



March 8, 2018

Ms. Martha Lynn Jarvis
Chief Clerk
North Carolina Utilities Commission
430 North Salisbury Street
Raleigh, NC 27603

Re: Docket No. E-100, Sub 101
NCSEA's Objections to the Duke Utilities' First Set of Data Requests

Dear Ms. Jarvis,

Enclosed for filing in the above-referenced proceeding are the objections of the North Carolina Sustainable Energy Association ("NCSEA") to certain requests contained in the first set of data requests of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC (collectively, the "Duke Utilities") to NCSEA dated February 26, 2018.

Please let me know if I can be of any further assistance.

Sincerely,

/s/ Peter H. Ledford
Peter H. Ledford
General Counsel for NCSEA



CERTIFICATE OF SERVICE

I hereby certify that all persons on the docket service list have been served true and accurate copies of the foregoing Comments by hand delivery, first class mail deposited in the U.S. mail, postage pre-paid, or by email transmission with the party's consent.

This the 8th day of March, 2018.

/s/ Peter H. Ledford
Peter H. Ledford
General Counsel for NCSEA
N.C. State Bar No.42999
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NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

Request:

Pages 1-2 of the NCSEA Comments list 37 of NCSEA's member companies that participated in the 2017 Interconnection Stakeholder Process. Please Identify any of these NCSEA member companies that i) reviewed and provided input into the NCSEA Comments; and/or ii) notified counsel for NCSEA verbally or in writing that the NCSEA member company supported the positions taken in the NCSEA Comments.

Response:

NCSEA objects to this Request because it seeks information which is not reasonably calculated to the lead to the discovery of admissible evidence in the instant proceeding. NCSEA further objects to this Request as overly broad, unduly burdensome, and lacking relevance to the instant proceeding. Furthermore, with regard to subsection ii)., NCSEA objects to this portion of the Request as it requests information and materials prepared in anticipation of litigation, protected by the attorney-client privilege, or otherwise protected as attorney work product.

Subject to said objections, and without waiving same, NCSEA circulated a draft of its Initial Comments to its business members, including:

- 8 Minute Energy
- ABB
- Able Grid Energy Solutions
- Abundant Power
- AlsoEnergy
- Apex Clean Energy
- Avangrid
- Birdseye Energy
- Blanco Tackabery & Matamoros, P.A.

- Blue Sphere
- Bradley Arant Boult Cummings
- Cape Fear Solar Systems
- Capital Solar Development
- Carolina Solar Energy
- Carolina Solar Services
- Cavanaugh Solutions
- Celtic Energy
- Community Energy
- Conti Solar
- Cooperative Solar
- Coronal Energy
- Cypress Creek Renewables
- Direct Power
- Dynapower
- Emerald Energy
- Evans Solar
- Geenex Solar
- Gransolar Group
- Green State Power
- GreenGo Energy
- Hannah Solar
- Headwaters Solar
- Heelstone Energy
- Hexagon Energy
- Holocene Energy
- Humium Energy
- Ingersoll-Rand
- Invenergy
- iSolar
- Kilpatrick Townsend
- Koolbridge Solar

- Leyline Renewable Energy
- Modern Energy
- Moore & Van Allen
- NARENCO
- NC Solar Now
- Nelson Mullins
- O2 EMC
- Ollo Energy
- OPDE
- Orion Renewables
- Palmetto
- Palmetto Green
- Parker Poe
- Pinegate Renewables
- Power Home Solar
- PS Renewables
- Pure Power Contractors
- Renew Petra
- Renewable Energy Design Group
- Renewable Energy Intel Group
- Renu Energy
- Sanford Law Office
- Self Help Credit Union
- Smith Moore Leatherwood
- SolAmerica Energy
- SolFarm Solar
- Solterra Partners
- Southern Current
- Strata Solar
- Sugar Hollow Solar
- Sun Dollar Energy
- Sundance Power

- Southern Energy Management
- Sunrun
- TW Solar
- United Renewable Energy
- Yes Solar Solutions

A list of NCSEA's business members can also be found on NCSEA's website, www.energync.org.

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

Request:

With regard to the information requested by NCSEA that was the subject matter of the email exchange included as Exhibit 4 to the NCSEA Comments, please identify any written requests for further information or verbal communication efforts undertaken by NCSEA to the Duke Utilities or to the Duke Utilities' Counsel between October 30, 2017, and January 29, 2018, when the NCSEA Comments were filed.

