Center for Renewables Integration

April 10, 2017

Ms. Brinda Westbrook-Sedgewick
Commission Secretary
Public Service Commission of the District of Columbia
1325 G Street NW, Suite 800
Washington, DC 20005

RE: Formal Case 1130 – MEDSIS Staff Report Comments

Dear Ms. Westbrook-Sedgewick,

The Center for Renewables Integration (CRI) respectfully submits these comments on the "MEDSIS Staff Report" filed in Formal Case No. 1130.

CRI is a new, non-profit organization being formed to provide state policymakers with the information they need to put rules, regulations and market mechanisms in place that support a rapid pace of renewables deployment, enabled by battery storage and advanced controls. The Center is being launched by a team of energy industry professionals of diverse backgrounds, but a shared passion to accelerate the reliable, cost-effective deployment of renewable energy. The team includes:

- Jeanne M. Fox, CRI Partner,
  Educator, former President of the New Jersey Board of Public Utilities, and former USEPA Region 2 Administrator
- Kerinia Cusick, CRI Partner,
  Principal Consultant and founder of Distributed Energy Innovation, former Vice President, Energy Storage and former Managing Director of Policy, Sun Edison
- Harry Warren, CRI Partner,
  President of CleanGrid Advisors, former Executive Vice President, Community Energy, Inc. and former President Washington Gas Energy Services, Inc.

CRI applauds the Public Service Commission of the District of Columbia for initiating the MEDSIS process, the Commission Staff for its thoughtful and comprehensive report, and the many parties who have offered input throughout this process. CRI appreciates the opportunity to add its voice and support to this important effort.

In its Executive Summary, Staff expresses the hope that the Commission will receive public comment on a number of issues "including, but in no way limited to whether:

- Staff has appropriately set out the scope of the Commission's jurisdiction;
- The definitions presented in the Draft Notice of Proposed Rulemakings ("NOPRs") at Appendices E and F are adequate and appropriate;
- Staff's discussion of microgrids in the District in relation to the Commission's jurisdiction and other statutory and regulatory requirements is correct;
- The proposed pilot project grant funding parameters are appropriate;
- The proposed implementation timetable is appropriate, and
- Additional information needs to be provided in the Annual MEDSIS Status Report, besides what is proposed in Table 8."[1]

CRI is providing comments on the definitions presented in the Draft NOPRs, and on the proposed pilot project grant funding parameters. CRI also recommends additional areas of Commission focus for this next phase of MEDSIS.

Definitions

Throughout the MEDSIS Staff Report, Staff provides significant and appropriate attention to defining terms relevant to distributed energy resources (DER) and to the roles of market participants. Proposed definitions are complied in Appendix E of the MEDSIS Staff Report "Draft Notice of Proposed Rulemaking".[2]

CRI is generally supportive of the definitions of technologies in the Draft NOPR proposed for inclusion in Section 999.1 of Chapter 9, and Section 4099.1 of Chapter 40[3]. CRI anticipates, of course, that the formal NOPR process may result in further refinement to these definitions, and CRI may suggest such refinements based on further review.

At this time, however, CRI suggests that three additional terms be defined and that the definition of Distributed Energy Resource be modified slightly.

<u>Recommendation #1 - Additional definitions</u>

1. *<u>"Smart Inverter"</u> – An inverter that allows Distributed Energy Resources to be controlled or aggregated to perform power support operations that enhance grid reliability. Smart inverters can be used where any inverter-based DC*

[1] MEDSIS Staff Report p. vii
[2] MEDSIS Staff Report p. E-1
[3] MEDSIS Staff Report pp. E-4 to E-5, "Battery" through "Microturbine"

generation is converted into AC and provided to the grid. This includes solar, energy storage, wind, and electric vehicles.

In addition to protecting the grid from any potential undesirable reliability impacts of Distributed Energy Resources (DER), Smart Inverters allow DER to act as grid reliability enhancing assets. Smart inverters are an essential element in deploying Distributed Energy Resource Management Systems (DERMS) as they operate as the control point for DERs.

