BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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Order Instituting Rulemaking on the Commission's Own motion to improve distribution level interconnection rules and regulations for certain classes of electric generators and electric storage resources.	R.11-09-011 (Filed September 22, 2011)

COMMENTS OF THE DIVISION OF RATEPAYER ADVOCATES ON CEC/CPUC CANDIDATE DER CAPABILITIES: RECOMMENDATIONS FOR UPDATING TECHNICAL REQUIREMENTS IN RULE 21 (VERSION 15, MAY 22, 2013)

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I. INTRODUCTION

Pursuant to the June 11, 2013 "Administrative Law Judge's Ruling to (1) Issue Working Group Paper on Autonomous Inverter Functionalities (2) Set Comment Dates and Workshop (3) Enter Working Paper Into the Record and (4) Announce New Rule 21 Working Group" (ALJ Ruling), the Division of Ratepayer Advocates (DRA) submits the following comments on the Smart Invertor Working Group (Working Group) working paper, "Candidate Distributed Energy Resources (DER) Capabilities: Recommendations for Updating Technical Requirements in Rule 21" (Working Paper). DRA appreciates the opportunity to comment on the Working Paper, however, DRA presents some overarching concerns with the process and makes recommendations for how best to move forward in the proceeding. Appendix A includes a draft of the Working Paper with specific redline recommendations.

DRA's procedural recommendations for the Working Group include:

- A Ruling to outline and clarify the purpose and process of the Working Group;
- An invitation to additional interveners;

- A workshop to discuss the Working Group process that led up to the Working paper;
- Documentation of Working Group discussion; and
- The addition of a phase for consideration of costs, that will consider a reasonable balance between the costs and the benefits to ratepayers to implement any proposed inverter functionalities.

Overarching Working Group process and Working Paper recommendations include:

- Maximizing consumer choice and protection and encourage interoperability of smart inverters and their functionalities through Open Architecture based on national standards;
- Include an open standards development process in the next phase of the Working Group; and
- Developing a master plan to ensure coordinated efforts to update and assess related Commission proceedings and programs, created through consensus of participants, which would improve transparency and promote efficiency to the implementation of related initiatives.

II. BACKGROUND

The ALJ Ruling did three things: (1) incorporated into the record the Working Paper prepared by the Working Group, announced a workshop to discuss the Working Paper, and established the schedule for opening comments and reply comments on the Working Paper; (2) announced a New Rule 21 Working Group; and (3) directed Energy Division to work with utilities to identify minor improvements to Rule 21 to improve clarity and seek input of parties.[1] The Working Group is a joint effort by the California

[1] *See* "Administrative Law Judge's Ruling to (1) Issue Working Group Paper on Autonomous Inverter Functionalities (2) Set comment dates and workshop (3) Enter Working Paper into the record and (4) Announce new Rule 21 Working Group," June 11, 2013.

Energy Commission (CEC) and the California Public Utilities Commission (Commission) to conduct an on-going collaboration and discussion between representatives from the CEC, Commission, investor owned utilities (IOUs), professional and governmental organizations, and other interested stakeholders dedicated to developing national standards and testing procedures for "inverter-interfaced" technology. Through the Working Group, the Commission seeks to develop a proposal that lists a range of functions and capabilities for "inverter-interfaced technology" in anticipation of the implementation of California Governor Brown's 12,000 megawatts (MW) of DER for the state, with a stated intent to identify inverter functions to ensure the long-term safety, reliability, and efficiency of the electric power system (EPS).[2] This effort yielded the Working Paper at issue in these comments, which addresses inverter capabilities including, but not limited to, autonomous DER functions, basic communications capabilities, and emergency DER management.

III. WORKING GROUP DISCUSSION

A. The Commission Should Take Procedural Steps to Ensure a Transparent and Collaborative Working Group Process

DRA has some overall concerns about limited participation in the Working Group thus far, unclear conformance with appropriate procedures and standards, and lack of transparency in the Working Group process. These concerns are enumerated below, followed by specific recommendations for moving forward to ensure a transparent and collaborative Working Group process.

