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Transmission & Interconnection Reform for Peak Decarbonization in Massachusetts

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Managing Director, Wholesale Markets
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Advanced Energy United

We are the association of businesses united in our mission to achieve 100% clean energy in America.

We provide:

- ✓ **Credible research and analysis** about the advanced energy industry
- ✓ **Knowledge about technologies** and services available to consumers and the power grid
- ✓ **Policies and regulations** that drive the transition to 100% clean energy in the power sector, the built environment, and in transportation.

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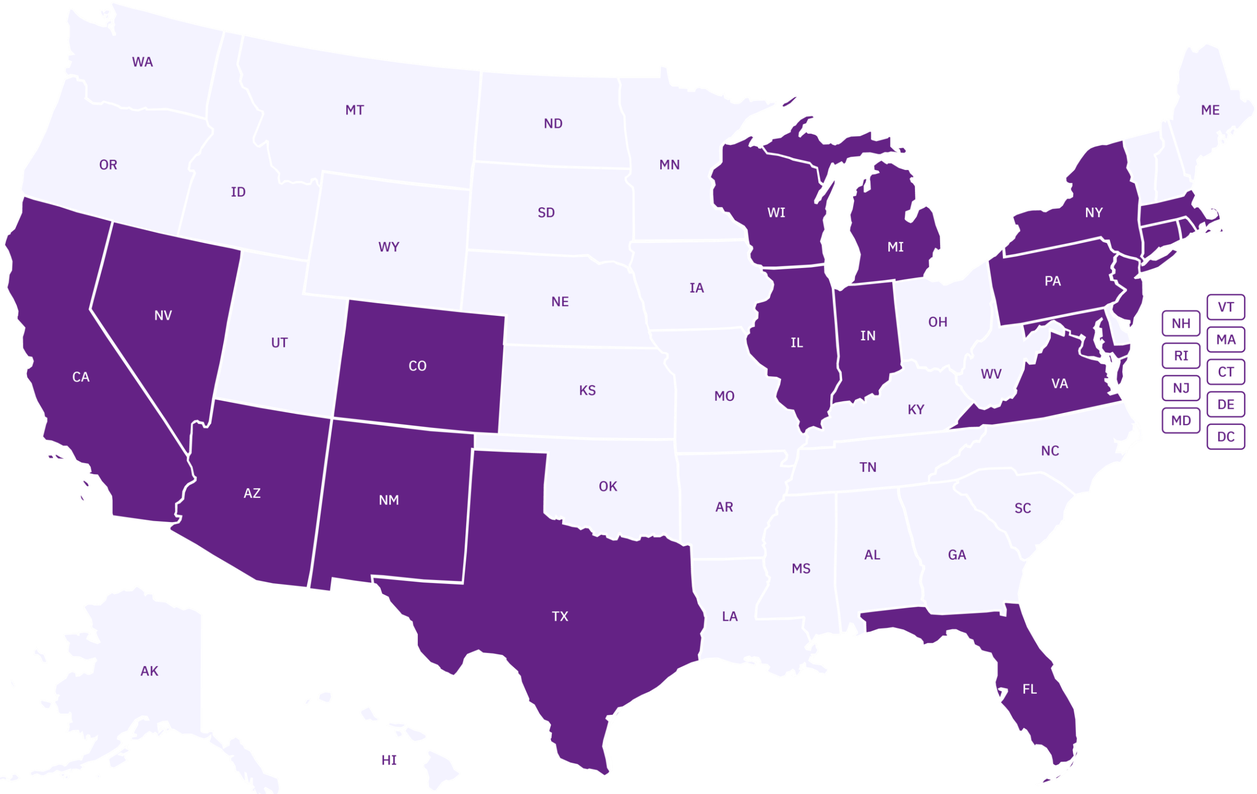
Where We Work

Regulatory, legislative, and gubernatorial engagement in 18+ states.



Energy market advocacy at Federal Energy Regulatory Commission (FERC) and Regional Transmission Organizations (RTOs) / Independent System Operators (ISOs)

Policy engagement with Congress and federal agencies relating to infrastructure investments and manufacturing

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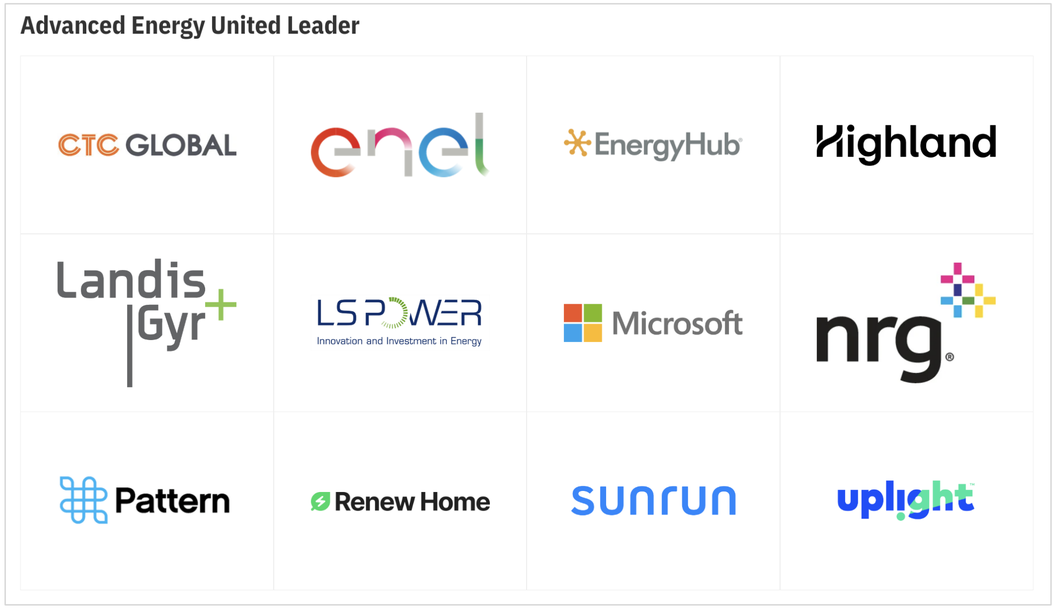
Our Members

100+ business members providing solutions



Our Member Companies:

- Develop renewable energy projects that serve everyone from homes to utilities
- Build, enhance, and strengthen the transmission grid
- Create solutions to manage data and demand making energy use more efficient
- Provide storage solutions to increase reliability
- Support clean energy development through large-scale purchasing commitments
- Build electric vehicles and the charging infrastructure to support them

And so much more!