Stakeholders in California and Hawaii have been engaged in processes to define common functions and communication protocols for Smart Inverters. The California Public Utilities Commission (CPUC) created the Smart Inverter Working Group in 2013[4]. Since then this working group has been responsible for developing recommendations allowing the commercial rollout of inverters able to provide Volt/VAr support, and an increasing number of grid-reliability enabling functions. EPRI, NIST, IEC and IEEE have all been working to update standards to reflect the capabilities of DER connected by Smart Inverters.[5]

2. *"Distributed Energy Resource Management System" or "DERMS"– A software system or an integrated software and hardware system allowing the operator of an electricity distribution or electricity transmission network to monitor and/or control the operation of Distributed Energy Resources (DER).*

   Distributed Energy Resource Management Systems (DERMS) will become essential to the operation of the modern electric grid as DER penetration increases. These systems are needed by distribution system operators to monitor and control DER to manage voltage, frequency, reactive power and other operational parameters, and may also provide valuable visibility into DER operations for transmission system operators.

3. *"Distributed Energy Resource Aggregator" – A market participant that can engage in organized wholesale electric markets and contract with the distribution utility.*

   While aggregation of energy storage is already taking place within the PJM grid to participate in regulation markets, FERC recognizes that the aggregation and control of Distributed Energy Resources needs to evolve in electricity markets. In FERC's November 17, 2016 NOPR[6] it proposes that ISO/RTOs revise tariffs to include new classes of participants, DER aggregators.

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[4] http://www.energy.ca.gov/electricity_analysis/rule21/
[5] EPRI, Common Functions for Smart Inverters, 4th Edition, December 2016, p. 2-1
[6] FERC Notice of Proposed Rulemaking, Docket No. RM16-23-000, November 17, 2016

CRI suggests the District include a similar definition to support achieving the MEDSIS objectives. Defining new market roles will support the assignment of appropriate relationships and responsibilities among participants, and will also transmit the view that the District of Columbia is anticipating the contributions of diverse market players in the emerging DER market.

Recommendation #2 - Modified definitions

1. *"Distributed Energy Resource" or "DER"— A resource sited close to the customer's load that can provide all or some of the customer's energy needs and can also be AGGREGATED AND used by the system to either reduce demand (such as demand response) or increase supply to satisfy the energy, CAPACITY or ancillary service needs of the distribution system. The resources, if providing electricity or thermal energy, are small in scale, connected to the distribution system, and close to the load. Types of DER include, but are not limited to: photovoltaic solar, wind, cogeneration, energy storage, demand response, electric vehicles, microturbines, and energy efficiency.*

   CRI suggests two redlines to Staff's recommended definition for Distributed Energy Resource (shown in 'all caps'). Specifically, the definition should recognize that DER can be aggregated and that DER can used to provide capacity in addition to energy and ancillary services. As highlighted in Pilot Program Recommendation #6A below, aggregating and using DER to provide capacity is a significant value of DER.

Pilot Program

Staff proposes a multi-phase MEDSIS pilot project program and outlines a comprehensive set of Grant Funding Qualification Parameters.[7] Staff also recommends that policy priorities be identified to guide the program:

> "Staff recommends that consideration be given to identifying policy priorities for Pilot Project applicants. **Pilot Projects eligible for MEDSIS grants could include, but are not limited to,** the following types of distributed energy resources ("DER"): **advanced control systems**, cogeneration systems, demand management, **electric vehicles**, **energy storage**, fuel cells, microgrids, **photovoltaic systems ("PV"), smart inverters, voltage regulation,** and district heating and cooling. For example, such priorities could include **demonstrating the value of smart inverters** or identifying opportunities for cogeneration projects. The

[7] MEDSIS Staff Report pp. 92 - 97

Commission should also prioritize evaluating outcomes and lessons learned through every stage of the programs. **The Fund may also support projects that address planning, integration, or interconnection issues related to higher levels of DER penetration in the District.**" (emphasis added)[8]

CRI agrees with Staff that the Commission should set priorities for the pilot project program, and submits that the policy priorities emphasized above are particularly important given the District's aggressive goals for solar power deployment established in the District's Renewable Portfolio Standard (RPS).

