholders agreed that NWA could be pulled out from the DER/NWA combined working group into the planning group.
- Several stakeholders wanted to change the microgrid name to include "and Resilience Systems".
- Several stakeholders agreed that smart city mobility (e.g. electric, autonomous, shared, connected) could be included in the DER working group.

Breakout Group 2 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
    - All stakeholders agreed that customer equity, unique characteristics of DC Grid, new approaches to rate making, sustainable utility business models, intangible benefits, 51st state ideas, building heritage codes, utility application behind the meter.
    - Topics considered by the stakeholders included the following: energy storage, safety, rate design, transportation electrification, data audit and verification, automatic control (e.g. demand response management), urban planning, building codes, IEEE standards, interconnection process (e.g. IEEE 1547, UL 1741) - and interrelated interconnection cases, low income, resiliency, and demand side management.
    - The World Bank noted that safety, with storage should be an important part of the working groups.
    - Greenlots noted rate design and transportation electrification as potential working groups.
    - Advanced Energy Group mentioned that 3rd party data verification and validation should be required and fleshed out in the working groups to identify Pepco's gaps.
    - DoEE wanted to see an active system management working group that would yield visibility into resources on the system, including autonomous network operation as a topic of discussion.
    - The World Bank noted an open planning and building code working groups to work through the requirements for charging stations, including state and system standards and regulations.
    - Advanced Energy Group stated that an interconnection process working group is warranted.
    - Pepco mentioned that it would like to see a smart cities element (e.g. streetlights) defined and prioritized in the working group.
    - EEI mentioned that low income integration, participation, and inclusion shall be addressed within a working group, or throughout all.

- Advanced Energy Group noted that a definition of resilience should be included in perhaps a critical resiliency strategy working group.
- The World Bank noted the importance of the evolving business models around virtual utilities and other new actors in the space.
- EEI and Pepco agreed that customer equity across all customer classes is key within the MEDSIS working gro8ups.
- Greenlots mentioned it would like to see pilot projects target the issues and realities that are unique to the District's grid.
- The World Bank noted a ratemaking working group should reconsider what goes into the rate casing process. The World Bank asked the question, "Does the 21st century grid need this type of approach (rate case)?
- Advanced Energy Group mentioned a utility of the future / new utility business model working group geared to answer what the sustainable business model for the utility look like in the future?
- Greenlots agreed that utility incentives should be aligned with everyone and that alternative ratemaking must be considered.
- Pepco mentioned non-quantifiable benefits and noted the need for more consideration into the cost benefit analysis approach (e.g. how to value certain things that you can't put dollars on)
- DoEE noted a "foundations for a smarter more active system" type working group would be beneficial.
- The World Bank noted the importance of integrating solar PV that is also heritage compatible (e.g. roof tiles that meet building heritage controls).
- Pepco noted the topic of utility in behind the meter applications (e.g. residential storage programs like Green Mountain Power's). Pepco described the potential pilot program of sponsoring the financial costs of the customers to utilize the residential storage as an aggregator / virtual power plant. Pepco mentioned the customer financial incentive and utilities benefit in managing the system.

- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":
    - The stakeholders collectively came up with the following working group recommendations:
        - Pilot Project Programs
            - Governance
            - Microgrids
            - Value of pilot projects (insights and future developments)
            - Cost recovery - who pays?
        - DER Resources / NWAs
            - Include demand-side management?
            - How to value DER as NWAs? (guidelines)
            - System benefit cost analysis
        - Utility DIRP
            - Hosting capacity, locational value, security/cybersecurity, data verification (accuracy, transparency, safe), interconnection, urban planning + building codes, transmission, timeline for upgrade
        - Future Utility
            - Role of aggregators, stakeholders, ownership/management of DERs
            - Rate making
            - Business models
            - Microgrids + all DER
            - spatial/temporal price variability, market design, platform models + dynamics
        - Consumer Protection and Engagement
            - Customer equity, low/income inclusion, customer data/privacy, cost causation
        - Ratemaking
        - Beneficial Electrification

Breakout Group 3 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
    - The stakeholders discussed the following topics needing to be addressed in MEDSIS working groups: performance-based ratemaking, tax incentives, market competition, social equity, rate design, policy and utility business model alignment, interconnection, DER technology intelligence, incentives to market players, cost-allocation, community outreach and education, consumer data protection, cybersecurity, reliability and physical security, and regulatory reform and assessment.
    - The stakeholders felt that it was very important to spend the time to (1) gather up all relevant information and resources and package it for stakeholders to reference before starting working groups and (2) ensure that there is a strong focus on alignment with existing related policies and regulations including City of DC Clean Energy Plan, other Pepco regulatory proceedings, etc. - we should be coordinating efforts as it relates to other grid modernization efforts.

- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":
    - The stakeholders collectively came up with the following potential working groups: pilot projects, DER/NWAs, rate design, consumer protection/engagement, market design and market roles, microgrids and resiliency, workforce development, policy alignment, utility business models, regulatory review including interoperability and code of conduct.

Breakout Group 4 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
    - Landis+Gyr stated that it may need a separate or parallel process focused on EV chargers and grid impacts.
    - GRID2.0 mentioned rate design, including performance-based rates, as current rates do not address what we want to advance.
    - Landis+Gyr stated efficiency and demand response as important topics to be part of working groups.
    - EKM Law, on behalf of Tesla,Inc., made it clear that it was in opposition of mandatory residential demand charges.
    - AECOM commented that regardless of what working groups are formed, the MEDSIS initiative needs to address the potential benefits of multiple energy delivery systems (e.g. electricity, gas, water, district energy) and take this into consideration in future regulatory policies, rate structures and pilot demonstration projects. GRID2.0 noted that the District did not define storage as generation and expressed that storage is a DER.
    - GRID2.0 noted that DERs and DERMs could be categorized as virtual power plants (VPPs)
    - ICF International commented that the smart city approach on how gas and electricity converge should be covered in the working groups.
    - Several stakeholders agreed that storage should be considered as an DER
- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":
    - ICF International noted that planning and DIRP should include NWA solutions.
    - GRID2.0 stated that customer protection should include customer facing utility programs.
    - EKM Law commented about the District's municipal aggregation statute and described it as a customer program to be considered within the customer protection working group.

- GRID2.0 suggested the microgrid working group to include VPPs and DERM to allow microgrids to be geographically isolated but aggregated as VPPs.
- ICF International agreed that microgrids, energy storage aggregation, and VPPs are good ideas to potentially fold into DIRP and NWA working groups.
- AECOM proposed resilience as a working group.
- ICF International replied that perhaps resilience could be covered throughout other working groups.
- EKM Law, on behalf of Tesla, Inc., said that Tesla strongly supports a separate working group on EVs, particularly on EV charging station infrastructure; but if addressed in the context of an existing working group, then preferably, on a separate or accelerated schedule.

Breakout Group 5 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
  - Urban Ingenuity commented on the need for a level playing field for wires versus NWA. Urban Ingenuity discussed the regulatory structure of today assumes a monopoly player and customer and asked the question, "what is a customer versus utility?". Urban Ingenuity noted financial mechanisms, acceptance criteria, and market prices for capacity constraints as potential topics for working group discussion.
  - BioSmart Solar noted that there is no bioengineering in the language and mentioned its concerns over the health issues and implications of solar manufacturing. BioSmart Solar noted that it likes customer protection.
  - ThinkEco stated that we should call it customer empowerment rather than customer protection.
  - All stakeholders agreed that rate design is important, and the District needs a new model to allocate cost.

- GridLion stated interoperability and hierarchy structure of investments as topics for working group consideration.
- All stakeholders agreed that there needs to be an improved interconnection process.
- All stakeholders agreed that the public needs to be able to get hosting capacity information quicker.
- All stakeholders agreed that the working groups should produce a roadmap for the future.
- All stakeholders agreed that working groups should consider low income upfront and often during this process.
- The summarized input that was provided and rolled up to the main group was (1) the need for a level playing field, (2) review of cost allocation, and (3) customer empowerment and the definition of what is a utility versus a customer.

- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":
  - The stakeholders broke down the topics into the following:
    - Pilot Projects
      - Focus not only on technology but how data will be shared between parties and how data ownership is defined.
    - DER/NWA
      - Stakeholders suggested this group be called "Market Design"
      - Encompasses NWA, capacity/connection costs, and where distribution system operators are needed.
    - Microgrid
      - Includes definitions and ownership structures.
    - Customer/Human Impact
      - Includes customer service, protection, empowerment, and access.

- Transitioning Resource Plan
  - Suggested alternate name to DIRP to be less utility oriented.

Breakout Group 6 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
  - The group brainstormed several topics that need to be addressed in the MEDSIS working groups, including: accountability, performance based ratemaking / alternative ratemaking, regulations, utility programs (e.g. DLC Load Control, dynamic pricing), cost-allocation, utility 2.0, low-moderate income customers and programs, rate classes versus customer type, value of DERs, value of the grid, customer engagement, data access/ownership/security, risk allocation and volatility, legal implication (e.g. statues beyond policy).
  - GRID2.0 noted that performance-based ratemaking and regulations should be a topic of consideration in MEDSIS.
  - Sunrun stated it does not want DER ownership and/or control for Pepco. Sunrun noted that customer and legal protection should be addressed in the working groups.
  - GRID2.0 noted that Pepco should be asked how they want to handle electric vehicles in the DER working group and in the working group process in general given that there are ongoing cases as part of MEDSIS.
  - Pareto Energy recommended that the U.S. Federal Trade Commission (FTC) participate in the hypothetical microgrid working group given their experience with the topic.

- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":

- All stakeholders agreed that a separate microgrid working group potentially covering definitions, jurisdiction, regulation, case studies/projects, retrofits, etc. should be considered.
- The stakeholders discussed how to best handle DERs and NWA – as standalone working groups or separate. The consensus was that because DERs include several topic areas unrelated to non-wires alternatives (e.g. valuation, interconnection, customer protection, ownership, security, standards, new technology), it should be covered in its own working group. Similarly, it was agreed upon that non-wires alternatives not only include DERs thus it should be a separate working group.
- GRID2.0 and Pepco agreed that the DER working group could potentially include several case studies to help formulate the road map for more DER integration for several different use cases and applications.
- The stakeholders discussed how the staging and the duration of each working group is variable and dependent per recommendations and the decided purpose of each working group.
- All stakeholders agreed that it was important that the system assessment conversation was to be addressed as part of the potential Utility Distribution Integration Resource Planning (DIRP) working group.
- The stakeholders came up with 6 working groups to recommend to the Commission: Pilot Project, NWA, DER, Microgrids, Ratemaking and Rate Design, and Utility Distribution Integration Resource Planning.

Breakout Group 7 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
  - EnerSys asked what the process is and anticipated outcomes of the working groups?

- OPC stated that its understanding was that the working groups create a white paper with recommendations to the Commission
- The entire group expressed that it did not fully understand the value of Phase 3 of the MEDSIS effort, which is the Working Group Recommendations. The group stated concern that the Pilot Projects will not be implemented until many years into the future.

- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":
  - The stakeholders agreed with several working group recommendations to move forward with Phase 2 of MEDSIS, including, microgrids, customer protection, future rate design, transportation electrification, future utility business models, EV, customer education, data transparency, grid and data security including cyber and resiliency, energy efficiency, carbon reduction, combined heat-to-power (CHP), battery storage, and cost benefit analysis.

Breakout Group 8 Discussion

- In response to the question "Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?":
  - Groundswell noted affordability and interconnection of DERs as topics for consideration. Groundswell commented about how the modernized grid impacts low income families and how DERs will impact the modernized grid.
  - Pareto Energy agreed on low income and interconnection and referenced learning experiences from New York. Pareto Energy noted additional interconnection concerns including process for application, timing, review, queues, interconnection studies, etc.
  - DC Climate Action noted that there is clear direction for projects less than 5 MW that will not feed into PJM. DC Climate Action emphasized

a call for public service criteria for interconnection for projects greater than 5MW but less than 20MW. DC Climate Action commented on the role of advanced inverter functionality, financial considerations for interconnections, and capacity to grid as components of interconnection processes that require consideration.

- Siemens asked if the upgrade is needed who will pay?
- Pareto Energy commented about the differences of ancillary transmission services and NWA, specifically what these differences mean to Pepco's adherence to FERC planning process. Pareto Energy proposed compatibility of regional and national planning as a result to this discussion.
- Siemens mentioned the topic of how to value stack NWA, specifically how to take advantage to the transmission and distribution portions of the grid since Pepco is only a distribution company.
- Siemens noted the need for a DER definition.
- DoEE included interactivity, efficiency, and sustainability to extract grid functionality as measurable topics to working groups and MEDSIS.
- DoEE stated the importance of independent verification of hosting capacity, load forecasting, etc. DoEE referenced the load forecasting methodology for Pepco and calls for an examination of load forecasting criteria.
- Siemens replied and stated that Pepco should use a consistent process similar to other utilities that is evaluated annually.
- DC Climate Action mentioned that there is a public interest proceeding critiquing Pepco's load forecasting and there are ongoing filings with the Commission about the topic.
- Siemens noted distribution forecasts need to be matched to PJM forecast and be included in integrated planning working group.
- DoEE commented that Pepco tries to align with PJM forecast.
- Siemens stated the need for the forecast to be built from the bottom up, starting with Pepco, and fed into PJM.

- Siemens and DC Climate Action agreed the forecast needs to be done hourly and agreed that the topic of DER forecasting into PJM and in coordination with IRP should be considered in the working groups.
- Siemens asked if energy efficiency (EE) is considered a part of DERs.
- Pareto Energy noted that identifying areas on the grid that could value from NWA should be addressed in the working groups.
- DC Climate Action included that the value of NWA presents an opportunity for utilities.
- Siemens mentioned that Pepco should make the value of NWA and optimal location for DERs data available to customers
- The stakeholders discussed advanced inverter functionality and capabilities and the questions of ownership and control.
- The stakeholders agreed that the business model for utility, alternative ratemaking (e.g. performance-based metrics) must be addressed.
- Siemens noted the need for defining VARs, loss elimination and frequency regulation to level set.
- DC Climate Action mentioned that carbon emissions should be top of mind during the working group process as one of the guiding principles of MEDSIS is meeting the carbon emission reduction goals for the District.
- Pareto Energy noted the topic of customer interaction with the grid and the idea of users organizing together to create a legal entity to do all DER related activities (e.g. Connecticut Energy Improvement District, Maryland Taxing District)
- All stakeholders discussed the benefits of electrification on reliability, sustainability, and other MEDSIS mission statements.

- In response to the question "If your group thinks the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for Phase 2 with a short description.":
  - DC Climate Action wanted to ditch consumer protection, noting that it means nothing.

- Siemens believed that consumer protection was meant to cover cyber security.
- DC Climate Action commented about the excuse for not releasing data being a privacy issue.
- DoEE noted data access can be a working group that informs the DER planning process and distribution system planning process.
- Pareto Energy stated future rate design working group could cover real and reactive power. Pareto Energy noted cyber and customer information management could cover several discussed topics in a working group.
- All stakeholders agreed that data access could be a potential working group to secure information and appropriate actors.
- DOEE and DC Climate Action agreed that microgrids should not be a standalone working group and it should be a part of DER.
- Pareto Energy disagreed and stated that microgrids should be separate.
- All stakeholders agreed that the DER working group would cover use of DERs to meet climate and energy goals, along with specific NWA criteria.
- DoEE argued against "Alignment with Regional and Federal Jurisdiction" being a standalone working group, even though this issue may impact microgrids.
- DoEE stressed the need to review the terms of the MEDSIS Vision Statement and translate them into specific measurable objectives – to determine functionalities, standards, and capabilities needed to achieve those objectives. DoEE noted that this process would inform the types of working groups that should be recommended.

F. Afternoon Session 6 - Working Group Review

- SEPA brought the groups back to the hearing room to lead a facilitated discussion related to the results from each breakout group.

- The results from individual breakout sessions have been summarized by SEPA **(see Attachment No. 6, Breakout Groups Summary)**
- Each facilitator of the 8 breakout groups recapped their groups discussion and answers to the two breakout questions **(see Attachment No. 6, Breakout Groups Summary)**

G. Afternoon Session 7 - Review

- SEPA presented the results and recommendations from the technical conference.
- Objective 1 Result/Recommendation
  - SEPA determined that the consensus amongst the stakeholders was that a system assessment was not appropriate at this time.
- Objective 2 Result/Recommendation:
  - SEPA collected feedback and input from the stakeholders and will summarize the results in the Technical Conference Report and will use the feedback towards its formal working group recommendation to the Commission.
- A representative from Groundswell asked how the issues and working groups ideas that did not making the top list within the summaries will be considered.
  - SEPA stated that the initial meeting minutes report will include all discussion items raised during the conference.
  - SEPA explained that the input produced at the technical conference is not the only input that will be collected through the MEDSIS initiative and that all stakeholder comment proceeding the technical conference, including the comment gathered at the technical conference will be considered in SEPA's formal working group recommendations and descriptions to the Commission.

Technical Conference Feedback

- SEPA sent a feedback survey to all Technical Conference attendees on June 29th, 2018. 18 stakeholders submitted feedback and the results are summarized in **Attachment No. 7, Technical Conference Feedback Summary.**

Other Points Made During the Course of the Day

A list of items that came up during the course of the day that were not directly part of the discussions are captured below.

System Assessment Breakout Groups Parking Lot Notes:

- Inclusion of safety and health impacts in the MEDSIS initiative
- Specifics of MEDSIS funding and the scheduling of the budget
- Understand load implication of EVs and explore a pilot project studying EV adoption and deployment solutions
- Data formatting and streamlining
- Learning lessons and data gathered from pilot projects made readily available and open to the public to allow the industry to facilitate market competition rather than causing a barrier to entry
- Changes in hosting capacity and load forecasting over time and by location
- Distinctions between commercial and residential customers and projects

Working Group Breakout Groups Parking Lot Notes:

- Review ongoing DIRP activities and investigate a District energy study
- Specifics regarding funding pilot projects amongst various investment options (e.g. CAPEX from Pepco, MEDSIS funds)
- Understanding existing pilot projects
- Review the specific inputs and outputs of hosting capacity analysis
- Inclusion of Formal Case No. 1143 (Pepco EV Managed Charging Pilot) in Phase 2 of MEDSIS (working group process).
- Tackle social equity and justice
- Repository of existing information to access and use as a resource
- Expansion of sustainability definition to include health impacts

Next Steps:

- www.DCGridMod.org will provide updates to the stakeholder process, including the presentation from the Technical Conference along with information on how to register for the working groups once they are ordered by the Commission.

