



RELIABILITY FIRST

PUBLIC

Agenda

Board of Directors • Risk and Compliance Committee

April 29, 2026 • 12:30 PM – 3:00 PM (ET)

ReliabilityFirst Corporation

3 Summit Park Drive • Cleveland, OH 44131

Room: 5th Floor, Suite 500

Attire: Business Casual

Closed Agenda – Telsa, 5th Floor

- 1. Confidential Compliance and Enforcement Matters** 12:30 pm

Presenter: Kristen Senk, Deputy General Counsel and Director, Legal and Enforcement, Matt Thomas, Director, Compliance and Monitoring, and Tom Scanlon, Senior Managing Counsel, Enforcement

Description: Ms. Senk, Mr. Thomas, and Mr. Scanlon will present confidential matters and an overview of the confidential documents.

Reference: (a) Confidential Enforcement Documents
(b) Summary of 2026 Regulatory Programs Oversight Plan NERC
(c) 2026 Regulatory Programs Oversight Plan NERC
(d) 2025 Oversight Summary
(e) 2025 NERC Findings Verification Program Report
(f) 2025 Oversight of Align and Secure Evidence Locker

Action: Information and Discussion
- 2. High Risk Readiness Initiative** 12:50 pm

Presenter: Diane Holder, VP Engineering & Strategic Engagement Ms.

Description: Holder will provide an update on the high-risk readiness initiative relating to current activities and consideration of additional actions given the current risk environment.

Reference: Presentation

Action: Information and Discussion
- 3. Risk and Data Initiative** 1:05 pm

Presenter: Atif Usman, Director, Analytics and Risk, and Jeff Craigo, SVP Operations and Risk

Description: Mr. Usman and Mr. Craigo will provide an update on the risk and data initiative relating to operationalizing risk identification, monitoring, and mitigation efforts.

Reference: Presentation

Action: Information and Discussion

4. **Adjourn** 1:25 pm

Open Agenda

5. **Call to Order and Appoint Secretary to Record Minutes** 1:30 pm
Presenter: Ken Seiler, Chair
6. **Antitrust Statement** 1:20 pm
Presenter: Ken Seiler, Chair
7. **Consent Items** 1:25 pm
Presenter: Ken Seiler, Chair
Reference: a) [Draft Minutes for the December 2, 2025 Risk and Compliance Committee Meeting](#)
b) [Enforcement Data \(Reference Materials\)](#)
c) [Registration Update](#)
Action: **Approve Consent Items**
8. **Keynote Speaker** 1:30 pm
Presenter: Jerry James, President of Eastern Energy Storage and Artex Oil Company
Description: Mr. James will discuss some of the key risks facing natural gas/ electric coordination, including natural gas supply and transportation risks (including storage) and electric/gas harmonization.
Reference: a) [Bio](#)
b) [Presentation](#)
Action: Information and Discussion
9. **Large Load Working Group Update** 2:00 pm
Presenter: Matt Veith, Managing Director Transmission System Operations Engineering, American Electric Power, and Former Chair, Large Load Task Force
Description: Mr. Veith will provide an overview of the NERC Large Load Working Group's activities, including work to identify unique characteristics and risks associated with emerging large loads, gaps in existing practices and reliability risks, and potential best practices to address these risks.
Reference: Presentation
Action: Information and Discussion
10. **2025-2026 RRA** 2:30 pm
Presenter: Johnny Gest, Manager Engineering & System Performance
Description: Mr. Gest will lead a discussion regarding the ReliabilityFirst Regional Risk Assessment (RF RRA), including an overview of the development process involving technical committees, and a discussion of how ReliabilityFirst plans to monitor and address some of the top risks identified in the RF RRA.
Reference: [Presentation](#)
Action: Information and Discussion

11. **Next Meeting** 2:55 pm
• August 26, 2026 • RF Offices
12. **Adjourn** 3:00 pm

Roster • Risk and Compliance Committee

Ken Seiler, **Chair** • Independent (2026)
Melika Carroll, **Vice Chair** • Independent (2027)
Joanna Burkey • Lead Independent (2028)
Dr. Renuka Chatterjee • MISO (RTO • 2027)
Lesley Evancho • Independent (2028)
Craig Grooms • Buckeye Power (S-LSE • 2026)
Mark Mroczynski • FirstEnergy (T • 2027)

Confidential Enforcement Documents

Draft Minutes for the December 2, 2025 Risk and Compliance Committee Meeting



DRAFT - Minutes

Board of Directors • Risk and Compliance Committee

December 3, 2025

Washington, DC

Closed Session

Risk and Data Initiative Update – Atif Usman, ReliabilityFirst's (RF) Director, Analytics and Risk, and Jeff Craigo, RF's SVP Operations and Risk, provided an overview of the risk and data initiative. Mr. Usman noted that the initiative will establish a more proactive approach to risk identification, monitoring, and mitigation efforts. He discussed a three-year roadmap for the initiative, as well as potential uses for AI in the new process. Craig Grooms asked what information will be examined at the registered entity level, and Mr. Craigo discussed the data streams for the new approach. Chair Ken Seiler shared that he has heard discussion on this topic at the NERC level and noted its importance. He requested that the Committee receive periodic updates on this initiative as it continues to move forward.

Confidential Compliance & Enforcement Matters – Kristen Senk, Deputy General Counsel and Director of Legal & Enforcement, Matt Thomas, RF's Director of Compliance Monitoring, and Tom Scanlon, RF's Senior Managing Counsel, Enforcement presented on confidential matters.

2025 FERC and NERC Oversight Activities – Matt Thomas provided an overview and led a discussion on 2025 FERC and NERC oversight activities and findings.

Adjourn – Chair Ken Seiler adjourned the Closed Committee session at 1:25 pm (ET).

Open Session

Call to Order – Chair Ken Seiler called to order a duly noticed open meeting of the Risk and Compliance Committee (Committee) on December 3, 2025, at 1:32 pm (ET). A quorum was present, consisting of the following members of the Committee: Ken Seiler, Chair; Joanna Burkey; Melika Carroll; Craig Grooms; and Mark Mroczynski. A list of others present during the Committee meeting is set forth in Attachment A.

Appoint Secretary to Record Minutes – Chair Seiler designated Niki Schaefer, RF's Vice President and General Counsel, as the secretary to record the meeting minutes.

Antitrust Statement – Chair Seiler advised all present that this meeting is subject to, and all attendees must adhere to, RF’s Antitrust Compliance Guidelines.

Approve Consent Items – Chair Seiler introduced the following consent agenda items for approval:

- a) Draft Minutes for the August 27, 2025 Risk and Compliance Committee Meeting
- b) Enforcement Data (Reference Materials)
- c) Registration Update (Reference Materials)
- d) Stakeholder and Technical Committee Update (Reference Materials)

Upon a motion duly made and seconded, the Committee approved the consent agenda items.

Keynote Speaker – Mike Benn, Director of Energy Procurement at STACK Infrastructure (STACK), discussed trends and challenges relating to increased demand for data centers and potential opportunities for collaboration. He shared information about STACK, including that it operates 44 data centers with more under development. Mr. Benn then discussed the rapid pace of growth for AI and data centers. He shared that STACK’s power supply priorities include reliability, a just and reasonable rate design, sustainability, and availability of capacity for speed to market.

Mr. Benn discussed AI training factories across the country that are seeking gigawatt-scale campuses. He then explained how although long term data center demand is rising, the data center load profile is generally flat on a 24-hour basis. However, an AI training load may have a unique load profile with large sub-second fluctuations. He shared that one idea in the works to address reliability challenges with these fluctuations is to have a natural gas powerplant with batteries acting as a buffer. Discussion and questions followed on upcoming data center projects and challenges associated with large load.

Guest Speaker – Sunny Wescott, Chief Meteorologist at Federal Emergency Response and Operations Support, provided a briefing on the latest trends in extreme weather and their effects on energy systems. She began by discussing how rising temperatures result in more extreme weather, including more precipitation. Ms. Wescott then discussed notable weather and climate events in 2025, including extreme heat, lightning strikes causing 60 data centers in Virginia to drop off the grid, tornadoes, fire, hail, wind, tropical storms, and flash flooding. She also discussed economic impacts related to these events. She highlighted how extreme cold affects transmission and distribution lines, as well as how extreme heat can degrade critical infrastructure.

Ms. Wescott reported that between 2000 and 2023, 80% of reported major outages in the U.S. were due to weather-related events, and that the average annual number of weather-related power outages increased by roughly 78% during 2011-2021, compared to 2000-2010. She concluded by stating that weather events are rising to levels of intensity that have not been planned for and that infrastructure was not built for.

Standards Update – Mallory Carlone, RF’s Manager of Operations and Planning, provided an update on standards initiatives. She discussed the NERC 2025-2027 Standards Development Plan, which emphasizes cybersecurity, extreme weather resilience, and integration of renewable resources. Ms. Carlone then highlighted high priority standards projects and inverter-based resources related standards projects.

She explained that each standards project has an RF staff member assigned to it, and that RF is involved in the standards ballot process. Ms. Carlone shared that it has been proposed to remove Regions from formal standards voting in the future, which RF supports as long as RF is still involved in the standards process. She highlighted new Standards for 2026, including TPL-008-1 (Transmission System Planning Performance Requirements for Extreme Temperature Events).

Charter Review and Evaluation of Committee’s Performance– Matt Thomas, RF’s Director of Compliance Monitoring presented the Committee Charter and led an evaluation of the Committee’s 2025 activities. The Committee confirmed during the evaluation that it met all obligations within the Committee Charter. Upon a motion duly made and seconded, the Committee accepted the Summary of Performance of Specific Duties for 2025.

Next Meeting – Chair Seiler noted that the next Committee meeting will occur on April 29, 2026, at the RF offices in Cleveland, Ohio.

Adjourn - Chair Seiler adjourned the Committee meeting at 2:54 pm (ET).

As approved on this 29th day of April 2026 by the
Compliance Committee,

Niki Schaefer
*Vice President General Counsel & Corporate
Secretary*

Attachment A

Others Present During the Risk and Compliance Committee Meeting

Steve Ambrose • DTE
Steve Belle • Dominion Energy
Mike Benn • STACK America
Stacey Burbure • AEP
Mallory Carlone • ReliabilityFirst
Jeff Craig • ReliabilityFirst
Craig Creamean • Exelon
Michelle Cross • ReliabilityFirst
Michael DeViscio • PJM
Beth Dowdell • ReliabilityFirst
Chelsey Eppich • ReliabilityFirst
Tim Gallagher • ReliabilityFirst
Diane Holder • ReliabilityFirst
Christie Klein • ReliabilityFirst
Summer Moses • AEP
Aubrey Patterson • AEP
Marcus Noel • ReliabilityFirst
Nelson Peeler • Duke Energy
William Pezalla • Old Dominion Energy
Tom Scanlon • ReliabilityFirst
Niki Schaefer • ReliabilityFirst
Kristen Senk • ReliabilityFirst
Andrea Shepherd • AEP
Robert Taylor • Invenergy
Brian Thiry • ReliabilityFirst
Matt Thomas • ReliabilityFirst
Jody Tortora • ReliabilityFirst
Joe Trentacosta • SMECO
Jim Uhrin • ReliabilityFirst
Atif Usman • ReliabilityFirst
Hunter Walter • Foxguard
Becky Webb • Exelon
Sunny Wescot • Department of Homeland Security

