Training Disclaimer: *ISO New England (ISO) provides training to enhance participant and stakeholder understanding. Not all issues and requirements are addressed by the training. Consult the effective Transmission, Markets and Services Tariff and the relevant Market Manuals, Operating Procedures and Planning Procedures for detailed information. In case of a discrepancy between training provided by ISO and the Tariff or Procedures, the meaning of the Tariff and Procedures shall govern.*

February 16, 2023
Webex Broadcast

Interconnection Process

Presentation updated on 3/24/2023; impacted slide is 9

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Project Manager, Transmission Service

Objectives

After attending this webinar, you will be able to:

- Determine whether your project should follow the ISO interconnection process
- Request the appropriate accounts and access to complete the interconnection process
- Submit an interconnection request (IR) and get a queue position
- Prepare for the scoping meeting
- Identify all study obligations and timelines pertinent to your project
- Recognize your next steps to:
  - Execute an interconnection agreement
  - Register your asset

Topics

- Is this process right for your project?
- Do you want to participate in the next FCM?
- Interconnection steps overview
- Schedule-based interconnection steps
  - Small generating facilities (SGF)
  - Large generating facilities (LGF)
  - Elective transmission upgrades (ETU)
- Closing

Acronyms

Acronym	Term
AP	affected parties
CAMS	Customer and Asset Management System
CCP	capacity commitment period
CEII	Critical Energy Infrastructure Information
COD	commercial operation date
E&P	Engineering and Procurement Agreement
ETU	elective transmission upgrade
FAC	Facilities Study
FCM	Forward Capacity Market
FS	Feasibility Study
IA	Interconnection Agreement
IC	interconnection customer

Acronym	Term
IP	interconnection process
IR	interconnection request
IRTT	Interconnection Request Tracking Tool
ITO	interconnection transmission owner
LGF	large generating facility
OIS	Optional Interconnection Study
POI	point of interconnection
PPA	Proposed Plan Application
PTF	pool transmission facility
SGF	small generating facility
SOI	show of interest
SIS	System Impact Study

Overview of the Interconnection Process

What projects do the ISO interconnection procedures apply to?

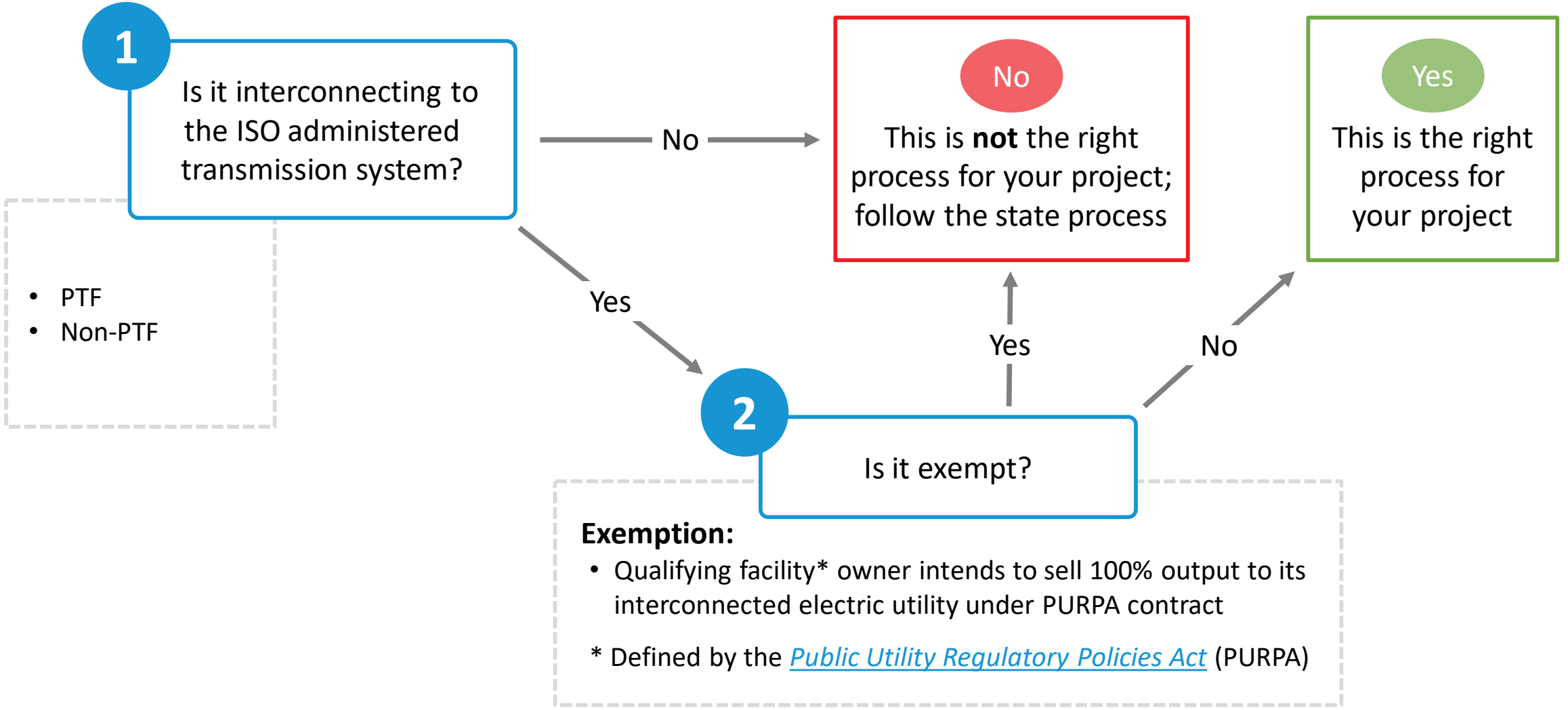
- The procedures apply to projects proposing to interconnect to the administered transmission system , which is defined as:
  - Pool transmission facility (PTF)
  - Non-PTF

PTF: A facility rated 69 KV or above owned by a participating transmission owner over which the ISO has operating authority.
- *View the New England System Diagram*
- *Visit the PTF Catalog page*

- To determine which interconnection process is followed, ask:
  - Who owns the point of interconnection (POI)?
  - Do you have confirmation from the interconnecting transmission owner (ITO)?

⚠ *Which process your project follows may change at any point during the process*

Before you begin… is the *ISO interconnection* process right for your project?

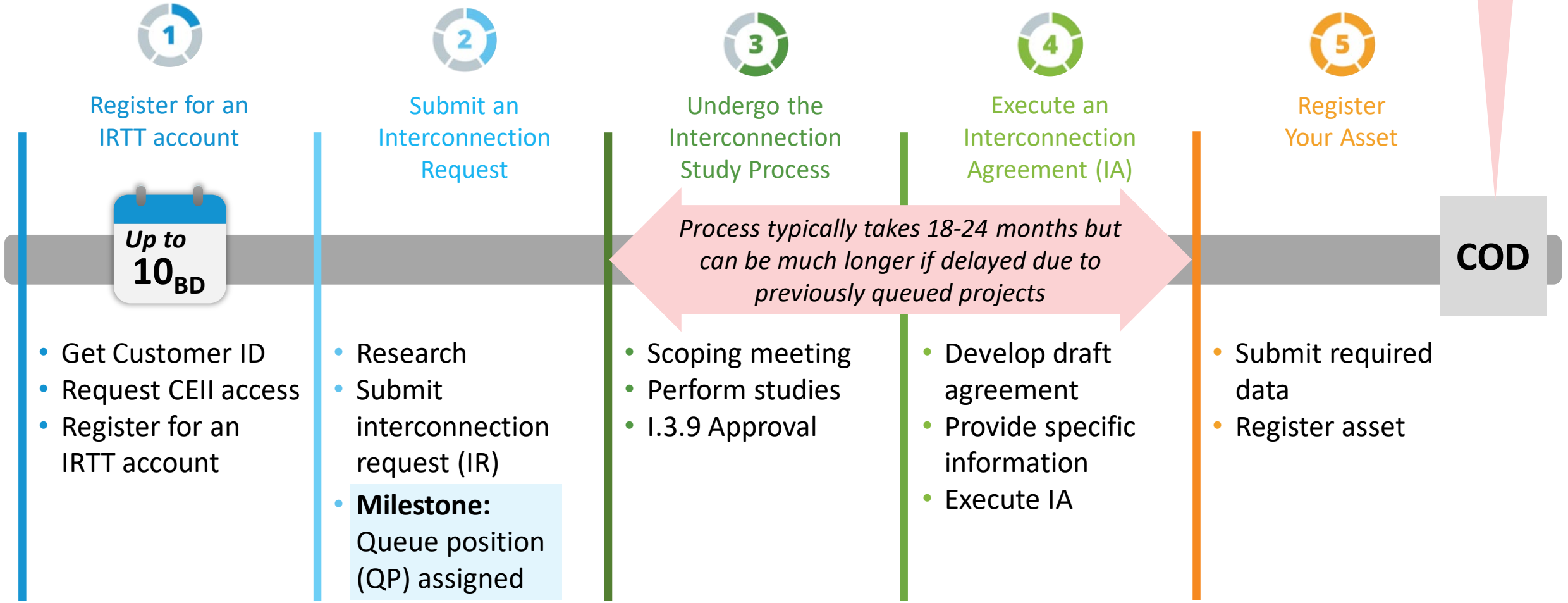


Learn more on the Interconnection Process Guide page.

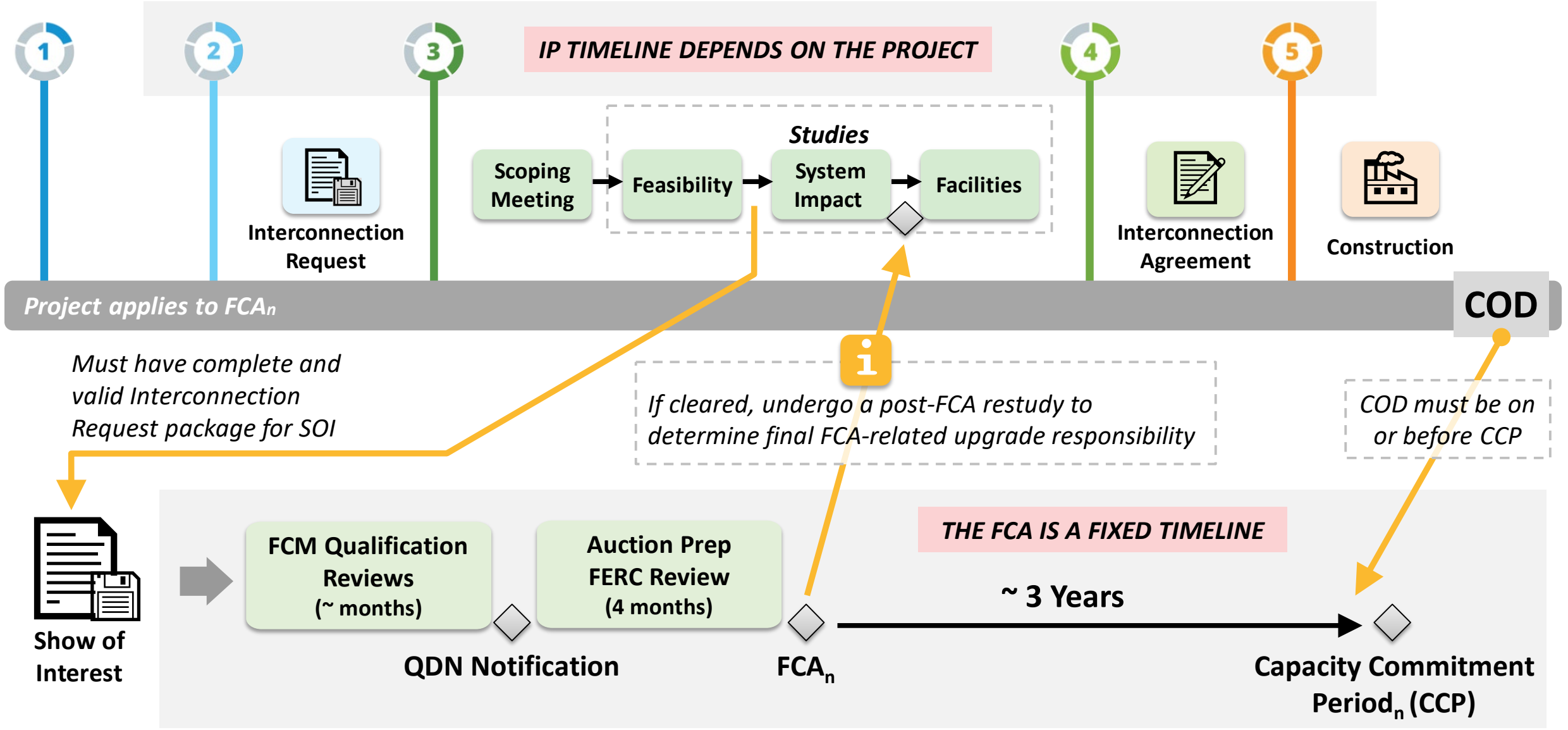
Timeline

Steps and Milestones of the Interconnection Process

Each project timeline is different. Make sure you understand which steps apply to you and that you can complete them in time for your commercial operation date (COD).



Important FCM Impacts to the Interconnection Process (IP) Timeline



Steps Overview

IMPORTANT TIP!

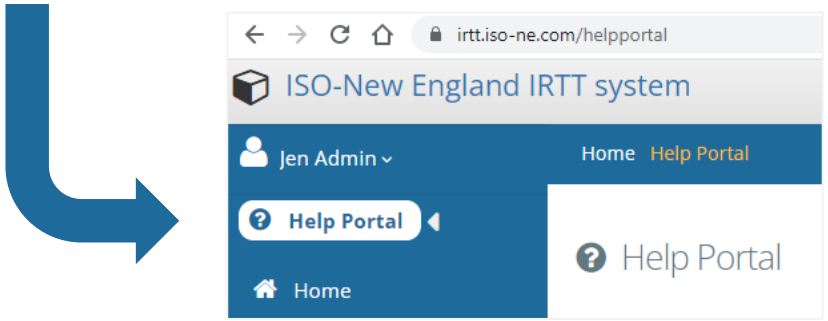
Begin preparing to submit your Interconnection Request (IR) *as early as possible* before your targeted FCA participation. You may submit anytime!

Jump to other topics:

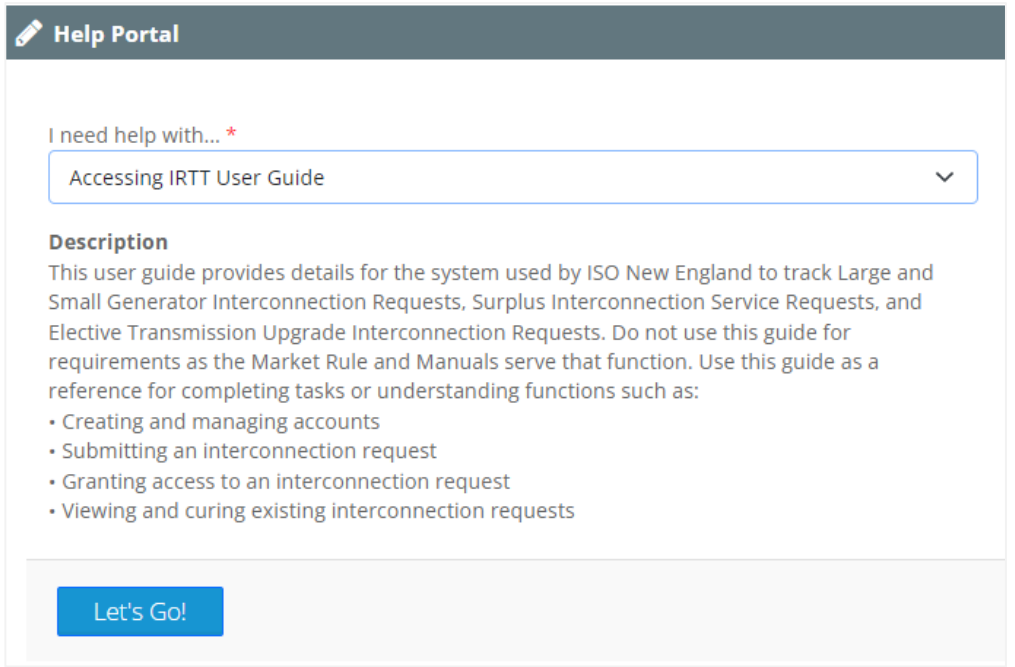
- **General Overview** *(you are here)*
- Small Generator Process steps 2-5
- Large Generator/ETU Process steps 2-5

Resources to use when completing the IR process

- Interconnection Process Guide (ISO web page)
- Interconnection Generator Data Submittal Requirements (presentation, .pdf)
- IRTT User Guide (.pdf)
- Help Portal IRTT Help Portal (links to FAQs, videos and knowledge articles)



You must be logged into IRTT to use the Help Portal.



Interconnection Steps

Use the links below to jump to a specific step in this training

[Register for an IRTT Account](#)

Required forms and requests are similar for all projects

[Submit an Interconnection Request](#)

[Undergo the Interconnection Study Process](#)

[Execute an Interconnection Agreement](#)

[Register Your Asset](#)

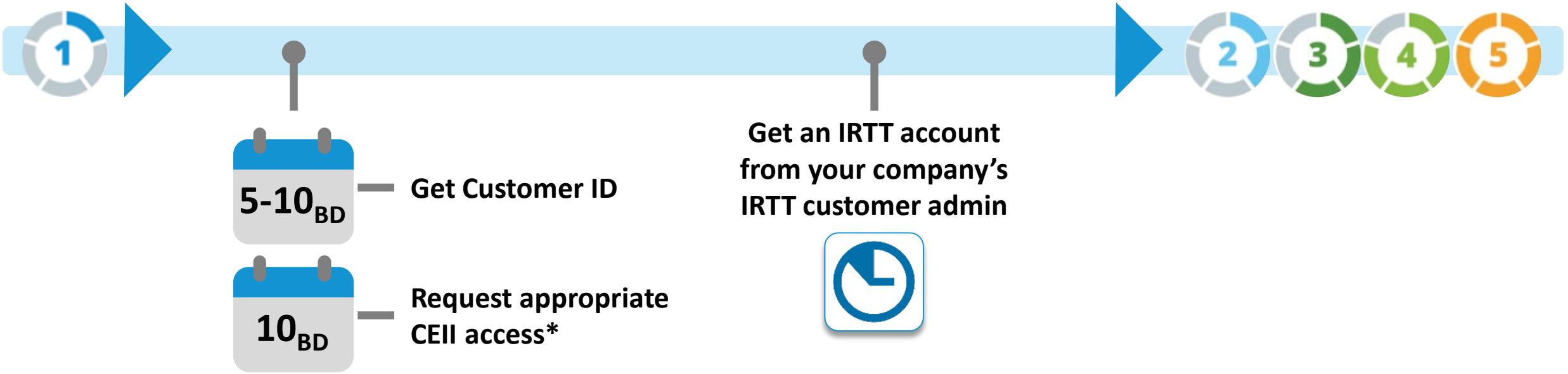
Choices are unique for every project and have different assumptions and rules

Specific tips for these steps are covered later in this training:	Acronym
Small Generators	SGIP
Large Generators and Elective Transmission Upgrades (ETU)	LGIP/ETUIP

Step 1 Timeline

+10

Step 1 is the fastest part of the process



= No wait

BD = Business Day(s)

** We use the CEII icon* CEII *throughout the slide deck to identify when CEII access is required.*

Does the project development company already have a Customer ID?

