



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

Queue Admin Overview

Application Review

Site Control

Special Studies

Definitive Planning Phase Provisional

Studies

Generator Interconnection Agreement

Generator Online Application Tool Overview

Helpful Resources

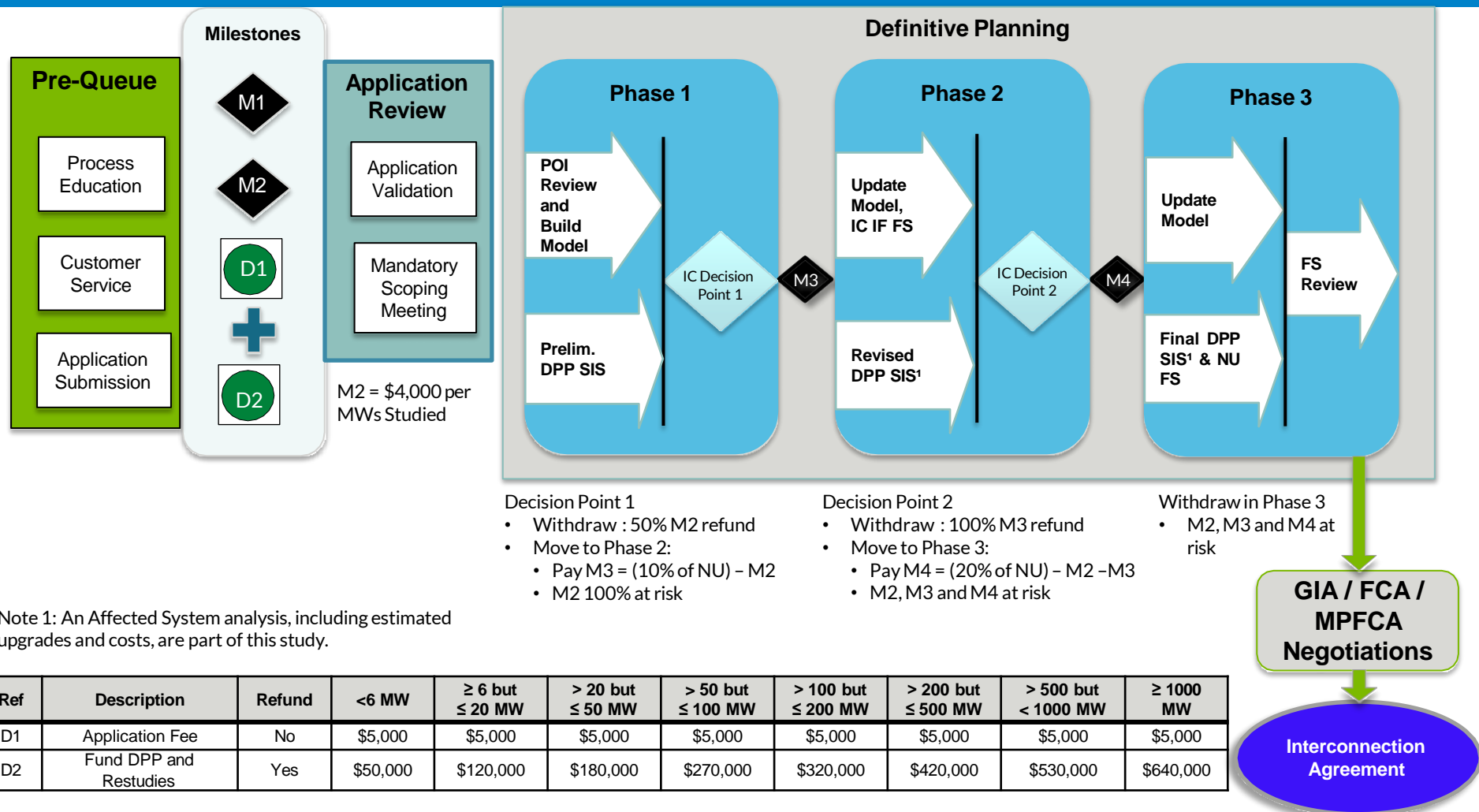
Introduction



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

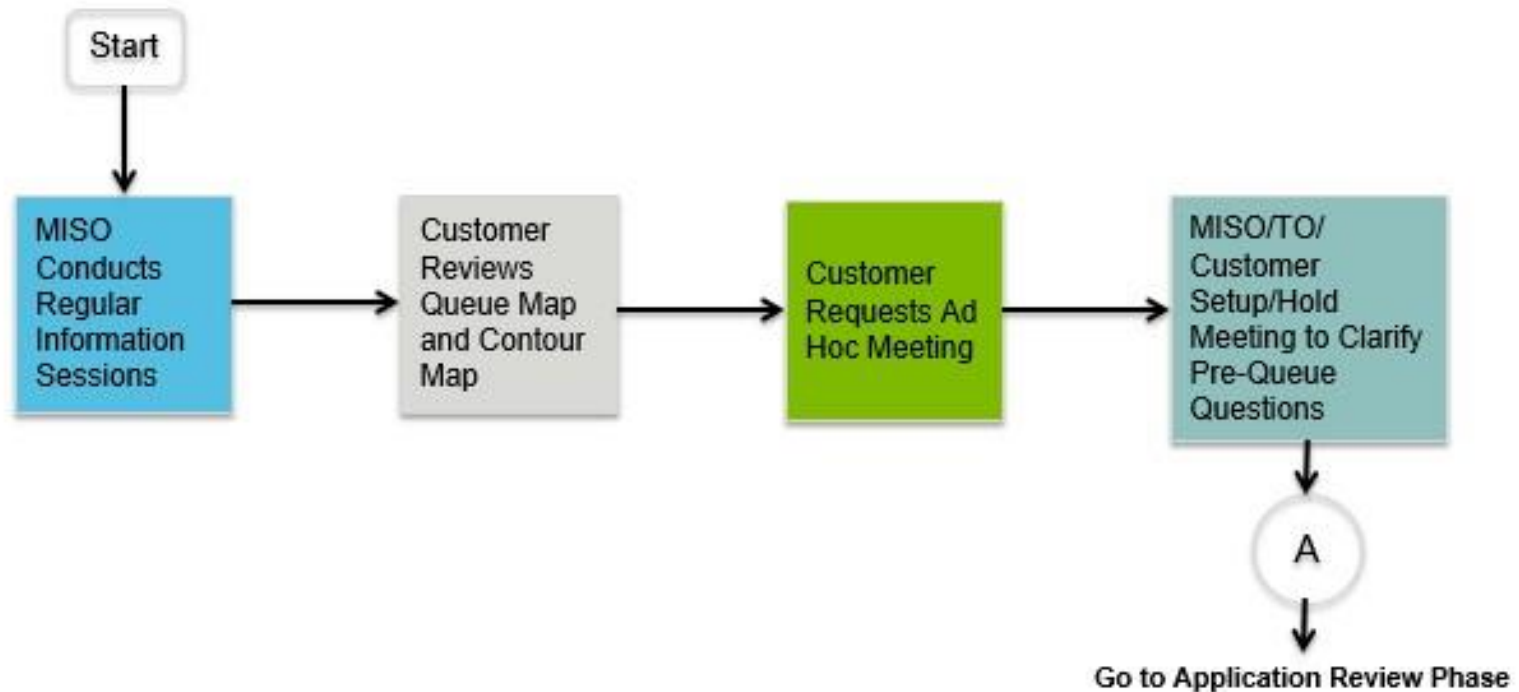
Generation Interconnection Process



Note 1: An Affected System analysis, including estimated upgrades and costs, are part of this study.

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

Points of Interconnection

MDU

MW Request: 500

KV Level: None

Filter POI

26th St. and Ave. D

BAKER 7

BEULAH

Bismarck DT

Bismarck Expressway

Bowdle

Cabin Creek

CENTURY

Collins

COYOTE 115

COYOTETAP 7 115 KV

CPEC-Bismarck Century

CPEC-CENTIPEDE

CPEC-McLAUGHLIN

DICKINS2-BE7 115KV

Dickinson Green River

See the availability of the network between the current capacity and the expected capacity after the addition of a generator.

Skip Next >

87 mi
Map Scale: 1:4,125,000

Ar... POI Monitored Facility MW Availa... % DFax MW Imp... % Imp... % Loading (Befo... % Loading (After)

Facilities Summary

MISO POI

- MISO POI (70)
- Overload (0)
- Normal load (0)
- Analysed - no results (0)

Current Capacity (MW)

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 .dyr format, models submitted must be acceptable and recommended in the NREC 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.