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 1 - Technical Conference Attendee List

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

First Name	Last Name	Company
Lilia	Abron	PEER Consultants, P.C.
Rhoda	Alale	BioSmart Solar, Inc.
Sharon	Allan	SEPA
Jason	Allnutt	IEEE
Matthew	Bearzotti	Sierra Club
Jeremy	Bedine	GridLion
Torrey	Beek	DC Department of Energy and Environment (DoEE)
Ronald	Bethea	PRESS
Sylwia	Bialek	Institute for Policy Integrity, NYU
Nicholas	Bihun	New Columbia Solar
Kenneth	Boley	pdvWireless, Inc.
David	Borden	Washington Gas
Patti	Boyd	DC Sustainable Energy Utility (DCSEU)
Robert	Burkhardt	pdvWireless, Inc.
Robert	Cain	Washington Gas

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Brian	Caldwell	Office of the Attorney General for the District of Columbia
H.G.	Chissell	Advanced Energy Group
Dan	Chwastyk	SEPA
Bryan	Clark	Pepco
Bicky	Corman	EKM Law, LLC
Jason	Cumberbatch	DC Office of the People's Counsel
Harry	Cuttler	SEPA
Erik	Desrosiers	ADL Ventures
Zach	Dobelbower	DC Department of General Services
Nina	Dodge	DC Climate Action
Edward	Drew	Blue Pillar
Ryan	Edge	SEPA
Shalom	Flank	Urban Ingenuity
Frann	Francis	AOBA
Jay	Frankhouser	EnerSys, Inc.
Rachel	Gold	ACEEE
Andrea	Harper	PHI

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Andy	Haun	Schneider Electric
Rachel	Henderson	SEPA
Ethan	Holmes	Pepco
Mike	House	AECOM
Eugene	Imhoff	GRID2.0
Ernest	Jolly	DC Water and Sewer Authority (DCWASA)
Erick	Karlen	Greenlots
Bart	Krishland	New Columbia Solar
Mike	Kruger	SEPA
Robert	LaCount	M.J. Bradley & Associates LLC
Rajesh	Lakhiani	Athena Power
Jared	Leader	SEPA
Alan D.	Lee	World Bank
Andrew	Levitt	PJM Interconnection
Nina	Lobo	Groundswell
Alex	Lopez	Oracle Corporation
John	Macgregor	DC Climate Action

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Yohana	Mariam	DC Office of Peoples Council
Larry	Martin	GRID2.0 / U.S. Environmental Protection Agency
Erika	Meyer	SEPA
Adrienne	Mouton-Henderson	DC Office of the People's Counsel
Chinyere	Osuala	EarthJustice
Clark	Pierce	Landis+Gyr
Natasha	Rao	Environmental Defense Fund (EDF)
Noel	Rivera	Pepco
Al	Roark	ABB, Inc.
Robert	Robinson	DC Consumer Utility Board (DCCUB)
David	Schatz	ChargePoint
John	Slocum	Exelon
Aaron	Smallwood	SEPA
Bianca	Smith-Incas-Allen	BioSmart Solar, Inc.
Christine	Stearn	SEPA
Samir	Succar	ICF International
Stephen	Swern	NV5

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Jen	Szarro	SEPA
Jim	Taylor	Siemens
Mishal	Thadani	District Solar
Mark	Thomson	ThinkEco
Lily	Wang	Exelon
Guy	Warner	Pareto Energy
Chet	Warner	Pareto Energy
Thomas	Weaver	Prospect Solar LLC
Erica	Weyer	Sierra Club
Alison	Williams	Edison Electric Institute (EEI)
Zach	Wilson	New City Energy
David	Wright	Groundswell
Edward	Yim	DC Department of Energy and Environment (DoEE)

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 2 - Technical Conference Agenda

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Time	Description	Presenter
9:30am	Introduction & Agenda Overview	PSC, SEPA
9:40am	MEDSIS Overview	SEPA
9:50am	System Assessment Overview	SEPA
10:00am	System Assessment Description	Burns & McDonnell
10:45am	System Assessment Data & Tools	PEPCO
11:15am	System Assessment Breakout Sessions	All
12:15pm	System Assessment Summary & Recommendations	SEPA
1:00pm	Lunch	
1:45pm	Working Group Introductory Discussion	SEPA
2:15pm	Working Group Breakout Sessions	All
3:15pm	Working Group Breakout Session Review & Recommendation Discussion	SEPA
4:15pm	Review Technical Conference Results & Recommendations	SEPA
4:30pm	Conclude & Adjourn	

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 3 – Technical Conference Presentation

MEDSIS Technical Conference

June 27th, 2018

9:30am – 4:30pm ET

DC Public Service Commission
Commission Hearing Room

MEDSIS

Modernizing the Energy Delivery System for Increased Sustainability

PUBLIC SERVICE COMMISSION
of the District of Columbia

Introduction & Agenda Overview

Introduction & Agenda Overview	9:30am – 9:40am	DC PSC/SEPA
MEDSIS Overview	9:40am – 9:50am	SEPA
System Assessment Overview	9:50am – 10:00am	SEPA
System Assessment Description	10:00am – 10:45am	Burns & McDonnell
System Assessment Data & Tools	10:45am – 11:15am	PEPCO
System Assessment Breakout Sessions	11:15am – 12:15pm	SEPA
System Assessment Summary	12:15pm – 1:00pm	SEPA
Lunch	1:00pm – 1:45pm	
Working Group Introductory Discussion	1:45pm – 2:15pm	SEPA
Working Group Break Out Sessions *topic areas include: pilot projects, non-wire alternatives, and others (i.e. EV, solar, storage, consumer protection)*	2:15pm – 3:15pm	SEPA
Working Group Breakout Session Review & Discussion	3:15pm – 4:15pm	SEPA
Technical Conference Summary	4:15pm – 4:30pm	SEPA
Conclude & Adjourn	4:30pm	

Objectives for the Day

1. Determine the scope and appropriateness of a system assessment of D.C.'s energy delivery system
2. Identify the working groups for Phase 2 of the Initiative

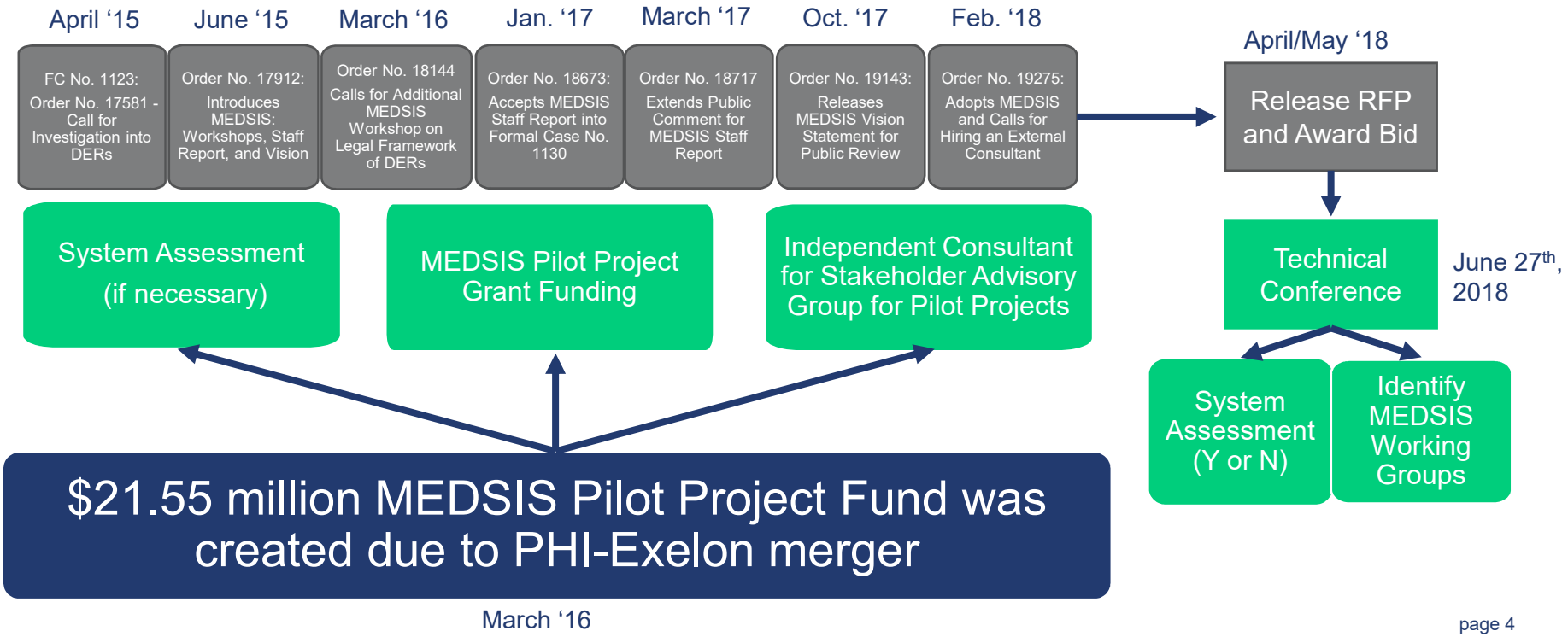
MEDSIS Vision Statement

Guiding Principles:

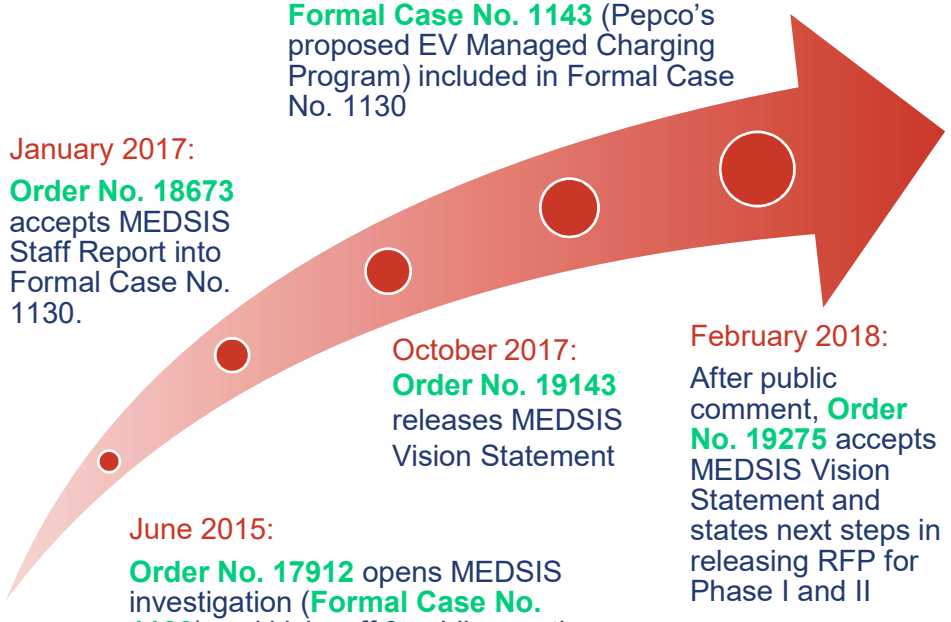
1. **Sustainable**
   a. Environmental Protection
   b. Economic Growth
   c. Social Equality
2. **Well-Planned**
3. **Safe and Reliable**
4. **Secure**
5. **Affordable**
6. **Interactive**
7. **Non-Discriminatory**

"The District of Columbia's modern energy delivery system must be sustainable, well-planned, encourage distributed energy resources, and preserve the financial health of the energy distribution utilities in a manner that results in an energy delivery system that is safe and reliable, secure, affordable, interactive, and non-discriminatory."

MEDSIS Overview



Evolution of MEDSIS Initiative



Scope of MEDSIS Initiative:

1. Stakeholder Engagement (Phase I)
2. Working Group Process (Phase II)
3. Working Group Recommendations (Phase III)
4. MEDSIS Pilot Project Program (Phase IV)

Interrelated Cases to MEDSIS

FC 1144 - Capital Grid Project

- DC PSC approves Notices of Construction for substations and underground transmission.
- Pepco proposed a new underground transmission line that will cross the District of Columbia.
- Pepco also proposed to rebuild two substations and build a new one to serve the Mt. Vernon area.
- Total original cost estimate: Approximately $700 million (both transmission and distribution).
- FC 1144 is an open docket; Pepco will make a new, comprehensive filing on June 29, 2018.

FC 1050 – Interconnection

- The Council of the District of Columbia enacted the Community Renewable Energy Amendment Act in 2013. The Community Net Energy Metering Rules were published in the D.C. Register in May 2015
- The Commission is currently considering changes to its Small Generator Interconnection Rules for Small Generating Facilities
- A Technical Conference was held to discuss proposed interconnection rules and implementation costs for CREFs on May 17, 2018

FC 1145 – Power Line Undergrounding (PLUG)

- Recommended by Mayor's Task Force and adopted by Council of the District of Columbia.
- In 2017, PSC approved the First Biennial Plan with six projects.
- Effort is focused on undergrounding the worst performing distribution feeders to reduce and prevent storm-related outages.
- Legislation authorized $500 million over at least six years.

Technical Conference Objective #1: Discuss the Appropriateness of a System Assessment

- Receive stakeholder input regarding the appropriateness of a system assessment of the Pepco energy delivery system in the District

BURNS McDONNELL

System Assessment Description

27 June 2018
District of Columbia

System Assessment Description

1. What is a System Assessment?
2. Why do a System Assessment?
3. System Assessment Components
4. Costs of a System Assessment

What is a System Assessment?

- Holistic & integrated analysis of the grid and relevant business practices (recommended) to optimally address areas of need.
- Scope based on Objectives
  - Targeted (I.E. improve a metric – like reliability) or more broadly based.
  - Whole electrical system or a piece of the system (e.g. circuit, substation and circuits)

Why do a System Assessment?

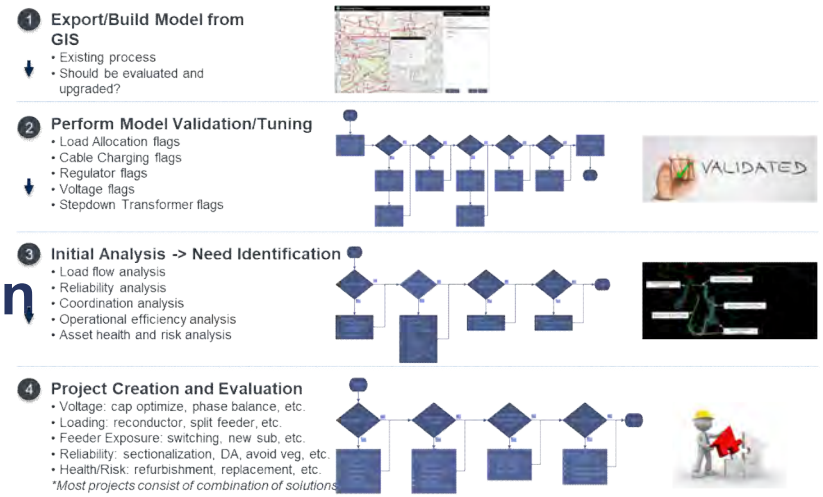
- Limited Resources < Project / Spend Opportunities
- Changing Utility Customer Needs
- Assess Emerging Technology & Tools

Why do a System Assessment?

- **Integrated / Holistic Look vs Silos & Buckets**
- **Plan & Forecast vs React**

System Assessment Components

- Data Collection & Cleanup
- Model Creation / Cleanup
- Model Tuning
- Initial Analysis / Need Identification
- Project Creation & Evaluation
  - Costing & timing
  - Estimated improvement(s)



System Assessment Input & Analysis Checklist

Input
Existing Circuit Models
Load Forecasts
Construction Standards
Load Profiles
Outage History
Critical Customers
Major Asset Details

Analyses
Hosting Capacity
Load Flow
Reliability
Distribution Automation
Asset Optimization
Fault Protection Coordination

Recent System Assessment Example

Grid Modernization Study (Distribution + Substation)

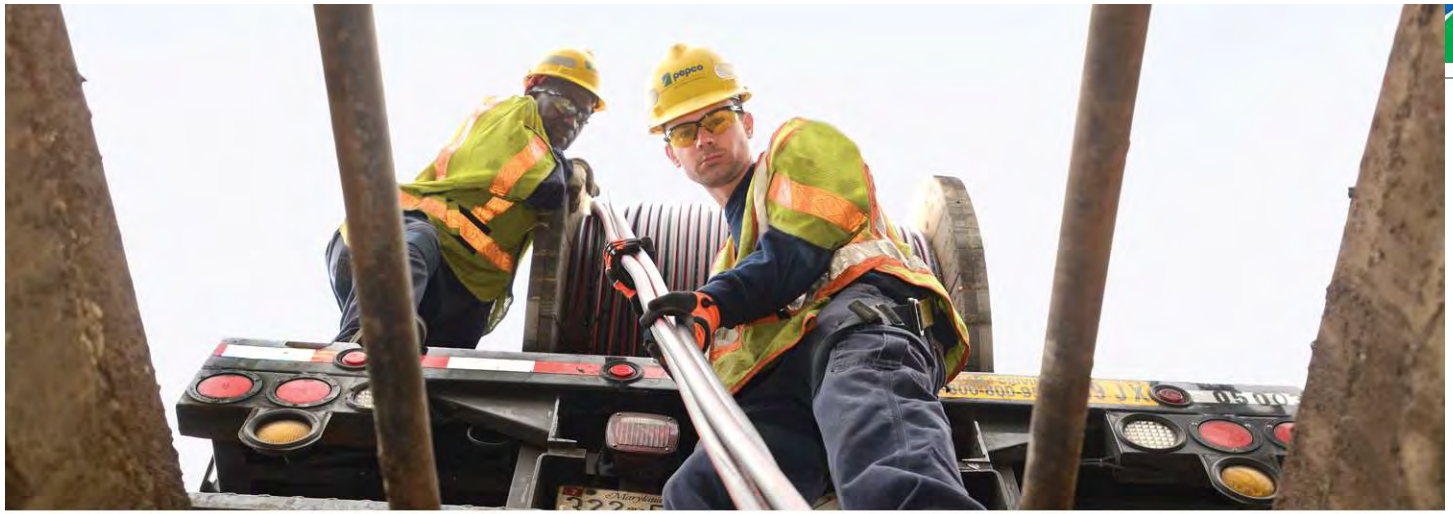
PHASE I (2016)	PHASE II (2017)	PHASE III (2018)
• Review Design, Maintenance & Operating Standards for Modernization Gaps • Develop Grid Modernization Planning Criteria • Execute Engineering Analysis (Distribution Planning) on pilot set of feeders to prove out planning procedure, tools and criteria	• Identify Phase II Circuits (~10% of the system) • Execute Modernization Analysis & Planning on over 400 feeders • Identify Recommendations for Improvement and Update to Standards, Processes, and Tools • Score and Rank all Projects Developed in Planning process and Prioritize according to comprehensive criteria • Develop a Roadmap for Prioritized Project Investment and Execution	• Support Internal and External Approvals • Deliver Go-Forward Processes • Deliver and Train on New Planning Tools • Establish Benefit Tracking to be maintained throughout execution

Costs of a System Assessment

- Cost
  - $8,000-$30,000 per circuit – mean is $25,000
  - Highly dependent on complexity & objectives
- Timeline
  - Months → Year+