Recommendation #3 – MEDSIS should place significant emphasis on enabling high penetration solar given the District's aggressive RPS goals

The District has made a significant commitment to deploying solar power in the City. By 2032 the District's Renewable Portfolio Standard requires that 5% of the City's generation come from solar facilities located within the District, or in locations served by a distribution feeder serving the District. As significant as this commitment is, it does not represent the full potential for solar deployment. In a 2016 report NREL estimated the technical potential for solar on rooftops as 1.3 GW, capable of providing 16% of the City's total electric needs.[9] Other estimates for total solar potential are even higher.[10] Note that these estimates do not include the potential for deployment on the ground or on parking areas.

While a 5% solar penetration on a single feeder may not exceed the standard screens that Pepco applies to hosting capacity on many of its circuits, it is probable that solar will be unevenly distributed on the grid, and that it could be located in areas with slightly lower density or be deployed in single large projects that could tax certain feeders. Data from Europe and California has demonstrated that a high percentage of variable generation on a feeder can contribute to reliability problems, if not proactively managed. [11]

It has also been shown, however, that distributed resources can provide significant value to the grid and can act to increase grid reliability.[12] A primary

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[8] MEDSIS Staff Report pp. 91 - 92

[9] Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment, Pieter Gagnon, Robert Margolis, Jennifer Melius, Caleb Phillips, and Ryan Elmore, National Renewable Energy Laboratory, Technical Report NREL/TP-6A20-65298, January 2016

[10] mapdwell.com, which is referenced on the District's Department of Energy & Environment website, estimates total rooftop potential at 2.3 GW

[11] European Network of Transmission System Operators for Electricity, "Dispersed Generation Impact on CE Region Security, Dynamic Study, Final Report", 22-03-2013

[12] Smart Inverter Working Group, Recommendations for Updating the Technical Requirements for Inverters in Distributed Energy Resources, January 2014

priority of MEDSIS should be to examine the technical and economic approaches to turn a potential liability into a benefit. More specific recommendations MEDSIS funding in this regard are made below.

Recommendation #4: Place a priority on secure, and accessible, data modeling, collection and analysis

As the nation's capitol, the District needs to place a critical emphasis on the security of the electricity grid. Yet, achieving MEDSIS goals will require third parties to connect and dispatch grid-connected distributed resources. Determining where to place and how to operate distributed resources in a manner that provides the greatest value to the grid will to require third party resources to have greater insight and access to grid performance data.

CRI suggests that the Commission anticipate this need to create secure, and accessible means of modeling and sharing information regarding District's distribution grid. Preferably, one common model, accessed via secure means, would be available to inform the siting of potential projects, the performance of the grid under specific scenarios, and the evaluation of the impact of the MEDSIS pilot projects. This may involve Pepco providing access to an existing, internal model, or MEDSIS funds should be set aside to create such a tool and the means to provide secure access to verified third parties.

Ideally, at the end of the MEDSIS pilot phase, enough data will have been collected from the pilots to inform long-term policy decisions that will enable the District to achieve the MEDSIS goals. To achieve that outcome, the Commission will need to ensure that each set of pilot projects is designed to test for specific outcomes and gather objective data – both on the technical performance of DER as well as their cost and value. Having a common model to use to analyze the data and evaluate the results will help ensure the success of the pilots.

Recommendation #5: Create "MEDSIS Simulation(s)" on selected distribution circuits

CRI recommends that the Commission dedicate a portion of the MEDSIS funds to create "simulation projects" on individual distribution circuits. These simulations would aggregate high-penetration solar together with battery storage, smart inverters and distributed energy resource management systems. This combination of technologies is being piloted in other jurisdictions and will ultimately form the fundamental "backbone" for deploying significant amounts of distributed solar in the District of Columbia.