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How Transmission and Interconnection Reforms Support Peak Decarbonization

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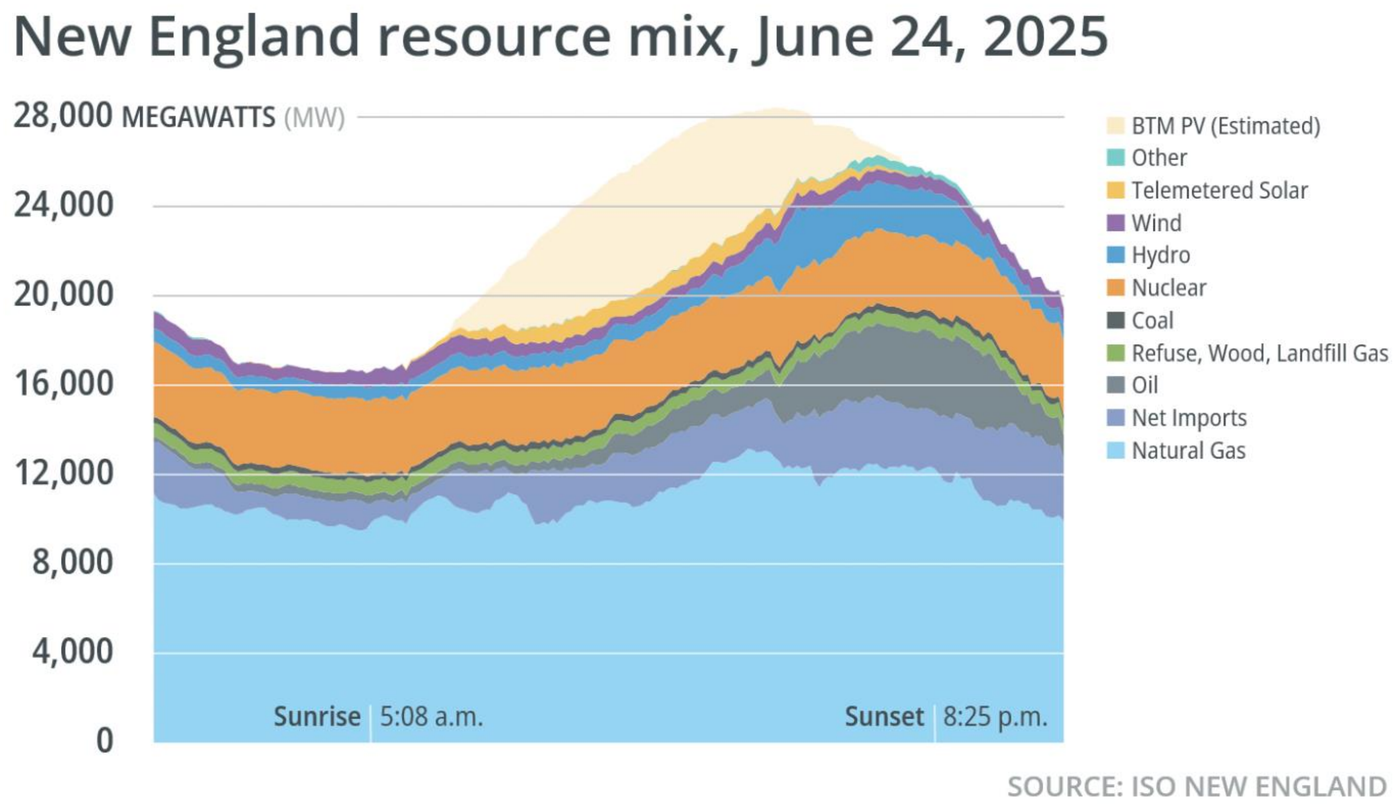
New England's Peak Remains Carbon-Intensive



Carbon-emitting resources supplied 74% of electricity on peak on June 24.

