



# Queue Process Workshop

## Generator Interconnection Queue

August 8, 2022

# Course Description

1

This is an overview of MISO's Generation Interconnection Queue (GIQ) processes. The following slides present an overview of the purpose, objectives, concepts, and planning related to GIQ.

2

This presentation is intended for those individuals seeking an understanding of MISO's GIQ – including the associated processes.

3

Previous training presentations on MISO Planning are at respectively higher levels. Those presentations focus on the broader concepts and processes.

4

Frequently used terminology, along with reference-links to MISO documentation and contacts, are included in this presentation.

## Notice:

*The following training materials are intended for use as training materials only and are not intended to convey, support, prescribe or limit any market participant activities. These materials do not act as a governing document over any market rules or business practice manuals. The data used in the examples is hypothetical data and should not be used to support market analyses.*

Introduction

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Special Studies

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Definitive Planning Phase Provisional

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Studies

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Generator Interconnection Agreement

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Generator Online Application Tool Overview

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Helpful Resources

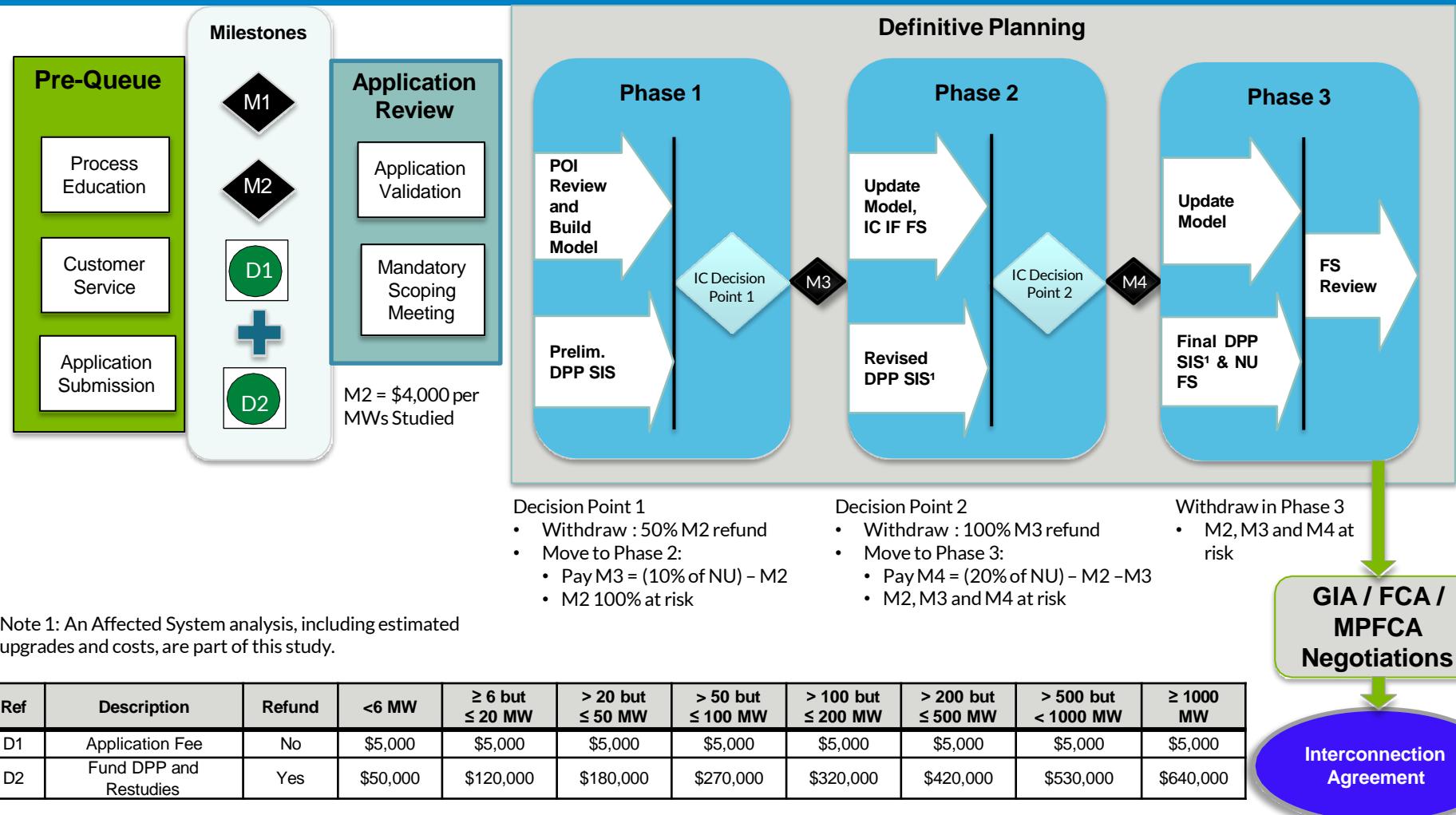
# Introduction



## Training:

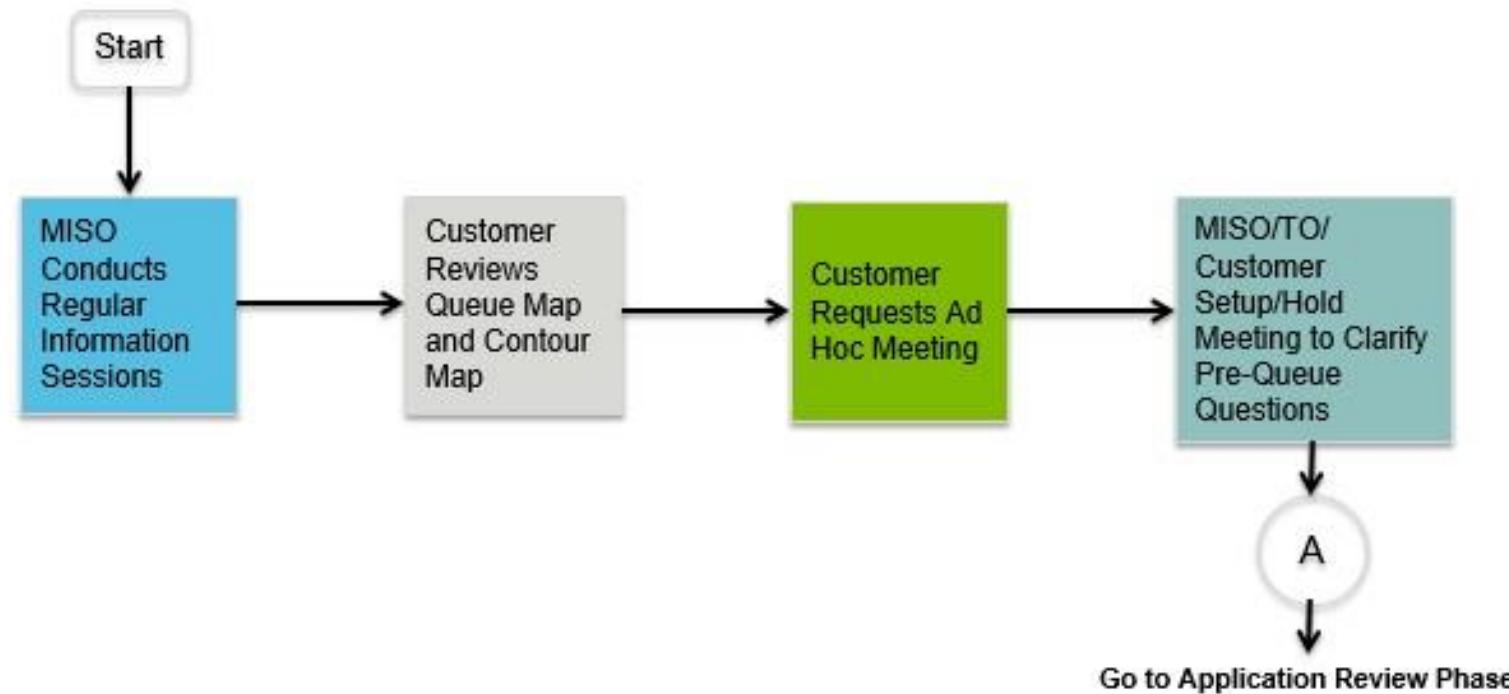
- It is highly recommended for stakeholders to review the online training available on the MISO Learning Management System. The online training was created to help applicants and TOs navigate the GI Portal. These guides are posted to the MISO Customer Learning Center under Transmission & Generation Planning and Resource Adequacy/Generation Interconnection
- Refer to Workshop section under Stakeholder Engagement on MISO public website for previous workshop presentations

# Generation Interconnection Process



# Queue Admin

# Overview of the Pre Queue Phase



*Note: Ad-Hoc Meeting Requests received after 5:00 pm ET on August 12, 2022 will be scheduled after the September 15, 2022 deadline.*



