



SCE's Generator Interconnection Processes

An Introduction to What You Need to Know Before Requesting Interconnection

April 7, 2017

Purpose and Contents

The purpose of this presentation is to provide a high level overview of SCE's interconnection processes with references to additional reading material. The presentation is broken down in four sections as follows:

1 Typical Interconnection Projects* 

2 Interconnection Tariffs 

3 Interconnection Processes 

4 Frequently Asked Questions (FAQs) 

* In this presentation, the word "project" refers to a *generation* or *energy storage* facility (and the associated assets) that is intending to be interconnected to SCE's electric system.



Typical Interconnection Projects

1

Self Generation Systems

*(Export and
Non-Export)* (*)

Backup Systems

(Non-Export Only)

Systems for Power Sales

(Export Only)

- * “**Export**” projects are sometimes referred to as “*In-Front-of-the-Meter*” (IFOM).
“**Non-Export**” projects are sometimes referred to as “*Behind-the-Meter*” (BTM).



Self-Generation Systems: Exporting Projects

SCE offers programs to help its customers generate their own power (become a “self-generator”). Self-generation allows SCE customers to produce electricity using equipment they (or a third party) own and operate to meet some or all of their energy needs. “Self-generation exporting systems” operate in parallel to SCE’s electrical system and are allowed to “dump” energy into SCE’s system (under specific program requirements).

- ▶ **Net-Energy Metering (NEM).** Self-generators who have eligible renewable energy generation systems connected to SCE’s grid and meet program requirements can apply for a rate billing option called Net Energy Metering (NEM). The NEM option allows you to receive a billing credit for the surplus electricity delivered to SCE’s electric grid. This credit will then be applied to your account to offset part of the energy charges on the customer’s electric bill. More info at: <https://www.sce.com/nem>
- ▶ **Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT).** Eligible local governments or campuses that own or operate a qualifying renewable energy generating facility located on their property can apply for RES-BCT. It allows the customer to apply credits for the surplus electricity delivered to SCE’s electric grid to other eligible “benefiting accounts” also owned by the customer. More info at: <https://on.sce.com/resbct>

	NEM	RES-BCT
Application for Interconnection	Rule 21 NEM Interconnection Application (Form 14-957) Online NEM Application	Rule 21 Exporting Interconnection Application (Form 14-918)
Application Fees	For current NEM program: <u>None</u> For NEM 2.0 (starting July 2017): <ul style="list-style-type: none"> • \$75 for projects up to 1MW; • \$800 for projects > 1MW 	\$800 Other technical review fees may apply depending on the study track. Refer to: Summary of Interconnection Request Fees (Table E1 of SCE’s Rule 21)

What to Expect in the Interconnection Process: Refer to Slide #13 (Interconnection Process)

For further information, please visit the following link: [Self-Generation Systems](#)



Self-Generation Systems: Non-Exporting

A self-generator uses electricity from a system on site to meet some or all of its energy needs. “Non-Exporting” systems may operate in parallel to SCE’s electrical system but have automatic controls to prevent the export of energy into SCE’s system for long periods of time. There is no compensation for any energy exported to SCE.

- ▶ **Non-export projects** include all generating facilities to be operated by, or for, a customer to serve part or all of its electric energy requirements that would otherwise be provided by SCE, including “distributed generation”, “cogeneration”, emergency, backup, and standby generation.
- ▶ For any of these systems, the customer must submit a **Rule 21“Non-Exporting” Interconnection Request** (*Rule 21 Form 14-732: Generating Facility Interconnection Application*)
- ▶ Refer to SCE’s webpage for additional information and for complete **application requirements**

What to Expect in the Interconnection Process

Following the submittal of the application package and applicable fee, an assigned engineer will review the technical data provided (usually within 10 business days)

10 Business Days

Once the application package is approved, you may be required to demonstrate (via a commissioning test) that your generator complies with Rule 21 Tariff requirements for non-exporting operation (usually within 15 business days or as otherwise agreed)

15 Business Days

Once all of the technical reviews, and inspections are completed you will receive a notification authorizing the operation of your back up system (usually within 10 business days of completion)

10 Business Days

For further information on Non-Exporting projects, please visit the following link: [Non-Exporting Projects](#)

Also, please consult with your local permitting authority to verify any local permitting requirements. SCE does not provide permitting services.



Self-Generation Systems: Backup Systems

Backup generators are used by customers to serve part or all of their electrical needs during a power outage. These systems are not designed to operate in parallel with SCE’s system. They may operate under either one of two modes:

- ▶ **Momentary Parallel Mode.** A backup generator that interconnects and operates with SCE’s Distribution System for duration of one (1) second or less through transfer switches or operating schemes specifically designed and engineered for such operation
- ▶ **Isolated Mode.** A backup generator that will be isolated and prevented from operating in parallel with SCE’s Distribution System through a transfer switch or operating scheme specifically designed and engineered for such operation

- ❑ For either one of these systems, the customer must submit a **Rule 21 “Non-Exporting” Interconnection Request** (*Rule 21 Form 14-732: Generating Facility Interconnection Application*)
- ❑ Refer to SCE’s webpage for additional information and for complete **application requirements**

What to Expect in the Interconnection Process

Following the submittal of the application package and applicable fee, an assigned engineer will review the **technical data** provided (usually within 10 business days)

Once the application package is approved, you may be required to demonstrate (via a commissioning test) that your generator complies with Rule 21 Tariff requirements for backup operation (usually within 15 business days or as otherwise agreed)

Once all of the technical reviews, and inspections are completed you will receive a notification authorizing the operation of your back up system (usually within 10 business days of completion)

10 Business Days

15 Business Days

10 Business Days

For further information, please visit the following link: [Backup Systems Page](#)

Also, please consult with your local permitting authority to verify any local permitting requirements. SCE does not provide permitting services.