Response:

NCSEA objects to this Request because it seeks information which is not reasonably calculated to lead to the discovery of admissible evidence in the instant proceeding. Furthermore, NCSEA objects to this Request as irrelevant to the underlying matter in this docket. Finally, NCSEA objects to this Request inasmuch as it requests information and materials which are equally available to the Duke Utilities or to the Duke Utilities' Counsel.

Subject to said objections, and without waiving same, in an effort to be constructive stakeholder process participants and to avoid litigating a collaborative process, NCSEA did not submit any data requests to the Duke Utilities except to request any data requests served on the Duke Utilities by other parties and the responses of the Duke Utilities to such.

Furthermore, NCSEA believes that Exhibit 4 to its Initial Comments speaks for itself with regard to the communications between the Duke Utilities and NCSEA on this specific issue. Counsel for the Duke Utilities' made abundantly clear in his October 30, 2017 email (contained within Exhibit 4) that the Duke Utilities would not be further discussing the issue in writing or verbally as it was not the "best use" of the Duke Utilities study team's time.

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

Request:

Please Identify and produce all Documents and Identify any other communications relied upon by NCSEA to support its statement on page 32 that the Duke Utilities' technical standards and criteria discussed on pages 32-42 of the NCSEA Comments represent "an attempt [by Duke Energy] to impede solar QF development and purge QF projects from its interconnection queue."

Response:

NCSEA objects to this Request because it seeks information which is not reasonably calculated to lead to the discovery of admissible evidence in the instant proceeding. Furthermore, NCSEA objects to this Request as it requests information and materials prepared in anticipation of litigation, protected by the attorney-client privilege, or otherwise protected as attorney work product.

Subject to said objections, and without waiving same, please see page 3 of the attached document (Active_94048150_1_DER 9-15 Planning Guidelines Presentation (Updated 2_20 p.m. 9-14).pdf) which shows that the proposed Duke Utilities' Method of Service Guidelines would purge a total of 537 megawatts of pending solar projects from the Duke Utilities' interconnection queues.

DER Planning Guidelines (DEC & DEP)

September 15, 2017 planning guidelines update and transition



Mar 08 2018

OFFICIAL COPY

Objectives of DER Planning Guidelines

- DER Planning Guidelines seek to better manage integration of utility-scale solar consistent with evolving “good utility practice” and to ensure long-term reliability of the transmission & distribution system
- S.L. 2017-192 (“H589”) recognizes State’s objective to transition to smarter, more cost-effective, and sustainable solar growth strategy than traditional “5 MW on general distribution” policy that has existed from 2012-2016.
- Duke’s commitment through H589 to continued solar growth cannot be questioned in light of mandates to interconnect aggregate 7,000+ MW in next 5 years
 - G.S. 62-110.8(b)(1) designed to “guarantee” at least 6,760 MW between legacy “uncontrolled PURPA” and controlled CPRE and Green Source
 - 2,660 MW CPRE within 45 months of NCUC’s approval of program
 - If 3,500 MW legacy PURPA not developed by 2022, then any deficiency is added to post 45-month CPRE procurement.
 - If 600 MW Green Source program not fully subscribed by 2022, then any deficiency is added to post 45-month CPRE procurement.
 - H589 also shows new commitment to customer-driven solar adoption through Leasing, Community Solar, and Solar Rebates.
 - DER Planning Guidelines will preserve some system capacity for future customer-sited solar on the distribution system.

Substation Nameplate Policy Impact

Company	Total Distribution Projects in the Queue (MWs)	Total Project Impact (MWs)	“On the Margin” (MWs)	Project Total Not Impacted by Policy (MWs)
DEP	2013	506	40	1507
DEC	641	31	25	610
Total	2654	537	65	2117

Note: “On the Margin” is a subset of the Total Project Impact where a reduced project size would not exceed the Substation Nameplate limit. Duke agrees to allow a downsize and not impact queue priority and the project would retain current rate eligibility

- Under a future CPRE Procurement paradigm, combining the ~ 2,100 MW Project Total Not Impacted by Policy with the ~ 1,990 MW installed as of August 31, 2017 (1,510 MW in DEP and 479 MW in DEC) exceeds the 3,500 MW legacy PUPRA contemplated in CPRE
- In addition, approximately 5,900 MW of projects progressing through combined DEC and DEP transmission queues.

