



# Electric-Gas Coordination in PJM

Brian Fitzpatrick  
Sr. Lead Fuel Supply Analyst  
Electric Gas Coordination Senior Task Force

November 5, 2021

## PJM Gas Electric Coordination History

- Genesis of Gas Electric Coordination
- Key Milestones

## Gas Electric Coordination Team

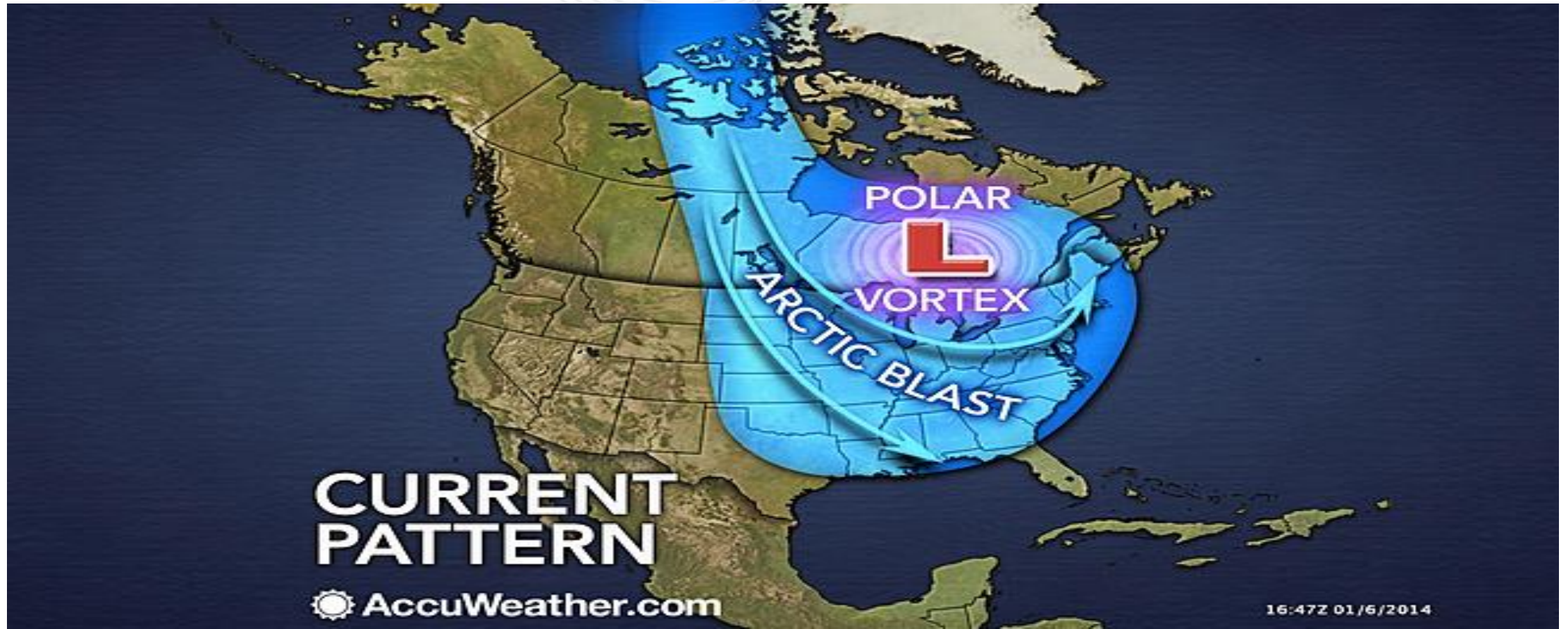
- Areas of Focus

## Future Challenges

- Gas fired generation operations in a high renewable resource mix
- Strict regulatory hurdles for gas supply and transportation expansion