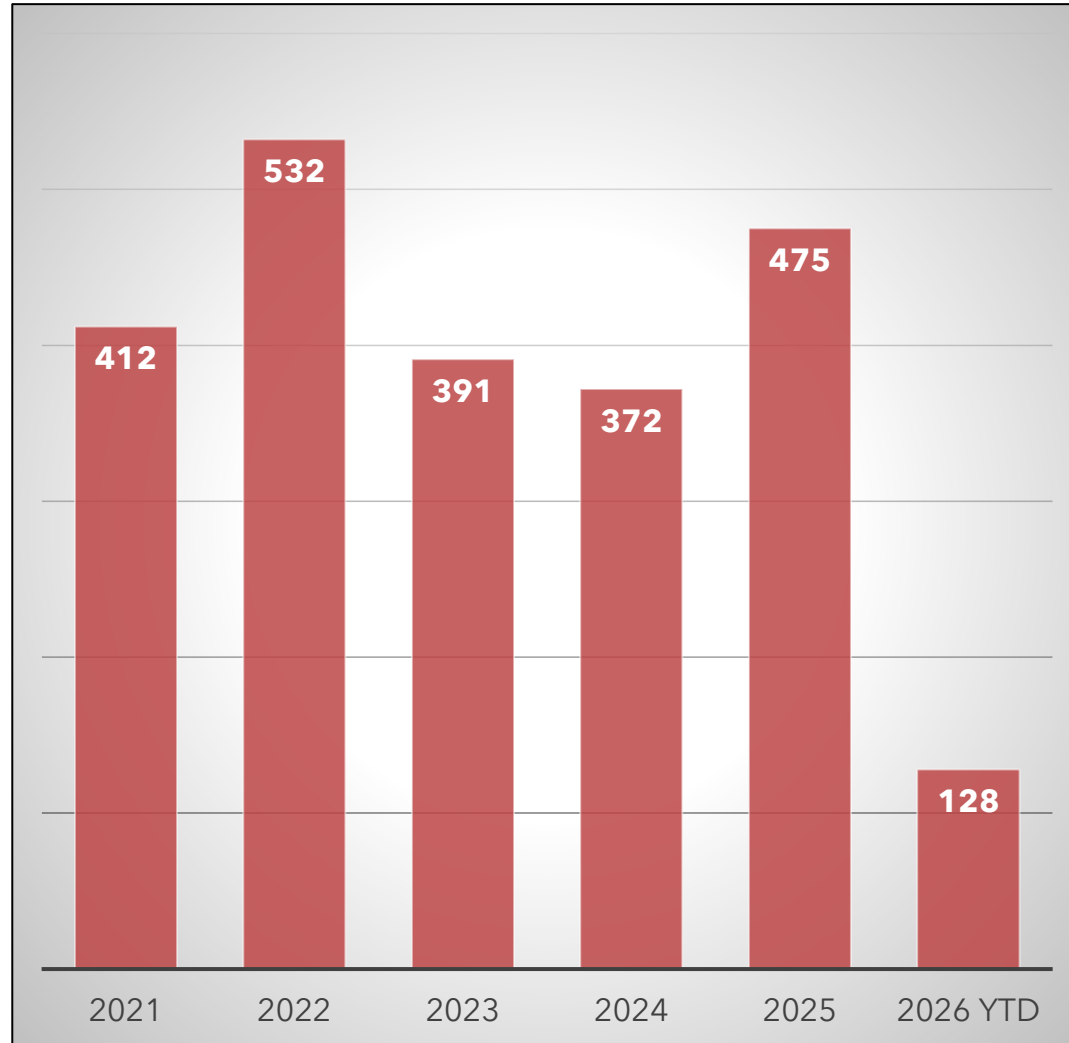
Enforcement Data (Reference Materials)

SUMMARY – ENFORCEMENT DATA

The following slides include some key enforcement metrics that ReliabilityFirst tracks.

The data shows that violation intake remains high. At the current pace, ReliabilityFirst is on track to receive approximately 470 violations in 2026. A significant majority of violations were self-reported or self-logged as opposed to identified through a compliance monitoring engagement. Regarding violations processed (i.e., filed with NERC) between January 1, 2026, and April 9, 2026, most were lower risk violations. The team expects to process approximately 500 violations by the end of 2026. There is a following slide summarizing ReliabilityFirst's violation inventory—most of the cases are considered relatively new, with 88% identified between 2024 and 2026, 10% identified in 2023, and 2% identified in 2022.

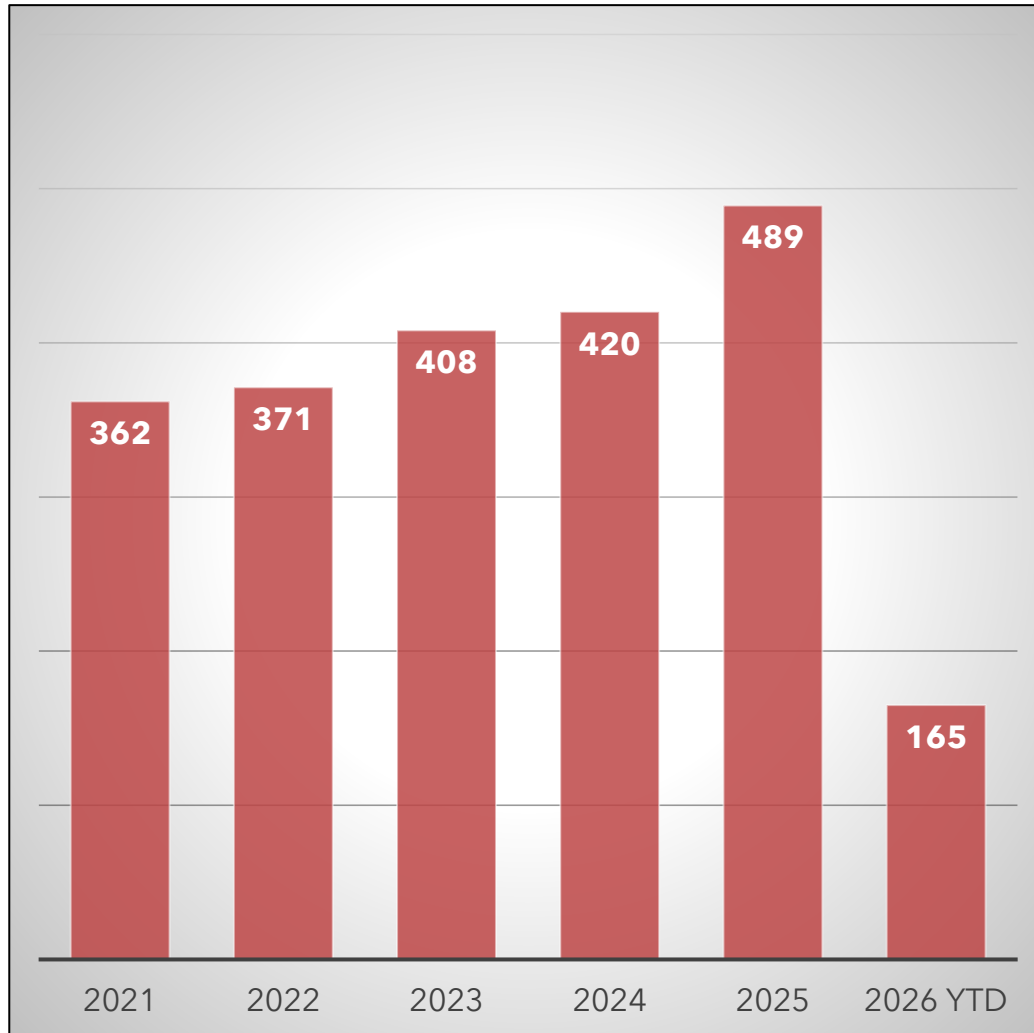
RF ANNUAL VIOLATION INTAKE



2026 Commentary:

- Year-to-date as of 04/10/2026; and
- Majority self-reported/self-logged (~83%).

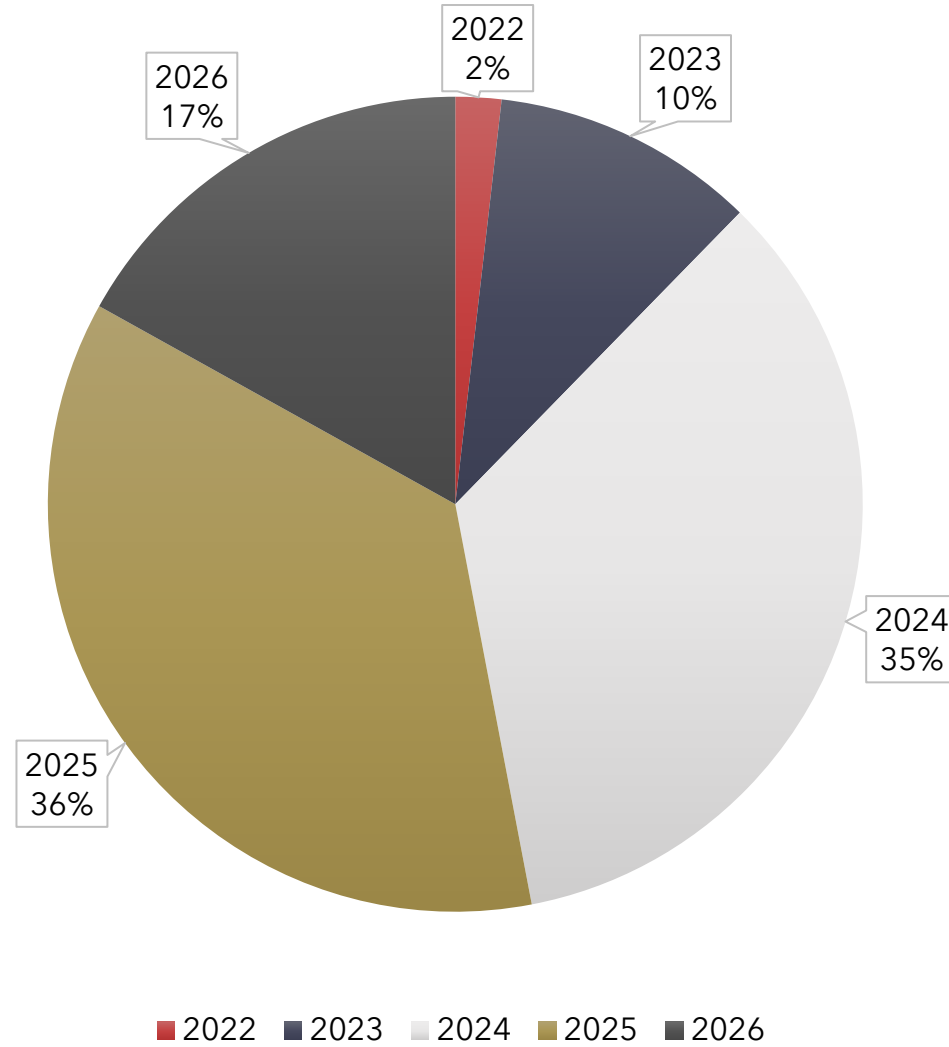
RF ANNUAL VIOLATIONS PROCESSED



2026 Commentary:

- Year-to-date as of 04/10/2026; and
- ~95% were processed as Compliance Exceptions or Find, Fix, and Track Report.

RF INVENTORY BY YEAR REPORTED



Registration Update

Registration Update

ReliabilityFirst (RF) is providing this update for the Risk and Compliance Committee’s awareness of recent registration activities. This update focuses on Category 2 Inverter Based Resources (IBRs).

The registration staff at RF has completed **Phase 3** of the **ERO Inverter Based Resource (IBR) Registration Initiative**. Phase 3 (May 2025 – May 2026) consisted of completing registration of Category 2¹ candidates and continued entity specific outreach.

Starting in August 2025, the staff began registering verified Category 2 Non-BES IBR sites and submitting these registrations to NERC for approval in a staggered manner ahead of the official NERC registration effective date set for May 15, 2026.

As of April 9, 2026, **60 Category 2 Non-BES IBR sites** have been registered, accounting for **100%** of total candidate sites in the RF footprint. These registrations were processed under **40 new Entity registrations (NCRs)** with the rest as footprint changes of existing entities.

