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Gas System Long-Term Plan

Technical Session 04.04.24

Focus Topic - Non-Pipeline Alternatives (NPAs)

Cases 20-G-0131 & 23-G-0676

Logistics and Background

James Keating
Director, Gas Transformation and Planning

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Agenda

- Logistics and Background for Session
- Project Selection
- NPA Program Results
- Beneficial Location Analysis
- Q&A

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Meeting Logistics

- Central Hudson Gas and Electric (CHG&E) is presenting at the Technical Session to provide Stakeholders with a summary discussion of its NPA program.
- Please use the “raise hand” feature of the meeting platform so that we know when there are questions to address (We will answer questions in the order they are received).

- https://www.cenhud.com/en/my-energy/our-energy-future/long-term-gas-system-plan/

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NPA Project Selection

Jason Mead - Section Engineer, Gas Engineering

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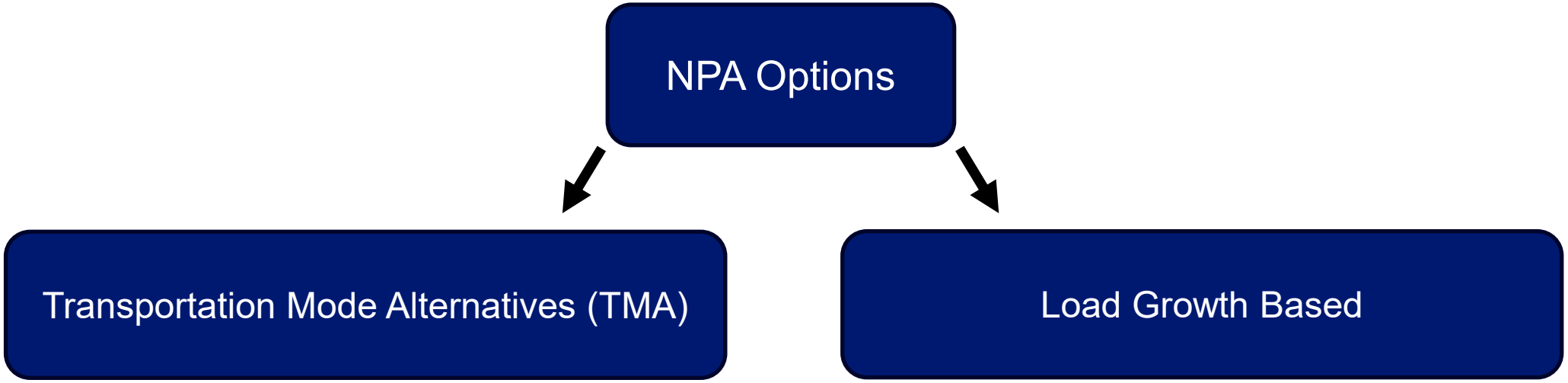
Non-Pipes Alternative (NPA) Types



- Identify instances where a NPA is more cost effective than traditional pipe replacement
- If successful, allows for strategic abandonment of LPP
- System reliability and safety is not negatively impacted
- Began initiative in 2019

- Designed to manage locational constraints associated with peak demands
- Pilot is in development phase

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NPA Screening and Suitability Criteria

- Screening
  - Projects that exceed a cost threshold will require Central Hudson to pursue a “full-scale solicitation of NPA followed by a benefit/cost analysis (BCA) of potential solutions.”
  - Projects that fall below this threshold will entail an “expedited standardized review approach with a streamlined economic and technical analysis and take advantage of known alternative solutions with identifiable costs."

