EIPC Gas-Electric Interface Study Update
ENGCTF
February 11, 2015

MISO
Tag Short

Eastern Interconnection Planning Collaborative Gas-Electric Study

Objective

Update stakeholders on status of the EIPC Gas-Electric Study

Key Takeaways

- Target 2 second draft recently released
- Stakeholder webinar Feb 12, 2015
  - http://www.eipconline.com/uploads/Notice_for_SSC_Webinar__02-12-15_.pdf
- Target 2 Key Findings:
  - Extensive pipeline and storage deliverability result in gas infrastructure adequacy under almost all market conditions and resource mixes
  - Small transportation deficit in MISO North/Central in Winter 2018 and 2023 when additional attrition of coal-fired capacity is replaced by gas-fired capacity

Status Update

All information regarding this study can be found at:
http://www.eipconline.com/Gas-Electric.html

Target 1
Existing Natural Gas-Electric System Interfaces - COMPLETE

- Final draft released Friday, April 4, 2014
- Develop baseline assessment, including descriptions of the natural gas-electric system interfaces, interaction effects, specific drivers of the pipeline/LDC planning process

Target 2
Infrastructure Capability – 2nd Draft/Near Final Report Posted

- In progress. Planned Completion Date 7/11/14
- Evaluate the adequacy of the interstate gas pipeline network to meet the coincident peak demands of local gas distribution companies (LDCs) serving firm residential, commercial, and industrial (RCI) customers, as well as gas-capable electric generators.

Status Update

All information regarding this study can be found at:
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Target 3
Contingency Analysis – IN PROGRESS

- Draft report scheduled for 2-27-15
- Identify contingencies on the natural gas system that could adversely affect electric system reliability

Target 4
Duel Fuel vs Firm/Infrastructure Expansion Analysis - COMPLETE 

- Final report posted December 1, 2015
- Review the operational / planning issues affecting the availability of dual fuel capable generation, including fuel assurance objectives.
- http://www.eipconline.com/uploads/Final_Draft_Target_4_Report_Redacted.pdf

Remaining Schedule

Date	Milestone
2/12/2015	Stakeholder Webinar
2/27/2015	Stakeholder Written Comments on Target 2 Report Due
2/27/2015	Post Draft Target 3 Report (public version) and send notice to SSC and Stakeholders
3/3/2015	SSC Webinar – discuss Draft Target 3 Report
3/13/2015	Final Draft Target 2 Report submitted to DOE (Target 2 complete)
3/13/2015	Stakeholder Comments on Draft Target 3 Report Due
3/27/2015	Final Draft Target 3 Report submitted to DOE (Target 3 Complete)
5/8/2015	Post Draft Revision to Phase II Report and send notice to SSC and Stakeholders
5/28-29/15	SSC Meeting – discuss Revised Draft Phase II Report
6/3/2015	Final Written Stakeholder Input on Draft Report Due
6/12/2015	Revised Final Draft Report Sent to DOE
6/26/2015	DOE comments on Final Draft Report
7/2/2015	Final Report Submitted
7/17/2015	End of Project