**Purpose:** Introduce and provide a demonstration of a new POI self-check tool

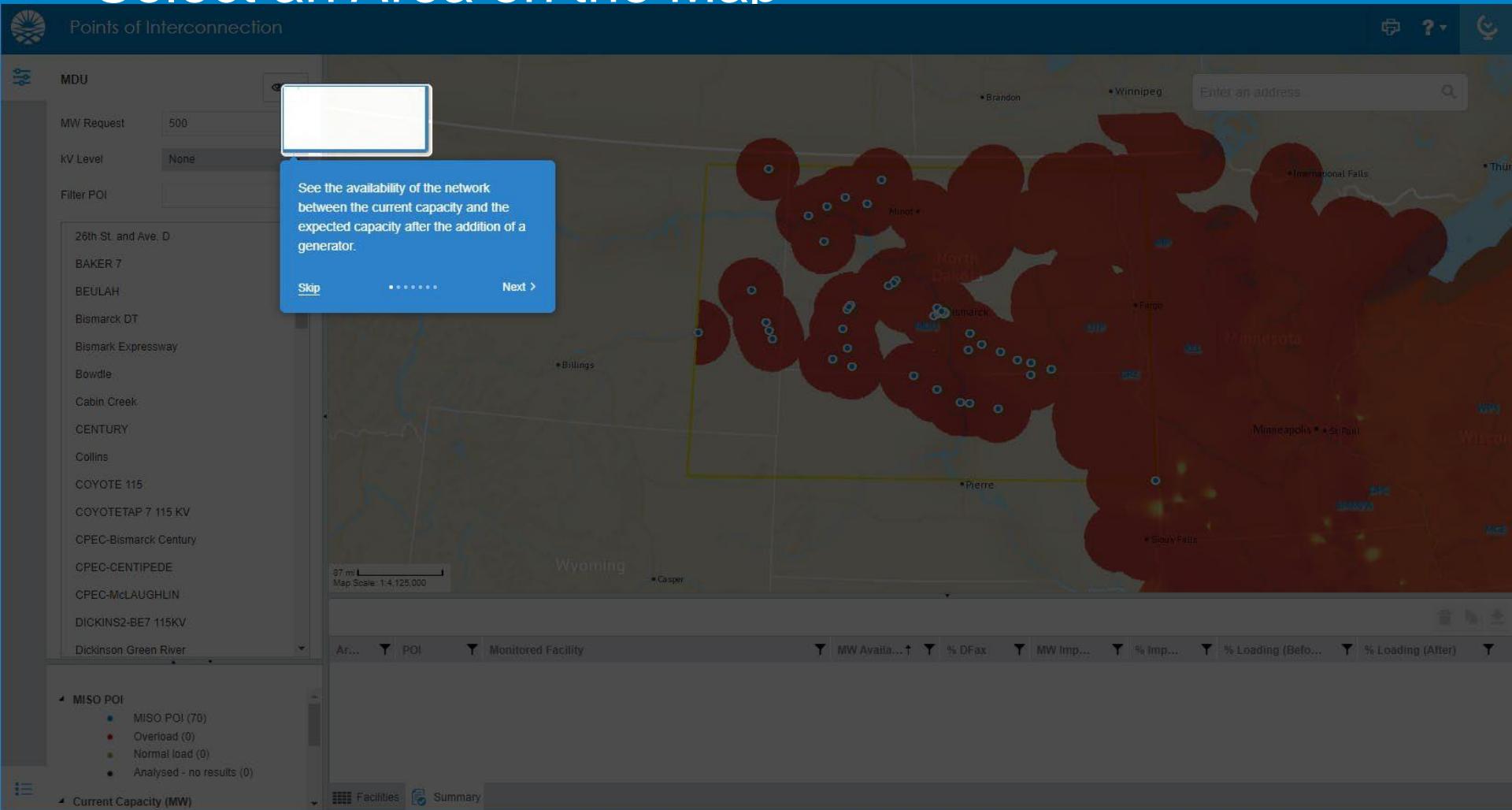
## Key Takeaways:

- POI self-check tool is designed to help Interconnection Customers pre-screen for potential POIs
- The results are for information only and do not include voltage or stability constraints

POI - Point of Interconnection

[POI Tool Workshop \(Demonstration\)](#)

# Select an Area on the Map



# Technical Requirement

- Definitive gross and net generator output (MW) as measured at the POI
- Definitive POI - Only 1 POI may enter into the DPP unless required by State regulations to take 2 POIs
- Definitive one-line diagram for the POI – Information shall include:
  - Breaker layout, bus configuration (if available) and number of generators
  - The zero sequence impedance (if applicable)
  - The distance from the collector substation to the POI referenced in miles and the line impedance
  - If the POI is a line tap, distance from the tap to the endpoints of the existing line referenced in miles
  - Generator step up (GSU) transformer data and collector substation transformer data (if applicable)
  - For inverter based generators, FERC Order 827 requires
    - Location and size of any dynamic and/or static VAR compensation devices
    - Equivalent collector system impedance
- Power flow models required
- All generator Types: Generic Standard Library Stability Model representing the dynamics of the Generating Facility in .dry format, models submitted must be acceptable and recommended in the NERC Acceptable Model List posted at [https://www.nerc.com/comm/PC/Pages/System-Analysis-and-Modeling-Subcommittee-\(SAMS\)2013.aspx](https://www.nerc.com/comm/PC/Pages/System-Analysis-and-Modeling-Subcommittee-(SAMS)2013.aspx) and also comply with MISO's Model Data requirements and Reporting Procedures posted at <https://www.misoenergy.org/planning-models/mod-032-1/>
  - FERC Order 842 requires newly interconnecting units to install, maintain and operate equipment capable of providing primary frequency response as a condition of interconnection, the order requires ICs to provide a plant controller for inverter based generation or governor model for thermal units in the provided dynamics model
  - For inverter based/non-synchronous generators, FERC Order 827 requires
    - Demonstration that the plant can meet a PF of 0.95 lead/lag at the high side on the main GSUs (The TOs planning criteria will supersede if they require a more stringent PF)
    - Base turbine or inverter reactive capability (inherent power factor)
  - For inverter based (wind or solar) generators, the IC shall provide the short circuit modeling instruction manual and associated model data
- All Generator Types: **All applicable information requested in Attachment A or Appendix 1**