Need for DER Planning Guidelines

- Continued utility-scale penetration on distribution demands a more sustainable & holistic approach
 - Must go beyond consideration of a single interconnection
 - System reliability & power quality negatively impacted if we change the basic “character” of the system (i.e., massive back-feed from distribution back to transmission)
 - (“system character” defined here as “underlying and far-reaching system design parameters”)*
 - e.g. T & D interface assumptions: planning & operations
 - e.g. maximum transformer size, maximum conductor size
- Need an approach that places round pegs in round holes, square pegs in square holes
 - Much like the concept of standard service voltages for customers, based on size
 - Guiding principles are to permit requested interconnections without changing the character of the system

Development of DER Planning Guidelines

- Specifically addressing distribution (& substation) interconnections:
 - How do we allow *some* back feed on distribution and at substation, but assure it doesn't go beyond reasonable limits which today's conventional study methods cannot capture, and without moving to incredibly complex study methods (simultaneous T&D simulation)?

- Establishment of DER Planning Guidelines
 - Develop reasonable DER planning guidelines which allow significant levels of DER on distribution, but also consider when it makes sense to connect direct to the substation or to transmission
 - When shared externally, should help planning activities for developers
 - Good Utility Practice:
 - As unique leader in utility industry in this area, Duke will continue to develop and mature new guidelines which maintain Good Utility Practice for interconnection to the system
 - Continue to pay attention to, and engage with, other utilities on developing practices
 - Active in, and planning increased involvement in, IEEE 1547: P1547, P1547.1; plan involvement in P1547.2 (once underway)
 - Share evolving guidelines with developer community via a technical working group structure
 - To be developed in Q4 2017, or after completion of NC interconnection standards revisions

DER Planning Guidelines, DEC & DEP: Essential components, as of Sept. 2017

1. Analysis of harmonics impacts for low stiffness interconnections (CSR)
2. Location criteria for system compatibility (LVR)
3. **Single** DER “right size” criteria for connection to distribution, substation, or transmission
 - “10/6/3/2” MW to distribution
 - 20 MW and up to transmission
 - In between: direct-to-substation connection
4. **Aggregate** DER “right size” criteria for distribution circuits and substations
 - Allow aggregate DER at circuit up to circuit planning capacity
 - Allow aggregate DER at substation up to transformer “nameplate” (ONAN) rating
5. Evolve RVC (rapid voltage change) & flicker criteria

DER Planning Guidelines: *“right-size” criteria for **single DER** connection to distribution (direct-to-substation), or transmission*

Directs the “natural” interconnection method of service, for utility-scale DER, based on facility size: distribution, direct-to-substation, or transmission

Interconnection facility (MVA) (lower limit)	Interconnection facility (MVA) (higher limit)	Interconnection Guideline for system / interconnection point
--	≤ 10 MVA (25 kV or 35 kV class) ≤ 6 MVA (15 kV class) ≤ 3 MVA (where local retail substation is served from 44 kV radial sub-transmission) ≤ 2 MVA (5 kV class)	general distribution circuit
> 10 MVA (25 kV or 35 kV class) > 6 MVA (15 kV class) > 3 MVA (where local retail substation is served from 44 kV radial sub-transmission)	< 20 MVA	direct connection to a retail substation
≥ 20 MVA	--	transmission system

^[1] Method “T” interconnections are specifically guided by DEC’s or DEP’s appropriate FCR (Facility Connection Requirements) documents, which are accessible at DEC’s and DEP’s OASIS sites (www.oasis.oati.com/duk/ and www.oasis.oati.com/cpl/).

^[2] In general, due to the existence of legacy terminology across operating areas, a “retail substation” is the term used within DEC to describe a substation which serves general retail distribution loads from circuits connected to the substation’s distribution bus. In this document, the term “retail substation” will be used to describe this type of substation, which in DEP is often called a “T/D” or “T to D” substation.

^[3] Interconnections at 5 kV, above 2 MVA, are not permitted. Such facilities must interconnect at a higher voltage class.