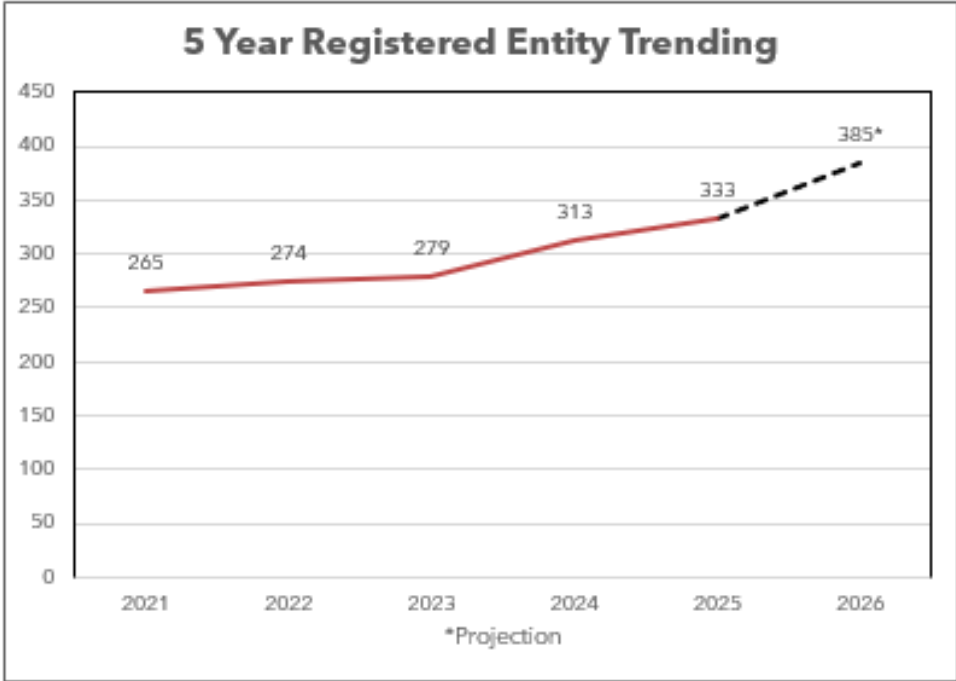
The final numbers of Category 2 Non-BES IBR sites by Region are in the chart below. These numbers decreased across the board from the original FERC filing, for multiple reasons:

- Site was BES (over 75 MVA) / already registered
- Site was under 20 MVA and/or connected below 60 kV
- Site will not be COD until June 2026 or beyond
- Wind Turbine Type was not IBR applicable (i.e., not Type 3 or 4)

Region:	# Category 2 Sites Registered:
RF	60
NPCC	38
WECC	231
TexasRE	31
MRO	58
SERC	118

As a result of Category 2 sites becoming NERC applicable, the number of Registered Entities in RF is anticipated to increase to **385** by May 15, 2026. See graph on next page.

¹ Entity who owns and/or operates non-BES inverter-based generating resources that have an aggregate nameplate capacity of greater than or equal to 20 MVA delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV to register with NERC.





Jerry James
President of Eastern Energy Storage and Artex Oil Company

Mr. James graduated Magna Cum Laude in Petroleum Engineering and has over four decades of experience working for major oil companies, consulting, and running one of the most successful exploration companies in the eastern United States.

He is a registered professional engineer, and former chairman of the Ohio Oil and Gas Association and the Ohio Oil and Gas Energy Education Program.

Presentation to
ReliabilityFirst
Board of Directors
April 29th, 2026

Changes on the Grid

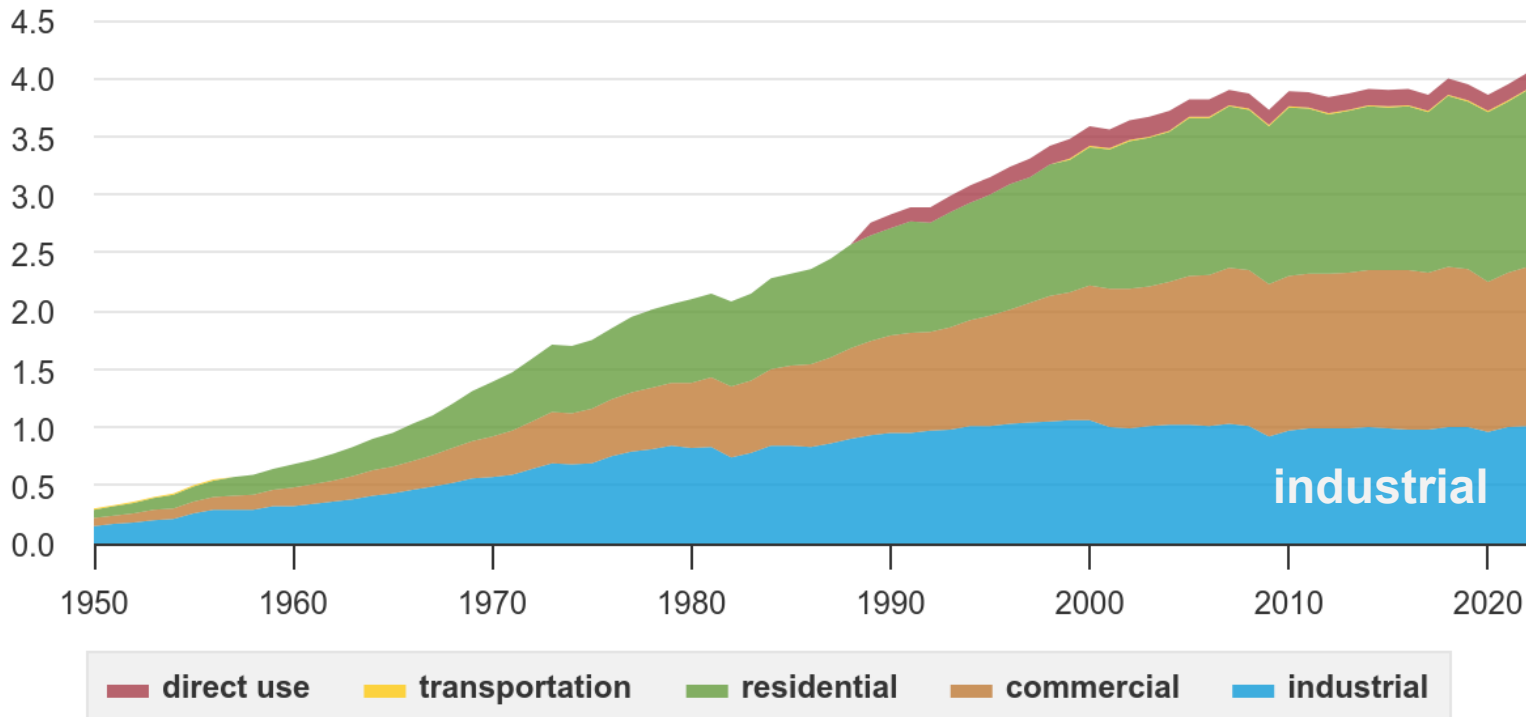
1. First time in 25 years industrial demand for electricity is growing.*
2. First time in 50 years industrial demand for natural gas is growing.*
3. First time ever Artificial Intelligence needing large amounts of energy.*
4. First time ever of a transition from coal to natural gas on the electric grid.
5. First time ever putting large quantities of intermittent generation on the electric grid.
6. First time ever exporting large volumes of natural gas.
7. First time in 50 years substantial grid expansion is needed—Who will make the required investments in a deregulated world?

* *Investment required for industrial expansion, national security and grid reliability.*

U.S. Industrial Expansion, National Security, and Grid Reliability

Electricity

trillion kilowatthours



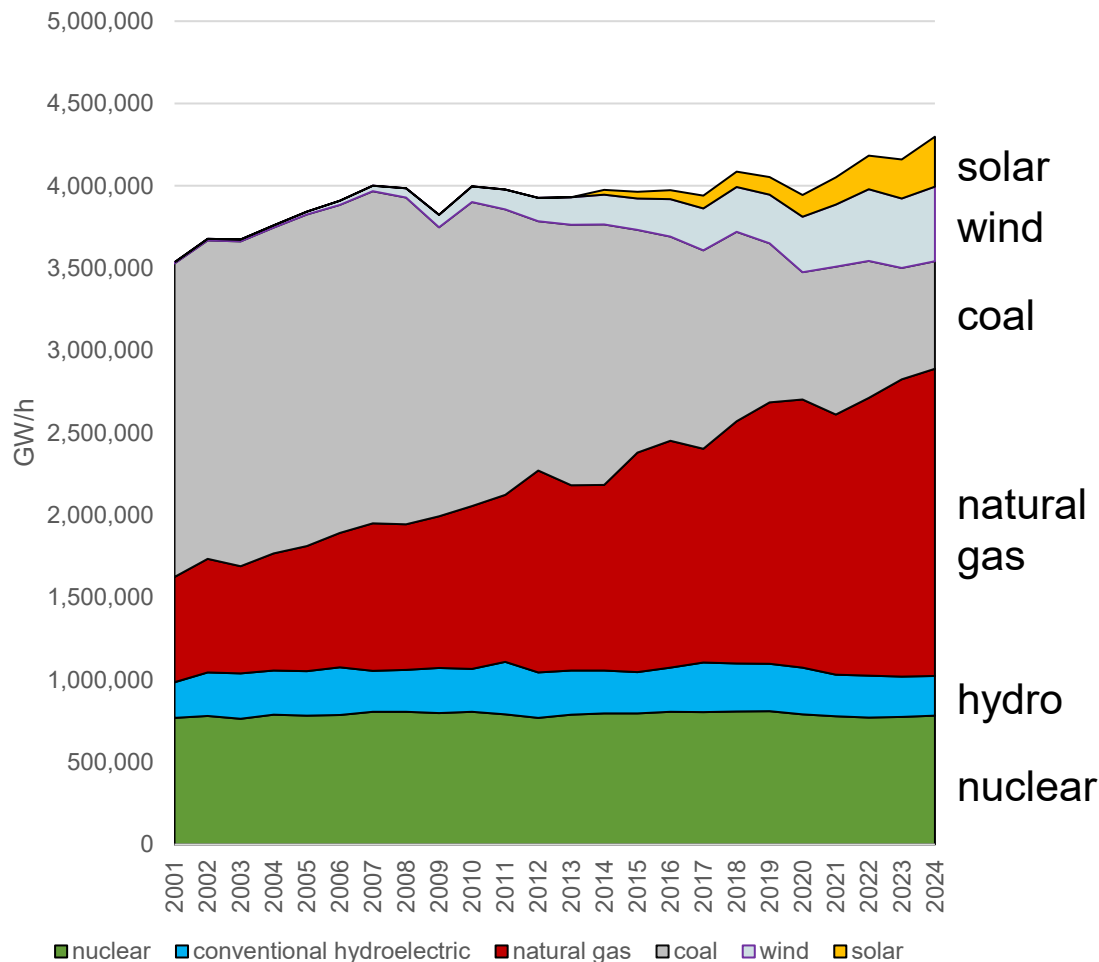
- First time in 25 years industrial demand for electricity is growing.



Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 7.6, March 2023, preliminary data for 2022

U.S. Industrial Expansion, National Security, and Grid Reliability

U.S. Electric Generation by Source



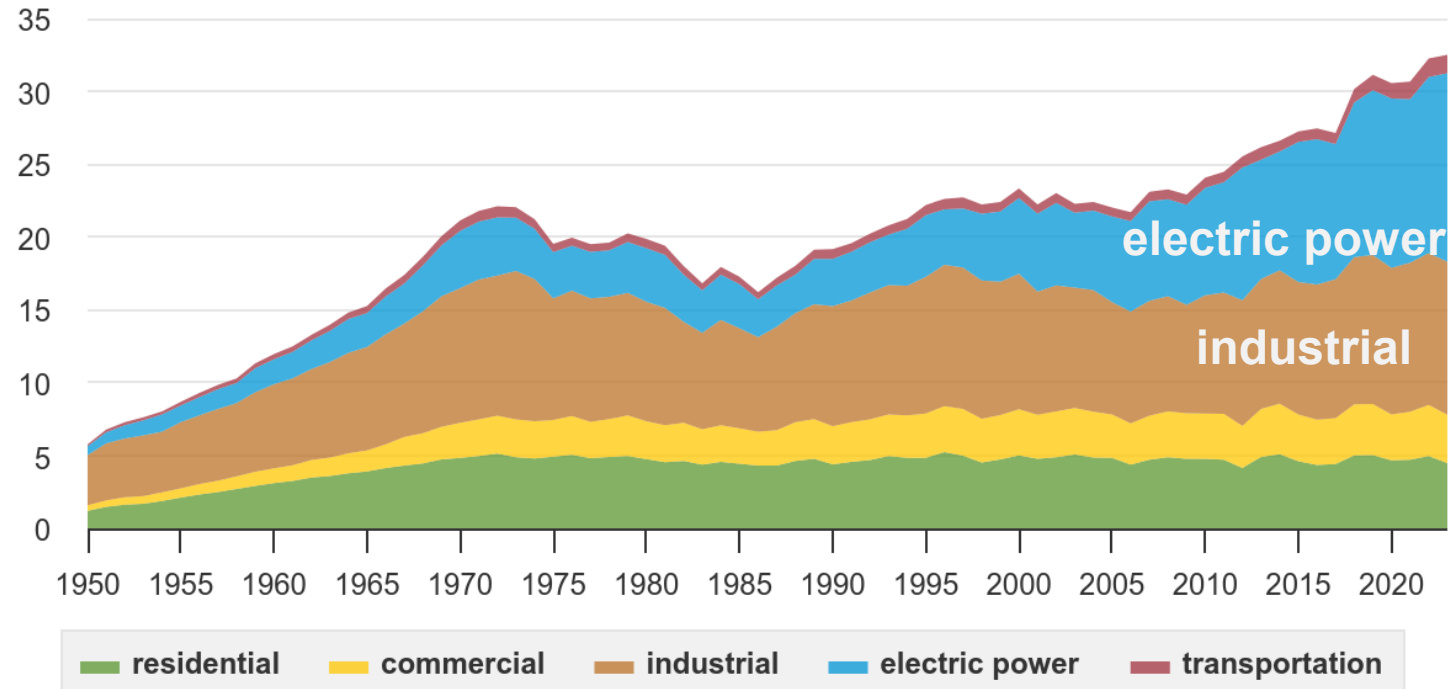
Some marginal generation sources omitted for legibility.

- First time natural gas is replacing coal.
- First time natural gas will also have to back up wind & solar due to their intermittency.

U.S. Industrial Expansion, National Security, and Grid Reliability

Natural Gas

trillion cubic feet



- First time in 50 years industrial demand for natural gas is growing.

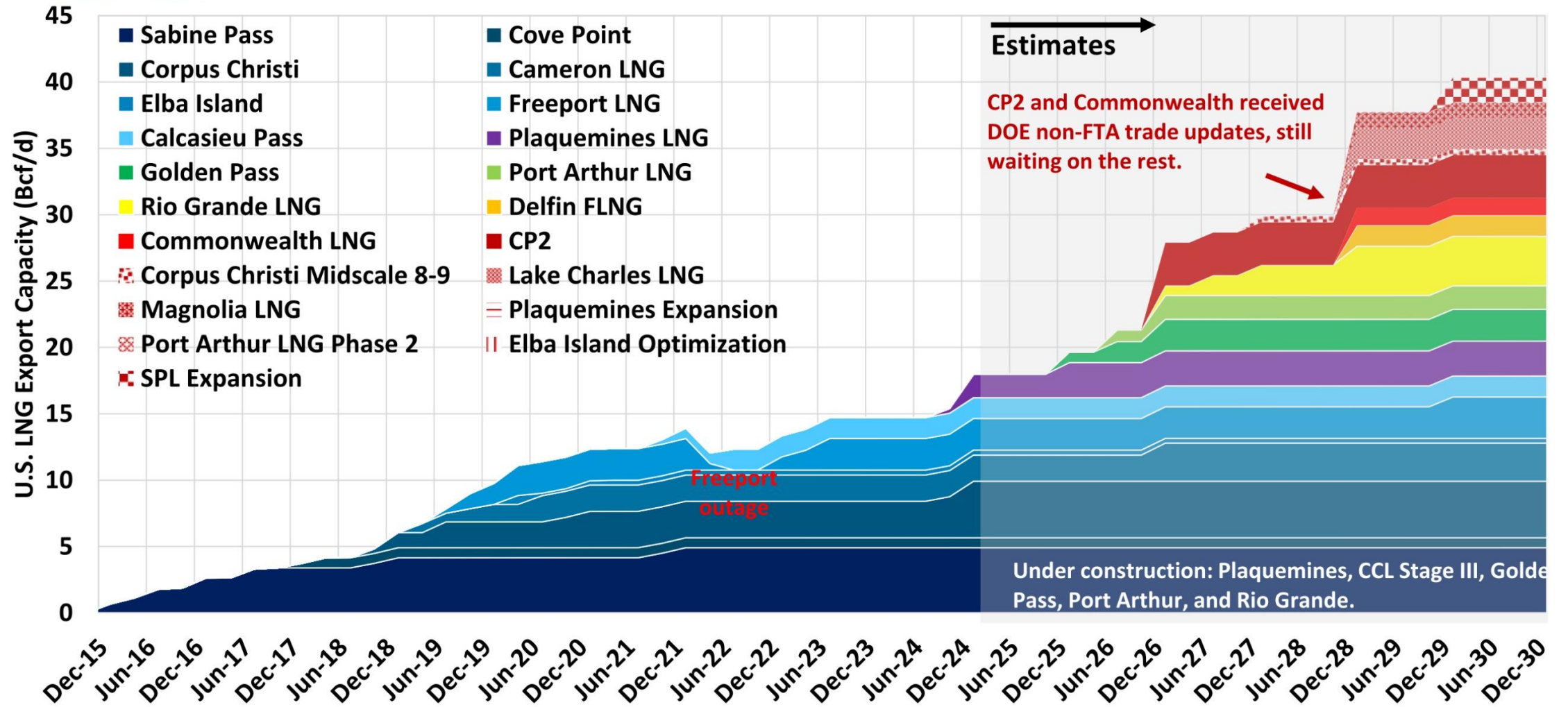


Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 4.3, April 2024; preliminary data for 2023

Note: Transportation includes pipeline and distribution use and vehicle fuel.

U.S. Industrial Expansion, National Security, and Grid Reliability

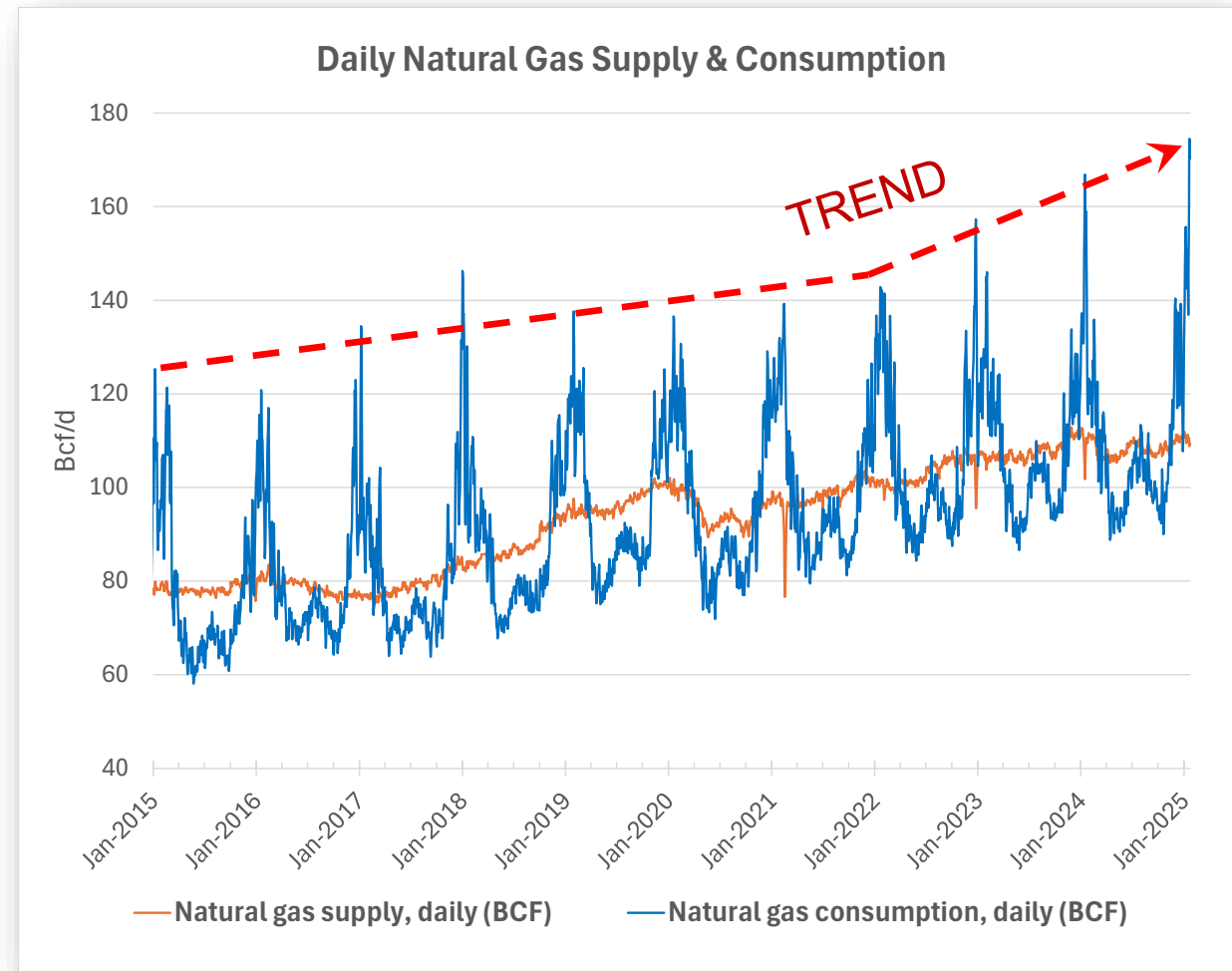
First time ever exporting
large volumes of natural gas



Source: EIA, company materials, Raymond James research.

