



# Interconnection Workshop 3

## PJM Response

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Interconnection Workshop  
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- Summary of Workshop 2
- Categories of concerns and suggestions
- Category walkthrough
  - Concerns
  - Suggestions for improvement
    - Completed by PJM
    - Requiring only internal efforts
    - Requiring the stakeholder process
- Recommended next steps

- 20 presentations by stakeholders
- 5 written comments submitted
- 69 unique concerns raised
- 135 unique suggestions offered



# 12 Categories for Concerns and Suggestions

Category	Description	Concerns	Suggestions
Transparency	Access to information ahead of and during the interconnection process	3	17
Schedule	Queue window frequency and duration. Duration of study phases.	4	6
Application	Requirements to submit a new request to PJM.	6	13
Base case	Case used for interconnection studies.	2	5
Studies	All study phases and assumptions used to conduct studies.	21	36
Affected System	Processes to coordinate work with affected systems	4	7
Cost Responsibility	Cost accuracy and financial responsibility to reinforce the transmission system	12	26
Agreements	Study agreements, Interim ISA, ISA and CSA	8	12
Interim Operation	Operation of facility prior to the completion of studies and construction of upgrades.	3	3
Construction	Construction activities and suspension	1	3
Disputes	Methods to resolve disputes between any party	2	2
Staffing	PJM and transmission owner staffing	3	5
		<b>69</b>	<b>135</b>

# Transparency

- Limited visibility into the queue process
- Insufficient information available to customers while in the queue
- Disconnect between state portfolio goals and limitations of the interconnection queue

Suggestion	Status
Create training to guide interconnection customers on the use of Queue Point and the data and information required for interconnection studies.	Pre-queue and process overview training ( <a href="#">Link</a> ) Post-ISA training ( <a href="#">Link</a> )
Post a copy of the Attachment N publically.	All applications are attachment to the PJM OATT ( <a href="#">Link</a> )
Post copies of the Queue Point data forms publically.	Manual 14G, Appendices A-1 and B-2 ( <a href="#">Link</a> ) Queue Point User Guide ( <a href="#">Link</a> )
Describe what is considered a deficiency with the application.	Most deficiencies are found when viewed in the context of the site specific information. All deficiencies will be described in a notice from PJM.
Set a date when no new process changes can be implemented prior to a queue window opening.	The stakeholder process governs how and when process changes are implemented. Manual 34 provides this overview ( <a href="#">Link</a> )
Publically post all process changes.	All interconnection process changes are presented at the Planning Committee and require endorsement by the PC, MRC. The MC will endorse changes when the OATT is modified.

Suggestion	Status
<p>Confirm which process changes apply to which queue windows.</p>	<p>The OATT will clearly reference the effective dates for changes. PJM also include requested effective dates in all filing letters to FERC. (<a href="#">Link to FERC filings</a>)</p>
<p>Review and develop key requirements for site control. Publish these requirements in the PJM manuals.</p>	<p>Site control requirements are described in PJM Manual 14G (<a href="#">Link</a>)</p>
<p>Provide regular reports to the Planning Committee or TEAC on the process including status of studies, network upgrades.</p>	<p>PJM presents updates on the queue twice a year to the Planning Committee (<a href="#">link to Nov 2020 update</a>). Network upgrades are presented to the TEAC once a year prior to approval by the Board of Managers (<a href="#">link to Sept 2020 update</a>)</p>
<p>Provide flowgate information to customers.</p>	<p>Customers are entitled to the flowgate details for their project. All customers are required to obtain CEII approval prior to obtaining the details (<a href="#">Link to CEII request form</a>)</p>
<p>Create an FAQ for interconnection customers</p>	<p>Newly created series of web pages capturing the common questions PJM staff receives from interconnection customers (<a href="#">Link</a>)</p>



## Suggestion

Provide congestion information and existing transmission system violations on the PJM website.

PJM and transmission owners should provide expected transmission system violations for various points of interconnection for each project at the kick off call.

Provide details on the number of projects connected to each facility.

Notify customers when projects withdraw or when projects are modified.

Communicate interconnection process challenges to each state. Encourage a partnership when developing portfolio goals.

## Suggestion

Create a stakeholder group with regular meetings dedicated to the interconnection process.

# Schedule

- Too many opportunities to submit interconnection requests
- Study durations too long and do not align with customer needs
- Unclear schedule for restudies
  
- Note: Some stakeholders state there are no issues with the existing schedule.