System Assessment - Considerations

- **Factors for justifying a System Assessment**
  - **Scope, Timeline, Budget**
  - **Deliverable/project horizon**
  - **Existing initiatives & processes**
  - **Existing planning/study processes**
- **Alternatives**
  - **Strategic Pilots**
  - **Constraints screening / k-means cluster analysis**
  - **Localized focused study**



pepco
An Exelon Company

MEDSIS

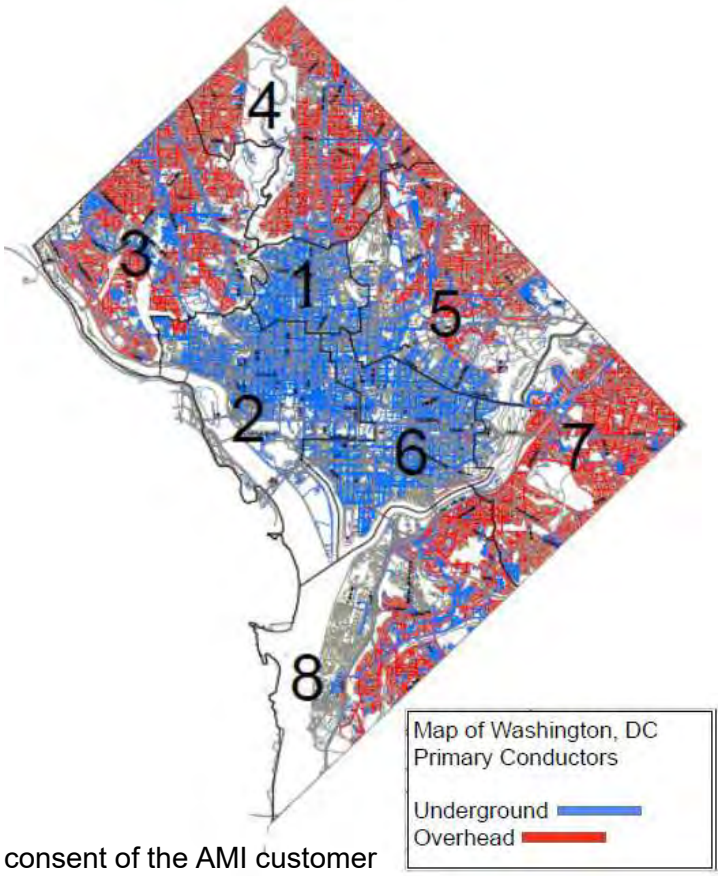
pepco
An Exelon Company

Assessment of Pepco's System and System Constraints

Bryan Clark, Director Utility of the Future
June 27, 2018

District of Columbia Electric Distribution System Overview

- 296,150 customers
- 50 substations
- 777 distribution feeders
  - 647 overhead circuit miles
  - 1,737 underground circuit miles
- 22,150 distribution transformers
  - 12,902 overhead
  - 1,793 padmount
  - 2,303 underground
  - 512 subsurface
  - 184 subway
  - 11 OH stepdown
  - 13 UG stepdown
  - 4,431 network
- 59,519 manholes
- 302,551 automated metering infrastructure (AMI) meters activated[1]



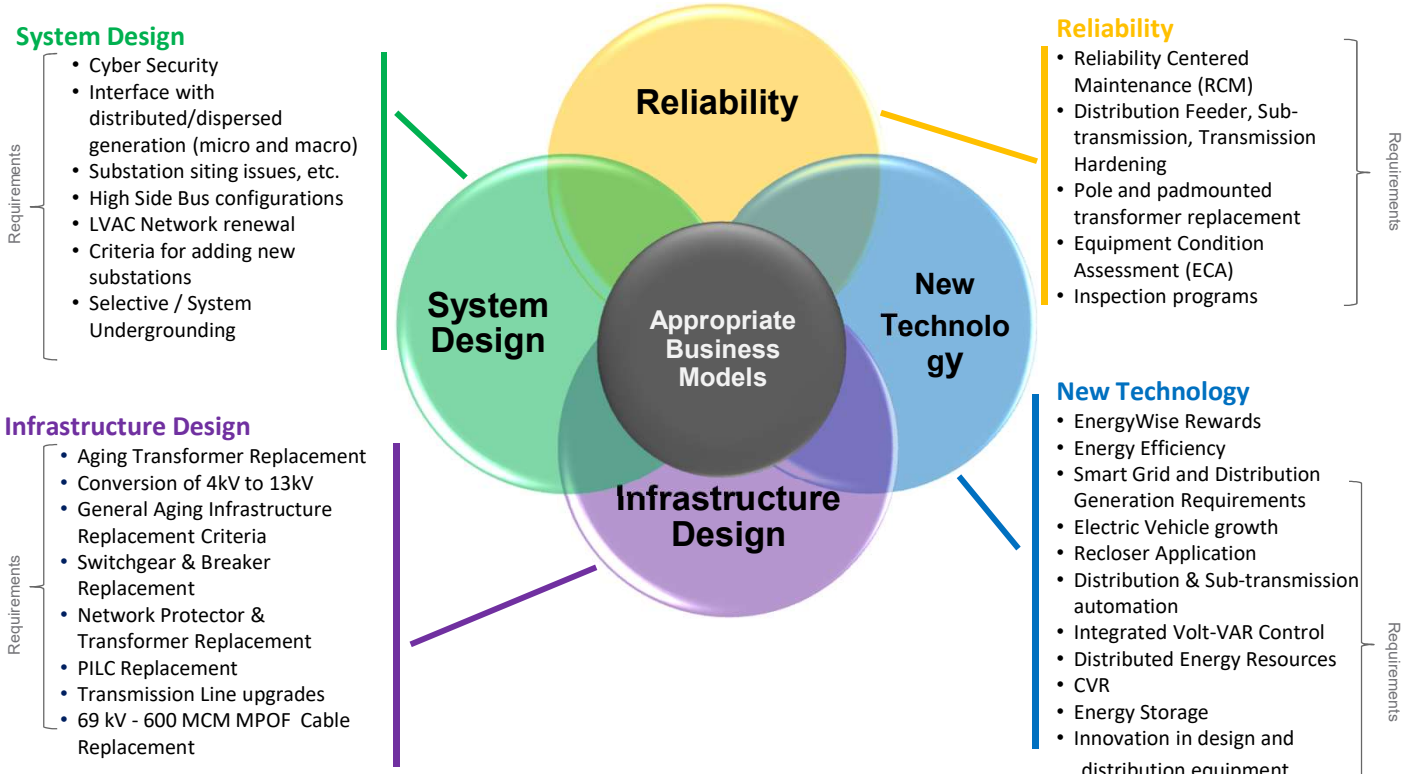
*Data as of 12/31/2017

[1]PEPCO Customer AMI Data is available to third parties upon written consent of the AMI customer

Managing Pepco System

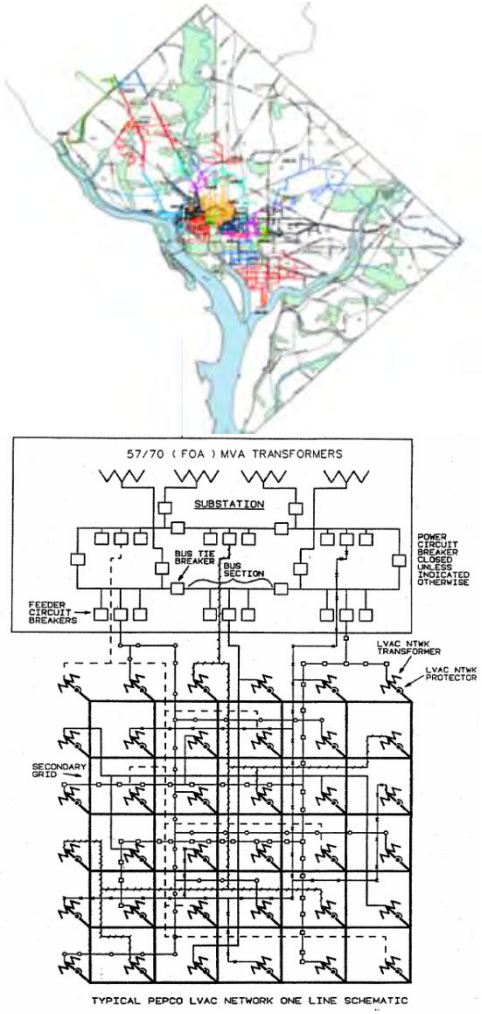
An Exelon Company

Aging infrastructure, emergence of new technologies, change in customer expectations, reliability assurance and traditional regulatory obligations drive the need to continue with a comprehensive asset management strategy for PHI



Pepco's District of Columbia LVAC Networks

- LVAC networks consist of up to 6 feeders with an operating capacity of approximately 45 MVA
- A secondary network is supplied from two or more transformers with secondaries tied between transformers
  - 120V / 240V @ 500, 750 and 1000 kVA
  - 265V / 460V @ 500, 750, 1000, 1500 and 2000 kVA
- Pepco has approximately 4,400 network transformers in the District
- Pepco currently has approximately 46,500 residential customers connected to a LVAC Network
- Primarily located within the central business district to support the high-density commercial loads



Pepco System Assessment Processes

- Reliability
  - Continuous review of system and feeder level performance
  - Continuous review of customers experiencing multiple interruptions

- Load Forecasting
  - Annual review of loading on half the system: feeders, substation transformers, and substations
  - Load flow analysis using various software packages
  - Incorporates DERs, energy efficiency, and other known load reducing factors

- Control Center Operations
  - Continuous monitoring of system
  - Leverages data supplied by multiple sources

Distribution System Planning Mission and Role

- The mission of PHI Distribution System Planning is to provide for the safe, reliable, economic and orderly modification and expansion of the PHI electric system to meet existing and future customer demands

- PHI companies maintain engineering and operating criteria used in the design of new and modified portions of the distribution system
  - These criteria govern how:
    - Load carrying capacity of system facilities are determined and utilized
    - Required service voltage levels are maintained
    - Distribution system reliability is maintained

DER Interconnection and Non-Wires Deferral

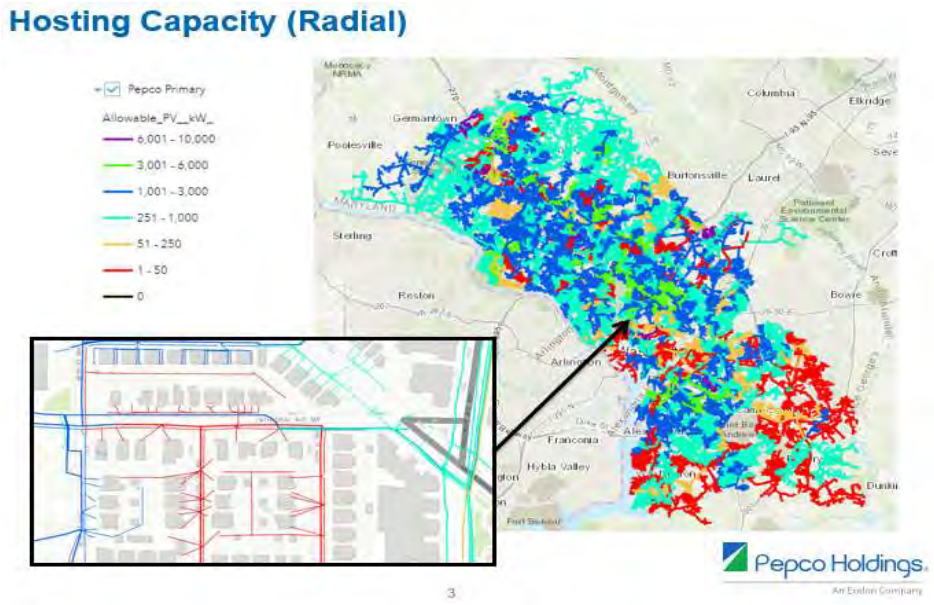
- For more than a year, Pepco has been evaluating project alternatives incorporating DER and using non-wires solutions to defer wires investment
  - Deferral of an overhead substation in Maryland
  - Deferral of a substation transformer in the District of Columbia
  - Expansion of Conservation Voltage Reduction (CVR) to include more District of Columbia feeders
  - Expansion of hosting capacity on closed feeders
  - Other storage projects being evaluated

- Pepco looks for solutions that will ensure the safe and reliable distribution of electricity to its customers

- Pepco plans its distribution system to account for the increase in DER interconnected to the system and provides information and tools that help identify where incremental DER can be interconnected

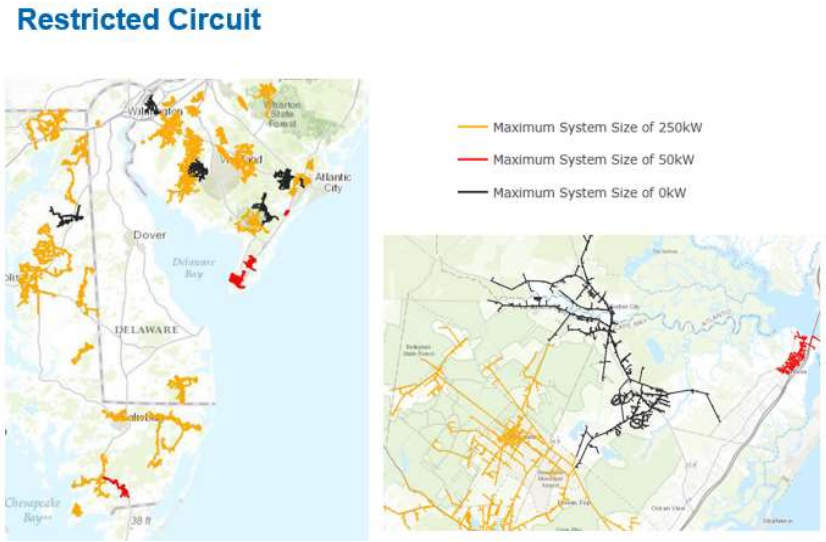
Hosting Capacity Map

- Pepco makes a Hosting Capacity Map available
  - Provides data that customers can use to determine if solar or other DER can be accommodated at their home
  - Developers can use to help size or site large projects
  - https://www.pepco.com/MyAccount/MyService/Pages/MD/HostingCapacityMap.aspx



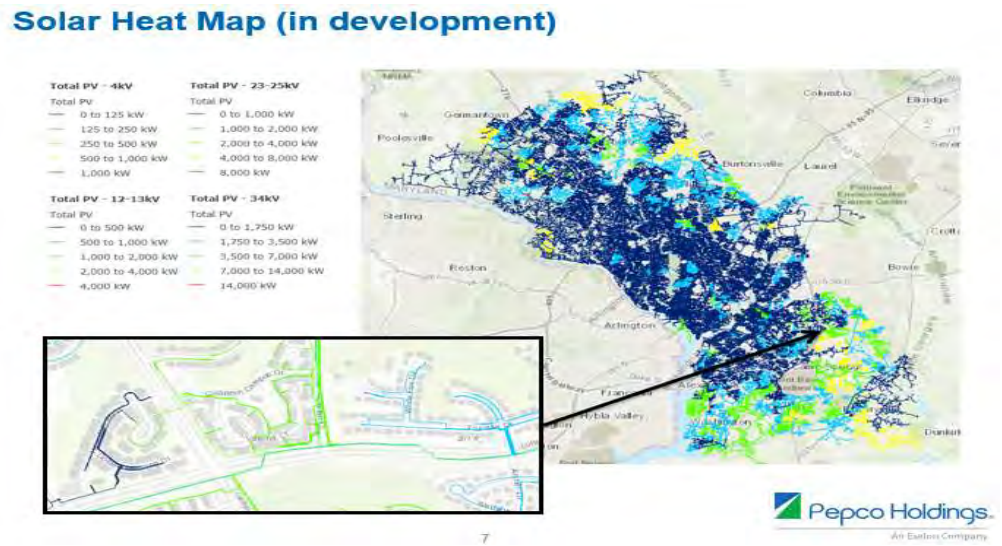
Restricted Circuit Map

- Pepco hosts a Restricted Circuit Map
  - Provides information regarding circuits that can no longer accept additional DER installations without distribution system upgrade
  - Without upgrades, there is DER threshold beyond which violations of voltage operating limits can cause damage to Pepco and customer equipment
  - https://www.pepco.com/MyAccount/MyService/Pages/MD/RestrictedCircuitMap.aspx



Solar Heat Map

- Pepco hosts a Solar Heat Map in an effort to provide more information to customers reflecting the amount of solar generation currently installed and pending installations
- The map is color-coded and can be filtered to display the active projects only, pending queued projects only, or the combination of active and pending queued projects
  - https://www.pepco.com/MyAccount/MyService/Pages/MD/HeatMap.aspx



Annual Consolidated Report (ACR)
Docket "PEPACR"

- The ACR, filed in April each year, provides significant amounts of data and information on Pepco's system, including:
  - Overview of Pepco's system and system planning procedures
  - Scopes of planned substation projects
  - Complete scopes of all distribution projects
  - Work Plan including the past year spending and current year budget by individual project
  - Detailed description of equipment standards and inspection schedules
    - Includes detailed Equipment Condition Assessment meeting minutes
    - Includes Overhead Feeder Inspection results
  - Scopes of distributed automation projects, voltage conversion projects, and detailed plans for each of the feeders scheduled to be worked under the 2% priority feeder program
  - Manhole Event Report
    - Underground Failure Analyses
    - Descriptions of each manhole event
    - Details for the manhole inspection program

Independent System Audits

An Exelon Company

- Comprehensive system reliability audit, as directed by the Commission
  - Siemens Reliability Audit/Liberty Management Audit of system planning and operating procedures ended in 2013
    - Siemens found that "Pepco is effective in planning its capital expenditures for substation and feeder investments to attend load growth"
    - Liberty found "Pepco's distribution planning practice to be consistent with good utility practice"
    - Docket "PEPACR"
  - Siemens also performs annual audit of Pepco's manhole inspection program, includes:
    - Audits of program elements, inspection cycles, and past year's inspections
    - Docket "PEPMIR"

MSO Plan & Monthly Outage Reports

- Annually, Pepco updates its Commission-directed Major Service Outage (MSO) Restoration Plan
  - Details include storm priorities, pre-event planning, storm response roles and procedures, and post-storm activities
  - Dockets FC 766 and FC 982
- On a monthly basis, Pepco provides detail concerning non-major outages* sustained, including date and cause
    - Includes GIS-enabled map of outages allowing for tracking by neighborhood and Ward
    - Docket example “SO2018”

Outage Cause / Incident Description / Actual Repair	Location	Ward	Time of Outage/Incident	Actual Restoration Time	Duration of Outage (hrs/min)	Max Number of Customers Affected
Equipment failure/Cable failure/Fuse blown/ Isolated fault/Made tie/All load restored	5th Place ne/o Congress Place, SE	8	642	918	2/36	124

*** Non-major service outages** - customer service outages caused by the failure of devices such as breakers, fuses, feeder lines, substation equipment, etc., lasting over eight (8) hours, regardless of how many customers are affected; or customer service outages affecting over 100 but less than 10,000 customers, regardless of duration.

Rate Cases
Dockets FC 1139 and 1150

- Construction Report
  - Pepco is required to supplement its rate case filings with a detailed description of its construction program
  - Details project plans and budgets from the period recovery is requested through four years beyond the current year
  - Includes detailed project plans including prioritization, timeline, and project justifications

- Load Forecasting
  - Pepco has filed testimony and exhibits describing its load forecasting methodology including the consideration of DERs

DER Reports

- Quarterly and annually, Pepco provides information concerning the number of interconnections it has processed and approved and also detailing the amount of DER capacity processed to date through its Green Power Connection (GPC) team (FC 1050 and FC 1119)
- Annually, Pepco provides a report showing information related to its Direct Load Control (DLC) program (FC 1086), including
  - Numbers of participants and the amount of potential capacity.
  - Budgetary and program-related information.
- As part of the NOC filing in FC 1144 (6/29), Pepco will also be providing more granular data showing Pepco DLC customers by location/feeder and capacity, and Pepco now has the capability to tie DLC to most locations/feeders in the District.

