Duke Energy Interconnection Queue Reform-
FERC Stakeholder Meeting

March 16, 2021



DUKE ENERGY®

Current State: A Case for Queue Reform

Growing Queue	The increasing size of the interconnection queue is creating challenges for both Duke Energy and developers that are not readily solvable under the existing processes.
Increasing Interdependencies	Solar penetration levels are increasingly resulting in interdependencies between transmission and distribution requests as well as FERC and State projects.
Network Upgrades Increasingly Triggered	Due to the level of successful interconnections achieved to date, interconnection requests are becoming increasingly likely to trigger substantial network upgrades.
Cost Sharing Mechanism	The existing serial process prevents developers from sharing costs when large upgrades are required creating both market and system congestion.
Growing Interest in Cluster Studies	Cluster studies have been utilized to successfully accommodate increased interest in interconnection processing at federal and state levels.
Commitment to Net-Zero Carbon Emissions	Queue Reform success is necessary to Duke Energy's goal of achieving net-zero carbon emissions from electric generation by midcentury.

FERC Orders Approving Queue Reform Filings

PSCo

- On December 4, 2019 in Docket No. ER19-2774, FERC issued an order approving PSCo's proposed revisions to its LGIP and LGIA providing for a transition from a serial first-come, first-served approach to a clustered first-ready, first-served approach finding the proposal a just and reasonable solution to addressing the backlog of generation interconnection requests in PSCo's queue while also specifically stating (1) PSCo's proposed financial security, readiness milestones, and withdrawal penalty provisions are consistent with or superior to the *pro forma* LGIP and (2) PSCo's proposed transition process is just and reasonable.

PacifiCorp

- On May 12, 2020 in Docket No. ER20-924, FERC issued an order approving PacifiCorp's queue reform proposal which described a similar process to the one recently approved for PSCo., finding that the reforms "represent a just and reasonable solution to address the backlog of generation interconnection requests in [PacifiCorp's] queue."

DEP, DEC, & DEF Joint OATT LGIP (Attachment J §2.1)

- **Option to Elect Serial or Cluster Process:** Under Duke's revised LGIP, each transmission provider has the option to implement the serial interconnection process or transition to the Definitive Interconnection Study Process.

- **DEC and DEP:** Initially, DEC and DEP will elect to transition to the cluster study process. The harmonization of a cluster study process between federal and state procedures will be necessary to overcoming the significant challenges of interdependency and inequitable cost allocation that Duke has experienced as a result of processing Interconnection Requests under the current serial interconnection study process.

- **DEF:** Initially, DEF will retain the serial interconnection process. Unlike DEC and DEP that compile their own base cases, DEF provides its information to the FRCC who compiles base cases on an FRCC-wide basis. The LGIP revisions permit DEF to elect to transition to a cluster process in the future, which would require additional coordination with transmission providers across the FRCC region for successful implementation.

LGIP: Comparison of Duke to PSCo

Issue	Approved PSCo LGIP Section	Proposed Duke LGIP Section	Substantive Change(s) Between Duke & PSCO LGIP?	Notes
Informational Interconnection Study Process	§ 6	§ 3	No	No substantive changes made to PSCo approved language.
DISP Study Process	§ 7	§ 10	Yes	Duke has 2 additional Customer Engagement Windows in the DISP and if restudy is required, a 3rd Customer Engagement Window will occur. More Interconnection Customer friendly than PSCo because it allows Interconnection Customers to interact with Duke on more occasions about their study results.
DISP Study Deposit	§ 3.1	§ 4.1.2	Yes	Duke study deposits and withdrawal penalties are lower for smaller MW projects as compared to PSCo. More Interconnection Customer friendly than PSCo because financial outlay and penalties for small MW projects are lower.
DISP Study Cost Allocation / Withdrawal Penalty Distribution	§ 4.2.3 § 3.7.1.2	§ 10.3 § 4.7.1.2	Yes	PSCo allocated 50% of study costs to Interconnection Customers on a per-customer basis and 50% of study costs to customers on a pro rata MW basis. Duke will allocate 10% of study costs to Interconnection Customers on a per-customer basis and 90% of study costs to customers on a pro rata MW basis. Aligns with FERC cost causation principles and equitable to all Interconnection Customers based on MW size.
DISP Distribution & Transmission Upgrade Cost Allocation	§ 4.2.4	§ 10.4	No	No substantive changes made to approved PSCo language.
DISP Financial Security	§ 7.7	§ 10.11	No	No substantive changes made to approved PSCo language.
DISP Readiness Milestones	§ 7.7	§ 10.11	No	No substantive changes made to approved PSCo language.
DISP Withdrawal Penalty	§ 3.7.1	§ 4.7.1	No	No substantive changes made to approved PSCo language.
Site Control	§ 7.7	§ 4.4.2	Yes	Duke adopted PSCo's (a) definition of site control and (b) site control requirements document posted on OASIS. However, unlike PSCo's escalating percentages of site control required during DISP, Duke requires full site control through DISP (which mirrors full site control required under current Duke serial process). No negative feedback from stakeholders on this issue.
Transitional Serial Process	§ 5.1.1.1	§ 7.1	No	No substantive changes made to approved PSCo language.
Transitional Cluster Process	§ 5.1.1.2	§ 7.2	Yes	PSCo's Transitional Cluster requires higher financial commitments upfront and one study phase combining the System Impact Study and Facilities Study. Duke's Transitional Cluster process is more Interconnection Customer friendly because it requires lower financial commitment upfront, provides non-ready security-only path, and multiple phases of studies.