A model for this effort could be Pacific Gas & Electric's Distributed Resource Management System (DERMS) pilot. That pilot involves projects on

three separate utility feeders to demonstrate how onsite solar, storage and smart inverters can be controlled by the utility to operate the distribution grid reliably and optimally. Information on this pilot program is included in Attachment A to these comments.

While Pepco and affiliated companies have engaged in some activities that support this type of initiative,[13] should Pepco not currently be prepared to execute a pilot with the scope of the PG&E pilot, a series of intermediate steps or pilots toward this level of coordination may be needed.

Such a pilot program would involve Pepco as well as other private and public entities. Note that part of the PG&E pilot evaluates its ability to coordinate DER operations through proprietary software of private solar and inverter companies.

Recommendation #6: Use pilot projects to determine the economic value of distributed energy resources

CRI recognizes that Staff could not comment on certain economic aspects of MEDSIS given ongoing formal rate cases.[14] CRI recommends, however, that MEDSIS pilot funds be used to gather data that can inform future ratemaking decisions. Below is a set of particular economic evaluations that CRI recommends the Commission undertake.

Recommendation #6A: Investigate "local distributed generation capacity value" of DER

Staff noted that the MEDSIS initiative was in part prompted by requests from intervenors in Formal Case 1123, a Notice of Construction for a new substation to be located at Buzzard Point.[15] Based on PEPCO's cost estimates, the new substation and transmission will cost $81.5M with annual maintenance costs of $153K to $203K.[16] The primary objective of the new substation is to accommodate an increasing peak load, and provide 140 MVA of firm capacity, with an ultimate capacity of 350 MVA, to the area. Ignoring the maintenance cost, the capital cost to provide 140 MVA of new capacity is $582 per peak kW. On 04/09/2015, the Commission authorized PEPCO to proceed with construction.[17]

[13] Pepco Power Point Presentation filing in FC1130 9/30/2015
[14] MEDSIS Staff Report, pp 72 - 90
[15] MESIS Staff Report, p ii
[16] PEPCO, FC1123-2014-E-1, June 30, 2014, pp 11- 12
[17] DC PSC, Formal Case No. 1123, In the Matter of PEPCO's Notice to Construct at 230 kV/138 kV/13 kV Substation and Four 230 kV/138 kV Underground Transmission Circuits on Buzzard Point, Order No. 17851, April 9, 2015

As the Commission may need to consider future upgrades to substations at both the distribution and transmission levels, solar energy combined with energy storage and appropriate control technologies can provide “non-wires” alternatives to those upgrades in some cases. CRI encourages the Commission to use MEDSIS funds to determine the local capacity contribution that aggregated “behind the substation” resources can provide and the appropriate economic valuation for that capacity.

Some expenditures will likely need to take the form of studies performed by appropriate consultants to map out the possible compensations structures for this “local distributed generation capacity”.

The Commission could also consider using MEDSIS funds to pilot the procurement of this type of capacity using a $/MW-day or $/MW-hr metric borrowed from wholesale power markets. CRI would suggest that no limits be placed on the technologies that can participate in this type of pilot procurement, and would also suggest that participants be allowed to aggregate technologies and resources (solar, storage, load control) over multiple sites.

Recommendation #6B: Determine “Volt/VAr Value” of distributed energy resources

The high penetration of variable generation on a distribution feeder can lead to fluctuations in voltage and to reactive power problems, both reliability concerns for distribution utilities. Fortunately, both distributed energy storage and smart inverters can be used to provide voltage control and reactive power support.

To date, inverters have not been used to provide these capabilities, except in pilots and demonstrations. Using inverters in an active vs. passive mode to provide voltage support has, however, been an IEEE 1547 “permitted option” with utility approval. Note that smart inverters used in conjunction with storage as well as with solar power can provide much greater opportunities in this regard.

