Interconnection in the Southeast

And Beyond

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Gridtech Connect Southeast
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NC Clean Energy Technology Center

UNC System-chartered public service center
- Administered by NC State

Advance a sustainable energy economy
- Education, demonstration, policy support

Objective research & analysis - No advocacy

Database of State Incentives - dsireusa.org
NC Clean Energy Technology Center

Working Areas

- Clean Transportation
- Industrial Efficiency
- Workforce Development
- Policy & Markets
Resources

DSIRE Insight
- Pending, proposed, and in-progress Power Sector Policy Activity

Quarterly & Annual Reports

Grid Mod, Solar & DER, Decarb, EVs
Resources Reviewed

Utilities Commission Dockets

State Legislatures

Non-docketed activities
- Working groups, Stakeholder meetings
Interconnection

- Adding generation to the Grid
- System(s)?
- Optimal throughput?
- Future rules/Processes?
Interconnection

In the News

MISO: 49 GW has received interconnection approval, but projects face major delays

The nearly two-year delays in building generation and storage come as the Midcontinent Independent System Operator is challenged by looming capacity shortfalls.

Published Sept. 14, 2023
Interconnection

In the News

US grid interconnection backlog jumps 40%, with wait times expected to grow as IRA spurs more renewables

Published April 11, 2023

By Emma Penrod
Interconnection

In the News

Breaking Through the PJM Interconnection Queue Crisis

NRDC analyzes the outlook for new transmission in PJM Interconnection, the largest U.S. grid operator, and the impact of reforms designed to ease the logjam of projects awaiting approval to connect to the grid.

May 18, 2023

By Emma Penrod
Standard Procedure

THE INTERCONNECTION PROCESS

START

COMPLETE APPLICATION

FAST-TRACK SCREENS

FAIL

SUPPLEMENTAL REVIEW SCREENS

FAIL

IMPACT STUDIES

MODEL

MITIGATE

EXPEDITED REVIEW PROCESS (PREFERRED)

SUPPLEMENTAL STUDY PROCESS (BETTER)

APPROVAL

DETAILED STUDY PROCESS (SLOWER, EXPENSIVE, TIME-CONSUMING)

Image: DOE
Interconnection

Southeastern US

- No single market
- Individual Utilities
- MISO in AR, LA, MS,
- PJM in KY, NC, VA, WV
- ERCOT

Map Image: FERC
Interconnection

Southeastern US

- Individual Utilities
  - Various Stages of Process Reform
  - Clusters, Cost allocation
- MISO & PJM
- ERCOT

Map Image: FERC
Interconnection

Southeastern US

- Individual Utilities
- MISO & PJM
  - Cluster Studies
  - Local Utility Rules
- ERCOT

Map Image: FERC
Interconnection

Southeastern US

- Individual Utilities
- MISO & PJM
- ERCOT
  - Energy-Only Market
  - Network Upgrades planned by ERCOT

Map Image: FERC
ERCOT Detour

- Energy-Only Market
  - Real-time, Day-ahead, Ancillary
- Transmission upgrades by ERCOT
  - No "Network Upgrade Costs"
- Prolific Interconnection Pace
  - 2022: 9.2 GW, 2023: 7.9 GW
- Congestion = Curtailment
ERCOT Detour

● December 2023 Report

The Changing Grid – Generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Renewables</th>
<th>Storage</th>
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<tr>
<td>2020</td>
<td>6,035 MW</td>
<td>275 MW</td>
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<td>2021</td>
<td>10,038 MW</td>
<td>1,316 MW</td>
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<td>14,818 MW</td>
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<td>2025</td>
<td>49,213 MW</td>
<td>18,641 MW</td>
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Renewables and storage

2022: 9.2 GW
2023: 7.9 GW
Interconnection

THE INTERCONNECTION PROCESS

- Start
- Complete Application
- Fast-Track Screens
  - Expedited Review Process (Preferred)
- Supplemental Review Screens
  - Supplemental Study Process (Better)
- Impact Studies
  - Detailed Study Process (Slower, Expensive, Time-Consuming)
- Model
- Mitigate
- Approval

Image: DOE
Relevant Considerations

- Location of interconnection
  - Utility, feeder, market

- Size of interconnection
  - Nameplate capacity, capacity factor
Interconnection

Tracks - Increasing in cost, time, complexity

- Small/DER ("Level 1")
- Fast Track - Intermediate ("Level 2")
- Study Track - Large/Constrained ("Level 3" or "Level 4")

Progressive review for each cluster (or project).
Interconnection

Exit possible after each step

Withdrawal reasons:

- Additional study fees
- Timeline extensions
- Network upgrade costs

Image: PV Magazine
FERC 2023 Detour

- Transition from serial to cluster review
- Hosting Capacity Map
- Study timelines, penalties
- Enabling new technologies
- Applies to generators >20 MW
Study Improvements

- Serial -> Cluster Studies
- Cohorts of applicants (not single projects)
- First ready, first served
- Cost Allocations
  - Shared Study Expenses
  - Network Upgrades - Proportional Impact
Cost Allocations

- Shared Study Expenses
  - Potential for economies of study scale

- Network Upgrades - Proportional Impact
  - Project impact = % network upgrade cost
Enabling New Tech.

FERC Order No. 2023

- Modifications do not reset queue position
- **Must** retain nameplate capacity
- Possible addition of storage to renewables
Local Research

- Investigations on Interconnection/Modernization
  - Working Groups - Proposed in GA, LA
  - PUC or Legislature Actions

- Formal Engagement
  - FERC NOPR
  - PUC or Agency Comment Requests
Performance Improvements

(Dis)Incentives for Performance

- FERC 2023: Study deadlines
  - Up to $2,500/day for violation
- Specific Regulation
  - Performance Incentive Mechanism
  - Hosting Capacity Heatmaps
Case Study - PIM

Performance Incentive Mechanism

- Proposed in compliance with PUC order
- PIM proposed to encourage prompt review
  - Refund to applicant for delays (4% per day)
  - Penalty for missing timelines
  - Credits for beating pace
Case Study - HCA

Hosting Capacity Analysis

- Public Heatmap
- Show Congested Areas
- Early Siting Info
Case Study - Virginia

- Small interconnection Commission Ruling
  - Re: Cost allocations of projects 250 kW to 3 MW
  - Network upgrades for 250 kW to 1 MW
    - Temporary approval from Commission
Case Study - Virginia

- Legislation Clarifying Small Interconnection
  - Penalty for exceeding timelines
  - Direction for formal ruling
  - Continued to 2025
Thank you!

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DSIRE Questions
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