Yes, I have an ISO Customer ID

Use that ID and your customer name as it appears in the Customer Asset Management System (CAMS) database

No, I do not have a Customer ID

Create an ISO Customer ID with the same name of the interconnection customer listed on the interconnection request. *Do not use an affiliate or consultant company.*

You must have these items before submitting an interconnection request:

- [x] **Customer ID**
- [ ] Approved request for CEII
- [ ] IRTT account

5-10$_{BD}$ — **Get Customer ID**

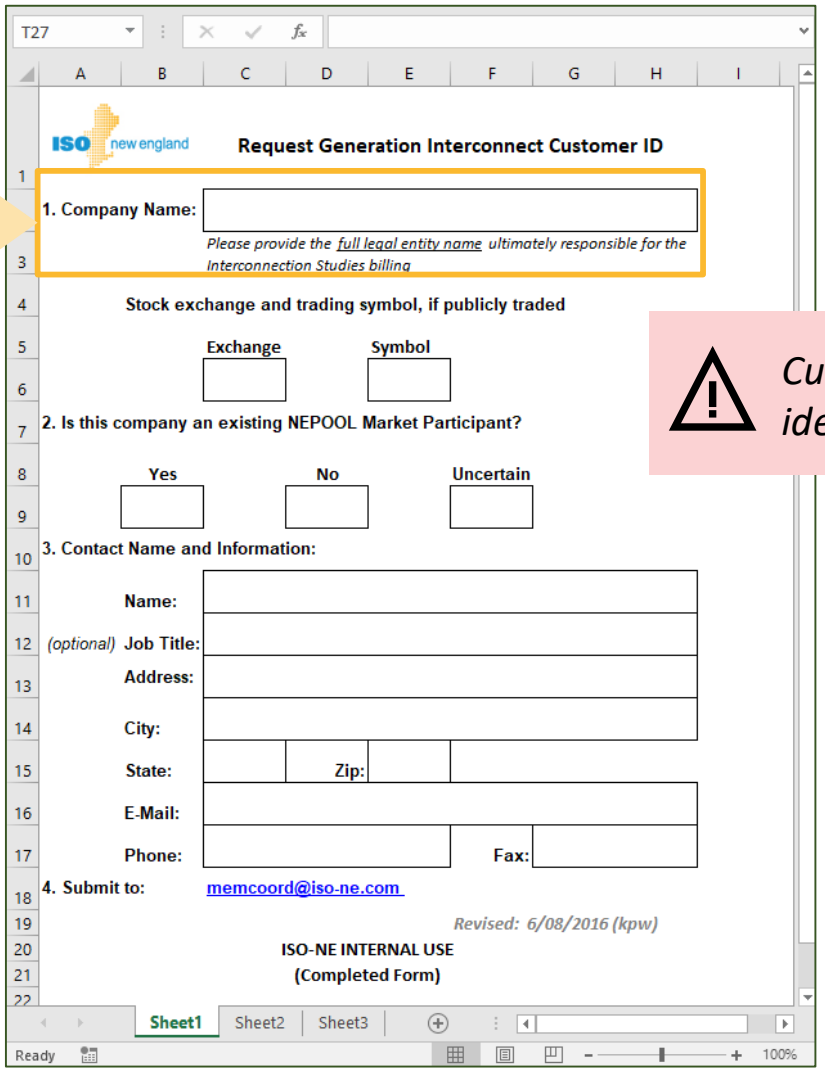
Request a New Generation Interconnect Customer ID

⚠ This customer ID name must match across **all** ISO registrations, submissions, and systems

1. Download the Request Generation Interconnect Customer ID form

2. Submit the completed form by email to: memcoord@iso-ne.com

5-10
Business days



ISO new england — Request Generation Interconnect Customer ID

1. Company Name:

Please provide the full legal entity name ultimately responsible for the Interconnection Studies billing

Stock exchange and trading symbol, if publicly traded

Exchange | Symbol

2. Is this company an existing NEPOOL Market Participant?

Yes | No | Uncertain

3. Contact Name and Information:

Name:
(optional) Job Title:
Address:
City:
State: Zip:
E-Mail:
Phone: Fax:

4. Submit to: memcoord@iso-ne.com

Revised: 6/08/2016 (kpw)

ISO-NE INTERNAL USE
(Completed Form)

Sheet1 Sheet2 Sheet3

Generator_interconnection_studies_billing.xlsx

⚠ *Customer ID is an identifier in FCTS*

Request Appropriate CEII Access

Throughout the interconnection process, you will need to view and provide materials deemed restricted, Critical Energy Infrastructure Information (CEII)

1. Use the Request CEII Access page to:
   A. Determine what type of access you need
   B. Download the form
2. Complete a CEII Access Request via Ask ISO
   - Read the article: *How to complete a CEII Access Request form* for more information

5-10
Business days

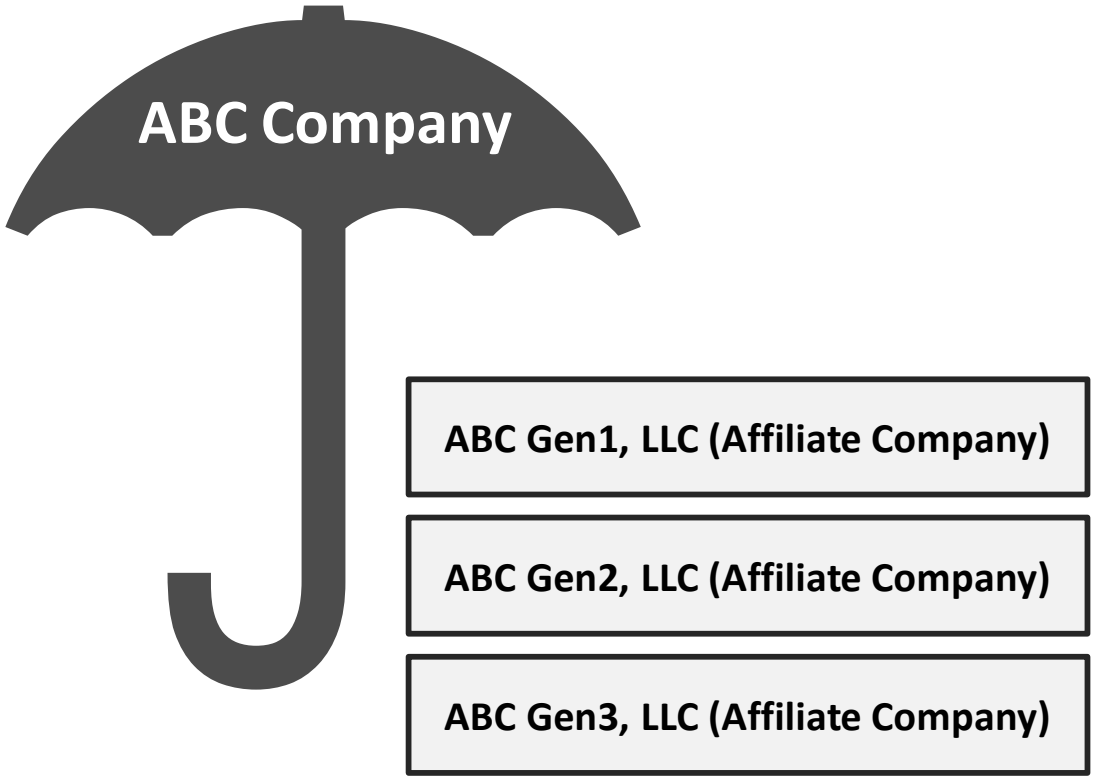
After approving your CEII access, the ISO will issue you a digital certificate if needed to provide certain data

You must have these items before submitting an interconnection request:

- [x] Customer ID
- [x] **Approved request for CEII**
- [ ] IRTT account

Register Your Company Account in IRTT

Your IR must be submitted by an account registered under your company's account



Choose the correct Associated Company

- *Exact* same name as in CAMS
- Owns the site control
- Submits IR
- Signs Study Agreement(s)
- Signs IA

Related Companies

Company Name	City	State	
ABC Gen1, LLC	Anytown	MA	
ABC Gen2, LLC	Anytown	MA	
ABC Gen3, LLC	Anytown	MA	
ABC Interconnection Company	Anytown	MA	

Showing 1 to 4 of 4 entries Previous 1 Next

⚠ Email IRTT@iso-ne.com to get help verifying the Associated Company on your IR before you continue. Choosing the incorrect Associated Company is a common mistake that can delay your queue position!

Register Your Company Account in IRTT

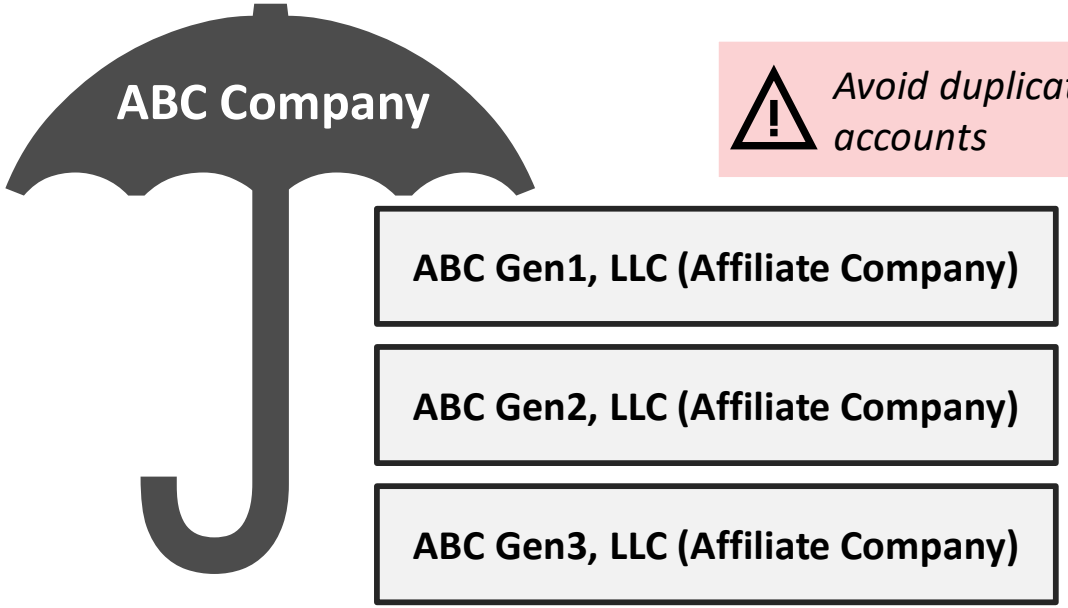
Your IR must be submitted by an account registered under your company's account

IRTT Company Admin (User)

- First user account (company admin) gets created when the company is first created in IRTT
- Company admin can create affiliate companies

Before starting your IR, contact ISO IRTT Customer Support (IRTT@iso-ne.com) to find out:

- Does your company have an account?
- Who is your company's IRTT Customer Admin?



Avoid duplicate accounts

IRTT User Accounts

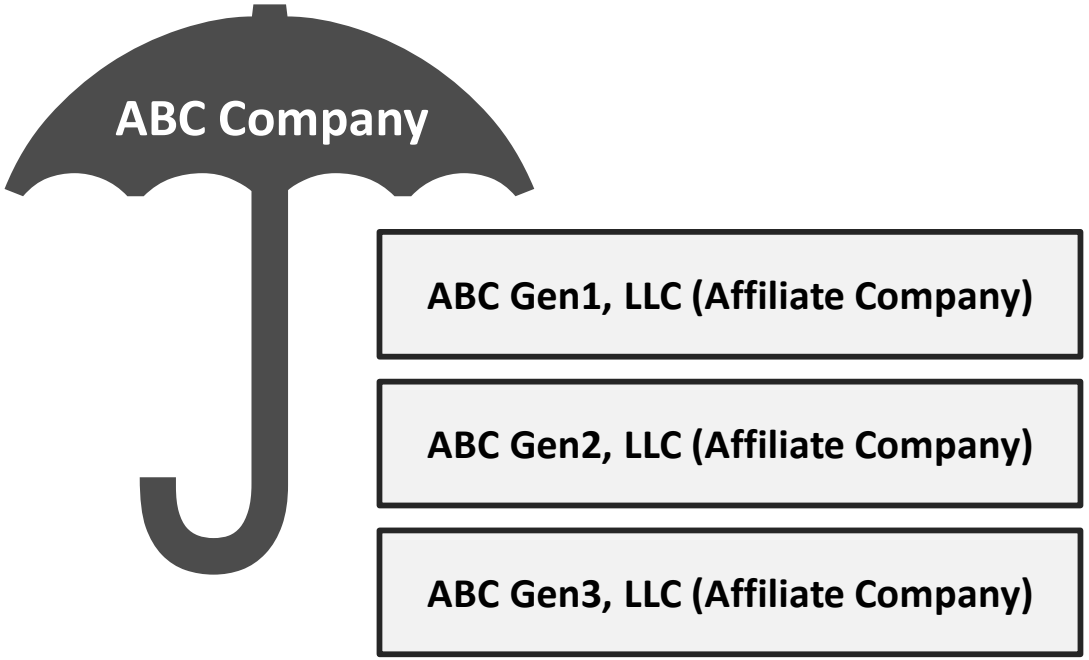
- Designated company admins can create user accounts for others within their company
- Admin accounts can also assign roles to user accounts for their company

Email IRTT@iso-ne.com to get help verifying the Associated Company on your IR before you continue. Choosing the incorrect Associated Company is a common mistake that can delay your queue position!

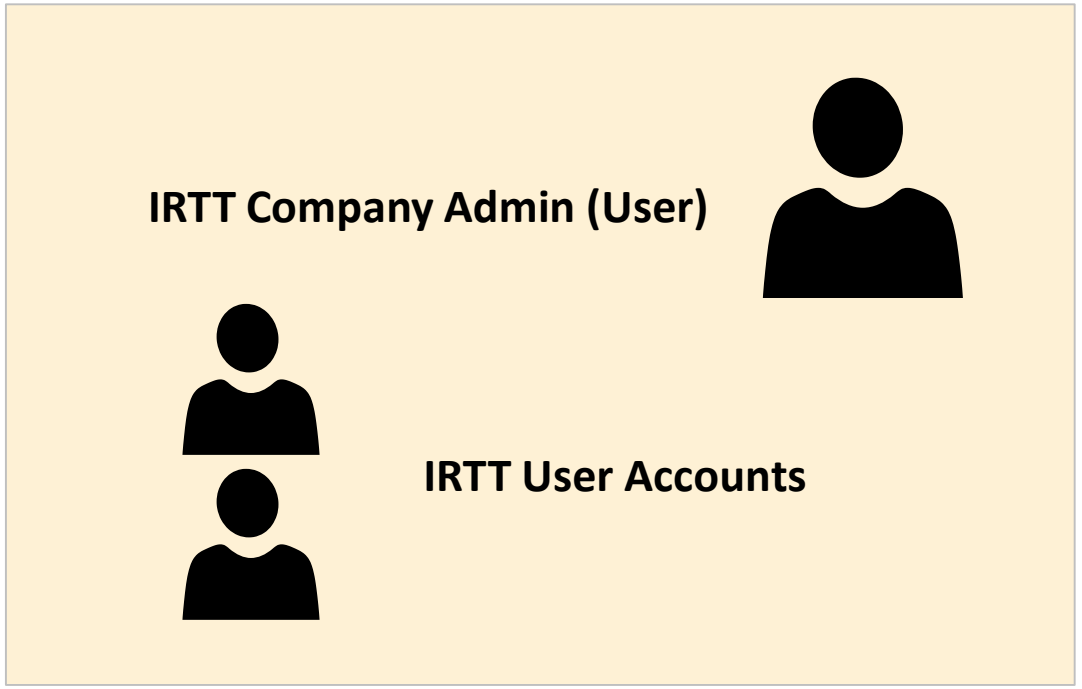
Learn How to Create User Accounts

Training knowledge articles and videos are available, and more are underway!

View the knowledge article and video on Ask ISO: How to Create a Company in IRTT



View the knowledge article and video on Ask ISO: How to Create Accounts in IRTT



Questions

Step 2 Timeline

Submitting an Interconnection Request (IR)

*Do sufficient research **before** submitting an IR:*

- *Review requirements in [Planning Procedure 5-6 (PP 05-6)]*

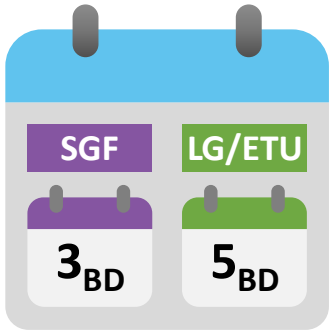
Important

Queue position (QP) assigned

PREPARE

IC submits interconnection request (IR) package

ISO acknowledges IR and identifies deficiencies



MILESTONE

IC cures deficiencies

SGF

Small Generators: Leave enough time to adequately prepare your IR to participate in the upcoming FCA

= No wait

BD = Business Day(s)

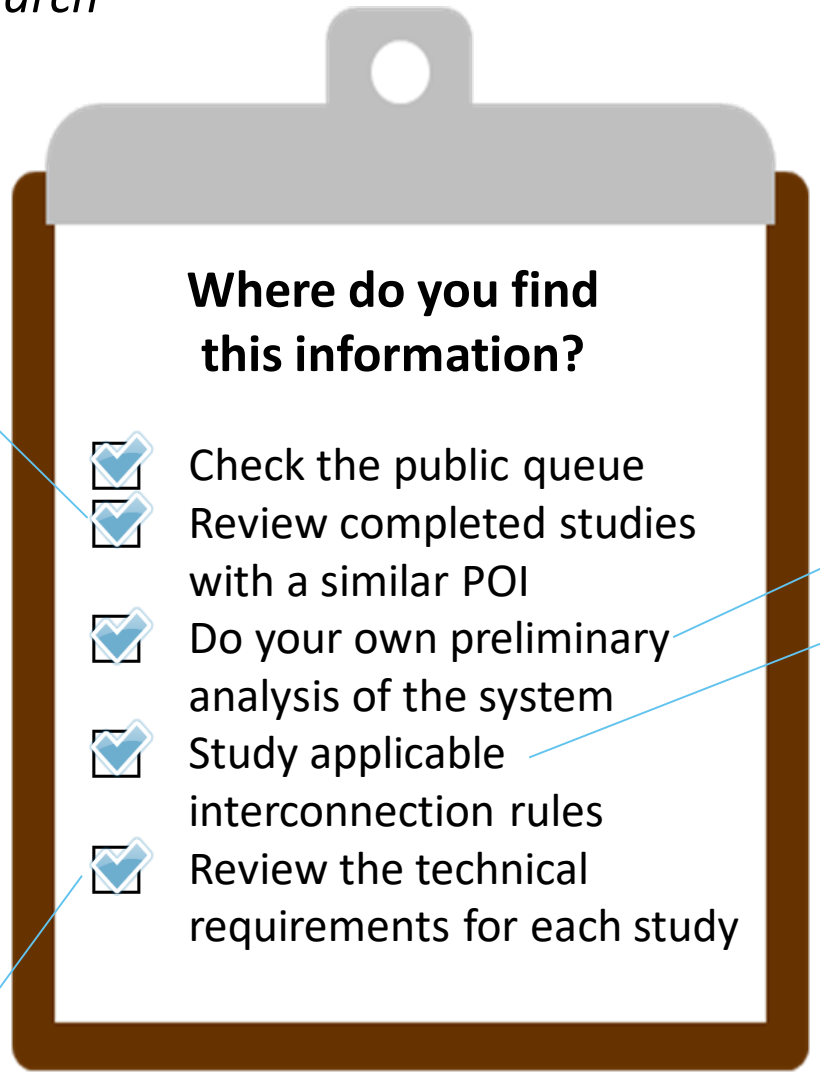
Do Sufficient Research Before Submitting Your IR

Steps for doing thorough research

Find completed studies for projects in your area on the Interconnection Request Studies page **CEII**

Planning Procedure 5-6 (PP 05-6)
Interconnection Planning Procedure for Generation and Elective Transmission Upgrades
- Study scopes and assumptions

Operating Procedure 14 (OP-14)
Technical Requirements For Generators, Demand-Response Resources, Asset-Related Demands, and Alternative Technology Regulation Resources