# PJM Electric Gas Coordination History

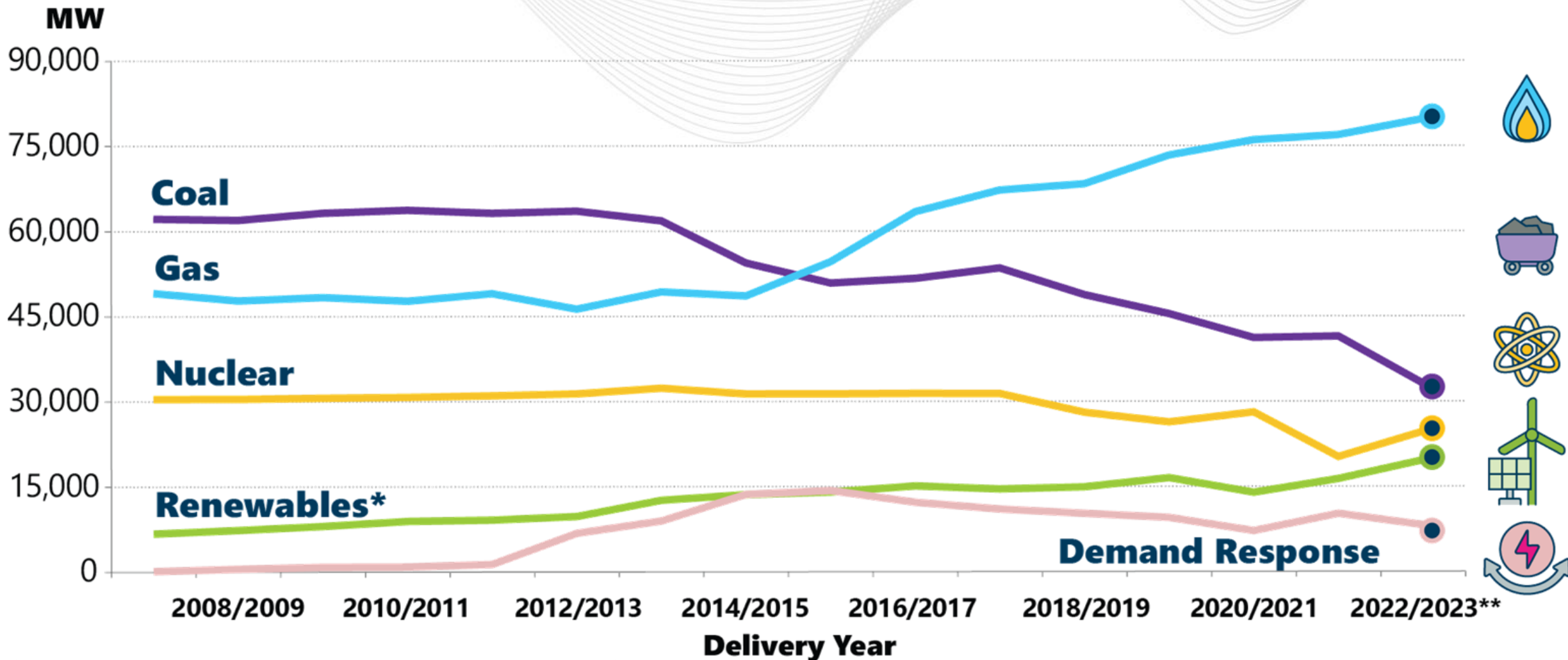
## “Polar Vortex” of January 2014



## Spring through Fall 2014

- PJM begins to assess the previous winter and investigates the development of guidelines, tools and processes to better understand and analyze the natural gas market and its impact on natural gas-fired generator availability and reliability.
- Stood up Gas-Electric Coordination Team in November 2014