Financial Security Requirements and Withdrawal Penalties in DISP: Comparison of Duke to PSCo

Utility	Process?	Study Deposits	Readiness?	**M1**- Due by close of 60 CD Cust. Eng. Window	**M2**- Due within 20 CDs of Phase 1 Rpt Mtg	**M3**- Due within 20 CDs of Phase 2 Rpt Mtg	**M4**- Due within 30 CDs of FSA delivery	**M5**- Due within 15 BDs of final LGIA delivery
Duke	DISP Financial Security	$20k + $1/kW < 20 MW $35k + $1/kW ≥ 20 MW< 50 MW $50k + $1/kW ≥ 50 MW< 80MW $150k ≥ 80 MW < 200 MW	Yes	1x Study Deposit	1x Study Deposit	1x Study Deposit	1x Study Deposit	9x Study Deposit
		$250k ≥ 200 MW	No	2x Study Deposit	3x Study Deposit	5x Study Deposit	7x Study Deposit	9x Study Deposit
PSCo	DISP Financial Security	$75k < 50MW $150k ≥ 50 MW< 200 MW	Yes	1x Study Deposit	1x Study Deposit	1x Study Deposit	1x Study Deposit	9x Study Deposit
		$250k ≥ 200 MW	No	2x Study Deposit	3x Study Deposit	5x Study Deposit	7x Study Deposit	9x Study Deposit
Duke	DISP Withdrawal Penalty	$20k + $1/kW < 20 MW $35k + $1/kW ≥ 20 MW< 50 MW $50k + $1/kW ≥ 50 MW< 80MW $150k ≥ 80 MW < 200 MW $250k ≥ 200 MW	Yes	1x Study Cost*	1x Study Cost*	1x Study Cost*	1x Study Cost*	9x Study Cost*
			No	2x Study Cost*	3x Study Cost*	5x Study Cost*	7x Study Cost*	9x Study Cost*
PSCo	DISP Withdrawal Penalty	$75k < 50MW $150k ≥ 50 MW< 200 MW	Yes	1x Study Cost*	1x Study Cost*	1x Study Cost*	1x Study Cost*	9x Study Cost*
		$250k ≥ 200 MW	No	2x Study Cost*	3x Study Cost*	5x Study Cost*	7x Study Cost*	9x Study Cost*