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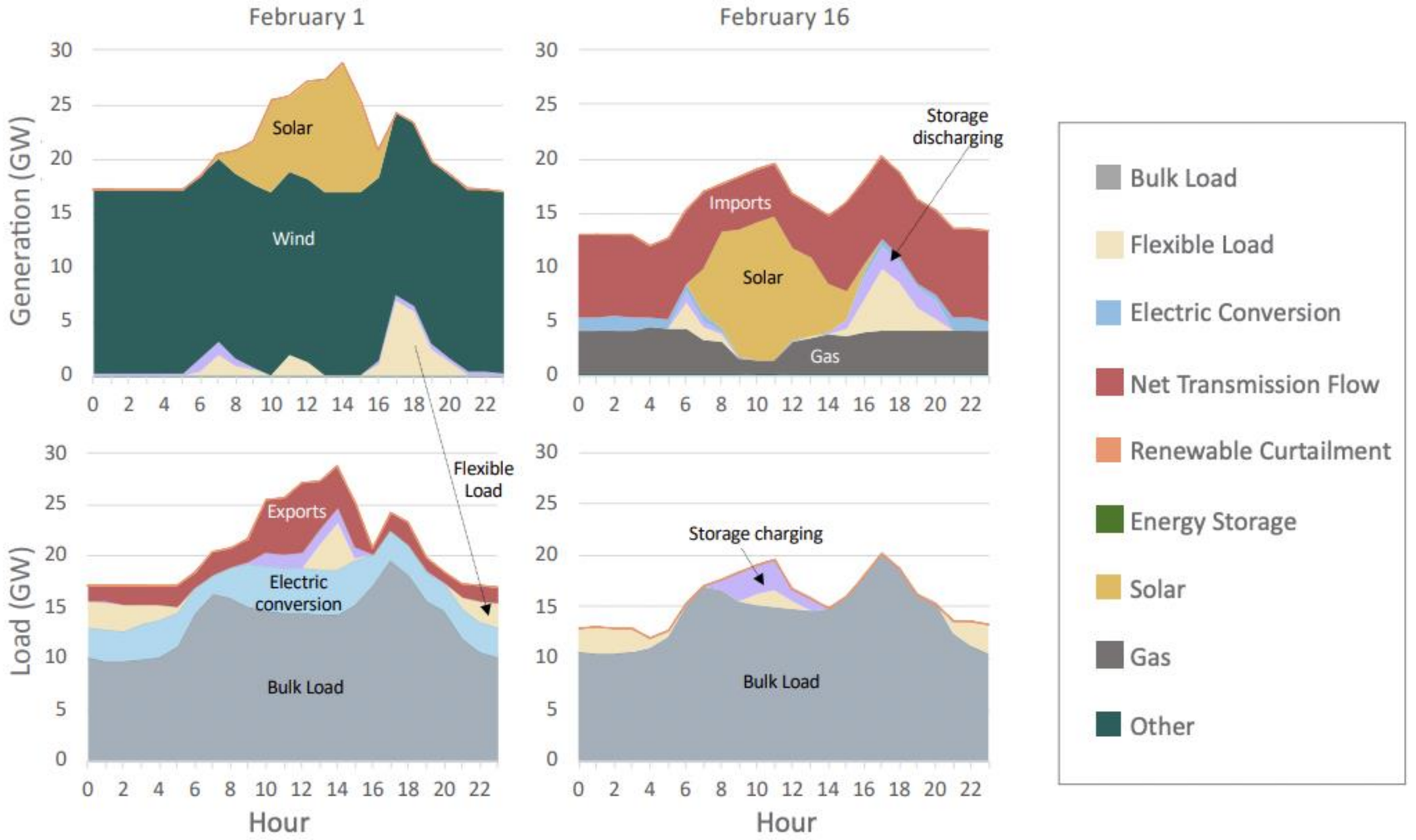
Pathways to Reducing Emissions at Peak

- Decarbonization studies show different pathways to reduce emissions overall and on peak
- Under any scenario, the resource mix delivering a low-carbon grid (including at peak) must be **interconnected** and **deliverable** to load



These figures show a high OSW day (Feb. 1) and low OSW day (Feb. 16) in 2050. Source: MA Energy Pathways Technical Report, https://www.mass.gov/doc/energy-pathways-for-deep-decarbonization-report/download, at 7.

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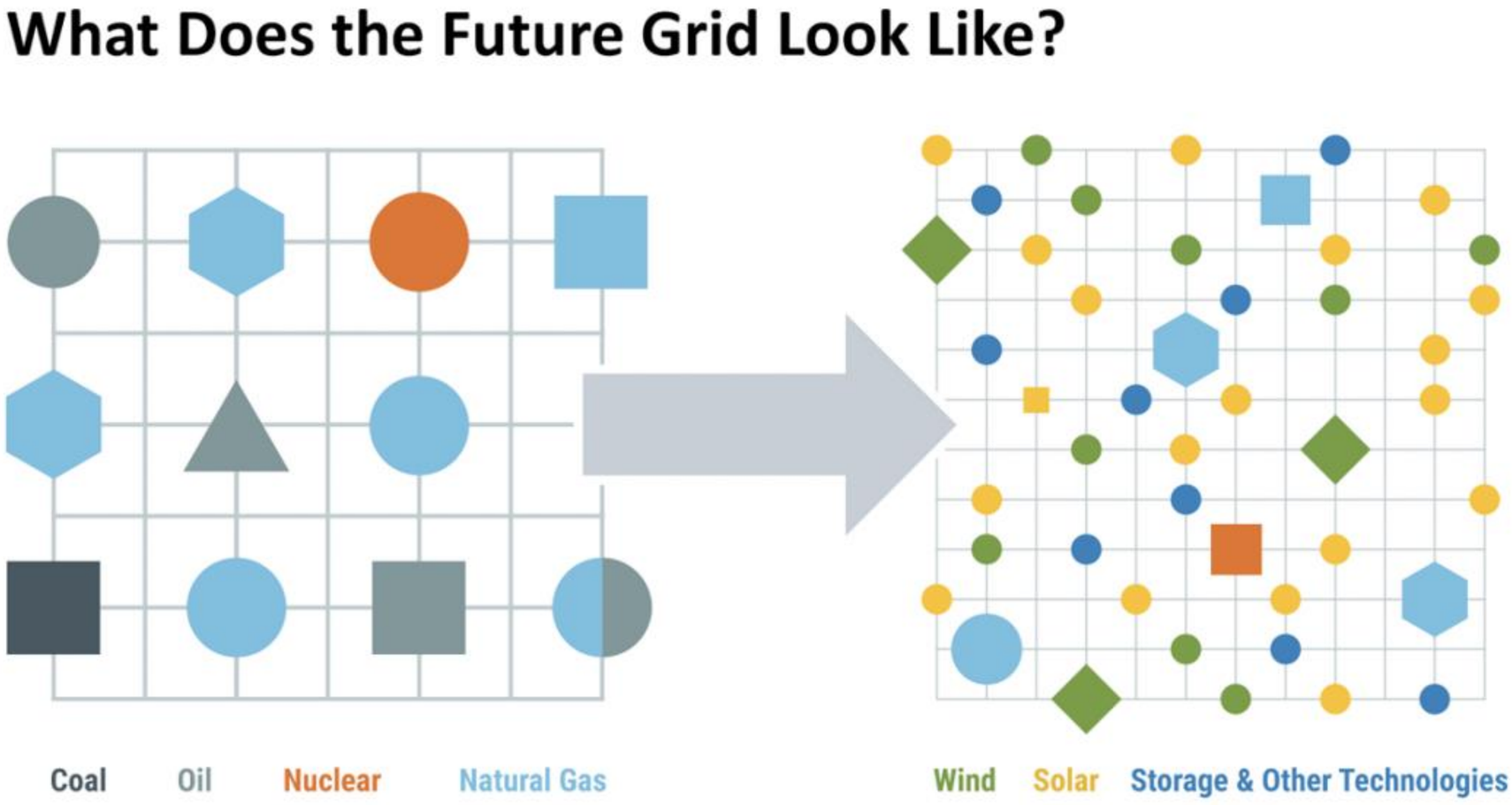
Decarbonizing Requires Rapid Deployment