DER Planning Guidelines - background

DEC & DEP distribution design basis

- Most common distribution-class equipment for a “circuit backbone” in DEC and DEP rated for a maximum of 600 amps
 - Common backbone conductor thermal ratings: 480 to 600 amps
 - Overhead line construction design factors (sag, tension, pole height, phase-to-neutral clearance) dictate actual planning limits, typically 300 to close to 500 amps
- DEC and DEP legacy line construction methods and planning philosophies different in several areas; reasons go back 70+ years ago
 - Legacy DEC backbone design planning rating ~ 450 amps (urban/suburban), less in rural areas
 - DEC: varying mixtures of radial sub-transmission (44 kV), standard substation sizes of 6 to 20 MVA (ONAN), and a mixture of 12 kV and 23 kV distribution. Conductor backbone size “right-sized” to local load (size drops multiple times as you get farther from substation); circuit ties may be limited in some areas
 - DEC planning capacities may need to scale back in near future, in order to implement DEC & DEP Self-Optimizing Grid (automated circuit tie) capabilities (“N-1” contingency for radial systems)
 - Legacy DEP backbone design planning rating ~ 330 amps
 - DEP: no radial sub-transmission, standard substation sizes of 15 or 25 MVA (ONAN), and almost exclusively 23 kV distribution with longer circuits. Conductor backbone size often large along whole length to aid in circuit ties, voltage drop, fault reach, etc.

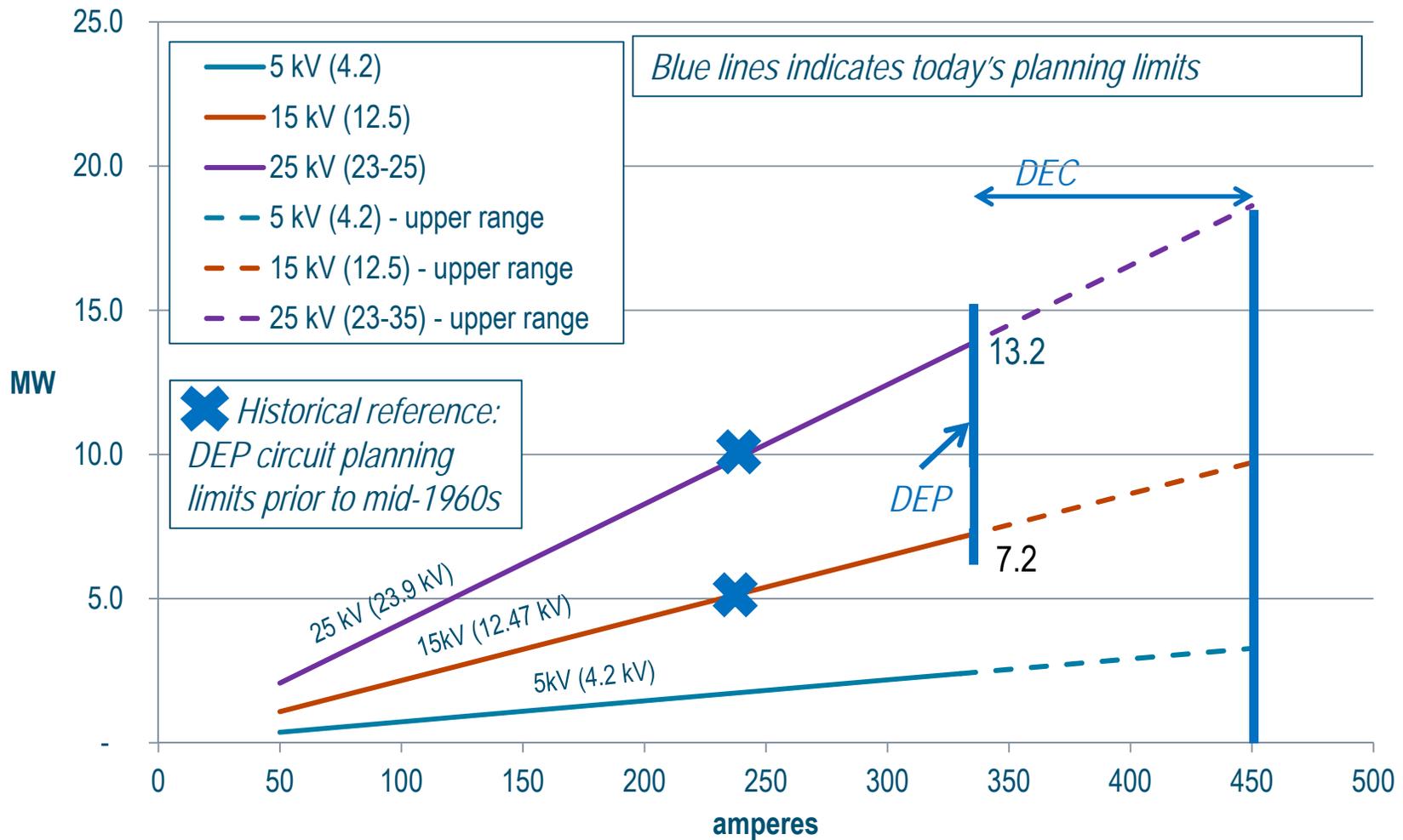
Three recommended textbooks for reference:

- Electric Power Distribution Handbook, by T.A. Short (ISBN 0-8493-1791-6)
- Power Distribution Engineering, by Jim Burke (ISBN 0-8247-9237-8)
- Electric Power Distribution Engineering, Turan Gönen (ISBN-13 978-1-4200-6200-7)

DER Planning Guidelines – background (cont.)

DEC & DEP distribution design basis

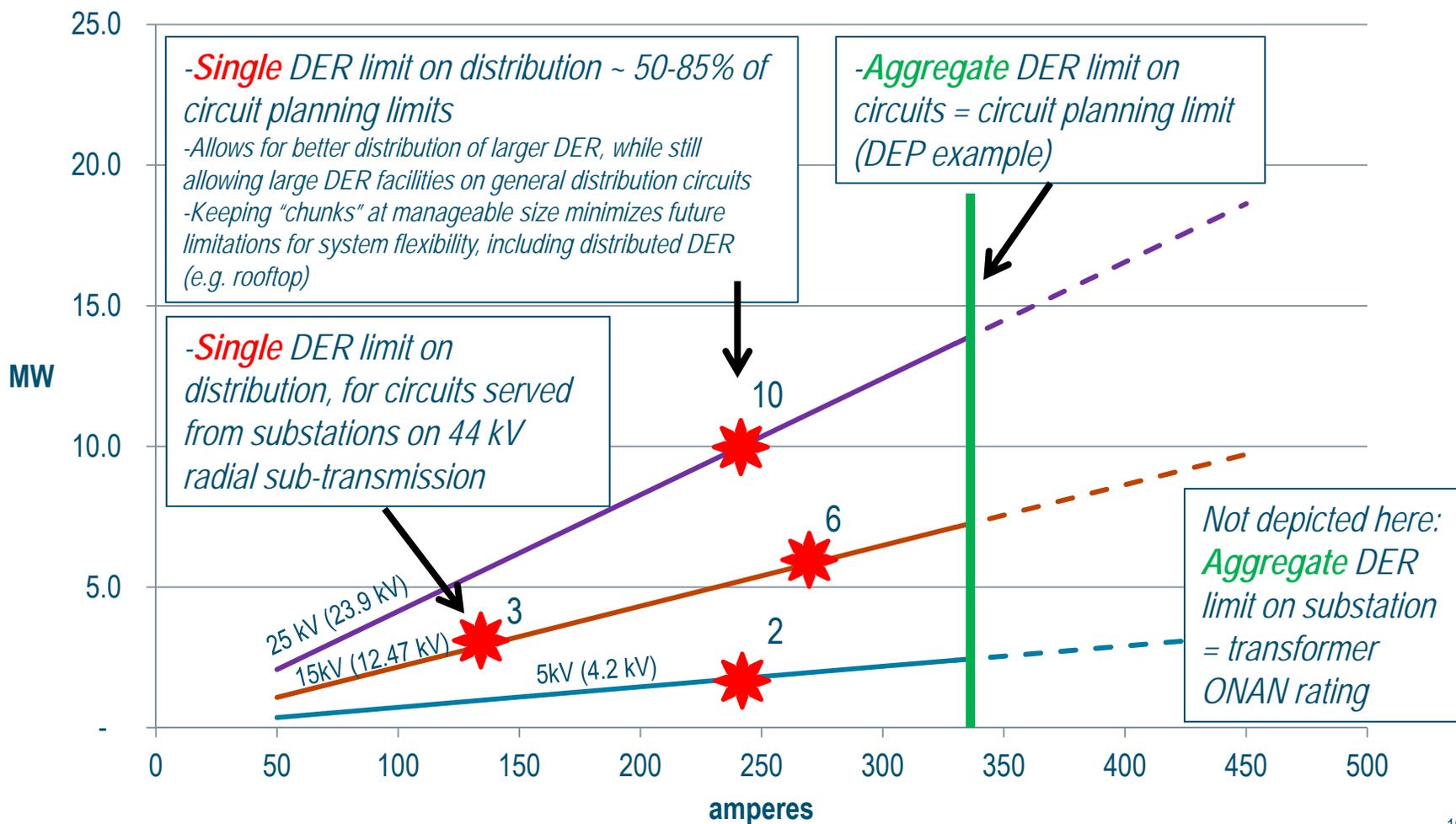
amperes to MW relationship



DER Planning Guidelines – background (cont.)