FERC Form No. 715, **CEII**
Annual Transmission Planning and Evaluation Reports

Completed interconnection studies **CEII**

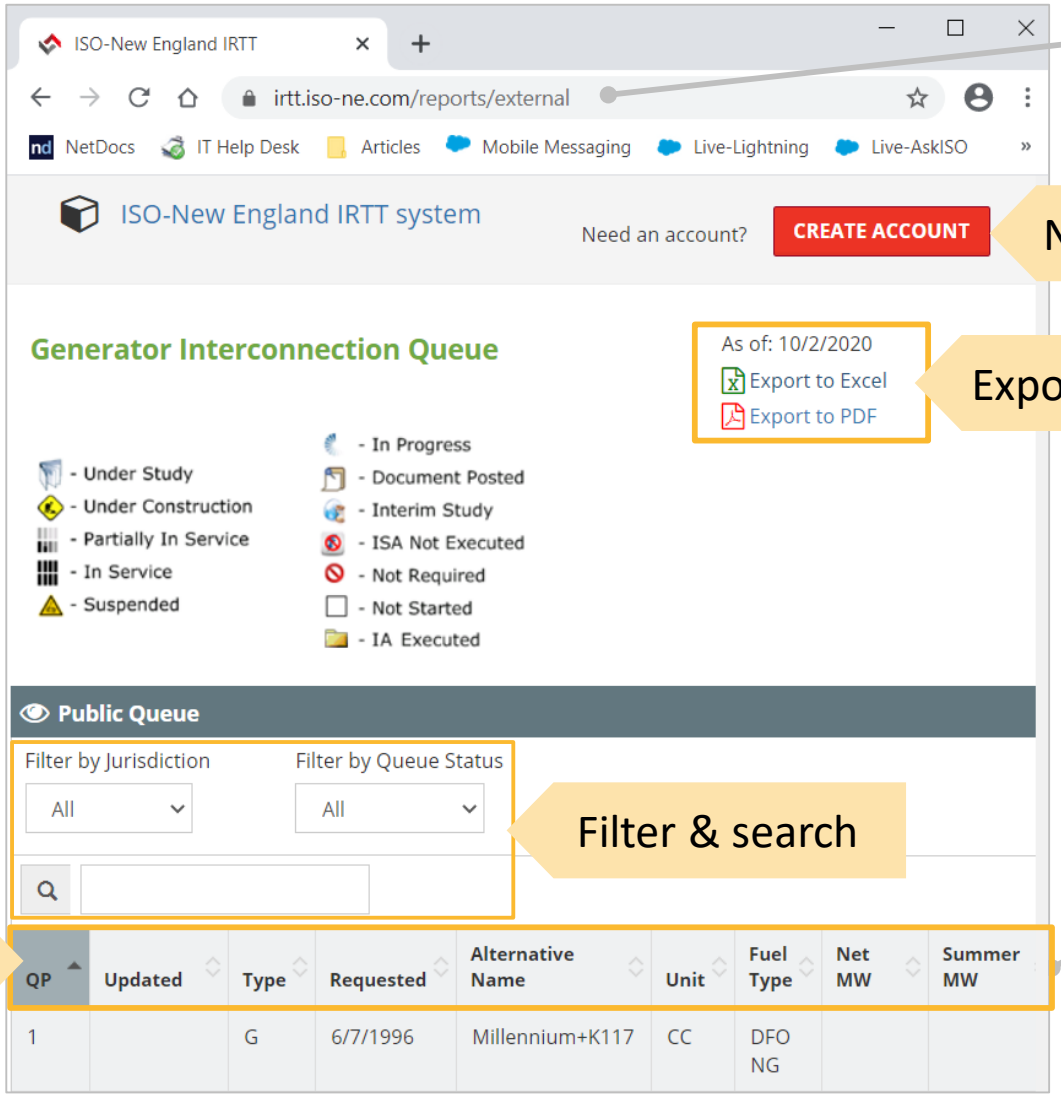
Schedule 23, Small Generator Interconnection Procedures

Schedule 22, Large Generator Interconnection Procedures

Schedule 25, Elective Transmission Upgrade Interconnection Procedures

Check the Public Queue

Look out for other projects in the area of your point of interconnection (POI)



irtt.iso-ne.com/reports/external

No login required

Export

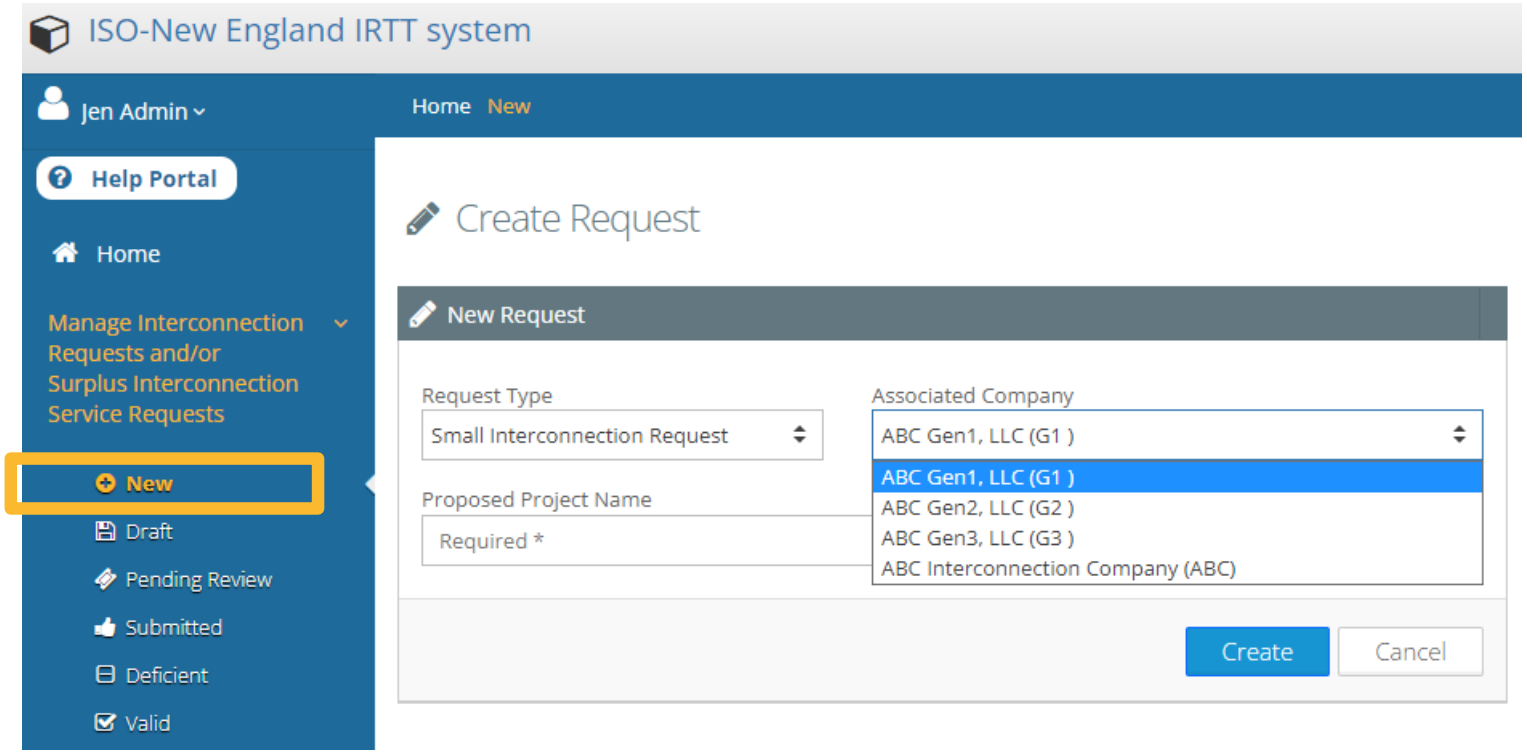
Filter & search

Sort

- *Visit the Interconnection Request Queue page to learn more about these fields and to get helpful tips for using the public queue*
- View the knowledge article and video on Ask ISO: How do I read the public version of the queue?

Starting a New Interconnection Request (IR)

Requirements for valid projects vary by project type (details covered later)



The company account associated with the IR must match the name on the site control and IC

For help, see:

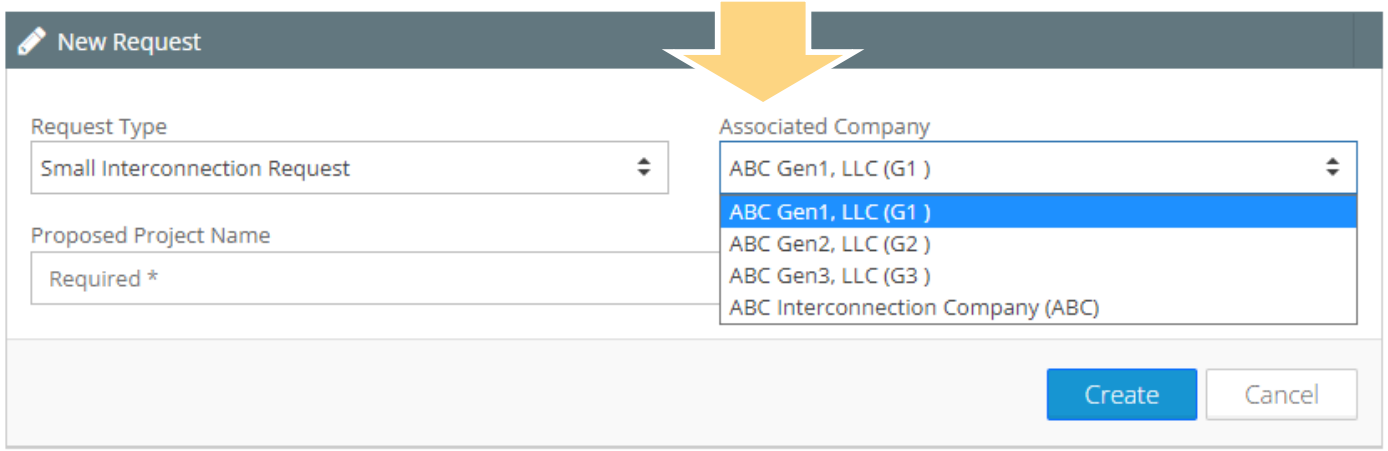
- *Submitting Interconnection Requests section of the IRTT User Guide*
- *Knowledge article with video on Ask ISO: How to create a new (draft) interconnection request or edit an existing one*
- *The Help Portal in IRTT* Help Portal

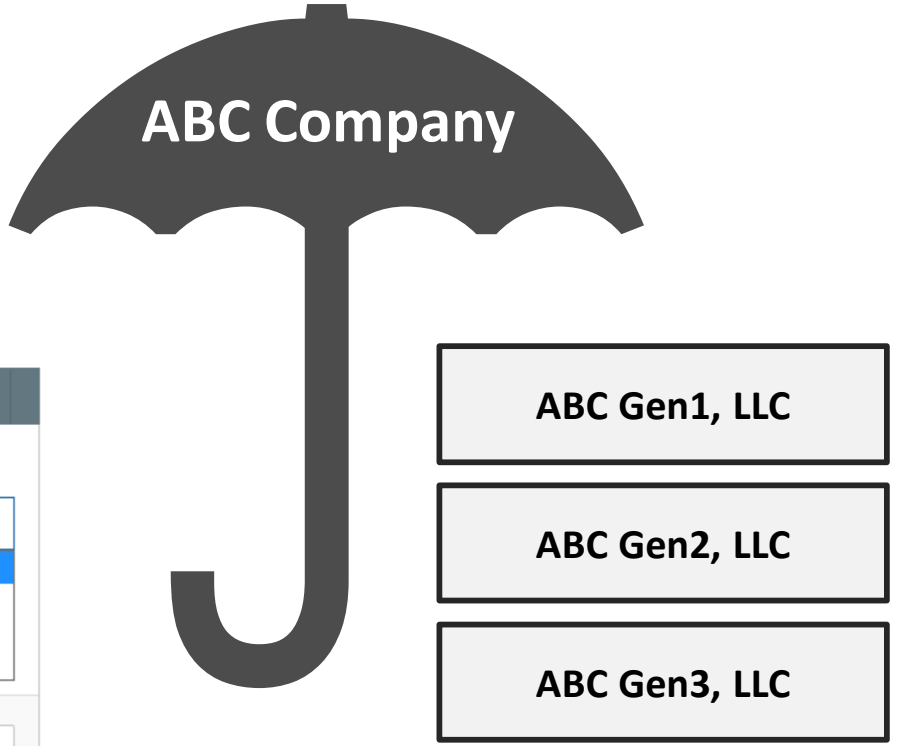
The Associated Company must be the same

The Associated Company on your IR must be correct

Choose the correct Associated Company

- *Exact* same name as in CAMS
- Owns the site control
- Submits IR
- Signs Study Agreement(s)
- Signs IA

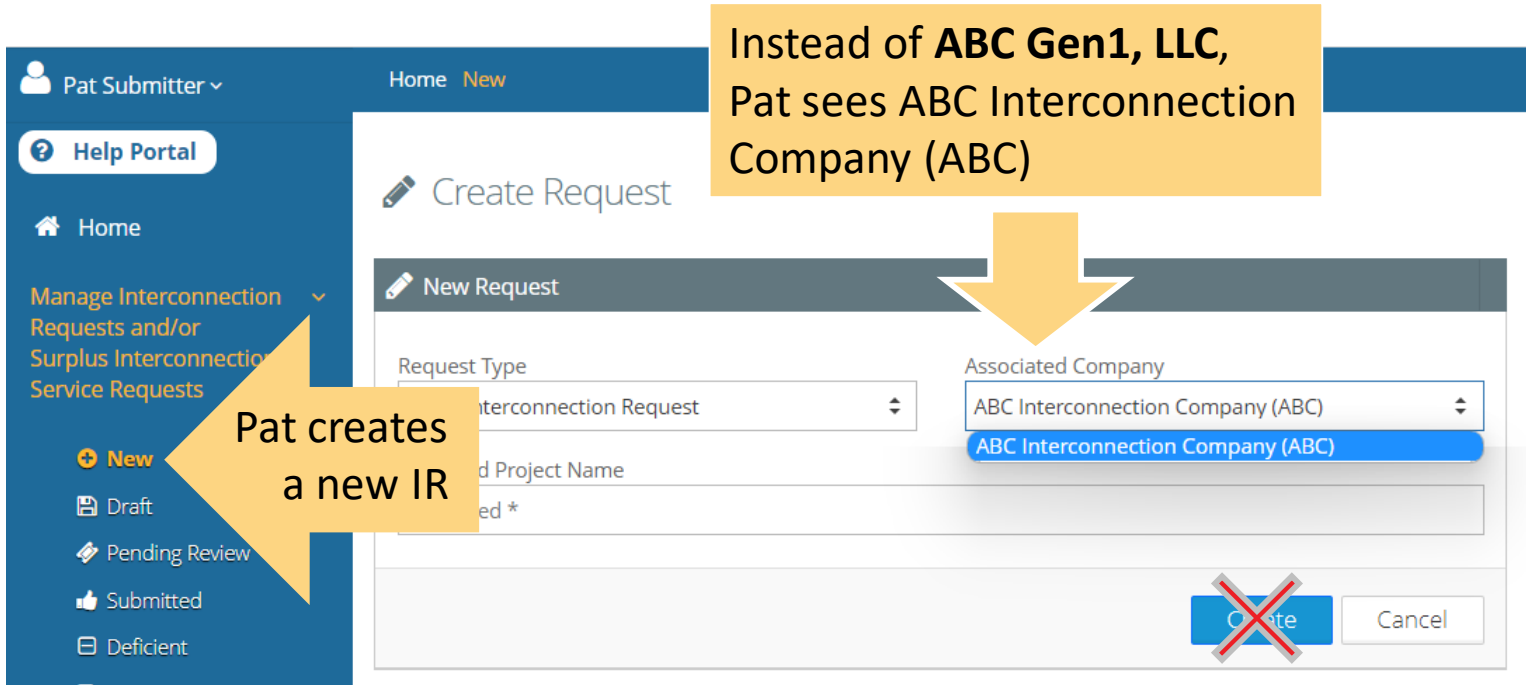




Email IRTT@iso-ne.com to get help verifying the Associated Company on your IR before you continue. Choosing the incorrect Associated Company is a common mistake that can delay your queue position!

Scenario: User does not see Associated Company when creating a new IR

Pat is an IRTT user creating a new IR for **ABC Gen1, LLC**, but the company is not listed as an Associated Company. What should Pat do?



PAT SHOULD STOP.

Do not use the wrong associated company

Check these common causes:

- ABC Gen1, LLC does not exist in IRTT
- ABC Gen1, LLC is not related (linked) to ABC Interconnection Company
- Pat account needs to be given the Request Manager security role for ABC Gen1, LLC

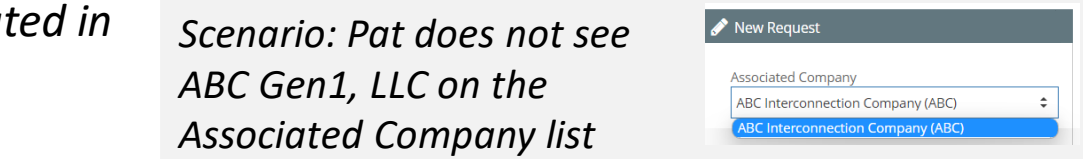
Email IRTT@iso-ne.com if you need help. One quick conversation can help avoid delays in getting your queue position.

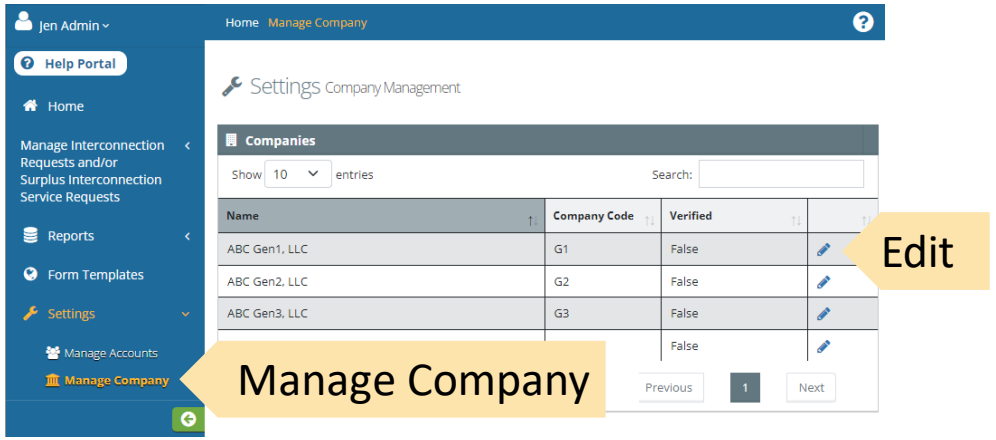
Scenario: User does not see Associated Company when creating a new IR

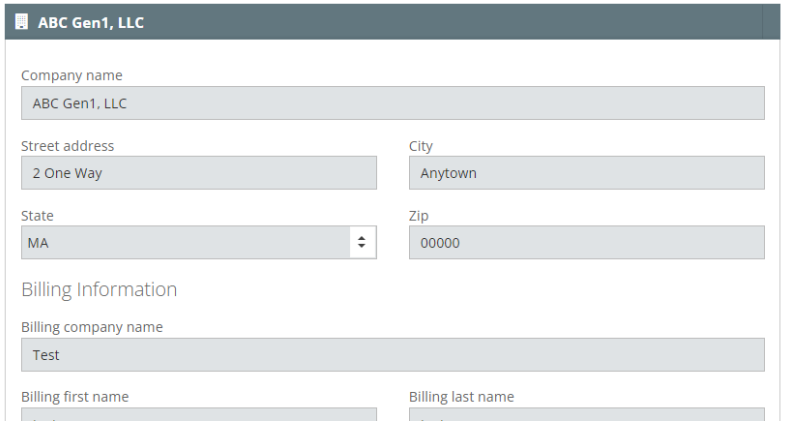
Make sure the Associated Company was created in IRTT and the Request Manager is associated with it

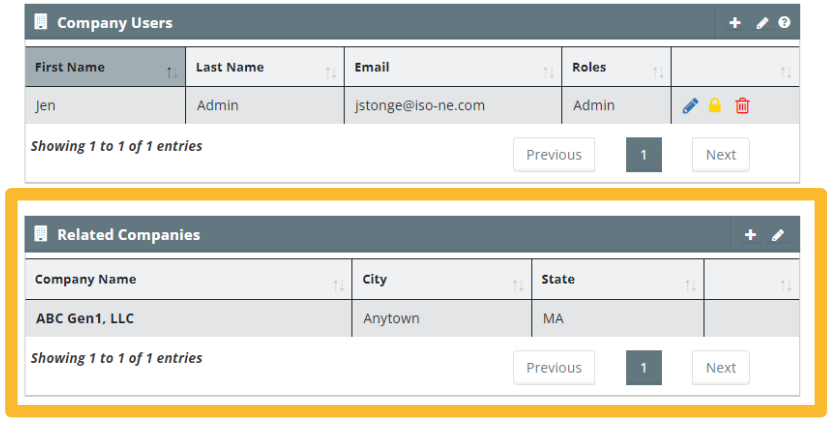
Possible solution(s): *Make sure the company* **ABC Gen1, LLC** *is created in IRTT. Make sure the Request Manager is from a related company.*

Scenario: Pat does not see ABC Gen1, LLC on the Associated Company list









– Add/link a company (must have same company admin)

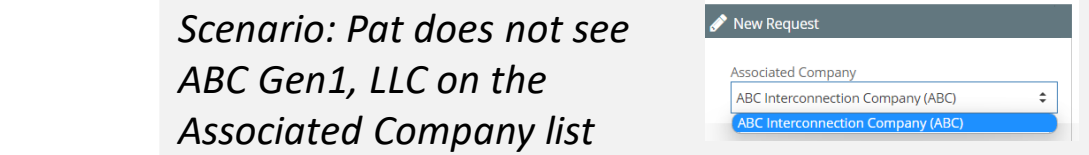
– Create a new company (company is not in IRTT)