Appendix

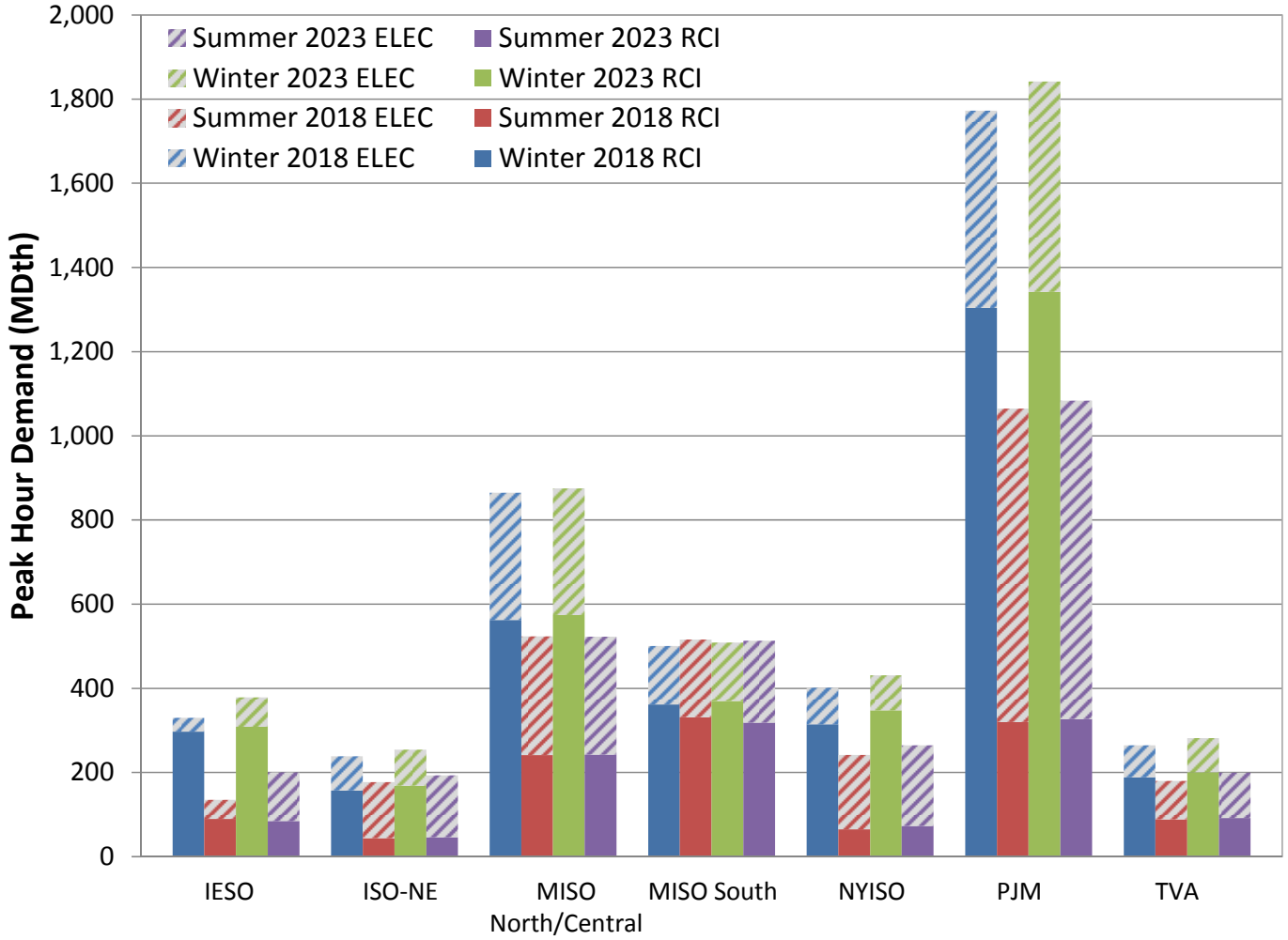
Target 2 Executive Summary (MISO)

- Gas infrastructure appears adequate in 2018 and 2023 under the market conditions and resource mixes in nearly all scenarios and sensitivities tested.
- A relatively small transportation deficit arises in MISO North/Central only in winter 2018 and 2023 if there is heightened attrition of coal-fired capacity coupled with low gas prices and high load.
  - Under such high gas demand conditions, certain of the pipelines serving MISO North/Central are fully utilized, resulting in significant affected generation.
- No significant constraints in MISO South
  - close proximity to traditional production
  - network of interconnected gas gathering, conventional storage and transportation infrastructure to serve loads in MISO South
- No significant transportation constraints affecting gas-fired generation during the summer in 2018 or 2023 in either MISO North/Central or MISO South.