- MA 2050 Decarbonization Roadmap found that "the carbon intensity of emissions from the electricity system will need to approach zero at the same time as installed generating capacity more than doubles."
- In addition to peak shaving, renewable energy (operating both on and off peak) and storage (short and long-duration) are critical for peak decarbonization, but deployment will need to far outpace historical rates
- This deployment will not happen on time and at least cost without **transmission buildout** and an efficient **generator interconnection process**

Source: ISO-NE EPCET Study: https://www.iso-ne.com/static-assets/documents/100016/2024-epcet-report.pdf, at 10.

Transmission and Interconnection are *Enablers*



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Source: ISO-NE Future Grid Reliability Study: https://www.iso-ne.com/static-assets/documents/100016/2024-epcet-report.pdf, at 10.

Transmission Reforms to Support Peak Decarbonization

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How Transmission Supports a Cleaner Peak

- More efficient, multi-value, forward-looking regional **transmission planning** can:
  - Unlock access to onshore and offshore resources in grid-constrained parts of New England (e.g., onshore wind in Maine)
  - Import Canadian hydro and wind into the region
  - Expand connections to neighboring grids to allow import/export during times of low/high supply
    - ISO-NE's EPCET study finds that RE produces as much as 18% more zero-cost energy than needed to meet the region's annual demand in one 2050 scenario
  - Reduce curtailment of renewable energy, increasing capacity value and revenue streams (relative to peaking units)

New England Transmission Planning Reform Timeline

Major steps taken by **ISO-NE/states** and by **FERC**

- **Oct. 2020:** New England States Vision Statement
- **Feb. 2024:** ISO-NE publishes 2050 Transmission Study
- **May 2024:** **ISO-NE files Long-term Transmission Planning (LTTP) reforms (ER24-1978, approved July 2024)**
- **March 2025:** ISO-NE issues LTTP Request for Proposals
- **May 2025:** Asset Condition Reviewer proposed
- **June 2025:** Northeast States Collaborative on Interregional Transmission issues Request for Information following April 2025 Action Plan

- **May 2020:** NOPR on transmission incentives (RM20-10, no action taken yet)
- **July 2021:** Transmission and Interconnection ANOPR (RM21-17)
- **April 2022:** Transmission planning NOPR (RM21-17)
- **Oct. 2022:** Transmission cost-containment technical conference (AD22-8, no action taken)
- **Dec. 2022:** Interregional Transfer Capability workshop (AD23-3)
- **May 2024:** **Order No. 1920 (RM21-17)**
- **Dec. 2024:** Consumer groups complaint to FERC regarding lack of oversight of locally planned transmission (EL25-44)

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Priorities for Transmission Planning in New England

1. **Follow-through on LTTP RFP:** Project selection by Sept. 2026 (proposals due by Sept. 30, 2025)
    - To increase ties between N and S New England, and unlock generation resources in Maine
2. **Order 1920 compliance:** ISO-NE will file June 14, 2027
    - Stakeholder discussion has not yet kicked off, but states and stakeholders can start considering priorities and how this process dovetails with LTTP
3. **Ensure efficient transmission spending:** Independent oversight of local / asset condition projects
    - Engage in development of Asset Condition Reviewer role, consider expansion toward broader scope, i.e., Independent Transmission Monitor
4. **Interregional transmission planning:** Follow through on RFI seeking interregional projects that will improve grid reliability, support economic growth, and reduce consumer costs; continue collaborative discussions with neighboring regions

