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March 25, 2024

VIA ELECTRONIC FILING

Ms. A. Shonta Dunston, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

Re: Duke Energy Carolinas, LLC's and Duke Energy Progress, LLC's Queue Reform Informational Report
Docket No. E-100, Sub 101

Dear Ms. Dunston:

Pursuant to Ordering Paragraph No. 5 of the North Carolina Utilities Commission's ("Commission") *Order Approving Queue Reform*, issued on October 15, 2020 in the above-captioned docket,[1] Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP" and, together with DEC, the "Companies") hereby submit this Informational Report following completion of the transitional cluster study process ("Transitional Cluster") and the initial Definitive Interconnection System Impact Study ("DISIS") cluster process to (1) describe the outcomes of those initial cluster studies and (2) communicate plans to engage stakeholders regarding whether additional queue reform efforts are needed.

To further inform the Commission's review of this Informational Report, the Companies are also submitting for the Commission's consideration Attachment A, which provides more detailed data on DEC's and DEP's processing of Interconnection Requests in the Transitional Cluster and initial annual DISIS cluster in 2022, as well as Attachment B, which provides an overview of the Companies' plans for compliance with Federal Energy Regulatory Commission Order No. 2023 as shared in a recent stakeholder meeting held on March 8, 2023.[2]

Thank you for your consideration in this matter. Please do not hesitate to contact me with any questions.

[1] Queue Reform Order at 3.

[2] The Companies made their Order No. 2023 compliance filing on March 18, 2023. *See* Duke Energy Carolinas, LLC and Duke Energy Progress, LLC – Compliance Filing Containing Revisions to Attachment K to Joint OATT (LGIP/LGIA), Docket No. ER24-1554-000 (filed March 18, 2024).

Very truly yours,

*/s/ E. Brett Breitschwerdt*__

cc: Parties of Record

Queue Reform Informational Report

Docket No. E-100, Sub 101

In September 2021, Duke Energy Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP" and, together with DEC, "Duke" or the "Companies") transitioned from a first-come, first-served serial interconnection study process to a first-ready, first-served cluster study process. From September 1, 2021 to October 31, 2021, serial Interconnection Customers were required to demonstrate readiness to remain in the queue as part of either the Transitional Cluster process or the Transitional Serial process.

On January 1, 2022, the Companies opened the enrollment window for the first annual Definitive Interconnection System Impact Study ("DISIS") cluster process (the "2022 DISIS Cluster"), which closed on June 29, 2022. This Informational Report contains data from the Companies' Transitional Cluster study process and 2022 DISIS Cluster.

I. BACKGROUND

A. Commission Acceptance of Queue Reform Revisions to NCIP

On May 15, 2020, the Companies submitted proposed revisions to the North Carolina Interconnection Procedures ("NCIP")[3] to transition to a "first-ready, first-served" cluster study process (the "Queue Reform Proposal"). From 2017 through 2020, the Companies faced growing challenges, backlogs, and complexities in managing the then-existing serial generator interconnection study process. At the time of their Queue Reform Proposal, a growing number of speculative and "non-ready" Interconnection Customers were holding capacity in the queue, increasing interdependencies between Interconnection Customers' grid impacts and limiting available capacity on the DEC and DEP transmission and distribution systems to interconnect additional generating capacity without significant System Upgrades. Under the serial interconnection process, 100% of these costs were assigned to the earliest-queued projects triggering the need for system upgrades, even though later-queued projects could also benefit from the upgrades. In many cases, assignment of such significant system upgrade costs made new generation projects infeasible, incentivizing those projects to delay committing to fund the upgrades or electing to withdraw from the queue, thereby causing delays and triggering the need for restudies.

To address these issues, the Companies proposed reforming their interconnection process from a "first-come, first-served" serial processing approach to a "first-ready, first-served" cluster study approach, with a phased implementation to allow late-stage interconnection customers already in the queue the option of proceeding serially or through the cluster process.

[3] Capitalized terms used in this Queue Reform Informational Report that are not defined herein are intended to have the same meaning as such terms are defined or otherwise used in the NCIP, as approved by the Commission.

On October 15, 2020, the Commission issued its Queue Reform Order accepting the Companies' proposed queue reform revisions. On August 11, 2021, after obtaining complementary queue reform approvals from the Public Service Commission of South Carolina ("PSCSC") and the Federal Energy Regulatory Commission ("FERC"), the Companies petitioned the Commission for approval to implement queue reform. The Commission's August 19, 2021 *Order Implementing Queue Reform* granted the Companies' request and directed that the revised NCIP implementing queue reform would become effective as of August 20, 2021. On September 1, 2021, the Companies commenced the Transitional Cluster and Transitional Serial Studies as part of the queue reform transition process, and, on January 1, 2022, the Companies commenced the initial annual 2022 DISIS Cluster process by opening the annual enrollment window.

B. Commission Requirement to Submit Informational Report

Ordering Paragraph No. 5 of the Queue Reform Order requires the Companies to "file reports with the Commission regarding the outcome of the Transitional Cluster study and the initial DISIS cluster study as recommended by the Public Staff."[4] Although the Queue Reform Order did not directly specify any required content for the reports, the Public Staff's comments on the Companies' Queue Reform Proposal[5] recommended that the Companies' report should address the following topics:

- The interconnection customers (size/capacity) that participated in each process;
- The actual experienced timeframes for completing each of the study phases;
- The customers that withdrew prior to successful completion of the cluster;
- The sufficiency of the fees charged for implementing the transition and initial definitive cluster; and
- Any recommended changes to these elements of the process.[6]

The Companies completed the Transitional Cluster study process in 2022 and recently completed the initial 2022 DISIS Cluster system impact study process and are therefore submitting this Informational Report in compliance with the Queue Reform Order. This Informational Report addresses each of the issues raised by the Public Staff

[4] Queue Reform Order at 3 (Ordering Paragraph No. 5).

[5] Public Staff Comments on Duke's Queue Reform Proposal at 5 (June 15, 2020) (the "Public Staff Comments"); *see also* Public Staff Reply Comments on Duke's Queue Reform Proposal at 9 (Aug. 31, 2020).

[6] Public Staff Comments at 5.

and is organized as follows:

A. Information on Interconnection Customer Participation, Timeframes for Study Completion, & Withdrawals

B. Sufficiency of Fees Charged

C. Recommended Changes & Plans for Engagement

II. INFORMATIONAL REPORT

A. Information on Interconnection Customer Participation, Study Timeframes for Completion, and Withdrawals

The Companies' revised NCIP includes increased study deposit amounts to enter the DISIS, financial and non-financial commercial readiness milestones to proceed in DISIS, as well as Withdrawal Penalties when Interconnection Customers exit the queue and negatively affect the timing or cost of equal or lower queued Interconnection Requests. These penalties were designed to incentivize readiness and early withdrawal of speculative projects to minimize potential harm to others.[7] While Interconnection Customers may withdraw from the interconnection queue at any time, withdrawals may be subject to increasing penalties as the interconnection process progresses. This Section sets forth the size and capacity of Interconnection Customers' facilities participating in the Transitional Cluster study process and the 2022 DISIS Cluster as well as the number of withdrawals prior to successful completion of the cluster(s). A chart containing the information described in this section is also included in Attachment A to this Informational Report.

