Studies, Study Results, and Project Cost Responsibility

Songzhe Zhu, Senior Advisor Regional Transmission Engineer
Chris Mensah-Bonsu, Regional Transmission Engineer Lead
February 22, 2017
Objective

- Understand the study processes and study results
- Understand requirements for posting financial security associated with your project
Interconnection Process Map

You are here
Generation Interconnection Studies – Big Picture

Interconnection Customer Decision

Deliverability Status, Deliverability Option, MW, etc

Phase I Study
July ~ Dec

1st IFS Posting
March

Phase II Study
May ~ Nov

TPD Allocations

TPD Allocation Choices

TPD Allocation
Jan ~ March

2nd IFS Posting
May

Annual Reassessment
March ~ July

Study Process

Acronyms:
IFS - Interconnection Financial Security
TPD – Transmission Plan Deliverability
Phase I & Phase II Studies - How is the Study Model Built

1. Cluster projects in ISO Queue
2. Cluster projects in WDAT Queue
3. ISP projects requesting deliverability in ISO Queue
4. ISP projects requesting deliverability in WDAT Queue

Acronyms:
WDAT – Wholesale Distribution Access Tariff
ISP – Independent Study Process
Phase I and Phase II Studies - 
What Studies Are Performed

• Studies are performed based on applicable ISO Tariff and in coordination with the applicable PTOs

• Deliverability Assessment
  – On-peak deliverability assessment for projects requesting full or partial capacity deliverability status
  – Off-peak deliverability assessment for information only

• Reliability Assessment Scope
  – Power flow study (thermal loading)
  – Voltage assessment (steady state and transient) and reactive power deficiency assessment
  – Post transient stability study
  – Transient stability study
  – Short circuit duty study
Phase I and Phase II Studies (Cont.)

- Reliability Assessment Scenarios
  - Generating mode study
    - Peak and off-peak load conditions
    - Simultaneous maximum output from generators in a local area
  - Charging mode study
    - Peak, partial peak, off-peak load conditions
    - Maximum simultaneous charging power (MW) of energy storage facilities in a local area
    - Analysis of potential congestions including necessary congestion management measures to ensure system reliability
Operational Study in Phase II

• During Phase II studies, operation date-based assessments are performed
  – Year by year peak deliverability assessments
  – Year by year reliability assessments
  – One study model per study year
  – Transmission upgrades are modeled according to their in-service dates
  – Generation projects are modeled according to their commercial operation dates
Phase I and Phase II Studies -
What to expect out of the studies

- Project impacts to the transmission systems
- Facilities required to interconnect the project
  - Some are PTO’s Interconnection Facilities (IF)
  - Some are Reliability Network Upgrades (RNU)
- Upgrades required to mitigate adverse impacts and deliver power to the grid
  - Reliability Network Upgrades (RNU)
  - Local Delivery Network Upgrades (LDNU)
  - Area Delivery Network Upgrades (ADNU)
- Estimated costs and construction time for IFs and NUs
- Potential Affected System impacts and coordination
Affected Systems

• The ISO does not comprehensively study the impacts on Affected Systems
• The Interconnection Customer shall:
  – cooperate with the ISO in all matters related to the Affected System studies,
  – enter into a study agreement with the Identified Affected System Operator to evaluate potential impacts on the Identified Affected System, and
  – pay for necessary studies and any upgrades necessary to mitigate the impacts of the interconnection on the Identified Affected Systems
Transmission Plan Deliverability (TPD)

- Renewable portfolios are developed by the CPUC and then adopted by the ISO Transmission Planning Process (TPP) every year
- ISO TPP approves new transmission upgrades to meet reliability, economic planning and policy needs
- The transmission system with the TPP approved transmission upgrades provides capability to support certain level of generation deliverability across one or more renewable zones, which is called Transmission Plan Deliverability (TPD)
- Specific TPD is calculated for each electrical area with a known area deliverability constraint
How does TPD Affect Generation Interconnection?