CRI suggests that the MEDSIS pilot projects specifically include projects that provide solutions for distributed voltage control and reactive power management. As with local distributed generation capacity, the Commission may consider a pilot procurement. CRI suggests that the District could rely upon the work done by NYISO to develop rules for procuring voltage support in $/MVAr-yr as a suitable metric.

Note that it will be important to allow participants to provide multiple services. The same assets, solar with smart inverters and/or energy storage, can be used to provide capacity as well as voltage support and reactive power. The most efficient way to use assets is to use them to the full extent possible,

therefore CRI suggests that this standard be used in the pilot and demonstration projects as well.

Recommendation #6C: Evaluate the role of time-of-use (TOU) retail rates in advancing DER adoption.

In its report, Staff highlighted that many parties suggested the District should transition from a flat-rate structure to time-varying rates.[18] Staff also highlighted that at least two other cases at the Commission are examining the issue, specifically Formal Case No. 1139 and Formal Case No. 1114.[19]

CRI's Recommendation #6A, above, relates to the TOU issue in that time-of-use price signals in distribution rates could draw out investment in avoiding costs associated with peak distribution demands, whether in the construction of new substations and power lines or upgrades to existing facilities.

CRI recommends that the Commission consider not only how TOU distribution rates would be accepted and responded to by individual retail customers, but also how Distribute Energy Resource Aggregators, as defined in CRI's Recommendation #1 above, could play a role in creating value for end users and for the grid in response to such rate structures.

Recommendation #6D: Evaluate locational impacts on the economic value of energy storage.

Energy storage can be located at many points on the distribution grid: behind the customer's meter, directly connected to a feeder line, or deployed at a substation. The location can affect the uses and value of the storage asset. For example, in front of the meter it can be used to provide peak capacity or to improve power quality at key points on the distribution grid. Behind the meter, it can be used to perform load shifting from on-peak to off-peak hours, reduce demand charges, or provide resiliency in the case of grid outage. A report by the Rocky Mountain Institute has identified over a dozen different services that batteries can provide.[20]

CRI recommends that the MEDSIS pilots specifically target placing storage at different point on the distribution grid, with the explicit objective of determining the economic value of the storage at those various locations. This will inform future

[18] MEDSIS Staff report, page 77
[19] MEDSIS Staff report, page 74 and page 80
[20] THE ECONOMICS OF BATTERY ENERGY STORAGE HOW MULTI-USE, CUSTOMER-SITED BATTERIES DELIVER THE MOST SERVICES AND VALUE TO CUSTOMERS AND THE GRID, Rocky Mountain Institute, October 2015

decisions regarding use cases, tariffs and compensation structures, and potentially appropriate ownership alternatives.

Additional Areas of Focus

Interconnection

Staff reviews interconnection rules in section V.D of the Report. Much of the discussion surrounds needs for streamlining the interconnection process, speeding the review of applications, and including electricity storage and microgrids in the Small Generator Interconnection process. Staff refrains from making detailed recommendations owing to the fact that Formal Case No. 1050 is concurrently underway,[21] but highlights areas that should be addressed in that case to support the MEDSIS effort:

> "Specifically, in addition to the interconnection measures currently being considered and implemented by the Commission, the Commission should consider interconnection procedures for distributed generation ("DG"), energy storage systems and microgrids within the context of the existing Formal Case No. 1050 docket.
>
> Specifically, the Commission should consider streamlining the rules and procedures for interconnecting DERs, including revising 15 DCMR § 4002 to allow smart inverter deployment or to add islanding standards for distribution generation.230 Also, Section 4002 may need to be amended to ensure that the proper inverters are required so the electric distribution system is not compromised."[22]

Whether the Commission determines that interconnection issues should be handled in FC1050 or in this proceeding, CRI concurs with Staff's recommendations noted above regarding issues that should be addressed. CRI suggests, however, that additional issues should be addressed as well. Specifically, CRI recommends that 1) interconnection guidelines should include explicit provisions relating to smart inverters, and 2) that the evaluations performed in Pepco's interconnection process should begin to incorporate analysis of the potential impacts of storage, smart inverters and DERMS on increasing hosting capacity and lowering interconnection costs.