Reliability Forecast Report

- Pepco annually provides (as an attachment to the ACR)
  - Information on all of its planned reliability distribution construction work for a given year
  - Descriptions and schedules for maintenance and inspections that support reliability

- This information includes project descriptions and budgets as well as performance measures

Introduction & Agenda Overview

Introduction & Agenda Overview	9:30am – 9:40am	DC PSC/SEPA
MEDSIS Overview	9:40am – 9:50am	SEPA
System Assessment Overview	9:50am – 10:00am	SEPA
System Assessment Description	10:00am – 10:45am	Burns & McDonnell
System Assessment Data & Tools	10:45am – 11:15am	PEPCO
System Assessment Breakout Sessions	11:15am – 12:15pm	SEPA
System Assessment Summary	12:15pm – 1:00pm	SEPA
Lunch	1:00pm – 1:45pm	
Working Group Introductory Discussion	1:45pm – 2:15pm	SEPA
Working Group Break Out Sessions *topic areas include: pilot projects, non-wire alternatives, and others (i.e. EV, solar, storage, consumer protection)*	2:15pm – 3:15pm	SEPA
Working Group Breakout Session Review & Discussion	3:15pm – 4:15pm	SEPA
Technical Conference Summary	4:15pm – 4:30pm	SEPA
Conclude & Adjourn	4:30pm	

Objectives for the Day

1. Determine the scope and appropriateness of a system assessment of D.C.'s energy delivery system
2. Identify the working groups for Phase 2 of the Initiative

MEDSIS Scope & Vision Statement

Guiding Principles:

1. **Sustainable**
   a. Environmental Protection
   b. Economic Growth
   c. Social Equality
2. **Well-Planned**
3. **Safe and Reliable**
4. **Secure**
5. **Affordable**
6. **Interactive**
7. **Non-Discriminatory**

Scope of MEDSIS Initiative:

1. Stakeholder Engagement (Phase I)
2. Working Group Process (Phase II)
3. Working Group Recommendations (Phase III)
4. MEDSIS Pilot Project Program (Phase IV)

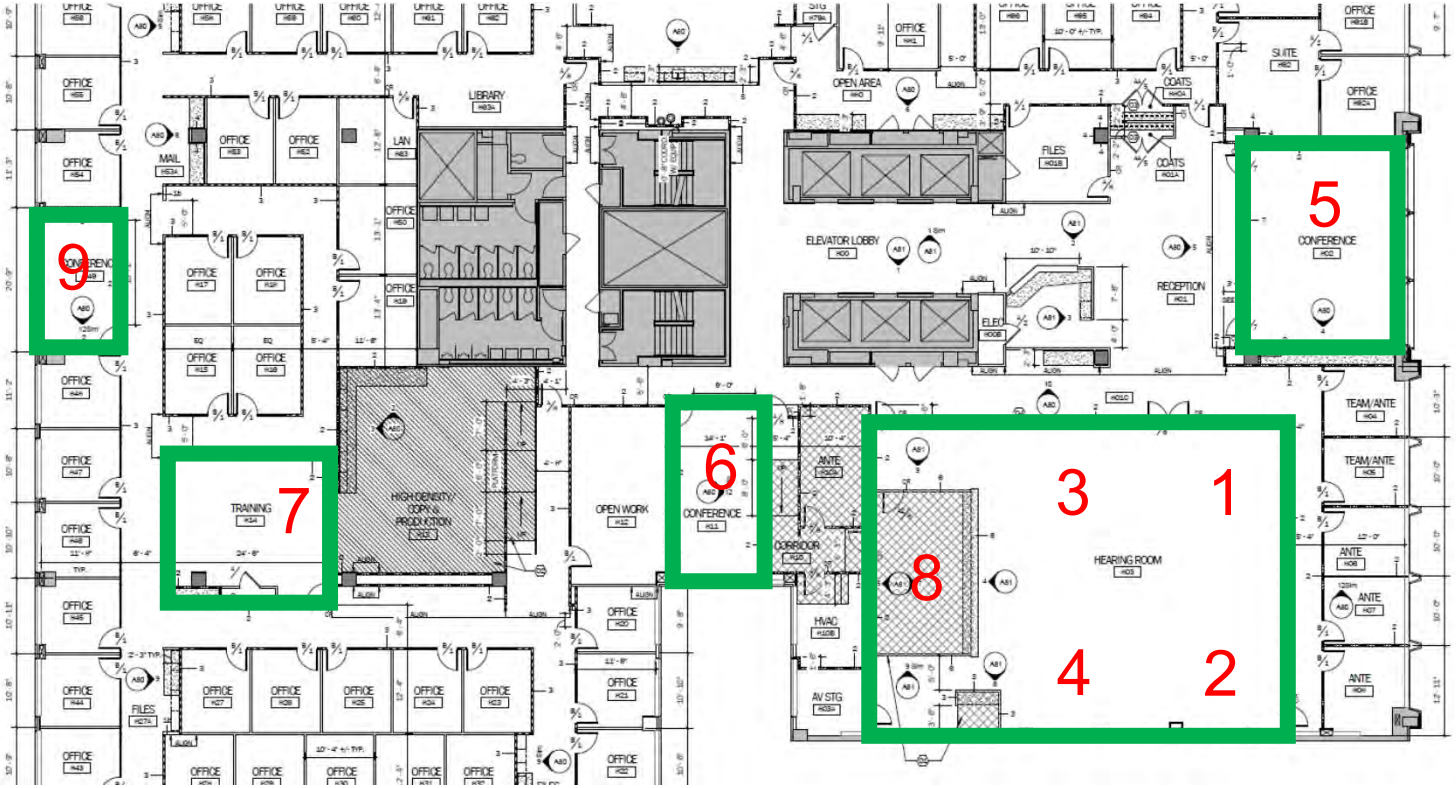
"The District of Columbia's modern energy delivery system must be sustainable, well-planned, encourage distributed energy resources, and preserve the financial health of the energy distribution utilities in a manner that results in an energy delivery system that is safe and reliable, secure, affordable, interactive, and non-discriminatory."

System Assessment Breakout Sessions

Objective: Determine the appropriateness of a system assessment

- Facilitated breakout groups will discuss a series of questions related to the system assessment
- Results will be compiled and reviewed in the breakout groups
- Entire group will review and discuss

Breakout Group Locations



	Facilitators
1	Erika Myers
2	Rachel Henderson
3	Jen Szaro
4	Ryan Edge
5	Sharon Allan
6	Jared Leader
7	Dan Chwastyk
8	Christine Stearn
9	Mike Kruger

System Assessment Summary & Recommendations

- Results to be included in the MEDSIS Technical Conference Report sent to participating stakeholders for comment on July 16th at the latest.
- Comments will be due back to SEPA by July 18th.

Lunch

Roti Modern Mediterranean - 1311 F St NW, Washington, DC 20004
District Taco - 1309 F St NW, Washington, DC 20004
Moe's Southwest Grill - 1331 Pennsylvania Ave NW, Washington, DC 20004
Five Guys - 13th NW & F St NW, Washington, DC 20004
Chopt Creative Salad, Co - 618 12th St NW, Washington, DC 20005
Potbelly Sandwich Shop - 555 12th St NW, Washington, DC 20004
Panera - 601 13th St NW, Washington, DC 20005

Be back for immediate start at 1:15pm

Introduction & Agenda Overview

Introduction & Agenda Overview	9:30am – 9:40am	DC PSC/SEPA
MEDSIS Overview	9:40am – 9:50am	SEPA
System Assessment Overview	9:50am – 10:00am	SEPA
System Assessment Description	10:00am – 10:45am	Burns & McDonnell
System Assessment Data & Tools	10:45am – 11:15am	PEPCO
System Assessment Breakout Sessions	11:15am – 12:15pm	SEPA
System Assessment Summary	12:15pm – 1:00pm	SEPA
Lunch	1:00pm – 1:45pm	
Working Group Introductory Discussion	1:45pm – 2:15pm	SEPA
Working Group Break Out Sessions *topic areas include: pilot projects, non-wire alternatives, and others (i.e. EV, solar, storage, consumer protection)*	2:15pm – 3:15pm	SEPA
Working Group Breakout Session Review & Discussion	3:15pm – 4:15pm	SEPA
Technical Conference Summary	4:15pm – 4:30pm	SEPA
Conclude & Adjourn	4:30pm	

Objectives for the Day

1. Determine the scope and appropriateness of a system assessment of D.C.'s energy delivery system
2. Identify the working groups for Phase 2 of the Initiative

MEDSIS Scope & Vision Statement

Guiding Principles:

1. **Sustainable**
   a. Environmental Protection
   b. Economic Growth
   c. Social Equality
2. **Well-Planned**
3. **Safe and Reliable**
4. **Secure**
5. **Affordable**
6. **Interactive**
7. **Non-Discriminatory**

Scope of MEDSIS Initiative:

1. Stakeholder Engagement (Phase I)
2. Working Group Process (Phase II)
3. Working Group Recommendations (Phase III)
4. MEDSIS Pilot Project Program (Phase IV)

"The District of Columbia's modern energy delivery system must be sustainable, well-planned, encourage distributed energy resources, and preserve the financial health of the energy distribution utilities in a manner that results in an energy delivery system that is safe and reliable, secure, affordable, interactive, and non-discriminatory."

Technical Conference Objective #2: Receive input on potential working groups for phase 2 of the initiative

Objective: Make recommendations regarding the working groups for phase 2 of the MEDSIS initiative

- Facilitated breakout groups will discuss a series of questions related to the MEDSIS working groups
- Results will be compiled and reviewed in the breakout groups
- Entire group will reconvene and review

Working Group Introductory Discussion

Based on our understanding of MEDSIS, stakeholder priorities, and needs within the District, below is our strawman of MEDSIS working groups for discussion:

1. **Pilot Projects Program**
2. **Distributed Energy Resources (Non-Wires Alternatives)**
3. Utility Distributed Integration Resource Planning (DIRP)
4. Customer Protection
5. Microgrids
6. Future Rate Design

(bold = Commission required working group)

MEDSIS Working Group Structure proposal for discussion

Pilot Projects Program Working Group

Distributed Integration Resource Planning Working Group

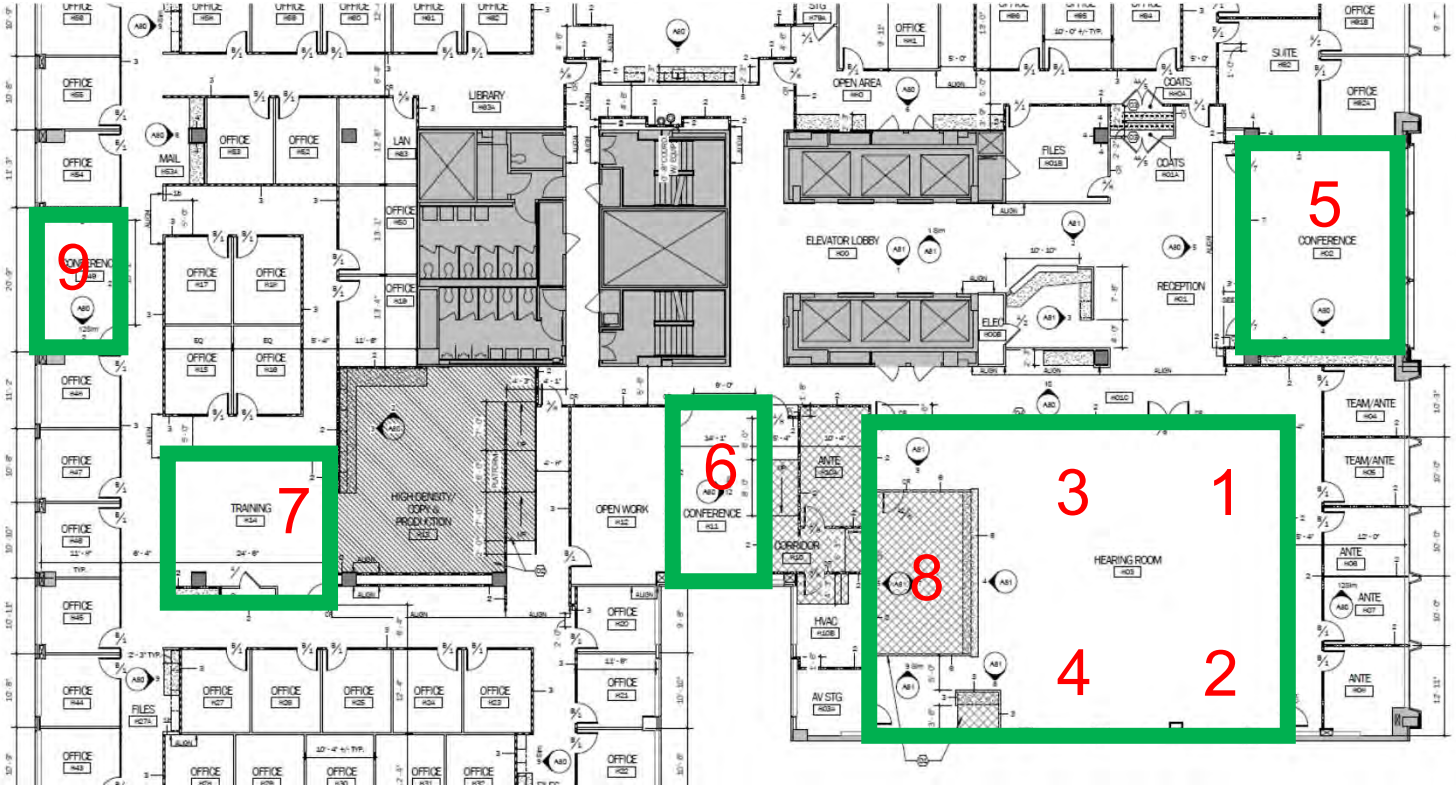
Microgrids Working Group

Distributed Energy Resources (NWA) Working Group

Customer Protection Working Group

Future Rate Design Working Group

Breakout Group Locations



	Facilitators
1	Erika Myers
2	Rachel Henderson
3	Jen Szaro
4	Ryan Edge
5	Sharon Allan
6	Jared Leader
7	Dan Chwastyk
8	Christine Stearn
9	Mike Kruger

Technical Conference Summary

- Results to be included in the MEDSIS Technical Conference Report sent to participating stakeholders for comment on July 16th at the latest.
- Comments will be due back to SEPA by July 18th.

Conclude & Adjourn

Thank you for your participation!

http://www.dcgridmod.org

Contact Information

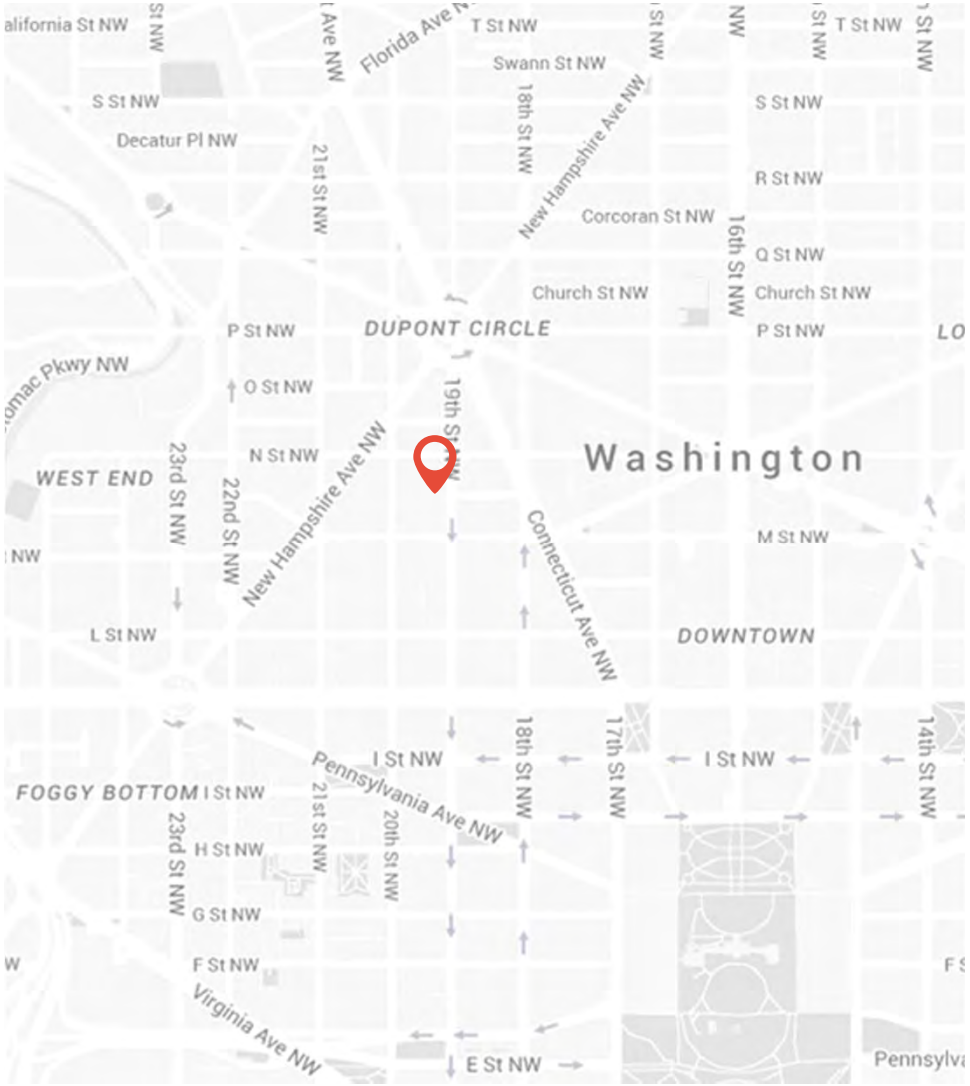
Sharon Allan: sallan@sepapower.org

Aaron Smallwood: asmallwood@sepapower.org

Jared Leader: jleader@sepapower.org

HEADQUARTERS

Smart Electric Power Alliance
1220 19th Street, NW, Suite 800
Washington, DC 20036-2405
202.857.0898



Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 4 – Burns & McDonnell Presentation

System Assessment Description

27 June 2018
District of Columbia

System Assessment Description

1. What is a System Assessment?
2. Why do a System Assessment?
3. System Assessment Components
4. Costs of a System Assessment

What is a System Assessment?

- Holistic & integrated analysis of the grid and relevant business practices (recommended) to optimally address areas of need.
- Scope based on Objectives
  - Targeted (I.E. improve a metric – like reliability) or more broadly based.
  - Whole electrical system or a piece of the system (e.g. circuit, substation and circuits)

Why do a System Assessment?

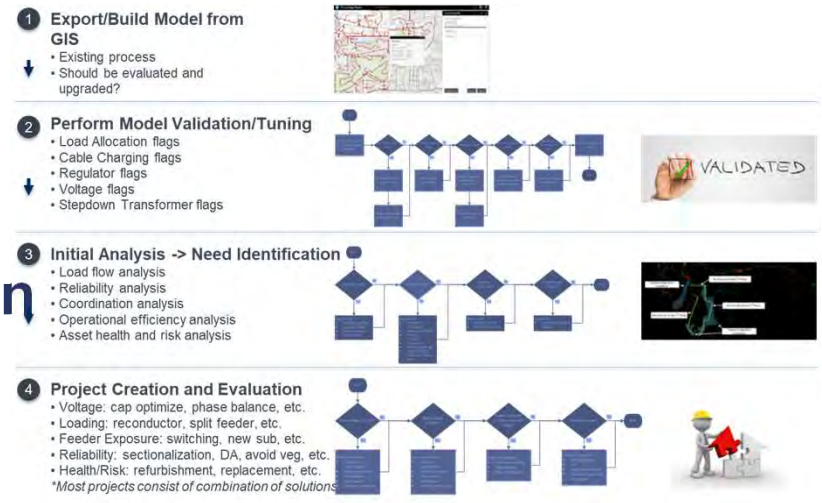
- Limited Resources < Project / Spend Opportunities
- Changing Utility Customer Needs
- Assess Emerging Technology & Tools

Why do a System Assessment?