# Schedule Agreement or Manual Changes Not Required

## Suggestion

Notify transmission owners and interconnection customers when restudies are needed, the cause and the schedule.

## Suggestion

Reduce the number of queue windows each year.

Reduce the duration of each queue window.

Reduce the duration of the study phases.

Create schedule restudy windows.

# Application

- Current requirements are too low and encourage speculative projects
- Current requirements are too high and encourage speculative project to remain to avoid sunk costs
- Too many projects wait until the end of the queue window to submit a request.
- Application deficiencies delay the ability to begin work on the project.
- No limitation on the number of requests that can be submitted.
- Do not want any limits to submit multiple projects or restrictions on locations.
- Note: Some stakeholders state there are no issues with the existing application requirements.



## Suggestion

Require customers to demonstrate readiness as part of the Attachment N.

Create ability for PJM to remove speculative projects already in the queue.

Increase deposits to place more money at risk and discourage speculation.

Reduce deposits to minimize lost costs.

Increase site control requirements.

Reduce site control requirements to reduce customer investment.

Create incentives to submit requests early in the queue window.

Eliminate the ability to resolve deficiencies after the queue window closes.

Reduce time to correct deficiencies.

Eliminate the ability to submit multiple requests at the same point of interconnection.

Eliminate the ability to submit redundant projects.

Eliminate the ability to select a secondary point of interconnection.

# Base Case

- Capacity and energy modeled inconsistently between RTEP analysis case and interconnection case.
- Interconnection models have outdated information (PJM upgrades and external systems)

Suggestion	Status
Consistently model capacity and energy for PJM studies.	Efforts already underway to resolve this difference. Requires modification to the PJM modeling and analysis tools before full implementation.
Update interconnection cases with newer baseline and supplemental projects.	Interconnection cases are locked to the assumptions from the corresponding RTEP analysis. New baseline and supplemental upgrades can be used as solutions to mitigate interconnection analysis violations.
Remove deactivated generators from interconnection cases.	Deactivated generators are removed once the CIRs for the facility have expired, 1 year after the unit deactivates.

## Suggestion

Update external models more frequently and incorporate external changes in the interconnection cases.

Include non-market generation in cases.

# Studies

- Schedule
  - Studies take too long and do not align with customer needs.
- Assumptions
  - Inefficient study methods cause delays
  - Insufficient accuracy in the results
  - Speculative projects delay projects that are ready to construct
  - Ability to withdraw at any time causes uncertainty for all later projects
  - Energy delivery violations are not mitigated by interconnection customers
  - Changes to projects trigger restudies and delay later studies

- Feasibility Studies
  - Provides little value or accurate information
  - Contains too much scope
  - Unclear selection criteria for a Combined Feasibility/System Impact Study
  - No concerns with existing process
- System Impact Study
  - Stability analysis delays the System Impact Study.



- Facilities Studies
  - Schedule is unclear
  - Lack of clarity regarding location of customer equipment.
  - Too much scope in the study.
  - Prolonged delays to complete study.
  - Transmission owners delayed if customers do not provide timely responses.
  - Inability to see the Facilities Study until the ISA is complete

- Current Backlog
  - Backlogged projects causing uncertainty for later projects and take PJM/TO resources away from current projects.
- Distribution connections
  - Insufficient information in study reports for distribution interconnection requirements.
- Accountability
  - Limited accountability for PJM and transmission owners.

Suggestion	Status
Run studies in parallel	PJM tools batch all projects within a single window and perform analysis on the batch. Development of network upgrades is performed by the TOs and created facility-by-facility.
Automate study tools	PJM uses several automation processes for the analysis report generation. Tools assist with case build, analysis, violation summaries, and report generation. Staff are motivated to continue developing automation scripts and propose IT solutions for automation.
Defer stability analysis to the Facilities Study phase.	Completed with PJM's Order 845 Compliance Filing.

## Suggestion

Complete work on time

Publish criteria used by PJM to determine when a Combined study is appropriate.

Do not make changes to the Feasibility Study process.

Publish performance metrics for each study phase and TO.

## Suggestion

### **General Study Policy**

- Study all projects at various outputs to give more information about potential impacts.
- Adopt a first-ready-first-served queue priority.
- Define points in the process where projects can be withdrawn.
- Create penalty for withdraws based on impact to later projects.
- Require upgrades for energy deliverability violations in the interconnection process.
- Restrict changes that can be made to a project under study
- Improve study accuracy.