1. Transitional Cluster Study Participation, Study Timeframes for Completion, and Withdrawals

As described in the Companies' Queue Reform Proposal, the transitional process was designed to allow Interconnection Customers currently in the Companies' queues to either demonstrate commercial readiness and proceed towards interconnection or to elect to withdraw from the queue without penalty and consider whether to re-enter a future cluster.[8] The Companies implemented their transition processes beginning on September 1, 2021 and proceeded with the Transitional Cluster study. The Phase 1 study work was timely completed, and the Transitional Cluster Study Phase 1 Report was issued to Interconnection Customers on February 28, 2022 within 90 calendar days. The Phase 2 study work was also timely completed, and the Transitional Cluster Study Phase 2 Report was issued to Interconnection Customers on August 26, 2022 within 150 calendar days. The Companies also made both the Phase I and Phase II Reports publicly available on their respective 'Generate Your Own Renewable Energy webpages.[9] The Facilities Studies for

[7] Queue Reform Proposal at 59.

[8] Queue Reform Proposal at 61.

[9] DEC, Generate Your Own Renewable Energy, Reporting, https://www.duke-energy.com/Business/Products/Renewables/Generate-Your-Own?jur=SC01 (last visited Mar. 25, 2024);

each individual Interconnection Customer in the Transitional Cluster were also timely completed and the Facilities Study Reports issued within 150 calendar days.

Prior to commencing the Transitional Cluster Phase 1 study, 179 of 268 (totaling 13,890.3 MW of 19,385.5 MW) FERC and State Interconnection Customers eligible for Transitional cluster entry in DEC and DEP elected to withdraw from the Companies' interconnection queues. The number of withdrawals from the Companies' respective generator interconnection queues during the transitional process (approximately 67% of all interconnection customers and approximately 72% of all MW in the queue during the transitional election window) indicates positive movement towards the goal of promoting speculative projects to withdraw from the queue in order to minimize potential adverse impacts to commercially ready and financially committed projects remaining in the queue. Other factors that may have influenced participation in the Transitional Cluster study include the CPRE Tranche 3 stakeholder meetings, in which participants debated which cluster Tranche 3 would align with, ultimately deciding that all Tranche 3 participants had to exit the Transitional Cluster and enter a Resource Solicitation Cluster specifically established to study CPRE Tranche 3 proposals. Another potential factor promoting interconnection customers to exit the Transitional Cluster study process was the passage of HB 951 (Session Law 2021-165) in October 2021, which likely indicated to solar developers that additional solar procurements would be forthcoming, potentially offering a more attractive business opportunity than a negotiated contract at the avoided cost rate or a CPRE Tranche 3 contract capped at avoided cost.

DEC: A total of 90 DEC Interconnection Requests[10] were eligible for the Transitional Cluster. Of those 90 eligible Interconnection Requests, 67 withdrew, nine (9) chose to be studied in the Transitional Serial process,[11] and 14 (representing approximately 2,770 MW) proceeded in the Transitional Cluster Phase 1 process. Of these 14 Phase 1 Interconnection Requests, six (6) withdrew and the remaining eight (8) (representing approximately 342.5 MW) were processed in the Transitional Cluster Study Phase 2. Of the eight (8) Phase 2 Interconnection Requests, two (2) withdrew and six (6) (representing approximately 229 MW) were processed in Facilities Study. Of the (6) Facilities Study Interconnection Requests, one (1) withdrew and (5) (representing approximately 172.6 MW) executed Interconnection Agreements ("IA"). Of the (5) Interconnection Requests

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DEP, Generate Your Own Renewable Energy, Reporting, https://www.duke-energy.com/Business/Products/Renewables/Generate-Your-Own?jur=SC02 (last visited Mar. 25, 2024). The Transitional Cluster and subsequent DISIS generator interconnection study reports are also available on the Generator Interconnection Information page of the DEC and DEP OASIS websites at https://www.oasis.oati.com/duk/index.html and https://www.oasis.oati.com/cpl/.

[10] Stats presented herein for Transitional Cluster and 2022 DISIS includes both FERC and State jurisdictional interconnection customers in North Carolina and South Carolina that were eligible for Transitional Cluster.

[11] Interconnection Customers that progressed to Facilities Study and had executed a Facilities Study Agreement on or before the effective date of the queue reform revisions could either elect to enter the Transitional Serial study process and complete Facilities Study (upon meeting readiness obligations to demonstrate exclusive site control and to make a supplemental deposit to fund 100% of the System Upgrades) or could elect to enter the Transitional Cluster study process and provide a supplemental study deposit to enter Phase 1 and then be required to provide a deposit equal to 100% of assigned System Upgrades after Phase 1 See NCIP §§ 1.10.1 and 1.10.2.

with executed IAs, three (3) (representing approximately 119 MW) are in the engineering and design phase post-IA execution but pre-construction, and two (2) (representing approximately 53.6 MW) are under construction.

DEP: 179 DEP Interconnection Requests that were eligible for the Transitional Cluster. One hundred and twelve (112) of those requests withdrew, 23 chose to be studied in the Transitional Serial process, and 44, representing approximately 2,093.2 megawatts, proceeded in the Transitional Cluster Study Phase 1 process. Of the 44 Transitional Cluster Phase 1 Interconnection Requests, 36 withdrew and 4 state jurisdictional projects that had only distribution impacts chose to be studied in a state-jurisdictional serial process for such projects. The remaining four (4) (representing approximately 203.7 MW) were processed in the Transitional Cluster Study Phase 2. Of the four (4) Transitional Cluster Phase 2 Interconnection Requests, two (2) withdrew and two (2) (representing approximately 105.4 MW) proceeded with the Facilities Study. The two (2) Facilities Study Interconnection Requests (representing approximately 105.4 MW) executed Interconnection Agreements ('IAs'). The (2) Interconnection Requests with executed IAs (representing approximately 105.4 MW) are under construction.