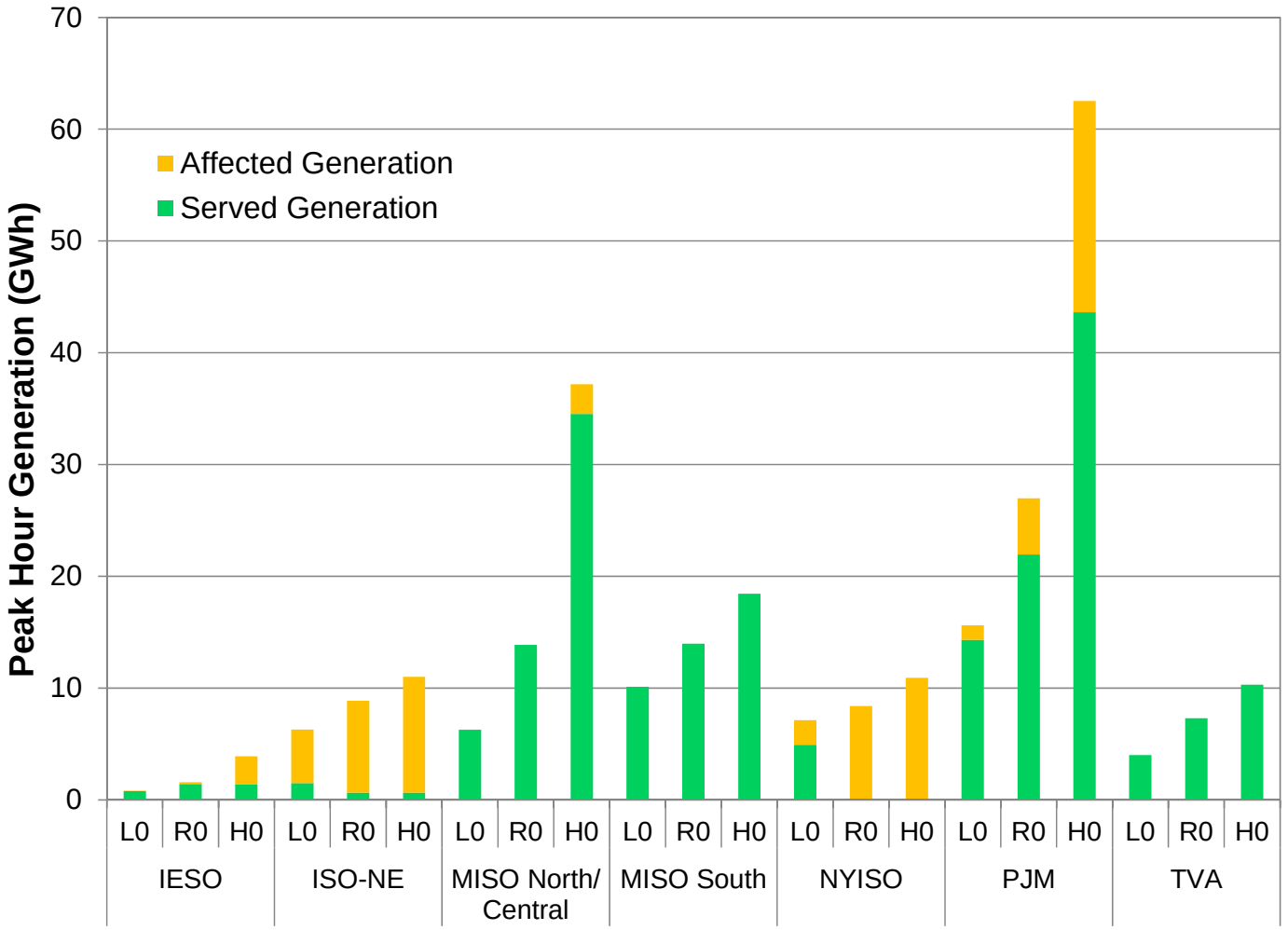
Target 2 Goals

1. Develop a dispatch model of the electric system representing the five-year (2018) and ten-year (2023) horizons to estimate hourly gas demands for each gas units
2. Incorporate forecasts of generator gas demand with forecasts of RCI gas demand, to represent seasonal peak days
3. Identify gas infrastructure constraint points and to evaluate infrastructure adequacy to meet generation gas demand on seasonal peak days
4. Determine potential mitigation measures to address gas infrastructure constraints.