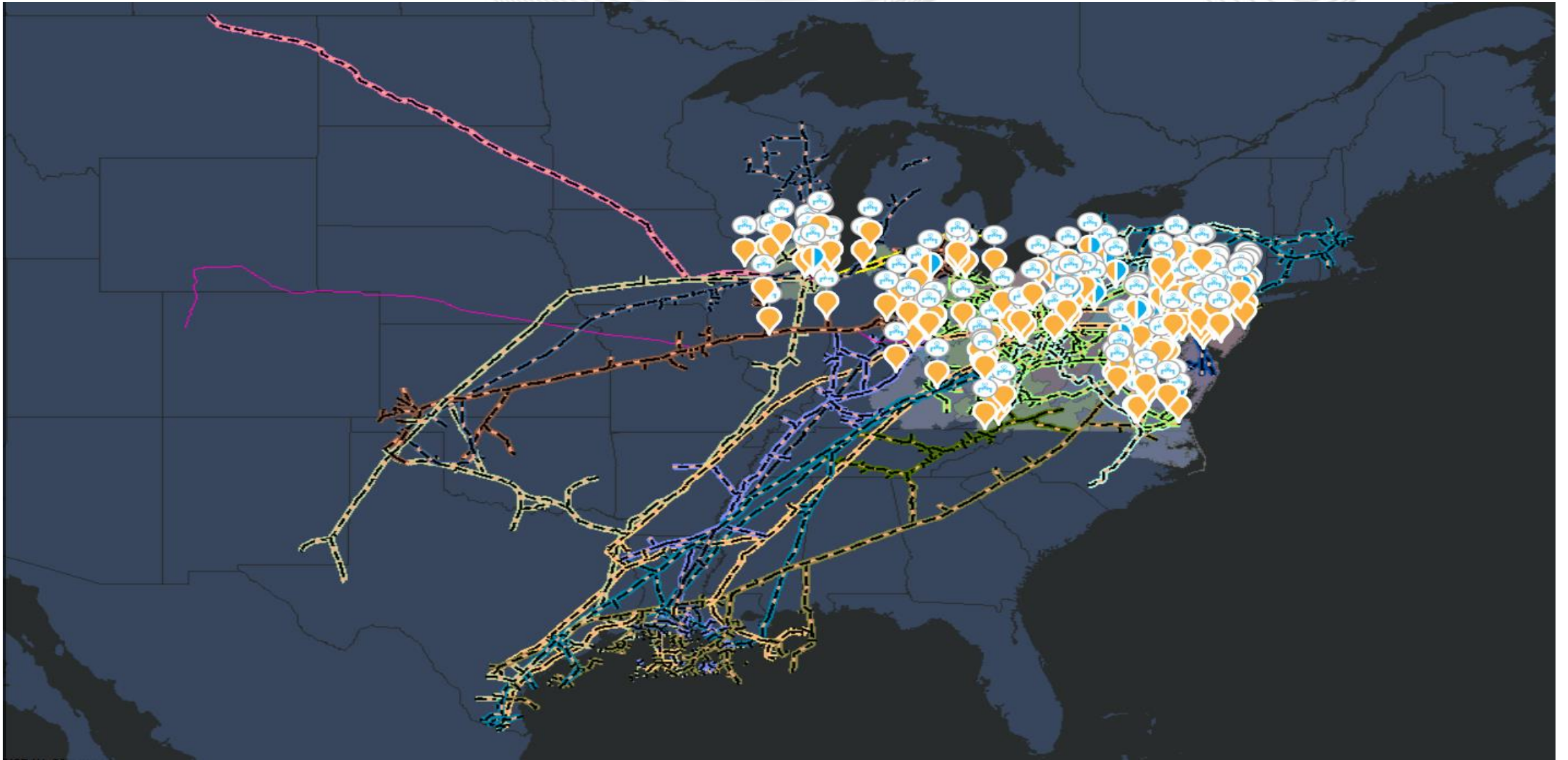




\*includes solar & wind at nameplate, hydro and wood

\*\* 2022/23 values adjusted for FRR elections

As of June 2021



- Approximately 80 GW of installed gas generation
  - 80% served directly by interstate pipelines
  - 19.8% served by local distribution companies
  - 0.2% served via gas gathering systems
- 15 interstate pipelines serving the PJM system
- 32 local distribution companies across the footprint