**During the Application Process, any changes require a submission of the corrected documents.**

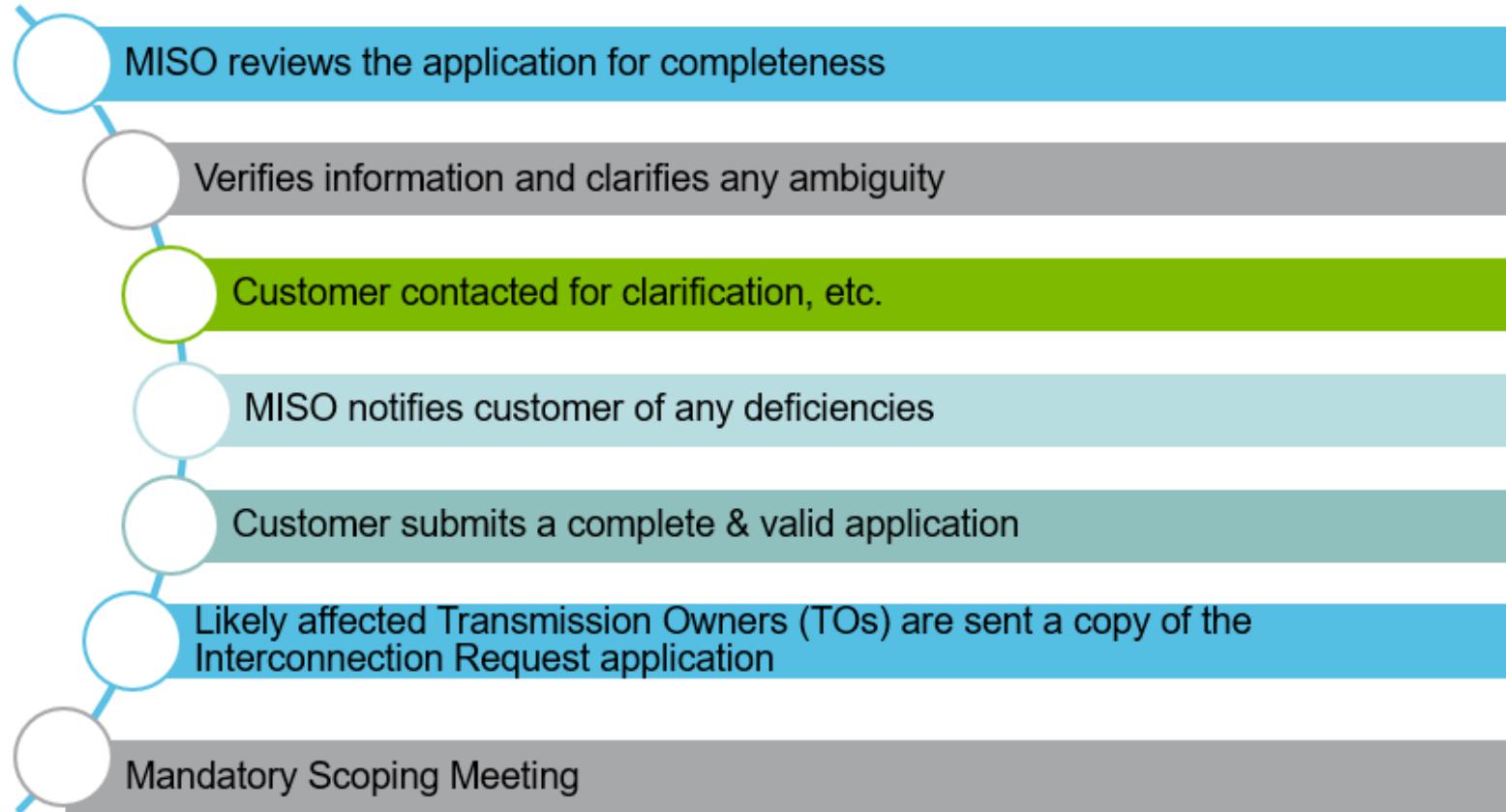
# Shared Interconnection Facilities (Tariff Att. X 3.3.1.3)

Interconnection Customer may submit an Interconnection Request that proposes to share Interconnection Facilities with one or more existing projects or pending Interconnection Requests. Interconnection Requests proposing such an arrangement shall so indicate in their Interconnection Request and attach a consent agreement executed by the applicable Transmission Owner and all Interconnection Customers with projects that propose to connect, or are connected, to the shared Interconnection Facilities.

- How to determine the need for consent agreement prior to submitting Interconnection Request
  - Multiple requests with Interconnected Facilities will need consent agreement
  - Expansion, Co-location, Hybrid Interconnection Requests – MISO will be reviewing these closely for consent agreements

# Application Review

## Application Review



# Site Control

# Site Control Submission

Documents must be legally binding and give rights to develop specific fuel source(s)

## 1. Entity relationship documents

- Leases, deeds, and/or binding options for **100%** of acreage requirements
- **Ensure each agreement's term is effective (or can be extended) at least through your project's COD.**
- If the lessee, optionee, or deed holder does not match the Applicant Company, then the IC must provide documentation of the relationship between entities

## 2. GIS-enabled Site Maps

- Google Earth KMZ map preferred
- PDF Site Plan Map
- Must show project boundary, IC IF, and POI

## 3. Executed Appendix 1 Attachment E

- Must be MISO's tariff version of this affidavit

# Documentation

## Accepted

- Lease Agreement
- Option to Lease
- Purchase Agreement
- Option to Purchase
- Title, Deed, or Tax Bill
- Memorandum of Lease\*

## Not Accepted

- Letter of Intent
- Memorandum of Understanding
- Officer Certification
- Other non-binding or non-exclusive agreements

\*Must be fully executed & indicate that lease was fully executed, must indicate same parties & terms as lease, must include land description & parcel numbers, and must convey exclusivity and term.