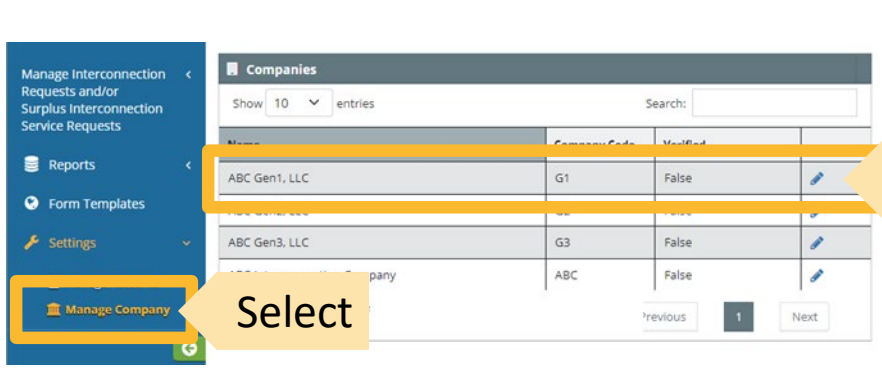
Scenario: User does not see Associated Company when creating a new IR

Make sure the user's account was granted permission to submit an IR (Request Manager)

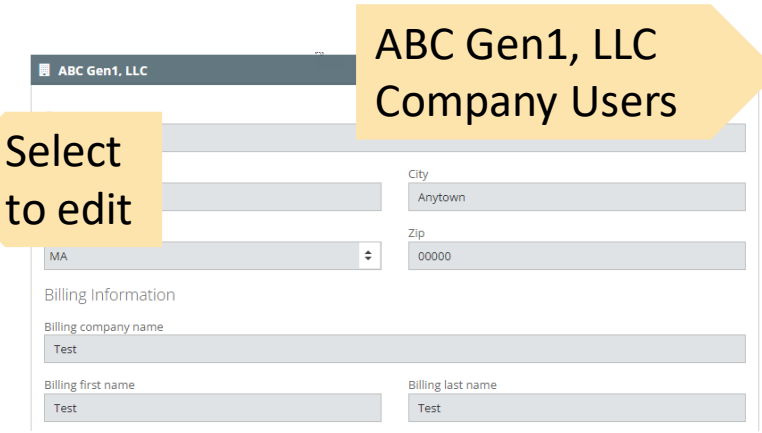
Possible solution: *Ask the IRTT Company Admin of* **ABC Gen1, LLC** *to ensure the user has an account with Request Manager security access.*

Scenario: Pat does not see ABC Gen1, LLC on the Associated Company list

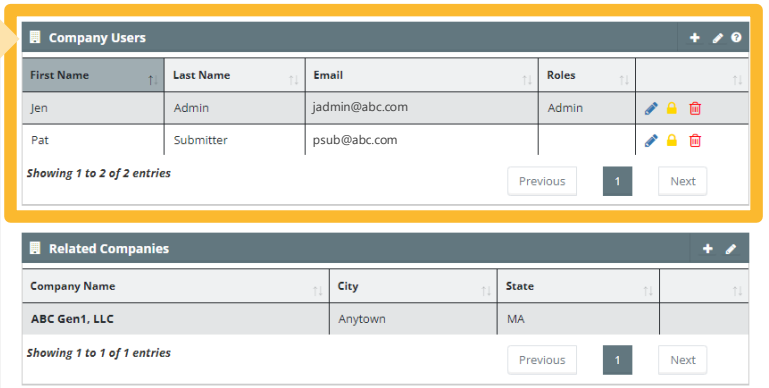


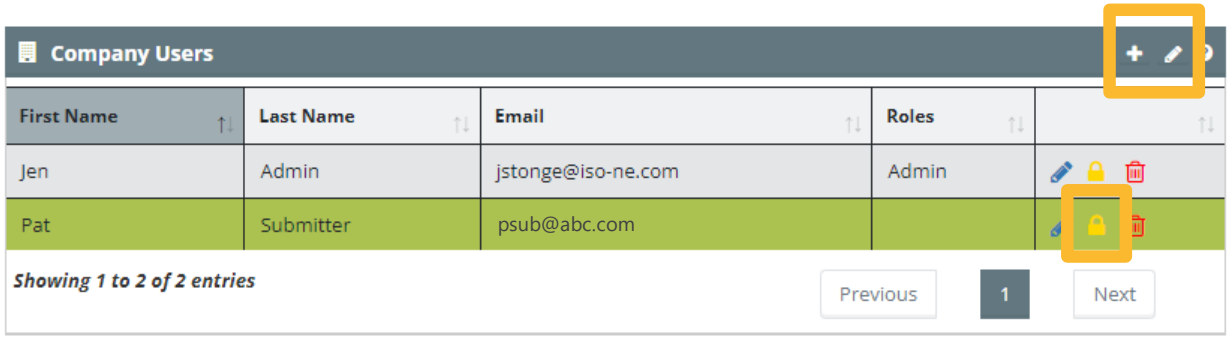


Select to edit



ABC Gen1, LLC Company Users





- Edit security (set Role to Request Manager)
- Create a new user (the user/email are not in IRTT)
- Add an existing user (from a related company in IRTT)

Decide on Type of Interconnection Service

Double-check this critical designation when completing your IR

Network Resource (NR) or Network Import (NI) interconnection service (energy capability only)

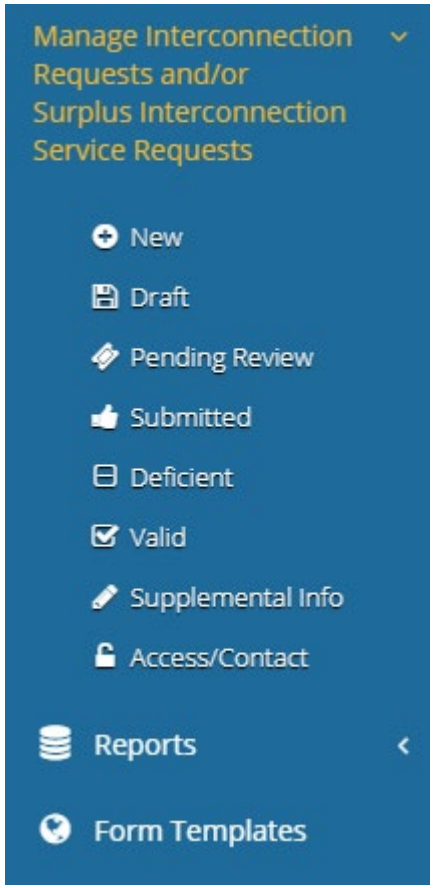
This enables participation in **all energy markets**, **but** not **the capacity market**. If later you wish to participate in the capacity market, you'll have to submit a new interconnection request for capacity network interconnection service.

Capacity Network Resource (CNR) or Capacity Network import (CNI) interconnection service (energy capability and capacity capability)

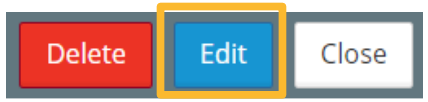
This enables participation in the **energy** and **capacity markets**. For more information, see the qualification process for generators and imports associated with elective transmission upgrades (ETUs).

Tips for Completing Your IR

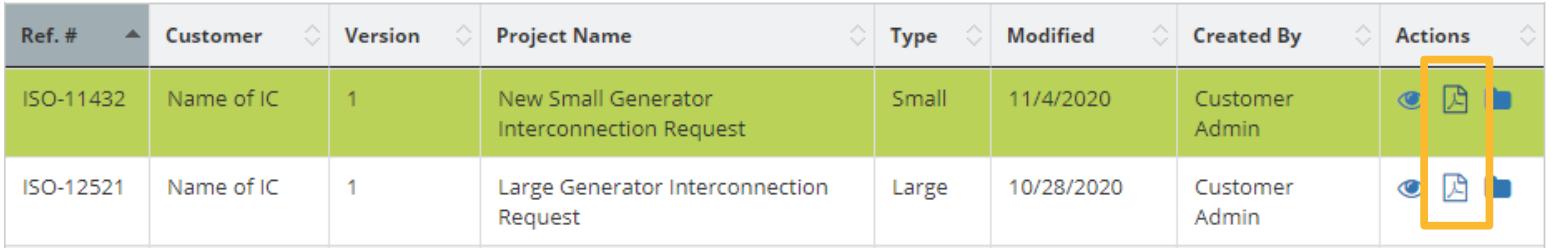
Completed IR packages include the IR deposit and are deemed valid to be assigned a queue position (QP)



- Commercial operation date (COD) is locked once you submit your IR
  - You can request an extension for exceptional circumstances (*See Schedule 22, Section 4*)
- Save your draft IR to return and complete later
  - When you save a new IR, it will be located in Draft until submitted
  - A draft IR's edit button is at the bottom of the Project Information tab



- Export a .pdf copy of your draft IR to review



Ref. #	Customer	Version	Project Name	Type	Modified	Created By	Actions
ISO-11432	Name of IC	1	New Small Generator Interconnection Request	Small	11/4/2020	Customer Admin	
ISO-12521	Name of IC	1	Large Generator Interconnection Request	Large	10/28/2020	Customer Admin	

- Download blank form templates

Use the IRTT User Guide for help when filling out your IR

After Your IR Has Been Deemed Valid

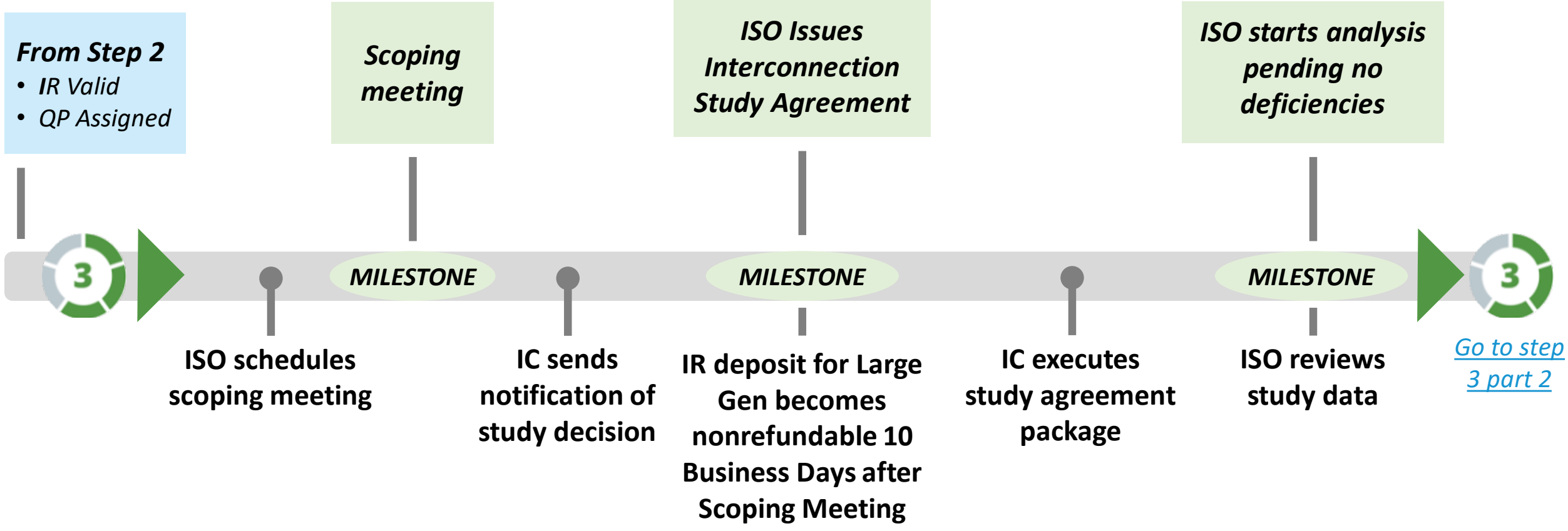
- ISO will assign a queue position to your project in the ISO Interconnection Queue
- A scoping meeting will be scheduled with ISO, IC, ITO and affected TOs
- You are in line for the required prerequisite interconnection studies
  - If no studies are required, you will move to IA development

⚠ A queue position is required for participating as a new generating resource or import in the Forward Capacity Market (FCM)

You are ready to continue to step 3

Step 3 (Part 1)

Scoping meeting to the executed study agreement



Who should attend the scoping meeting?

Scoping meeting attendees:

- Interconnection customer (IC)
- Project Manager and Tech Lead, Technical Manager (ISO)
- Interconnecting transmission owner (ITO)
- Affected parties (AP)

Make sure all participants have the appropriate CEII clearance

Technical Expertise for scoping meeting

Personnel and others with relevant technical knowledge of the project design and area of the system relevant to the point of interconnection should attend the scoping meeting. Attendees should bring the following types of information to the meeting, as applicable:

- The primary and any alternative POIs for discussion
- General facility loadings and general instability issues
- General short-circuit, voltage, and reliability issues, as may be reasonably required for scoping out the project to accomplish the purpose of the meeting

Purpose of the Scoping Meeting

CEII

Make sure all participants have the appropriate CEII clearance

Scoping meeting attendees:

IC = interconnection customer
ISO = ISO New England
ITO = interconnecting transmission owner
AP = Affected parties

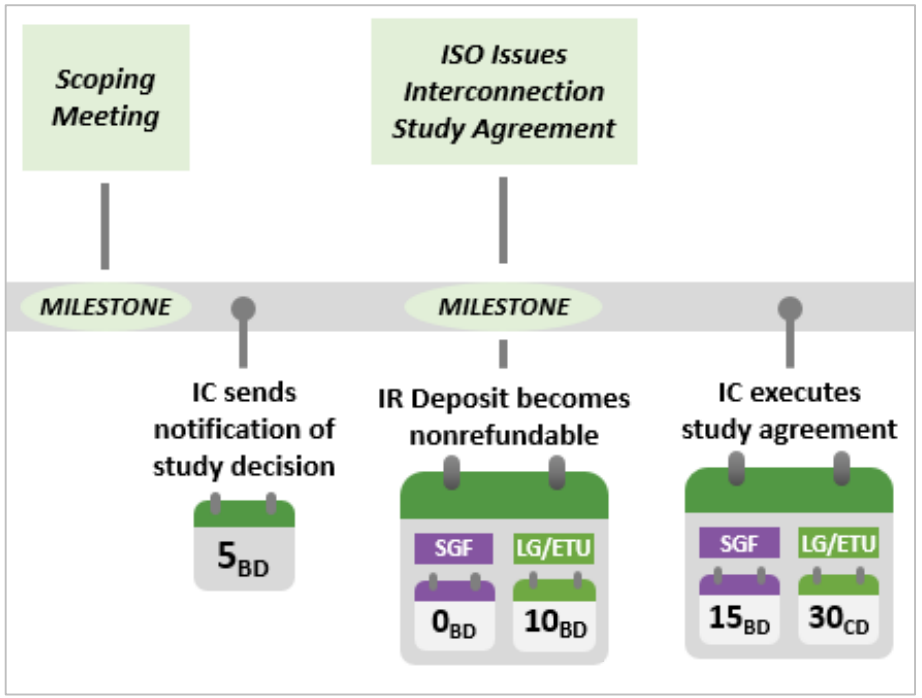
Meeting Task	ISO	IC	ITO	AP
Discuss estimated timeline for completing all applicable interconnection studies	X			
Discuss proposed project and alternative interconnection options		X		
Exchange transmission data and study evaluations expected to impact interconnection options and distribution system, including potential reliability issues or challenges	X		X	X
Determine the primary and alternative points of interconnection	X	X	X	
Discuss information necessary to facilitate the administration of the interconnection procedures and development of the study agreement	X	X		

Post-Scoping Meeting Decisions

Provide the ISO your Study Decision Notification in writing

5 BD **Within five business days after the scoping meeting, send to your ISO PM (via email):**

- Your study decision
- The name and title of the signatory for the agreement and state of incorporation
- The selected POI and any reasonable alternatives

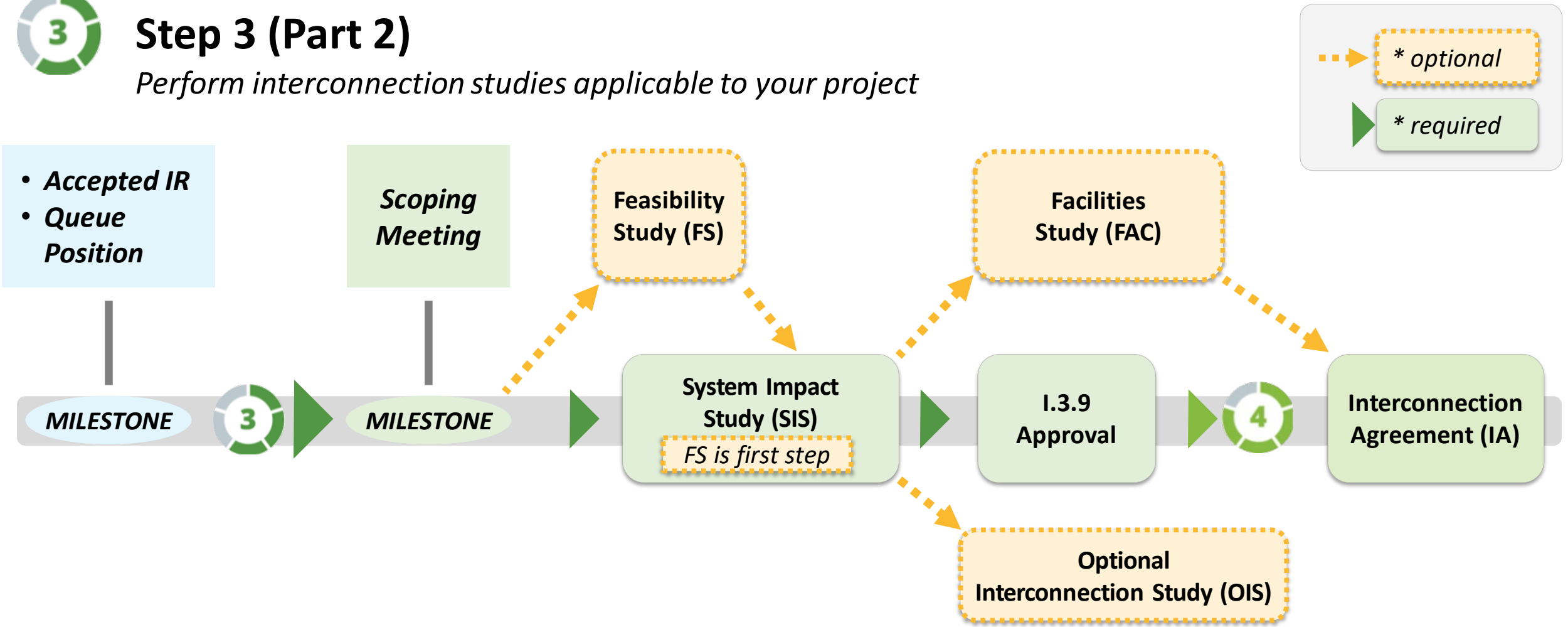


5 BD **The ISO has five business days to issue study agreement**

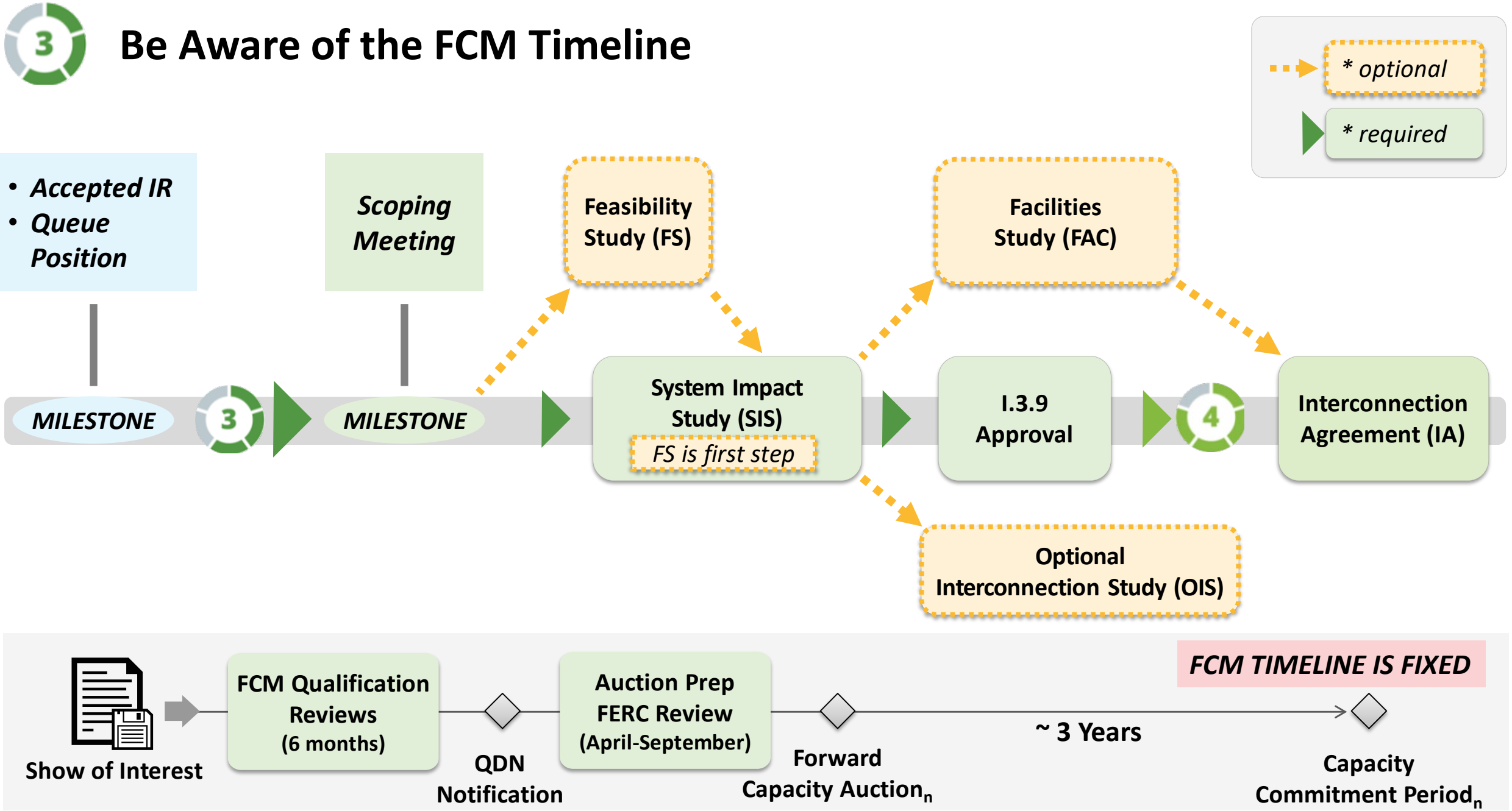
BD = Business Day(s)
CD = Calendar Day(s)