**Higher of Study Deposit or Study Cost Multiplier*

DISP Transitional Process: Comparison of Duke to PSCo

Utility	Process?	Study Deposits	Transitional Serial or Cluster?	Pre-Transitional Cluster Study Phase 1	Pre-Transitional Cluster Study Phase 2	Pre-Facilities	Pre-IA
Duke	Transitional Process Financial Security	$20k + $1/kW < 20 MW $35k + $1/kW ≥ 20 MW< 50 MW $50k + $1/kW ≥ 50 MW< 80MW $150k ≥ 80 MW < 200 MW	Serial	N/A	N/A	100% Interconnect Facilities & Network Upgrades cost estimates in SIS Report	100% Interconnect Facilities & Network Upgrades cost estimates in SIS Report
		$250k ≥ 200 MW	Cluster	1x Study Deposit (ready)/ 1x Study Deposit + $3 Million (non-ready)	$3 Million (ready)/ $6 Million (non-ready)	$3 Million (ready)/ $6 Million (non-ready)	$3 Million (ready)/ $6 Million (non-ready)
PSCo	Transitional Process Financial Security	$75k < 50MW $150k ≥ 50 MW< 200 MW	Serial	N/A	N/A	100% Interconnect Facilities & Network Upgrades cost estimates in SIS Report	100% Interconnect Facilities & Network Upgrades cost estimates in SIS Report
		$250k ≥ 200 MW	Cluster	$5 Million		$5 Million	$5 Million
Duke	Transitional Process Withdrawal Penalty	$20k + $1/kW < 20 MW $35k + $1/kW ≥ 20 MW< 50 MW $50k + $1/kW ≥ 50 MW< 80MW $150k ≥ 80 MW < 200 MW	Serial	N/A	N/A	9x Study Cost	9x Study Cost
		$250k ≥ 200 MW	Cluster	N/A	9x Study Cost	9x Study Cost	9x Study Cost
PSCo	Transitional Process Withdrawal Penalty	$75k < 50MW $150k ≥ 50 MW< 200 MW	Serial	N/A	N/A	9x Study Cost	9x Study Cost
		$250k ≥ 200 MW	Cluster	9x Study Cost		9x Study Cost	9x Study Cost

APPENDIX

Informational Interconnection Studies (§ 3.)

- The Informational Interconnection Study is an optional study available where Transmission Provider is implementing Definitive Interconnection Study Process.

- The Informational Interconnection Study shall be performed solely for informational purposes and is non-binding and does not confer any rights.

- Within five (5) Business Days after receipt of a request for an Informational Interconnection Study, Transmission Provider shall provide to Interconnection Customer an Informational Interconnection Study Agreement. Interconnection Customer shall execute the Informational Interconnection Study Agreement within ten (10) Business Days of receipt of an agreed upon scope of work and deliver the Informational Interconnection Study Agreement, the technical data, and a $10,000 deposit to Transmission Provider.

- An Informational Interconnection Request to evaluate one site at two different voltage levels shall be treated as two Informational Interconnection Requests. Any one Interconnection Customer shall have no more than five (5) requests for Informational Interconnection Study reports pending at one time. Interconnection Customer must submit a deposit with each Informational Interconnection Request even when more than one request is submitted for a single site.

Interconnection Request & Initial Study Deposits (§ 4.)

- Where the Transmission Provider is administering a Definitive Interconnection Study Process, an Interconnection Customer shall submit an Interconnection Request, an application fee of **$5,000**, and a **study deposit based upon the requested capacity of the Generating Facility (MW)** as follows:
  - $20,000 plus one dollar ($1.00) per kWac for requests < 20 MW*;
  - $35,000 plus one dollar ($1.00) per kWac for requests ≥ 20 MW < 50 MW;
  - $50,000 plus one dollar ($1.00) per kWac for requests ≥ 50 MW < 80MW;
  - $150,000 for requests ≥ 80 MW < 200 MW; and
  - $250,000 for requests ≥ 200 MW

- Small Generating Facilities requesting NRIS will be included in DISIS as detailed in LGIP.*

- Transmission Provider shall apply the deposit toward the cost of administering the Definitive Interconnection Study Process as well as any Network Upgrades and Interconnection Facilities, including overheads under a future Interconnection Agreement.

- Study costs will be allocated to Cluster Study participants as follows: 10% based on the number of Interconnection Requests in the Cluster; and 90 % based on the requested megawatts in the Cluster.

- Differences between the actual cost of study and study deposit will be charged or refunded, as applicable (subject to potential Withdrawal Penalties).

Engagement Window (§ 10.1)