Electricity is competing
for Natural Gas supply
with other growing
demands

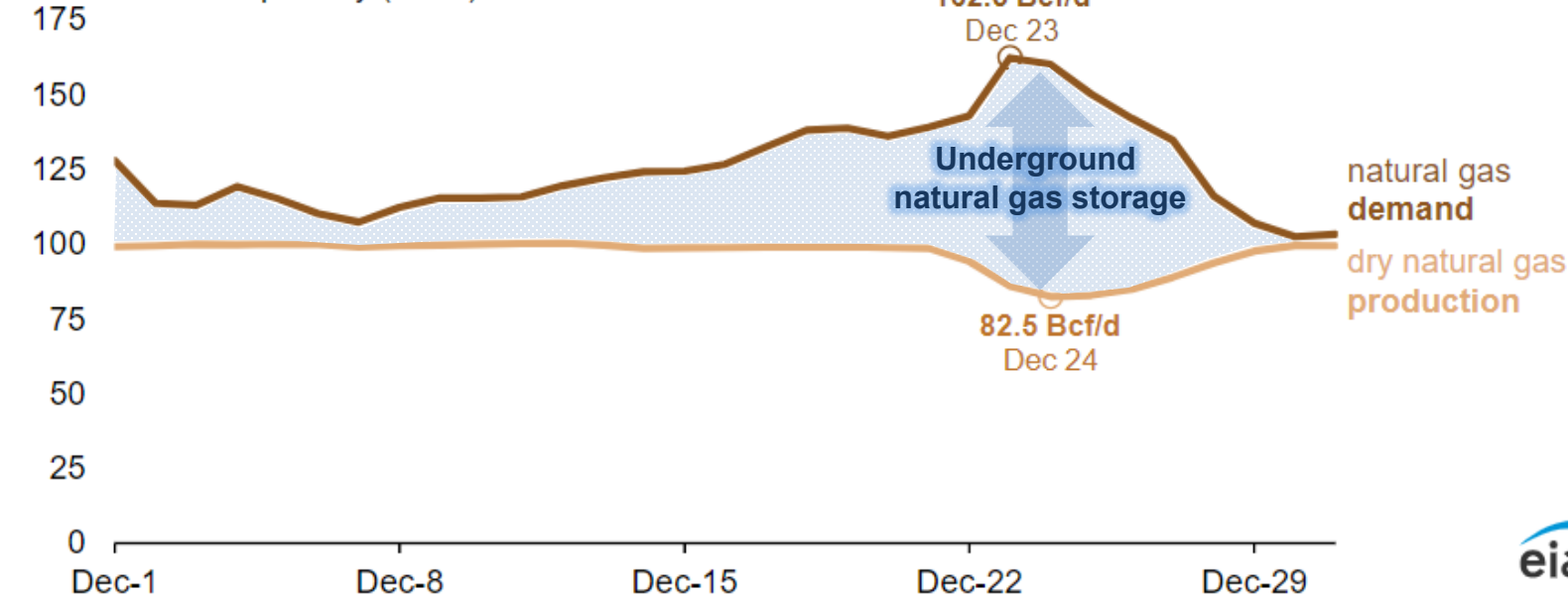
- Peak natural gas demand is growing faster than natural gas production.



Data derived from EIA's *Natural Gas Weekly Updates* and PointLogic

December daily natural gas supply and demand in the Lower 48 states (Dec 1–31, 2022)

billion cubic feet per day (Bcf/d)



Data source: S&P Global Commodity Insights

Note: Total demand includes total consumption, pipeline exports, liquefied natural gas (LNG) feedgas deliveries, and pipeline loss and fuel.

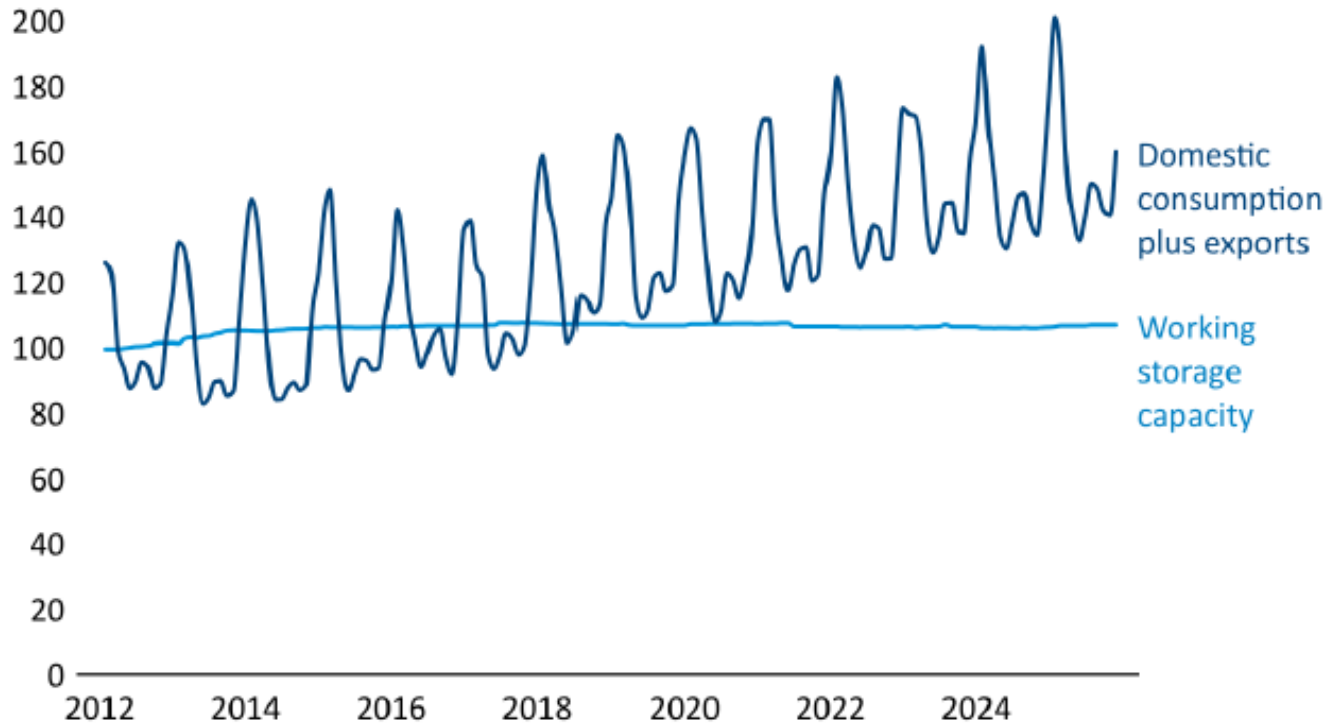


- Natural gas storage backs up the electric and natural gas grid during extreme weather events.

U.S. Industrial Expansion, National Security, and Grid Reliability

Growth in U.S. consumption and exports of natural gas have outpaced working storage capacity growth

U.S. natural gas consumption, exports, and storage based to 2012=100

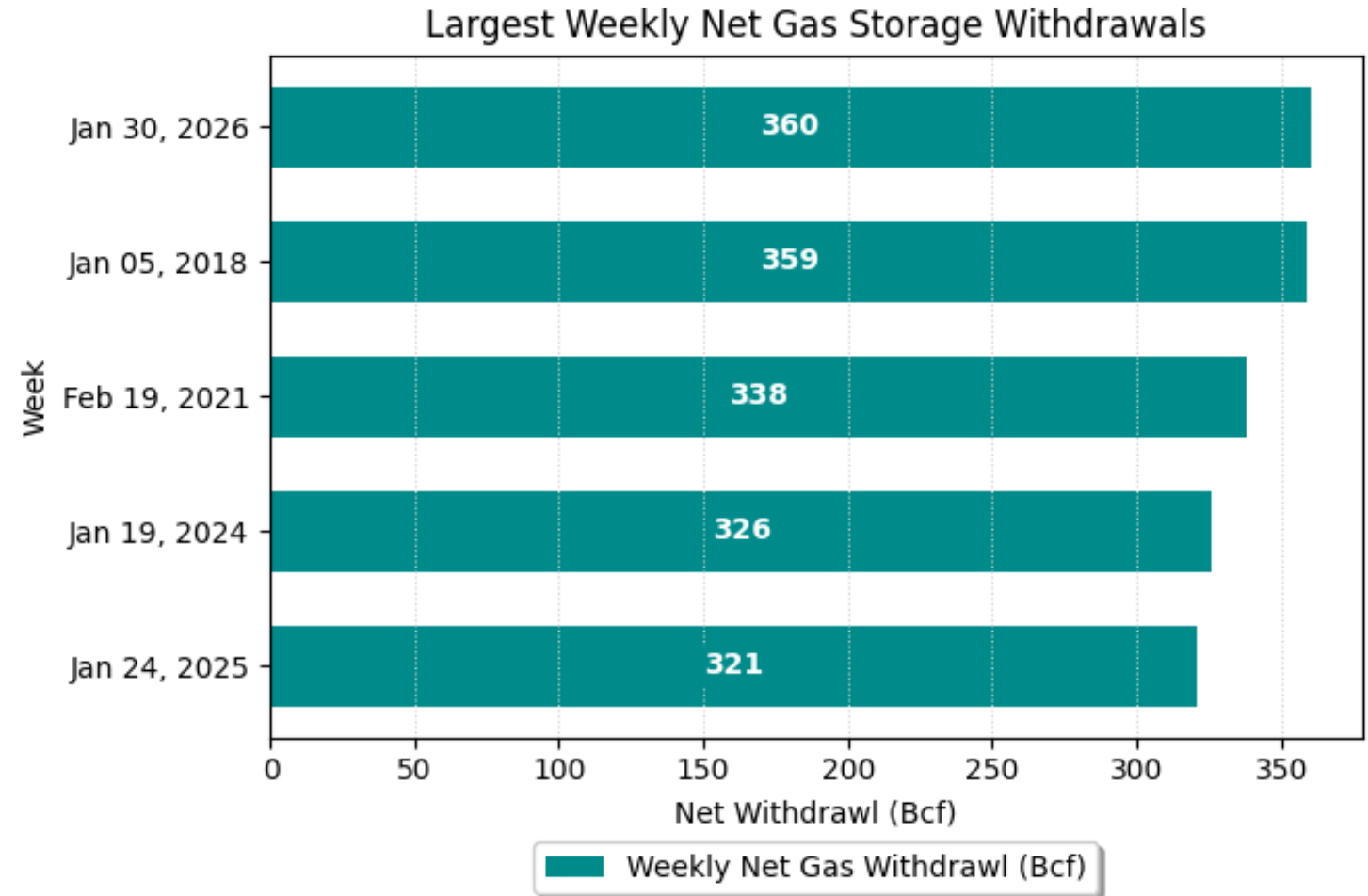


Source: U.S. EIA



- Demand is also growing faster than natural gas storage.

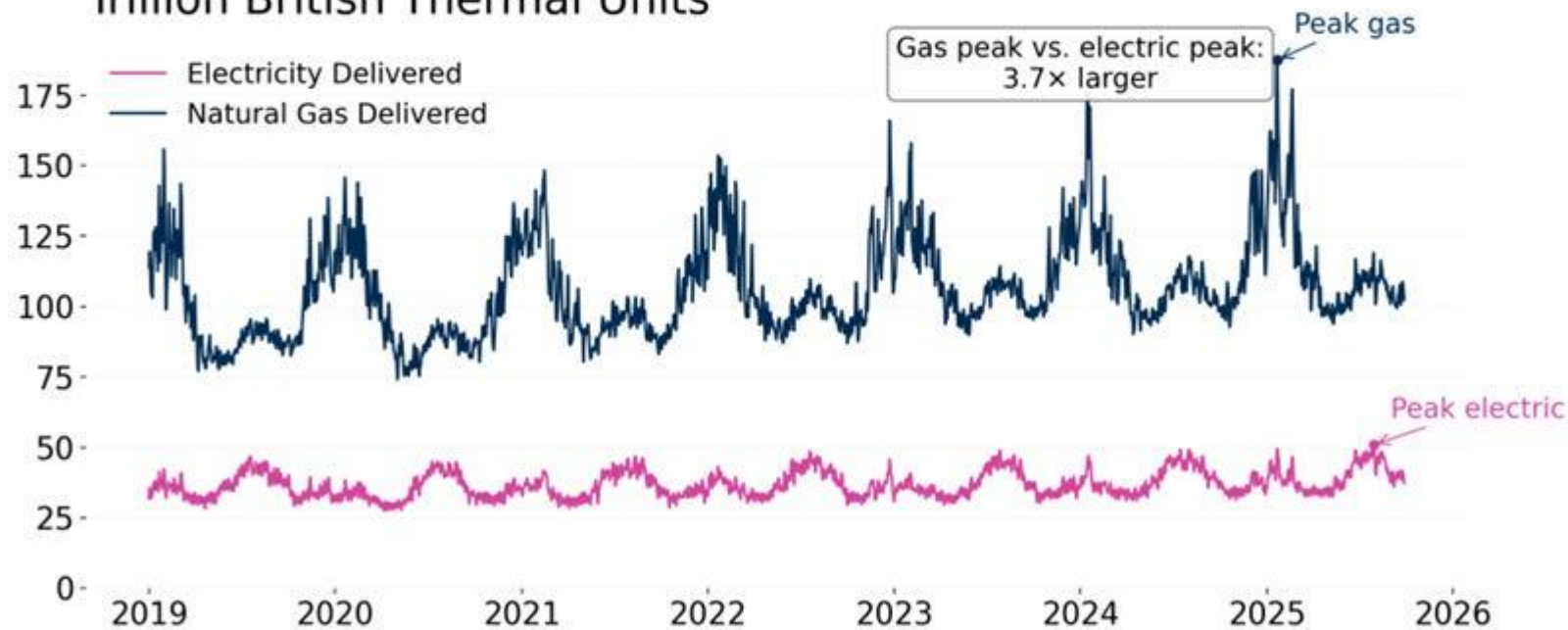
- Peak demand is growing faster than production.
- Demand is also growing faster than storage.
- Record withdrawals from natural gas storage is the new norm.