2. 2022 DISIS Cluster Participation, Study Timeframes for Completion, and Withdrawals

As previously discussed, the Companies opened the 2022 DISIS Cluster enrollment window on January 1, 2022.[12] Eighty-three (83) Interconnection Customers (totaling 9,983.14 MW) provided deposits and met the M1 readiness requirements to enter Phase 1 of the 2022 DISIS Cluster. As introduced above and further described for DEC and DEP separately below, the 2022 DISIS Cluster included an extended system impact Phase, including a Phase 3 restudy due to significant withdrawals after Phase 2. The Phase 1 study for the 2022 DISIS Cluster was timely completed in 90 calendar days on November 23, 2022, and Phase 2 of that study was timely completed within 150 calendar days on May 22, 2023. Due to the number of Interconnection Customer withdrawals that occurred in both the DEC and DEP 2022 DISIS Clusters at the end of Phase 2, the Companies determined that a Phase 3 restudy was necessary to accurately assess the grid impacts of projects remaining in the Cluster. The Phase 3 restudy commenced on July 10, 2023and was completed within 150 calendar days on December 6, 2023.

Many of the withdrawals in the first annual 2022 DISIS Cluster were attributed to projects that bid in but ultimately were not selected in the 2022 Solar Procurement Program solicitation process ("2022 RFP"), which coincided with the 2022 DISIS Cluster.[13] The

[12] 2022 DISIS Cluster's queue position was established after the Transitional Cluster as well as the winter 2021-2022 resource solicitation cluster initiated to study proposals bid into CPRE Tranche 3.

[13] Step 1 of the 2022 RFP of the RFP bid evaluation process aligned with DISIS Phase 1. At the conclusion of Step 1 of the RFP, a subset of bidders were shortlisted for further evaluation and invited forward to Step 2 of the bid evaluation process. Step 2 of the 2022 RFP of the RFP bid evaluation process aligned with the more detailed Phase 2 of the 2022 DISIS. Many Interconnection Customers that were not invited forward to Step 2 of the 2022 Solar RFP elected to withdraw from the 2022 DISIS cluster. Again, the 2022 Solar RFP Step 2 conclusion coincided with the end of 2022 DISIS Phase 2, at which point the Companies invited winners to execute a contract, and many of those that were not selected as winners elected to withdraw from

eligibility criteria for the 2022 RFP required bidders (unless they already had an executed IA) to enter the 2022 DISIS Cluster to study the grid impacts of project proposals. Step 1 of the 2022 Solar RFP bid evaluation process coincided with Phase 1 of the 2022 DISIS Cluster. Twenty-four (24) Step 1 RFP participants exited the 2022 DISIS Cluster after Phase 1 (approximately 2,250 MW), and eight (8) more projects that were Step 2 RFP participants (approximately 475 MW) exited after Phase 2.[14] Including non-RFP projects, a total of 33 projects (approximately 3,750 MW) exited the Cluster after Phase 1, and a total of 12 projects (approximately 2,100 MW) exited after Phase 2. The combination of non-winning RFP participants and non-RFP participants exiting the 2022 DISIS Cluster drove the need for a Phase 3 restudy. In an attempt to avoid the need for Phase 3 restudies in future clusters, the 2023 RFP obtained authorization[15] to use an RFP-specific Resource Solicitation Cluster to conduct interconnection studies of RFP bidders separately from the 2023 DISIS Cluster, which is anticipated to result in fewer project withdrawals.

DEC: A total of 27 Interconnection Requests (representing approximately 5,192.2 MW) proceeded into Phase 1 of DEC's 2022 DISIS Cluster. Of these 27 Phase 1 Interconnection Requests, three (3) withdrew and the remaining 24 (representing approximately 4,468.9 MW) were processed in the 2022 DISIS Cluster Study Phase 2. Of the 24 Phase 2 Interconnection Requests, nine (9) withdrew and 15 (representing approximately 2,607.1 MW) proceeded to a Phase 3 restudy, which was completed and the DISIS Cluster Study Phase 3 Report was issued to Interconnection Customers within 150 calendar days. Following Phase 3, three (3) Interconnection Requests withdrew and twelve (12) (representing 3,651.9 MW) proceeded to Facilities Study, which is performed for each project individually. Those studies are scheduled to be complete by mid-June 2024.

DEP: A total of 56 Interconnection Request (representing approximately 5,192.2 MW) proceeded into Phase 1 of DEC's 2022 DISIS Cluster. Of these 56 Phase 1 Interconnection Requests, 30 withdrew and the remaining 26 (representing approximately 1,752.7 MW) were processed in the 2022 DISIS Cluster Study Phase 2. Of the 26 Phase 2 Interconnection Requests, three (3) withdrew and 23 (representing approximately 1,514.3 MW) proceeded to a Phase 3 Restudy, which was completed and the 2022 DISIS Cluster Study Phase 3 Report was issued to Interconnection Customers within 150 calendar days. Following Phase 3, two Interconnection Requests withdrew and 21 (representing 1,302.4 MW) proceeded to Facilities Study, which is performed for each project individually. Those studies are scheduled to be complete by mid-June 2024.

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the cluster.

[14] Initially bidding into the 2022 Solar RFP and then being selected in the 2022 RFP allowed Interconnection Customers to demonstrate commercial readiness and to submit a lesser amount of financial security as compared to projects not in the RFP (or otherwise demonstrating commercial readiness). Such "non-ready" projects were required to submit additional (2x at M2 and 3x and M3) security in lieu of demonstrating readiness. Many projects that were not selected in the 2022 Solar RFP and, therefore, could no longer use the 2022 Solar RFP to demonstrate commercial readiness elected to exit the 2022 DISIS versus meeting the materially higher non-commercial readiness security requirements. See NCIP 4.4.10 and 4.4.11.

[15] See Order Authorizing the Use of a Resource Solicitation Cluster Study for the 2023 Solar Procurement and Establishing Procedures, Docket Nos. E-2, Sub 1317, E-7, Sub E-7, Sub 1290 (March 2, 2023).

B. Sufficiency of Fees Charged

To mitigate the risk of project delay and restudy, the Companies' revised NCIP incorporates higher initial study deposits as well as increasing levels of project readiness and financial commitment from Interconnection Customers as they advance through the approved Cluster Study process. In review of the data prepared for this report, 50 of the 58 participants that entered the Transitional Cluster study process withdrew by the end of the study,[16] and 50 of the 83 participants that entered the 2022 DISIS Cluster withdrew by the end of the system impact study phase. Participants that withdrew from the Transitional Cluster study process did not incur withdrawal penalties,[17] and 10 of the participants that withdrew from the 2022 DISIS Cluster incurred withdrawal penalties totaling $2,512,331.66. Taken together, the data indicates that over 70% participants in the 2022 DISIS Cluster withdrew by the end of study. As part of ongoing efforts to comply with FERC's Order 2023,[18] which are discussed further in subsection C, the Companies will request approval for FERC supported, increased financial readiness, elimination of non-financial readiness options, and increases to withdrawal penalties as part of the FERC Cluster Study Process. If approved by FERC, the Companies will then seek approval for increased financial readiness and withdrawal penalties as part of the NCIP and SC GIP. Increasing financial readiness and withdrawal penalties associated with the cluster study process will potentially lead to fewer late-stage withdrawals in future cluster studies, achieve compliance with FERC Order 2023, and assist in maintaining necessary alignment between the FERC and State cluster study processes.