180 Day Request Window

60 Day Customer Engagement

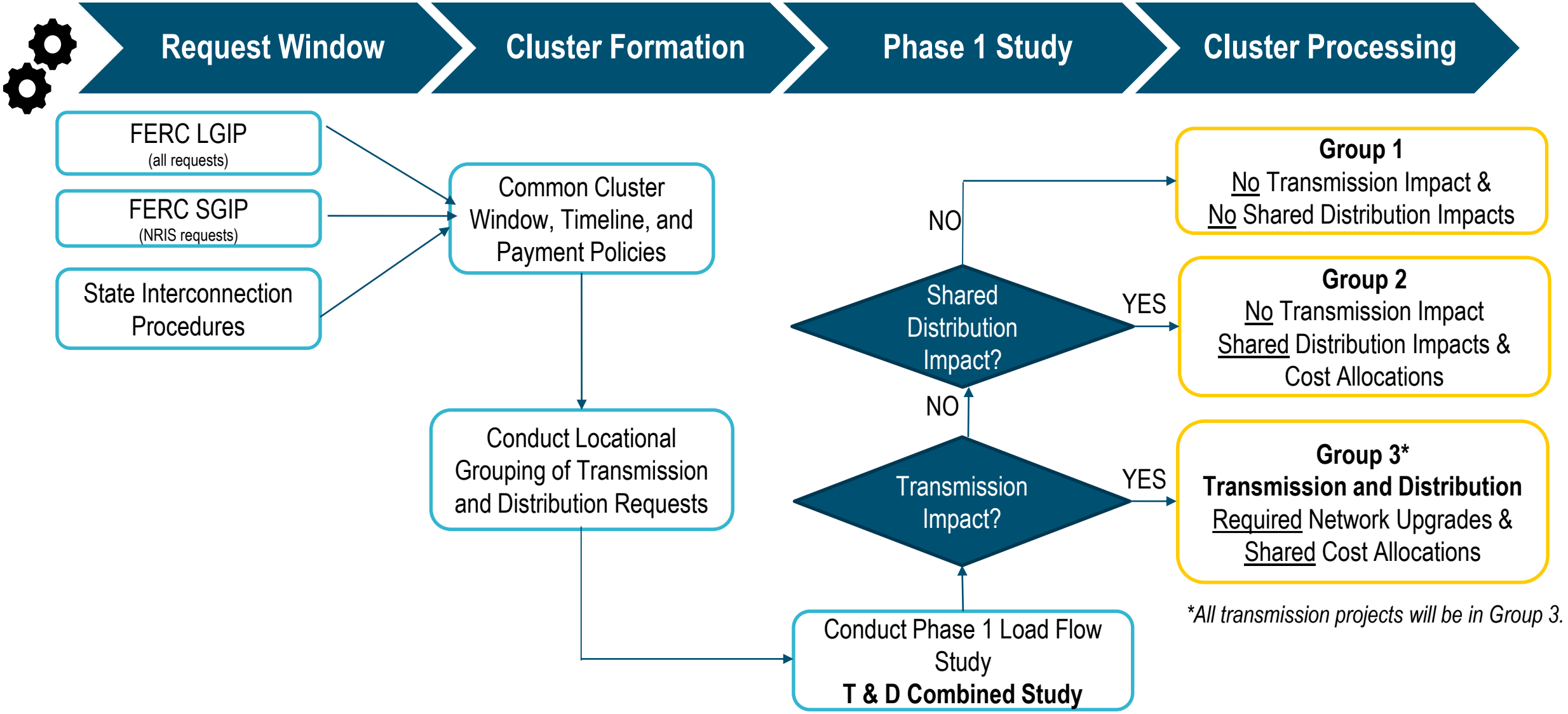
Duke hosts open Scoping Meeting within 10 business days of DISIS Window close.

*All requests must have executed agreement by end of Customer Engagement Window.

90 Day Phase 1

Power Flow & Voltage

Proposed Cluster Impact Group Determination



Interconnection Customers Exempt from DISIS Phase 2 (§ 10.8)

- At the end of DISIS Phase 1, a distribution-level Interconnection Customer (SGIP NRIS) that does not cause or contribute to Network Upgrades will be exempt from DISIS Phase 2, and, if applicable DISIS Phase 3.

- The Transmission Provider shall then complete an individual Distribution-level System Impact Study for the proposed Generating Facility within 50 business days.

- Upon issuance of the individual Distribution-level System Impact Study Report, the Interconnection Customer will proceed immediately to Facilities Study.

- Interconnection Customers that are studied for distribution level impacts must continue to meet all Readiness Milestone requirements (or provide security in lieu of the Readiness Milestone) to proceed to Facilities Study under Section 11.

Cost Allocation for Transmission Upgrades

- Identify constrained facility (thermal) and worst condition

- Determine impact of projects on constrained facilities based on worst condition

  - Calculate Distribution Factor **[MW Impact / Generator MW Rating]**
  - Calculate Loading Impact **[MW Impact / Applicable Facility Rating]**
  - Calculate MW Impact **[Distribution Factor x Generator Rating (MW)]**