### **Feasibility Studies**

- Remove the Feasibility Study phase.
- Modify the Feasibility Study phase to incorporate the scope of work covered in the System Impact Study phase. Convert the System Impact Study phase to the first scheduled retool.
- Create a pre-Feasibility Study to provide the initial screening for network upgrades.
- Remove short circuit analysis, light load screening, and/or AC analysis from the Feasibility Study.
- Reduce the scope of the Feasibility Study to only contain the list of transmission system violations. Provide the upgrade scope and cost estimates with the System Impact Study phase and cost allocations with the Facilities Study phase.

## Suggestion

### **Facilities Studies**

- Require the kick off meeting to occur within 30 days of executing the Facilities Study Agreement.
- Provide a milestone schedule to complete each item in the Facilities Study scope.
- Require all Facilities Studies within the same queue window and TO be issued at the same time.
- Require the interconnection customer to return GPS coordinates of the POI and updated site layout with the Facilities Study Agreement.
- Separate the interconnection facilities and networks into different study reports with independent deadlines.
- Create a Multi-Party Facilities Study to allow a group of projects to share cost responsibility for the study and construction cost.
- Impose a penalty on transmission owners based on the delay in the study completion.
- Discount the reimbursement required of the interconnection customer for delayed studies.
- Cluster Facilities Studies together.
- Allow customers to hire TO-approved contractors to perform the Facilities Study work.
- Extend the deadline to complete the Facilities Study when customers do not provide requested information.
- Allow PJM to issue the Facilities Study report and then begin drafting the ISA and CSA.

## Suggestion

### **Backlogged Studies**

- Issue an ISA to all backlog projects.
- Require a security payment from all backlogged projects.

### **Distribution Studies**

- Include distribution requirements in the ISA and CSA.
- Include power consumption, metering, and retail service requirements in reports and agreements.
- Include distribution companies in the entire interconnection process.

# Affected System Studies



- Inadequate coordination between PJM and affected systems.
- Inconsistent processes between RTOs.
- Lack of transparency about process, study assumptions and queue priority.
- Misalignment between generator milestones and external system studies and upgrades.



# Affected System Studies Completed by PJM

Suggestion	Status
Provide clarity on how queue priority works for Affected System projects in relation to PJM projects.	Queue priority added to MISO/PJM JOA in 2020 at the request of FERC.
Document the Affected System Study process in PJM manuals and Joint Operating Agreements.	Study phases and data exchange timelines added to MISO/PJM JOA in 2020 at the direction of FERC.

# Affected System Studies Agreement or Manual Changes Not Required

## Suggestion

Improve collaboration and coordination and the interregional queue process to avoid unfunded liabilities for TOs.

Monitor the progress of MISO and SPP interconnection process changes.

Provide clarity on how queue priority works for Affected System projects in relation to PJM projects.

Document the Affected System Study process in PJM manuals and Joint Operating Agreements.

Increase PJM's involvement in the study timelines and construction schedules for affected system upgrades.

# Affected System Studies Agreement or Manual Change Required

## Suggestion

Require Affected System Study results in the System Impact Study.

Standardize Affected System Study process between all entities.

# Cost Responsibility

- Cost accuracy
  - Tight cost accuracy standards pose challenges if unexpected issues are found after field visits
  - Loose cost accuracy standards do not give enough certainty to customers
- Cost responsibility
  - Insufficient transparency into the current allocation methodology
  - Limited ability to modify a project to avoid a network upgrade or allocation towards an upgrade
  - Current allocation methods do not assign cost to all that see the benefit
  - First-to-cause allocation method creates a high burden for the first project
  - Customers do not know the maximum cost exposure for the project
  - Not easy to identify when upgrade drivers change
  - Customers are not certain the least cost solutions are provided
  - Requirement for network upgrades jeopardizes the financial viability of a project
  - Annual reliability studies do not account for anticipated generation.
  
  - Note: Some stakeholders believe the current allocation rules are fair and should not be modified.

# Cost Responsibility Agreement or Manual Changes Not Required

## Suggestion

Publish current cost allocation criteria and methodology.

Recalculate all cost allocations on a regular bases (quarterly suggested).

Post all network upgrades publically along with the current cost allocation.

## Suggestion

### Cost Accuracy

Relax estimation requirements.

Add line item for contingency costs.

Create standard facility estimates that can be used for early study phases.