Accepting these recommendations will require the Commission to direct Pepco to develop the standards, analytics and processes necessary to identify the impacts of this full range of technology on interconnection.

[21] MEDSIS Staff Report p. 59
[22] MEDSIS Staff Report p. 59

Hosting Capacity

Hosting capacity is generally defined as the amount of distributed generation that can be added to a feeder before the feeder experiences conditions that can negatively affect operation and reliability.

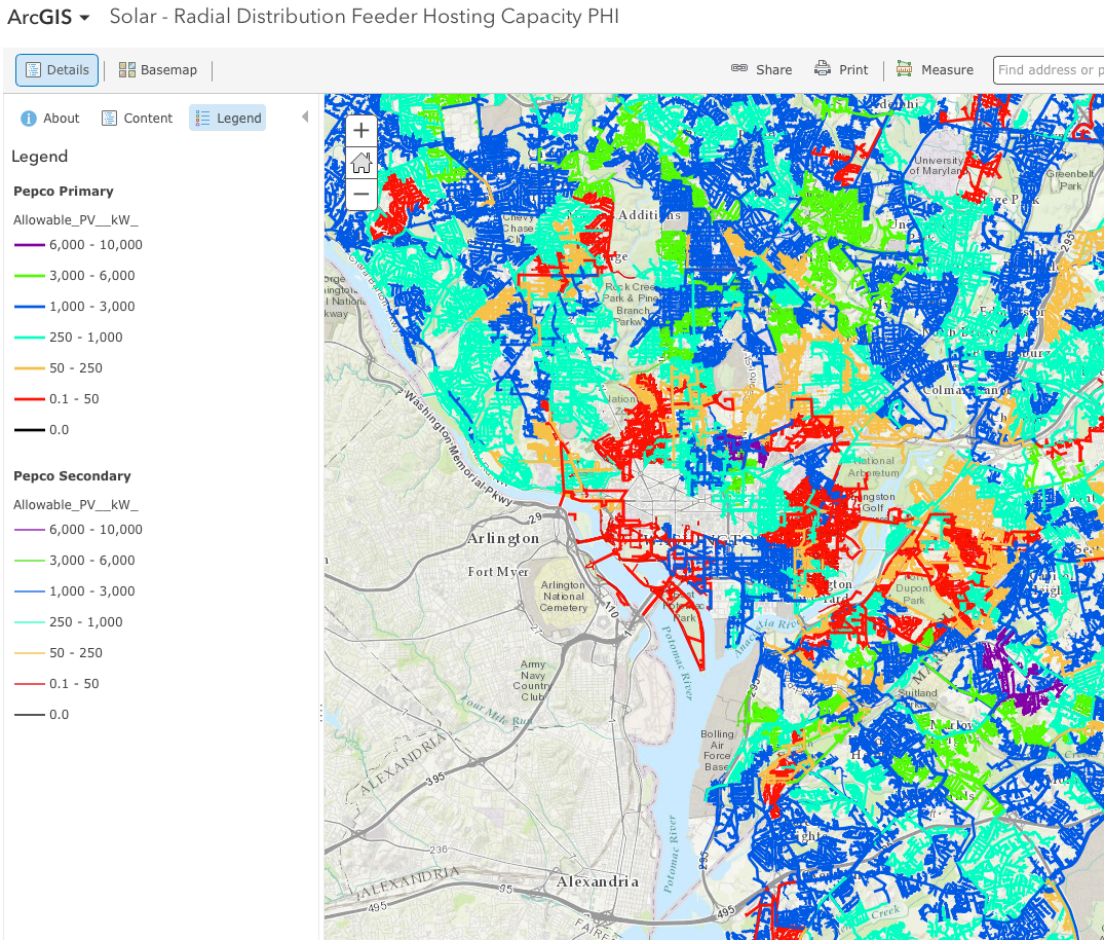
Pepco publishes hosting capacity maps on-line using the ArcGIS system. The hosting capacity of individual feeders are based on the "Criteria Summary" available at:
http://www.pepco.com/library/templates/Interior.aspx?Pageid=6442460710&LangType=1033