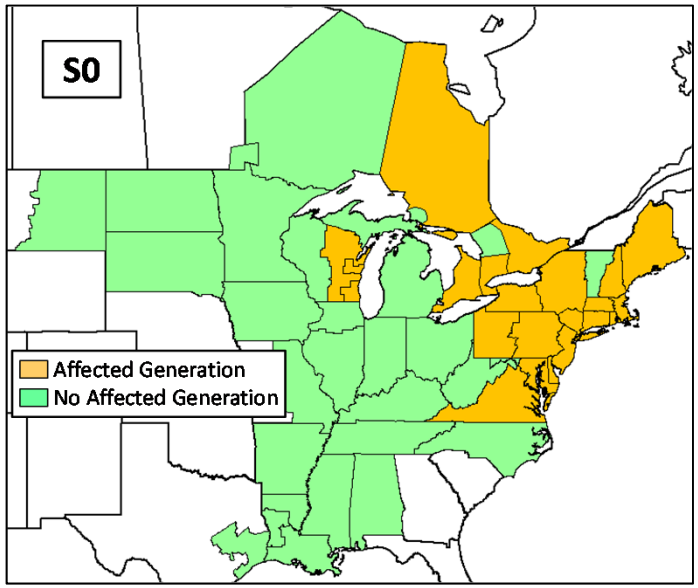
Peak Gas Demand – High Gas Demand Scenario



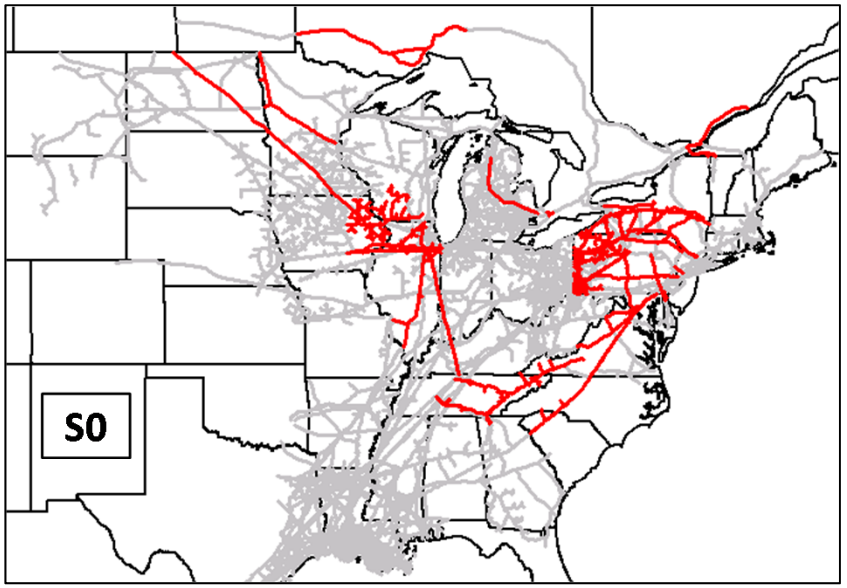
Peak Hour Affected Generation – Winter 2018



High Gas Demand Scenario – Winter 2018



Peak Hour Affected Generation



Constrained pipeline segments that result in affected generation for HGDS S0 and HGDS S1 during the Winter 2018 peak hour