# Acreage Requirements

Fuel Type	Land Required
Wind	Fifty (50) acres per MW
Solar	Five (5) acres per MW
Battery	One-tenth (0.1) acres per MW
Conventional	Ten (10) acres
Hybrid	Sum of individual Fuel Type requirements

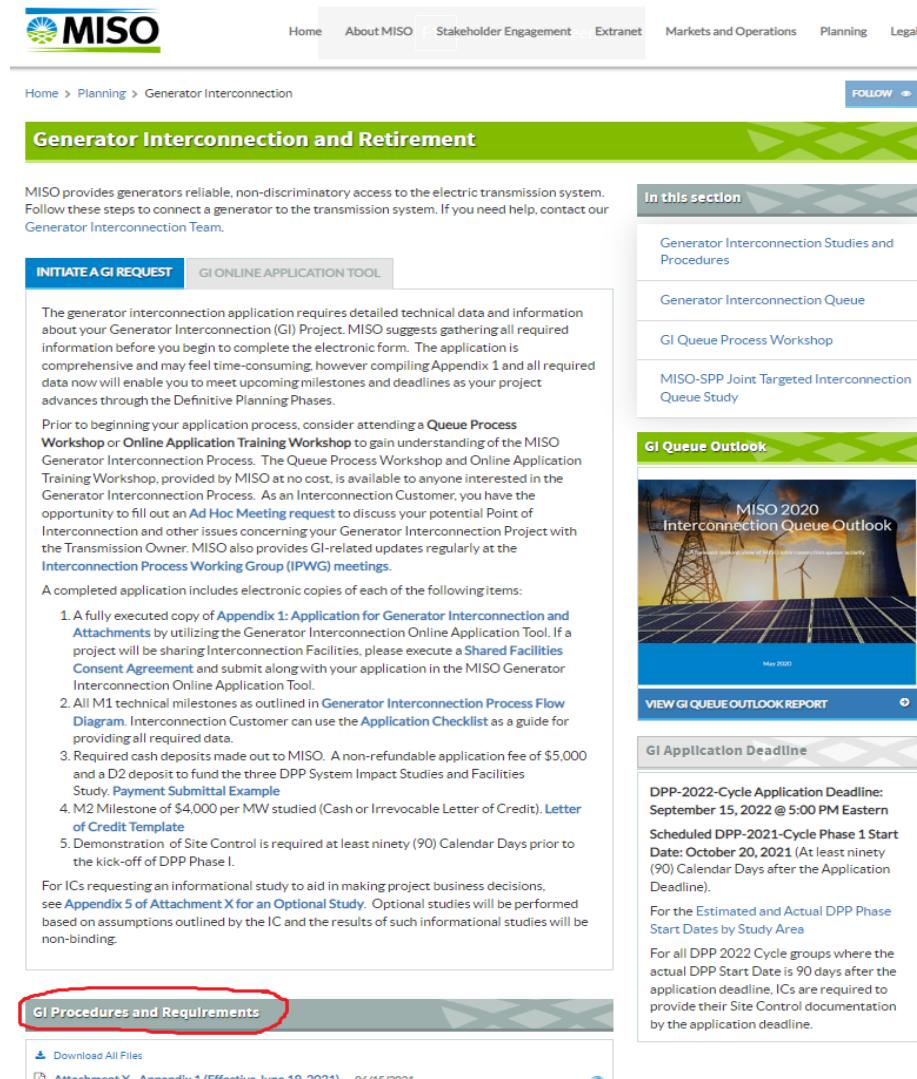
See BPM-015 Section 5.1.2

# Insufficient Land Option

- If land does not meet the acreage requirement, the IC may provide additional evidence to demonstrate adequate site control
  - Due at time of application
- Additional Requirements: Detailed Site Plan & Justification Document
  - Include design considerations such as: complete site design, local spacing and setback requirements, location of feeder routes and Collector substation, and land utilization calculations
- See [Attachment X](#) Section 7.2.1.1 (ii) and [BPM-015](#) Section 5.1.2 “Insufficient land to meet the acreage requirements”

# Site Control Checklist Coming Soon

- Coming soon to the MISO public website will be a Site Control Submission Checklist
- This checklist will cover all the requirements for Site Control
  - It will include:
    - Lease Agreements
    - KMZ Map Requirements
    - PDF Site Plan Map Requirements
    - Acreage Requirements
    - Reduced Footprint Requirements