DER size criteria, circuit level (*single* and *aggregate*)

amperes to MW relationship



DER Planning Guidelines – background (cont.)

*single DER limit of 3 MW,
for circuits/substations served from 44 kV radial sub-transmission*

- DEC's 44 kV sub-transmission system exhibits unique characteristics related to utility-scale DER
 - radial (not networked) transmission lines with extended distances
 - presents much higher system impedance than typical
 - serves a number of unregulated customers: industrial and wholesale (muni's, EMCs)
 - impacted by rapidly changing load flows and/or reverse flows
- Electrically, interconnection here has over 1.6 times the impact of one not served from the 44 kV system, but cannot account for all factors
 - Radial transmission topology still presents challenge: integrated study of transmission & distribution not feasible

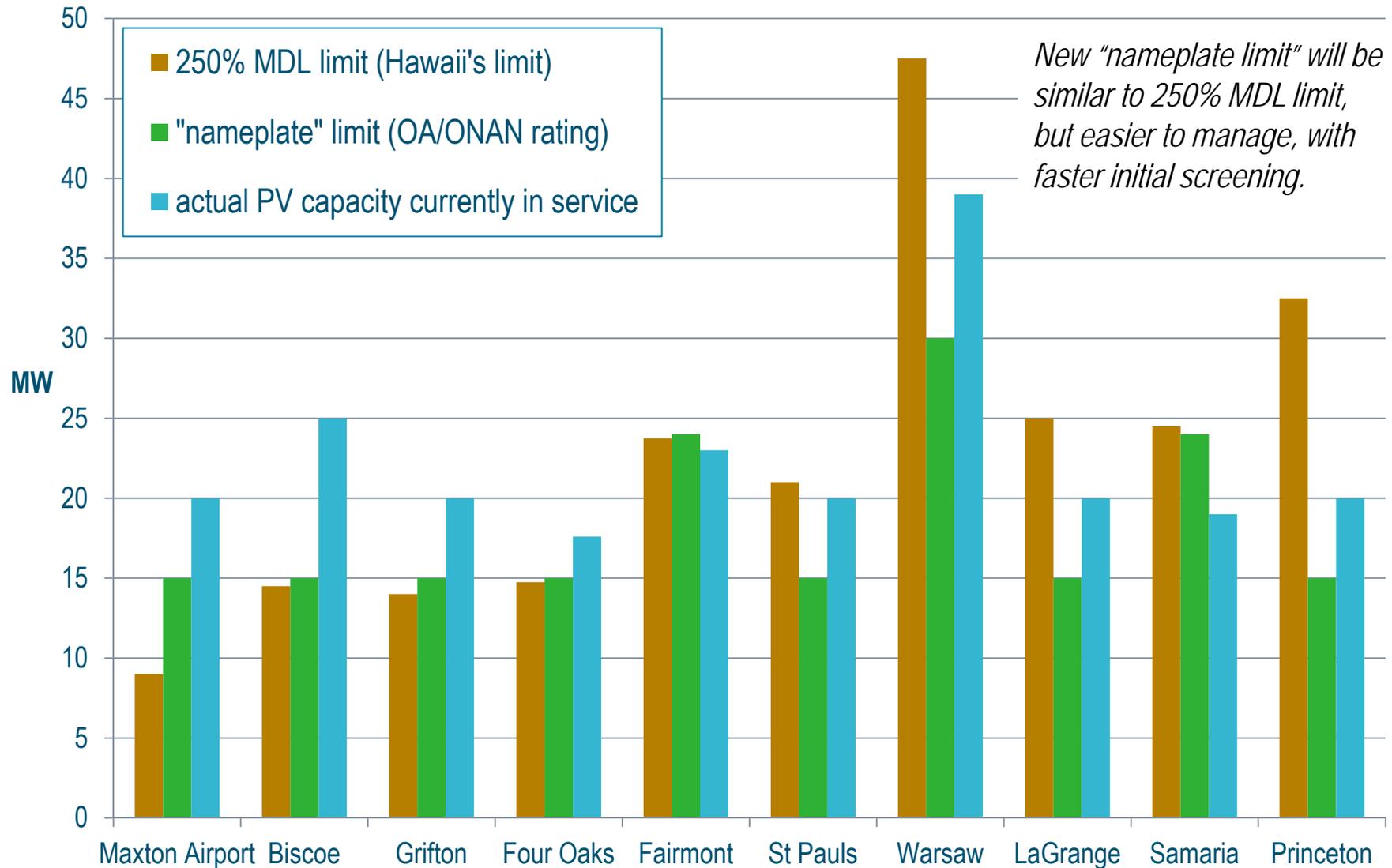
DER Planning Guidelines – background (cont.)