- **Integrated / Holistic Look vs Silos & Buckets**
- **Plan & Forecast vs React**

System Assessment Components

- Data Collection & Cleanup
- Model Creation / Cleanup
- Model Tuning
- Initial Analysis / Need Identification
- Project Creation & Evaluation
  - Costing & timing
  - Estimated improvement(s)



System Assessment Input & Analysis Checklist

Input
Existing Circuit Models
Load Forecasts
Construction Standards
Load Profiles
Outage History
Critical Customers
Major Asset Details

Analyses
Hosting Capacity
Load Flow
Reliability
Distribution Automation
Asset Optimization
Fault Protection Coordination

Recent System Assessment Example

Grid Modernization Study (Distribution + Substation)

PHASE I (2016)	PHASE II (2017)	PHASE III (2018)
• Review Design, Maintenance & Operating Standards for Modernization Gaps • Develop Grid Modernization Planning Criteria • Execute Engineering Analysis (Distribution Planning) on pilot set of feeders to prove out planning procedure, tools and criteria	• Identify Phase II Circuits (~10% of the system) • Execute Modernization Analysis & Planning on over 400 feeders • Identify Recommendations for Improvement and Update to Standards, Processes, and Tools • Score and Rank all Projects Developed in Planning process and Prioritize according to comprehensive criteria • Develop a Roadmap for Prioritized Project Investment and Execution	• Support Internal and External Approvals • Deliver Go-Forward Processes • Deliver and Train on New Planning Tools • Establish Benefit Tracking to be maintained throughout execution

Costs of a System Assessment

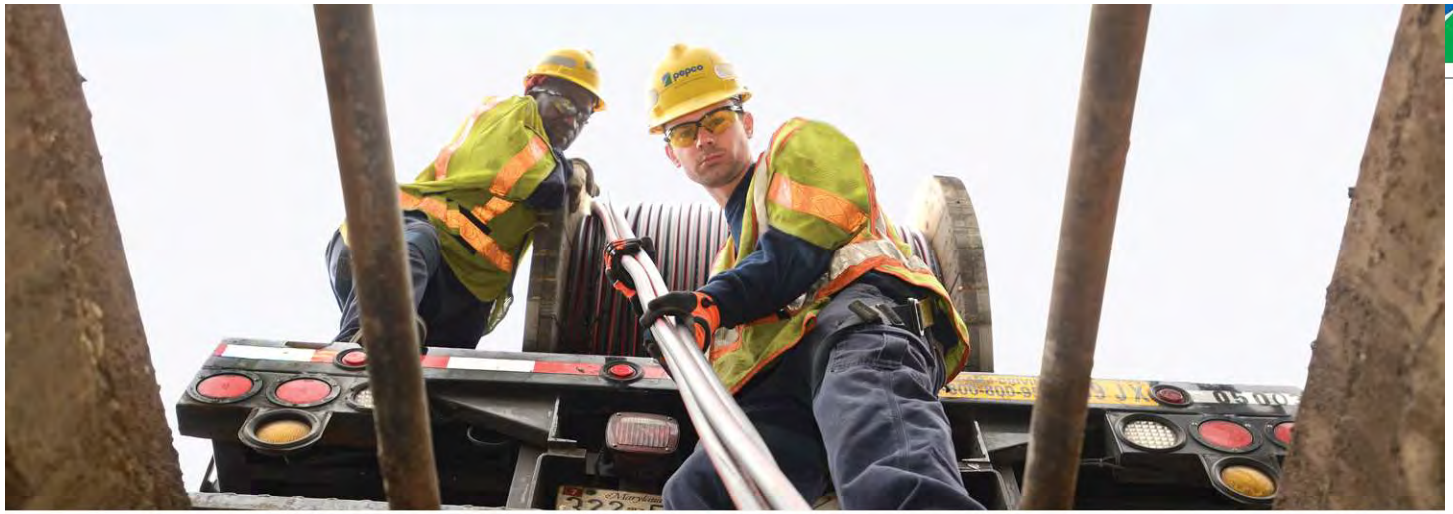
- Cost
  - $8,000-$30,000 per circuit – mean is $25,000
  - Highly dependent on complexity & objectives
- Timeline
  - Months → Year+

System Assessment - Considerations

- **Factors for justifying a System Assessment**
  - **Scope, Timeline, Budget**
  - **Deliverable/project horizon**
  - **Existing initiatives & processes**
  - **Existing planning/study processes**
- **Alternatives**
  - **Strategic Pilots**
  - **Constraints screening / k-means cluster analysis**
  - **Localized focused study**

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 5 – PEPCO Presentation



pepco
An Exelon Company

MEDSIS

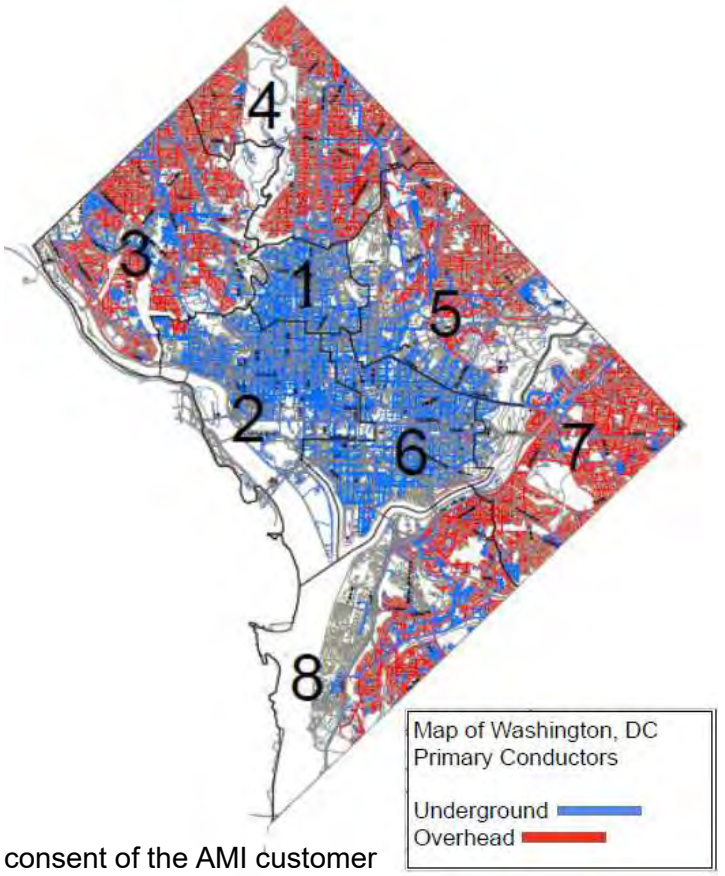
pepco
An Exelon Company

Assessment of Pepco's System and System Constraints

Bryan Clark, Director Utility of the Future
June 27, 2018

District of Columbia Electric Distribution System Overview

- 296,150 customers
- 50 substations
- 777 distribution feeders
  - 647 overhead circuit miles
  - 1,737 underground circuit miles
- 22,150 distribution transformers
  - 12,902 overhead
  - 1,793 padmount
  - 2,303 underground
  - 512 subsurface
  - 184 subway
  - 11 OH stepdown
  - 13 UG stepdown
  - 4,431 network
- 59,519 manholes
- 302,551 automated metering infrastructure (AMI) meters activated[1]



*Data as of 12/31/2017

[1]PEPCO Customer AMI Data is available to third parties upon written consent of the AMI customer

Managing Pepco System

Aging infrastructure, emergence of new technologies, change in customer expectations, reliability assurance and traditional regulatory obligations drive the need to continue with a comprehensive asset management strategy for PHI

System Design

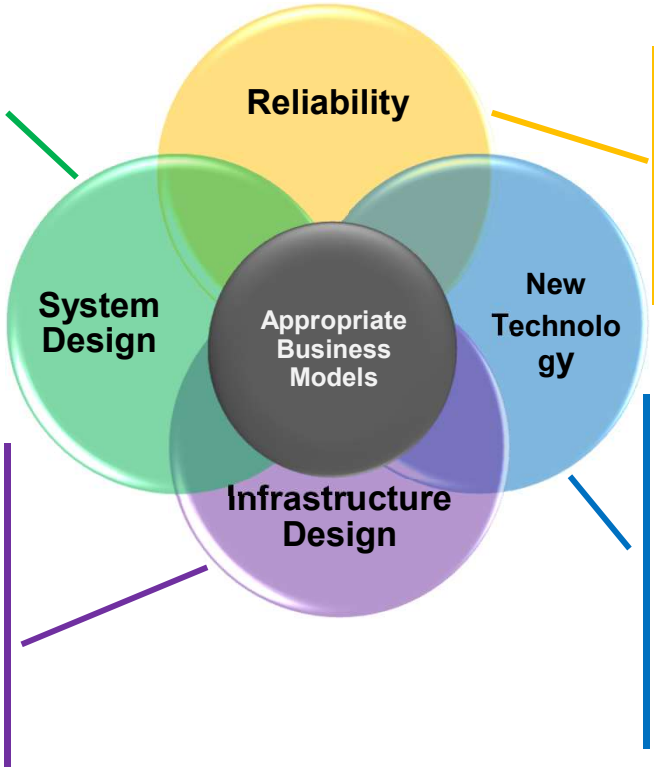
Requirements

- Cyber Security
- Interface with distributed/dispersed generation (micro and macro)
- Substation siting issues, etc.
- High Side Bus configurations
- LVAC Network renewal
- Criteria for adding new substations
- Selective / System Undergrounding

Infrastructure Design

Requirements

- Aging Transformer Replacement
- Conversion of 4kV to 13kV
- General Aging Infrastructure Replacement Criteria
- Switchgear & Breaker Replacement
- Network Protector & Transformer Replacement
- PILC Replacement
- Transmission Line upgrades
- 69 kV - 600 MCM MPOF Cable Replacement



Reliability

Requirements

- Reliability Centered Maintenance (RCM)
- Distribution Feeder, Sub-transmission, Transmission Hardening
- Pole and padmounted transformer replacement
- Equipment Condition Assessment (ECA)
- Inspection programs

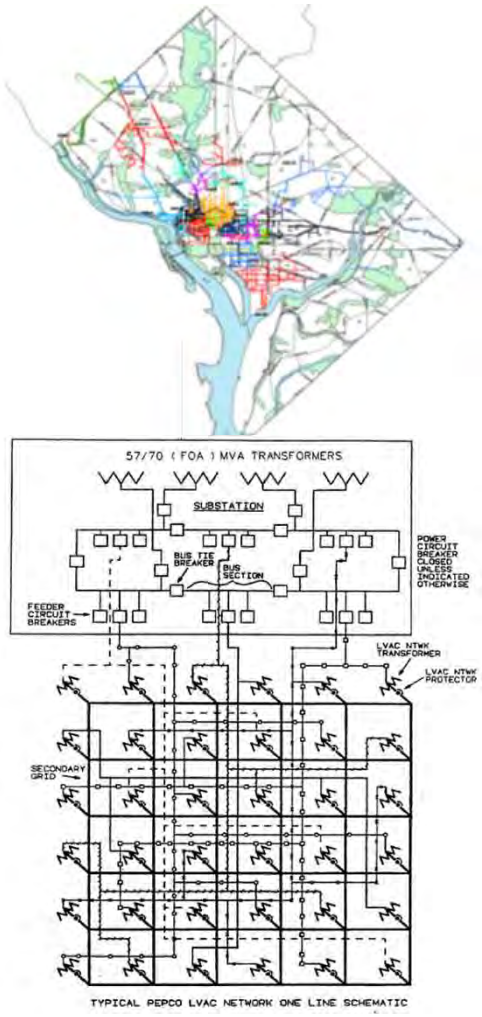
New Technology

Requirements

- EnergyWise Rewards
- Energy Efficiency
- Smart Grid and Distribution Generation Requirements
- Electric Vehicle growth
- Recloser Application
- Distribution & Sub-transmission automation
- Integrated Volt-VAR Control
- Distributed Energy Resources
- CVR
- Energy Storage
- Innovation in design and distribution equipment

Pepco's District of Columbia LVAC Networks

- LVAC networks consist of up to 6 feeders with an operating capacity of approximately 45 MVA
- A secondary network is supplied from two or more transformers with secondaries tied between transformers
  - 120V / 240V @ 500, 750 and 1000 kVA
  - 265V / 460V @ 500, 750, 1000, 1500 and 2000 kVA
- Pepco has approximately 4,400 network transformers in the District
- Pepco currently has approximately 46,500 residential customers connected to a LVAC Network
- Primarily located within the central business district to support the high-density commercial loads



TYPICAL PEPCO LVAC NETWORK ONE LINE SCHEMATIC

Pepco System Assessment Processes

- Reliability
  - Continuous review of system and feeder level performance
  - Continuous review of customers experiencing multiple interruptions

- Load Forecasting
  - Annual review of loading on half the system: feeders, substation transformers, and substations
  - Load flow analysis using various software packages
  - Incorporates DERs, energy efficiency, and other known load reducing factors

- Control Center Operations
  - Continuous monitoring of system
  - Leverages data supplied by multiple sources

Distribution System Planning Mission and Role

- The mission of PHI Distribution System Planning is to provide for the safe, reliable, economic and orderly modification and expansion of the PHI electric system to meet existing and future customer demands

- PHI companies maintain engineering and operating criteria used in the design of new and modified portions of the distribution system
  - These criteria govern how:
    - Load carrying capacity of system facilities are determined and utilized
    - Required service voltage levels are maintained
    - Distribution system reliability is maintained

DER Interconnection and Non-Wires Deferral

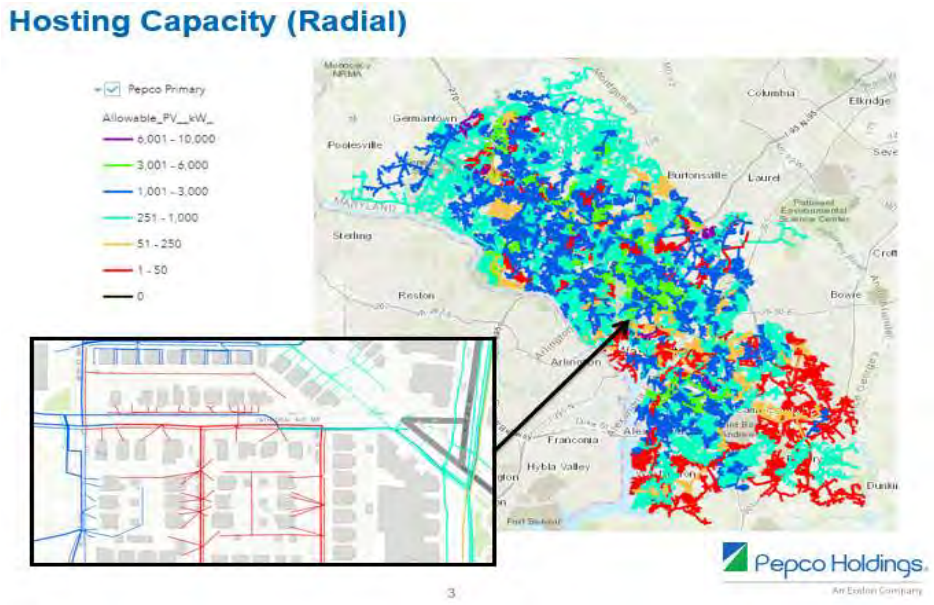
- For more than a year, Pepco has been evaluating project alternatives incorporating DER and using non-wires solutions to defer wires investment
  - Deferral of an overhead substation in Maryland
  - Deferral of a substation transformer in the District of Columbia
  - Expansion of Conservation Voltage Reduction (CVR) to include more District of Columbia feeders
  - Expansion of hosting capacity on closed feeders
  - Other storage projects being evaluated

- Pepco looks for solutions that will ensure the safe and reliable distribution of electricity to its customers

- Pepco plans its distribution system to account for the increase in DER interconnected to the system and provides information and tools that help identify where incremental DER can be interconnected

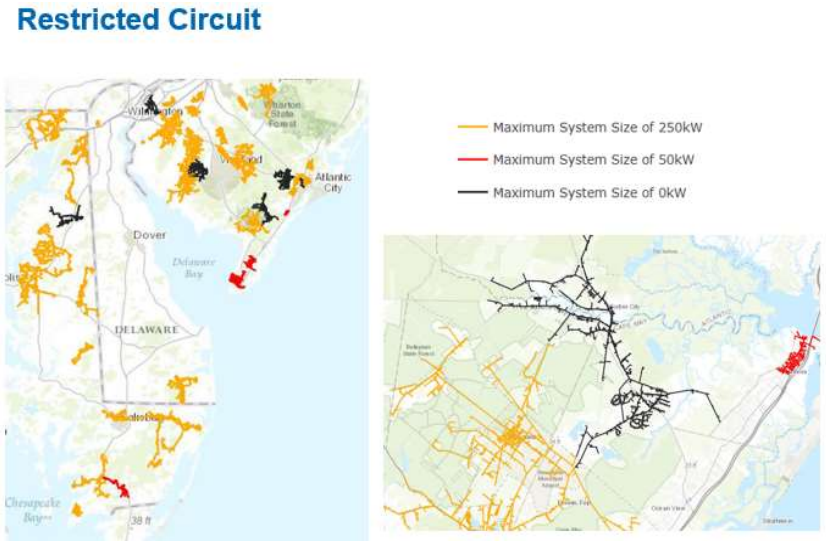
Hosting Capacity Map

- Pepco makes a Hosting Capacity Map available
  - Provides data that customers can use to determine if solar or other DER can be accommodated at their home
  - Developers can use to help size or site large projects
  - https://www.pepco.com/MyAccount/MyService/Pages/MD/HostingCapacityMap.aspx



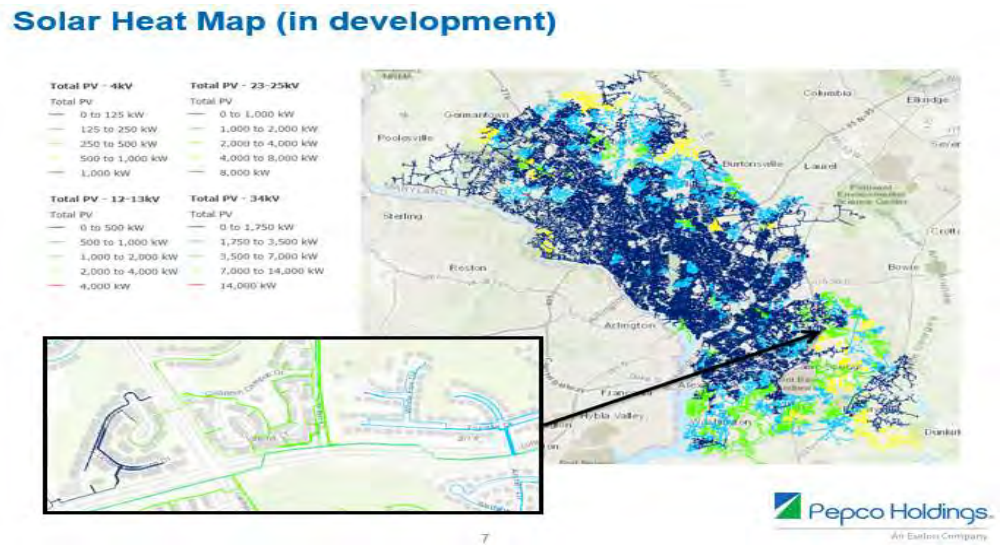
Restricted Circuit Map

- Pepco hosts a Restricted Circuit Map
  - Provides information regarding circuits that can no longer accept additional DER installations without distribution system upgrade
  - Without upgrades, there is DER threshold beyond which violations of voltage operating limits can cause damage to Pepco and customer equipment
  - https://www.pepco.com/MyAccount/MyService/Pages/MD/RestrictedCircuitMap.aspx