The main goals for the Working Group were identified as: (1) identify those autonomous smart inverter functions which can be beneficial to utilities under different scenarios; (2) categorize the inverter requirements by DER size, DER location on the circuit, existing and expected total DER generation/storage on the circuit, sensitivity of

[2] CEC/CPUC Candidate DER Capabilities: Recommendations for Updating Technical Requirements in Rule 21, Version 15, May 22, 2013.

the circuit to power anomalies, and other factors; (3) modify the Rule 21 technical operating standards to include mandatory, recommended, and optional inverter requirements; and (4) plan for implementation and testing – involvement of vendors and test facilities.[3] While these are reasonable goals, DRA is concerned that the Working Group does not seem to have taken into account the history of the prior CEC/CPUC efforts[4] in this area, normal standards-related practices, or recognition of the type of Working Group report document needed to facilitate further Commission progress. The Commission should not ignore these past efforts, as there already exists a large record of relevant information that could be useful in the present proceeding.

The current Version 15 of the Working Paper, dated May 22, 2013, focuses on the operational methods and inverter functions the utilities require for each DER interconnection to ensure the long-term safety, reliability, and efficiency of the power grid.[5] Active participants in the Working Group meetings from the beginning include representatives from the three IOUs, the California Independent System Operator, CEC, the Commission, and DRA. However, DRA is concerned that there was minimal participation by other potentially interested stakeholders until the "June 21, 2013 Candidate Smart Inverter Capabilities for Improving Distribution Grid Functionality Workshop" (June 21 Workshop). The Commission has the opportunity through the Working Group process to solicit, compile, develop, and recommend appropriate interconnection facilities and testing procedures necessary to meet the safety and performance requirements of the National Electrical Code, the Institute of Electrical and Electronics Engineers, accredited testing laboratories, and, where applicable, rules, and decisions of the Commission regarding safety and reliability for distributed generation

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[3] Inverter Working Group Kickoff Webcast PowerPoint Presentation, January 18, 2013.

[4] *See* relevant decisions: D.99-10-065, D.00-11-001, D.00-12-037, D.02-03-057, D.03-02-068, and D.05-08-013 in proceedings: R.94-04-031, I.94-04-032, R. 99-10-025, and R. 98-12-015.

[5] Candidate Distributed Energy Resources (DER) Capabilities: Recommendations for Updating Technical Requirements in Rule 21, Version 15, May 22, 2013, p. 1.

and energy storage systems interconnection, and should effectively undertake to do so before too much additional time is lost. DRA believes that a successful collaboration of this effort can only occur if the Commission affirmatively includes additional stakeholders, who can technically address issues of functional design, standards integration, manufacturing, testing, engineering application, and consumer protection. Without input from a wide range of stakeholders, the Working Group cannot comprehensively address potential issues from the Working Paper that impact consumers, manufactures, and states other than California. DRA is unclear how many stakeholders were initially contacted to participate, as discussed below, and recommends that more outreach be conducted.

DRA supports the retention of a well-known and highly-regarded technical consultant by CEC to lead the Working Group effort. However, it seems that initiative has not been followed up with adequate regulatory context and procedural efforts to guide the Working Group, such as how the Working Paper will be used within the Rule 21 proceeding, Rulemaking (R.)11-09-011 and the steps the Working Group intends to take to accomplish its stated goals, along with a schedule.

Additionally, DRA is concerned that the Working Group effort has been opaque and without visibly established procedures. For example:

- The ALJ Ruling incorporated the Working Paper into the record for comment, yet a new draft iteration of the document was recently released with little documentation of inputs, approval of changes, or consensus development. As recently as July 17, 2013, Version 18 of the Working Paper was distributed. Additionally, it seems that at least some of the drafting of the Working Paper takes place outside of official Working Group meetings.
- The email announcing the Working Group kickoff webcast addressed to "CEC/CPUC Inverter Core Utility Group" was sent to a limited number of participants (around 30) and DRA was not aware of any announcement sent to the Rule 21 service list, whereas after the June 21 Workshop announced through the Rule 21 service list, the number of participants increased considerably. This seems to indicate that not enough potentially interested stakeholders were aware of the Working Group from the beginning.