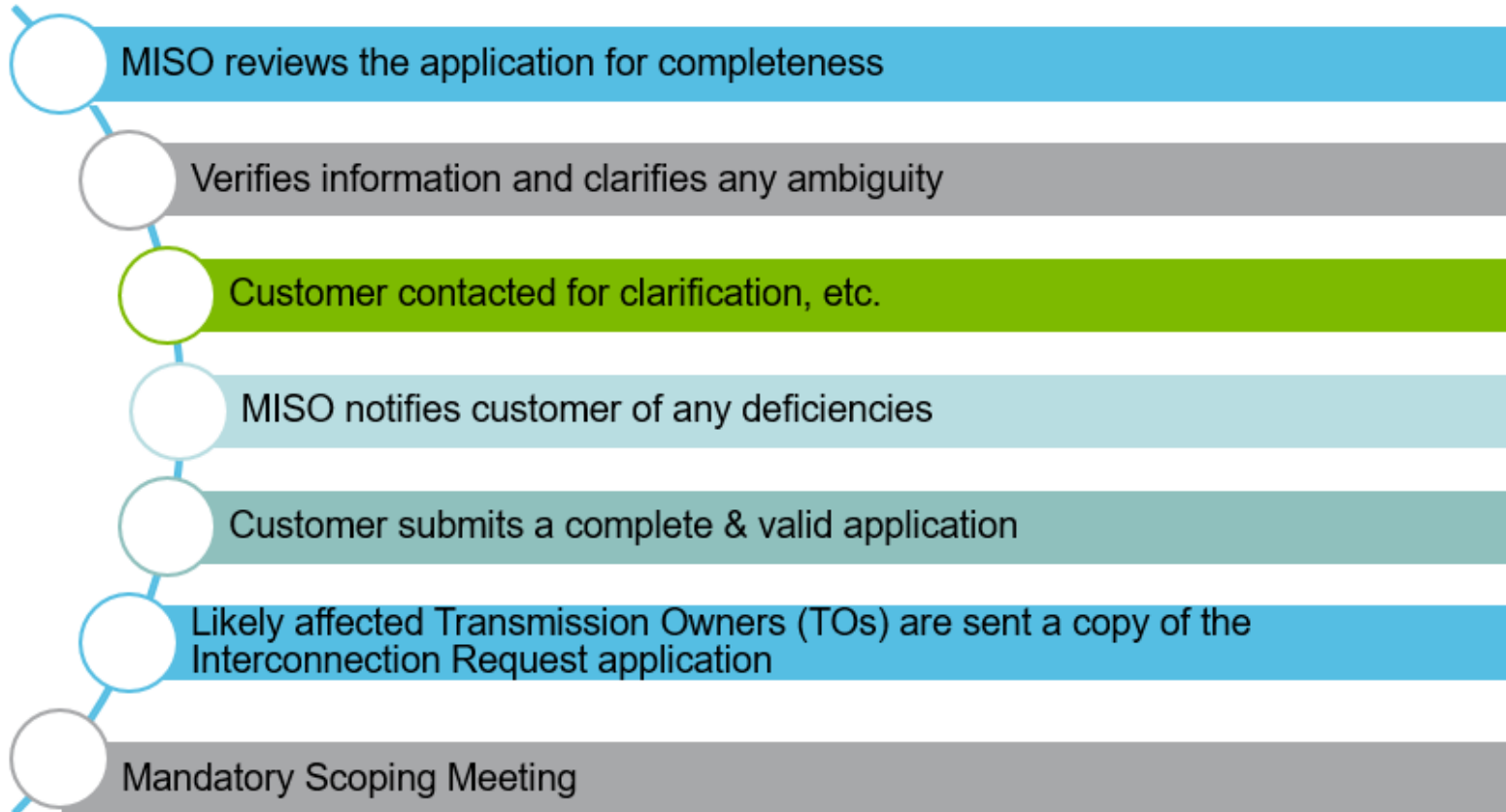
Shared Interconnection Facilities (Tariff Att. X 3.3.1.3)

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.

Acres 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

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

Home > Planning > Generator Interconnection FOLLOW

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

The generator interconnection application requires detailed technical data and information about your Generator Interconnection (GI) Project. MISO suggests gathering all required information before you begin to complete the electronic form. The application is comprehensive and may feel time-consuming; however, compiling Appendix 1 and all required data now will enable you to meet upcoming milestones and deadlines as your project advances through the Definitive Planning Phases.