Step 3 (Part 2)

Perform interconnection studies applicable to your project



Be Aware of the FCM Timeline



Purpose of Doing a Separate Feasibility Study (FS)

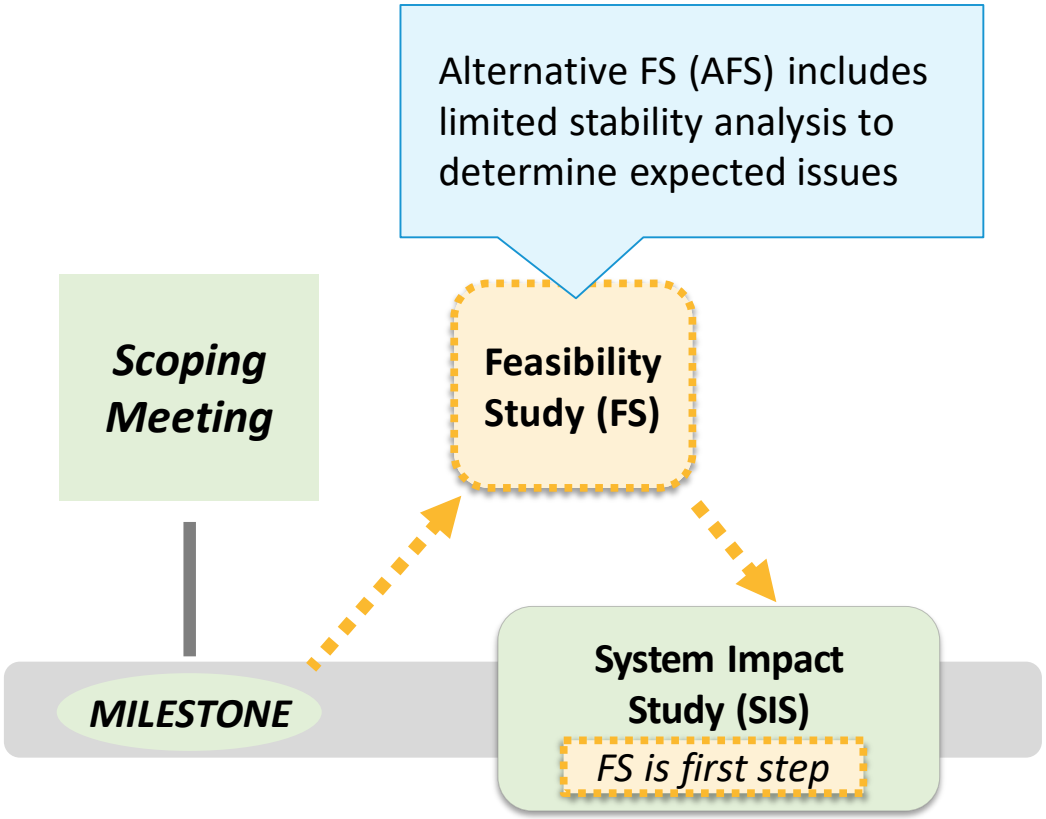
Limited analysis with a high-level scope to make sure project is feasible

Why complete a separate feasibility study ?

- Project is more conceptual
- Based on study results, IC can make certain changes before starting the system impact study (SIS)
- Takes less time to get a report

You may revise certain data before starting the SIS if the FS results lead you to:

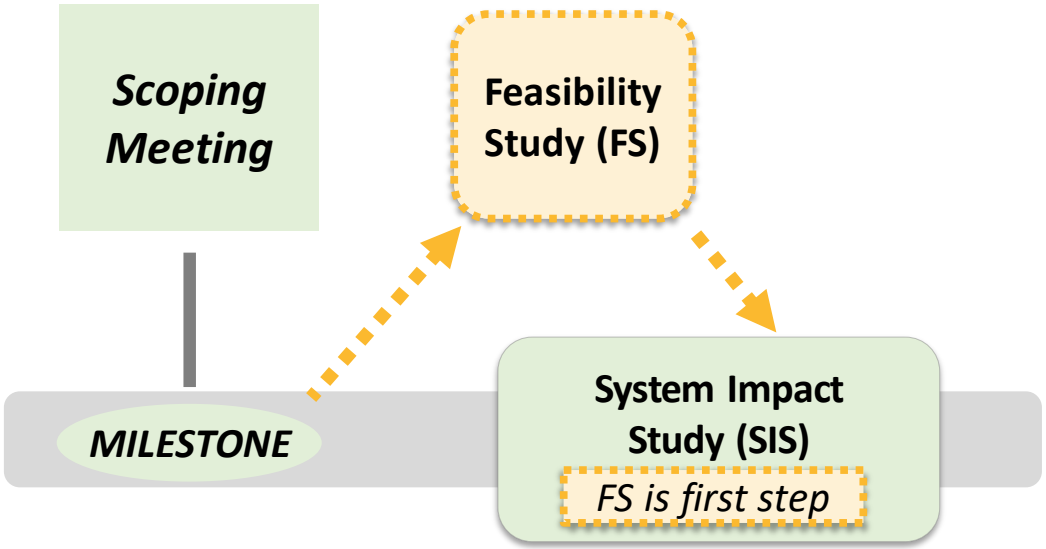
- Reduce the project size
- Modify technical parameters
- Modify interconnection configuration



Factors That Influence Cost and Timing of an Interconnection Study

These key factors influence cost and timing:

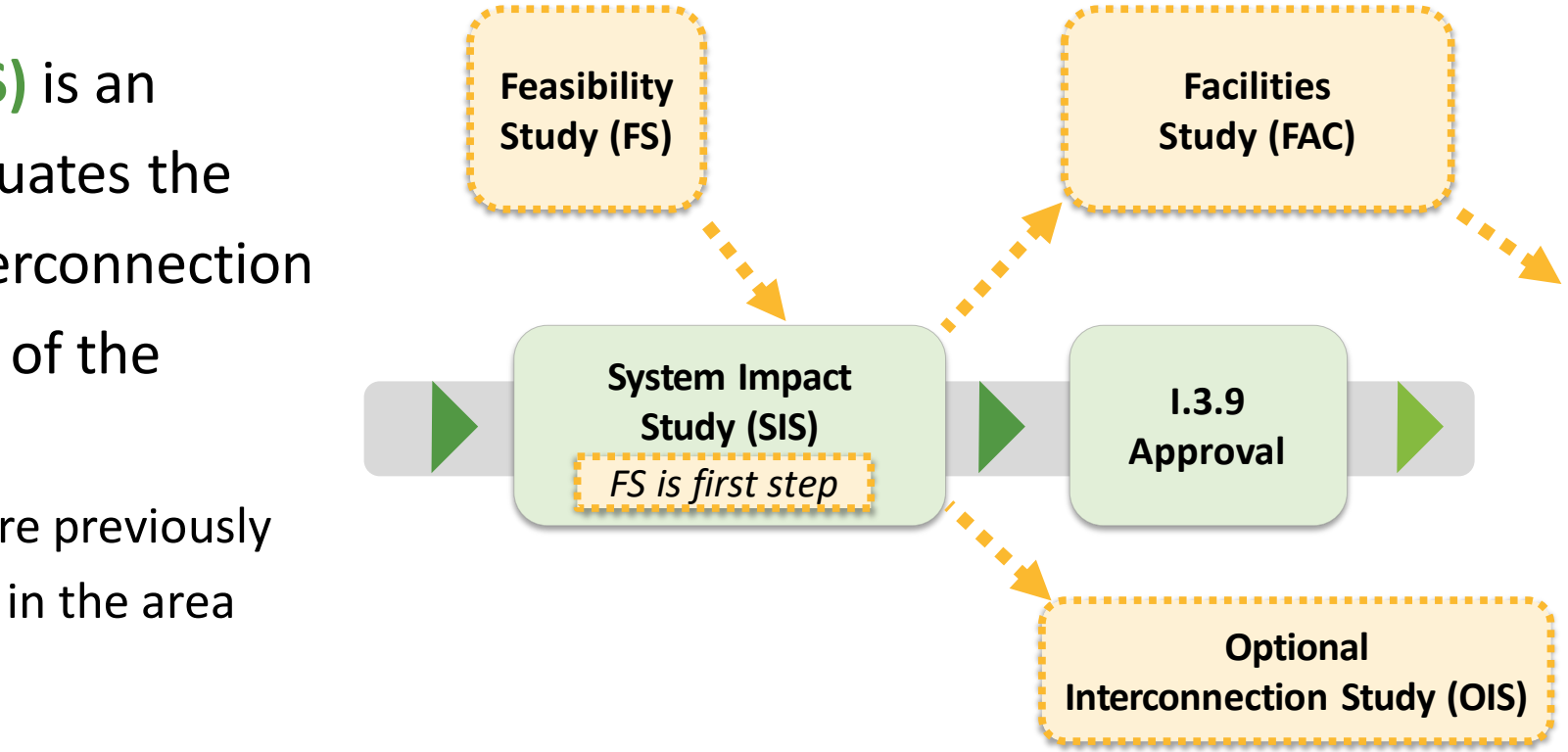
- Size
- Location
- Technology type
- Voltage level of the point of interconnection
- Timely input provided by study participants
- Quality of the data
  - All values match throughout the required paperwork
  - Models meet requirements of PP5-6
  - PSSE and PSCAD models match
  - Benchmarking report confirms the behavior



System Impact Studies Are Required

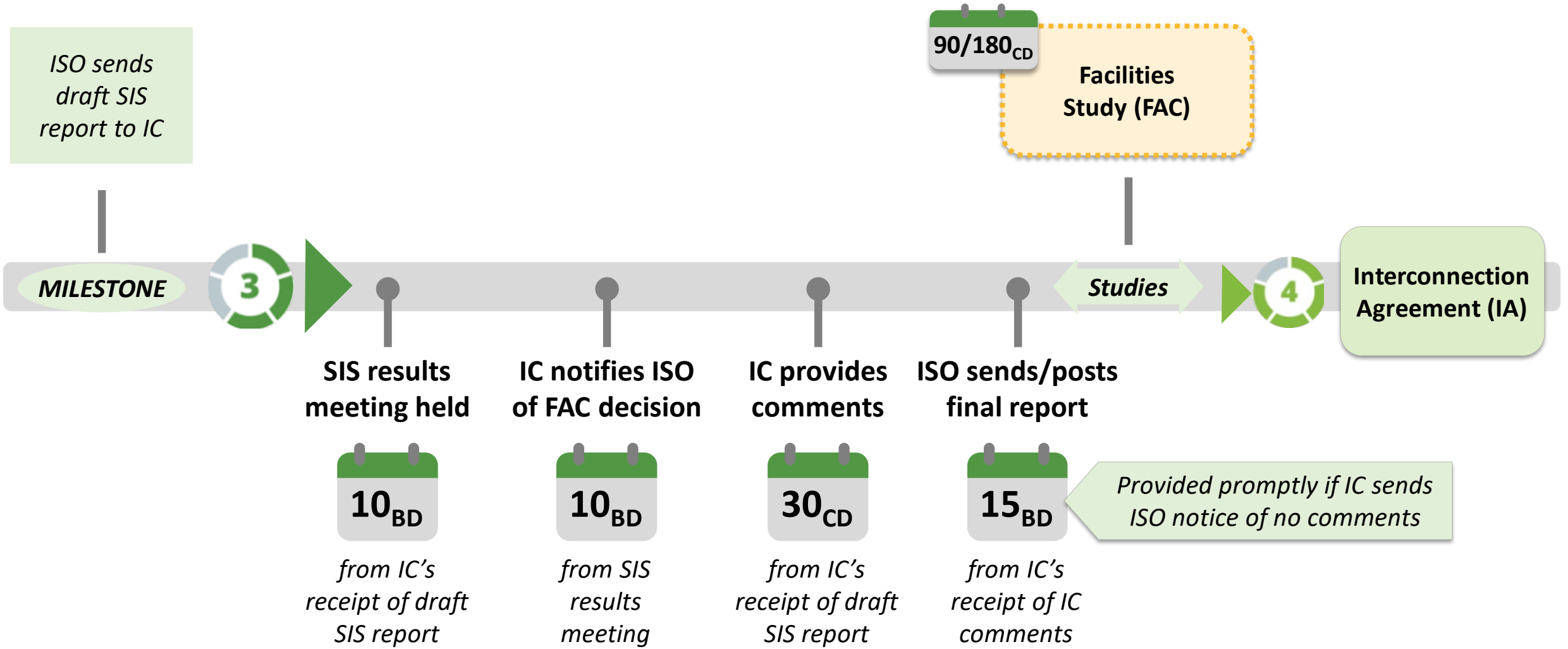
A **System Impact Study (SIS)** is an engineering study that evaluates the impact of the proposed interconnection on the safety and reliability of the transmission system

- Start can be delayed if there are previously queued project dependencies in the area



SIS Results Meeting and Next Steps

ISO sends draft SIS report to IC



BD = Business Day(s)
CD = Calendar Day(s)

Options after a Completed System Impact Study

Facilities Study

A **Facilities Study (FAC)** is a study performed by the ITO to determine a list of facilities (including interconnecting transmission owner's interconnection facilities and network upgrades as identified in the interconnection system impact study), the cost of those facilities, and the time needed to build

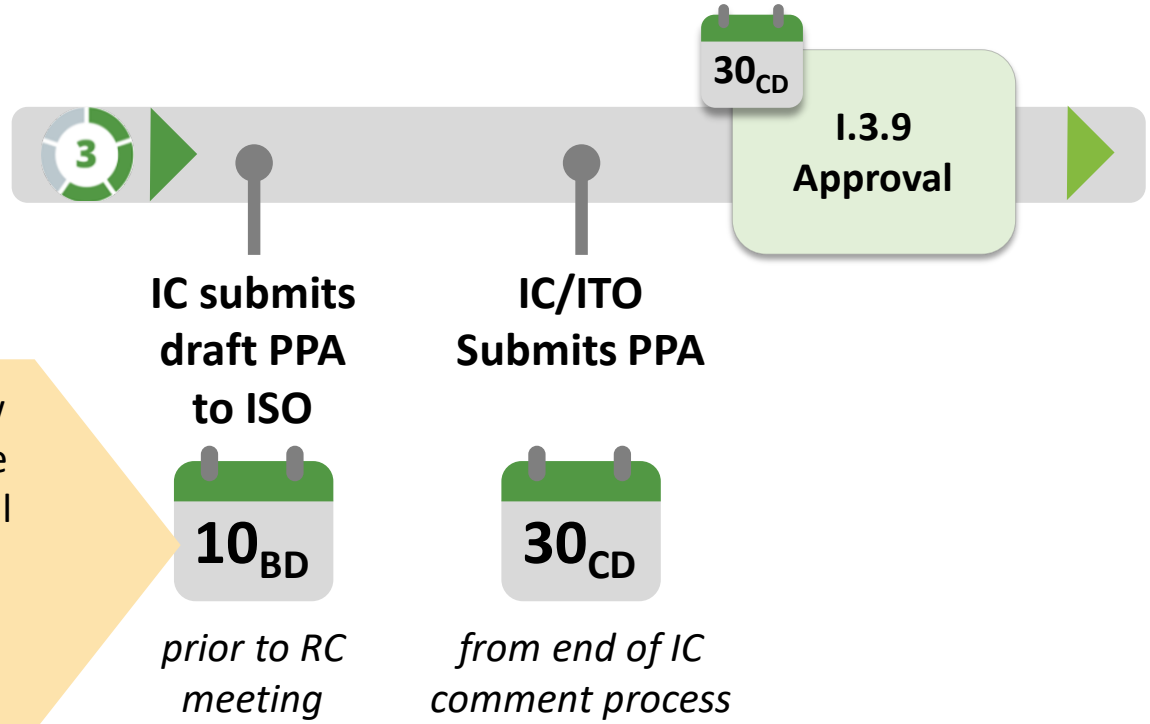
- FAC provides a good-faith cost estimate of ±20% or ±10%, whereas FS/SIS is not required to provide degree of accuracy with cost/time to build estimates
- 10 business days following your SIS results meeting, you must provide the ISO written notice to pursue the FAC, or waive the FAC and elect an expedited interconnection.
- If you waive the FAC:
  - You assume all risks and costs associated with equipment, engineering, procurement, and construction work typically covered by the FAC
  - You and the ITO can enter into a separate Engineering and Procurement Agreement (E&P) in its place

⚠ *This election cannot be reversed*

I.3.9 Approval Information

See Planning Procedure 5-1

During this part of process, NEPOOL evaluates the potential for significant adverse impact on the stability, reliability, or operating characteristics of the interconnected system.



- Submit to ISO for review, preferably a few days ahead of the final due-by date of the Proposed Plan Application (PPA) submittal
- Time used to get on the Reliability Committee (RC) agenda (NEPOOL requirement)

https://www.iso-ne.com/system-planning/transmission-planning/proposed-plan-applications

Step 4

Interconnection Agreement (IA) development timeframe

From Step 3
- ***SIS results meeting***

An **Interconnection Agreement** (IA) is a formal legal document detailing the terms and conditions for interconnection service administered by the ISO

Interconnection Agreement

IC submits or waives comments within 30 CD of receipt of SIS

IC chooses FAC or waives FAC and expedites IA

ISO tenders Interconnection Agreement

IA executed by all parties

15_{BD}

from issuance of final IA

BD = Business Day(s)
CD = Calendar Day(s)

Options after a Completed System Impact Study

Expedited Interconnection – Interconnection Agreement Negotiations

By choosing an expedited interconnection, you

- Waive the Facilities Study (FAC)
- Enter into an Engineering and Procurement Agreement (E&P) with ITO/affected party
- Commit to these milestones in your Interconnection Agreement (IA):
  1. Siting approval for the generating facility and interconnection facilities
  2. Engineering of interconnection facilities approved by interconnecting TO
  3. Ordering of long lead time material for interconnection facilities and system upgrades
  4. Initial synchronization date
  5. Commercial operation date

Step 5

Deadlines for submitting data and registering your asset

From Step 4
- **Interconnection Agreement**

IC submits "as-purchased" data

180 CD

before initial synchronization date

Initial synchronization date

Commercial Operation Date (COD)

MILESTONE

MILESTONE

Construction

IC submits "as-built/ as-tested" data

Before **COD**

If required by ITO/PTO, IC submits applications for local service and RNS

90 CD

before COD

Capacity Commitment Period

CCP

Details vary by project type and are covered in other training programs. See the Asset Registration page to learn how to register your asset.