C. Recommended Changes & Plans for Engagement

Overall, the Companies implementation of the first-ready, first-served DISIS cluster study process has proven to be a superior process to the first-come, first-served serial process that the Companies previously used to study generator interconnection requests. The cluster study process, generally, and multi-phase DISIS framework, specifically, has improved study timelines for Interconnection Customers, reduced restudies due to late-stage withdrawals, allowed System Upgrade costs to be shared across projects and jurisdictions as needed, and eased administrative burdens associated with managing the significant volume of new interconnection requests as compared to the former serial process.

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[16] Withdrawal penalties did not apply to Interconnection Customers exiting the Transitional Cluster process prior to Phase 2.

[17] NCIP Section 1.10.2.3 provided that Interconnection Customers electing to withdraw from Transitional Cluster Interconnection Customer electing to withdraw from the Transitional Cluster Study prior to commencement of the Phase 2 study should be assigned their allocated Transitional Cluster Study Phase 1 study costs subject to the withdrawal process under Section 6.3.4, but should not be subject to any Withdrawal Penalty.

[18] Order No. 2023, FERC Docket No. RM22-14-000, Improvements to Generator Interconnection Procedures and Agreements (July 28, 2023); Order on Motions and Addressing Limited Arguments Raised on Rehearing and Setting Aside Prior Order, in Part, FERC Docket No. RM22-14-000 & RM22-14-001 at 5 (Oct. 25, 2023) (extending deadline for compliance filings to April 3, 2024).

The process in North Carolina has been mostly aligned with the FERC and South Carolina interconnection processes where both DEC and DEP also administer jurisdictional interconnection queues. Having these aligned processes benefits both the utilities and Interconnection Customers. Aligning processes at the federal and state level has allowed the utilities to facilitate competitive resource solicitations for solar and solar paired with storage facilities, decreased administrative burdens, and decreased the complexity of shared system upgrade cost allocation in administering interconnection queues. The similarities in FERC and state interconnection processes provide Interconnection Customers with improved transparency and predictability in navigating the process regardless of the queue in which the project is located.

In terms of improvements to the revised process, on March 18, 2024, the Companies submitted a required compliance filing in response to FERC's Order No. 2023 issued July 28, 2023.[19] In Order No. 2023, FERC adopted significant reforms to its *pro forma* large generation interconnection procedures ("LGIP"), primarily adopting a first-ready, first served cluster process, generally similar to DISIS in an effort to address interconnection queue backlogs, improve certainty, and prevent undue discrimination for new technologies.[20] As part of the Order No. 2023 *pro forma* LGIP, FERC established a single-phase cluster study process for all transmission providers across the country.

As part of their compliance filing, the Companies proposed to (1) adopt the vast majority of FERC Order 2023 *pro forma* LGIP reforms that may lead to process improvement and (2) request variations necessary for continued alignment between FERC and state cluster study processes. The primary components of the Order No. 2023 Cluster Study process that the Companies intend to adopt include: (i) increasing financial readiness required to progress in the cluster study process, (ii) increasing withdrawal penalties associated with the cluster study process, (iii) removing non-financial readiness options from the cluster study process, and (iv) shortening the cluster study enrollment window from 180 days to 45 days. Based on available data that indicates nearly all Interconnection Requests were submitted in the two weeks leading up to the enrollment deadline, the Companies believe that Order No. 2023's shorter enrollment period will not adversely impact the current annual cluster process. The Companies have also used substantially shorter enrollment windows than the current 180-day DISIS enrollment window in administering Resource Solicitation Clusters.

Prior to filing their Order No. 2023 compliance filing with FERC, the Companies held an open stakeholder meeting on March 8, 2024, to preview with Interconnection Customers and other interested stakeholders the Companies' planned changes to the FERC jurisdictional interconnection study process to comply with FERC Order No. 2023 as well as plans to ensure continued alignment between the FERC and state interconnection processes. In addition to adopting certain components of FERC's Order 2023 *pro forma* LGIP that may provide process improvements, Duke will also request variations to the *pro*

[19] Duke Energy Carolinas, LLC and Duke Energy Progress, LLC – Compliance Filing Containing Revisions to Attachment K to Joint OATT (LGIP/LGIA), Docket No. ER24-1554-000 (filed March 18, 2024).

[20] Order No. 2023 at 1 (Summary).

forma LGIP revisions to 1) retain the previously approved Resource Solicitation Cluster procedures and 2) retain the previously approved two-phase Cluster Study Process. These deviations will ensure that the Companies can retain the beneficial core components of their pre-existing cluster study process that are necessary for alignment between FERC and state process as described earlier in this subsection C.

In the coming months, the Companies plan to prepare amendments to the state procedures focused on process improvement and maintaining beneficial alignment after FERC approval of the compliance filing has been received. In advance of filing amendments to the state procedures, the Companies will engage with interconnection customers and other interested stakeholders in North Carolina and South Carolina to share plans for amendments to the state procedures focused on process improvement and maintaining beneficial alignment. The Companies plan to keep the Public Staff apprised of new developments relating to Order No. 2023 implementation and, at the appropriate time, will file with the Commission for needed changes to the NCIP to achieve continued alignment of the State's NCIP with the applicable FERC and South Carolina generator interconnection procedures.

III. CONCLUSION

Overall, this Informational Report shows that the first-ready, first-served cluster study process is a superior process to the first-come, first-served serial process that the Companies historically used to study generator interconnection requests. The new DISIS Cluster process has reduced speculation and improved study timelines for Interconnection Customers, allowed System Upgrades costs to be shared across projects and jurisdictions, and eased administrative burdens associated with the volume of requests in the former serial process.

Additionally, the interconnection process in North Carolina is reasonably aligned with the South Carolina and FERC jurisdictional interconnection study processes, enabling the Companies to administer the state and FERC jurisdictional interconnection queues in a coordinated manner. To date, utilizing aligned processes that rely upon consolidated Cluster Studies has produced efficiencies and benefits for both the Companies and Interconnection Customers. The Companies' recent experience is that administering a better aligned process across North Carolina, South Carolina, and FERC jurisdictions creates numerous benefits including process efficiencies, decreasing administrative burdens, and the ability to allocate System Upgrade costs among projects clustered at both the federal and state level.