- A document entitled "Purpose and Procedures of the Smart Inverter Working Group," was distributed only on July 24, 2013, a full four weeks after the formal workshop and one week prior to the deadline to file formal comments. This discussion of purpose and procedures should have been included in the Working Paper, so that stakeholders can understand the intent of the Working Paper and what the Working Group hopes to accomplish.

DRA recommends that, in order to improve transparency and broaden participation from interested stakeholders, the next procedural steps with regards to the Working Paper within this proceeding should include:

1. A Ruling to outline the purpose, procedures, scope, schedule, end products and any limitations of the Working Group to provide transparency to the process;
2. An invitation to additional interveners (such as the service lists for distributed generation proceedings) in order to seek out and document a balanced participation, prior to substantial development;
3. A workshop to provide clarification to all stakeholders about the discussions and process that led up to the Working paper;
4. Documentation of future Working Group discussion to show inputs and consensus on proposed changes to the Working Paper; and
5. A phase for consideration of costs, as part of the Working Group.

B. The Working Group Should Use Commonly Agreed-Upon Attributes as a Foundation for Any Standards Development

A successful process to identify and develop inverter functionalities and testing procedures that promotes cost-beneficial recommendations needs significant coordination and up-front efforts involving all stakeholders. There are specific, commonly agreed-upon attributes in developing standards for an electricity infrastructure/architecture development endeavor that takes into account consumer interests, specifically, consumer

choice and minimize costs of adoption/implementation.[6] DRA recommends these attributes, should be used as the foundation for developing the Working Paper:

- The practical need for equipment interoperability;
- The necessity of an Open Architecture to assure interoperability;
- The unique value of national standards to support an Open Architecture;
- The practical need for the integration of related programs and balancing the effective use of existing infrastructure with prudent planning for long-range infrastructure requirements; and
- Prudent consideration of the balance between costs and benefits to ratepayers.

1. Interoperability is a Major Utility and Consumer Protection Strategy

The concept of interoperability in the context of the inverter Working Group is to encourage the development of inverters standards and manufacturing specifications in a competitive and transparent environment where there are minimal limitations in how and where consumers will use the inverters, minimize the costs to adopt new changes, and protect the health and safety of utility energy infrastructure systems. Customer choice should be maximized to the extent practical, influencing choices through appropriate planning and coordination between utilities and consumers.

Interoperability is the ability of a diverse range of elements within a system to work together. Interoperability among user equipment and between customer premises equipment and utility system applications is one of the most important components of maximizing customer choice. Interoperability allows flexibility for the consumers and will minimize the costs of adoption of the smart inverter functionalities technology and generator interconnections with different IOUs, suppliers, and in different locations

[6] Anthony Mazy, Wade Malcolm, Ellen Petrill, Raymond Lings, Joseph Hughes, Richard DeBlasio, George Cluff; "California: A Problem, a Solution, and a Program;" Public Utilities Reports, Fortnightly Spark, May 2006.

(e.g. California vs. other states), thus, promoting consumer choice. Any effort to develop California-and/or utility-specific requirements and testing procedures for smart inverters may result in a one-of-a-kind, unreliable, and expensive systems. Vendors might not be motivated to maintain these orphan systems, thus leading to greater maintenance and upgrade expenses over time.[7] The concept of interoperability should be part of the discussion within the Working Group, and has been lacking so far. The most effective way to encourage interoperability of smart inverters and their functionalities is through Open Architecture based on national standards, as discussed in the next section.

2. DRA Recommends an Open Architecture Strategy to Assure Interoperability

An "Open Architecture," or, more technically, "open system architecture," is a vendor-independent, non-proprietary, device design based on official and/or de facto standards. It allows all vendors (in competition with one another) to create add-on products that increase a system's (or device's) flexibility, functionality, interoperability, potential use, and useful life, and enables the users to customize and extend a system's (or device's) capabilities to suit individual requirements. An Open Architecture is the necessary strategy to accomplish interoperability among user equipment and throughout the EPS, i.e., between customer premises equipment and utility system applications. Adoption of an Open Architecture is required in order to enable customers to choose different suppliers, and, if they so desire, different combinations of suppliers.[8]

For the Commission's efforts to update Rule 21, the continued adoption of an Open Architecture facilitates flexibility among generators, utilities, and manufacturers

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[7] *See*, Mazy, et al., *supra*.