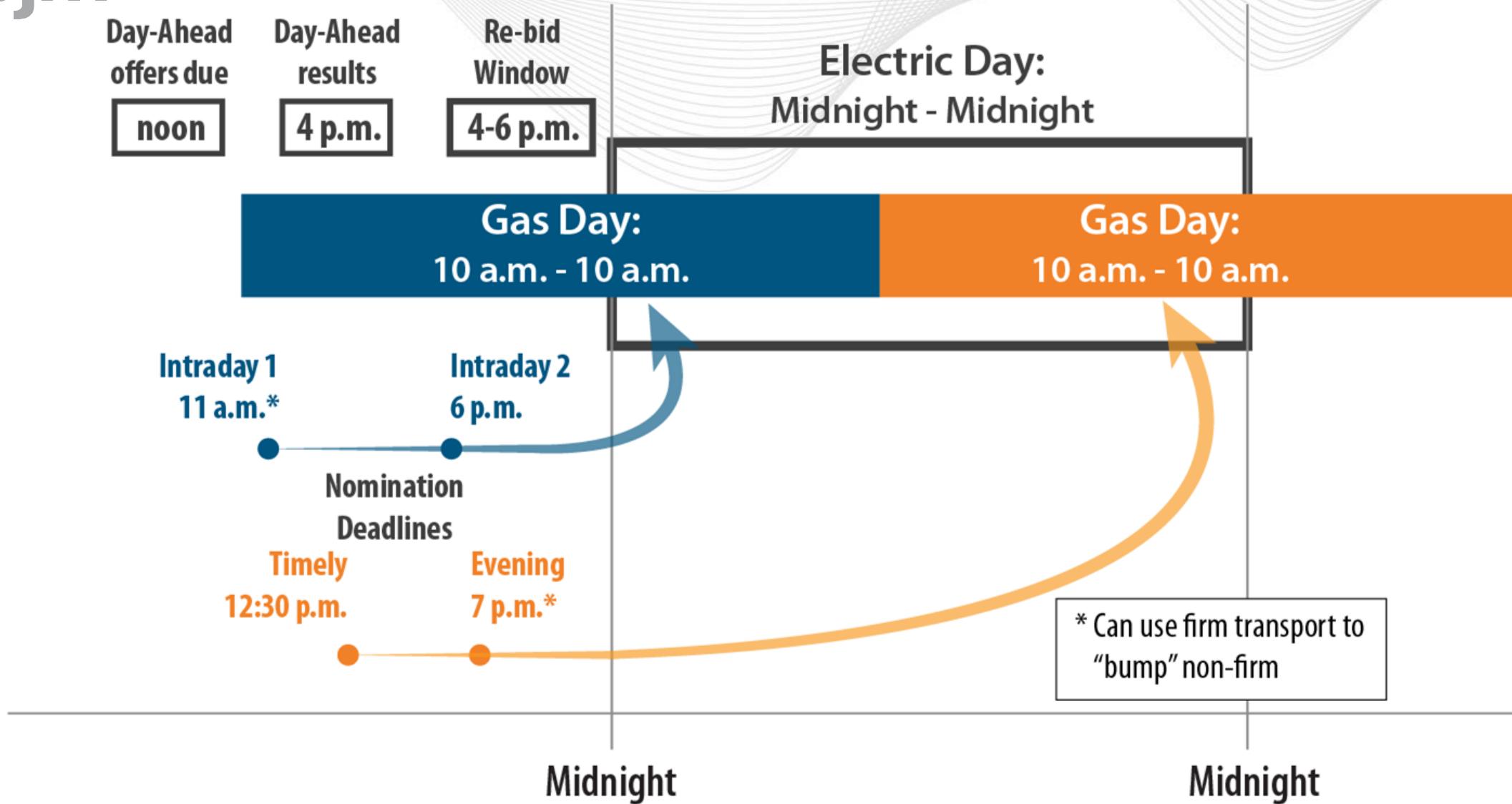
## Key Regulatory Drivers

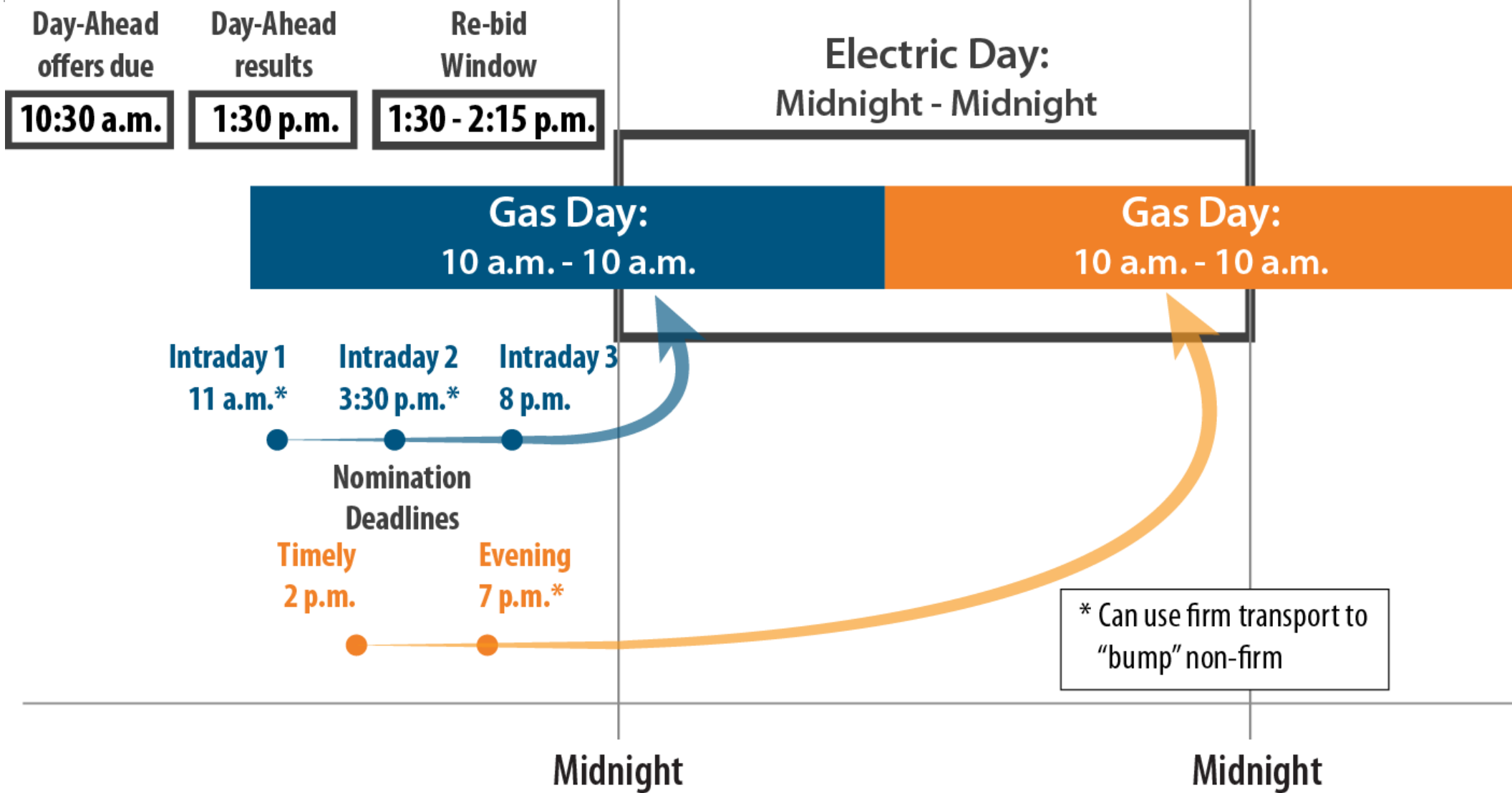
- **FERC Order 787 (2013)**
  - Allowed voluntary sharing of non-public operating information between interstate pipelines, public utilities and electric transmission operators
    - PJM signed Memorandum of Understanding with nine interstate pipelines to foster communication and coordination
    - PJM entered into Confidentiality Agreements with several interstate pipelines and LDCs to bolster information sharing

## Key Regulatory Drivers

- **FERC Order 809 (March 31, 2016)**
  - Adjustment of gas nomination cycles to improve gas-electric coordination
    - Timely nomination deadline moved from 12:30 p.m. Eastern time to 2:00 p.m. Eastern time
    - Addition of 3<sup>rd</sup> intraday nomination cycle
  - PJM also moved the Day Ahead award timing from 4pm Eastern time to 1:30pm Eastern time effective with this change

# Pre-March 30, 2016 Market Timing





# Gas Electric Coordination Team



Comprised of a matrix of personnel from across Operations and Markets Divisions

4 Primary Team Members

10 Secondary Support Team Members



Focused on real time gas electric operations analysis as well as providing seasonal and longer term gas related analytical support





# Gas Electric Coordination Team Focus

Weekly winter operations calls with interstate pipeline gas operations personnel (Primarily November through March)

Daily analysis of natural gas scheduled deliveries to generators (Is the gas nomination sufficient to meet electric obligation?)