Prior to beginning your application process, consider attending a **Queue Process Workshop** or **Online Application Training Workshop** to gain understanding of the MISO Generator Interconnection Process. The Queue Process Workshop and Online Application Training Workshop, provided by MISO at no cost, is available to anyone interested in the Generator Interconnection Process. As an Interconnection Customer, you have the opportunity to fill out an **Ad Hoc Meeting request** to discuss your potential Point of Interconnection and other issues concerning your Generator Interconnection Project with the Transmission Owner. MISO also provides GI-related updates regularly at the **Interconnection Process Working Group (IPWG) meetings**.

A completed application includes electronic copies of each of the following items:

1. A fully executed copy of **Appendix 1: Application for Generator Interconnection and Attachments** by utilizing the Generator Interconnection Online Application Tool. If a project will be sharing Interconnection Facilities, please execute a **Shared Facilities Consent Agreement** and submit along with your application in the MISO Generator Interconnection Online Application Tool.
2. All M1 technical milestones as outlined in **Generator Interconnection Process Flow Diagram**. Interconnection Customer can use the **Application Checklist** as a guide for providing all required data.
3. Required cash deposits made out to MISO. A non-refundable application fee of \$5,000 and a D2 deposit to fund the three DPP System Impact Studies and Facilities Study. **Payment Submittal Example**
4. M2 Milestone of \$4,000 per MW studied (Cash or Irrevocable Letter of Credit). **Letter of Credit Template**
5. Demonstration of Site Control is required at least ninety (90) Calendar Days prior to the kick-off of DPP Phase I.

For ICs requesting an informational study to aid in making project business decisions, see **Appendix 5 of Attachment X for an Optional Study**. Optional studies will be performed based on assumptions outlined by the IC and the results of such informational studies will be non-binding.

In this section

- Generator Interconnection Studies and Procedures
- Generator Interconnection Queue
- GI Queue Process Workshop
- MISO-SPP Joint Targeted Interconnection Queue Study

GI Queue Outlook

MISO 2020 Interconnection Queue Outlook

VIEW GI QUEUE OUTLOOK REPORT

GI Application Deadline

DPP-2022-Cycle Application Deadline:
September 15, 2022 @ 5:00 PM Eastern
Scheduled DPP-2021-Cycle Phase 1 Start Date: October 20, 2021 (At least ninety (90) Calendar Days after the Application Deadline).

For the **Estimated and Actual DPP Phase Start Dates by Study Area**

For all DPP 2022 Cycle groups where the actual DPP Start Date is 90 days after the application deadline, ICs are required to provide their Site Control documentation by the application deadline.

GI Procedures and Requirements

Download All Files

Attachment X - Appendix 1 (Effective June 19, 2021) 06/15/2021

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

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

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

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

PDF Site Plan Map

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

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

Getting Started



ApplicationsMy Account


Welcome to the MISO Generation Interconnection Portal



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!

Interconnection



View existing Applications

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

Queue View

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

MISO

Applications My Account

Start

Are you ready to start a new Interconnection Application?

Get ready to start your application

Ready to continue? * Yes

Copy from an existing application? + * Yes

⇒ Copy from Application ID: ++ * 17714

+ 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.

++ Application ID can be found on the Queue View or Application Details page.

Submit

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



MISO

Interconnection Application

Navigation bar: Facility Information (selected), Contact Information, Documents and Legal Information, Payment Information, Facility Data, Section A, Section B, Section C, Non-Disclosure

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:
Sam's Solar Project I		17714	Central	DPP-2020-Cycle 1	2020-06-25

Project Common Name *

PROJECT TYPE

This Interconnection Request is for: *

Interconnection Service Type *

FACILITY LOCATION

Address *

City *

State *

Zip Code *

Latitude *

Longitude *

State County Study Group

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/

Generator Interconnection Studies and Procedures

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

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

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/

Generator Interconnection Appendix 1

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

Contacts

MISO Client Relations

866-296-6476

help@misoenergy.org

Resource Utilization

General Contact

ginterconnection@misoenergy.org

Resource Integration

General Contact

ResourceIntegration@misoenergy.org

GIA Negotiations

General Contact

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@misonenergy.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