DER size criteria, substation level (aggregate)

- Perspective
 - Hawaii is limiting aggregate DER, per circuit, to 250% of minimum daily load (MDL)
 - Changed in 2015 from 120%
 - Almost all residential, net-metered
 - Hawaii has some of the highest distribution circuit or substation penetration levels in the U.S.; however, DEP/DEC rivals or already exceeds 250% of MDL on some circuits
- **“Substation Nameplate Limit” (ONAN) in DEC & DEP** limits DER on a substation to similar levels as Hawaii, without having to research MDL
 - Limits **aggregate DER to the ONAN, or “nameplate” limit**
 - Not the same as a % of MDL, but in the same neighborhood
 - Permits developers better ability to plan
- Unmanaged loading to much higher levels creates significant and ongoing operational and planning challenges which remain forever

DER Planning Guidelines – background (cont.)

DER size criteria, substation level (aggregate)





DER Planning Guidelines: revision of RVC & flicker effect criteria

- RVC (rapid voltage change) & flicker criteria are part of distribution system impact studies
 - In recent past, little in the way of industry standards
 - IEEE P1547 (scheduled for 2018 passage) addresses RVC and flicker
 - Not yet final
 - Uses IEEE 1453 (recommended practice – not required), which many utilities, like Duke Energy, have not yet fully adopted
- Duke recognized, at least back to 2015, that the DEC & DEP RVC & flicker criteria needed to be reviewed for possible revision
 - After some research cooperation with EPRI, NC State, and a survey of other utilities, DEC & DEP will adopt revised RVC & flicker criteria as of 9/15/2017
 - Similar to criteria adopted recently by Xcel Energy
 - Will be known as “DEC & DEP RVC & flicker criteria version 2”

DER Planning Guidelines: Implementation

- Planned transition to revised guidelines, centered around Sept. 15, 2017
- Transparency being stressed for transition of guidelines
 - External release of DER Planning Guidelines document
 - External release of “DER size guidelines implementation matrix” document
- The **single** and **aggregate** DER guidelines may cause projects to no longer be viable as general distribution circuit interconnections
 - Direct connection to substation may require new RoW and may not be feasible at all substations
- The revised RVC & flicker criteria may cause some projects to interconnect with fewer required upgrades than prior RVC & flicker criteria

DER Planning Guidelines: Key points – planned transition

- Most urgent item: **single** DER “right size” guideline
 - For System Impact Studies completed before 9/15/2017 where IA is not yet executed, System Impact Study will be revisited if DER capacity exceeds the applicable **single** DER “right size” guideline (10/6/3/2 MW). System Impact Study will identify the proper interconnection “type” to guide project to general distribution, direct-to-substation, or transmission interconnection. For those studies revisited, revised RVC & flicker criteria version 2 will be used.
- For studies already underway as of 9/15/2017
 - **Single** DER guideline (10/6/3/2) to guide project to general distribution, direct-to-substation, or transmission
 - Revised RVC & flicker criteria version 2 (when prudent)
 - **Aggregate** substation capacity guidelines
- For studies not yet started as of 9/15/2017
 - **Single** DER guideline (10/6/3/2) to guide project to general distribution, direct-to-substation, or transmission
 - Revised RVC & flicker criteria version 2
 - **Aggregate** substation capacity guidelines
 - **Aggregate** circuit capacity guidelines

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

Request:

Please Identify and produce all Documents and Identify any other communications relied upon by NCSEA to support its statement on page 32 that the Duke Utilities’ technical standards and criteria discussed on pages 32-42 of the NCSEA Comments represent have been designed based upon “dubious technical grounds.”