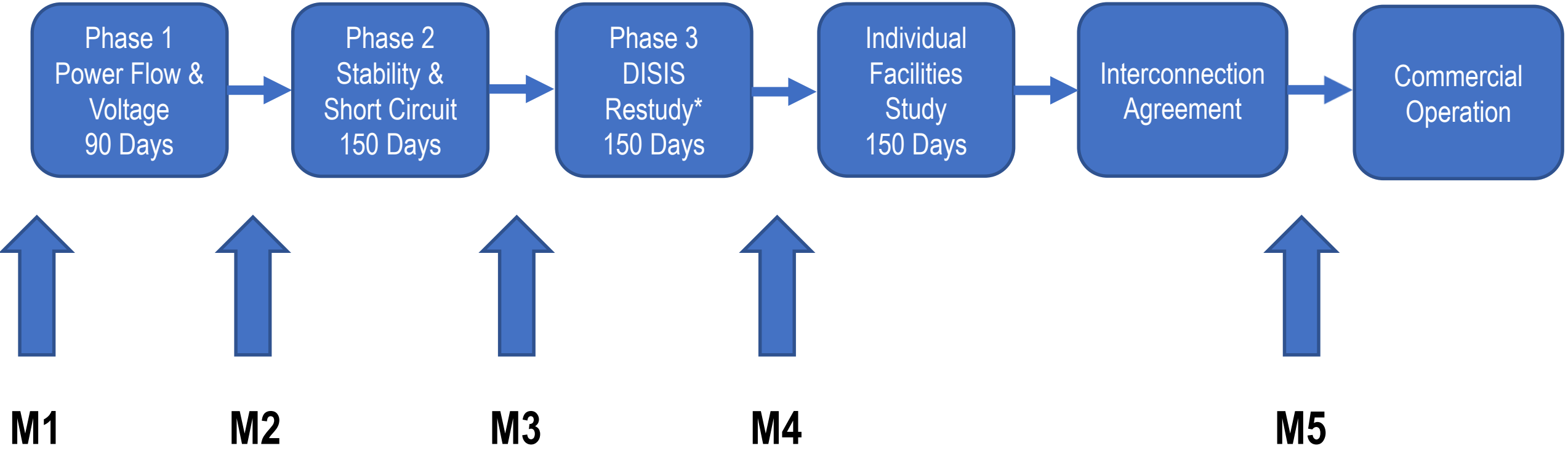
- Projects with Distribution Factor < 3% <u>and</u> Loading Impact < 1% on constrained facilities are exempt from cost allocation

- Cost for the required thermal upgrades will be allocated based on the individual project MW Impact divided by the Total MW Impact for all projects subject to cost allocation.

Cost Allocation for Distribution Upgrades

Transformer/Substation Bank Upgrades	Per MW basis
Distribution Line Work (e.g. reconductor)	Per MW basis, based on location (% use of upgrade)
Distribution System Protection Upgrades	Per count of projects on feeder
Relaying Upgrades for Anti-Islanding Protection	Per count of projects on substation
Communication Medium for Anti-Islanding Protection	Per count of projects, based on location (% use of upgrade)
Interconnection Facilities	Per count of projects

Definitive Interconnection Study Process (§§ 10.7-10.8)



**Phase 3 Re-Study will occur only if required*

Financial Security and Readiness Milestones (§10.11)

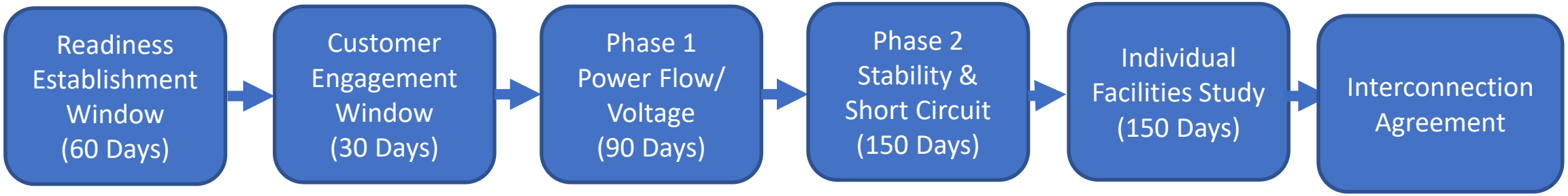
Readiness?	**M1-** Due by close of 60 CD Cust. Eng. Window	**M2-** Due within 20 CDs of Phase 1 Rpt Mtg	**M3-** Due within 20 CDs of Phase 2 Rpt Mtg	**M4-** Due within 30 CDs of FSA delivery	**M5-** Due within 15 BDs of final LGIA delivery
Yes	Financial Security 1x Study Deposit Readiness options: (1) Executed Term Sheet (2) Reasonable evidence selected in Resource Plan or offered into RSP (3) FERC Accepted Provisional LGIA	Financial Security 1x Study Deposit Readiness options: (1) Executed Term Sheet (2) Reasonable evidence selected in Resource Plan or offered into RSP (3) FERC Accepted Provisional LGIA	Financial Security 1x Study Deposit Readiness options: (1) Executed Contract (2) Reasonable evidence selected in Resource Plan or offered into RSP (3) FERC Accepted, Unsuspended Provisional LGIA	Financial Security 1x Study Deposit Readiness options: (1) Executed Contract (2) Reasonable evidence selected in Resource Plan and applied for CPCN, if required, or selected in RSP (3) FERC Accepted, Unsuspended Provisional LGIA	Financial Security 9x Study Deposit Readiness Reasonable evidence of continued Site Control of the Generating Facility and required Interconnection Facilities (as previously provided at IR submission)
No	Financial Security 2x Study Deposit	Financial Security 3x Study Deposit	Financial Security 5x Study Deposit	Financial Security 7x Study Deposit	