As can be seen from the screen shot of the hosting capacity map below, some feeders in the District of Columbia currently cannot support more than 50 kilowatts of distributed generation capacity while others can support over one thousand kW.

CRI recommends that Pepco begin to evaluate the potential impacts on its evaluation criteria and its hosting capacity maps of the deployment of storage, smart inverters and DERMS. In order to fully develop the District of Columbia's solar potential and to assure that all parts of the City can benefit from access to DER opportunities, the use of these companion technologies will be needed to increase hosting capacity.

CRI notes that PHI companies have engaged in research and modeling efforts on this subject in its Atlantic City Electric service territory.[23]

[23] Model-Based Integrated High Penetration Renewables Planning and Control Analysis, December 15, 2015. U.S. Department of Energy Award DE-OE0006328.



DERMS Alternatives Evaluation

As discussed above, the pilot project program will provide opportunities to test the integration of solar energy, battery storage, smart inverters and DERMS, to create a basis for developing regulations, policies and technical parameters surrounding the deployment of those technologies. Separate and apart from any testing, the Commission should also require Pepco to study the alternatives for DERMS. As implied from the PG&E pilot program description in Attachment A, Pepco should not only study software and hardware that Pepco could select for this purpose, but also how any Pepco systems could interface with third party software and hardware. Note that CRI has no recommendation at this time as to utility ownership and operation of systems vs. third party ownership.

Fast Ramping Products

Analysis performed by the CAISO showed the impact of high-penetration solar, on specific days of the year characterized by low electricity load and high solar generation, on the overall load curve throughout the day. With a significant amount of solar generation during the middle of the day, the load profile dips significantly as the sun rises and ramps up quickly as the sun sets. The load profile has become known as the “duck curve.”

One of the implications of the duck curve is the need for short duration, fast ramping generation. CRI recognizes that the Commission does not have the ability to dictate the electricity products that PJM designs. The Commission may want to consider, however, exploring with other state Commissions within the PJM footprint, whether CAISO’s experience with high-penetration solar and the duck curve warrants exploring the need for fast ramping generation services in PJM.

Thank you for the opportunity to file these comments, and CRI looks forward to continuing its participation in the MEDSIS process.

Very Truly Yours,

Jeanne M. Fox, Kerinia Cusick, & Harry Warren

on behalf of the Center for Renewables Integration

ATTACHMENT A

PG&E Launches Distributed Energy Resource Projects Testing Technology to Unlock Benefits of the Grid

Release Date: July 12, 2016
Contact: PG&E External Communications (415) 973-5930

SAN FRANCISCO, Calif. — Today, Pacific Gas and Electric Company (PG&E) announced the launch of multiple technology demonstration projects in San Jose to advance integration of distributed energy resources (DERs), such as solar and battery storage, further unlocking benefits of the electric grid.

PG&E is teaming up with GE to demonstrate a distributed energy resource management system (DERMS), with Enphase Energy to install and test smart inverters, and with SolarCity to install and test smart inverters and battery storage systems for private solar customers. The demonstrations will evaluate to what extent the DERMS technology enhances the stability and power quality of the grid and optimizes solar generation and power-flow management, as more customers adopt solar.