Systems for Power Sales: Exporting Projects

Generation projects (including storage systems) that are intending to sell energy or capacity products to SCE, a 3rd party, or the CAISO are required to request interconnection under one of the existing interconnection tariffs. Projects selling electricity to SCE or a 3rd party are considered “exporting” projects.

Specific tariff/process to request interconnection depends on the following:

- ▶ The energy sales under the Power Purchase Agreement (PPA) you pursue will be governed by either the CPUC or FERC. This means that the PPA may require you to choose between the CPUC or FERC jurisdictional interconnection process.
- ▶ The entity to which you intend to sell power may identify requirements that determines the interconnection process. The interconnection process you select should also satisfy the PPA you decide to pursue. Please check with your PPA contacts.
- ▶ Interconnection requests from exporting projects follow one of the following tariffs:
 - SCE’s Rule 21 (CPUC jurisdictional interconnections to SCE’s distribution system)
 - SCE’s Wholesale Distribution Access Tariff (FERC jurisdictional interconnections to SCE’s distribution system)
 - CAISO’s Tariff (FERC jurisdictional interconnections to SCE’s transmission system)

For further information, please visit:

- [SCE’s Systems for Power Sales page](#)
- [SCE’s Power Procurement Program](#)
- [FERC’s Qualifying Facilities page](#)

Interconnection Tariffs



2

Rule 21

*Export and
Non-Export^(*)*

WDAT

Export Only

CAISO

Export Only

- * “*Export*” projects are sometimes referred to as “*In-Front-of-the-Meter*” (IFOM)
“*Non-Export*” projects are sometimes referred to as “*Behind-the-Meter*” (BTM).

Applicability of Interconnection Tariffs



➤ Electric Rule 21 (Export and Non-Export)

- Non-Export Projects: Projects built for use on-site with no export for sale — use Rule 21 Form 14-732 to apply for interconnection
- Export Projects: Projects connecting to SCE'S distribution system that intend to sell 100% of exported power to SCE and can be certified as a Qualifying Facility (QF) can use Rule 21 Form 14-918 to apply for interconnection
 - Currently, “stand-alone” energy storage projects cannot be certified as a QF, thus the WDAT GIP is the applicable interconnection process for exporting storage projects interconnecting to SCE's distribution system. Refer to the [FERC Qualifying Facilities page](#) for certification requirements.
 - NEM and RESBCT projects are considered “export” projects although there is no “sale” of energy to SCE; NEM projects use Form 14-957 to apply for interconnection; RESBCT projects use Form 14-918

➤ WDAT GIP (Export only)

Any exporting project that is interconnecting to SCE's distribution system that intends to sell power to SCE or a 3rd party follows SCE's Wholesale Distribution Access Tariff - Attachment I (“Generator Interconnection Procedures”, or **GIP**)

➤ CAISO GIDAP (Export only)

Any exporting project interconnecting to the CAISO Controlled Grid follows the CAISO's Generation Interconnection and Deliverability Allocation Procedures (Attachment DD to the CAISO Tariff; also known as “GIDAP”)

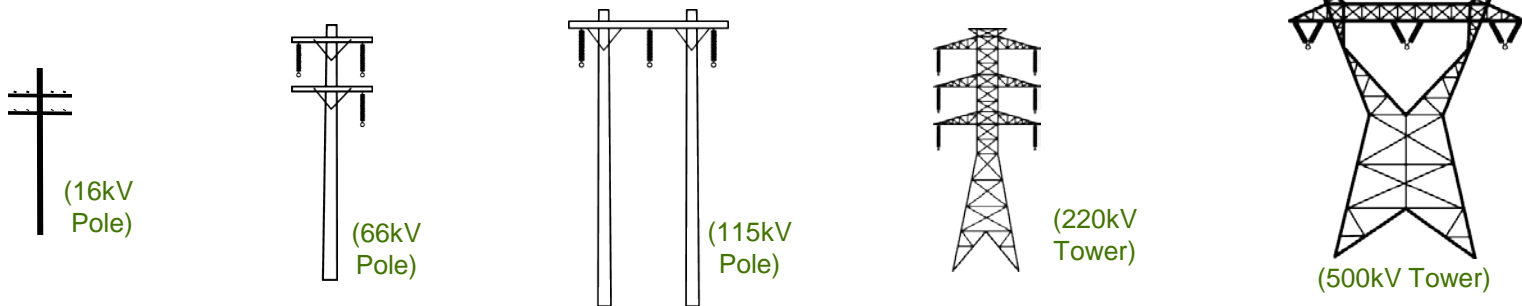
The Interconnection Process May Vary Depending on the Voltage of the Requested Point of Interconnection



Although SCE owns its electric system, some of its facilities are operated by CAISO.