Solar Heat Map

- Pepco hosts a Solar Heat Map in an effort to provide more information to customers reflecting the amount of solar generation currently installed and pending installations
- The map is color-coded and can be filtered to display the active projects only, pending queued projects only, or the combination of active and pending queued projects
  - https://www.pepco.com/MyAccount/MyService/Pages/MD/HeatMap.aspx



Annual Consolidated Report (ACR)
Docket "PEPACR"

- The ACR, filed in April each year, provides significant amounts of data and information on Pepco's system, including:
  - Overview of Pepco's system and system planning procedures
  - Scopes of planned substation projects
  - Complete scopes of all distribution projects
  - Work Plan including the past year spending and current year budget by individual project
  - Detailed description of equipment standards and inspection schedules
    - Includes detailed Equipment Condition Assessment meeting minutes
    - Includes Overhead Feeder Inspection results
  - Scopes of distributed automation projects, voltage conversion projects, and detailed plans for each of the feeders scheduled to be worked under the 2% priority feeder program
  - Manhole Event Report
    - Underground Failure Analyses
    - Descriptions of each manhole event
    - Details for the manhole inspection program

Independent System Audits

An Exelon Company

- Comprehensive system reliability audit, as directed by the Commission
  - Siemens Reliability Audit/Liberty Management Audit of system planning and operating procedures ended in 2013
    - Siemens found that "Pepco is effective in planning its capital expenditures for substation and feeder investments to attend load growth"
    - Liberty found "Pepco's distribution planning practice to be consistent with good utility practice"
    - Docket "PEPACR"
  - Siemens also performs annual audit of Pepco's manhole inspection program, includes:
    - Audits of program elements, inspection cycles, and past year's inspections
    - Docket "PEPMIR"

MSO Plan & Monthly Outage Reports

- Annually, Pepco updates its Commission-directed Major Service Outage (MSO) Restoration Plan
  - Details include storm priorities, pre-event planning, storm response roles and procedures, and post-storm activities
  - Dockets FC 766 and FC 982
- On a monthly basis, Pepco provides detail concerning non-major outages* sustained, including date and cause
    - Includes GIS-enabled map of outages allowing for tracking by neighborhood and Ward
    - Docket example “SO2018”

Outage Cause / Incident Description / Actual Repair	Location	Ward	Time of Outage/Incident	Actual Restoration Time	Duration of Outage (hrs/min)	Max Number of Customers Affected
Equipment failure/Cable failure/Fuse blown/ Isolated fault/Made tie/All load restored	5th Place ne/o Congress Place, SE	8	642	918	2/36	124

* **Non-major service outages** - customer service outages caused by the failure of devices such as breakers, fuses, feeder lines, substation equipment, etc., lasting over eight (8) hours, regardless of how many customers are affected; or customer service outages affecting over 100 but less than 10,000 customers, regardless of duration.

Rate Cases
Dockets FC 1139 and 1150

- Construction Report
  - Pepco is required to supplement its rate case filings with a detailed description of its construction program
  - Details project plans and budgets from the period recovery is requested through four years beyond the current year
  - Includes detailed project plans including prioritization, timeline, and project justifications

- Load Forecasting
  - Pepco has filed testimony and exhibits describing its load forecasting methodology including the consideration of DERs

DER Reports

- Quarterly and annually, Pepco provides information concerning the number of interconnections it has processed and approved and also detailing the amount of DER capacity processed to date through its Green Power Connection (GPC) team (FC 1050 and FC 1119)
- Annually, Pepco provides a report showing information related to its Direct Load Control (DLC) program (FC 1086), including
  - Numbers of participants and the amount of potential capacity.
  - Budgetary and program-related information.
- As part of the NOC filing in FC 1144 (6/29), Pepco will also be providing more granular data showing Pepco DLC customers by location/feeder and capacity, and Pepco now has the capability to tie DLC to most locations/feeders in the District.

Reliability Forecast Report

- Pepco annually provides (as an attachment to the ACR)
  - Information on all of its planned reliability distribution construction work for a given year
  - Descriptions and schedules for maintenance and inspections that support reliability

- This information includes project descriptions and budgets as well as performance measures

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 6 – Breakout Groups Summary

Q1: What information was the most helpful in considering the Non-Wires Alternatives options available to the MEDSIS initiative in the presentations from Burns and McDonnell and Pepco?

Group	Most helpful	2nd most helpful
1	Clarification of the issue	Assessment costs
2	Level setting	
3	Hosting Capacity information is helpful but not user friendly	Assessment costs were good to know but lacked detail of full scope and value of doing full scope
4	Presentations were higher level than could be applicable to this question	System design criteria was helpful but not clear how it is additive to the process already in place
5	Like will take stakeholder input	NWA is still new
6	Data/info provided already by PEPCO	Experts to conduct S.A.
7	Discussion regarding when assessments may not be needed / possibility to do localized assessments	Availability of tools the Pepco has available to public
8	Can do targeted need-based	General level setting of vision (electrification, goals), w/interplay between the pieces (economics, goals, metrics, other mission statement req. etc.)

Q2: Based upon what you know and have learned, do you feel there is sufficient information from available sources to make DC Grid Modernization recommendations? If no, what is missing?

Group	Sufficient info provided?		If not, what's missing?
	Yes	No	
1		5	Sustainability/resiliency objectives of the commission; cost-benefit analysis of traditional vs. NWA/DER options; CVR plans (peak reduction vs. power quality?); assumptions used for hosting capacity maps
2			Data transparency
3	2	8	What problem are we solving? Coordination of available data and end uses. Social equity considerations. Disconnect between DC policy and MEDSIS initiative, gap between current process and incentive structures and objectives of DC MEDSIS initiative
4		6	What is the justification? What is the value add of an assessment that exceeds what is already in place?
5	8	2 abstentions	Burns/Mac was internally focused perspective of a utility and it didn't consider other things like policy and new developments that need to happen more solar, EE for green buildings, EV
6	0	9	Lack of institutional design, lack of technology roadmap from PHI
7	7	0	The information is there, but getting the information and interpreting it is challenging.
8		6, 1 abstention	1) need end state objective - what is modernized grid on goals of system assessment?, 2) Consideration of forecast/electrification in planning process. 3) long-term scale, 4) info on small planning areas where those physical boundaries.

Q3: Do you feel that a system assessment is needed for the MEDSIS initiative?

Group	Assessment Needed?		Reasons for why	
	Yes	No	Yes	No
1	1	4	More information for stakeholders (assume that stakeholders would have input on how narrow/broad it would be)	The original intent of the system assessment is less of an issue today than three years ago. Too expensive
2	0	9		Move forward w/o full assessment but address info gaps and transparency moving forward.
3	0	8	2 abstentions	Time and money. Partial assessment once objectives are defined.
4	1	5	Some assessment is needed though not a full system assessment. should be targeted	Justification has not been made
5	3	4	4 abstentions	There are 4 unsures
6	0	9	No straightforward yes/no.	ID gaps and provide info. Handle thru DIRP.
7	0	7		Localized assessments are a better use of time. There is enough low hanging fruit, and obvious areas where pilots would help that a full assessment is not needed.
8		8 (full SA)		needs to be targeted, focused needs-based SA
TOTALS	**5**	**54**	**6 abstentions**	**4 unsures**

Q1: Regardless of what working groups are formed, what specific topics need to be addressed in MEDSIS working groups?

Group	Most important topic	2nd most important topic	3rd most important topic
1	Data Availability	Microgrids	Sustainability objectives & role of the utility
2	Utility business model, role of utility behind the meter	Urban planning and business codes, safety, data, etc.	Standards, electrification, consumer equity
3	Cost Allocation / Rate Design	Policy Integration / Alignment	Consumer Equity/Education/Engagement
4	Rate design, regulatory issues, and consumer education	Utility business models	Consumer Products & Services
5	Level playing field for wires/NWA	Cost Allocation	Customer Empowerment/Protection, Def'n of a utility/customer
6	Rate Making	Utility 2.0 / Customer eng. / Data / Risk	Value of solar, DER, grid
7	Consumer Issues (Protection/Education/Equity)	Legislation & Policy (Rate Design)	Cost Benefit of Pilots (Backend)
8	Meeting emissions reduction goals for gas and electric	Value stack of NWA	Interconnection (criteria, pricing/cost, sizing, advanced inverter, etc.)

Q2: If you think the MEDSIS working groups should be structured differently than proposed, list what working groups you believe are key for phase 2 with a short description.

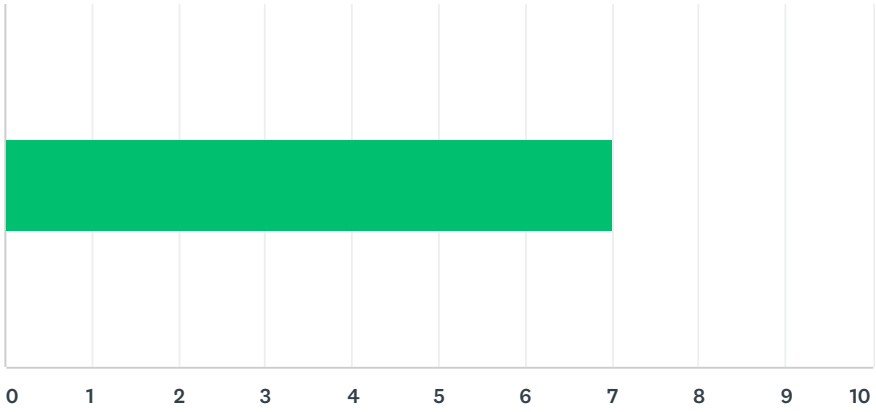
Group	WG #1	WG #2	WG #3	WG #4	WG #5	WG #6
1	Pilot Projects	DER/Smart Mobility	Microgrid	DIRP (move NWA here)	Consumer Protection	Rate Design
2	Pilot Projects	DER (NWA)	Future of the Utility	Utility DIRP	Consumer Protection	Ratemaking
3	Pilot Projects	DER (NWA)	Consumer Protection / Engagement	Utility Business Models	Policy Alignment	Rate Design
4	Pilot Projects	DER (NWA)	Microgrids VPPs and DER aggregation	DIRP	Consumer Protection, Products, and Programs	Future Rate Design
5	Pilot Projects	DER (NWA)	Microgrid	Customer / Human Impact	Transitioning Resource Planning	
6	Pilot Projects	DER	Microgrids	DIRP	NWA	Rate Design/Making
7	Pilot Projects	DER (NWA)	Microgrids	Customer Protection	Transportation Electrification	Future Rate Design
8	Pilot Projects	DER (sub groups: NWA, MG, EV, EE, etc.)	Data Access	DIRP	Policy Alignment (All Levels)	Future Rate Design

Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 7 – Technical Conference Feedback Summary

Q1 Did you find the Technical Conference was worthwhile?1 - Not at all 10 - Very much so

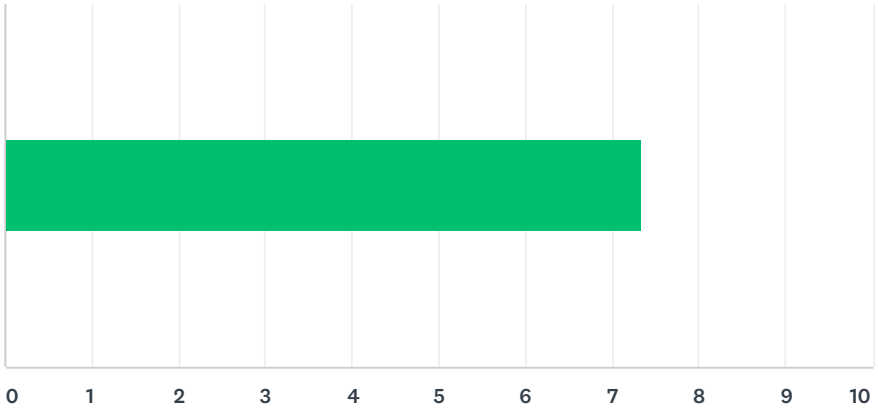
Answered: 18 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	7	126	18
Total Respondents: 18			

Q2 Was the day well organized and efficient?1 - Not at all 10 - Very much so

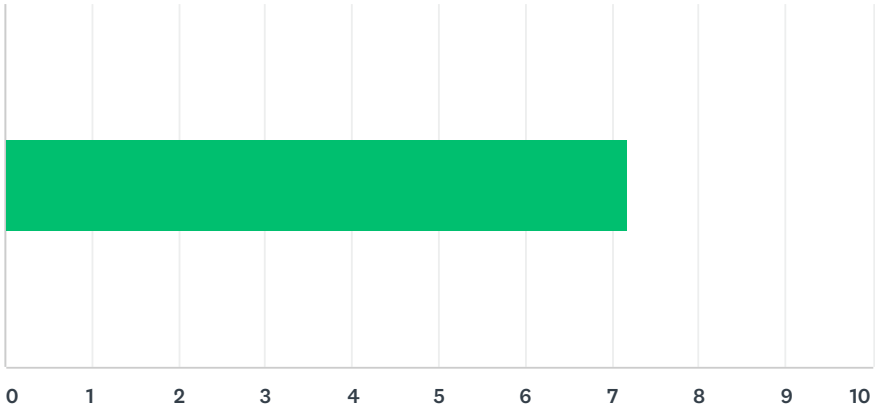
Answered: 18 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	7	132	18
Total Respondents: 18			

Q3 Did you feel your day was well spent?1 - Not at all much so 10 - Very

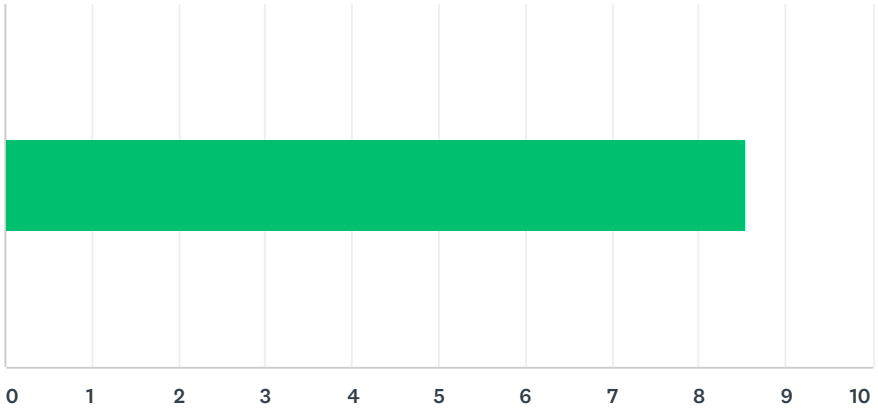
Answered: 18 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	7	129	18
Total Respondents: 18			

Q4 Did you feel your contributions were heard and recorded?1 - Not at all 10 - Very much so

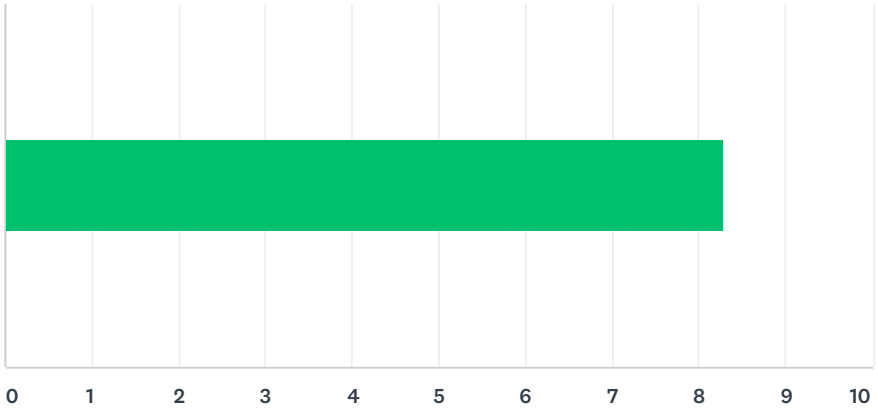
Answered: 17 Skipped: 1



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	9	145	17
Total Respondents: 17			

Q5 Did you like the format with the breakout sessions?1 - Not at all 10 - Very much so

Answered: 18 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	8	149	18
Total Respondents: 18			

Q6 Do you have any comments you would like to make?

