



California ISO
Your Link to Power

California Independent
System Operator

Centralized Generator Interconnection Study Process



Generator Interconnection Procedures

- **Large Generator Interconnection Procedures (LGIP) apply to proposed Generating Facilities that are > 20 MW.**
- **For proposed Generating Facilities that are < or = 20 MW, the Amendment 39 process still applies.**
- **For wind projects, there are LGIP & LGIA Interconnection Requirements that are specific to Wind Plants.**



FERC Order

- **July 1, 2005 FERC Order established Interim LGIP procedures and ordered the CAISO to create a Centralized Interconnection Study process where the CAISO itself conducts the Interconnection Studies.**
- **November 1, 2005 the CAISO, SCE, SDG&E, PG&E made the compliance filing to establish the Centralized Interconnection Study process.**
- **May 24, 2006 FERC largely accepted the study process indicating the Roles and Responsibilities struck the right balance of responsibility.**



Centralized Interconnection Study Process

Overview / Structure

- **FERC ordered the ISO to be the single point of contact for the Interconnection Customer (IC)**
- **FERC ordered the ISO to provide direction, oversight and approval over both the administrative and technical portions of the study process.**
- **Today, we will provide an overview of the procedures associated with the new Centralized Interconnection Study process.**



Interconnection Request (IR)

- **ISO receives Interconnection Request (IR) and IC deposits. ISO provides a copy of the IR to the PTO.**
- **ISO & PTO review the IR. ISO responds to the IC within 6 BD to establish the queue date and queue position for the IC's project.**
- **Within 10 BD of the IR being deemed valid, ISO schedules the Scoping Meeting to be held within 30-CD of the notification of the valid IR, unless otherwise mutually agreed upon by all Parties.**



Scoping Meeting

- **A Standard agenda for all Scoping Meetings has been established so that the ISO, PTO, and any Affected Systems can come prepared.**

The agenda includes:

- **Introductions**
 - **Project Overview by the Interconnection Customer**
 - **LGIP Review by the ISO**
 - **Discussion of Interconnections Points – Preferred and Alternate**
 - **Known Transmission System limitations**
 - **Projects that may impact study results**
 - **Study Options – Feasibility and System Impact**
 - **Expected Study Results**
 - **Planning Standards**
 - **Discuss Attachment A to Appendix 1 of LGIP, Detailed project and machine information**
 - **Communication Plan**
 - **Action Items**
- **The Scoping Meeting sets the stage for the development of the study plan and Feasibility Study Agreement between the ISO and IC. It is required to be tendered within 15 BD following the Scoping Meeting.**



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Interconnection Study Deposits

Study deposits required from the IC to perform each study are paid to the California ISO.

- | | |
|------------------------------|------------------|
| • Feasibility Study | \$10,000 |
| • System Impact Study | \$50,000 |
| • Facilities Study | \$100,000 |
| • Re-Study | \$10,000 |
| • Optional Study | \$10,000 |

Note: Actual costs to perform each Interconnection Study are the cost responsibility of the IC.



Interconnection Study Timelines

Timelines in Calendar Days (CD) to complete each study and deliver the Interconnection Study Report to the IC.

- **Feasibility Study** **60 CD**
- **System Impact Study** **120 CD**
- **Re-Study (FES)** **60 CD**
 (SIS) **80 CD**
- **Facilities Study (FAS)** **120+ CD / 210+ CD**
 - **To issue the Draft FAS Report to the IC**
 - **120 CD for +/- 20% accuracy of cost estimate**
 - **210 CD for +/- 10% accuracy of cost estimate**
 - **IC is provided 30 CD to provide comments on Draft FAS Report**
 - **FAS Re-Study: 60 CD to issue the Draft FAS Report**
 - **To issue the Final FAS Report to the IC**
 - **150 CD + 15 BD for ISO to incorporate IC comments**
 - **240 CD + 15 BD for ISO to incorporate IC comments**
 - **FAS Re-Study: 80 CD to issue the Final FAS Report**



Interconnection Studies

ISO Administrative & Accounting Functions:

- **With input from the PTO, the ISO finalizes the Study Agreement (with the finalized study plan and study cost estimate) and tenders to the IC.**
- **If at any time the estimated cost to complete an Interconnection Study changes, the ISO Project Manager will notify the IC.**
- **Similarly, if additional time is required to complete an Interconnection Study, the ISO Project Manager will notify the IC and will provide the IC with an estimated date of when the study is expected to be completed and the reasons why additional time is needed.**
- **If the tariff requirements are not met by an IC, the ISO is responsible for notifying the IC of the potential withdrawal of the project from the ISO Queue.**
- **If the tariff requirements are not cured by an IC within the timelines specified in the tariff and within the notice of withdrawal, then the ISO is responsible for withdrawing the IC's project from the ISO Queue.**

Interconnection Studies

ISO Administrative & Accounting Functions:

- **ISO provides the completed Interconnection Study Report to the IC.**
- **ISO schedules and coordinates the Results Meeting within 10-BD of providing the report.**
- **The Results meeting sets the stage for the development of the next study plan & Study Agreement to be tendered to the IC.**
- **PTOs will invoice the ISO for study costs incurred at the direction of the ISO.**
- **The ISO will reconcile all costs and payments received from the IC.**



Interconnection Studies

The Interconnection Studies will consist of:

- **Feasibility Study** **60 CD to issue the report**
 - **Power flow analysis**
 - **Short circuit study (PTO)**
 - **Non-binding estimate of cost & time to construct (PTO)**

- **System Impact Study** **120 CD to issue the report**
 - **Power flow analysis**
 - **Short circuit study (PTO)**
 - **Stability study**
 - **Post transient analysis**
 - **Deliverability assessment (ISO)**
 - **Non-binding estimate of cost & time to construct (PTO)**

- **Facilities Study** **120+ CD to issue the draft report**
 - **Detailed work scope, cost estimate & time to construct (PTO)**



Interconnection Studies

ISO Technical Functions include:

- **The ISO reviews the Interconnection Request within 6 BD of its receipt to determine if it's complete and can be deemed valid to establish the project's queue date and queue position.**
- **Performs Feasibility Studies**
- **Performs System Impact Studies when grid impacts to more than one IOU PTO have been identified in the Feasibility Study.**
- **Performs the Deliverability Assessment**



Feasibility Study (FES)

Purpose: Evaluates the feasibility of the proposed interconnection by performing power flow and short circuit analyses.

- **The Feasibility Study:**
 - Screens for and identifies system impacts to the grid.
 - Identifies if there are grid impacts to more than one IOU PTO and any other Affected Systems.
 - If grid impacts to more than one IOU PTO are not anticipated, the CAISO may utilize the PTO or a contractor to perform the Feasibility Study.
 - The determination of whether the interconnection is physically feasible (substation and transmission line field review) is performed during the System Impact Study.
- **Timeline to complete the Feasibility Study:**
 - 60 CD to issue the FES Study Report to the IC and to any Affected System.



System Impact Study (SIS)

Purpose: Evaluates the impact of the proposed interconnection on the reliability of the grid.

- **Based on the results of the Feasibility Study:**
 - If grid impacts to more than one IOU PTO were identified, then the ISO will perform the SIS.
 - If grid impacts to more than one IOU PTO were not identified, then the PTO will perform the SIS.
- The SIS determines the Interconnection Facilities & Network Upgrades required to implement the interconnection.
- The SIS determines whether the interconnection is physically feasible. A field review of the substation and transmission facilities by the PTO occurs during the SIS and Facilities Study.
- **Timeline to complete the SIS:**
 - 120 CD to issue the SIS Report to the IC and to any Affected System.