Interconnection Reforms to Support Peak Decarbonization

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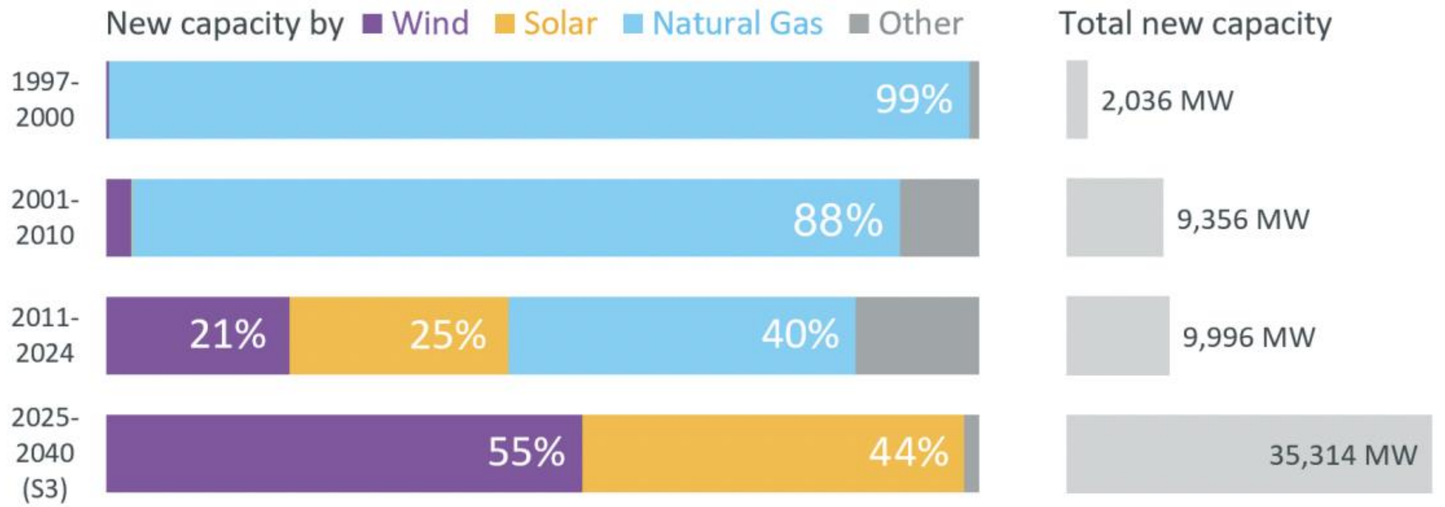
How Interconnection Supports a Cleaner Peak

- Faster, more efficient **generator interconnection** can:
  - Bring online more onshore and offshore wind, solar, and storage resources more quickly
  - Reduce uncertainty and lower costs for new generation and storage
  - Increase completion rates for proposed projects
  - Facilitate entry of new technologies with different operating parameters (e.g., long-duration energy storage)



Source: ISO-NE Future Grid Reliability Study: https://www.iso-ne.com/static-assets/documents/100016/2024-epcet-report.pdf, at 8.

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Interconnection Challenges: Cause & Effect

- Lack of available interconnection capacity (“headroom”)
- Lack of reliable upfront information about cost and time to connect
- Overly conservative identification of necessary network upgrades
- Resource constraints (staffing and tools to complete studies, supply chain shortages)

Oversubscribed queues

Slow studies, unrealistic results

Withdrawals and restudies

Projects come online more slowly and at higher cost

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ISO-NE Generator Interconnection Reform Timeline

Steps taken by **ISO-NE/states** and by **FERC***

- **June 2022:** FERC Interconnection NOPR (RM22-14)
- **July 2023:** FERC issues Order No. 2023
- **May 2024:** ISO-NE files its compliance with Order No. 2023
  - ISO-NE's transitional cluster eligibility and timing was contingent on receiving a FERC Order by Aug. 2024
- **Sept. 2024:** FERC holds 2-day workshop to evaluate reforms beyond Order No. 2023 (AD24-9)
- **April 2025:** FERC accepts ISO-NE's filing, subject to further compliance (filed by ISO June 2025)
- **May 2025:** ISO-NE filed to adjust transition timing
  - Transitional CNR group study pushed from 2024 to 2025, and moved back the date for eligibility for the Transitional Cluster Study, which will occur from late 2025 through mid-2026
- **2026 (planned):** Full implementation of new first-ready, first-served cluster process

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*These refer specifically to the *FERC-jurisdictional generator interconnection process* administered by ISO-NE. State-jurisdictional interconnection of resources to the distribution system is also of critical importance to peak decarbonization, and the MA DPU is working on a long-term system planning program to anticipate DER interconnection needs.

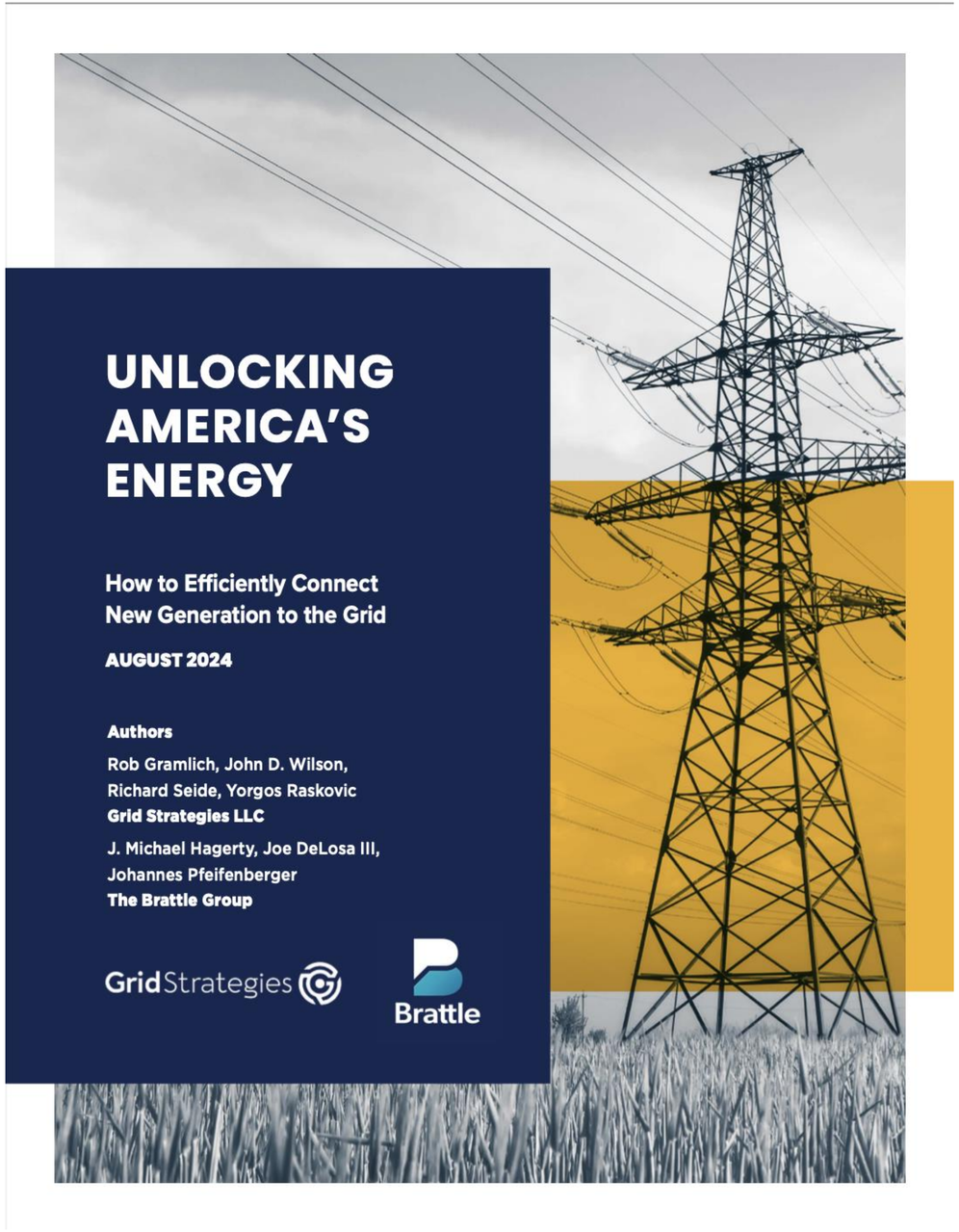
FERC Order No. 2023: What it Did and Didn't Tackle