Peak Hour Affected Generation as % Peak Load – Winter 2018

RGDS = Reference Gas Demand Scenario

LGDS = Low Gas Demand Scenario

HGDS = High Gas Demand Scenario

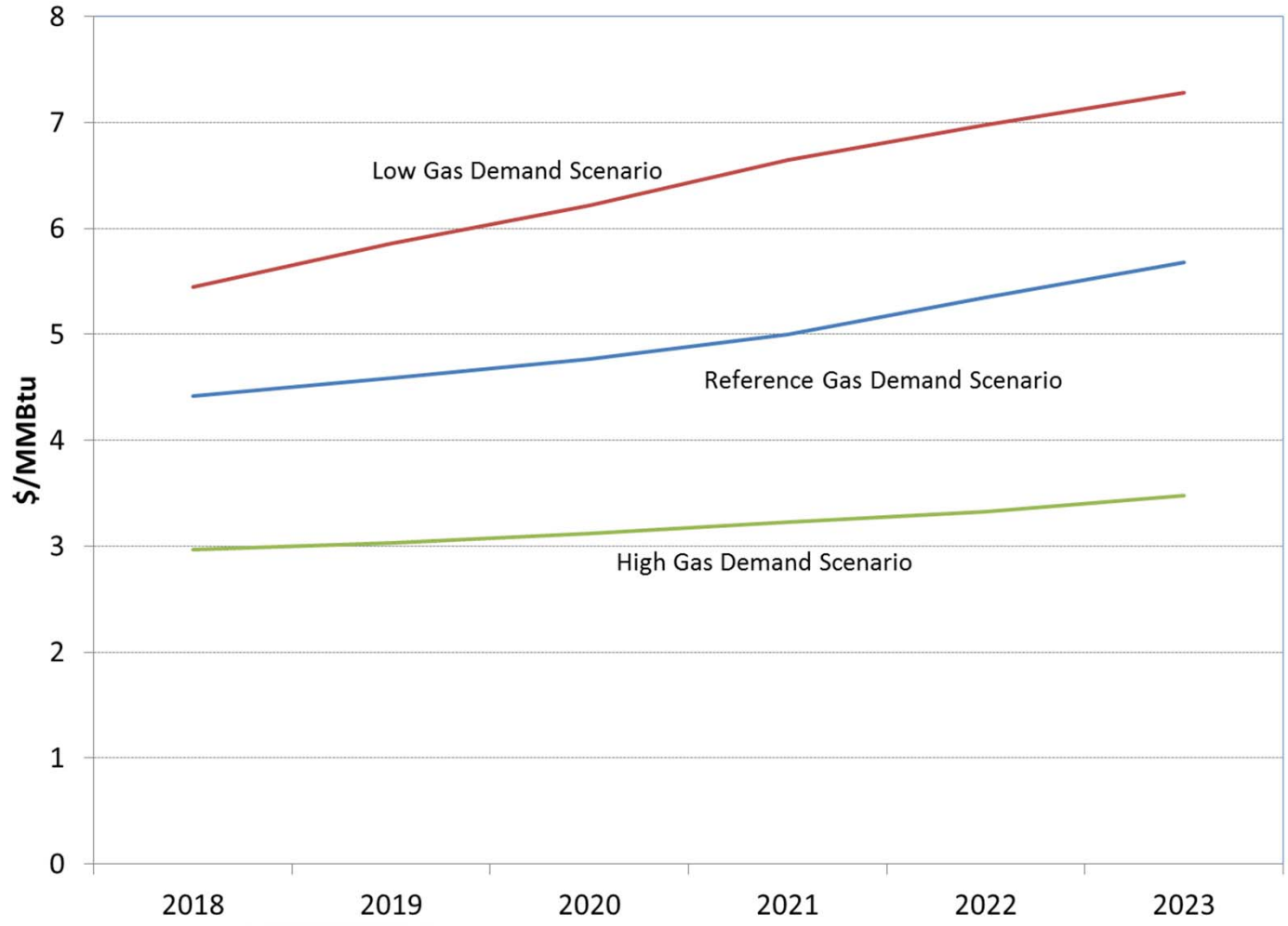
S# represents a sensitivity, where descriptions can be found on the EIPC website.