U.S. Industrial Expansion, National Security, and Grid Reliability

Natural gas delivers nearly 4x more energy than the electric system on peak days

Daily Energy Delivered — Electric vs. Natural Gas
Trillion British Thermal Units

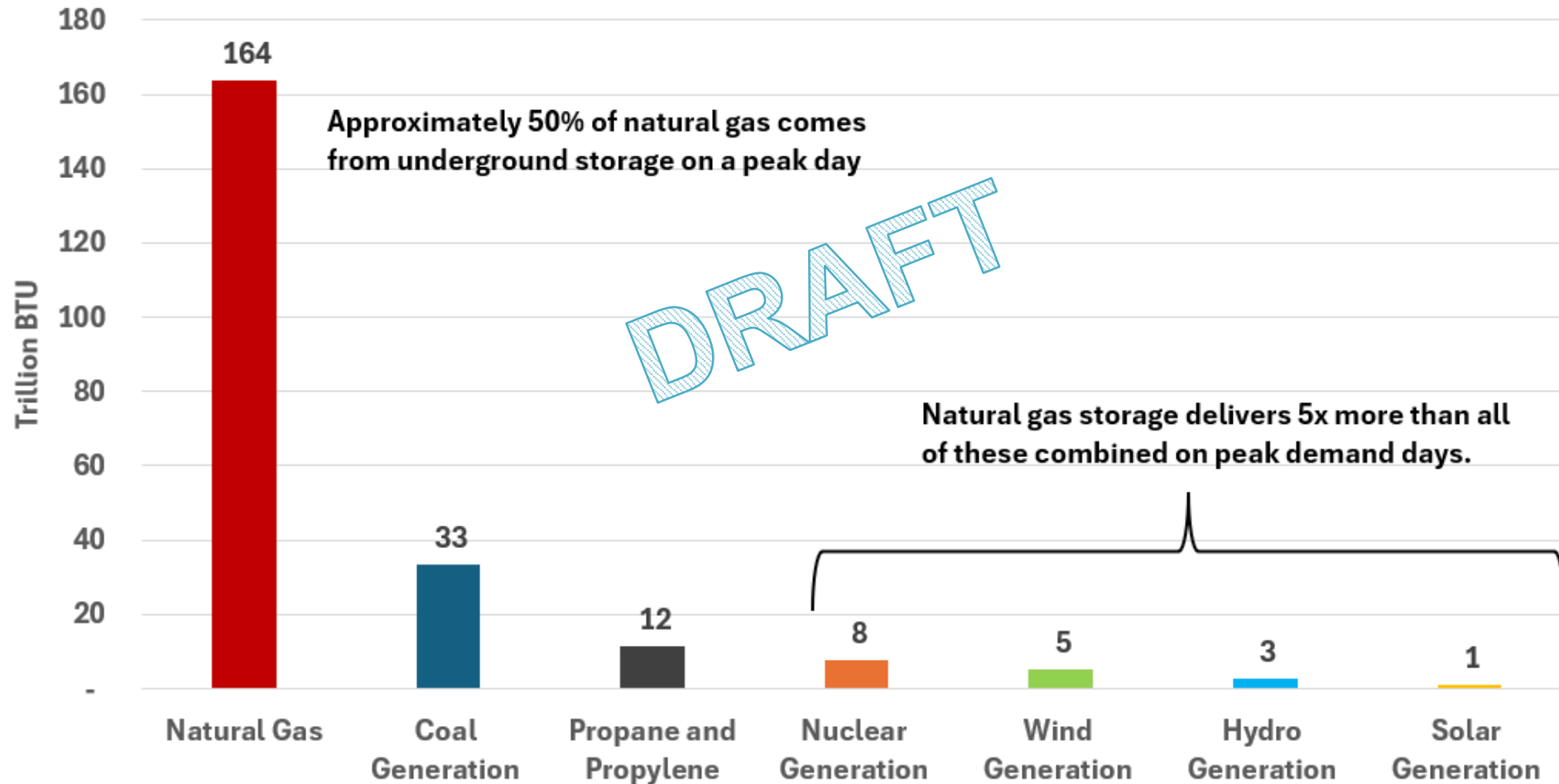


Source: Rystad Energy, S&P Global Commodity Insights, ©2025 S&P Global Inc., Chart: American Gas Association | Data subject to revision



U.S. Industrial Expansion, National Security, and Grid Reliability

U.S. Energy (Excl. Transportation & Petroleum) Delivered on a Peak Day
Jan 17, 2024 (Trillion BTU)



Solutions

- PJM has a World-Class Fuel Supply in Natural Gas
- National Petroleum Council Recommendations for Fuel Supply

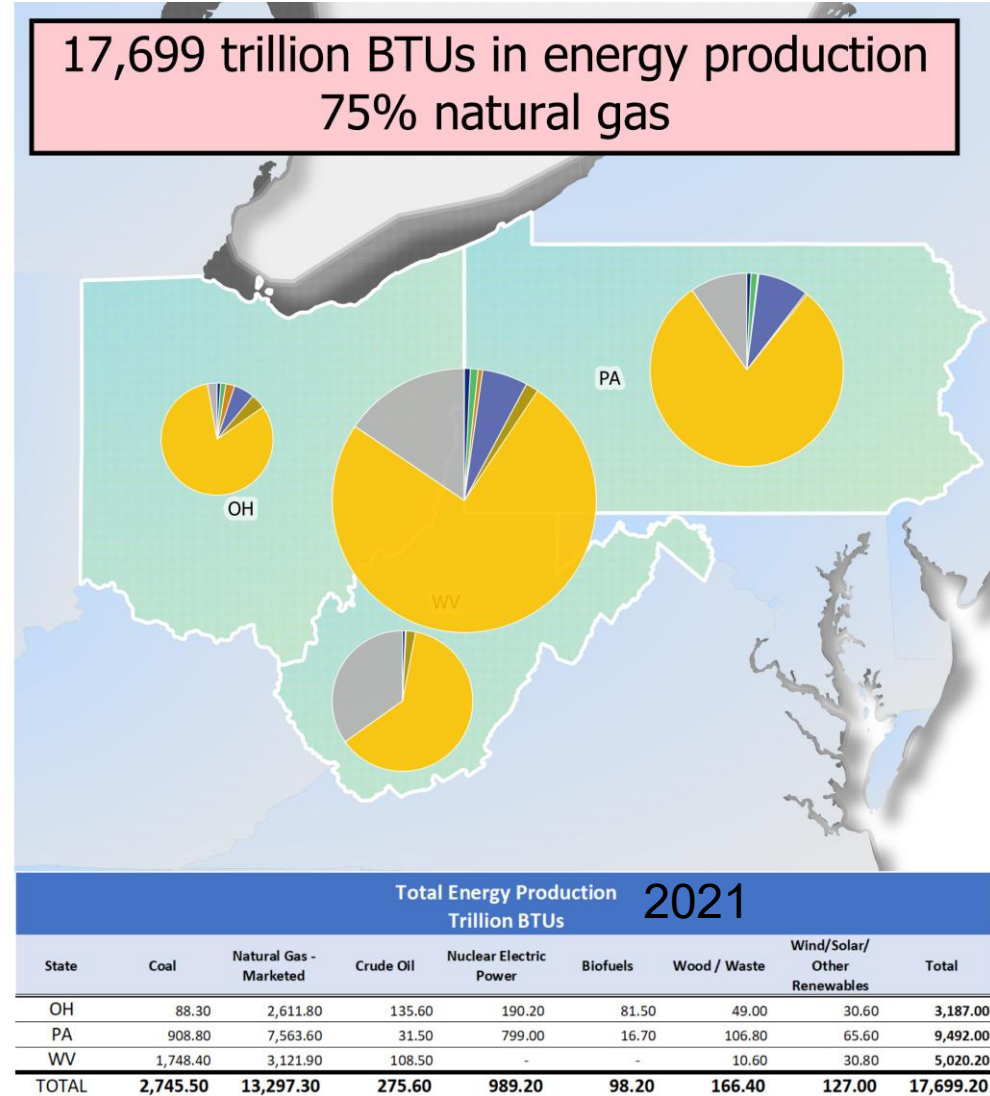
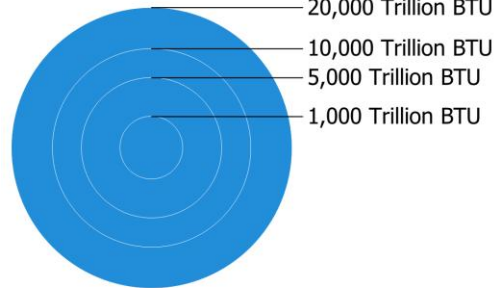
U.S. Industrial Expansion, National Security, and Grid Reliability

Legend

Energy Production by Source

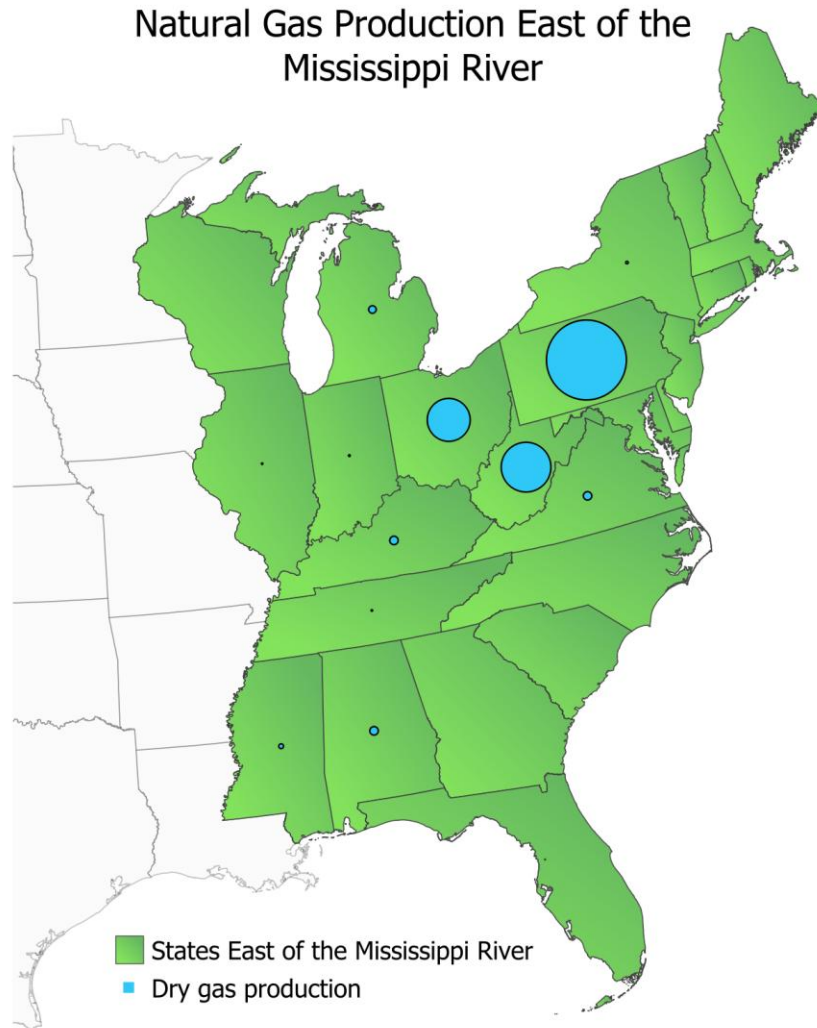
- Natural Gas
- Coal
- Nuclear Electric Power
- Crude Oil
- Wood/Waste
- Wind/Solar
- Biofuels