- SCE's distribution system: SCE controlled -> WDAT or Rule 21
 - 4kv – 16kv: residential circuits
 - 16 – 33 kv: city/industrial circuits
 - 33 – 66 kv and some 115 kv: sub-transmission
- SCE's transmission system: CAISO controlled -> CAISO Tariff
 - Some 66 kv, some 115 kv: sub-transmission
 - 220 kv – 500 kv: bulk electric system/transmission

SCE Line Voltage	*Maximum Aggregate Generation
12 kv	10 MW
16 kv	13 MW
25 kv	19 MW
33 kv	27 MW



* The Maximum Aggregate Generation is shown here for reference. If a new interconnection request triggers an excess to these limits, the project may be required to change their requested POI, or pay for required upgrades.

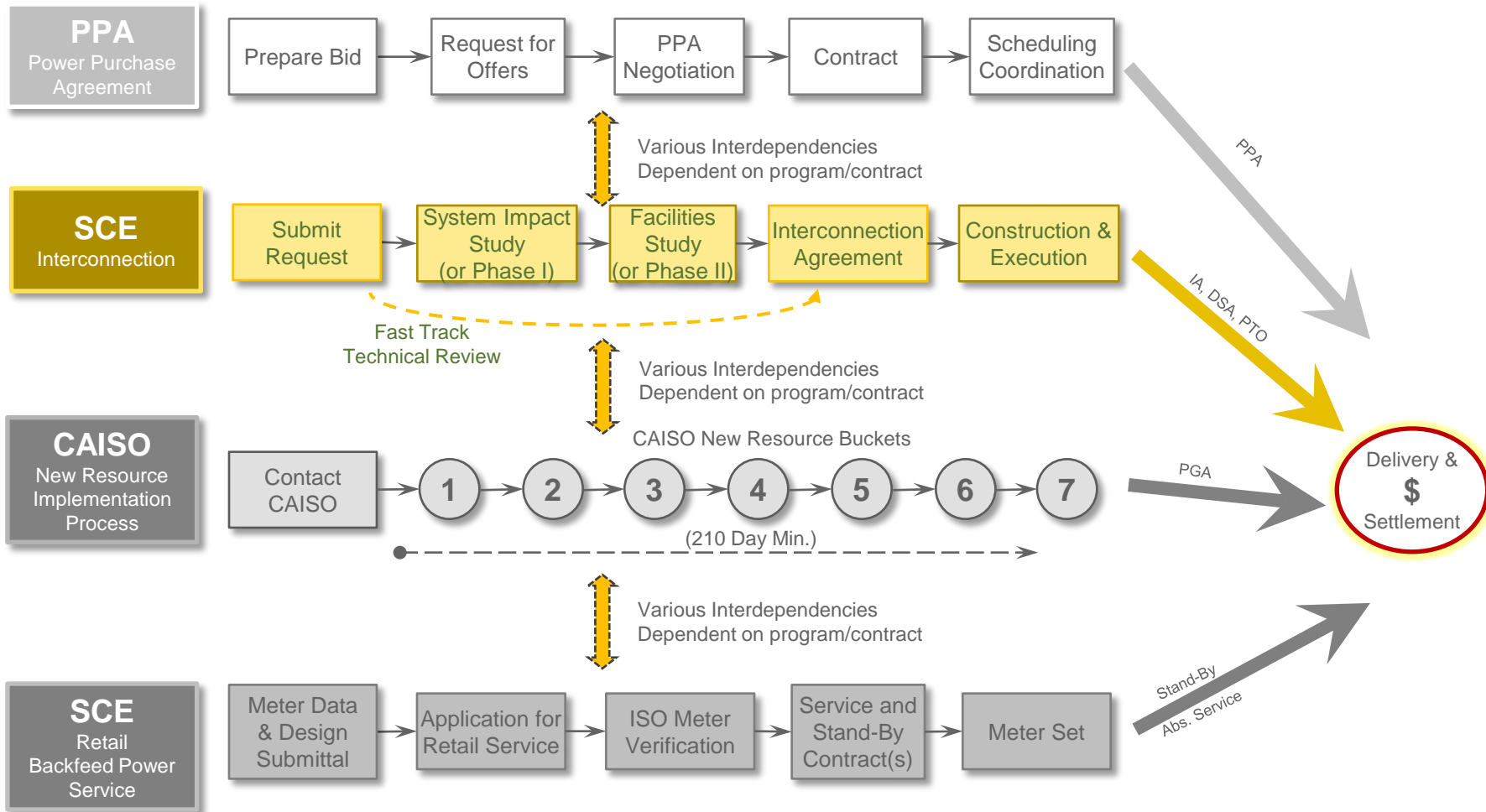
Applicable Interconnection Tariff



	Rule 21 CPUC Jurisdiction	SCE'S GIP FERC Jurisdiction	CAISO GIDAP FERC Jurisdiction
General Applicability	<ul style="list-style-type: none"> Qualifying Facilities interconnecting to SCE's distribution system and selling 100% of their output to SCE (Form 14-918) NEM Projects Online NEM Application 	Generators interconnecting to SCE's distribution system selling energy to SCE, CAISO or any 3 rd party	Generators interconnecting to SCE's transmission system (SCE's facilities under CAISO's control)
Details	<ul style="list-style-type: none"> Request for interconnection is submitted directly to SCE Current process described in SCE's Rule 21 	<ul style="list-style-type: none"> Request for interconnection is submitted directly to SCE Current process described in SCE's GIP 	<ul style="list-style-type: none"> Request for interconnection is submitted directly to the CAISO Current process described in CAISO's GIDAP
FAQs / More Information	Information about SCE's Rule 21 interconnection process	Information about SCE's WDAT interconnection process	Information about the CAISO's interconnection process