The screenshot shows the MISO website's Generator Interconnection and Retirement section. At the top, there is a navigation bar with links to Home, About MISO, Stakeholder Engagement, Extranet, Markets and Operations, Planning, and Legal. Below the navigation, a breadcrumb trail shows Home > Planning > Generator Interconnection. A 'FOLLOW' button is also present. The main content area has a green header 'Generator Interconnection and Retirement'. Below it, a sub-header 'Generator Interconnection Application Requirements' is followed by a section titled 'INITIATE A GI REQUEST' and 'GI ONLINE APPLICATION TOOL'. This section contains text about the application requirements and a detailed description of the process. A 'GI Procedures and Requirements' section is highlighted with a red oval. At the bottom of the page, there are download links for 'Attachment X - Appendix 1 (Effective June 19, 2021)' and the date '06/15/2021'. To the right, there are three vertical boxes: 'In this section' (listing Generator Interconnection Studies and Procedures, Generator Interconnection Queue, GI Queue Process Workshop, and MISO-SPP Joint Targeted Interconnection Queue Study), 'GI Queue Outlook' (showing a thumbnail for the 'MISO 2020 Interconnection Queue Outlook' report), and 'GI Application Deadline' (providing details about the DPP-2022 Cycle Application Deadline and the DPP-2021 Cycle Phase 1 Start Date).

# Where to Submit Site Control Documents

Interconnection Application

Facility Informa Contact Informa Docum and Leg Informa Paymen Informa Facility Data Section A Section B Section C Non Disclos Application Summary

Appendix 1 to GIP 4.f, 4.h, 6.

Project Name: Project Number: Reference Number: Study Group: Study Cycle Name: Application Deadline Date:

test	17185	Central	DPP-2021-Cycle	2021-07-22
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STATE OR FEDERAL TAX FORM

OPERATING AGREEMENTS

SITE CONTROL

Evidence of Site Control as specified in the GIP:  Attached  Will be provided

\*Larger files may take longer to upload

Site Control  Attach Document

Lease Agreement  Attach Document

Zip File with KMZ map, and all other SC documents

Entity Relationship Documents

PDF Site Plan Map

Facility Informa Contact Informa Docum and Leg Informa Paymen Informa Facility Data Section A Section B Section C Non Disclos Application Summary

Clock Status	Not Applicable	Submit Date	2021-06-08 17:58:44	Action For	Customer
Application Status	Validated	Due Date	2021-06-29	Assigned To	

Application Info

Appendix 1 to GIP 2., 3., 4.a, 4.b, 4.I, 4.m, 4.n, 4.o, 4.p

Project Name: Project Number: Reference Number: Study Group: Study Cycle Name: Application Deadline Date:

test	17185	Central	DPP-2021-Cycle	2021-07-22
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Project Common Name \*

PROJECT TYPE

FACILITY LOCATION

Address \*

City \*

State \*

Zip Code \*

Latitude \*

Longitude \*

State

County

Study Group

Add County

\*Larger files may take longer to upload

Site Map \*  Attach Document

# Deadline

- Site Control is due at Application Deadline
  - September 15, 2022 @ 5pm ET
  - Will not be delayed
- Please direct project-specific questions to  
[ginterconnection@misoenergy.org](mailto:ginterconnection@misoenergy.org)

# GI Online Application Tool Overview

# Getting Started

**MISO**

Home About MISO Stakeholder Engagement Extranet Markets and Operations **Planning** Legal

Home > Planning > Generator Interconnection

## Generator Interconnection and Retirement

MISO provides generators reliable, non-discriminatory access to the electric transmission system. Follow these steps to connect a generator to the transmission system. If you need help, contact our Generator Interconnection Team.

**INITIATE A GI REQUEST** **GI ONLINE APPLICATION TOOL**

### GI Online Application Guide

The Generator Interconnection Online Application Guide is now available in the MISO Customer Learning Center. Please view [instructions](#) on how to access the training.

### GI Online Application Tool

Need access to submit the Generator Interconnection Application online? Complete this [GI Access Request form](#).

Start your Generator Interconnection Online Application.

*(Please be advised that GridUnity will cease supporting IE11 and Legacy Edge starting May 1st, 2021.)*

**Planning**

Competitive Transmission Administration

**Generator Interconnection**

**Generator Interconnection**

Generator Interconnection Queue

Generator Interconnection Studies

IEEE 1547

Interregional Coordination

MTEP

Planning Modeling

Policy Studies

Resource Adequacy

Transmission Planning

**GI Queue Outlook**

MISO 2020 Interconnection Queue Outlook

A forward-looking view of MISO's generator connection queue activity

# Getting Started



**Applications** **My Account**

## Welcome to the MISO Generation Interconnection Portal



**Interconnection**

**Start a new Application**

The MISO Generation Interconnection Portal will guide you through the entire application process. Take the next step and [start an interconnection application](#) today!