System Impact Study (SIS)

Deliverability Assessment (ISO performs)

- **Purpose:**
To assess the ability to deliver the Generating Facility's energy to the ISO Controlled Grid under peak load conditions.
- **Provides the following information to the IC:**
 - The level of deliverability with no Network Upgrades
 - The Network Upgrades required for 100% deliverability
- **Deliverability Baseline Studies are available on the CAISO website:**
<http://www.caiso.com/181c/181c902120c80.html>
- **For Questions on deliverability**
Contact Robert Sparks at: rsparks@caiso.com
or Paul Didsayabutra at: pdidsayabutra@caiso.com



Facilities Study (FAS)

- **ISO coordinates the Facilities Study with the PTO & any Affected Systems.**
- **The Facilities Study is based on the results of the System Impact Study.**
 - **Interconnection Facilities & Network Upgrades have been determined in the SIS.**
- **PTO specifies & estimates the cost of the equipment, engineering, procurement & construction work to implement the conclusions of the SIS.**
- **PTO estimates the time to construct the Interconnection Facilities & Network Upgrades.**



Facilities Study (FAS)

Timeline to complete the Facilities Study:

- **CAISO to issue the Draft Facilities Study Report to IC within:**
 - **120 CD for +/- 20% accuracy of cost estimate**
 - **210 CD for +/- 10% accuracy of cost estimate**
- **IC is provided 30 CD to comment on the Draft FAS Report.**
- **CAISO to issue the Final Facilities Study Report to the IC within:**
 - **150 CD for +/- 20% accuracy + 15 BD for ISO to incorporate IC comments**
 - **240 CD for +/- 10% accuracy + 15 BD for ISO to incorporate IC comments**

Re-Study (FES, SIS, FAS)

What may trigger the need for a Re-Study?

- **A change in the study assumptions**
- **A higher-queued project withdraws from the Queue**
- **Interconnection Customer changes the location of their Interconnection Point**
- **Material Modification (Ref: LGIP Section 4.4)**

Optional Study

- **Consists of a sensitivity analysis and is based on the assumptions specified by the IC.**
- **Optional Study is performed for informational purposes.**
- **Study is to be completed within a mutually agreed upon timeframe (CAISO, PTO, IC)**
- **Identify the Interconnection Facilities & Network Upgrades.**
- **PTO provides estimate of cost & time to construct.**

Study Results Meeting

- **ISO to schedule the Study Results Meeting within 10-BD of providing an Interconnection Study Report to the IC.**
- **ISO coordinates the Results Meeting (IC, ISO, PTO, Affected Systems).**
- **Within 10-BD of the Facilities Study Results Meeting, the IC will need to elect which Delivery Network Upgrades are to be installed.**
- **Should the IC elect not to install Delivery Network Upgrades, then any operating constraints on the IC's Generating Facility will need to be specified in Appendix C of the LGIA. (Ref: LGIA Article 9)**



LGIA

- **LGIA is a 3-party agreement (ISO, PTO, IC)**
- **Affected Systems will tender a separate LGIA with the IC.**
- **PTO and the ISO to tender the draft LGIA & Appendices together within 30 CD after the CAISO receives the IC's written comments (or notification of no comments) to the Draft Facilities Study Report.**
- **Operating constraints on the IC's Generating Facility shall be specified in Appendix C of the LGIA.**
- **IC to provide comments on the draft LGIA & Appendices within 30-CD of receipt.**
- **Negotiations period – within 60 CD of issuing the Final FAS.**



LGIA

- **IC needs to provide with the executed LGIA:**
 - **Evidence of continued Site Control or \$250,000 non-refundable deposit and**
 - **Reasonable evidence of one or more of the following milestones:**
 - **Execution of :**
 - **a contract for the supply or transportation of fuel to the generating facility or**
 - **a contract for supply of cooling water to the generating facility or**
 - **a contract for the engineering for procurement of major equipment for, or construction of, the generating facility or**
 - **a contract for the sale of electric energy or capacity from the generating facility or**
 - **application for an air, water, or land use permit**



LGIA

- **Execution & Filing**

- ISO will execute and forward all four LGIA sets to the PTO for execution.
- PTO will return one fully executed LGIA to the IC and two executed originals to the ISO.
- Non-pro forma LGIA: ISO will be responsible for an additional filing at FERC.

- **Withdrawal**

- IC can request the termination of LGIA negotiations.
- IC has not executed or returned LGIA, requested filing of an unexecuted LGIA or initiated Dispute Resolution within 90 CD of issuance of final FS report.