Answered: 15 Skipped: 3

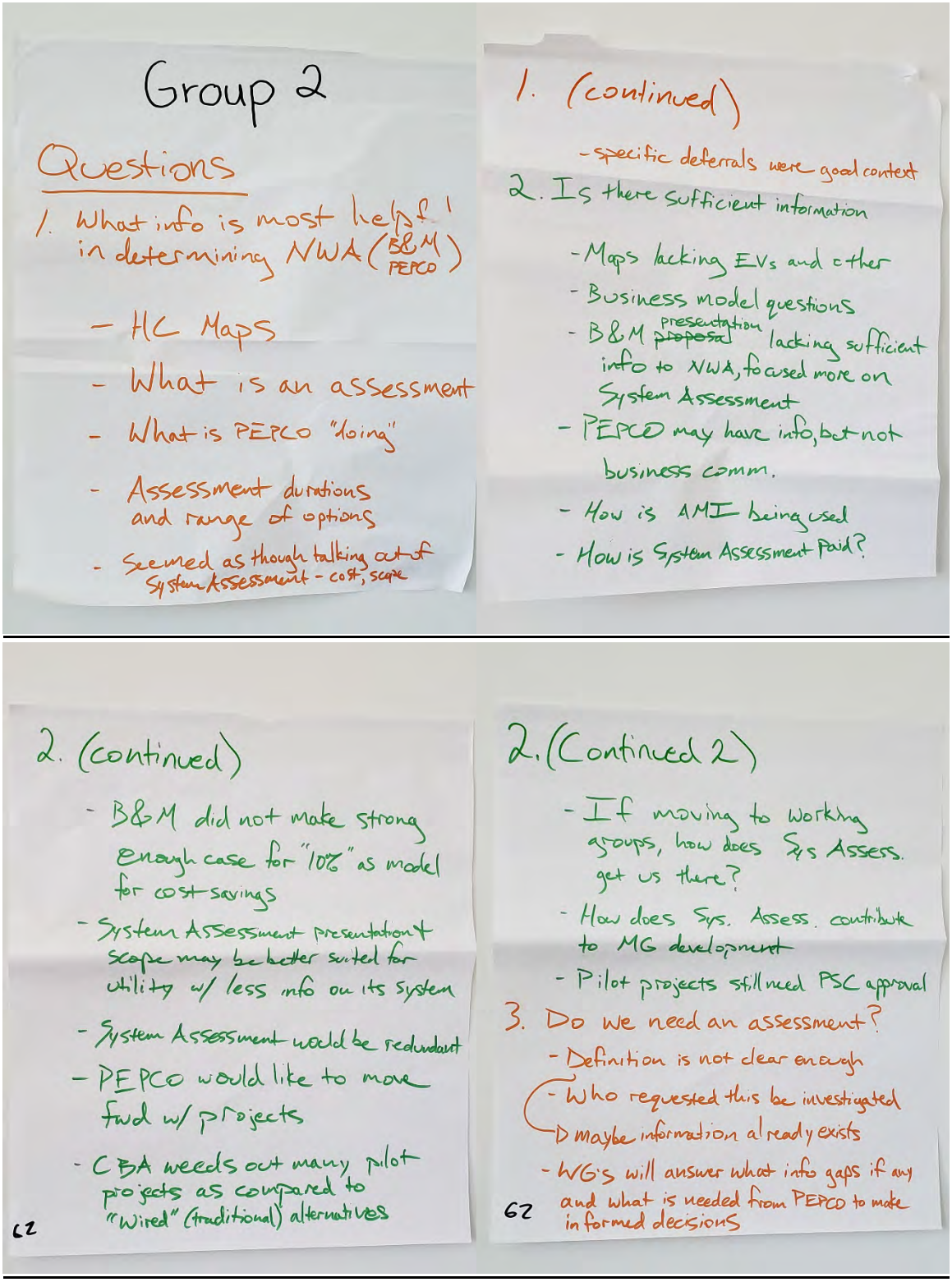
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Attachment No. 8 – Breakout Groups Sticky Notes

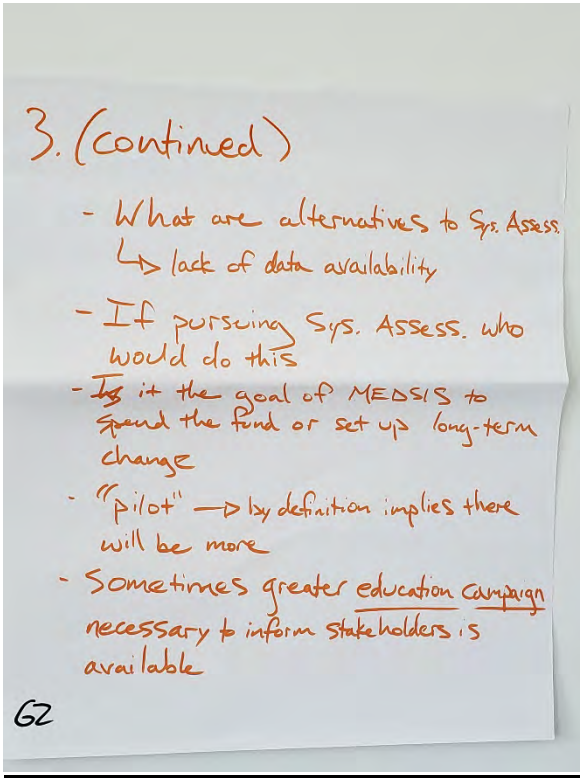
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

System Assessment Breakout Session Sticky Notes

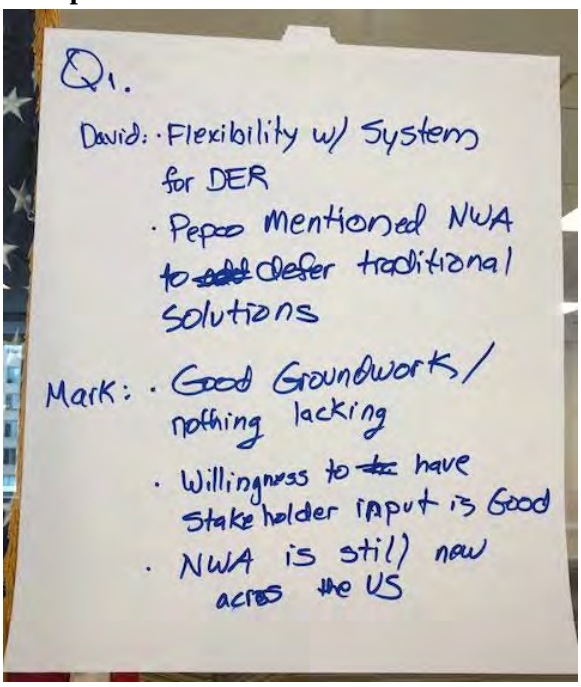
Group2



Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

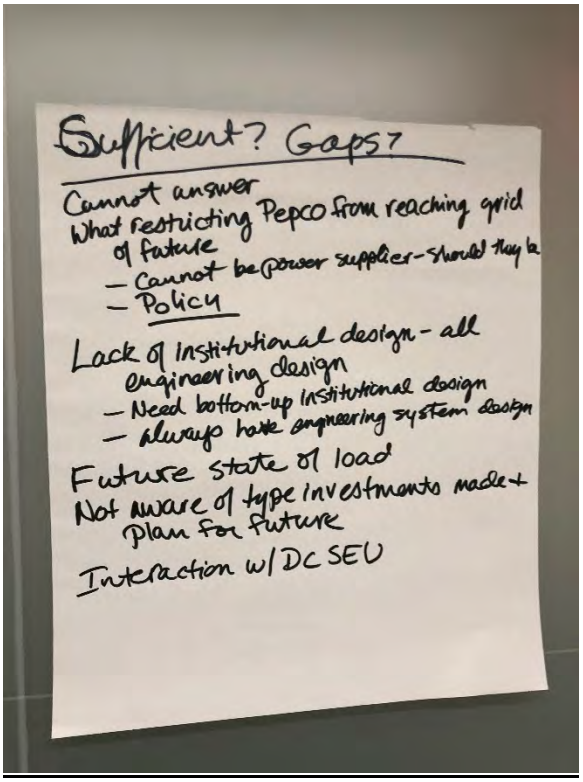


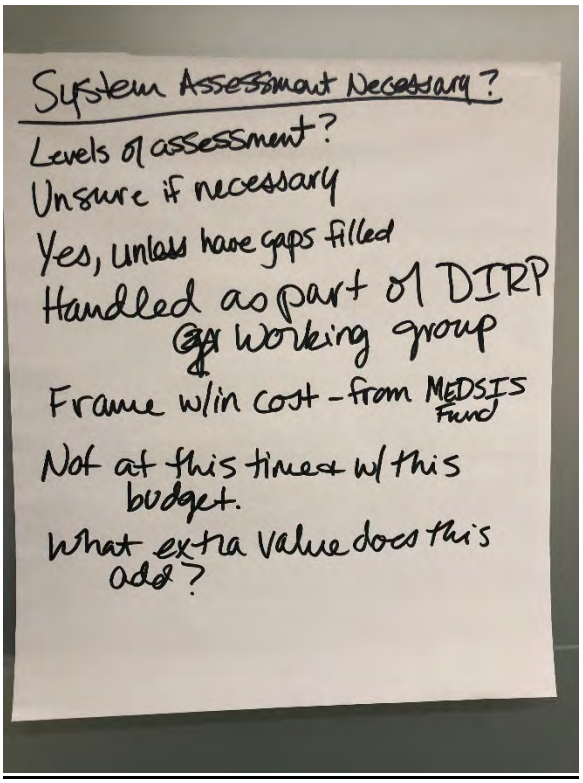
Group5



Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

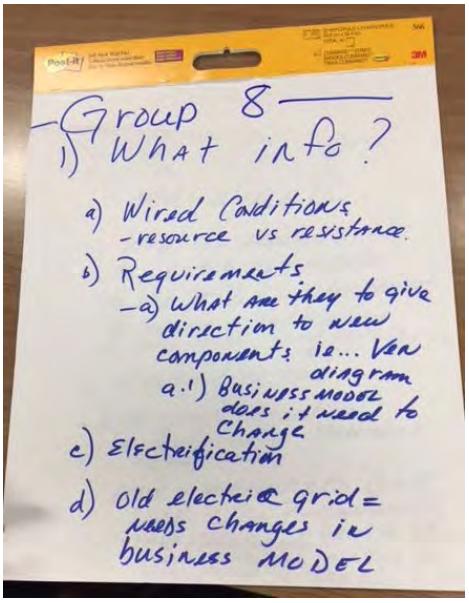
Group 6

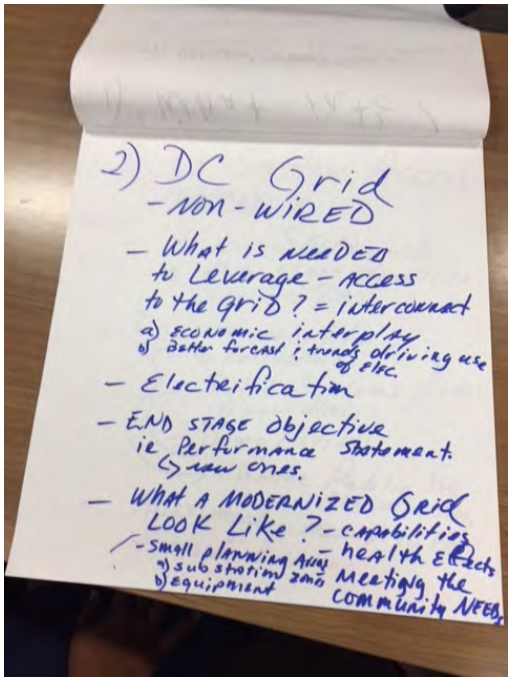


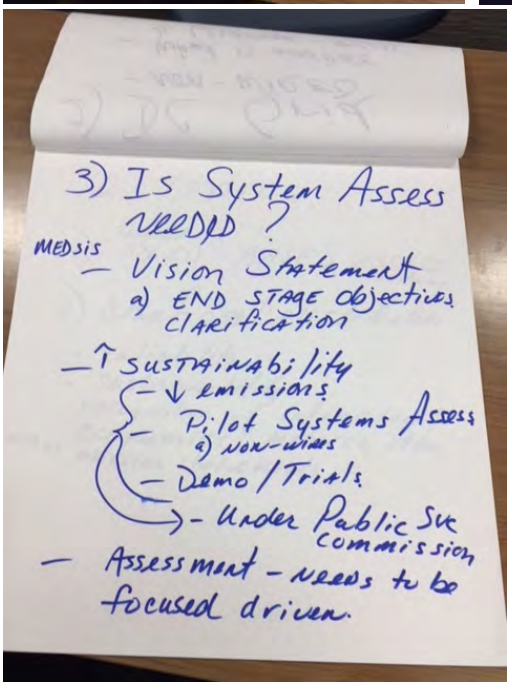


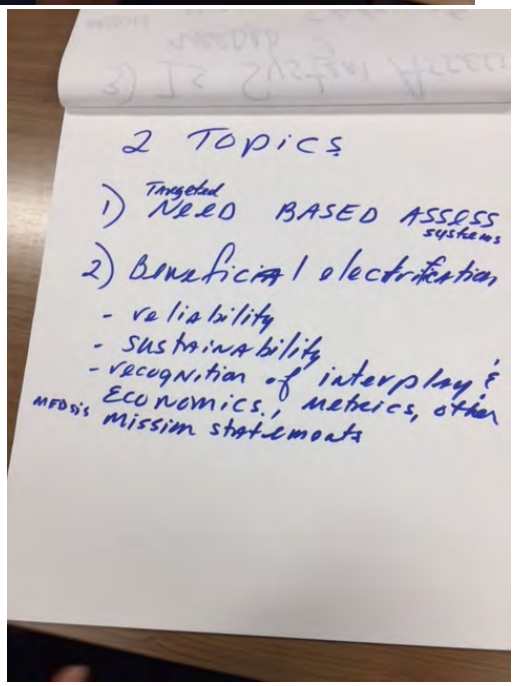
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Group8



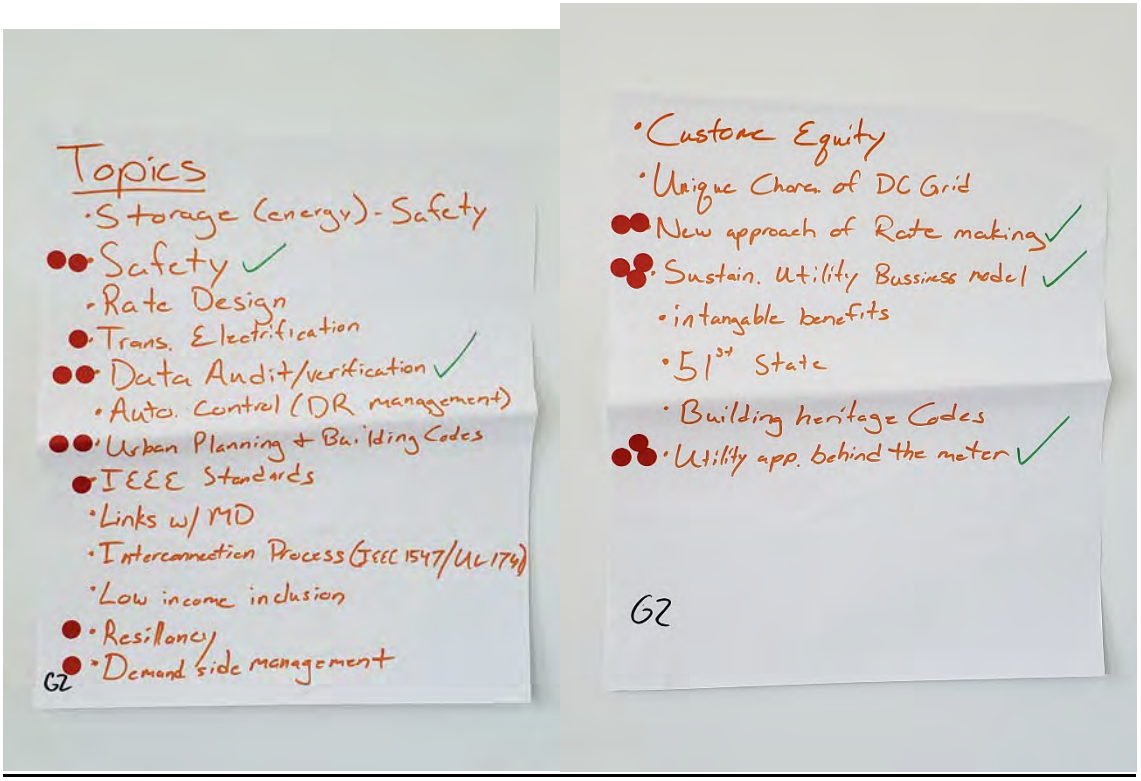


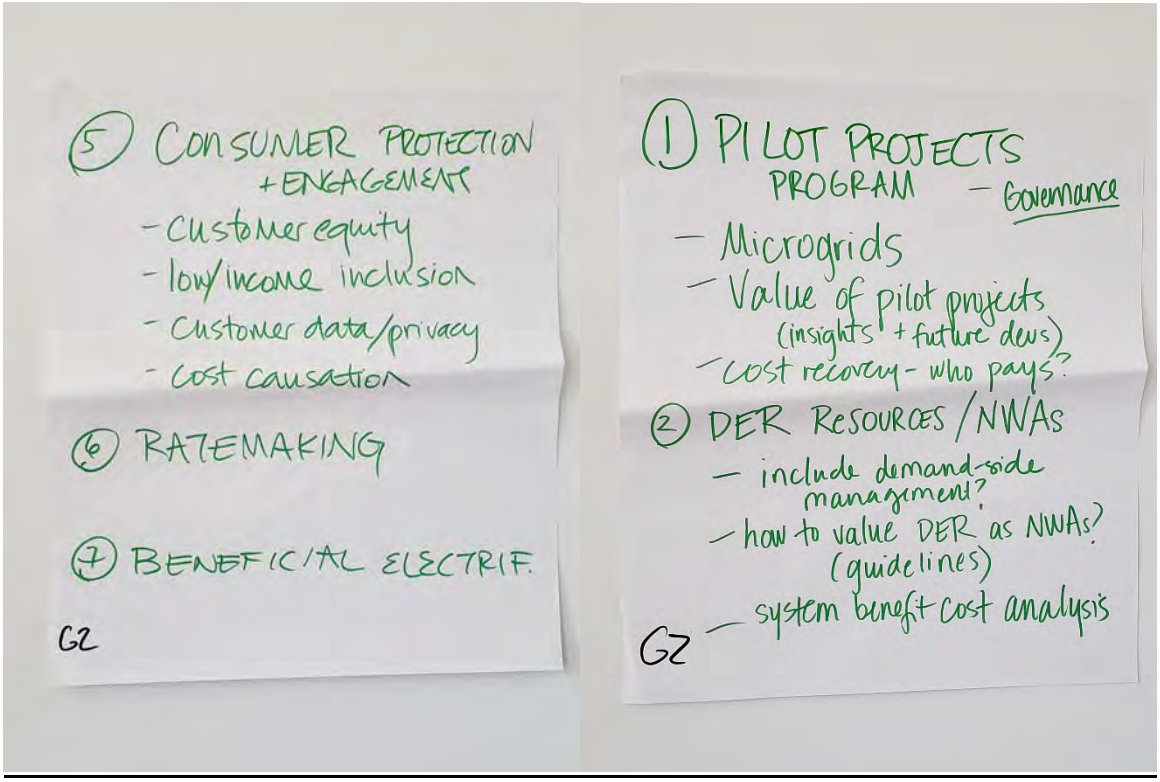




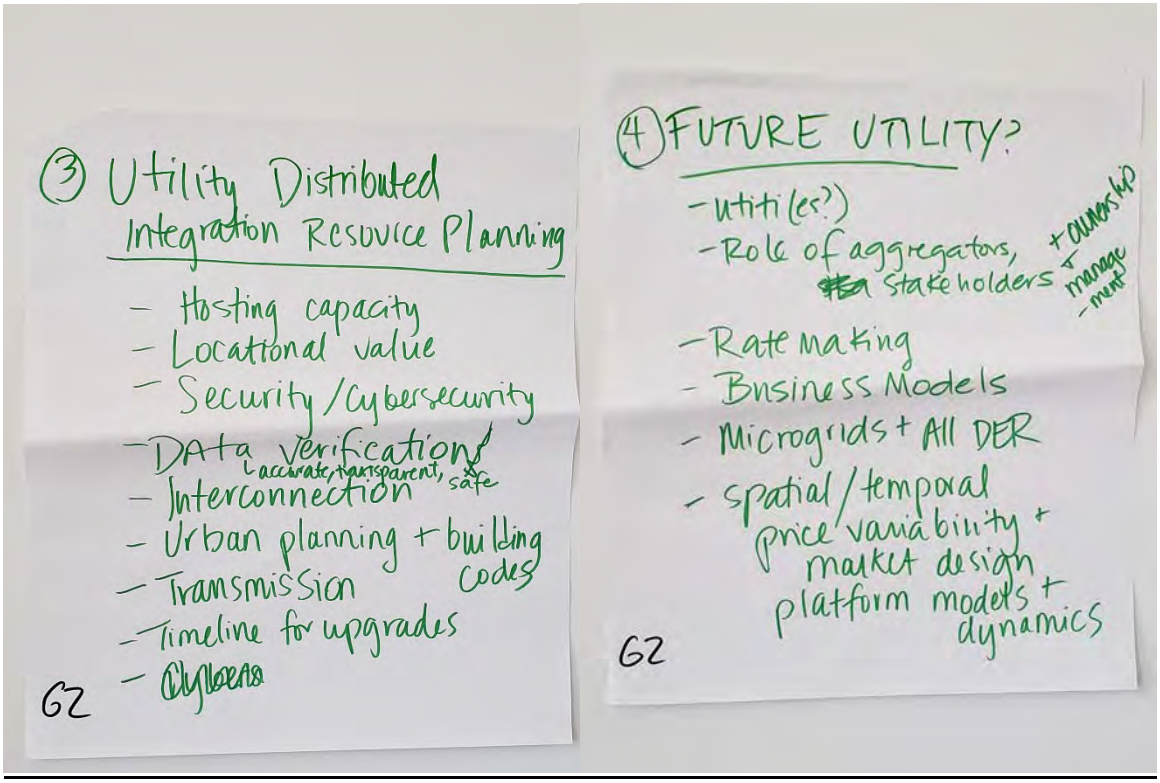
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Working Group Breakout Session Sticky Notes
Group2