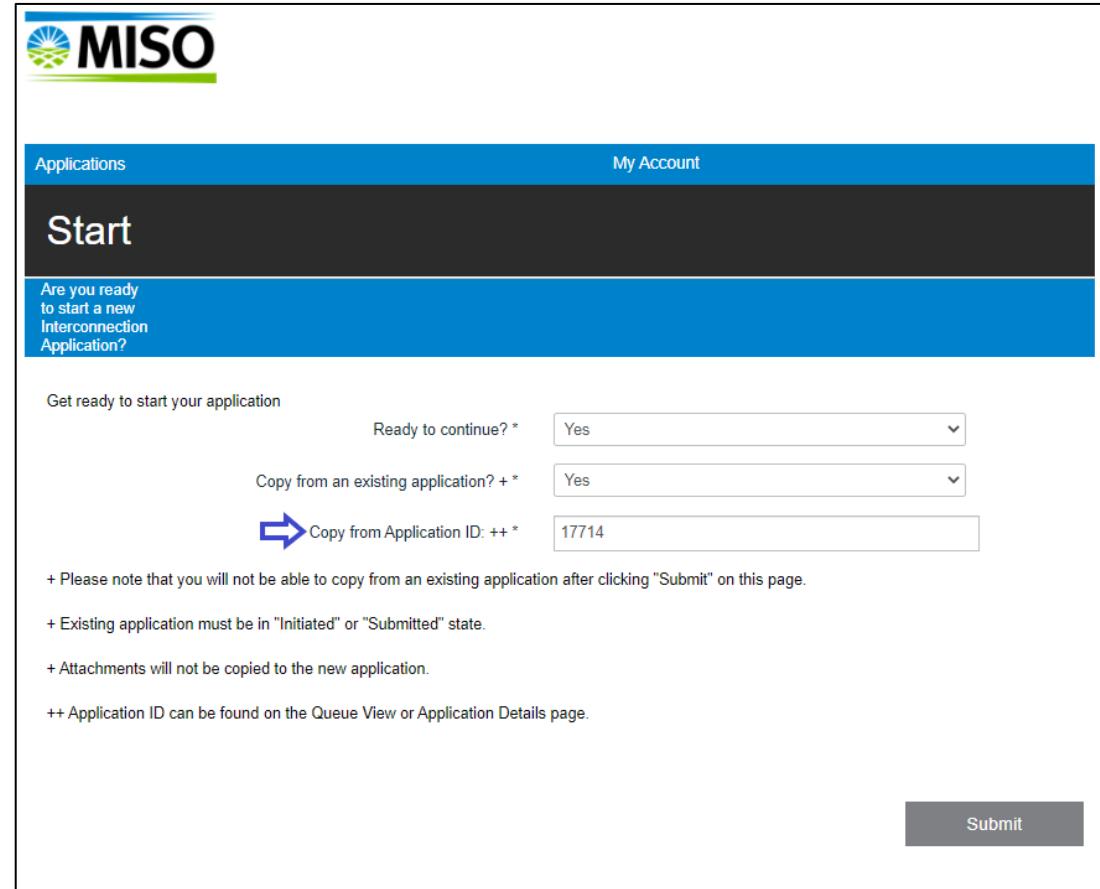
**Queue View**

**View existing Applications**

The Queue View provides you with simple, flexible access to your applications.

# Copy from an Existing Application

- Data can be copied from an existing application to a new one
- Existing application must be a DPP-2022-Cycle project
- Existing application must be in “Initiated” or “Submitted” status
- This feature can be used to duplicate repetitive information
  - Contact Info, Banking Info, Generator Specs, and Att C NDA



The image shows the MISO Start page. The header features the MISO logo and navigation links for 'Applications' and 'My Account'. The main content area is titled 'Start' and contains a question: 'Are you ready to start a new Interconnection Application?'. Below this, there are two dropdown menus: 'Ready to continue? \*' set to 'Yes' and 'Copy from an existing application? \*' also set to 'Yes'. A text input field shows 'Copy from Application ID: ++ \*' with the value '17714'. At the bottom, there are several notes: '+ Please note that you will not be able to copy from an existing application after clicking "Submit" on this page.', '+ Existing application must be in "Initiated" or "Submitted" state.', '+ Attachments will not be copied to the new application.', and '++ Application ID can be found on the Queue View or Application Details page.' A 'Submit' button is located at the bottom right.

# Navigating the Application

- Navigate between Application pages using the Navigation bar
  - Be sure to click “Save and Continue” or values will be lost
- “Facility Information” page must be fully complete before proceeding
- Remaining pages may be left blank and returned to later

The screenshot shows the MISO Interconnection Application interface. At the top, there is a navigation bar with tabs: Facility Information, Contact Information, Document and Legal Information, Payment Information, Facility Data, Section A, Section B, Section C, and Non Disclosure. A green arrow points to the 'Facility Information' tab. Below the navigation bar, there is a section for project details: Project Name (Sam's Solar Project I), Project Number (17714), Reference Number (Central), Study Group (DPP-2020-Cycle 1), and Application Deadline Date (2020-06-25). There is also a field for Project Common Name, which is filled with 'Sam's Solar Project I'. Below this, there is a section for PROJECT TYPE with dropdown menus for 'This Interconnection Request is for:' (Proposed new Generating Facility) and 'Interconnection Service Type' (Network Resource Interconnection Service). At the bottom, there is a section for FACILITY LOCATION with fields for Address (720 City Center Drive), City (Carmel), State (IN), Zip Code (46032-3826), Latitude (39.966), and Longitude (-86.144). There is also a table for State, County, and Study Group, with dropdown menus for State (IN), County (Hamilton), and Study Group (Remove).