- **Order No. 2023** includes key reforms:
  - Improves efficiency by moving all regions to a cluster process
  - Disciplines queue entry and discourages parking projects in the queue
  - Incentivizes greater schedule certainty via deadlines and penalties
  - Adds flexibility and requires consideration of GETs to reduce upgrades for some projects
- These changes will *reduce* but not *resolve* the **root causes** of interconnection challenges, *improving* but not *optimizing* the **outcomes** of the interconnection process
- **Its scope did not address** important reforms that are critical to achieving an efficient interconnection process, such as:
  - Functional transmission planning that accounts for new generation (Order No. 1920 should help)
  - Increasing staffing and ensuring adoption of best available software/automation tools
  - Aligning study parameters to avoid identification of unnecessary upgrades
  - Improving / standardizing surplus, generator replacement, and energy resource interconnection service
  - Addressing delays and cost overruns after the interconnection agreement is signed

Unlocking America's Energy

Brattle Group / Grid Strategies Paper

- The report asks and answers:
  - What is an ideal, efficient interconnection process?
  - If Order 2023 won't deliver that process, what additional opportunities exist to increase efficiency?
- Available to download at: https://blog.advancedenergyunited.org/reports/unlocking-americas-energy



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Solutions to Improve Efficiency

Issue/Proposal*
Immediate "Band-aid" proposals
Scrutinize (and where possible, avoid) queue prioritization proposals (e.g., queue caps, prioritization)
Immediate Efficiencies
Rapidly implement FERC Order 2023
Encourage adoption of automation and advanced computing tools
Address Post-GIA delays and cost increases
Enhance Surplus Service and Generator Replacement
Near-term Efficiencies
Restore Energy Resource Interconnection Service viability (energy-only interconnection)
Adopt cost envelopes for certain interconnection construction costs
Increase transparency about grid capacity and study methodologies
Consider establishing Independent Interconnection Studies Monitors where evidence demonstrates their need
Long-term Efficiencies
Ensure proactive transmission planning
Consider an "entry fee" approach

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**Chart adapted from Clean Energy Associations' comments in FERC Docket No. AD24-9*

Lessons from Other Regions

- **Automation / AI** can be integrated into various aspects of the process (application, communication, model development, results, etc.) to speed things up and improve accuracy.
    - **MISO** has done work with PearlStreet to automate its cluster process; **SPP** has worked with PearlStreet, GridUnity, Hitachi; **PJM** recently announced a partnership with Google/Tapestry
    - **ISO-NE** has not yet taken public action on automation/AI
- **Surplus Interconnection Service** allows new resources to quickly connect to the grid at the site of an existing resource that is not always using its full interconnection capacity.
    - **MISO's** flexible SIS option has seen 3.6 GW of requests (mostly storage added to wind / solar) since 2021; **PJM** has recently reformed its SIS process to allow more resources to take advantage
    - **ISO-NE** has a pending stakeholder request to look at SIS reform as part of 2026 workplan

Lessons from Other Regions (cont'd)

- Some regions have pursued **reforms beyond the scope of FERC Order No. 2023**
    - **SPP's** "Consolidated Planning Process" will integrate transmission and interconnection planning, and bring additional certainty for projects earlier in the process; **ERCOT** employs a "connect and manage" approach to quickly connect new resources; **CAISO** uses Remedial Action Schemes to minimize network upgrades
    - **ISO-NE** has not yet taken on further reforms outside the scope of Order 2023
- **Fast track processes that discriminate among resources** provide expedited access to the grid for certain projects, but risk disrupting other projects in development and dampening future investment
    - **PJM** is implementing a "Reliability Resource Initiative" that allows 51 projects to enter the queue ahead of other projects; **MISO** and **SPP** have both proposed "Expedited" study processes for select projects
    - **ISO-NE** has not explored any of these quick "fixes" and should continue to avoid doing so

Conclusions

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Conclusions

- A more robust, well-planned **transmission** grid and a more efficient, predictable, cost-effective generator **interconnection** process are *foundational* to rapid entry of new clean generation and storage resources to enable peak decarbonization
- Transmission and interconnection are highly related – better transmission planning that takes new generation into account will lead to a faster, more cost-effective interconnection process
- Transmission and interconnection must be considered alongside other peak decarbonization strategies: transmission upgrades will be minimized by pathways that reduce peak demand (e.g., EE, DR, and DERs)
- The region has made significant progress (on its own and in response to FERC) on both issues—but more work is needed given the pace and scale of change in order to maintain reliability and affordability

Thank you.