CD = Calendar Day(s)

Questions

SGF-Specific Interconnection Process Steps

Steps 2-5 of the Interconnection Process

SGF

Jump to other topics:

- General Overview
- **SG Process** *(you are here)*
- LG/ETU Process

Timeline

SGF

Do sufficient research before submitting an IR

!

PREPARE

SGF

Small generators: Give yourself enough time to receive your QP to participate in the upcoming FCA

- Schedule 23 requirements may take several months to prepare

IC submits interconnection request (IR)

ISO acknowledges IR and identifies deficiencies

3_{BD}

MILESTONE

Queue position (QP) assigned

IC cures deficiencies

10_{BD}

BD = Business Day(s)

2

SGF

Small Generator IR Requirements

Your IR is not valid if it is missing any of these

A completed small generator capacity Interconnection Request (IR) includes these items
$2,500 non-refundable deposit • Send via electronic funds transfer (do not mail checks) • Contact ISO Billing Department (billingdept@iso-ne.com) to get banking information
Site control documentation
Site map
One-line diagram
Technical data
Models for all interconnection studies

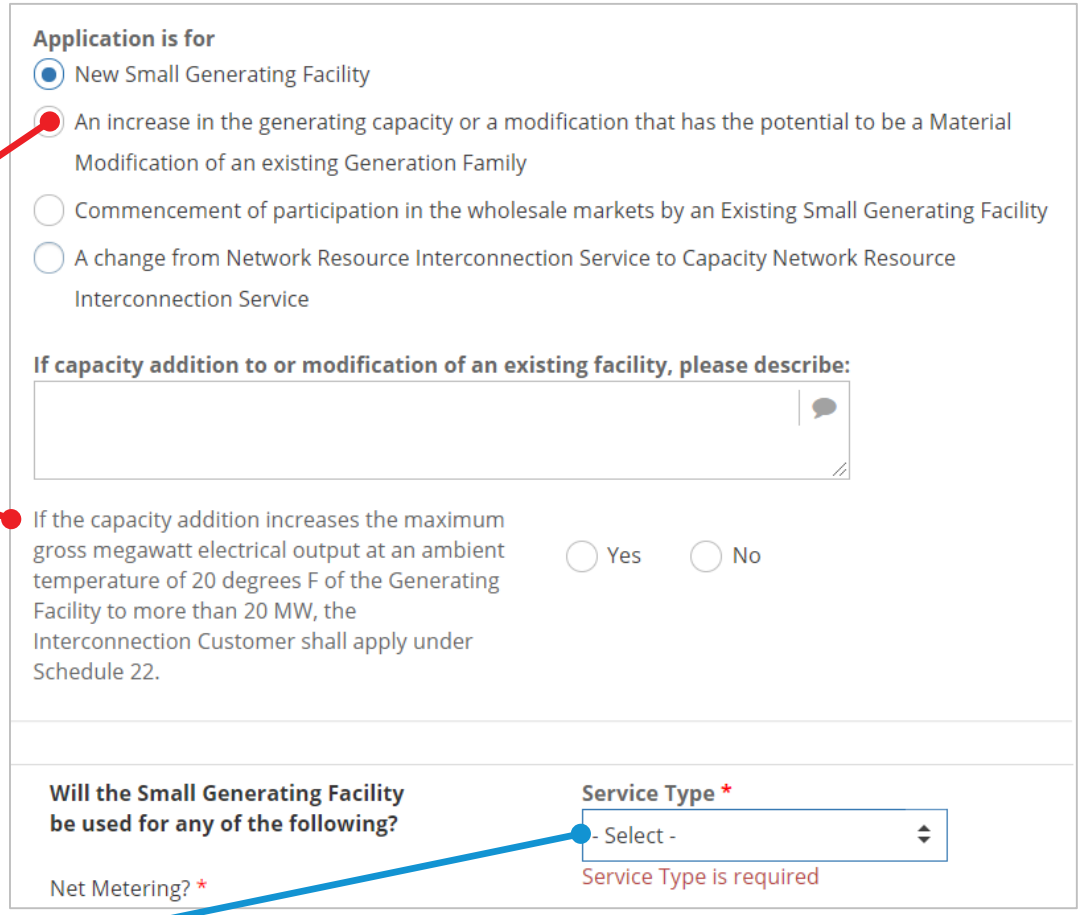
- *See Submitting Interconnection Requests: Submitting a New Small Generator Request (IRTT User Guide)*
- *Attachment A to the IR form provide details for the technical data required*

⚠ *Technical review cannot be completed until the deposit is received*

Tips for Completing the Project Information Tab

Fill out this information carefully

If your project will increase your gross MW by more than 20 MW, complete IR for large generators instead



Reminder: Service Type is Very Important

- Network Resource Interconnection Service *(energy capability only)*
- Capacity Network Resource Interconnection Service *(energy capability & capacity capability)*

Tips for Completing Your IR

Avoid these common mistakes

SGF

> ⚠ *If applicable, you must get a queue position in time to submit an SOI*

- Verify that all of your values are accurate and use the same
- Use consistent common values (MVA rating, MVAR capability, impedances, etc.)
- Your choices should be consistent with other selections (and all forms and all applications going forward)

Will the Small Generating Facility be used for any of the following?

Net Metering? *
Yes No

To Supply Power to the Interconnection Customer? *
Yes No

To Supply Power to Others? *
Yes No

Refer to slide 7 to help answer these questions about exemptions

Check: Do your answers make sense?

For example, if you plan to participate in the wholesale markets (Yes), you must also choose supply power to others (Yes)

Service Type *

- Select -

A retail customer interconnecting a new Small Generating Facility that will produce electric energy to be consumed only on the retail customer's site? *
Yes No

A qualifying Facility where 100% of the output will be sold to its host utility? *
Yes No

An Interconnection Customer interconnecting a new Small Generating Facility that plans to participate in the wholesale markets? *
Yes No

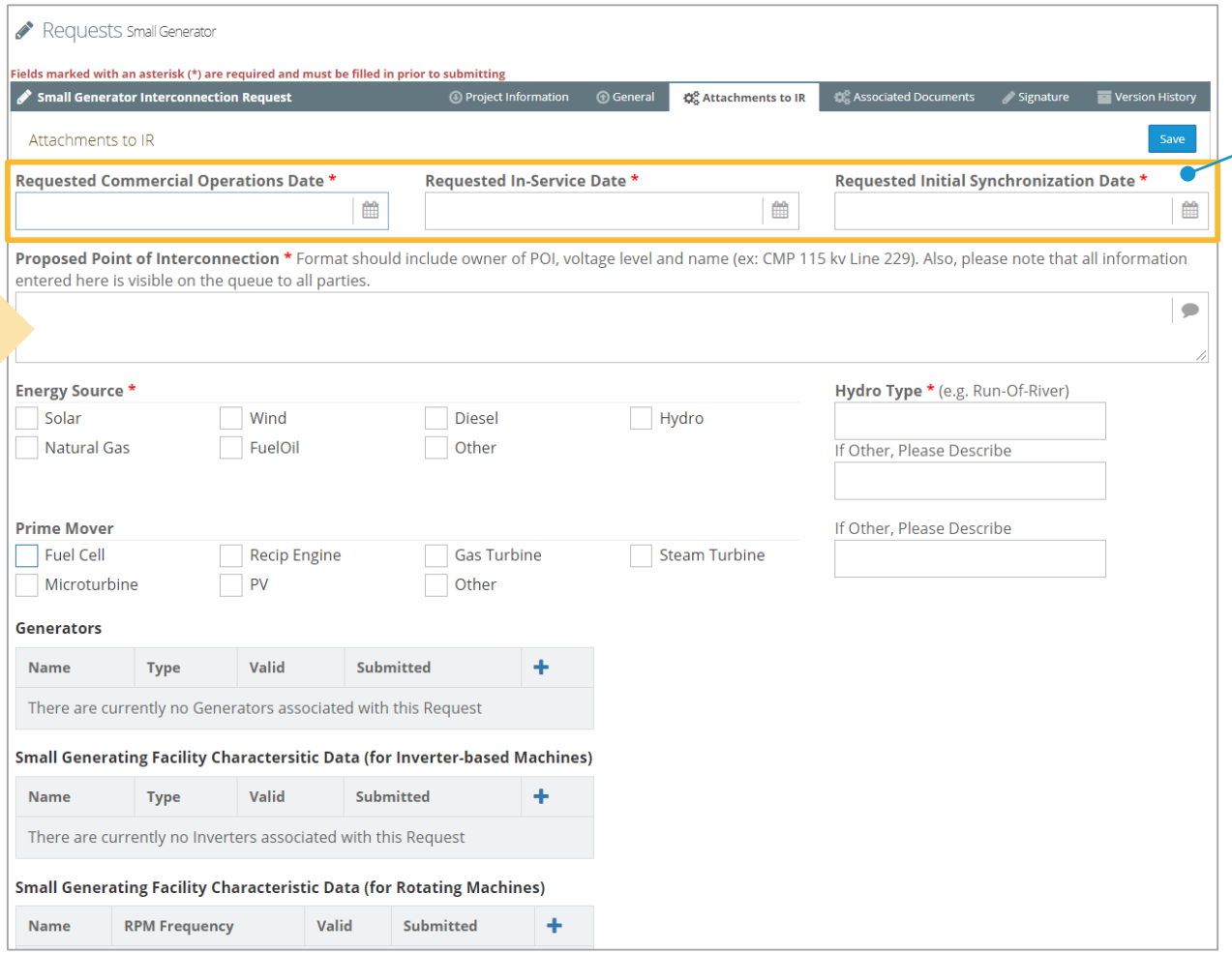
An existing Small Generating Facility commencing participation in the wholesale markets? *
Yes No

Tips and Lookouts for the *Attachments to IR* Tab

This tab contains the information to complete Attachments 2, A, and A1

Attachments to IR

POI must be modeled in the ISO-NE PSSE basecase



These dates:

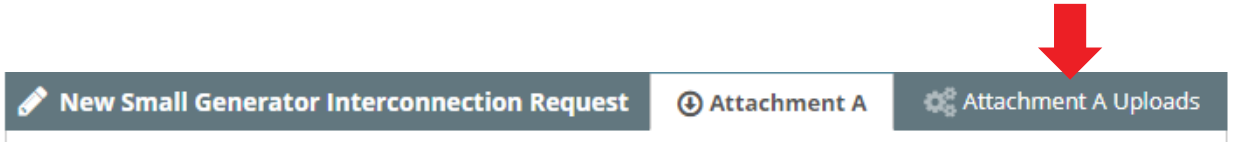
- Are the basis for future extensions
- Must be consistent throughout ISO applications (e.g., FCTS)

** Requests to extend by more than 3 years are considered if due diligence is shown, and circumstances are out of the control of the IC*

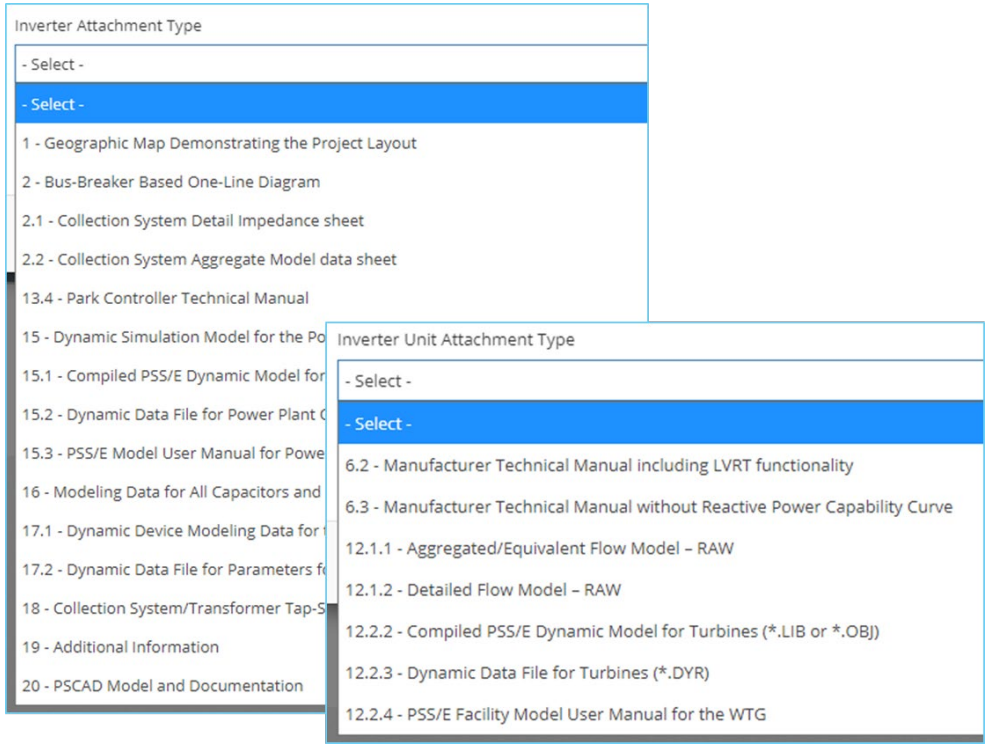
Attachment A: Wind and Inverter-Based Generating Facilities

*Tips for completing Attachment A and uploading documents via **Attachment A Uploads** tab*

- *Supplementary Wind and Inverter-Based Generating Facility* (Attachment A) is found in attachments to IR tab
- Use **Attachment A Uploads** tab to upload required documents



- As you upload a document for each step in Attachment A, (e.g., 1-Geographic Map), you will see the file name listed for that step
- You must save Attachment A before the option to add units becomes available in Step 3
  1. Click Save and confirm
  2. Scroll to the bottom of Attachment A and click the Edit button
  3. Click the plus (+) button in step 3 to add a new unit



Tips for Completing the *Attachments to IR* Tab

Avoid common data errors that could delay approving your IR

Attachments to IR

Provide the maximum output of each generator including each energy storage device

Primary frequency response operating range for electric storage resources

Minimum State of Charge:

Maximum State of Charge:

Generating Facility Capacity (MW)	Maximum Net MW Electrical Output	Maximum Gross MW Electrical Output
At or above 90 degrees F *	Net @ 90	Gross @ 90
At or above 50 degrees F *	Net @ 50	Gross @ 50
At or above 20 degrees F *	Net @ 20	Gross @ 20
At or above 0 degrees F *	Net @ 0	Gross @ 0

List components of the Small Generating Facility equipment package that are currently certified *

Equipment Type	Certfifying Entity

Add new

Enter total values for the whole project

Enter values per-inverter

Generator (or solar collector) *

Manufacturer, Model, & Number *

Version Number *

Nameplate Output Power Rating in kW *

Summer kW

Winter Nameplate Output kW Power Rating *

Winter kW

Nameplate Output Power Rating in kVA *

Summer kVA

Winter Nameplate Output kVA Power Rating *

Winter kVA

Individual Generator Power Factor *

Rated Power Factor Leading *

Rated Power Factor Lagging *

Total Number of Generators in wind farm to be interconnected pursuant to this Interconnection Request *

Elevation *

Single or Three Phase *

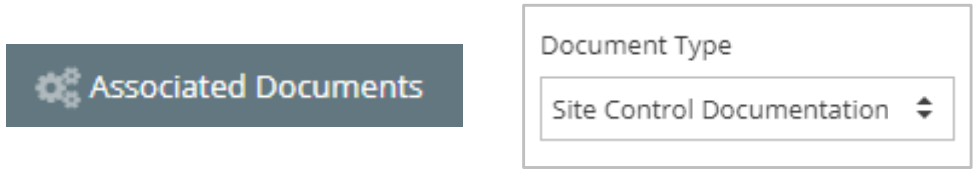
Single Phase Three Phase

Submit Site Control (as needed)

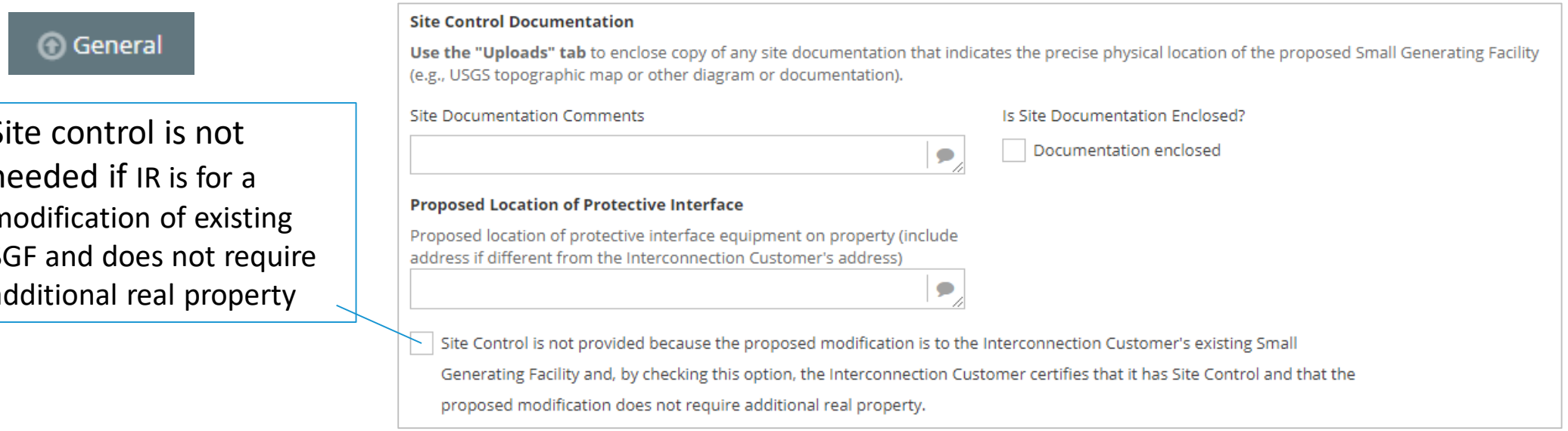
SGF

Upload the files and provide comments

1. Upload site control and site map indicating the precise physical location of the proposed SGF (e.g., US Geological Survey topographic map or other diagram or documentation)



2. Add comments and additional details from the General tab



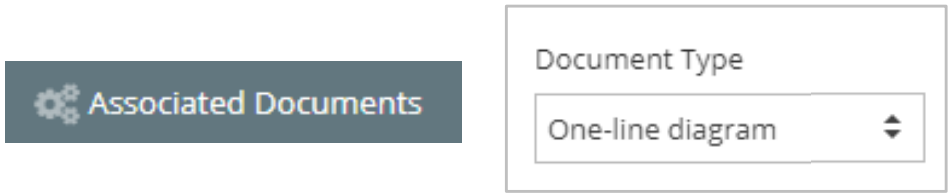
Site control is not needed if IR is for a modification of existing SGF and does not require additional real property

Submit One-Line Diagram

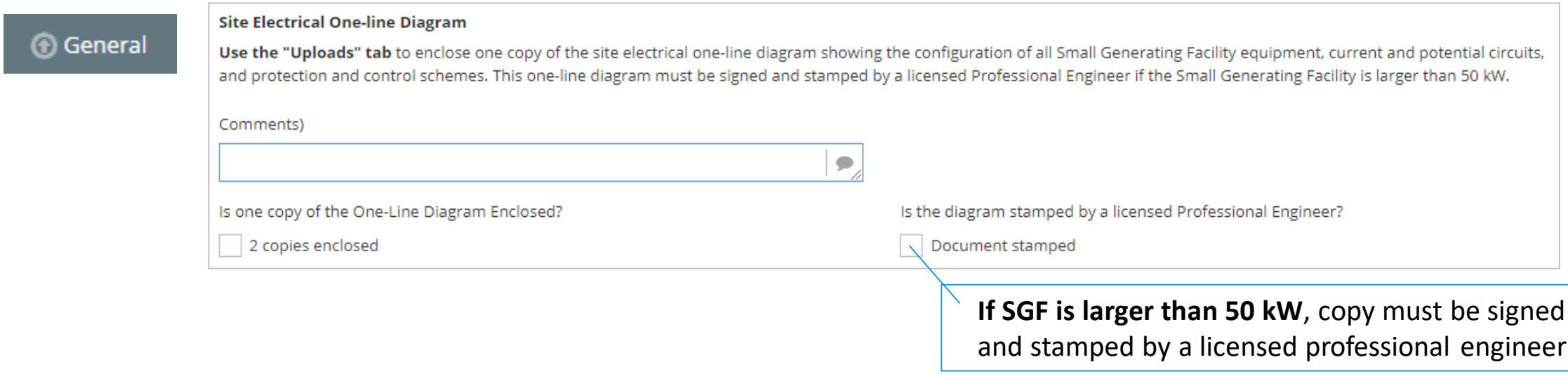
Upload the file and provide comments

SGF

1. Upload your one-line diagram file from the Associated Documents tab



2. Add comments and additional details from the General tab



Tips and Lookouts for Submitting Modeling Data

SGF

Avoid mistakes which can delay receiving your queue position

Complete, accurate, and consistent technical data are critical

- Plan enough time to secure technical help (e.g., consultants to perform benchmarking analysis)
- Be consistent with common values across files and platforms (MVA rating, MVAR capability, impedances, etc.)
  - Applications should match PSSE files, PSSE files should match PSCAD, etc.
- Listed POI must be explicitly modeled in the ISO PSSE basecase
- PSSE, PSCAD, and ASPEN models must be site-specific (not connected to an infinite bus)
- All generation types must upload power flow model data sheets
  - Must be fully functioning, non-proprietary, non-confidential (public)
  - Must be standard library models in PSS/E or applicable applications
  - Do not submit user models