In conclusion, the Companies' revised NCIP has resulted in a more streamlined and efficient interconnection study process for the benefit of commercially ready Interconnection Customers in the Carolinas. The Companies and their Interconnection Customers have benefited from the transition to the new Cluster Study process and are now seeing the positive impacts of aligning the generator interconnection processes for all of their Interconnection Customers—customers subject to FERC interconnection procedures and customers subject to state interconnection procedures in both North Carolina and South Carolina.

As part of their Order No. 2023 compliance efforts, the Companies are making reasonable efforts to retain beneficial and necessary components of their pre-existing cluster study process while also incorporating new components from FERC's pro forma Cluster Study process that may lead to process improvement.

The Companies look forward to working with the Commission, the Public Staff, interconnection customers and other interested Carolinas interconnection stakeholders to ensure continued alignment and successful execution of the Cluster study process to promote efficient generator interconnection processing in North Carolina.

NCUC DEC & DEP Queue Reform Informational Report

Transitional Cluster

	start	complete	# days
Phase 1	12/1/2021	2/28/2022	90
Phase 2	3/31/2022	8/26/2022	149
Facilities Studies			

All of the FERC request completed FS by 2/23/2023. 2 State requests completed FS after 2/23/2023. The FS complete date for projects vary since they were individually studied.

	FERC								State								Total	
	Project Count				MWs				Project Count				MWs				Project Count	MWs
	DEC		DEP		DEC		DEP		DEC		DEP		DEC		DEP			
	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC		
Valid Requests Received	7	6	20	5	4,828.0	2,232.0	4,759.35	624.9	21	56	66	88	774.17	2,021.37	2,191.81	1,944.83	269	19,376.42
Phase 1 requests	2	1	5	3	1,553.0	741.0	417.10	389.9	2	9	17	19	37.75	438.25	786.61	499.66	58	4,863.27
Phase 2 requests	1	0	2	1	50.0	0	53.80	74.9	2	5	1	0	37.75	254.75	75.00	0	12	546.20
Phase 3 requests	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Facilities Studies requests	1	0	1	1	50	0	30.5	74.9	2	3	0	0	37.75	141.25	0	0	8	334.4
Executed IA	1	0	1	1	50	0	30.5	74.9	1	3	0	0	35	141.25	0	0	7	331.65
Operational	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

2022 DISIS

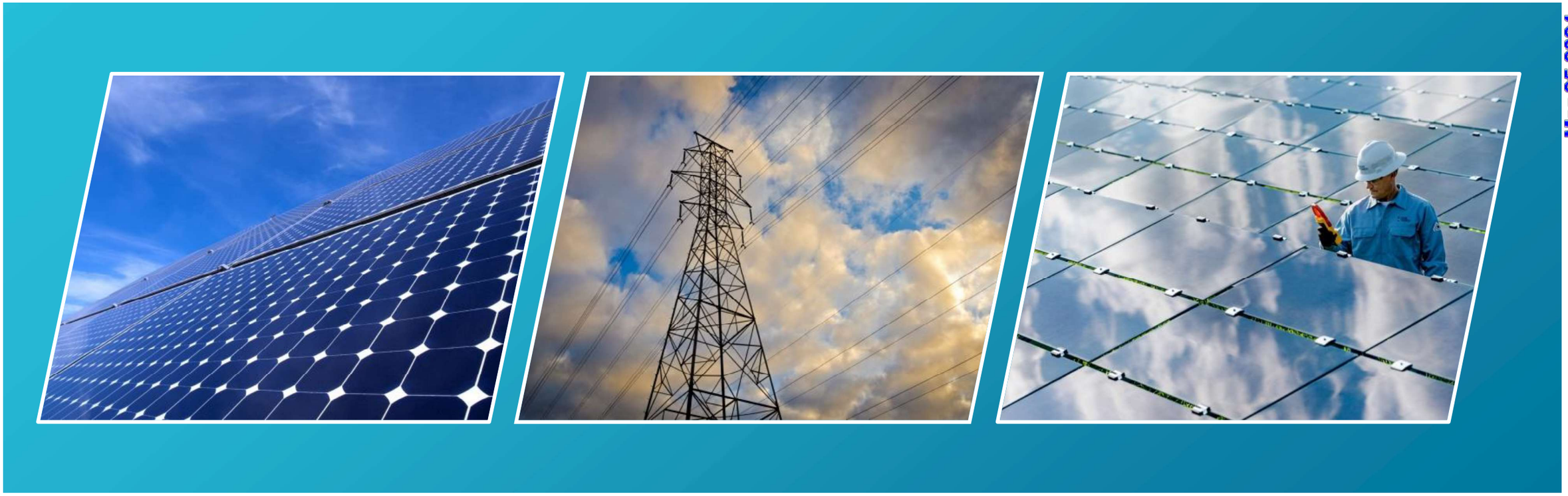
	start	complete	# days
Request window	1/1/2022	6/29/2022	180
Customer Engagement	6/30/2022	8/28/2022	60
Phase 1	8/29/2022	11/23/2022	87
Customer Engagement	11/24/2022	12/23/2022	30
Phase 2	12/24/2023	5/22/2023	150
Customer Engagement	5/23/2023	6/21/2023	30
Phase 3	7/10/2023	12/6/2023	150
Customer Engagement	12/7/2023	1/6/2023	30
Facilities Studies			

Twelve projects executed their Facilities Study Agreement within the 30 Calendar Day Customer Engagement period, and are currently in Facilities Study, which is a 150 day study period

	FERC								State								Total	
	Project Count				MWs				Project Count				MWs				Project Count	MWs
	DEC		DEP		DEC		DEP		DEC		DEP		DEC		DEP			
	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC		
Valid Requests Received	5	5	14	3	1,088.3	3,461.7	1,822.55	351.0	5	15	27	19	110.33	690.87	2,048.80	1,147.07	93	10,720.62
Phase 1 requests	5	5	12	3	1,088.3	3,461.7	1,590.96	351.0	3	14	25	16	25.33	615.88	1,893.80	956.17	83	9,983.14
Phase 2 requests	3	5	4	1	412.0	3,461.7	273.26	76.0	3	13	9	12	25.33	565.88	712.23	691.17	50	6,217.58
Phase 3 requests	2	3	4	1	312.00	1,947.7	273.26	76.0	2	8	6	12	5.33	342.08	473.91	691.17	38	4,121.46
Facilities Studies requests	2	2	3	1	312	1,750.7	135.26	76.0	1	7	5	12	2.67	284.08	400.00	691.17	33	3,651.88
Executed IA	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Operational	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

DEC & DEP FERC Order 2023 Engagement Meeting

March 8, 2024



Queue Reform Background

- On October 15, 2020, Duke's proposed Queue Reform revisions to the NC Interconnection Procedures (NCIP) were approved by the NCUC.

