

Interconnection Service Capacity Resource vs Energy Resource Education

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Disclaimer: While materials are current at the time of publishing, applicable requirements may change. PJM Governing Documents control.

- An overview of the two types of Interconnection Service in PJM
- Education on the PJM rules and requirements as it relates to the two types of Interconnection Service in PJM

- 1 Background – FERC Order 2003
- 2 Types of Interconnection Service in PJM – Capacity Resource & Energy Resource
- 3 PJM Cycle Process Rules
- 4 Reliability Studies for Capacity Resources & Energy Resources
- 5 Key Takeaways
- 6 References

FERC Order 2003 – defines 2 Interconnection Service products/levels – ERIS & NRIS

Energy Resource Interconnection Service (ERIS):

- Deliver the Generating Facility's output on an "as available" basis
- Studied for basic system reliability – requires reliability studies
- The study consists of steady state powerflow, short circuit, and stability analyses to identify network upgrades to allow the Generating Facility to operate at full output in a safe and reliable manner

Network Resource Interconnection Service (NRIS):

- Allows the Generating Facility to qualify as a designated Network Resource to help ensure aggregate generation can meet and serve native aggregate load to satisfy regional reliability and resource adequacy requirements
- Allows the Generating Facility to contribute to meeting the capacity needs of the Control Area
- Secures deliverability of the Generating Facility with a more comprehensive study by testing that the aggregate of local generation can be delivered to the aggregate of load (i.e. deliverability test)

Types of Interconnection Service in PJM – Comparison

	PJM Capacity Resource	PJM Energy Resource
FERC Equivalent:	NRIS	ERIS
Provides:	Injection rights to PJM that are demonstrated as deliverable to the system to serve the total system load	Injection rights to PJM "as available"
Energy Market Eligible:	Yes	Yes
Energy Market Must Offer:	Yes	No
CIRs:	Yes	No
Capacity Market (RPM) Eligible:	Yes	No
Input to Resource Adequacy (RRS & ELCC) Requirements:	Yes	No

Cycle Process – Interconnection Service Application Details



Application (ASA) Submission	Includes Generation Project Developers seeking to interconnect new or upgrade existing generation on the PJM system	Generation Interconnection Requests for both Capacity Resources and Energy Resources apply to the Cycle Process	Project Developers must elect either Capacity Resource or Energy Resource in the ASA	Capacity Resources must specify the MFO and CIRs requested. Energy Resources must specify the MFO requested. (CIRs=0 for Energy Resource)
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Allowable changes to Interconnection Service and injection rights at decision points:

At DP1

Project Developer may reduce the previously requested New Service Request Maximum Facility Output and/or Capacity Interconnection Rights values, up to 100% of the requested amount at Decision Point I

At DP2

Project Developer may reduce the previously requested New Service Request Maximum Facility Output and/or Capacity Interconnection Rights values up to 10% of the values studied in Phase II at Decision Point II.

At DP3

No changes to project output are allowed after Decision Point II.

Projects in the Cycle Process may be eligible for accelerated treatment if they meet the applicable requirements for accelerated treatment per the PJM OATT and PJM Manual 14H.

The applicable requirements for accelerated treatment **apply to both Capacity Resources and Energy Resources**, as both are required to enter and follow the PJM Cycle Process.

- Acceleration at DP1: Only New Service Requests that have no cost allocation for Network Upgrades and do not require further studies are eligible for acceleration at DP1.
- Acceleration at DP2: Only New Service Requests that have no cost allocation for Network Upgrades and do not require further studies are eligible for acceleration at DP2.

	PJM Capacity Resource	PJM Energy Resource
MFO:	Yes	Yes
CIRs:	Yes	No
Provides:	Injection rights to PJM that are demonstrated as deliverable to the system to serve the total system load	Injection rights to PJM "as available"
Reliability Studies Required:	Yes	Yes
Short Circuit Study:	Yes	Yes
Stability Study:	Yes	Yes
Affected Systems:	Yes	Yes
TO Facilities Study For Physical Interconnection:	Yes	Yes
Powerflow Study:	Generator Deliverability Test Individual Plant Deliverability Test (IPD)	Individual Plant Deliverability Test (IPD)

PJM Planning's reliability criteria and the studies in which Capacity Resources and Energy Resources are subjected to applies to both:

1. **RTEP** – where existing PJM generation is annually tested and verified for deliverability
2. **Interconnection Queue** – where planned PJM generation is tested to ensure deliverability when commercial operation is reached

- Capacity Resources and Energy Resources studied in the Cycle process are evaluated in the same manner as existing Capacity Resources and Energy Resources already operating on the PJM system
- Reliability studies are required for both Capacity Resources and Energy Resources
- Capacity Resources and Energy Resources both have the potential for having required Network Upgrades and being assigned Network Upgrade cost allocation to support their requested Interconnection Service

The scope of the powerflow study is less stringent for Energy Resources

The potential for required Network Upgrades is less for Energy Resources due to the scope and type of the powerflow study when compared to Capacity Resources.