S0 = Base case sensitivy

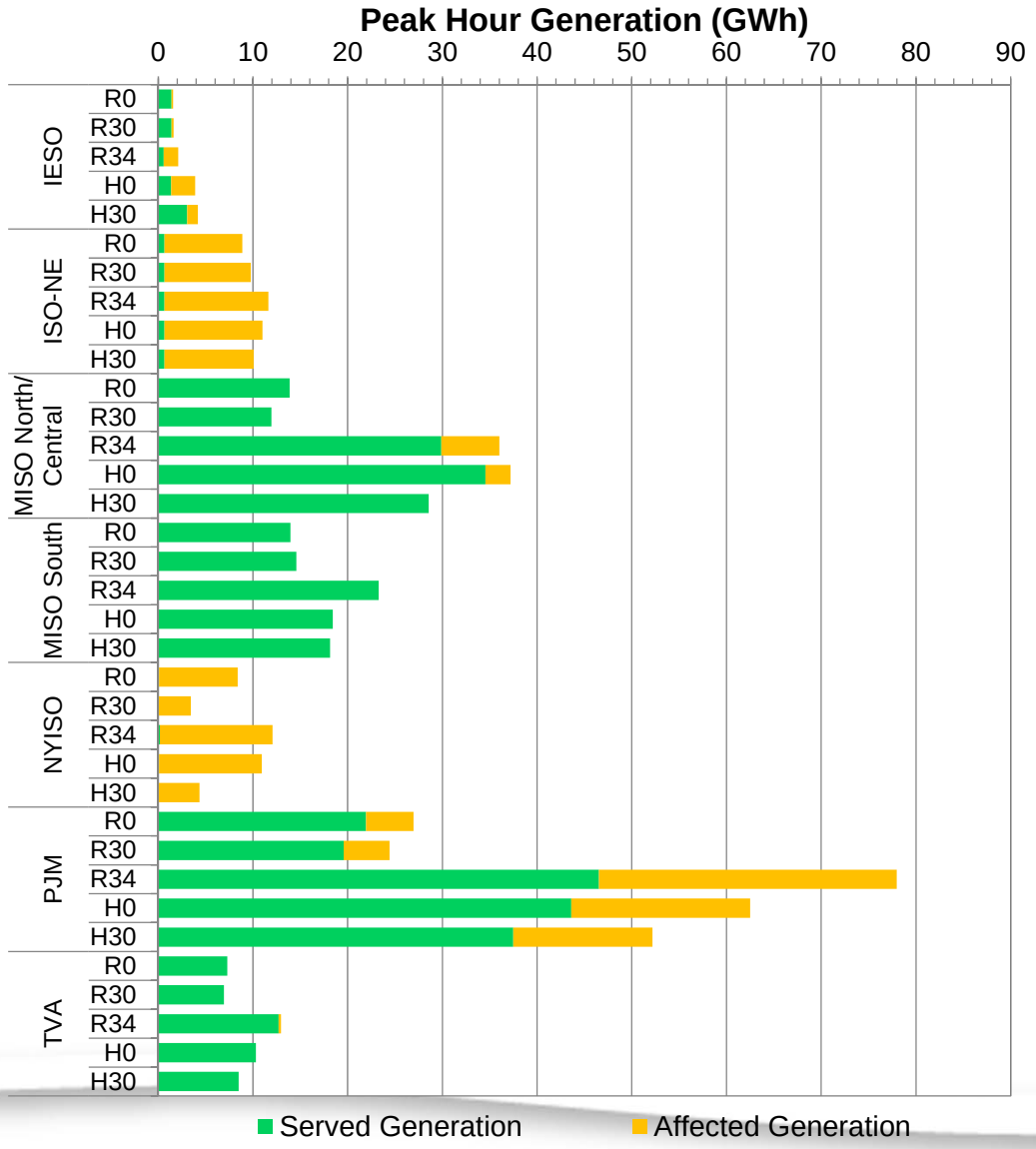
S34 = Dual fuel units are restricted to burning only gas

Scenario/ Sensitivity	IESO	ISO-NE	MISO North/ Central	MISO South	NYISO	PJM	TVA
RGDS S0	1%	38%	0%	0%	36%	4%	0%
HGDS S0	11%	48%	4%	0%	46%	15%	0%
LGDS S0	0%	23%	0%	0%	10%	1%	0%
RGDS S1	2%	0%	0%	0%	11%	3%	0%
HGDS S1	2%	0%	0%	0%	21%	8%	0%
LGDS S1	0%	0%	0%	0%	0%	2%	0%
HGDS S2	5%	36%	0%	0%	2%	11%	0%
LGDS S2	0%	30%	0%	0%	17%	2%	0%
RGDS S3	1%	45%	0%	0%	47%	11%	0%
RGDS S5a	0%	32%	0%	0%	30%	4%	0%
RGDS S5c	0%	45%	0%	0%	36%	3%	0%
HGDS S9	14%	48%	4%	0%	52%	14%	0%
RGDS S13	0%	33%	0%	0%	15%	3%	0%
RGDS S14	1%	38%	0%	0%	36%	4%	0%
RGDS S16	1%	14%	0%	0%	36%	4%	0%
RGDS S18	3%	44%	0%	0%	39%	4%	0%
RGDS S19	1%	38%	0%	0%	36%	7%	0%
RGDS S23	1%	38%	0%	0%	36%	4%	0%
RGDS S30	1%	43%	0%	0%	15%	4%	0%
HGDS S30	5%	43%	0%	0%	19%	12%	0%
RGDS S31	2%	0%	0%	0%	17%	8%	0%
RGDS S33	2%	0%	0%	2%	17%	8%	0%
RGDS S34	8%	51%	8%	0%	51%	25%	1%
RGDS S36	2%	0%	0%	0%	17%	8%	0%