- Each tariff has a “fast track”, an “independent” (or “detailed”), and a “cluster” (or “group”) study track
- Each tariff has slight variations and qualifications for each study process (i.e., requirements, timelines, study scope, agreements, etc.). Please consult each tariff for specific details.

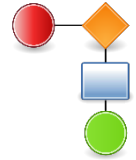
Obtaining Interconnection is Only One of Many Processes to Achieve Successful Project Execution



Note: Illustrative only... This is not a comprehensive list; not all processes shown may be applicable

Interconnection Process Tracks

Exporting Projects - High Level Review



3

Fast Track

**Detailed Study
Processes**

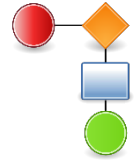
(includes the
Independent Study
Process and the
Cluster Process)

DISCLAIMER

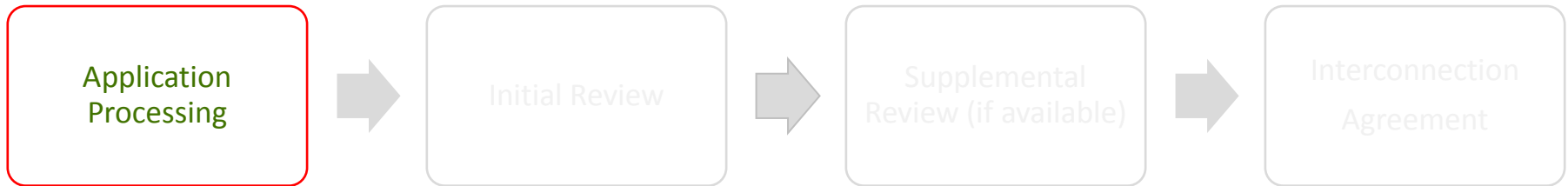
The guidelines in this section are provided with the intent to help customers understand SCE's interconnection procedures. Each tariff has slight variations and qualifications for each study process track (i.e., requirements, timelines, study scope, agreements, etc.). Please consult each tariff for specific details.

Fast Track Process

1. Application Processing



1



Applicability: Intended for projects that can interconnect to SCE’s electrical system without the need for system upgrades. Each tariff has a set of technical screens to evaluate whether the project can be interconnected under this track.

Requirements:

- Completed Interconnection Request, with all requested technical data
- Site Plan Diagram and Single Line Electrical Diagram stamped by a Professional Engineer
- Site Exclusivity documentation (demonstration that the project developer has the right to develop the proposed project at the proposed site)
- Request for Distribution Service requires a separate application form

Study Fee/Deposit:

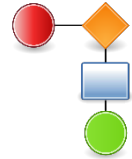
- Rule 21: \$800; WDAT: \$1,500; CAISO: \$500

Deficiencies in the Application

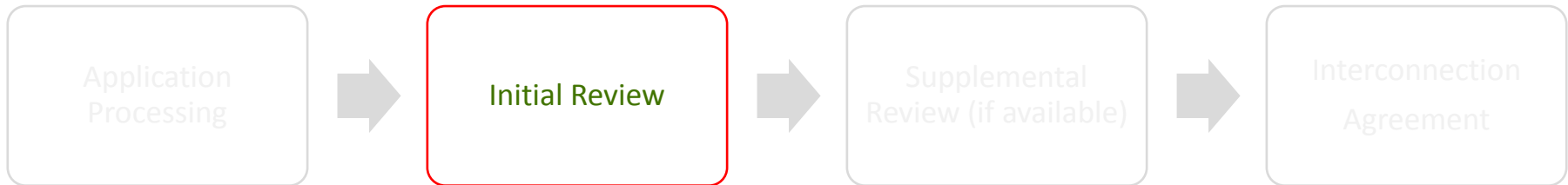
- Lack of site exclusivity documentation or technical data are typical reasons for triggering a deficiency notice
- When application package is complete, the interconnection request is “deemed valid” and is assigned a “queue position” or “queue date”

Fast Track Process

2. Initial Review



2



Fast Track Initial Review Process

- Perform Initial Review Screens (A-M) (refer to specific tariff for details on the screen evaluation and purpose)
- Hold Optional Initial Review Results Meeting to discuss results with customer