Improve cost accuracy standards for transmission owners.

Create consistent standards across all transmission owners.

Publish cost accuracy standards

### Cost Responsibility

Increase amount projects can be reduced to fall below the requirement for an upgrade or cost allocation.

Create multi-driver allocation method to assign costs to the load when network upgrades improve the transmission system beyond the needs of the generators.



## Suggestion

### **Cost Responsibility**

Convert to cluster-based allocations for network upgrades.

Modify rules so that all upgrades are allocated to later projects.

Publish a cost cap for all network upgrades.

Perform a study at least 6 months prior to commercial operation to confirm the need for all network upgrades identified in the study report.

Add cost allocations to the Feasibility Study.

Defer cost allocation calculations until the Facilities Study is complete.

Create a platform to obtain prior studies and list of network upgrades with the associated drivers.

Include alternative upgrades considered by transmission owners to demonstrate selected solution is the least cost option.

Eliminate the requirement for interconnection customers to fund network upgrades.

Allow interconnection customers to be reimbursed for all network upgrades after the facility goes in service.

## Suggestion

### Cost Responsibility

Expand PJM planning criteria to incorporate expected generation.

Develop a 20 year study and develop transmission system enhancements based on expanded deployment of solar, storage and wind.

Develop holistic transmission planning criteria to build large transmission solutions to deliver generation from lower voltage systems.

Expand use of the State Agreement Approach.

# Agreements

- Study Agreements
  - Low “dollars at risk” encourage speculative project to remain in the queue
  - High deposits do not keep speculative projects out
  - Note: Some stakeholders believe the current deposits are fair and should not be modified.
- Interim ISA
  - Insufficient scope and payment terms in Interim ISA
  - Interim ISA is overused

- ISA / CSA
  - Burden to manage two separate agreements
  - Administrative burden for the conformance review after agreements have been executed
  - Lack of clarity for actual construction costs and payment timeline
  - Lack of clarify for construction schedules

## Suggestion

### Study agreements

Require milestone payments with each study agreement based on cost estimates in prior study report.

Require proof of readiness with the System Impact Study Agreement and Facilities Study Agreement.

### Interim ISA

Improve the Terms and Conditions to address payment provisions.

Standardize the required level of detail for all scope included in the Interim ISA.

Restrict the ability for the customer to request an Interim ISA.

Define the earliest point in the process to request an Interim ISA.

## Suggestion

### ISA / CSA

Merge ISA and CSA into a single agreement

Perform the conformance review during the agreement drafting phase.

Require a quarterly cost forecast issued with the ISA.

Create steps to true up costs during the process.

Create new schedule in the ISA detailing all milestones for the customer facilities and network upgrade construction.



# Interim Operation



- No clear schedule to request interim deliverability studies.
- No barrier to request interim deliverability study which encourages speculators to request studies without any intent to construct.
- Current procedure does not comply with FERC Order 845.



# Interim Operation Agreement or Manual Changes Not Required

## Suggestion

Publish schedule to request a study and receive results.

## Suggestion

Charge a fee to request an interim deliverability study.

Allow operation of a facility prior to the completion of studies.



# Construction

- Suspension creates uncertainty for later projects in the queue.

Suggestion	Status
Create greater visibility into suspension (date of suspension, cumulative duration, etc)	Efforts in progress to publish additional details to the queue status page on PJM.com

## Suggestion

Eliminate the ability to suspend a project.

Reduce the duration a customer can suspend a project.

# Disputes



- Inability to resolve disputes between interconnection customer and transmission owner over design and construction standards.
- Customers constructing transmission facilities in violation of transmission owner standards or location requirements.

## Suggestion

Grant PJM the authority to resolve disputes between the interconnection customer and transmission owner.

Create ability for transmission owners to force compliance with design and construction standards as well as physically location of transmission facilities.

# Staffing

- Insufficient resources available to process studies.
- PJM project managers must draft study reports and agreements.
- Inadequate response times from the PJM single point of contact.

Suggestion	Status
Set up dedicated team to focus only on drafting agreements.	PJM setting up a pilot between Planning and Legal to shift responsibility of agreement to the PJM attorneys.
Increase use of contractors	PJM expanding use of contractors to support interconnection departments with project manager, case build, and analysis.

## Suggestion

Increase PJM staffing.

Increase use of contractors.

Allow interconnection customers to contact PJM engineers and transmission owner staff directly instead of working through the PJM project manager.