Gas Demand Scenario Pricing



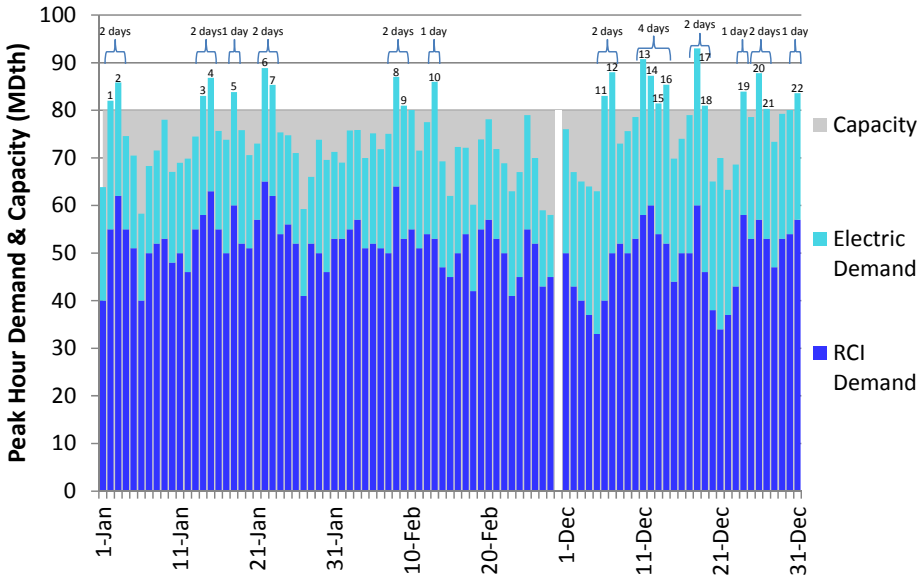
Peak Hour Affected Generation – Winter 2018, Impact of Forcing Fuel Type



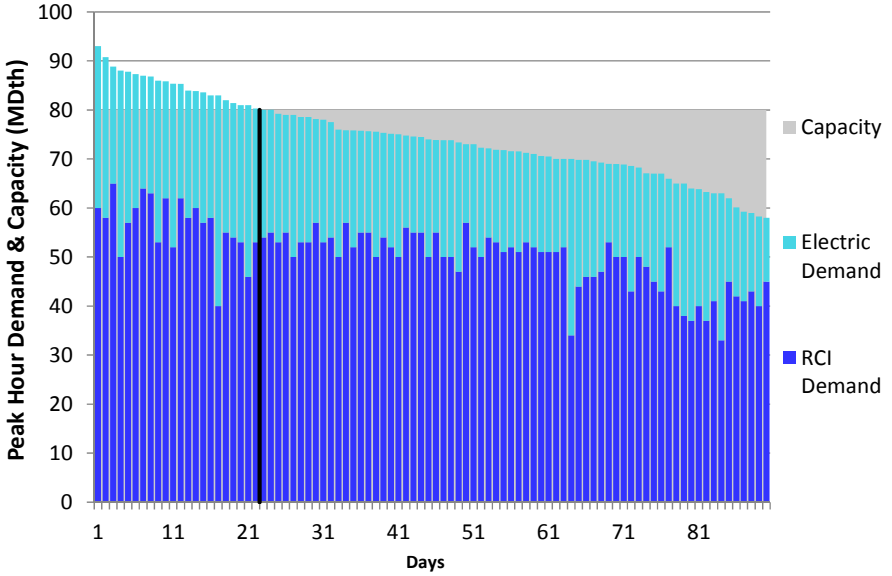
Risk Factors and Market Dynamics Affecting Gas Infrastructure

Market Dynamic and/or Risk Factor	IESO	ISO-NE	MISO North/ Central	MISO South	NYISO	PJM	TVA
Transport Deficits							
New Pipeline Additions							
Proximity to Shale Gas							
Reversal-of-Flow							
Available Coal Output							
Nuclear Retirements/delay							
LNG Import Constraints							
LNG Export Constraints							
Transmission Transfer Limits (Electric)							
Generator FT Entitlements							
Generator Reliance on Non-Firm Arrangements							
Dual Fuel Capability							
Renewables Penetration							