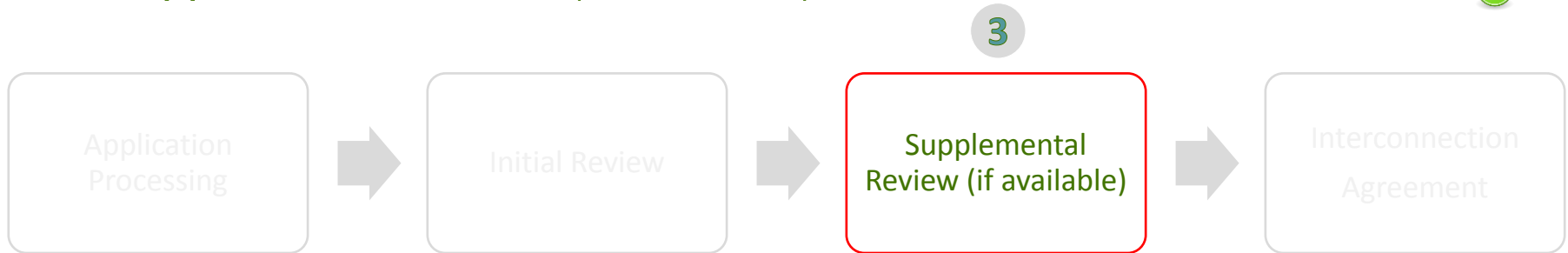
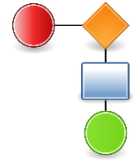
If Initial Review **passes**, move to Interconnection Agreement

If Initial Review **fails**, discuss next steps:

- Supplemental Review
- Detailed Study Process
- Withdraw Application

Fast Track Process

3. Supplemental Review (if available)



Fast Track Supplemental Review Process

- \$2,500 Supplemental Review Fee for Rule 21, or an estimated deposit for WDAT or CAISO.
- Perform applicable technical screens (refer to specific tariff)
- Hold optional Supplemental Review results meeting to discuss results with the customer

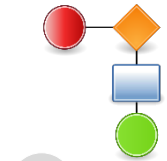
If Supplemental Review **passes**, move to Interconnection Agreement

If Supplemental Review **fails**, discuss next steps:

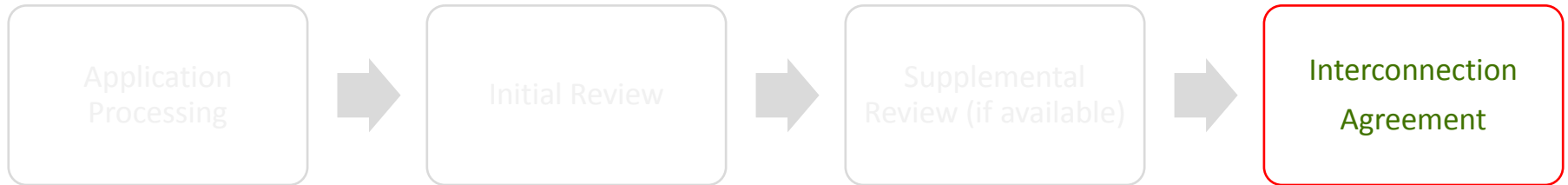
- Detailed Study Process
- Withdraw application

Fast Track Process

4. Interconnection Agreement



4



Interconnection agreement negotiations commence following completion of successful technical review (passes Initial Review or Supplemental Review)

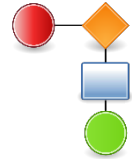
The Interconnection Agreement (IA, GIA, GFIA, etc.) is a contract that sets forth the requirements for interconnection, including:

- Scope of required facilities and upgrades such as:
 - Interconnection facilities
 - Distribution upgrades (typically none under the Fast Track process)
 - Network upgrades (typically none under the Fast Track process)
 - Operational requirements
- Financial responsibility for facilities and upgrades (if any)
- Taxes, financial security, milestones, and other important information

Interconnection agreements are executed by all parties and may be filed for acceptance by FERC (WDAT / CAISO)

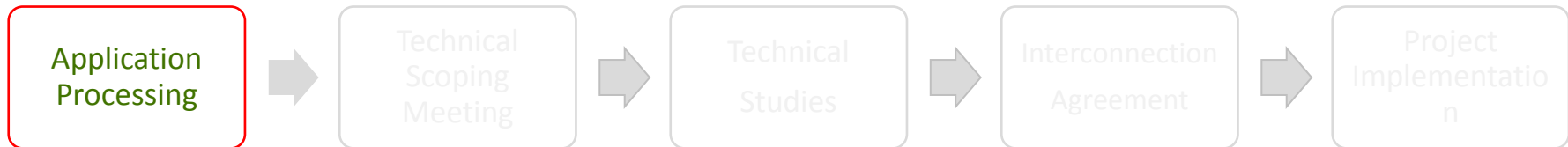
For WDAT/CAISO projects, agreements can be filed unexecuted at FERC if an impasse during negotiations occurs

Detailed Study Process (ISP / Cluster)



1. Application Processing

1



Applicability: Intended for projects that do not qualify to be processed under the Fast Track or fail the Fast Track technical reviews. Typically, it requires “studies” to determine the upgrades required for the project to safely and reliably interconnect to SCE’s system (transmission or distribution, as applicable).