Daily assessment of pipeline operating conditions (OFO's, Critical Days, Ratable Take Requirements, Force Majeure)

Daily report(s) to PJM Dispatch on gas delivery risks which could impact generation and provide overall operational awareness

Timely assessment and communication of emergent pipeline events to PJM Ops and Markets personnel

Pre Winter meetings with interstate pipelines and local distribution companies

Monthly Pipeline outage coordination calls (April through October)

## Annual Generator Fuel Data Request

- Supply and Transportation arrangements
- Dual Fuel Capability
- Multiple pipeline delivery capability

Gas Pipeline - Criticala x

https://gaspipe.pjm.com/gaspipe/pages/dashboard.jsf

My Tools | Contact | Help

**Gas Pipeline**

### Critical Notifications

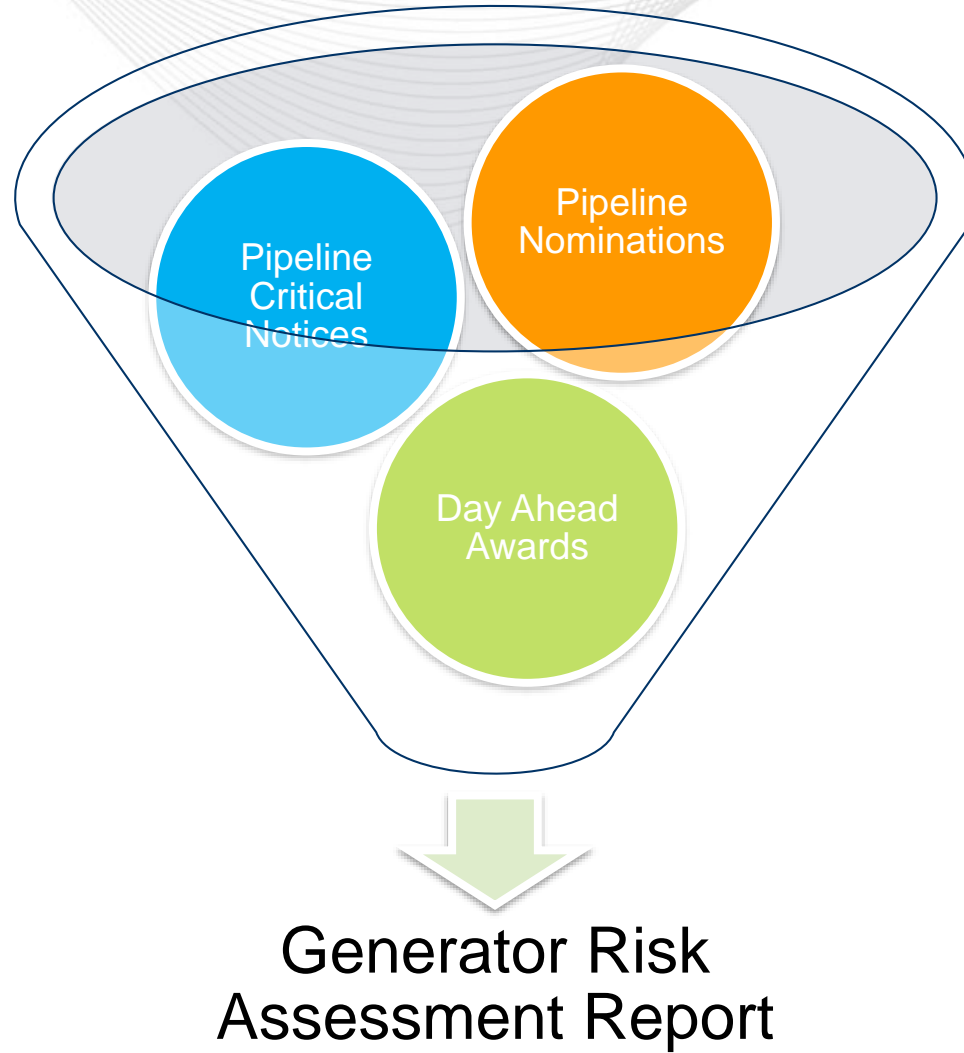
Search (Pipeline, ID, Type, Subject)   883 records Export: [CSV](#) [Print](#)