1. **Capacity Resource** – tested with Generator Deliverability Test (and IPD Test)
2. **Energy Resource** – tested with Individual Plant Deliverability Test (IPD Test) only

Generation output levels not examined as part of Generator Deliverability Test are studied using separate Individual Plant Deliverability (IPD Test).

Covers these two specific scenarios to ensure system reliability:

- 1) Test Capacity Resources to their seasonal maximum net energy capability (which is not always done in the Generator Deliverability Test)
- 2) Test Energy Resources since they are not subjected to the Generator Deliverability Test

Ensures that each individual generating plant (both Capacity Resources and Energy Resources) can deliver their seasonal maximum net energy capability to the system under an N-1 AC contingency thermal analysis. Under these generation output levels, the system must be secure for single and common mode contingencies (i.e. common tower failure, bus faults, faults with a stuck breaker).

Examines all three seasonal models:

- Summer peak
- Winter peak
- Light load

Key difference between IPD Test and Generator Deliverability Test:

- **IPD Test** – single generating plant ramped and tested ***individually*** to ensure it can deliver its output under normal and contingency conditions
- **Generator Deliverability Test** (Capacity Resources only) – single generating plant ramped and tested ***along with other generating plants also being ramped as an aggregate*** to ensure the aggregate generation can be delivered through the PJM system to serve the total PJM system load

1	2	3
<u>Interconnection Service</u> • FERC NRIS ⇔ PJM Capacity Resource • FERC ERIS ⇔ PJM Energy Resource	<u>PJM Cycle Process</u> • Developers elect Capacity Resource or Energy Resource with application • Rules and requirements at decision points and for project acceleration apply to both Capacity Resources and Energy Resources	<u>Reliability Studies</u> • Reliability studies are required for both Capacity Resources and Energy Resources • Capacity Resources and Energy Resources both have the potential for having required network upgrades • Potential for required network upgrades is less for Energy Resources due to the less stringent powerflow study (IPD Test) as compared to Capacity Resources

1	FERC Order 2003	
2	PJM RAA, Schedule 10 “Procedures for Establishing Deliverability of Generation Capacity Resources”	
3	PJM OATT	• Part VIII: New Rules Generation Interconnection Procedure • Part IX Subpart A: Form of Application and Studies Agreement (ASA)
4	PJM Manual 14H	• Section 2: Application Phase • Section 4: Phases and Decision Points • Section 9.4: Electing Capacity Resource Status versus Energy Resource Status • Section 9.8: Modification of New Service Requests at Cycle Decision Points
5	PJM Manual 14B	• Attachment C.1.1 & C.1.2: Deliverability Requirements • Attachment C.3: Deliverability of Generation • Attachment C.3, Addendum 2: Individual Plant Deliverability Procedure
6	PJM MRC slides detailing PJM Planning’s Deliverability Test modifications in 2023 (note slides 47, 49, 50)	• Generator Deliverability Test Modifications: Light Load, Summer & Winter
7	Posted FAQ – TC2 Phase 1 Model Posting	• Transition Cycle 2 Phase I Model Posting • Section 3 “GenDeliv Reform Questions” – questions Q3, Q10, Q16 – details on Energy Resources and the IPD Test

Acronym	Term
ERIS	Energy Resource Interconnection Service
NRIS	Network Resource Interconnection Service
CIR	Capacity Interconnection Right
DP1	Decision Point I
DP2	Decision Point II
GIA	Generation Interconnection Agreement
MFO	Maximum Facility Output

Acronym	Term
TO	Transmission Owner
OATT	Open Access Transmission Tariff
ASA	Application and Studies Agreement
ELCC	Effective Load Carrying Capability
RPM	Reliability Pricing Model
RRS	Reserve Requirement Study

[PJM Glossary](#)

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