Requirements:

- Completed Interconnection Request, with all requested technical data
- Site plan diagram and Single line electrical diagram stamped by a Professional Engineer
- Site exclusivity documentation (demonstration that the project developer has the right to develop the proposed project at the proposed site)
- Request for Distribution Service requires a separate application

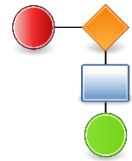
Study Fee/Deposit:

- Varies by tariff/track. For WDAT: \$50,000 plus \$1,000/MW up to \$250,000 maximum

Deficiencies in the Application

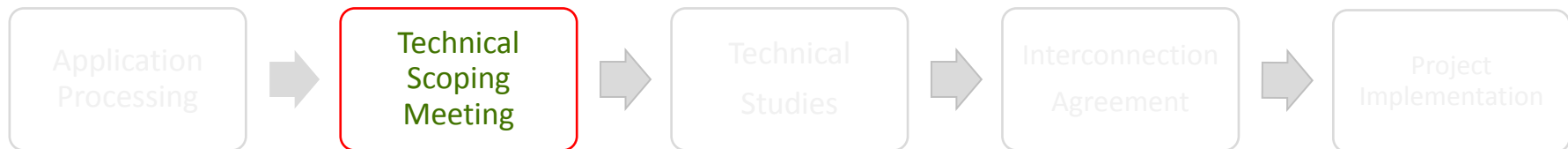
- Lack of site exclusivity documentation or technical data are typical reasons for triggering a deficiency notice
- When application package is complete, the interconnection request is “deemed valid” and is assigned a “queue position”

Detailed Study Process (ISP / Cluster)



2. Technical Scoping Meeting

2



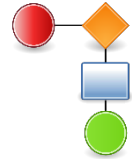
Scoping Meetings are designed to:

- Ensure common understanding of interconnection project's details
- Ensure understanding of the applicable tariff procedures
- Come to agreement on Point of Interconnection and generator size
 - SCE will provide technical system details, limitations, and information regarding earlier queued projects to aid the customer in finalizing the details on the requested interconnection
- Outline general study process steps for track chosen by Interconnection Customer and discuss alternative study tracks that might be available
- Outline next steps

5 Business Days (3BD CAISO) after Scoping Meeting, the Developer must:

- Provide confirmation on the Point of Interconnection
- Provide confirmation on the generator size

Detailed Study Process (ISP / Cluster)



3. Technical Studies



Technical Studies are intended to provide:

- Impact of generation on SCE's electric system and/or CAISO grid
- Scope of facilities required to ensure the safety, reliability, and integrity of the grid:
 - Interconnection Facilities
 - Generator-specific facilities required for interconnection
 - Distribution Upgrades
 - Upgrades to the Distribution System required by Generator or Cluster
 - Network Upgrades
 - Upgrades to the Network (CAISO Controlled Grid) triggered by Generator or Cluster

Applicable Studies:

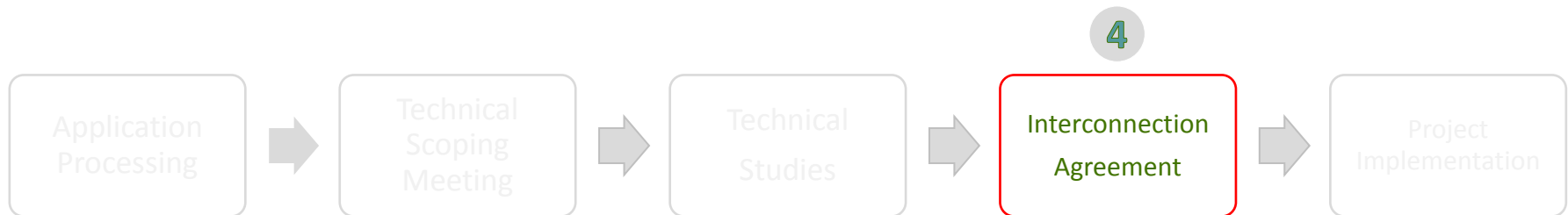
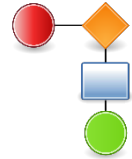
- For projects being studied "Independently" from other projects in the queue, there will be a System Impact Study and a Facilities Study
- For projects being studied "jointly" with other projects in a "group" or "cluster", there will be a Phase I Study and a Phase II Study

Outcome of the Studies:

- Besides identifying the facilities needed by the project(s) to interconnect, the studies should identify a feasible construction schedule as well as the cost responsibility and financial requirements of the project(s)

Detailed Study Process (ISP / Cluster)

4. Interconnection Agreement



Interconnection agreement negotiations commence following completion of studies (or successful eligibility for Fast Track status)

Interconnection Agreement is a contract that sets forth the requirements for interconnection, including:

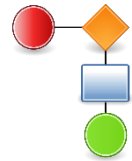
- Scope of required facilities
 - Interconnection facilities
 - Distribution upgrades
 - Network upgrades
 - Operational requirements
- Financial responsibility for such facilities
- Required income taxes, financial security, milestones, and other important information

Interconnection agreements are executed by all parties and filed for acceptance by FERC

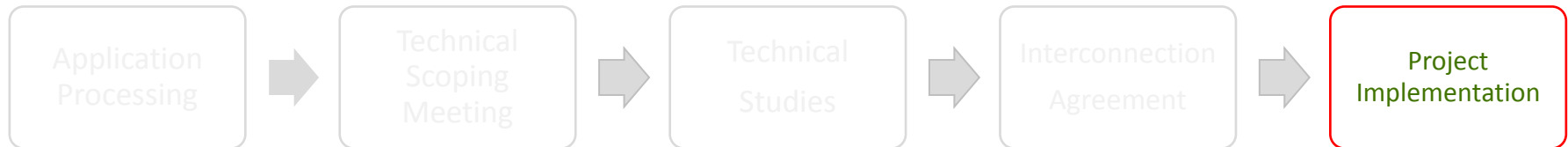
For WDAT/CAISO projects, agreements can be filed unexecuted at FERC if an impasse during negotiations occur