- Suitability
  - Evaluation based on costs, load relief needs, timeline, and feasibility
  - Procurement pathway determined by project specifics
  - Criteria adjusted over time based on experience and inflation, with consideration of project types and geographic coverage

Central Hudson Suitability Criteria		
Cost	Large Project	>$2 million
	Small Project	≤$2 million
Timeline	Large Project	24 months or more
	Small Project	12 to 24 months

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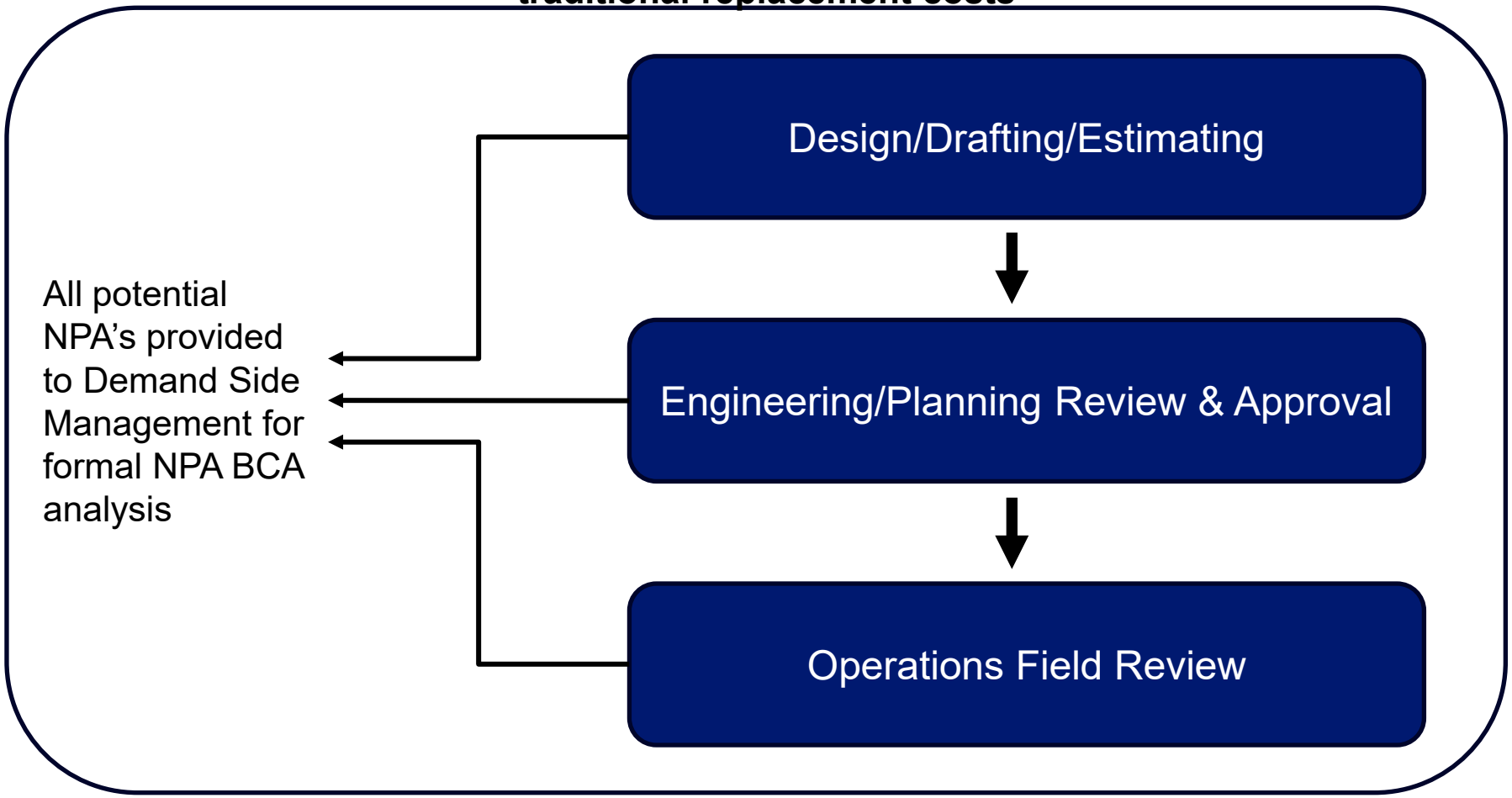
NPA's Incorporated into LPP Projects