Transition Process Options (§ 7.1-7.2)

The following three options will be provided for Interconnection Requests in the current queue to transition into the first-ready, first-served process:

1) **Transitional Serial Process-** Interconnection Requests with a final System Impact Study report and an Interconnection Facilities Study agreement executed by the Interconnection Customer prior to the effective date of the Cluster Study transition notice date are eligible to enter the transitional serial process.

2) **Transitional Cluster Process-** Interconnection Requests with an assigned queue position prior to the Cluster Study transition notice date are eligible to enter the transitional cluster process.



3) **Withdrawal** from the queue and reentry into the queue in a future DISIS Cluster

Transition Process Initial Readiness & Deposits (§ 7.1)

An Interconnection Customer electing to transition their Interconnection Request must notify the Transmission Provider and meet the following Transitional readiness milestone requirements within 60 Calendar Days of the delivery of notice of the Transmission Provider's transition to the Definitive Interconnection Study Process:

1) providing applicable deposit described below
2) demonstrating exclusive Site Control (or $20,000 plus $500/MW in lieu of Site Control to enter Transitional Cluster Phase 1)
3) signing applicable transitional study agreement
4) providing one of the following: (1) an executed contract (Transitional Serial) or term sheet (Transitional Cluster); (2) reasonable evidence that the Generating Facility is included in a Resource Plan or has received a contract award in a RSP, or (3) an executed Provisional Large Generator Interconnection Agreement filed with FERC (shall not be suspended and shall include a commitment to construct the Generating Facility)
5) Choice of requesting either ERIS or NRIS (Transitional Cluster only)

- Interconnection Customers with Interconnection Requests entering the **transition serial process** will be required to provide security equal to one hundred percent (100%) of the costs identified for Transmission Provider's Interconnection Facilities and Network Upgrades in the System Impact Study Report.

- Interconnection Customers with Interconnection Requests entering the **transition cluster process** will be required to make a supplemental Interconnection Request study deposit, if necessary, to equal the amount required upon entering the Definitive Interconnection Study Process (Slide 10- Interconnection Request & Initial Study Deposits) and any applicable additional security as part of the Transitional Cluster.

Transitional Cluster Study Phase 2 Readiness

Within thirty (30) Calendar Days of the Transmission Provider's publication of the Transitional Cluster Study Phase 1 Report, each Interconnection Customer electing to bring an Interconnection Request to Phase 2 of the Transitional Cluster Study must meet all of the following requirements:

- Provide security equal to three million dollars ($3,000,000) inclusive of any security previously required for entering the transition cluster process.

- Demonstrate exclusive Site Control for the entire Generating Facility and all required Interconnection Facilities to the Point of Interconnection on the Transmission Provider's Transmission System.

- Interconnection Customer shall provide one of the following:

1) A contract binding upon the parties to the contract, for sale of the Generating Facility's energy, or the entire constructed Generating Facility, where the term of sale is not less than five (5) years, or
2) Reasonable evidence that the Generating Facility is included in an Resource Planning Entity's Resource Plan and, if required, has filed an application for a Certificate of Public Convenience and Necessity to construct the Generating Facility or has been selected in a Resource Solicitation Process
3) An executed Provisional Large Generator Interconnection Agreement filed with FERC that is not in suspension with 1) a commitment to construct the Generating Facility, 2) a Commercial Operation Date no later than 2024 and 3) a security deposit in addition to amount required under Section 4.1.2 where the total security deposit represents a reasonable estimation of the potential costs that could be ultimately allocated to the Generating Facility in the transitional cluster study.
4) Provide additional security equal to three million dollars ($3,000,000).