- On February 5, 2021, Duke's proposed Queue Reform revisions to the SC Generator Interconnection Procedures (SCGIP) were approved by SCPSC directive order. The SCPSC also issued a final order on June 18, 2021.

- On August 6, 2021, Duke's proposed Queue Reform revisions to the Large Generator Interconnection Procedures (LGIP) governing DEC and DEP were approved by the FERC.

FERC Order 2023 Overview

- Federal Energy Regulatory Commission (FERC) Order 2023 establishes a cluster study process for all transmission providers across the country. It is intended to address interconnection queue backlogs, improve certainty, and prevent undue discrimination for new technologies.

- By April 3, 2024, all transmission providers are required to submit a compliance filing that either:

1

adopts the FERC-approved *pro forma* tariff revisions to the Generator Interconnection Procedures and Agreements without deviations

OR

2

requests deviations that meet the legal standard (which is "consistent with or superior to" for DEC and DEP)

- Providers may seek variances from the FERC pro forma Large Generator Interconnection Procedures (LGIP) in their compliance filing to FERC.
- DEC and DEP were early adopters of a cluster process, so will not be required to perform a serial-to-cluster transition study process again.
- Serial study and feasibility study were removed from FERC pro forma as part of Order 2023.

Duke's Approach to FERC Order 2023 Compliance

DEC & DEP Large Generator Interconnection Procedures (Attachment K)

- Planned Deviations – Maintain current 2 Phase Cluster process & Resource Solicitation Cluster option
- Filing Due – April 3, 2024; Filing will be made mid-March
- Planned Effective Date – November 1, 2025
- No deadline for FERC to issue an order on this filing

Order 2023 Key Reforms

Key Reforms	Summary Directive
Cluster Study Cost	Transmission Providers can allocate between 10% and 50% of cluster study costs on a per interconnection request basis with remaining 50%-90% allocated pro rata on a per MW basis
Network Upgrade Cost	Transmission Providers required to use proportional impact methodology
Shared Upgrade Cost	Order 2023 declined to require transmission providers to allocate Network Upgrade costs between earlier and later clusters
Study Deposits, Commercial Readiness, Withdrawal Penalties, Site Control	Covered by upcoming slides
Affected Systems Coordination	Transmission providers are required to adopt a new 150 day affected systems study process and new pro forma affected systems study agreements
Reasonable Efforts/ Penalites	Eliminated the “reasonable efforts” standard for all studies. Financial penalties will be imposed on transmission providers who fail to complete studies on time.
Transition Process	Order 2023 established a transition process for transmission providers currently using serial studies; not applicable to those already using cluster studies
Resource Solicitation	FERC did not establish a Resource Solicitation Process. FERC acknowledged resource solicitation processes may be beneficial, but determined that it would not require all transmission providers to adopt a one size fits all approach that did not account for regional differences/ transmission provider needs and requirements.
Cluster Studies	Transmission Providers required to adopted one-phase cluster study process.
Publicly Available Information	Transmission Providers required to make heatmap and interconnection metrics table publicly available, allowing prospective interconnection customers to see certain estimates of potential generating facility’s effect on transmission system.

Order 2023 Comparison- RSC & Cluster Study Process

- FERC did not establish a process for Resource Solicitation Clusters (which the Companies currently have). FERC acknowledged resource solicitation processes may be beneficial, but determined that it would not require all transmission providers to adopt this aspect.

- FERC pro forma Cluster study differences from Duke's current Cluster Study:
  - Does not include Resource Solicitation Cluster
  - requires commercial readiness for all projects in the form of increasing financial security, no non-monetary readiness qualifications are allowed
  - establishes a single-phase “Cluster Study” which is equivalent to the Companies’ current “Phase 2” (thermal studies with short circuit, stability, and reactive power studies)
  - 45 day enrollment window (compared to current 180 day window)
  - 90 days (with 20% accuracy) or 180 days (with 10% accuracy) Facility Study (compared to current 150 days).

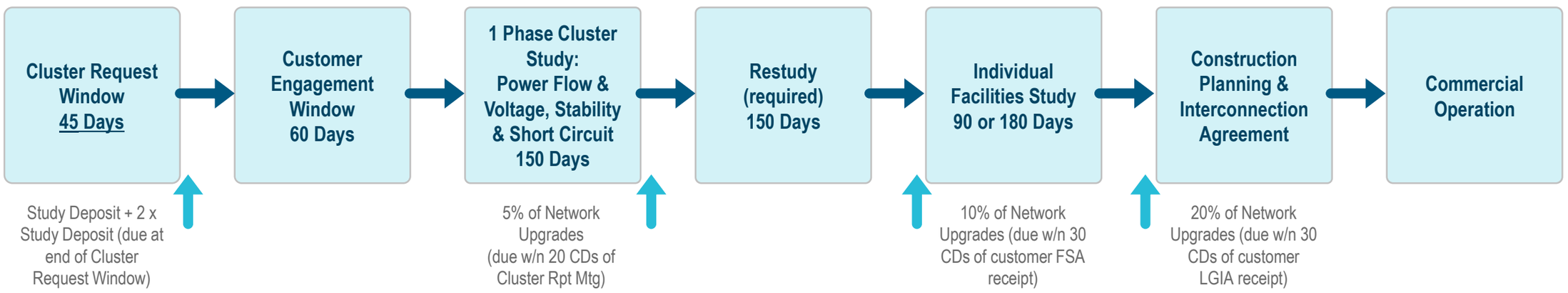
DEC & DEP Planned Variation Requests

DEC/DEP are seeking variances on the following:

- **Keeping the Resource Solicitation Cluster**
  - Approved by FERC in 2021
  - Order 2023 acknowledged resource solicitation cluster processes may be beneficial, but determined that requiring uniform approach in pro forma would ignore transmission provider/ region specific needs
  - RSC has been important tool in Carolinas for studying proposals bid into Competitive Resource Solicitations separate from annual DISIS and has reduced speculation and restudy risk in DISIS
- **Keeping the 2-Phase study process** (see next 3 slides)
  - Approved by FERC in 2021
  - Maintains alignment with state cluster study process that is critical to assessing transmission impacts that are not jurisdictional specific. Restudy will likely be required if Order 2023 single-phase process is adopted.
  - Assuming a Cluster restudy is required, performance of Order 2023 cluster study will require 300 days minimum compared to Duke's 2-phase 240 days minimum