Detailed Study Process (ISP / Cluster)

5. Project Implementation



5



Once SCE and Customer (and CAISO, if applicable) agree to all terms and conditions in Interconnection Agreement, all parties sign the agreement (and related Distribution Service Agreement, if required)

Project Implementation Milestones:

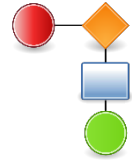
- SCE commences a “kick off” meeting with Customer and SCE construction personnel to start construction of required facilities
- SCE holds regular project meetings with SCE project team, which includes representatives from the interconnection customer
- All milestones for construction and commissioning should be clearly identified in the Interconnection Agreement

In-Service and Online Milestones:

- “In-Service Date” (ISD) is achieved when all facilities needed to interconnect the project are completed
- “Permission to Operate” (PTO) is achieved when SCE/CAISO authorize the project to synch to the grid
- “Commercial Operation” (COD) is achieved when the project satisfies SCE/CAISO’s requirements for unrestricted commercial operation of the project

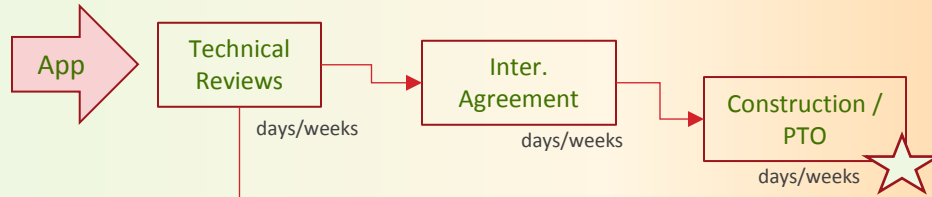
High-Level Timeline

For Illustration Purposes Only



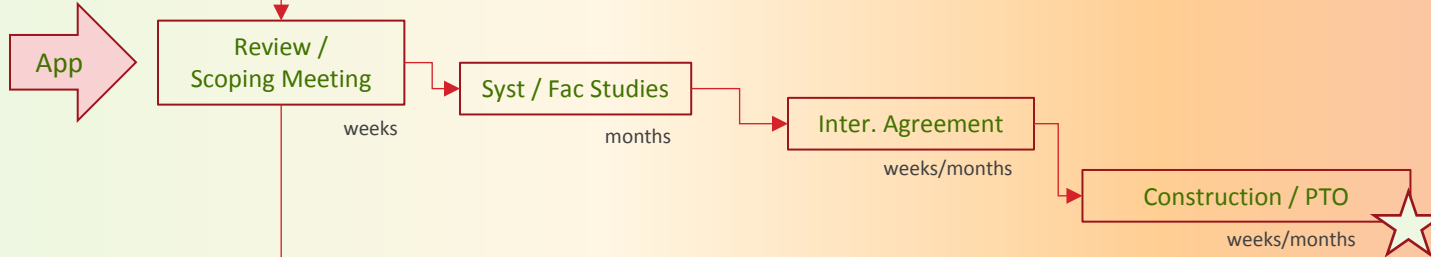
--- days ----- weeks ----- months ----- years -----

Fast Track



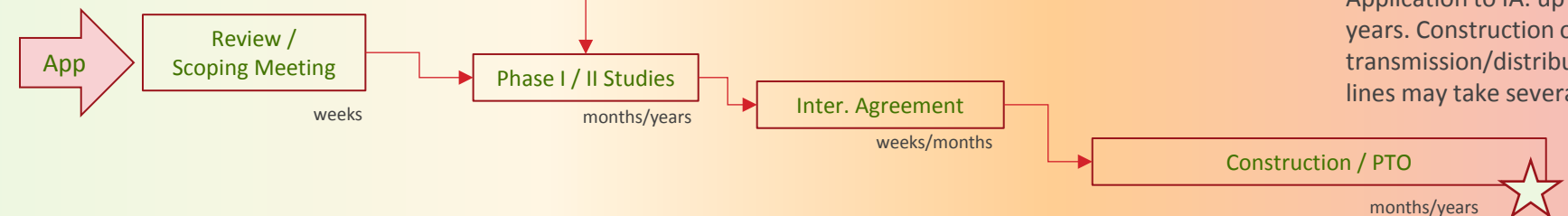
Application to Online:
From a few days (most NEM projects) to a few months

Independent Study



Application to Online:
From a few months to a 1-2 years period (depending on construction)

Cluster/Group Study



Application to Online: From Application to IA: up to 2 years. Construction of transmission/distribution lines may take several years

Frequently Asked Questions (FAQs)



4



What Generation Equipment To Use



- ▶ The project developer selects the design/technology of the facility.
 - ▶ The developer chooses the type of technology and technical specifications for the project. If the generation owner plans to sell the energy under a specific energy procurement program, there might be requirements (such as size, technology, technical specifications, etc.) to be eligible to participate in the program. Consult the entity you are selling your energy to.
- ▶ Once the developer have designed the project and decided to interconnect to SCE's Electrical system, a complete application for the applicable tariff is required to commence the interconnection process. The application package includes:
 - ▶ complete detailed technical data regarding the equipment chosen including balance of plant items (e.g., inverters, power system controls, etc.),
 - ▶ a site plan, a single-line diagram, demonstration of exclusive rights to use the proposed site, and
 - ▶ the applicable review fee or study deposit