[8] Joint Comments of Data and Metering Specialties, Inc.; Electric Power Research Institute; General Electric Company; Illinova Energy Partners, Inc.; Industry Canada Task Force; Office of Ratepayer Advocates; Pacificorp; Share Plus; Southern California Gas Company; U. S. Department of Defense; and Utility Consumers' Action Network on the Final Workshop Report on Metering and Data Communications Standards, August 11, 1997, in Calif. PUC Order Instituting Rulemaking on the Commission's proposed Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation/ Investigation, R.94-04-031/I.94-04-032, filed April 20, 1994.

because in an Open Architecture standards development, the inverter specifications and testing procedures would be discussed and agreed upon in an open process and guided by applicable nationally-recognized standards body. Using an Open Architecture, manufacturers of inverters can supply interoperable equipment to different consumers nationally, thus promoting competition and minimizing cost to consumers.

3. DRA Recommends Using National Standards Approach To Achieve an Open Architecture Strategy

National Standards are the best available means to ensure an Open Architecture. State- or utility-specific deviations from, or alternatives to, American National Standards Institute (ANSI)[9] national standards will raise costs to consumers, and potentially result in issues that the national standards are developed to address, namely, reliability, safety, and efficiency of the ESP. Anticipating national standards in interim rules may be beneficial only if they are explicitly anticipatory, not intentionally deviant, and subsequently fully harmonized with the final published national standards. Under the Energy Policies Act of 2005,[10] harmonization is required if California- or utility-specific requirements end up deviating from revisions to the Institute of Electrical and Electronics Engineers (IEEE)-STD-1547.[11] However, California- or utility-specific requirements that promote current best practices may add to current IEEE-STD-1547 if they are just and reasonable and not unduly discriminatory or preferential. Thus, a transitional

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[9] ANSI is the administrator and coordinator of the United States private sector voluntary standardization system, having served in this capacity since 1918. Founded by five engineering societies and three government agencies, ANSI is a private, nonprofit membership organization supported by a diverse constituency of private and public sector organizations, and is the only accreditor of U.S. voluntary consensus standards developing organizations. ANSI is the sole U.S. representative and dues-paying member of the two major non-treaty international standards organizations, the International Organization for Standardization (ISO), and, via the U.S. National Committee (USNC), the International Electrotechnical Commission (IEC). ANSI plays a strong leadership role in the ISO as one of its founding members, and in the IEC, through its USNC.

[10] Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594, codified at 16 U.S.C. §2621(d)(15).

[11] Standard for Interconnecting Distributed Resources with Electric Power Systems

implementation plan designed to facilitate and not frustrate updates to IEEE-STD-1547 could be appropriate. However, the Commission should require compliance with national standards for inverter functionalities to avoid additional ratepayer costs to rework or redo investments made under California-specific standards. In order to be successful, it is imperative that the Working Paper describes the Working Group's intended purpose, procedures, goals, and end products. If the Commission decides to develop technical standards, the Working Group should model itself much more closely after ANSI national standards development procedures.

The Working Paper references relevant national standards currently in the process of being updated:

- IEEE 1547a - Standard for Interconnecting Distributed Resources with Electric Power Systems), the update to the base IEEE 1547 of 2003;
- IEEE 1547.1a - Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power System;
- Underwriters Laboratories (UL)[12] 1741-Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources; and
- IEEE 1547- IEEE 1547.8 - IEEE P1547.8 Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Standard 1547.

It is not clear to DRA if the Working Group participants from IEEE and UL or anyone else have coordinated the recommendations of the Working Paper with the national standards that are currently being updated. As there is no guarantee federal

[12] UL, formerly "Underwriters' Laboratory," is a global independent safety science company, founded in 1894, that offers certifying, validating, testing, inspecting, auditing, and advising and educating expertise across five key strategic businesses: Product Safety, Environment, Life & Health, Verification Services and Knowledge Services. UL is one of Occupational Safety and Health Administration's (OSHA) Nationally Recognized Testing Laboratory (NRTL); typically, only equipment that is listed as tested and safe by a NRTL may be installed in new or renovated residential or commercial buildings without violating OSHA regulations or breaching fire insurance requirements.

standards, once created, would align with California-specific standards, there is a significant risk California-specific standards will increase costs to California consumers and potentially result in issues related to reliability and safety if the standards are not developed in an open process and testing plans and procedures of implementation are thoughtfully designed and thoroughly evaluated.