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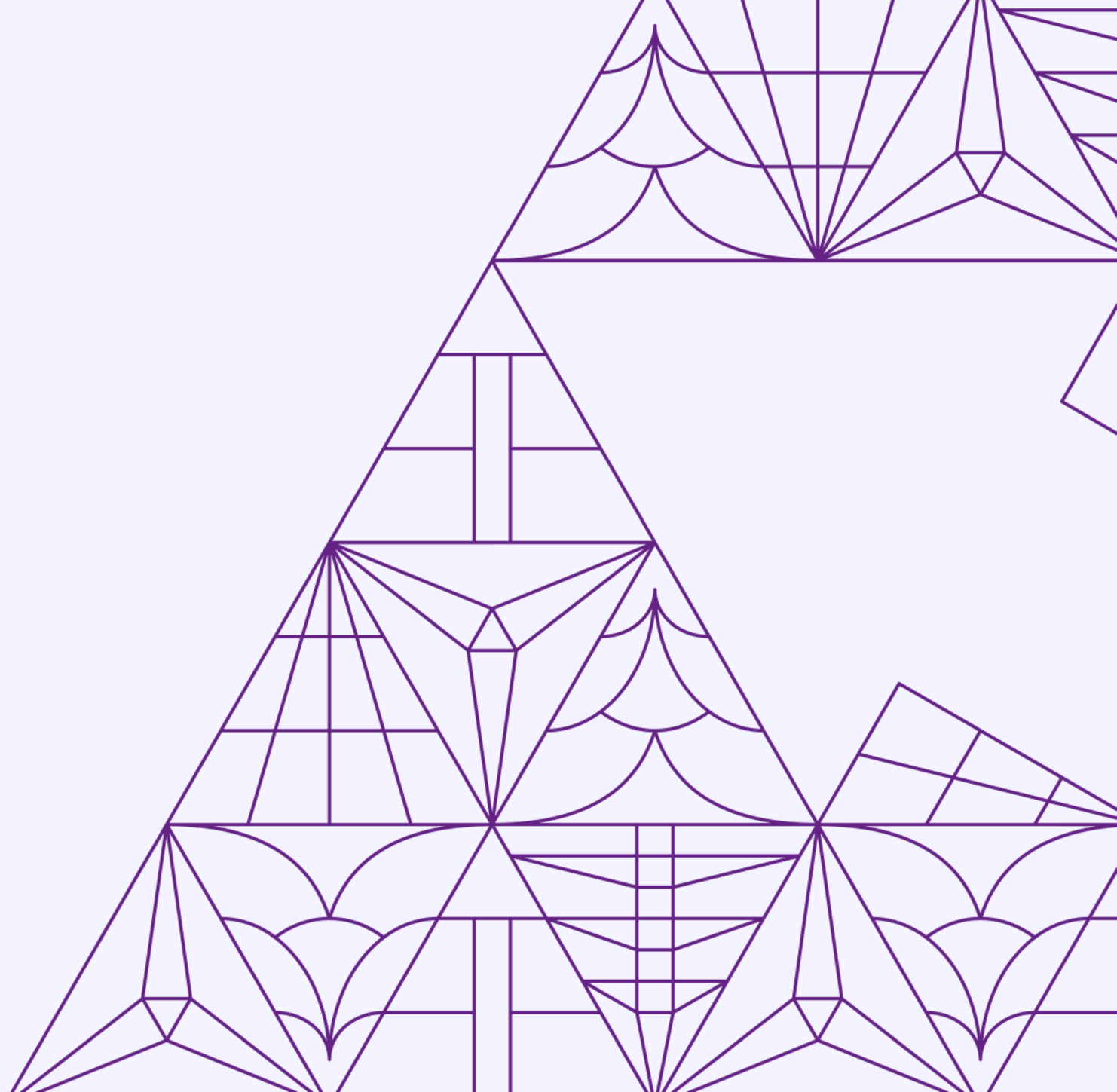

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Transmission: Advanced Energy United Resources

- Reports / Explainers
  - Checklist for States (Order No. 1920 Compliance)
  - Improving Transmission Planning Outcomes in New England
  - Order 1920 Resource Hub
- Transmission Possible
  - Resource Hub
  - New England Region
  - Massachusetts

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FERC Order 1920: How a Need Becomes a Line

20-yr scenario planning IDs regional transmission needs

→ Project(s) proposed to meet needs

Put forward by (non)incumbent transmission developers or identified by transmission provider; must consider ATTs

→ Benefits and costs measured

Option for voluntary funding of projects not selected regionally

Project(s) selected according to evaluation criteria

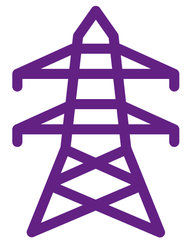
By year 3

→ Costs allocated regionally

Option for states to develop alternative cost allocation, otherwise ex ante approach applies

→ Siting & Permitting

Not addressed by O.1920

→ 

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Interconnection: Advanced Energy United Resources