Requirements of PSS/E Models are written in Appendix B of Planning Procedure PP5-6

Types of power flow model data sheets to upload

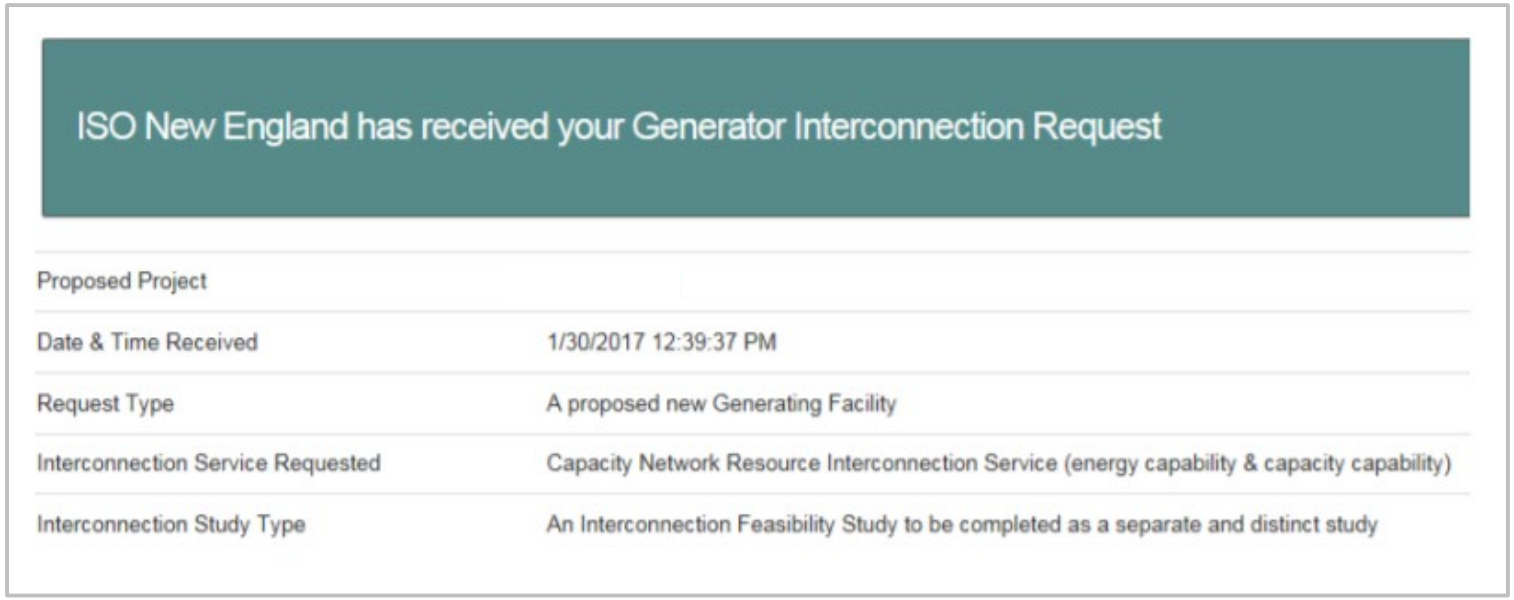
- Wind and inverter-based SGFs must upload a PSCAD model
  - Include a benchmarking analysis, confirming acceptable performance of the PSS/E model in comparison to the PSCAD model
- Inverter-based SGFs must upload a collection system detailed impedance sheet

Requirements of PSCAD Models are written in Appendix C of Planning Procedure PP5-6

What to Expect After Submitting Your IR

Immediately

The designated primary representative will receive a confirmation email from the ISO when we have received your submitted application



ISO New England has received your Generator Interconnection Request

Proposed Project	
Date & Time Received	1/30/2017 12:39:37 PM
Request Type	A proposed new Generating Facility
Interconnection Service Requested	Capacity Network Resource Interconnection Service (energy capability & capacity capability)
Interconnection Study Type	An Interconnection Feasibility Study to be completed as a separate and distinct study

ISO has 3 business days to determine if there is a problem

You have 10 days to cure identified deficiencies

Step 3 (Part 1)

Scoping meeting to the executed study agreement analysis date

- ***Accepted IR***
- ***Queue Position***

IR deposit is nonrefundable

Scoping Meeting

ISO issues Interconnection Study Agreement

ISO starts analysis pending no deficiencies

MILESTONE → ***MILESTONE*** → ***MILESTONE*** → ***MILESTONE***

ISO schedules scoping meeting — 10_{BD}

IC sends notification of study decision — 5_{BD}

IC executes study agreement package — 15_{BD}

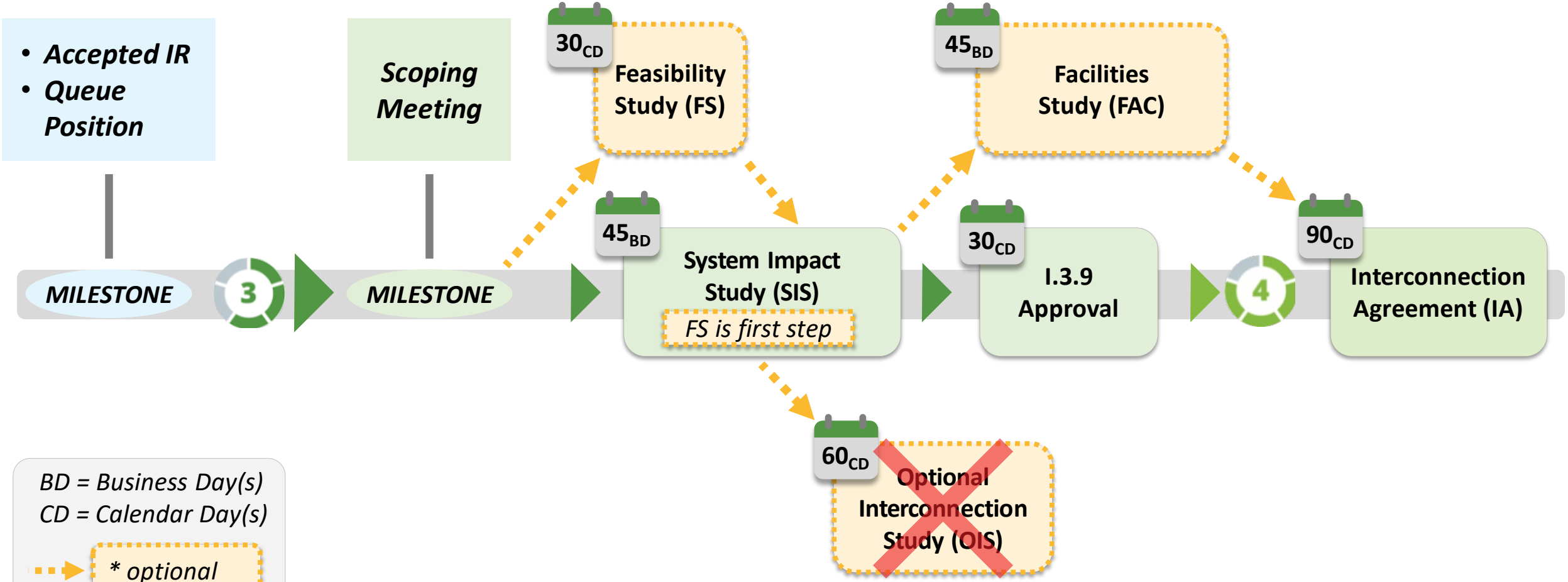
ISO reviews study data — 5_{BD}

$+10_{BD}$ *Cure deficiencies*

BD = Business Day(s)
CD = Calendar Day(s)

Step 3 (Part 2)

Perform interconnection studies applicable to your project



Be mindful of elections you can make and deadlines for study deposits, data, and model submissions

Study Deposits and Other Requirements

SGF

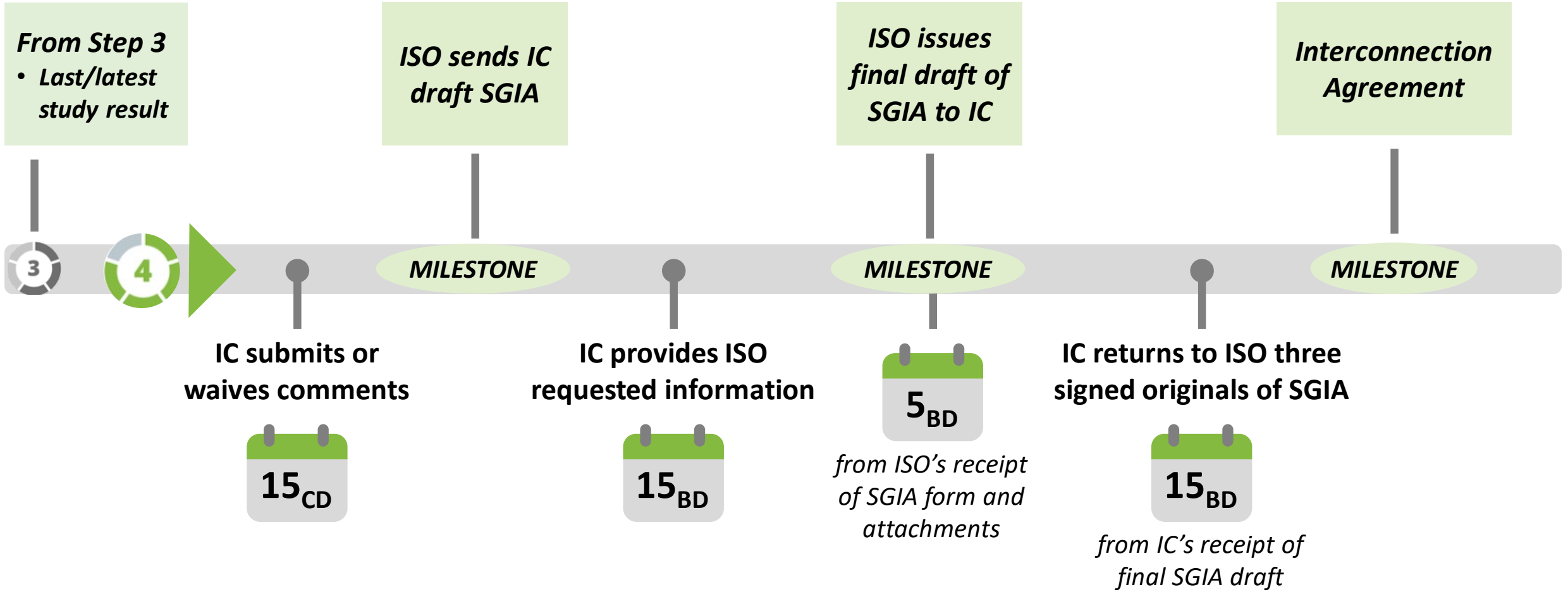
Study	Deposit	Other requirements
Feasibility Study (FS)	Refundable deposit of the lesser of 50% of estimated study costs or $1,000	• Can be done as first part of SIS to expedite process • Option to include preliminary, non-binding analysis for FCM
'Alternative' Feasibility Study (AFS)	Refundable deposit of the lesser of 50% of estimated study costs or $1,000	• Only applies in 'weak grid' areas of the system • Option to include preliminary, non-binding analysis for FCM
System Impact Study (SIS)	Refundable deposit of 50% of the estimated cost for the transmission portion and 100% of the estimated cost for the distribution study	• PSCAD model and benchmarking analysis required of all inverter based technology or if determined needed during scoping meeting for other technologies • Option to include preliminary, non-binding analysis for FCM
Facilities Study (FAC)	Refundable deposit of 100% of the estimated study cost	• Can be waived to expedite Interconnection Agreement

- After FS study report is delivered to the IC, a results meeting is scheduled
- 5 business days after the FS results meeting, the ISO issues the SIS agreement

Step 4

SGF

Small Generation Interconnection Agreement (SGIA) development timeframe



BD = Business Day(s)
CD = Calendar Day(s)

Please see Step 4: Execute an Interconnection Agreement on the ISO website for more details.

Small Generation Interconnection Agreement (SGIA)

SGF

Follow rules in Section 4.8 (SGIA) of Schedule 23

- SGIA initiated following the acceptance of one of these items
  - the FAC report (less common)
  - SIS report (if FAC waived)
- If you waive the FAC, you must commit to the following milestones:
  - Siting approval for the generating facility and interconnection facilities
  - Engineering of interconnection facilities approved by interconnecting transmission owner
  - Ordering of long lead time material for interconnection facilities and system upgrades
  - Initial synchronization date
  - Commercial operation date

See **Attachment 4** of the **SGIA** for additional milestones set forth by the Interconnection Agreement.

Step 5

Deadlines for submitting data and registering your asset

From Step 4
- ***Interconnection Agreement***

IC submits "as-purchased" data

180 CD

before initial synchronization date

Initial synchronization date

Commercial Operation Date (COD)

MILESTONE

MILESTONE

Construction

IC submits "as-built/ as-tested" data

Before **COD**

If required by ITO/PTO, IC submits applications for local service and RNS

90 CD

before COD

Capacity Commitment Period

CCP

These details vary by project type and are covered in other training programs

See the Asset Registration page for instructions on how to register your asset

BD = Business Day(s)
CD = Calendar Day(s)

LG/ETU-Specific Interconnection Process Steps

LG/ETU

Jump to other topics:

- General Overview
- SG Process
- **LG/ETU Process** *(you are here)*

Step 2 Timeline

LG/ETU

Submitting an Interconnection Request

Do sufficient research before submitting an IR

IC submits interconnection request (IR) package

60 CD

ETU only *- If one POI is located outside of the ISO-NE control area (External ETU), the IC has 60 days to submit evidence of a valid request*

Queue position (QP) assigned

PREPARE

MILESTONE

ISO acknowledges IR and identifies deficiencies

5 BD

= No wait

BD = Business Day(s)

CD = Calendar Day(s)

2

LG/ETU

Large Generator/ETU IR Requirements

Your IR will not be deemed valid if any of these components are missing

A completed large generator or ETU Interconnection Request (IR) includes these items
$50,000 deposit (+$10,000 in lieu of site control) • Non-refundable 10 business days after the scoping meeting • Send via electronic funds transfer (do not mail checks) • Contact ISO Billing Department (billingdept@iso-ne.com) to get banking information
Site Control documentation (CNRIS/CNIIS)
Site Map
One-line diagram (ETU only)

General Tips for LGF/ETU

- The IR requires less information up-front
  - Fields are still visible in the IR – to be completed later to support the interconnection studies
  - ETU requires a one-line diagram

Are you an ETU with one POI outside the ISO-NE control area?

- If connecting to another control area, you have 60 days from when you submit your IR to provide evidence of an valid request to that control area
- ETUs with both POIs internal to the ISO-NE footprint are not eligible for CNI interconnection service – you need to interconnect outside of ISO-NE in order to participate in FCM (External ETU)

2

LG/ETU

Project Site Control Documentation Information

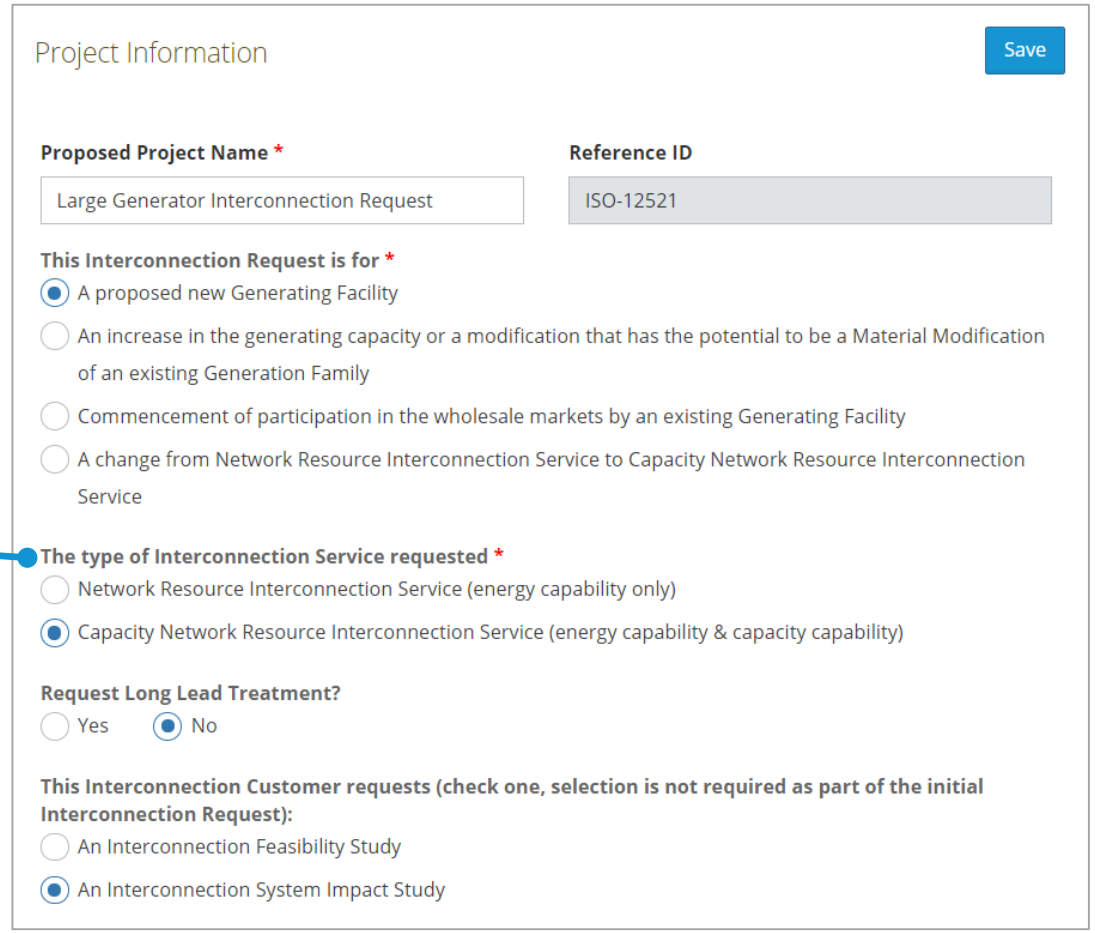
Capacity network resource or capacity network import interconnection service	Network resource or network import interconnection service (energy only)	Existing generators or ETU
Provide documentation demonstrating site control under the same interconnection customer name	Demonstrate site control or post an additional deposit of $10,000	You do not need to submit site control documentation if the proposed modification either: • does not require any additional real property • is for a pool transmission facility (PTF) not owned by the interconnection customer

⚠ *Entity listed on site control should be same company as interconnection customer (not an affiliate)*

2

LG/ETU

Project Information Tab



Reminder: Service Type is Very Important

- Network Resource/Import Interconnection Service *(energy capability only)*
- Capacity Network Resource/Import Interconnection Service *(energy capability & capacity capability)*

** Screenshot reflects LGIR*

Step 3 (Part 1)

LG/ETU

From Step 2
- *IR valid*
- *QP assigned*

Scoping Meeting

MILESTONE

ISO schedules scoping meeting
30 CD

IC sends ISO notification of study decision
5 BD
from scoping meeting

ISO issues Interconnection Study Agreement
5 BD
from IC's notification of study decision

IR deposit becomes nonrefundable
10 BD
from scoping meeting

IC submits technical data
30 CD
from ISO's issuance of study agreement (FS or SIS)