Pipeline	ID	Type	Subject	Posted UTC	Effective UTC	End UTC
TIGT	1981	Pipeline Conditions	<a href="#">Current Pipeline Conditions</a>	12/09/2014 22:21	12/09/2014 22:21	06/09/2015 21:21
TET	47740	Capacity Constraint	<a href="#">Te Pipeline Conditions For 12/10/2014</a>	12/09/2014 21:04	12/10/2014 15:00	12/11/2014 15:00
ETNG	47741	Capacity Constraint	<a href="#">Etng Pipeline Conditions For 12/10/2014</a>	12/09/2014 20:58	12/10/2014 14:00	12/11/2014 14:00
NGPOA	34806	Pipeline Conditions	<a href="#">Current Pipeline Conditions</a>	12/09/2014 20:35	12/09/2014 20:35	12/31/2049 14:00
AGT	47737	Capacity Constraint	<a href="#">Agt Pipeline Conditions For 12/10/2014</a>	12/09/2014 19:55	12/10/2014 14:00	12/11/2014 14:00
CGT	23861027	Operational Alert	<a href="#">Pre Ofo - Market Area 24 (west Deptford) Hourly Limitation</a>	12/09/2014 19:14	12/09/2014 05:00	01/09/2015 05:00
TGP	354197	Current Pipeline Conditions	<a href="#">Restrictions For 12-9-14 Id1</a>	12/09/2014 17:29	12/09/2014 17:29	12/31/2049 14:00
TGP	354195	Ofo	<a href="#">Ofo Balancing Alert Pin Specific 421070</a>	12/09/2014 15:22	12/09/2014 15:22	12/31/2049 14:00
TGP	354194	Maintenance	<a href="#">Emergent Repair Sta 405a Effective 12-9</a>	12/09/2014 14:39	12/09/2014 14:39	12/31/2049 14:00
TGP	354193	Ofo	<a href="#">Ofo Balancing Alert Pin Specific Lifted</a>	12/09/2014 14:27	12/09/2014 14:27	12/31/2049 14:00
TRA	6179188	Constraint	<a href="#">Market And Production Constraints</a>	12/09/2014 13:54	11/22/2014 15:00	11/22/2015 15:00
CGT	23861026	Capacity Constraint	<a href="#">Capacity Posting - Timely For December 10, 2014</a>	12/09/2014 12:26	12/09/2014 05:00	01/09/2015 05:00
TIGT	1977	Pipeline Conditions	<a href="#">Current Pipeline Conditions</a>	12/08/2014 22:25	12/08/2014 22:25	06/08/2015 21:25
DGT	169016	Capacity Constraint	<a href="#">PL-1 Restrictions Effective December 9, 2014</a>	12/08/2014 21:50	12/08/2014 21:50	12/08/2015 21:50
DGT	169015	Capacity Constraint	<a href="#">PL-1 Limitations Effective December 8, 2014, Id-2</a>	12/08/2014 21:47	12/08/2014 21:47	12/08/2015 21:47

#### Disclaimer

Recipient acknowledges, understands and accepts that neither PJM Interconnection, LLC nor its directors, officers, affiliates, subsidiaries, shareholders, employees or agents has made any warranty whatsoever to recipient as to the information included herein, express or implied, and that the information being made available to recipient is solely on an "as is" basis, and PJM is not the originating source of the data. PJM Interconnection, LLC makes no representation, warranty or guarantee as to the accuracy or completeness of the information provided herein. Any copying, reproduction and/or redistribution of any of the documents, data, content of materials contained herein is strictly at recipients own risk. In no event is PJM Interconnection LLC its affiliates or any of its contributors liable to any person or entity for any decision made or action taken in reliance upon the information provided herein.

# Gas Generator Risk Assessment Tool Process





## IRC Electric Gas Coordination Task Force

- Consists of ISO/RTO reps from US and Canada
- Meets multiple times per year
- Larger Pre Winter meeting with the natural gas industry (INGAA/NGSA/Pipelines)
- Focus is on sharing of best practices and electric gas related initiatives

## EIPC Electric Gas Task Force

- Eastern Interconnect Planning region representation
- Inaugurated in late 2019
- Initial focus is on development of consistent criteria for members to follow when studying gas supply disruptions

## NERC Electric Gas Working Group

- Kicked off January 2019
- Consists of electric and gas industry reps
- Focus is on the development of a set of guidelines that industry participants can use for effective gas electric coordination practices and when performing gas electric studies

## ISO/RTO Operational Calls

- Monthly call to touch base on recent operational experiences focused primarily on natural gas and industry and regulatory requirements
- Informal meeting format

## PJM/Interstate Pipeline/LDC Tabletop Exercises

- Testing operational and communication protocols between PJM, Interstate Pipeline and LDC personnel under various system disruption scenarios

## GridEx

- Active participation from several interstate pipelines

## NPCC Tabletop Exercise

- Collaborating on New York/New England based exercise simulations

## National Labs

- Maintaining working relationships with national labs on ongoing fuel security studies and model development