Questions on how to use the Online Application Tool?

Please refer to the [Generation Interconnection Online Application Guide](#)

# Helpful Resources

# List of Helpful Links...

## Documents

Generator Interconnection and Retirement Website

<https://www.misoenergy.org/planning/generator-interconnection/>

Generator Interconnection Queue Website

[https://www.misoenergy.org/planning/generator-interconnection/GI\\_Queue/](https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/)

Generator Interconnection Studies and Procedures

[https://www.misoenergy.org/planning/generator-interconnection/GI\\_Studies/#t=10&p=0&s=&sd=](https://www.misoenergy.org/planning/generator-interconnection/GI_Studies/#t=10&p=0&s=&sd=)

# List of Reference Materials and Contacts...

## Documents

Business Practice Manual: Generator Interconnection BPM - 015

<https://www.misoenergy.org/legal/business-practice-manuals/> MISO

Committees, Work Groups, and Task Forces

<https://www.misoenergy.org/stakeholder-engagement/>

Generator Interconnection Ad-Hoc Requests

[https://cdn.misoenergy.org/GI\\_Ad\\_Hoc\\_Info\\_Session\\_Request108144.pdf](https://cdn.misoenergy.org/GI_Ad_Hoc_Info_Session_Request108144.pdf)

Generator Interconnection GI Process flowchart, GI Application Checklist and DPP Schedule Updates

[https://cdn.misoenergy.org/GI\\_Ad\\_Hoc\\_Info\\_Session\\_Request108144.pdf](https://cdn.misoenergy.org/GI_Ad_Hoc_Info_Session_Request108144.pdf)

Generator Interconnection Contour and Queue Maps

[https://www.misoenergy.org/planning/generator-interconnection/GI\\_Queue/](https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/)

Generator Interconnection Appendix 1

[https://cdn.misoenergy.org/Attachment%20X\\_%20Appendix%201\\_Interconnection%20Request%20for%20a%20Generating%20Facility108376.pdf](https://cdn.misoenergy.org/Attachment%20X_%20Appendix%201_Interconnection%20Request%20for%20a%20Generating%20Facility108376.pdf)

MISO Instructions for Resources Connecting to Distribution System or Non-MISO Transmission System

[https://cdn.misoenergy.org/Distribution\\_System\\_Interconnection\\_Request\\_Instructions108140.pdf](https://cdn.misoenergy.org/Distribution_System_Interconnection_Request_Instructions108140.pdf)

## Contacts

MISO Client Relations

866-296-6476

[help@misoenergy.org](mailto:help@misoenergy.org)

## Resource Utilization

General Contact

[ginterconnection@misoenergy.org](mailto:ginterconnection@misoenergy.org)

## Resource Integration

General Contact

[ResourceIntegration@misoenergy.org](mailto:ResourceIntegration@misoenergy.org)

## GIA Negotiations

General Contact

[GIANegotiation@misoenergy.org](mailto:GIANegotiation@misoenergy.org)

# Additional Resources

## Current Queue Info

[Interactive Queue & Queue Map](#)  
[GIQ Web Overview](#)  
[Replacement Requests](#)  
[Surplus Requests](#)  
[MHVDC Requests](#)  
[Definitive Planning Phase Schedule](#)

## Stakeholder Entities

[Interconnection Process Working Group \(IPWG\)](#)  
[Planning Advisory Committee \(PAC\)](#)  
[MISO-SPP Joint Targeted Interconnection Queue Study \(JTIQ\)](#)

## Getting Started

[Attachment X](#)  
[BPM-015](#)  
[MISO Learning Center](#)  
[Queue Process Diagram](#)  
[Queue Process Workshops](#)  
[POI Analysis Tool](#)  
[Transferred Transmission Facilities](#)  
[Ad Hoc Info Session Request Form](#)  
[GI Online Application Tool](#)

Contact the Generator Interconnection team at [ginterconnection@misonergy.org](mailto:ginterconnection@misonergy.org)

# Acronyms

COD	Commercial Operation Date
D1	Deposit 1
D2	Deposit 2
DF	Distribution Factor
ERIS	Energy Resource Interconnection Service
DPP	Definitive Planning Phase
FCA	Facility Construction Agreement
FERC	Federal Energy Regulatory Commission
FS	Facility Study
GIA	Generation Interconnection Agreement
GIQ	Generation Interconnection Queue
GIP	Generator Interconnection Process
GSU	Generator Step Up Transformer
IA	Interconnection Agreement
IC	Interconnection Customer

# Acronyms (Cont.)

ICT	Independent Coordinator of Transmission
IF	Interconnection Facilities
IR	Interconnection Request
M1	Milestone 1
M2	Milestone 2
M3	Milestone 3
M4	Milestone 4
MTEP	MISO Transmission Expansion Plan
MPFCA	Multi Party Facility Construction Agreement
MVP	Multi Value Project
NRIS	Network Resource Interconnection Service
NU	Network Upgrade
PIA	Provisional Interconnection Agreement
POI	Point of Interconnection
QOL	Quarterly Operating Limit
SIS	System Impact Study
TO	Transmission Owner