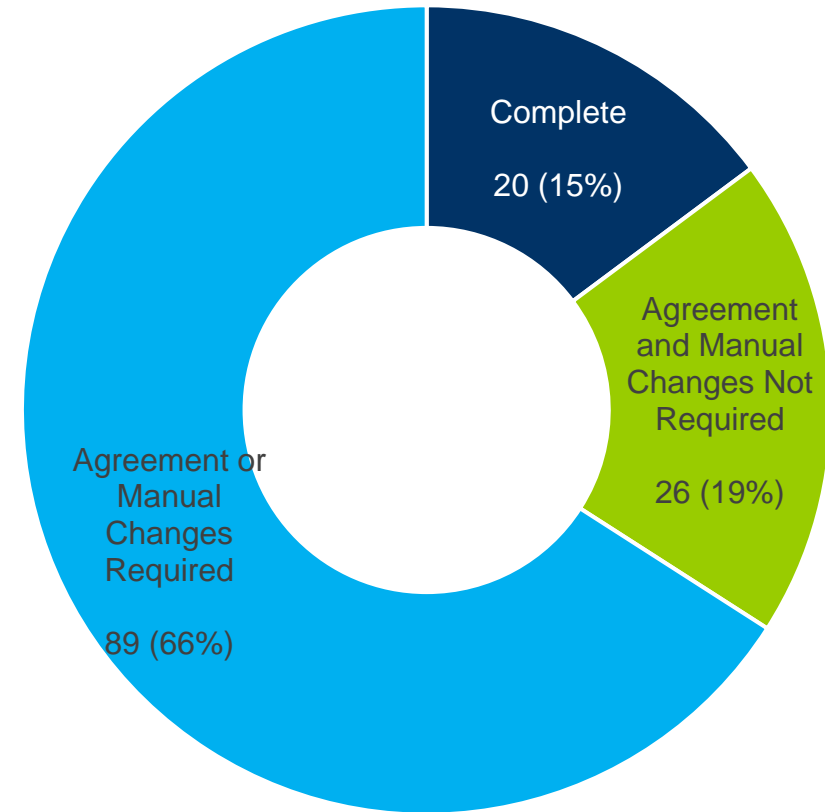
## Suggestion

Increase TO staffing.

# Next Steps



- Some suggestions already incorporated by PJM or in progress
- Many suggestion require stakeholder endorsement
- Some suggestions will require changes in FERC policy
- Some suggestions are in conflict with each other



- Target 2-3 areas that maximize gains for all parties in the process
- PJM suggested focus areas:

Primary Concern	Category for Reform	Focus
Insufficient cost certainty for customers	Cost Responsibility	Focus on opportunities to increase cost certainty.
Extended duration in the study process	Studies	Focus efforts with the Facilities Study phase to reduce overall time projects remain in the queue.
Limited ability to generate before all work is complete	Interim Operation	Provide clear path on how to obtain interim service prior to the completion of interconnection work.

- Polling will gather stakeholder feedback if other areas should be assessed first.
- PJM will use the stakeholder process for Tariff changes of limited scope to address existing or potential compliance issues.

- Status Quo:
  - Transmission Owners estimate costs based on their internal methods.
  - No standard accuracy range between TOs
  - First-to-cause responsible for 100% of the cost
  - Contributors responsible for an allocated portion which is refunded to the first-to-cause

- Considerations
  - Cause causer (Order 2003) versus cost beneficiary (Order 1000)
  - TOs:
    - Reimbursed for actual costs when the generator funds
    - Rate of return available when the TO funds
  - Customers
    - First-to-cause method creates high burden for a single customer
    - Cluster allocation links study schedules for projects within cluster

- Status quo:
  - PJM OATT allows PJM to determine if study is necessary.
  - TOs use this phase to perform preliminary engineering for all required work
  - Interconnection facilities and network upgrade engineering performed at the same time by the same TO staff
- Considerations from FERC pro forma LGIP
  - Requires the Facilities Study to list all engineering that will be required along with estimates. No actual engineering is performed.
  - Allows customers to use contractors to perform Facilities Studies

- Status quo:
  - Customers can request an interim deliverability study at any point in the process
  - No study cost or deposit required
  - No proof of readiness required
- Considerations
  - Risk to the transmission system if connected ahead of transmission upgrades
  - Uncertainty for customers if connecting before studies are complete
  - Delays to commercial operation could jeopardize the viability of the project

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## Interconnection Process



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