## DOE NTRR Project

- Participating in Technical Review Committee with ongoing Near Term Reliability and Resilience study

## Current and Future Challenges

# Current Interconnection Queue

*As of April 1, 2021*

Storage,  
**27,895 MW**

Wind,  
**31,693 MW**

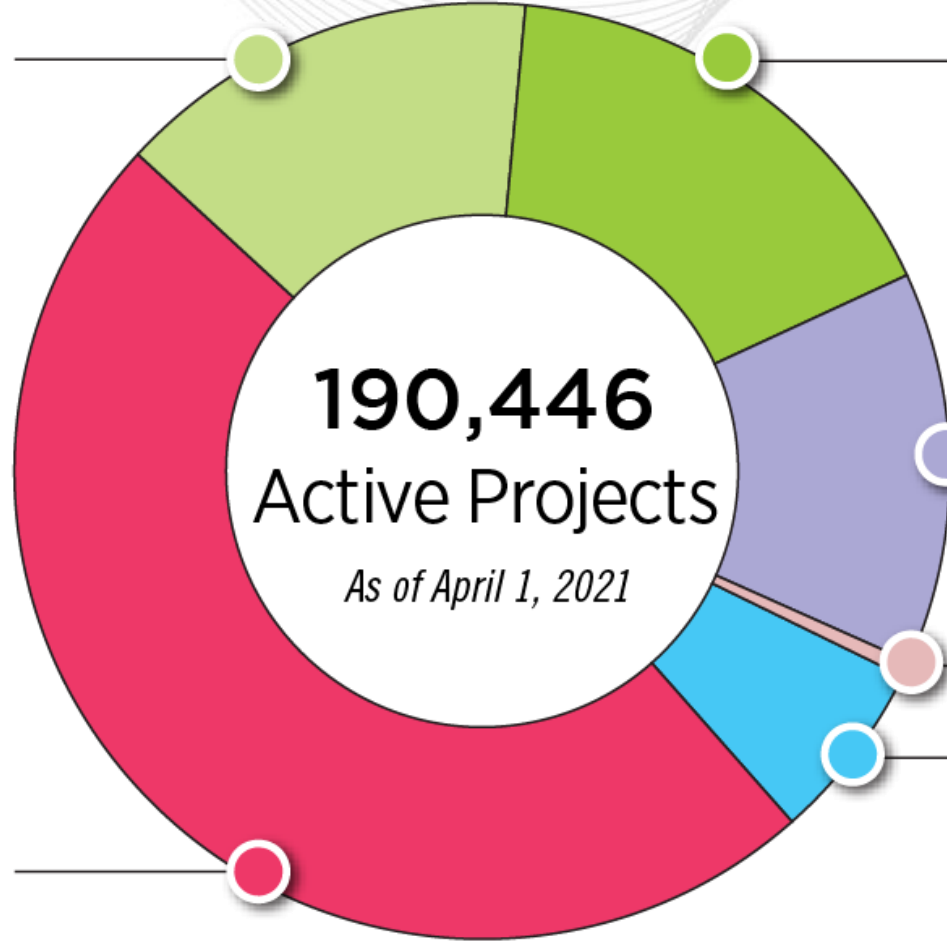
**190,446**  
Active Projects  
*As of April 1, 2021*

Hybrid,  
**25,804 MW**

Other,  
**1,043 MW**

Solar,  
**92,099 MW**

Natural Gas,  
**11,912 MW**



- Staying ahead of cyber and physical threats
  - Collaboration with federal agencies
  - Exercises and drills between gas and electric industries
- Fuel assurance during a system emergency/restoration event
  - Black start and critical load generation
    - How much gas would be available?
    - Emergency order to raise priority of gas deliveries
    - On-site fuel requirements
  - Ensuring all electrically powered critical gas infrastructure is clearly identified to mitigate any curtailments
- ***Continuing collaboration with stakeholders and natural gas industry***
  - ***Identification of operational/market solutions to improve reliability***



SME/Presenter:  
Brian Fitzpatrick

[brian.fitzpatrick@pjm.com](mailto:brian.fitzpatrick@pjm.com)

Gas-Electric Coordination in PJM



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

[custsvc@pjm.com](mailto:custsvc@pjm.com)