Response:

NCSEA objects to this Request because it seeks information which is not reasonably calculated to the lead to the discovery of admissible evidence in the instant proceeding. Furthermore, NCSEA objects to this Request as it requests information and materials prepared in anticipation of litigation, protected by the attorney-client privilege, or otherwise protected as attorney work product. Finally, NCSEA objects to this Request to the extent that it requires NCSEA to perform significant original work and is, therefore, inappropriate in the context of discovery under North Carolina Rule of Civil Procedure 26(b) as applied to this North Carolina Utilities Commission proceeding.

Subject to said objections, and without waiving same, NCSEA relied upon the IEEE 1547.7 standard (Guide for Conducting Distribution Impact Studies for Distributed Resource Interconnection), which demonstrates the industry standard for conducting interconnection system impact studies. While IEEE 1547.7 references the use of screens as a trigger for further study, the standard does not have strict limitations as are seen in the Duke Utilities’ Method of Service Guidelines and Line Voltage Regulator screens.

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

Request:

Please Identify and produce all Documents and Identify any other communications relied upon by NCSEA to support its statement at footnote 5 on page 32 that “Dominion does not utilize the interconnection screens used by Duke and discussed in this section [IV of the NCSEA Comments].”

Response:

NCSEA objects to this Request because it seeks information which is not reasonably calculated to the lead to the discovery of admissible evidence in the instant proceeding. Furthermore, NCSEA objects to this Request as it requests information and materials prepared in anticipation of litigation, protected by the attorney-client privilege, or otherwise protected as attorney work product. Finally, NCSEA objects as this Request is overly broad and unduly burdensome.

Subject to said objections, and without waiving same, upon information and belief, Dominion has never informed stakeholders that it utilizes the Circuit Stiffness Review screen, the Line Voltage Regulator screen, or the Method of Service Guidelines. Furthermore, upon information and belief, NCSEA is not aware of any solar developers that have made requests to interconnect to Dominion’s grid and then have encountered any of the above-mentioned screens.

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

Request:

Please Identify and produce all Documents and Identify and describe any other communications relied upon by NCSEA to support each separate subpart of its statements at page 42 of the NCSEA Comments that the Duke Utilities’ “implementation of the [Method of Service Guidelines]: (a) is not consistent with the policies of other utilities in the region; (b) is unsupported by and inconsistent with relevant industry standards; (c) imposes unreasonable costs on interconnection customers; and (d) is not consistent with good business practices.”

Response:

NCSEA objects to this Request because it seeks information which is not reasonably calculated to lead to the discovery of admissible evidence in the instant proceeding. Furthermore, NCSEA objects to this Request as it requests information and materials prepared in anticipation of litigation, protected by the attorney-client privilege, or otherwise protected as attorney work product. Finally, NCSEA objects as this Request is overly broad and unduly burdensome.

Subject to said objections, and without waiving same:

- a. As is shown on page 9 of the document attached to NCSEA’s Response to the Duke Utilities’ DR1-4, NCSEA would first note that the Method of Service Guidelines are not consistent between Duke Energy Carolinas, LLC and Duke Energy Progress, LLC. Further, the only location cited by the Duke Utilities’ in support of its Method of Service Guidelines is Hawaii. However, NCSEA notes that, as is recognized on pages 12-13 of the document attached to NCSEA’s Response to the Duke Utilities’ DR1-4, Hawaii uses an entirely different standard (250% of a circuit’s minimum daily load). Further, NCSEA does not believe that Hawaii is in the same geographic region as North Carolina.

- b. IEEE 1547 calls for a study of the impacts of an interconnecting generator, and not the use of screens. The Duke Utilities' Method of Service Guidelines are clearly inconsistent with this IEEE 1547 standard.
- c. Given that the Duke Utilities' Method of Service Guidelines require interconnecting customers to pay for upgrades to substation transformers without a verified system impact is an *ipso facto* unreasonable cost imposed on interconnection customers and violates the vested rights of such interconnection customers who relied on the Duke Utilities' screens that were in place prior to the Duke Utilities' unilaterally implementing the Method of Service Guidelines.
- d. See responses to subsections (a), (b), and (c).