Where To Locate The Project



- ▶ The location of the facility is important in the interconnection process
 - ▶ The interconnection process varies depending on whether the proposed project connects to SCE's transmission or distribution lines
 - ▶ System constraints, such as areas of over-generation, may impact the cost and timing of your interconnection
 - ▶ Choosing the right size and location could expedite the interconnection process
- ▶ Some of SCE's energy procurement programs may be targeted for projects located in specific, preferred areas. Consult SCE's Power Procurement team
- ▶ SCE's distribution circuits maps provide information that could help developers to size or site a project
 - ▶ Refer to SCE's [Distributed Energy Resource Interconnection Map \(DERiM\)](#)
 - ▶ DERiM [User Guide](#)
- ▶ Once a potential project site is identified, the developer can request a Pre-Application Report (PAR) to obtain technical system data (see next slide)

What System Information is Available to Make Decisions about A Project?



- ▶ At any time, any interested party can request technical information regarding SCE's electric system around a potential interconnection site. Upon receipt of a completed Pre-Application Report Request (PAR) and a non-refundable processing fee of \$300 (or other applicable fees for any requested enhancements, see link to Rule 21 PAR below), SCE will provide available system data. This typically includes:
 - ▶ Total Capacity (in MWs) of substation bus
 - ▶ Approximate circuit distance between the proposed site and the substation
 - ▶ Relevant line section(s) peak line load estimate
 - ▶ Number of protective devices and voltage regulating devices between the proposed site and the substation/area
 - ▶ Whether or not three-phase power is available at the site
 - ▶ Limiting conductor rating from proposed Point of Interconnection to distribution substation
- ▶ Links for more information about how to request a Pre-Application Report:
 - ▶ [Pre-Application Report Request under SCE's WDAT](#)
 - ▶ [Pre-Application Report Request under SCE's Rule 21](#)

Who Will Buy The Project's Output?



Largely depends on who is the intended market:

- ▶ **Wholesale market** Sales to SCE, PG&E, SDG&E or any other 3rd party under a wholesale contract. It usually requires Seller to become a participant in CAISO's market.
- ▶ **Sell 100% to SCE under a Power Purchase Agreement** For more information about the available SCE energy procurement programs, refer to **SCE's Power Procurement website**.
- ▶ **Self-Generation**. These are projects built on site for use by an energy customer without exporting power for sale into SCE's system
- ▶ **Self-Generation (and Billing Credits)**. These are projects built on site for use by an energy customer that may export excess power to SCE's system in exchange for "billing credits". Existing SCE programs that offer billing credits include **Net Energy Metering (NEM)** and **RES-BCT**.

How To Participate in the CAISO Market



- ▶ CAISO provides information on how to become a market participant
- ▶ The interconnection process applicable for a project that is intending to be a CAISO's market participant depends on whether the project interconnects to the transmission or distribution system
 - ▶ Refer to CAISO's "Resource Interconnection Guide" website if your project is connecting to the transmission system
 - ▶ Refer to SCE's WDAT GIP page if your project is interconnecting to SCE's distribution system
- ▶ Any new project participating in CAISO's market is required to follow CAISO's New Resource Implementation (NRI) process
- ▶ SCE encourages developers to become familiar with the NRI process since CAISO requires notice at least 210 days prior to online date.




Finding More Information



Visit our new Grid Interconnections website

- Go directly to it: on.sce.com/gridinterconnections
- Go to sce.com and browse
Home > Your Business > Generating Your Own Power > Grid Interconnections

You can navigate through the options below or you could get started by reviewing our [Interconnection 101 presentation](#).



Generation Project Types

- [Generating Power for Sales](#)
- [Programs for Self-Generation at Home or Business](#)
- [Backup Systems](#)

Rules and Regulations

- [Rule 21](#)
- [Wholesale Distribution Access Tariff \(WDAT\)](#)
- [Transmission Owner Tariff](#)
- [Interconnections to California Independent System Operator \(CAISO\)](#)

Additional Information

- [Interconnection Queue](#)
- [Distributed Energy Resource Interconnection Map \(DERiM\)](#)
If you have any trouble accessing the above page, click [here](#) to see a complete list of supported browsers.
- [DERiM User Guide](#)
- [Qualifying Facility Conversions](#)
- [Redacted Interconnection Study Reports](#)

Frequently Asked Questions (FAQs) ▼

Current Application Windows and Other Important Information ▼

Information relevant depending on the purpose of your project

How to learn about the interconnection process for each tariff

Distribution System Maps

How to Contact the Interconnection Team

For questions regarding interconnection processes or materials
InterconnectionQA@sce.com

SCE Grid Interconnections team (where to send interconnection requests)
Grid.interconnections@sce.com

SCE Grid Interconnections website
www.sce.com/GridInterconnection

Our Frequently Asked Questions
[WDAT FAQs](#)
[Rule 21 FAQs](#)