One of the key ways to promote coordination and continuity with national standards is to include more stakeholders in the Working Group and include an open standards development process.[13] As previously mentioned, the June 21 Workshop attracted additional participants to the Working Group, including representatives from applicable nationally-recognized standards bodies and inverter and other related equipment manufacturers. DRA recommends that the CEC and Commission continue their efforts to encourage interested stakeholders to participate, particularly consumer advocates. This process should include a clearer expression of the effort's goals, scope, and limitation, establishment of agreed upon definitions for key terms used within the proceeding,[14] presentation of the contents and scheduling of national standards updates and any potential discrepancies between the California- or utility-specific plans and national standards, and documentation of strategies for implementation of any California- or utility-specific plans while anticipating and resolving potential issues resulting from such discrepancies. Such a process can also contribute to the usefulness of the final work product, in both its near-term serviceability and its long-term conformity with any emerging national standards.[15] DRA recommends that the next phase of the Working Group include an open standards development process.

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[13] An open standards development process, such as those promulgated by ANSI-accredited standards development organizations, are concerned with, and have procedures in place to help meet, essential requirements for openness, balance, consensus and due process.

[14] *See* Appendix A.

[15] *See*, Mazy, et al., *supra*.

4. Integration of Related Programs and Balancing the Effective Use of Existing Infrastructure with Prudent Planning for Long-Range Infrastructure Requirements

The Working Group discussions demonstrate little meaningful effort to identify any synergies with related initiatives. An open standards development process with a broader scope of stakeholders would bring together proponents of related customer service and utility operations programs that should be integrated and coordinated at the State-level to allow the potential sharing of physical systems and communication functionalities.[16] DRA believes a master planning effort, designed to ensure coordinated efforts to update and assess the various distribution modernization-related Commission proceedings and programs and created through consensus of participants would improve transparency and promote efficiency to the implementation of related initiatives. This Working Group's efforts would benefit from the proposals and existing infrastructure from other programs.

5. The Commission Should Undertake Due Consideration of a Reasonable Balance Between the Costs and the Benefits to Ratepayers to Implement Any Proposed Inverter Functionalities

The issue of the costs and the benefits of inverter functionalities to consumers have not been discussed so far. DRA recommends there be a discussion of costs and any funding mechanism to facilitate the least-cost path to implement inverter functionalities and how the proposed functionalities can deliver value to consumers. The Commission should direct the Working Group to evaluate the cost-effectiveness of the inverter functionalities, including impacts to the different generators and if it is prudent to require all generators to acquire inverters with the proposed functionalities. For example, a cost and benefit analysis should be considered for self-generators, such as Net Energy

[16] *Id.*

Metering (NEM) customers and self-generating customers who have only incidental export to determine if the proposed inverter requirements should be applied to them.

Finally, while the second goal of the Working Group proposes to categorize the inverter requirements by DER size, DER location on the circuit, and existing and expected total DER generation/storage on the circuit; there is little evidence of this in the Working Paper. DRA recommends this issue be discussed in the Working Group.

IV. WORKING PAPER DISCUSSION

DRA provides specific recommendations in redline to the Working Paper, Appendix A. Those recommendations are based on the overarching concepts described below.

A. Discussions and Recommendations within the CEC/CPUC Draft Document Should Conform with Standards Development Practices

DRA's recommendations in the attached Appendix reflect typical practices within the standards development community and actual practice within the IEEE 1547 series of standards:

1. The "grid" is a slang term that has somewhat different meanings to different parties and in different contexts. When referring to the physical infrastructure of the electric services industry, standard terminology is the "electric power system," or "EPS." Those portions of the electrical power system existing on customer premises, beyond any "point of Common Coupling," or "PCC," are the "Local" EPSs, while those portions of the EPS actually operated by electric companies constitute the "Area" EPS. When referring to the service functionality of the EPS, the term "electric service" should be used. When referring to the individual circuits or feeders of the distribution system, "network" should be used for specifically networked distribution circuits, while "lines" should be used for circuits or feeders, generally, or for specifically non-networks circuits or feeders.
2. The Working Paper refers to "functions" "not currently permitted." However, DRA is not aware of any functions "not currently permitted" with utility coordination in IEEE-STD-1547. "IEEE Application Guide for IEEE STD 1547™, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems" clearly states:

   8.1.1 Voltage regulation (IEEE Std 1547-2003 4.1.1)

The DR [distributed resource] shall not actively regulate the voltage at the PCC. The DR shall not cause the Area EPS service voltage at other Local EPSs to go outside the requirements of ANSI C84.1-1995, Range A." [NOTE—ANSI C84.1 was revised in 2006. However, no changes to ANSI C84.1-2006 [B3] were made applicable to IEEE Std 1547-2003.]

There is a subtle difference between actively regulating and fulfilling an area EPS request to supply or absorb reactive power. Often, local authorities having jurisdiction (AHJ) (e.g., state public utility commissions) have rules or tariffs that govern power factor operating values at customer interfaces with the area EPS.

When the DR actively regulates voltage, it may support the area EPS or work in opposition to regulation equipment installed by the area EPS operator. If the DR is requested to absorb or supply reactive power, the request is beyond the IEEE 1547 voltage requirement. Often, the area EPS operator will request that the DR operate at a constant power factor, which will vary the reactive power with respect to the power generated. This type of operation allows the DR voltage to follow the area EPS voltage but limits the impact of the DR facility on the area EPS. An example is the connection of a large DR facility near the end of an area EPS radial line. In this case, the DR may offset sufficient load to interfere with the normal voltage profile of the line and cause the voltage at the end of the line to be too high. By absorbing reactive power, this voltage rise can be offset. The EPS operator requests previously described are beyond the IEEE 1547 voltage requirement.[17]

3. Technical standards are developed in a context where key terminology is consensually well-defined prior to its use in specific standard requirements, recommendation practices, or guides to permitted applications. Key terms in a document must be defined within the document, regardless of where those definitions may have been originally developed. This principle should be applied in Rule 21, where the functions to be discussed are first defined, so that their meaning does not have to be derived from context or from reference to other documents. After that, individual discussions should explain why each is desired, what benefits it might produce, what

[17] IEEE-STD-1547.2, "IEEE Application Guide for IEEE Std 1547™, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems," at p. 13.

impacts might be incurred, and what levels of scope, scale, or priority might be appropriate. Only after this, should a comprehensive program be discussed. Graphical figures may be useful to illustrate textual descriptions, but must not be a substitute for textual descriptions.

4. Technical "requirements" should be technically-justified and consensus-driven requirements, necessary to accomplish the purpose and scope specified. Requirements should not be "mandated," by utilities or any other interested party; nor merely asserted by any subset of interested parties and left for dissenters to achieve consensus for their removal.[18] Although standards requirements may become "mandatory" by the effect of establishing consensus in the standard, and their adoption by Authorities Having Jurisdiction,[19] they are not "mandated" by utilities or any other interested party.

B. Ratepayer Protection

DRA's recommendations in the attached Appendix A are intended to provide strong consumer protections for ratepayers, such as safety, reasonable rates, reliability and power quality, and are necessary safeguards against the market power of electric companies.

1. Utilities are no longer the only technically competent authorities on utility service, safety, reliability, and economic operation. However, unilateral utility discretions is may be appropriate in isolated situations where the need for safety and reliability of utility legacy systems have been clearly demonstrated, fully reviewed, and fully documented.

2. Existing interconnection equipment should be grandfathered for the lifetime of that existing interconnection equipment, as is done with other listed consumer equipment, without need to upgrade to standard unless and until that equipment is replaced.

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[18] ANSI-accredited national standards are voluntary, consensus standards that are established by a broad-base consensus of affected parties. In the IEEE process, consensus is established by an affirmative ballot of 75% of the interested parties. Dissenters are typically obligated to state their reason for withholding consensus and the standards development body is likewise obligated to respond to all such dissent.

[19] Authorities Having Jurisdiction (AHJs) are the legal entities, such as municipal authorities that mandate adherence to the Uniform Building Code for building construction, or regulatory agencies, such as the Commission, that, in each case, exercises some political authority to require relevant parties to adhere to the technical requirements of some consensus standard.