"The rapid growth of distributed energy resources has ushered in a new era of electric distribution, and we're seeing the smarter grid emerging as a reliability, storage and interconnection system that compliments the new energy technologies that our customers are using in their homes. As this dynamic, two-way operating environment develops, PG&E continues to embrace and test innovative technologies that improve electric reliability and equip our customers with valuable services and products that support their choices to adopt clean energy," said Geisha Williams, president, PG&E Electric.

Innovating in Northern California

To support DERMS, up to 150 residential customers and up to 20 commercial customers in San Jose will receive solar smart inverters and/or behind-the-meter battery storage systems. The project will demonstrate how smart inverters and energy storage can be used with DERMS to optimize electric distribution. The demonstration is expected to commence this September and end in December 2017.

These projects are a part of the Electric Program Investment Charge (EPIC) - a program that enables California investor-owned utilities to develop Smart Grid technology demonstration and deployment projects and evaluate how they support safety, reliability, and affordability objectives for the benefit of their customers.

PG&E believes in enabling customer choice and is evolving to meet customer needs:

PG&E has more private solar than any other utility in the country, with more than 250,000 private solar customers connected to the energy grid. The company connects approximately 6,000 new solar customers to the grid monthly, or approximately one every seven minutes.

One in five electric vehicles (EVs) in the United States is registered in PG&E's service area – more than 200,000 EVs in California and over 85,000 in PG&E's service area.
PG&E operates the largest, single-building EV charging installation in the state of California at its Bishop Ranch campus in San Ramon.
Nearly 60 percent of the energy PG&E delivers comes from sources that emit no greenhouse gases. By the year 2020, PG&E expects that number will grow to approximately 65 percent.

Similarly, PG&E expects a dramatic increase of DERs connecting to its grid between now and 2025, making it essential to thoughtfully plan and enhance its grid to effectively address that growth. A smarter energy grid provides critical infrastructure for more clean energy options, such as solar and EVs.

Collaborating to bring innovation to clean energy

PG&E is collaborating with multiple companies to execute this technology project in San Jose. PG&E is working with GE's Grid Solutions business to execute the development of the new DERMS system behind this technology project. GE is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive.

Enphase Energy Inc., a global energy technology company based in Petaluma, Calif., is providing solar smart inverters for the project. SolarCity, a nationwide solar power provider headquartered in San Mateo, Calif. with more than 30 locations serving customers across the state – is providing solar smart inverters as well as the residential battery storage systems for the project.

The residential battery storage systems will interface with the DERMS to evaluate whether and how customer-sited energy storage can be used to operationally support the grid during periods of high electric demand.
PG&E is in the final stages of vendor selection for deployment of battery storage systems for commercial installations.

As PG&E works to create the smart grid that advances the integration of DERs and enables greater customer choice in clean energy options, cities in PG&E's service area are adopting "smart city" visions to meet sustainability, social, and economic goals.

"Demonstrating new and innovative technologies is a key component of our Smart City Vision to enhance city services and the quality of life in San Jose. As the capital of Silicon Valley, San Jose is an ideal test bed for this kind of energy-management technology that has the potential to help promote a smarter energy grid and improve energy conservation," said Mayor Sam Liccardo.

While the further integration of DERs introduces some operational complexity, automated technology such as DERMS could one day help PG&E enhance decision making by gathering, analyzing, and visualizing new and expanding data streams to improve operations, reduce costs and support new services.

"This work should advance industry understanding and help us further assess how to not just to manage DERs on the grid, but ultimately turn them into more effective grid resources," said Kevin Dasso, PG&E's vice president of Electric Strategy and Asset Management.

DERs play a central role in PG&E's vision for the Grid of Things™ – a "plug and play" distribution grid platform that facilitates emerging energy technologies to be interconnected with each other and integrated into the larger grid. Just like with the "Internet of Things," grid assets can interact with each other to optimize group coordination for the benefit of customers.

"We are living in one of the most exciting times in the energy industry, and these demonstrations are the latest examples of PG&E's many technology investments to improve our operations supporting clean energy options and lay the foundation for the future," said Williams.