- Comments
  - Post-Workshop Comments in AD24-9
- Reports
  - Unlocking America's Energy (see also: blog post)
  - Interconnection Scorecard and regional fact sheets (see also: blog post)
  - Interconnection impacts report and state fact sheets (see also: blog post)
  - ISO-NE Interconnection reforms paper
- Explainers
  - Order 2023 summary
  - Interconnection Process Explainer

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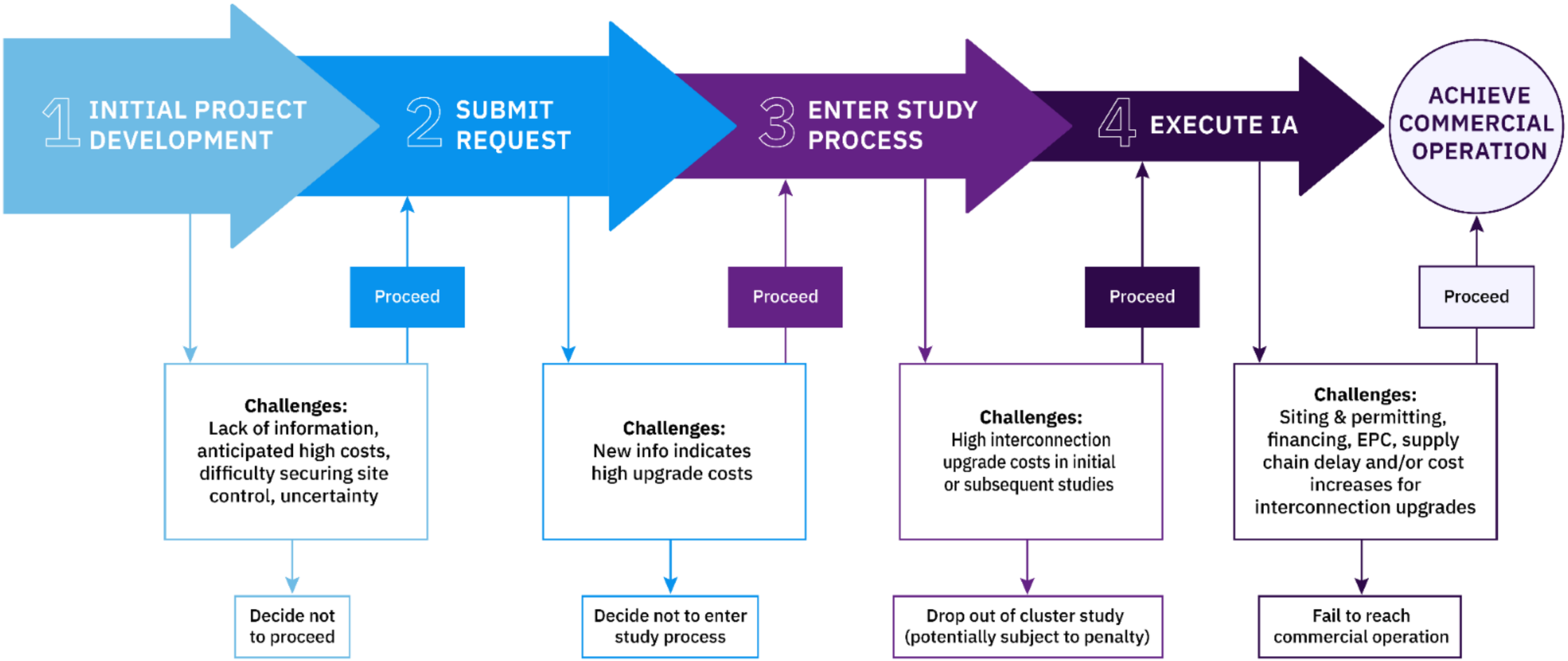
Major interconnection steps and challenges



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Currently: Imperfect Interconnection Process

CURRENT PROCESS (ORDER NO. 2023-COMPLIANT)

Level of risk for interconnection customers does not align with degree of cost and schedule certainty

Pre-Interconnection	Interconnection Application	Interconnection Studies & Interconnection Agreement	Network Upgrade Construction	Commercial Operation
Lack of actionable information about transmission system headroom due to uncertain costs, study delays, and construction backlog	Projects pay to enter queue but receive little cost or schedule certainty Limited information, not updated or reliable Managing entries with queue caps may not prioritize "most ready" projects	High queue volumes lead to ambiguous results that delay withdrawals Studies progress slowly, restudies common Studies identify deep network upgrades Costs and timelines uncertain	Cost increases and delays outside of developers' control with limited visibility Insufficient proactive solutions to supply chain bottlenecks	Consumer costs increased due to process uncertainty and delays Potential for reliability to be threatened due to lack of sufficient new resources

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End Goal: An Efficient Interconnection Process

EFFICIENT INTERCONNECTION PROCESS

Level of risk for interconnection customers corresponds to degree of cost and schedule certainty

Pre-Interconnection

Proactive planning to ensure transmission grid can accommodate known amount of new generation at a known cost

Existing and planned available headroom identified based on recent planning and interconnection studies

Interconnection Application

High fee to enter based on cost to increase planned interconnection capacity, in exchange for cost and schedule certainty

Transparent, timely, and actionable upfront information guides applications

Interconnection Studies & Interconnection Agreement

Most projects move through fast-track processes, do not encounter surprise costs or delays and fewer withdraw

Competition for available headroom resolved through "most ready" scoring

Study results are fast, predictable, and replicable due to limited scope (focused on necessary upgrades for level of service requested), expanded use of cost-effective non-wire solutions, and deployment of automation

Network Upgrade Construction

Transmission providers meet construction deadlines and budgets

Interconnection customers have visibility and recourse in the case of delays or cost increases outside their control

Commercial Operation

Generators efficiently come online as needed to deliver cost-effective, reliable power to consumers

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