All parties execute study agreement
30 CD

ISO starts analysis pending no deficiencies

MILESTONE

ISO reviews associated technical data
5 BD

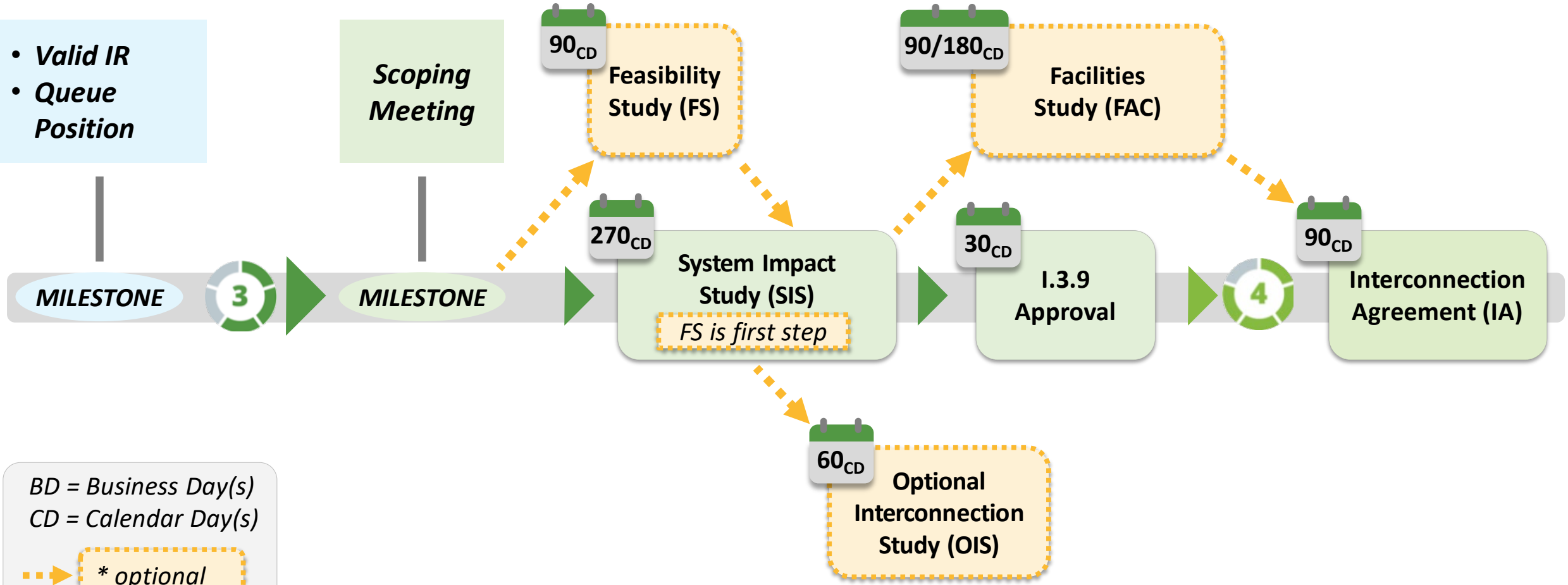
+10 BD *Cure deficiencies*

BD = Business Day(s)
CD = Calendar Day(s)

Step 3 (Part 2)

LG/ETU

Perform interconnections studies applicable to your project



Be mindful of elections you can make and deadlines for study deposits, data, and model submissions

3

LG/ETU

Technical Data Is Due When You Execute the SIS Agreement

Due 30 CD from when respective study agreement (FS or SIS) issued

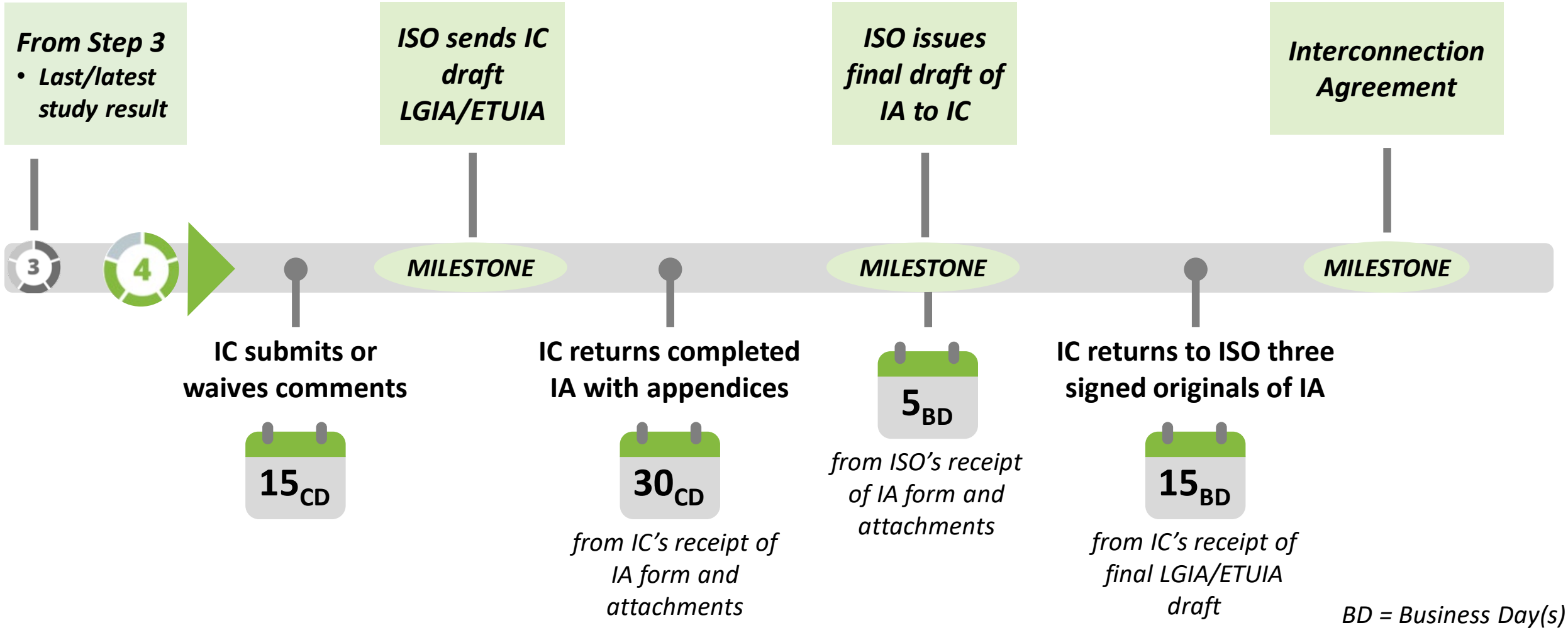
Planning Procedure 5-6 (PP 05-6), *Interconnection Planning Procedure for Generation and Elective Transmission Upgrades*, has all the information you need for your technical submittals

- Read benchmarking details in Appendix C Section 3.4.1
  - Verify that PSSE and PSCAD models match
  - Confirm all additional forms are filled out consistently with the model settings
- ISO will work with IC whose responsibility it is to loop in the manufacturer, if needed
  - IC may give consent for ISO to work directly with the OEM, but the IC still needs to be accountable if OEM is not responsive

Step 4

LG/ETU

Interconnection Agreement Development Timeframe



Please see Step 4: Execute an Interconnection Agreement on the ISO website for more details.

BD = Business Day(s)
CD = Calendar Day(s)

Interconnection Agreement Milestones

Key Milestones

- Milestone 4 in LGIA/ETUIA – IC must either provide evidence of major permits obtained OR a refundable deposit of the *greater of* 20% of the total costs for the interconnection facilities and other upgrades identified in the SIS (or FAC) *or* ITO's initial payment installment.
- The dates for the following milestones under Appendix B in the LGIA are negotiated with the ITO and directly influence the development of an overall schedule and commitment:
  - Milestone 7C—when you provide written authorization to the ITO to start spending
  - Milestone 10A—commitment to ordering long-lead-time materials and equipment
  - Milestone 15A—start of the construction of the interconnection facilities

See the New Generator Projects: Process Guide on the ISO website for more details.

Step 5

LG/ETU

Deadlines for submitting data and registering your asset

From Step 4
- ***Interconnection Agreement***

IC submits "as-purchased" data

180$_{CD}$

before initial synchronization date

Initial synchronization date

Commercial Operation Date

MILESTONE

MILESTONE

Construction

IC submits "as-built/ as-tested" data

Before **COD**

If required by ITO/PTO, IC submits applications for Local Service and RNS

90$_{CD}$

before COD

Capacity Commitment Period

CCP

These details vary by project type and are covered in other training programs
- *See the Asset Registration page for instructions on how to register your asset*

BD = Business Day
CD = Calendar Day

Questions

Summary

We covered:

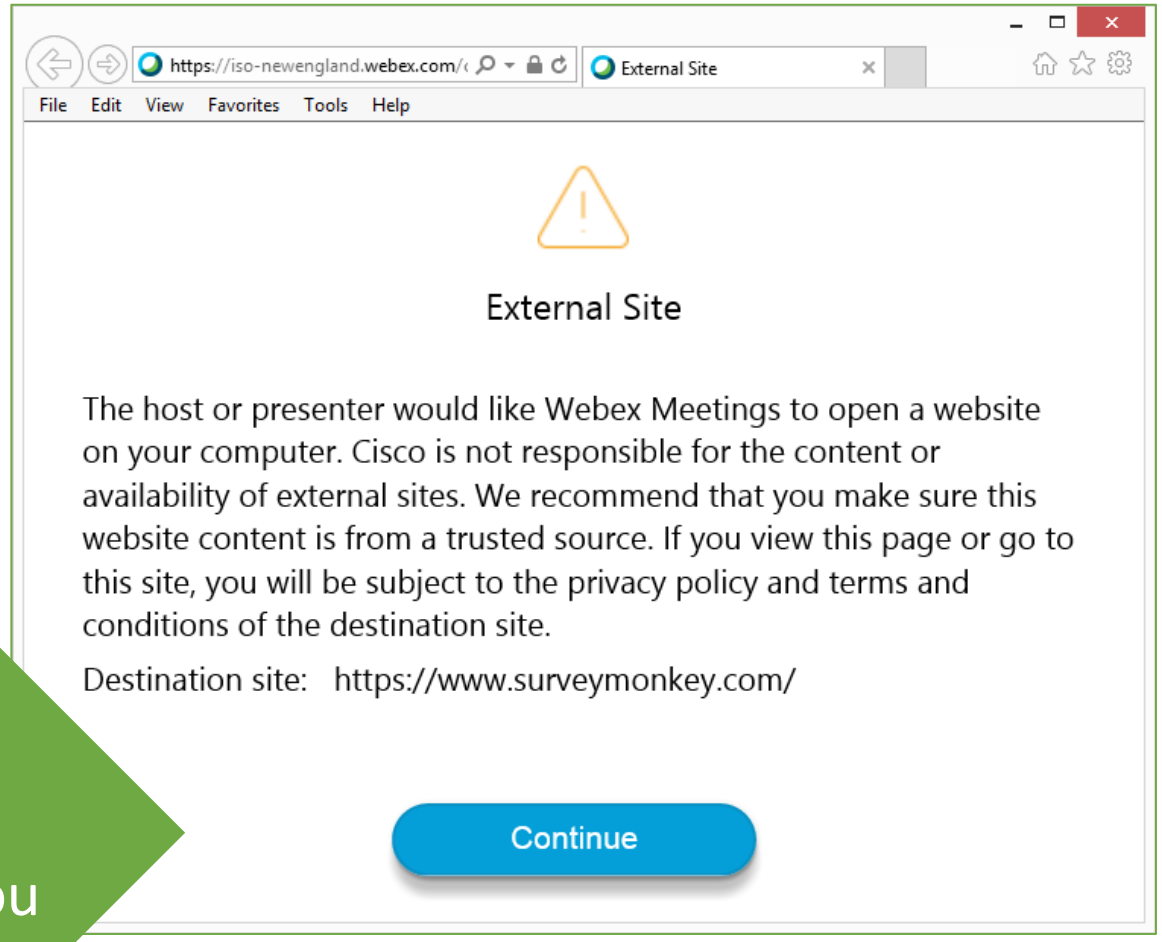
- Eligibility for the Interconnection Process (IP)
- Tips for preparing for the Interconnection Process
- Timeline for the Interconnection Process
- Comparison of the IP timeline versus the FCM timeline
- Overview of the Interconnection Process
- Tips for completing your Interconnection Request
- Special considerations for your project’s type

References

- ISO-NE website: www.iso-ne.com
- Transmission, Markets, and Services Tariff *(Participate > Rules and Procedures)*
- Market Rule 1 *(Participate > Rules and Procedures > Transmission, Markets, and Services Tariff)*
- Interconnection Process Guide *(Participate > Applications and Status Changes)*
- Interconnection Request Tracking Tool (IRTT): https://irtt.iso-ne.com/
- Interconnection Request Tracking Tool (IRTT) User Guide: (*Participate > Support > User Guides*)
- FCM Participation Guide: Markets and Operations > Markets Data and Information > Forward Capacity Market

Appendix

- *Documentation and deposits to submit with your Small Generator Interconnection Request*
- *Checklist of documents to upload with your Small Generator Interconnection Request*
- *Documentation and deposits to submit with your Large Generator or ETU Interconnection Request*



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Please click the **Continue** button and complete our short evaluation after you close out of the session.

Join Us for Other FCM-Related Webinars!

- Register for upcoming webinars via *ISO New England Calendar* on our website (iso-ne.com/calendar)
- Subscribe to the *ISO Training* mailing list to receive notices about upcoming training
- View presentation and recordings of past webinars at Participate > Training > Training Materials

Date	Webinar Title
☑ February 2	FCM Existing Capacity Qualification Process
☑ February 9	FCM Delisting
Today ☑ February 16	Interconnection Process
☐ February 23	FCM Show of Interest for New Demand Capacity Resources
☐ February 23	FCM Show of Interest for New Generation and Imports
☐ March 29	FCM New Capacity Offer Price Development
☐ May 11	FCM New Capacity Qualification for Demand Capacity Resources
☐ May 11	FCM New Capacity Qualification for Generation and Imports

Registration opens soon!

Contact Participant Support and Solutions

Ask ISO
ISO NEW ENGLAND PARTICIPANT SUPPORT

Submit a request via Ask ISO *(preferred)*
https://askiso.force.com/

Email AskISO@iso-ne.com

Phone

(413) 540-4220 (call center)

(833) 248-4220

Pager ***(for emergency inquiries outside of business hours)***

(877) 226-4814

Business hours and additional contact details are available from the Participant Support page

Visit the Participant Support page

Appendix

- *Documentation and deposits to submit with your Small Generator Interconnection Request*
- *Checklist of documents to upload with your Small Generator Interconnection Request*
- *Documentation and deposits to submit with your Large Generator or ETU Interconnection Request*

Submitting a Small Generator Interconnection Request

SGF

Documentation and deposits you must submit with your IR

A completed small generator capacity Interconnection Request (IR) includes these items	
$2,500 non-refundable deposit	Send via electronic funds transfer (EFT)* • Contact ISO Billing Department (billingdept@iso-ne.com) to get banking information • Do not mail checks

Site Control documentation (if applicable)	• Must be in the name of the entity submitting the IR, the Interconnection Customer (IC)
	• Not required for modification to existing Small Generating Facility if
	  • IC certified in the IR that it has Site Control
	  • Modification proposed does not require additional real property

Site Map	Map must be detailed, such as a map from the U.S. Geological Survey, which clearly indicates the site of the new facility and pertinent surrounding structures
One-line diagram	Copy must be signed and stamped by a licensed Professional Engineer
Technical Data: Models for all interconnection studies	• All wind and inverter-based projects (e.g., solar, battery) must provide acceptable PSSE and PSCAD models as well as a benchmark analysis (See PP5-6) • Other types of generators may also be required to supply an acceptable simulation model, as discussed at the scoping meeting • User-models will not be accepted
Schedule 23, Attachment 2, and Attachment A to the IR form, provide details for the technical data required	

** WIRE ACH (automated clearing house) is used for EFT. See https://www.fiscal.treasury.gov/ach/*

Checklist of Documents to Upload

SGF

Upload from the Associated Documents tab; Comment and verify from the tabs listed here

Associated Documents

General Tab

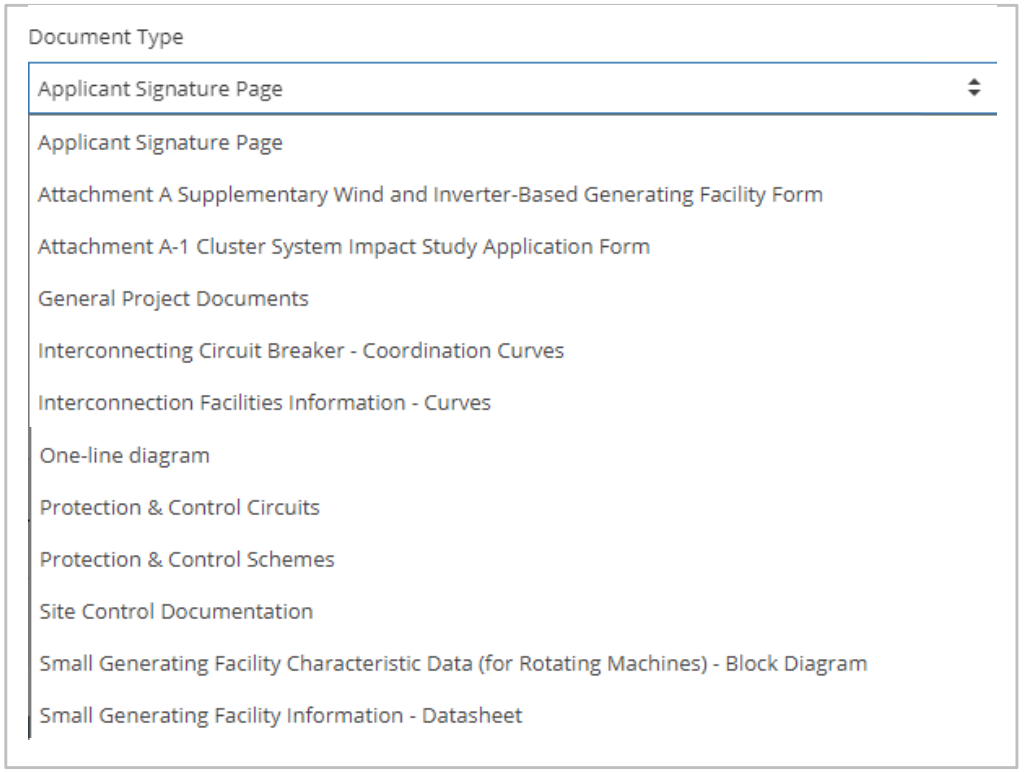
- ❑ Site Electrical One-line Diagram
- ❑ Site control Documentation
- ❑ Protection & Control Schemes
- ❑ Protection & Control Circuits

Attachments to IR Tab

- ❑ Generators > Model Requirements
- ❑ SGF Characteristic Data (for Rotating Machines) > Excitation and Governor System Data for Synchronous Generators Only
- ❑ Interconnection Facilities Information > Transformer Fuse Data (fuse manufacturer's minimum melt and total clearing time-current curves)
- ❑ Interconnecting Circuit Breaker (Discrete Components) > Proposed Time-Overcurrent Coordination Curves
- ❑ Interconnecting Circuit Breaker > Corrections Curves
- ❑ **Supplementary Wind and Inverter-Based Generating Facility >**
  - X Attachment A has its own uploads area (covered earlier)

Signature Tab

- ❑ Applicant Signature page (with link to the blank form)
- ❑ Attachment A



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LG/ETU

Submitting a Large Generator or ETU Interconnection Request

Documentation and Deposits You Must Submit with Your IR

A completed large generator or ETU capacity Interconnection Request (IR) includes these items	
$50,000 deposit Nonrefundable 10 business days after scoping meeting	Send via electronic funds transfer (EFT)* • Contact ISO Billing Department to get banking information • Do not mail checks
Site Control documentation (if applicable)	Requirements depend on the type of project and type of Interconnection Service
Site Map	Provide a detailed map, such as those produced by the US Geological Survey, which clearly indicates the site of the new facility and pertinent surrounding structures.
One-line diagram	Required with ETU IR submission and Large Generator technical data submission
Technical Data: Models for all interconnection studies	• Wind and inverter-based projects: Provide acceptable PSSE and PSCAD models n • All other types of generators: Provide a PSSE model Note: You may also be required to supply a PSCAD (discussed at the scoping meeting) • ETU: An acceptable PSSE model is required with technical data submission; PSCAD models may be requested and must be provided within 90 days of the request

Technical data submittal is due no later than the due date of execution of the System Impact Study Agreement

- All large generators submit Schedule 22, Appendix 1, Attachment A
- Wind and inverter-based generators submit technical data required in Schedule 22, Appendix 1, Attachment A-1
- All elective transmission upgrades (ETU) submit Schedule 25, Appendix 1, Attachment A