Seasonal Constraints Measurements – Hypothetical Example of Frequency and Duration



Chronological Demand

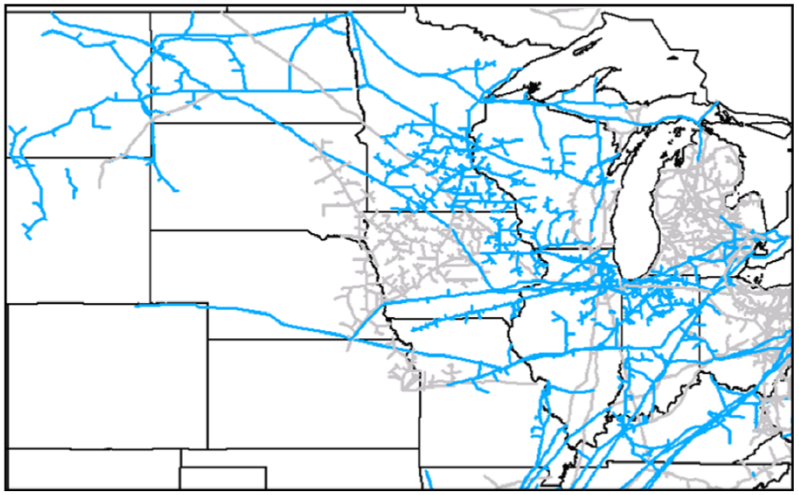


Descending Demand

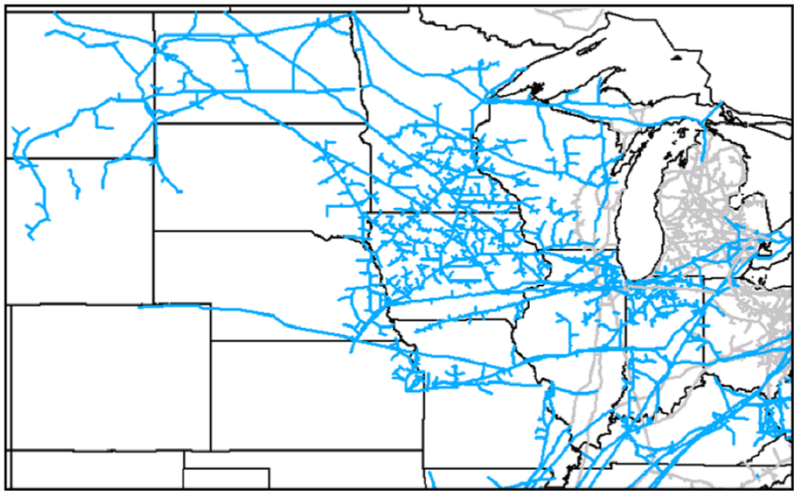
Constrained Segments Unique to High Gas Demand Scenario 2018

	HGDS Winter 2018				HGDS Summer 2018				Characterization		
Constrained Segment	Events	Min Duration (Days)	Max Duration (Days)	Total Days	Events	Min Duration (Days)	Max Duration (Days)	Total Days	Persistance	Severity	Depth
Algonquin Connecticut					8	1	5	21	Mod	Mod	Mod
Alliance	4	1	6	10					Mod	High	High
ANR Northern Illinois	10	1	35	60					High	Mod	Mod
Great Lakes East	12	1	30	66					High	High	Mod
Midwestern	19	1	10	55					High	Mod	Mod
NGPL IA/IL North	11	1	20	51					High	Mod	Mod
NGPL IA/ILSouth	12	1	11	48					High	High	Mod
Northern Border Chicago	14	1	10	46					High	High	Mod
Northern Natural D	4	1	4	8					Low	Mod	Mod
PNGTS N of Westbrook					11	1	7	28	Mod	Low	Mod
PNGTS S of Westbrook					12	1	8	48	High	Low	High
Viking Zone 1	11	1	10	24					Mod	High	Mod

Pipeline Utilization



Reference Gas Demand Scenario
Winter 2018
Segments Less Than 80% Utilized



Reference Gas Demand Scenario
Winter 2018
Segments Less Than 90% Utilized

Questions

http://www.eipconline.com/Home.html

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