Production in Trillion BTUs



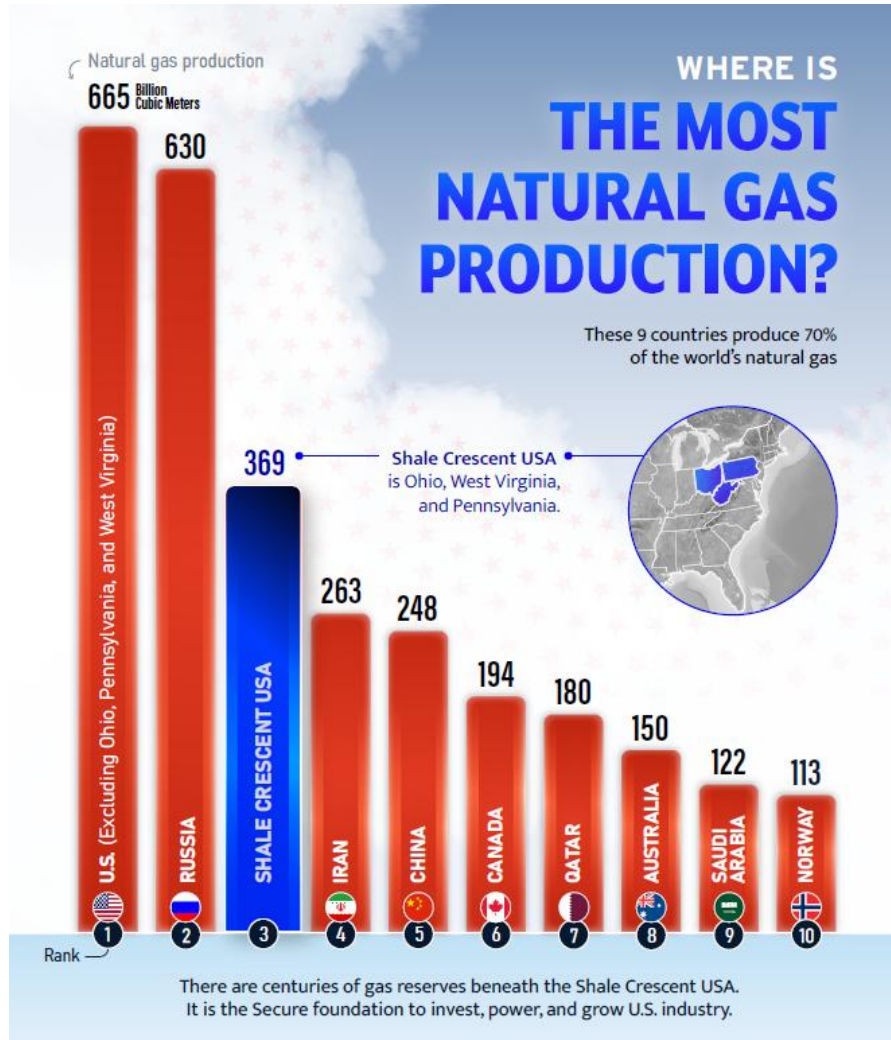
U.S. Industrial Expansion, National Security, and Grid Reliability

Ohio, Pennsylvania, and West Virginia are essentially
the only native gas sources east of the Mississippi



- Ohio, Pennsylvania & West Virginia produce 98% of the natural gas in the eastern U.S.
- These three states need to be thought of as a strategic natural gas resource.

U.S. Industrial Expansion, National Security, and Grid Reliability



- If Ohio, Pennsylvania & West Virginia were their own country, they would be the third-largest natural gas producer in the world.

- 1. Comprehensive Long-Term Planning:** Integrate resource adequacy and fuel assurance across sectors.
- 2. Reform Permitting :** Streamline processes to accelerate infrastructure investment.
- 3. Build New Infrastructure:** Construct fit-for-purpose pipelines, storage, and assets.
- 4. Enhance Existing Infrastructure:** Upgrade current assets for near-term reliability.
- 5. Reform Market Compensation:** Incentivize generators to secure reliable fuel supply.
- 6. Accountability Framework:** Require prudent fuel supply arrangements and readiness plans.
- 7. Expand Pipeline Service Offerings:** Develop flexible gas service offerings for variable generator needs.
- 8. Clarify Roles and Responsibilities:** Clearly define accountability for reliability and fuel assurance.
- 9. Leverage Existing Forums:** Use current industry groups to share leading practices.
- 10. Improve Performance Metrics:** Expand and regularly report on reliability and fuel assurance metrics.

Link to video: [IPAA Webinar Examining NPC Reports on Natural Gas/Electricity Coordination and Permitting Reform](#)

Summary

U.S. Industrial Expansion, National Security, and Grid Reliability

- An OSU report issued in the late 1970s at the request of Governor Rhodes still rings true today.

Everyone could see the problem coming but nobody did anything about it.



The 1970s were more than just gasoline shortages. Ohio's manufacturers lost 85% of their natural gas supply.

Rhodes Seeks General Fund Budget Boost

\$8.77 Billion Proposed For 22 Per Cent Rise; No Tax Increase Urged

By TOM LINDEMAN
 State Columnist Bureau

COLUMBUS — Governor Rhodes today proposed a two-year state general fund budget of \$8.77 billion, up 22 per cent from the last biennium, with no increase in taxes.

The state administration's overall budget runs \$14.5 billion, up from \$12.1 billion in the current biennium. The total budget figure reflects all funds, including federal and rotary accounts over which the state has little or no control.

The formal budget will be introduced in bill form next Tuesday, since legislators are sitting in special session to deal solely with the energy emergency.

Healthy Economy Anticipated

Millions of Ohioans state income tax...



BARBED WIRE CAN'T STIFLE JOY OF CHILDREN

Large Users To Lose 85 Pct. Of Columbia Gas Supply From Feb. 1 To Season's End

Situation Is Close To Crisis, Official Of Company Says

Natural-gas supplies to large industrial and large commercial customers of Columbia Gas of Ohio will be curtailed 85 per cent beginning Feb. 1 and continuing through the end of the heating season March 31, company officials announced Monday.

The stricter curtailments probably will mean that some area industries will have to close, John M. Pickens, Columbia northwest district manager, Toledo, said.

Large schools such as high schools fall under the curtailment, he said.

is "close to crisis," Mr. Pickens said the gas company is making "an impassioned plea" for residential customers to conserve.

The company is asking householders to set thermostats no higher than 65 degrees during the day and 55 at night, and for businesses to cut consumption to a minimum by turning down thermostats and shortening hours.

Mr. Pickens stressed that the curtailment plan announced Monday assumes that weather through March will be normal. Colder than normal temperatures could possibly bring even more stringent industrial and commercial curtailment.

"I would not rule it out," he stated, adding that the prospects of finding emergency gas the rest of the winter are "practically nil."

Temperatures throughout Ohio have averaged 31 per cent colder than normal this winter and 43 per cent colder than normal in January, making it the coldest winter in Ohio in more than 100 years, the company said.

"We're almost beyond the point of no return. We have to conserve in every way we can to maintain this level," Mr. Pickens stated.

He said that Columbia had hoped to obtain some 3 to 7 billion cubic feet of gas, some from Ohio industrial users outside the Columbia system who could use alternate fuels. But the supplies did not materialize.

★ ★ ★ ★

2025-2026 RRA

2025-26 REGIONAL RISK ASSESSMENT

Johnny Gest – Manager, Engineering & System Performance

April 29, 2026

Cleveland, OH



RRA OVERVIEW

- Examines risk from a regional perspective
- Input obtained from industry stakeholders via RF technical committees
- Utilizes performance data, reviews trends, identifies areas that require focus
- Informs future RF work
- Conducted approximately every two years
- Internal and public facing reports
- Efforts ongoing to ensure RRA is data driven and can be operationalized

Risk Ranking

1. Environmental Factors

2. Grid Transformation

3. Security

4. Supply Chain

5. Misoperations

6. Modeling

7. Situational Awareness

RISK ANALYSIS CONSIDERATIONS

Analyzed four common considerations for each risk:



Human Performance

The capability of the workforce to complete the tasks associated with a given risk. This includes consideration of established processes and procedures, training, and capability to mitigate human error, as well as skilled workforce retention and retirements.



Policy & Standards

The implementation of rules and regulations at federal, state, and local levels that directly or indirectly impact the reliability of the Bulk Power System. This includes the NERC Reliability Standards.



Resilience

The ability to anticipate, absorb, adapt to, minimize the impact of, and/or rapidly recover from a potentially disruptive event.



Data

The availability of data to perform analysis, the quality of the data available, the development and maturity of metrics to assess performance, and the level of expertise held by the risk analysts.

COMPARABLE RF AND NERC RISKS

		NERC Reliability Issues Steering Committee (RISC) Risk Profiles				
		Grid Transformation	Resilience to Extreme Events	Critical Infrastructure Interdependencies	Security	Energy Policy
RF Risk Categories	Environmental Factors		X			
	Grid Transformation	X	X	X		X
	Security				X	X
	Supply Chain	X		X	X	X
	Misoperations					
	Modeling	X				X
	Situational Awareness					
RF Risk Considerations	Human Performance				X	
	Policy and Standards					X
	Resilience	X	X	X		
	Data	X				

RF ensures that all NERC identified risks are covered

RF focuses on additional region-specific risks: *Situational Awareness* and *Misoperations*

NERC has additional considerations around electric-gas coordination and other critical infrastructure

RRA MAIN CONTRIBUTORS



INDUSTRY FEEDBACK

Reliability Committee

- Assist in the development and ranking of RRA risk categories
- Endorse subcommittee reports

Protection Subcommittee

- Creation of protection system risk report
- Contributes to risk insights on:
 - Misoperations
 - Environmental Factors
 - Human Performance