- In some electrical areas, the generation in the interconnection queue exceeds the corresponding TPD.
- To increase TPD, Area Delivery Network Upgrades (ADNUs) would be needed.
- ADNUs are typically expensive and require long lead times for permitting and construction.
- Interconnection Customers (IC) are given a choice between the two deliverability options:
  - Option (A) projects do not fund any ADNUs and rely on TPD allocation.
  - Option (B) projects are willing to fund ADNUs if not getting TPD allocation.
More on Deliverability Options

• Deliverability Status: Full Capacity (FC), Partial Capacity (PC) or Energy-Only (EO)

• If the project requests EO, the deliverability option is not applicable

• If the project requests FC or PC, the project must select Option (A) or Option (B) after the Phase I but prior to the Phase II studies

• To move forward into Phase II, Option (A) project posts for IF and $NU = (RNU + LDNU)$; Option (B) posts for IF and $NU = (RNU + LDNU + ADNU)$

• After Phase II, both Option (A) and Option (B) are subject to TPD allocation
TPD Allocation

- All projects must meet the eligibility criteria to receive TPD allocation
- In an electrical area *without binding area constraints*, all eligible projects receive TPD allocation
- In an electrical area *with binding area constraints*
  - TPD is first reserved for prior commitments;
  - TPD is then allocated to current generation projects in the electrical area based on ranking scores reflecting the project development status in the submitted affidavits
- Option (A) and Option (B) projects get the same treatment in the TPD allocation study
TPD Allocation (Cont.)

- If a project does not receive full allocation for its requested deliverability status
  - Option (A) projects may park the entire or a portion of the project for one year and get a second chance of TPD allocation
  - Both Option (A) and Option (B) projects may change the project size or deliverability status to match the allocation

- Cost responsibility
  - Option (A) and Option (B) projects with allocation are responsible for: IF and NU=(RNU+LDNU) costs
  - Option (B) projects without allocation are responsible for: IF and NU=(RNU+LDNU+ADNU) costs
Annual Reassessment

• The Network Upgrade requirements could change after the Phase II study due to:
  – Generation project withdrawals
  – Generation project downsizing
  – Generation project modifications allowed by the tariff
  – System condition changes, such as newly approved transmission upgrades, resource retirement, etc.

• An annual re-assessment is performed to update the Network Upgrade requirements and cost responsibility
Cost Re-allocation in the Annual Reassessment

• NU cost re-allocation (CR)
  – If an NU is no longer needed for all projects in the reassessment, the cost is removed
  – If an NU or its alternative is needed, the cost is allocated to the remaining projects in the original responsible group pro rata on the Phase II cost allocation factors

• Maximum (RNU + LDNU) cost responsibility
  – Original cost cap: lower between Phase I and Phase II
  – Current cost cap: maximum RNU and LDNU cost responsibility effective until the reassessment is issued
  – Updated cost cap: maximum RNU and LDNU cost responsibility updated in the reassessment and effective once the reassessment is issued
Final Costs in the Annual Reassessment

• Updated maximum (RNU+LDNU) cost responsibility
  – If (CR) is at least 20% lower and at least $1M lower than the current cost cap,
    \[ \text{updated cost cap} = \min\{\text{current cost cap}, \sum \text{of 100% costs of all remaining (RNU + LDNU)}\} \]
  – If \{(CR) > \text{current cost cap}\} and
    \{\text{current cost cap} < \text{original cost cap}\},
    \[ \text{updated cost cap} = \min\{(CR), \text{original cost cap}\} \]
  – Otherwise, \text{updated cost cap} = \text{current cost cap}

• \text{Final cost responsibility} = \min\{(CR), (Updated Cost Cap)\}
Phase I and Phase II Study Reports and Addenda

- During the life-cycle of interconnection process, an IC will receive various project reports from the ISO
  - Final Phase I and Phase II study reports
  - Addendum to Phase I and/or Phase II report
    - Correction to non-substantial errors or omissions
    - Remove cost responsibility after an assigned NU is approved in TPP
      - Does not change the next IFS posting due date
  - Revised Phase I and/or Phase II reports
    - Correction to substantial errors or omissions
    - May change the next IFS posting due date
Post-Phase II Notification and Updates

• During the life cycle of interconnection process, an IC will also receive from the ISO:
  – Notification of TPD allocation results
    • Information about the TPD allocation results
  – Annual reassessment reports
    • Updated NU requirements and cost responsibility
Where to Find More Information

- Deliverability assessment methodology

- TPP and TPD

- Study plans, data and reports
  https://portal.caiso.com/tp/Pages/default.aspx
  (This is a secure website that requires signed NDA with the ISO and certificate)
Where to Find More Information (Cont.)

- Instruction to Transmission Plan Data NDA submission
- Regional Transmission NDA Form
Thank you!

• If you have any further questions, please send them to NewResourceImplementation@caiso.com