3. Self-generators, specifically including NEM customers and self-generating customers having only incidental export, should be allowed the greatest practical exclusion from any requirements that inherently contemplate the provision of services to the grid.

4. Utilities should begin to anticipate, plan for, and provide interconnection services to distributed generators as a normal part of the provision of electric service to the public and not as an aberrant or disruptive activity, and to provide those services on a non-discriminatory, cost-of-service basis, offered on terms comparable to terms for services provided to traditional load customers.

C. DRA Recommends the Technical Standards have a More Balanced Perspective

DRA's recommendations in the attached Appendix A support the multi-lateral nature of a restructured electric services industry and all aspects of a modernized transmission and distribution infrastructure.

1. The essential characteristic of DERs is that they are distributed. They are not "uncoordinated"; rather, they are coordinated according to the interests of customer-generators or potential independent power producers competing in their respective restructured electric services marketplaces, instead of the "undistributed" resources traditionally coordinated by the electric company.

D. DRA Recommends the Use of accurate or appropriate References to Foreign Standards

Foreign experiences can provide some value, but useful adaptations of foreign experiences must be undertaken in light of the full context of both the technical and the socio-political aspects giving rise to those experiences and of the usefulness and local acceptance of those experiences. The two main instances of reference to the European interconnection experience in the draft document impart rather significant implications into the discussion without any explanation or justification.

1. The statement that the "European experience has shown that the implementation of some DER functions can cost-effectively improve the reliability and efficiency of the Area EPS," is very broad and sweeping, and is not explained or supported by references. Further, DRA is especially concerned with adopting a vague reference cost-effectiveness in lieu of actual consideration of costs in this proceeding, as recommended above.

2. The statement that the "European experience has also shown that waiting to implement these functions, and/or providing overly prescriptive requirements for low penetration scenarios and not anticipating higher penetration scenarios, may lead to costly upgrades and replacements," is also very broad and sweeping, and not explained or supported by references. Again, DRA is very concerned about adopting a vague reference to higher costs in lieu of actual consideration of costs in this proceeding. DRA posits that it may be necessary to "wait" and use national standards and Open Architecture for inverter functionalities in California for all the reasons previously discussed above.

E. Miscellaneous Remarks

1. In Section 1.5., after defining any "DER Functions" not already defined, the draft document should then define what types of "communication" are meant, and then explain why certain DER functions "require" certain communications capabilities, then explain why their implementation should or should not be left to voluntary customer option.

2. At Section 2. DER Functions to Support Area EPS Operations, DRA notes that the various services needed by Area EPS Operators are generally well understood and that nothing in IEEE-STD-1547 prohibits Area EPS Operators from procuring these services from whoever may be available to supply them, under regulated and/or mutually agreeable terms. Historically, providers of grid services to the Area EPS were well-established commercial operators that could negotiate on reasonable terms with the Area EPS Operator or, in certain situations, could do so under regulatory protection. To the extent that new entrants into these markets might include a large number of less sophisticated or experienced, smaller customers, migration of these services into the tariffed circumstances traditionally afforded to either load-only customers or early customer-generators (primarily, self-generators) may be appropriate.

3. At Section 2.1, "Hierarchical Management," regardless of its value, does not seem to be a "DER Function," but a function of some overarching architecture.

4. At Section 2.1, Facility DER management system (FDEMS) interactions with one or more DER systems, the text seems to advocate and/or take for granted a specific view of the world, rather than explain the possibilities of the hierarchical approach it envisions.

5. Sections 2 and 3; the technical requirements for inverter functionalities should strike a balance between the interests of utilities and self-generators for safe and reliable service.

F. DRA Comments on Sections 4 and 5

DRA will provide additional, specific comments on Sections 4 and 5 in the next round of comments, as may be appropriate.

V. CONCLUSION

DRA's recommendations on the Working Group and Working Paper seeks to improve the clarity and transparency to the process of developing inverter functions and testing procedures to ensure the long-term safety, reliability, and efficiency of the EPS. DRA will continue to participate in the Working Group and the process of revising the Working Paper.

Respectfully submitted,

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