Committee and Subcommittee Insights

Workforce Management

Data Availability and Quality

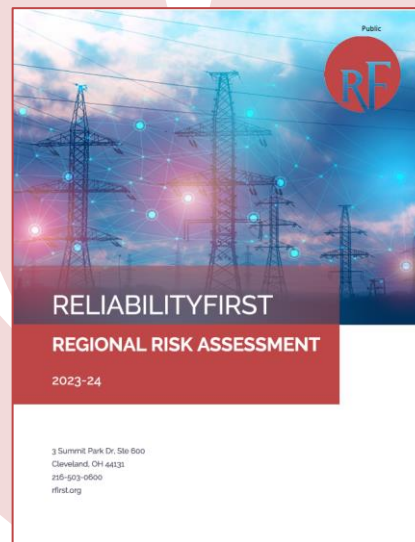
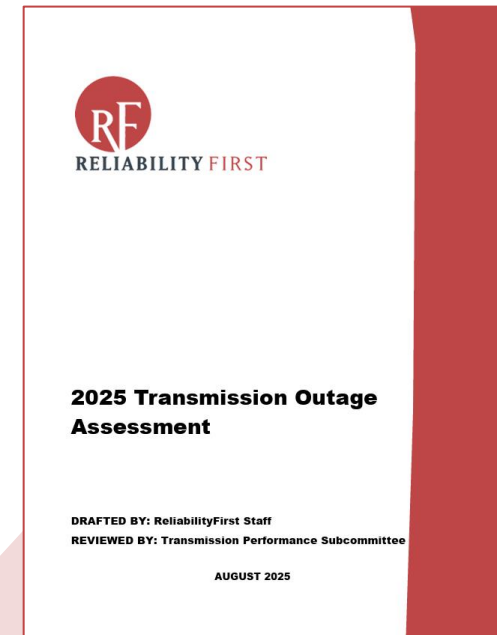
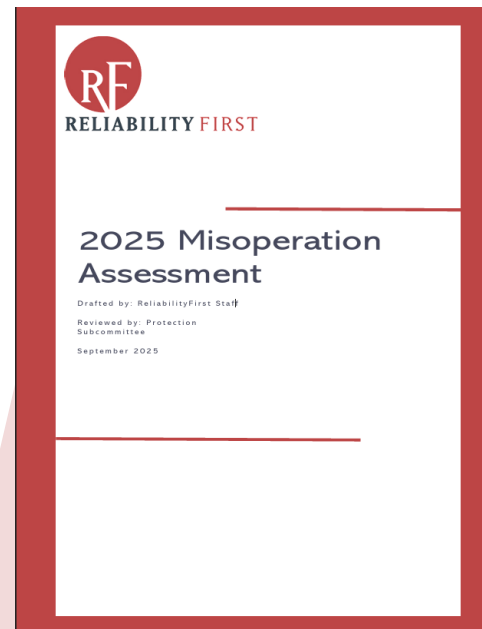
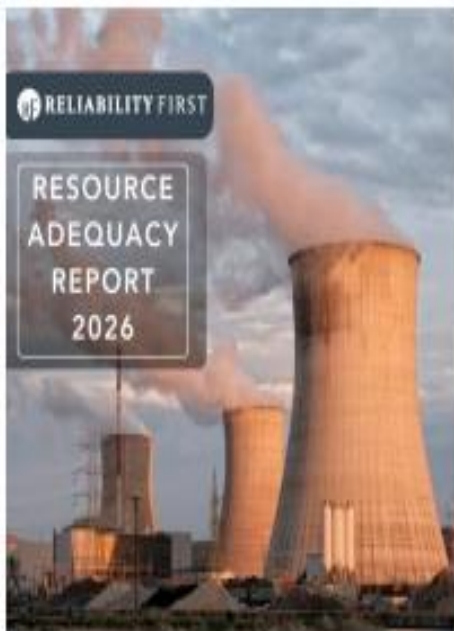
Critical Infrastructure Protection Committee

- Assist in the ranking of RRA risk categories

Transmission Performance Subcommittee

- Creation of transmission risk report
- Contributes to risk insights on:
 - Resilience
 - Environmental Factors
 - Human Performance

RRA AND PUBLIC REPORTS



GRID TRANSFORMATION

Covers reliability impacts from federal and state regulations and policies on resource and demand growth

Federal Policies

State Policies

Resource Retirements

Growth of Inverter-based Resources

Resource Availability

Demand Growth (Computational Loads)



POLICY IMPACTS - EXAMPLE

State

Clean Energy Goals

Multiple states have initiatives to reduce greenhouse gas emissions by 2050 or earlier

- Early retirement of conventional resources
- Shifted resource mix towards inverter-based resources

Federal

DOE Reliability 202(c) Orders

Prevent resources from retiring due to potential reliability concerns

- Keeps 4.2 GW of generation online within RF

Resulted in net reduction of coal, natural gas, and petroleum resources

INVERTER-BASED RESOURCE GROWTH

Between 2026 - 2035

- Natural gas is dominant fuel source
- Battery growth not on pace with solar and wind

PJM - solar, wind, and battery

- Add 7 GW of existing/planned capacity
- Potential capacity up to 74 GW in queue

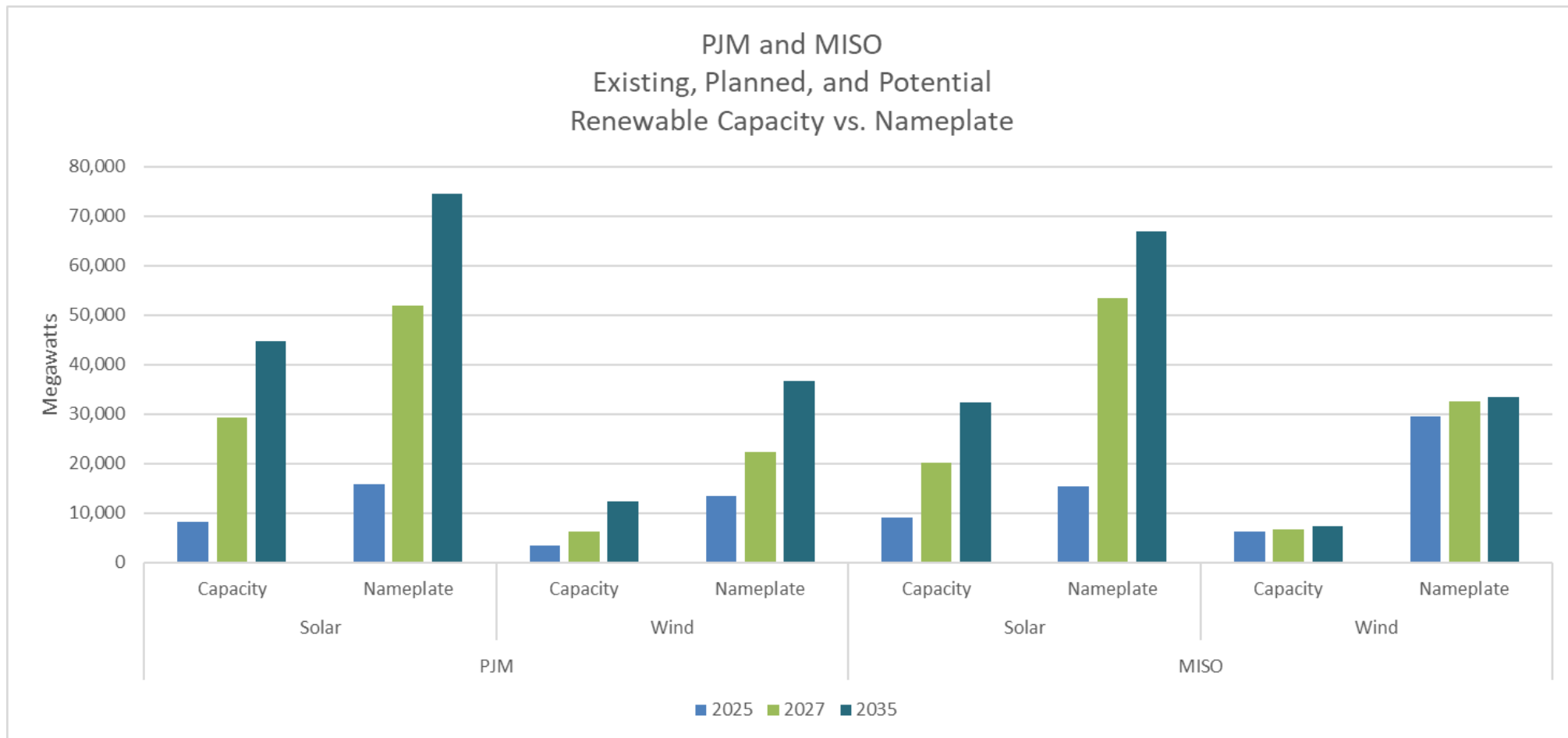
MISO - solar, wind, and battery

- Add 17 GW of existing/planned capacity
- Potential capacity up to 31 GW in queue

RESOURCE VARIABILITY

Natural gas susceptible to cold weather outages

Solar, wind, and battery output varies during high demand periods



DEMAND GROWTH

PJM

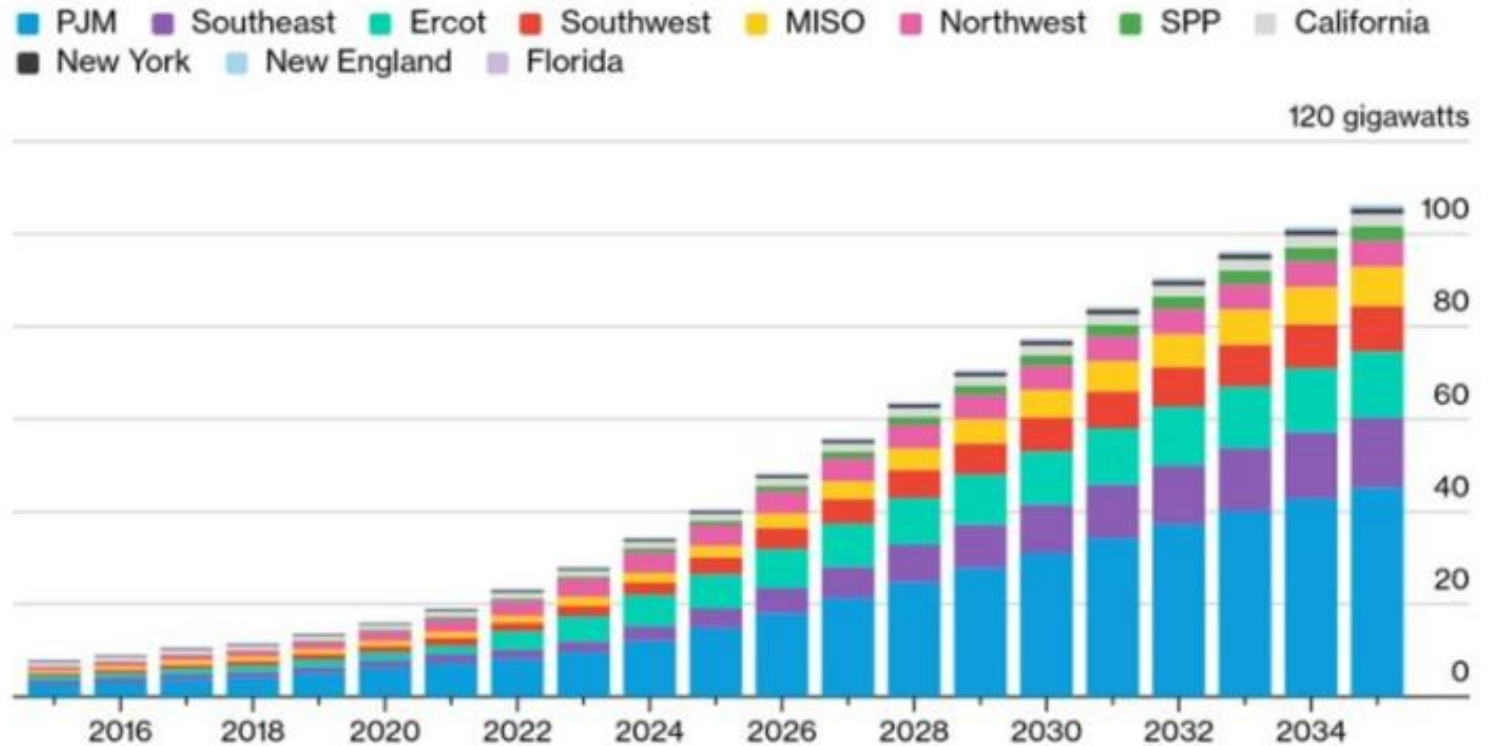
- Increase in summer peak demand by 42% from 146 GW to 222 GW

MISO

- Increase in summer peak demand by 15% from 125 GW to 144 GW

Computational Loads

US Data Center Demand to Triple in a Decade



SUMMARY

Between 2026 - 2035

- **Fossil Fuel Retirements** - Retirement of coal, natural gas, and petroleum resources
- **Fuel Assurance** - Natural gas dominant fuel source but susceptible to cold weather
- **Intermittent Resources** - Increase in solar, wind, and battery resources, output varies during high demand
- **Ability to Manage Intermittency** - Battery/storage growth is not on pace with solar and wind

Results in high risk for resource shortfalls in the next 5 years

RF plans to *Monitor, Trend, and Manage* this risk



QUESTIONS & ANSWERS

Johnny Gest

Manager - Engineering &
System Performance

johnny.gest@rfirst.org