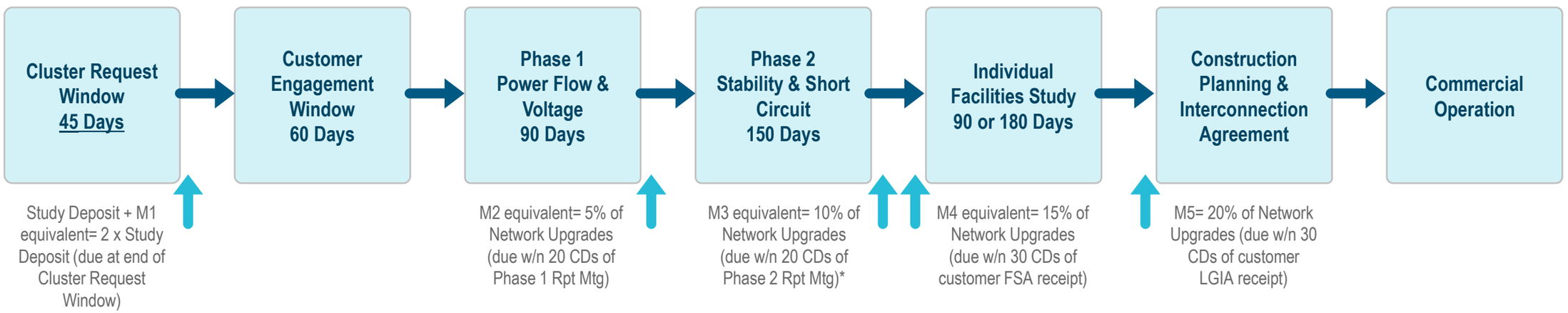
Cluster Study Formation - Order 2023

Order 2023



Cluster Study Formation - Duke Proposal

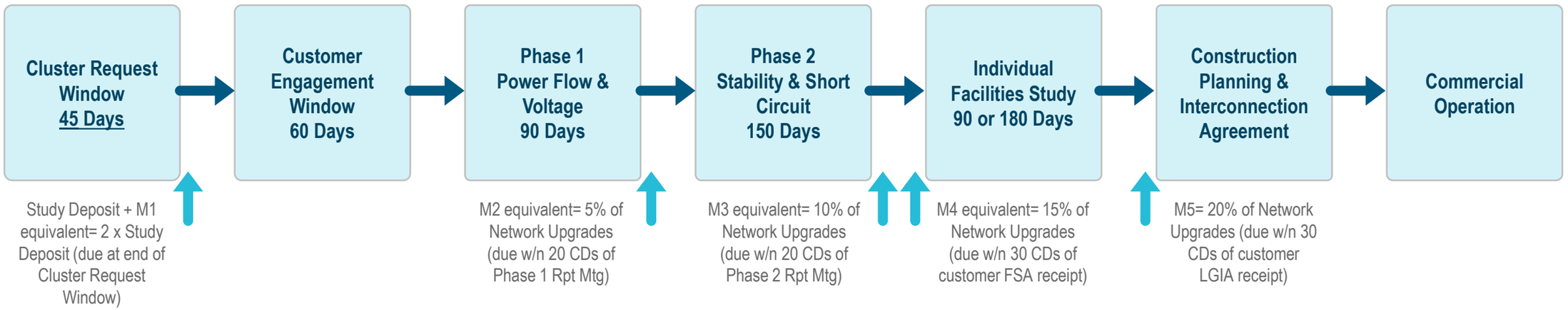
DEC & DEP FERC Order 2023 Compliance Proposal



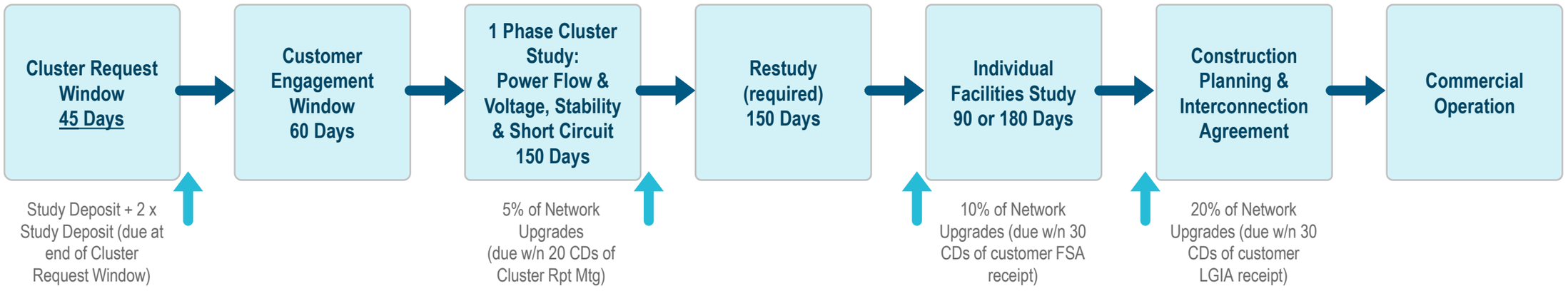
**Restudy may be required after Phase 2. M3 equivalent provides sufficient readiness to encourage only viable project proceed.*

Cluster Study Formation - Duke Proposal & Order 2023

DEC & DEP FERC Order 2023 Compliance Proposal

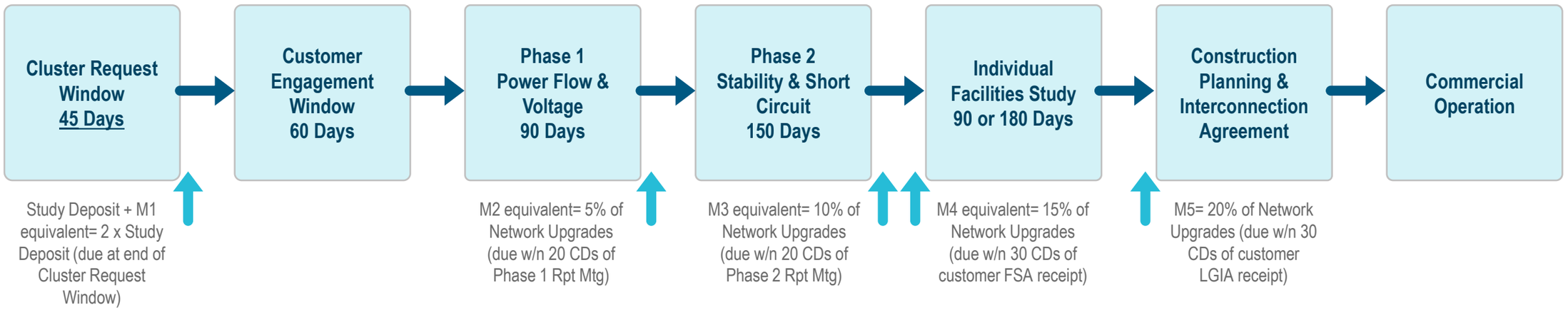


Order 2023



Cluster Study Formation - Duke Proposal & Current

DEC & DEP FERC Order 2023 Compliance Proposal



DEC & DEP FERC 2021-2023 DISIS

Current Financial Commitments and Commercial Readiness

Study Deposits: $20,000 + $1 per kW for requests < 20 MW; $35,000 + $1 per kW for requests ≥ 20 MW < 50 MW; $50,000 + $1 per kW for requests ≥ 50 MW< 80MW; $150,000 for requests ≥ 80 MW < 200 MW; $250,000 for requests ≥ 200 MW.