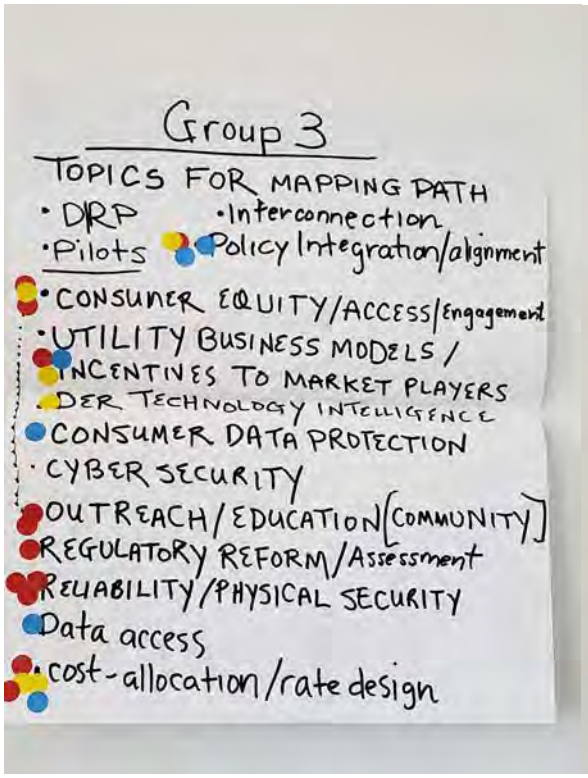


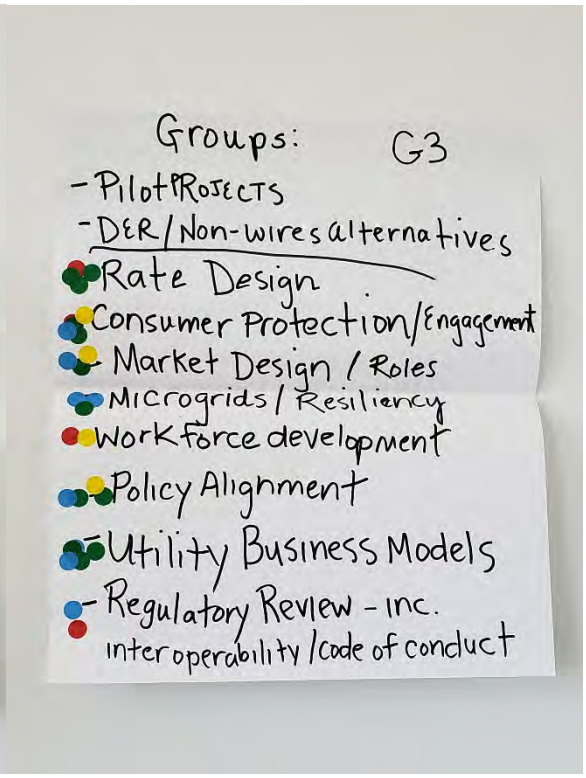
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

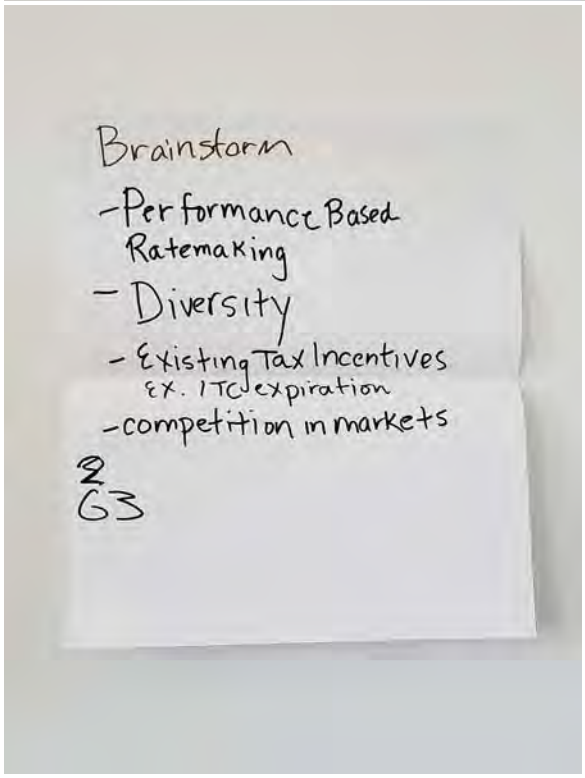


Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Group3

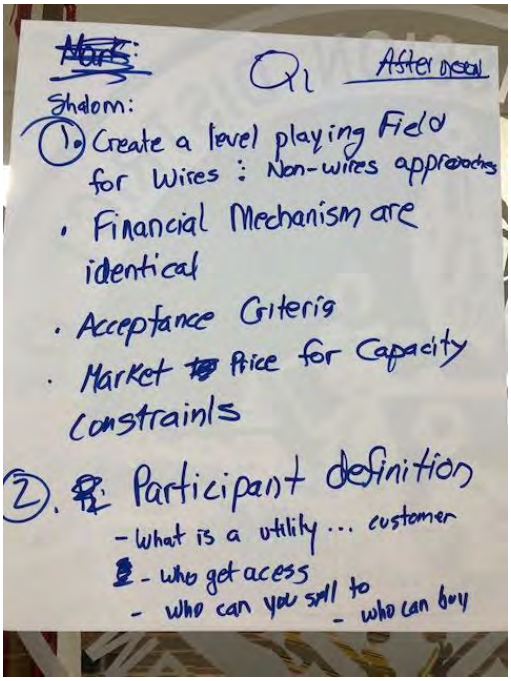


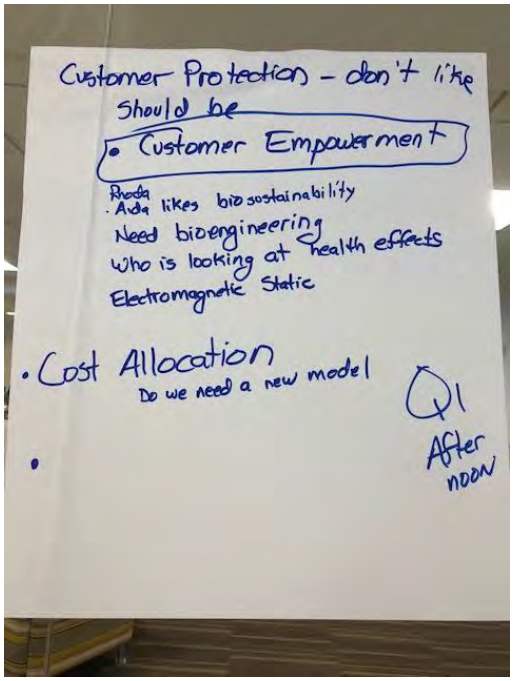


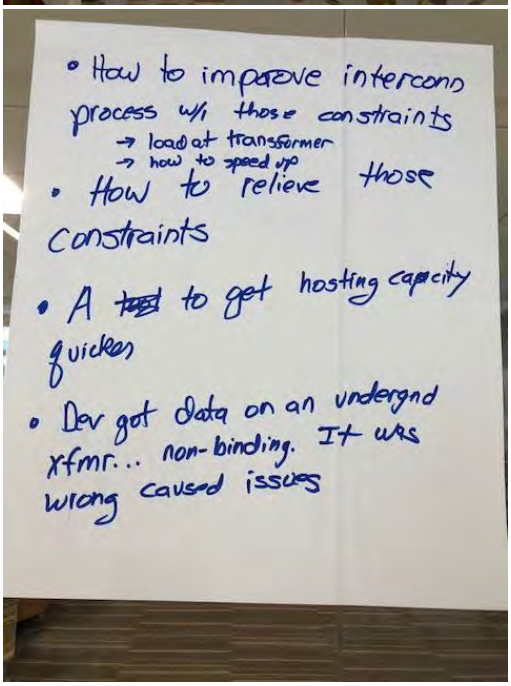


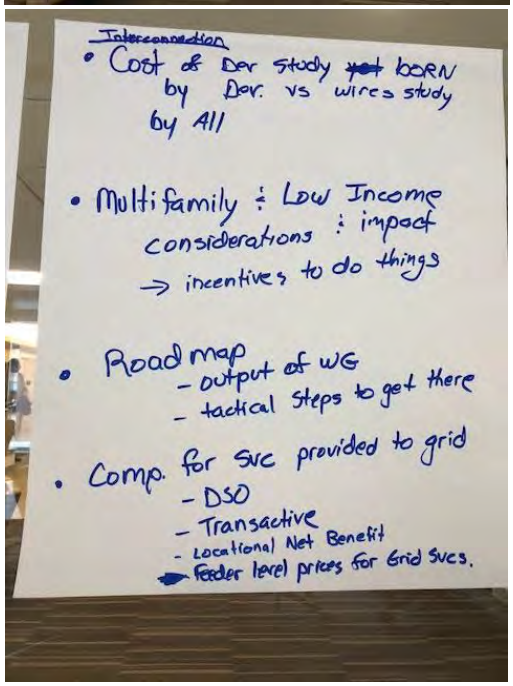
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Group5



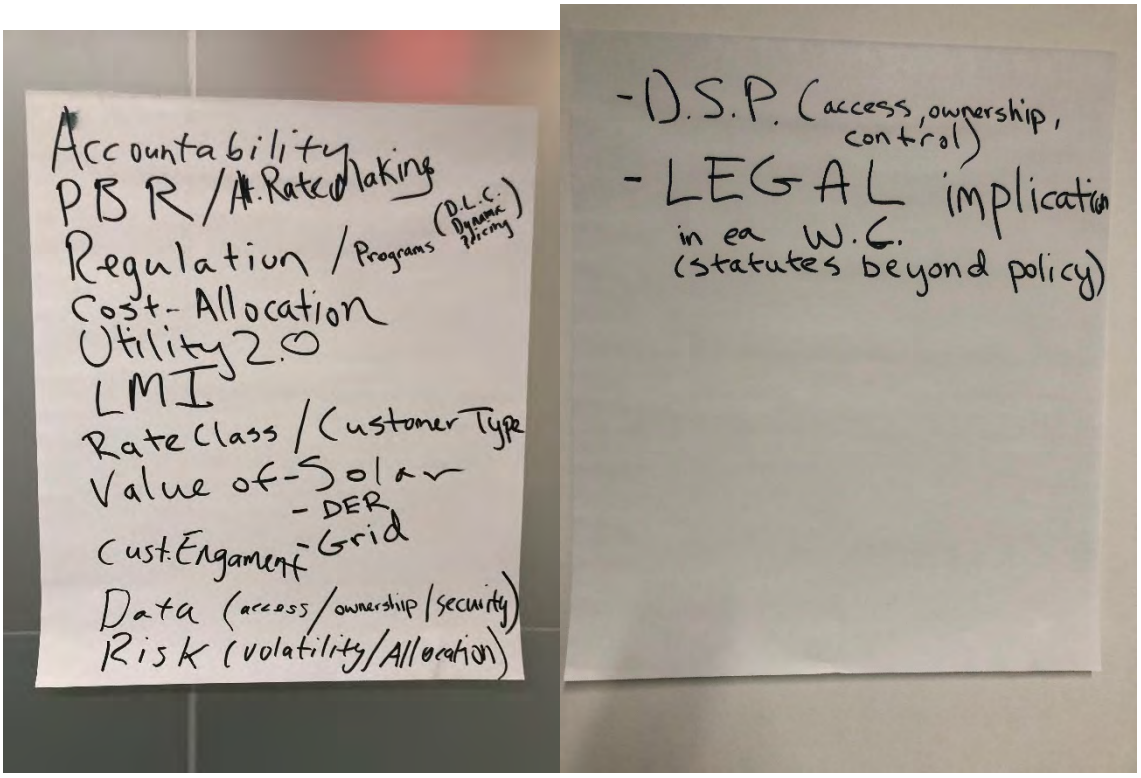




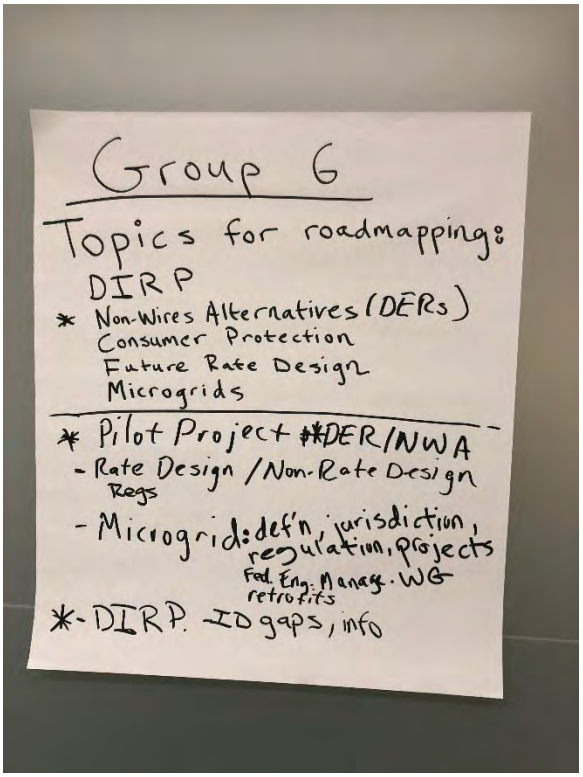


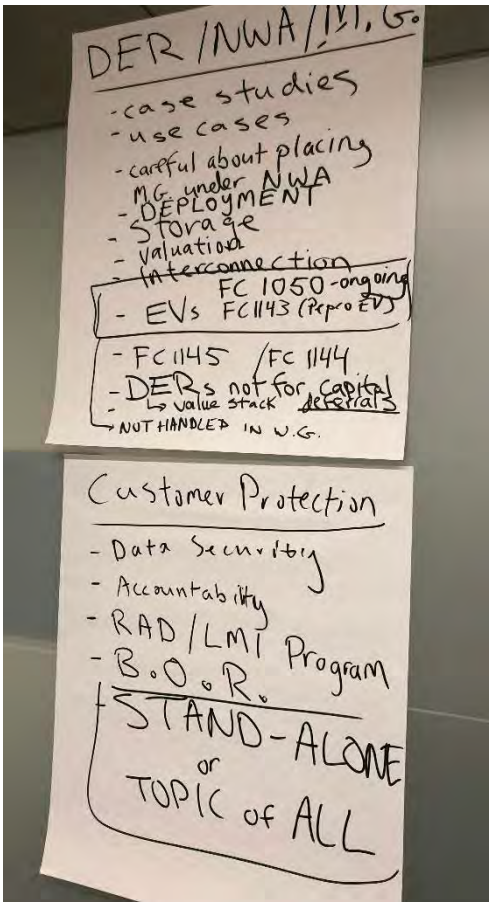
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Group 6



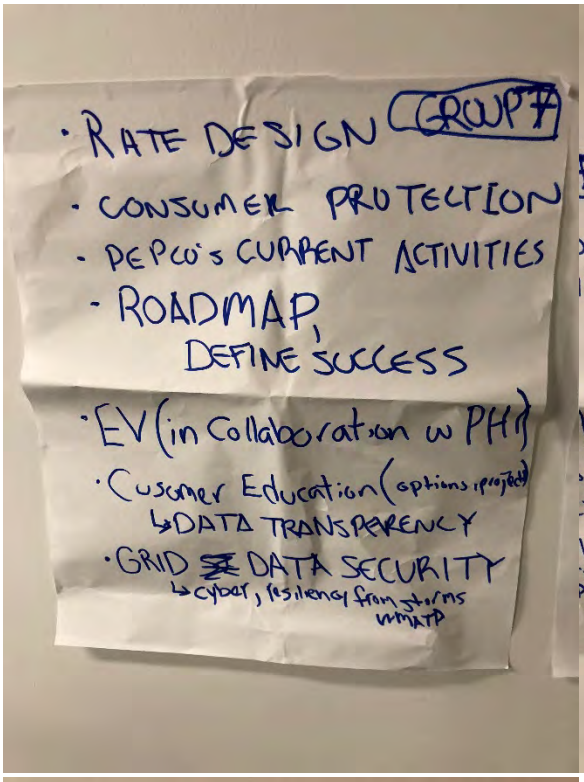
Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

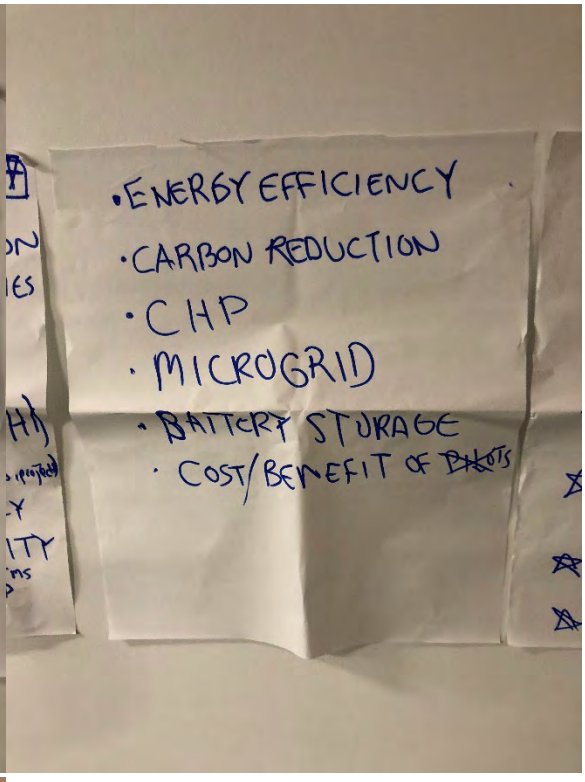


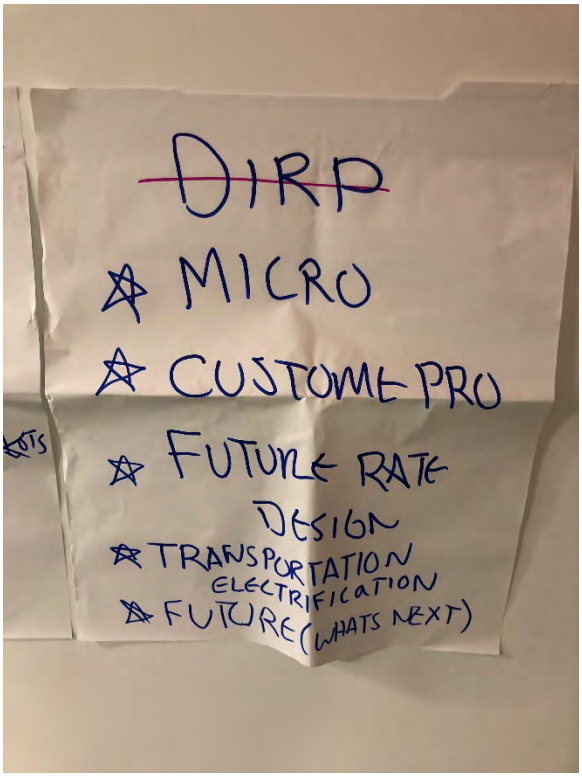


Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Group 7







Formal Case No. 1130: Technical Conferences
1325 G Street, N.W., Suite 800
Washington, D.C. 20005

Group 8