Site Control: Full Site Control required throughout the Definitive Interconnection Study Process. Interconnection Customer may provide a $20,000 + $500/MW deposit in lieu of Site Control to enter Phase 1. Deposit in lieu of Site Control is not accepted for later Phases.

Commercial Readiness:

Customer Engagement Window End:	1 x Study Deposit + non-monetary readiness or 2 x Study Deposit
After Cluster Study Phase 1:	1 x Study Deposit + non-monetary readiness or 3 x Study Deposit
After Cluster Study Phase 2:	1 x Study Deposit + non-monetary readiness or 5 x Study Deposit
FSA Execution:	1 x Study Deposit + non-monetary readiness or 7 x Study Deposit
LGIA:	9 x Study Deposit

Withdrawal Penalties: Interconnection Customers will face increasing penalties for withdrawal based on study cost multiplier depending on readiness provided and time of withdrawal; Includes exceptions such as for increased costs (e.g. 25% increase between cluster study reports)

Proposed Financial Commitments & Commercial Readiness

Study Deposits: $35,000 plus $1,000 per MW for Interconnection Requests ≥ 20 MW < 80 MW; $150,000 for Interconnection Requests ≥ 80 MW < 200 MW; $250,000 for Interconnection Requests ≥ 200 MW

Site Control: 90% Site Control required at Interconnection Request stage (Size dependent $500k to $2m deposit in lieu of site control option available only when regulatory restriction prevents acquiring control), with 100% required at IA stage

Commercial Readiness: no non-monetary commercial readiness allowed, only monetary deposits required

Interconnection Request:	2 x Study Deposit
After Cluster Study Phase 1:	5% of Interconnection Customer's Network Upgrade costs (inclusive of Interconnection Request Commercial Readiness Deposit)
After Cluster Study Phase 2:	10% of Interconnection Customer's Network Upgrade costs (inclusive of Interconnection Request Commercial Readiness Deposit)
FSA Execution:	15% of Interconnection Customer's Network Upgrade costs (inclusive of prior Commercial Readiness Deposits)
LGIA:	20% of LGIA Network Upgrade costs (inclusive of Commercial Readiness Deposits received to date)

Withdrawal Penalties: Interconnection Customers will face increasing penalties for withdrawal based on study costs or Network Upgrade estimated costs depending on time of withdrawal; Includes exceptions such as for increased costs (e.g. 25% increase between cluster study reports)

Planned State Alignment

- DEC/DEP are adopting the following Order 2023 aspects that **will require amendments to the state procedures (the tentative filing timeline with the states is within a few months of FERC approval of the compliance filing, so likely Q4 2024 or 2025), including:**
  - No more non-commercial readiness criteria, so all participants have to pay the higher deposits / financial readiness
  - Adopting the new withdrawal penalties and penalty distribution for interconnecting customers
  - Changing the enrollment window to 45 days.
  - Alignment will impact the Section 4 study process in NCIP, Section 4 Study process in SCGIP, and Duke's Cluster study process detailed in Appendix Duke CS to the SCGIP

- State alignment plans will be dependent on final FERC determination in response to DEC/DEP's Order 2023 compliance filings

Appendix

Order 2023- New Affected Systems Process

- New Affected Systems Process
  - Affected System Study – 150 calendar days
  - includes system impact study and network upgrade facilities study
  - utilizes ERIS modeling standards
  - Affected System Restudy

- New Affected Systems Agreements
  - Pro forma affected system study agreement
  - Pro forma multiparty affected system study agreement
  - Pro forma affected system construction agreement
  - Pro forma multiparty affected system construction agreement

Order 2023- Study Cost Allocation

- Attachment K – DISIS
  - Actual Costs, split among participants in Cluster:
  - 10% per capita
  - 90% pro rata

- Order 2023 – Cluster Study
  - Actual Costs, Transmission Provider to choose allocation as follows:
  - Between 10% and 50% based on per capita basis
  - Balance of 50% and 90% based on pro rata
  - Duke plans to keep current 10% per capita / 90% pro rata

Order 2023- Network Upgrade Assignment

- Attachment K – DISIS
  - Proportional Impact/DFAX

- Order 2023 – Cluster Study
  - Substation Upgrades – per capita
  - System Upgrades – Proportional Impact/DFAX

Order 2023- Network Upgrade Assignment

- Attachment K – DISIS
  - Proportional Impact/DFAX

- Order 2023 – Cluster Study
  - Substation Upgrades – per capita
  - System Upgrades – Proportional Impact/DFAX

Order 2023- Alternative Transmission Technologies

- Attachment K – N/A

- Order 2023 – Transmission Providers will evaluate the following enumerated list of alternative transmission technologies in their Cluster Study process:

  - Static synchronous compensators
  - Static VAR compensators
  - Advanced power flow control devices
  - Transmission switching
  - Synchronous condensers
  - Voltage source converters
  - Advanced conductors
  - Tower lifting

Order 2023- Public Information/ Heatmap

- Attachment K – N/A
- Order 2023
  - Interactive visual representation of the estimated incremental injection capacity (in MW) available at each point of interconnection in Transmission Provider's footprint under N-1 conditions
  - Table of metrics concerning the estimated impact of a potential Generating Facility on Transmission Provider's Transmission System based on a user-specified addition of a particular number of MW at a particular voltage at a particular point of interconnection.
    - Distribution Factor
    - MW impact
    - Percentage impact on each impacted transmission facility
    - Percentage of power flow on each impacted transmission facility before injection
    - Percentage of power flow on each impacted transmission facility after injection
  - Updated within 30 Calendar Days of conclusion of each Cluster Study/Restudy

Order 2023- Generator Replacement

- Attachment K – Accepted by FERC
- Order 2023- FERC ruled outside the scope
  - DEC and DEP plan to retain process accepted by FERC

CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Carolinas, LLC's and Duke Energy Progress, LLC's Queue Reform Informational Report, in Docket No. E-100, Sub 101, has been served electronically to all parties of record.

This the 25th day of March, 2024.

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