Targeted Review for low customer saturation and/or higher than normal traditional replacement costs



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NPA Program Results

Cory Scofield
Director, Demand Side Management

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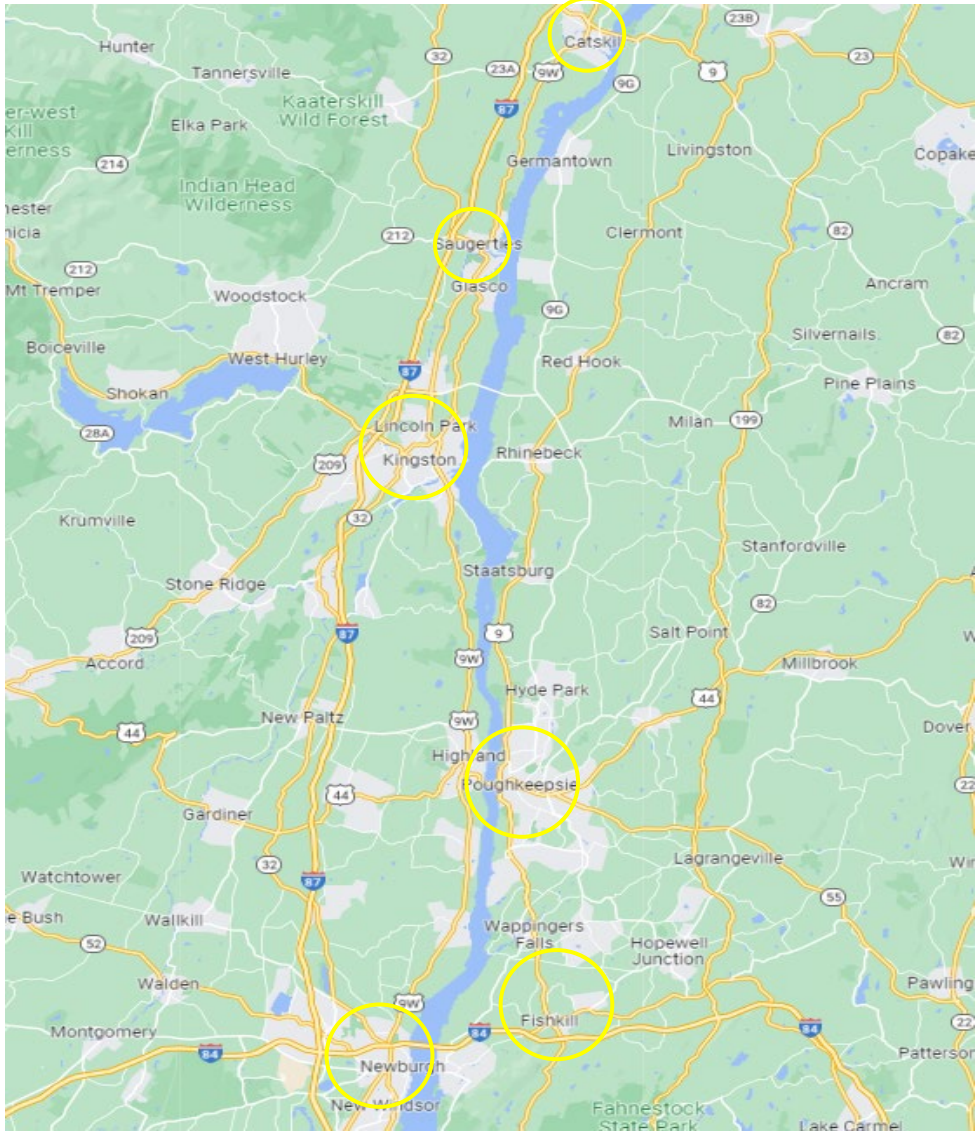
Background and Filings

- June 14, 2018: Rate Plan Order
- June 21, 2019: Filed initial NPA TMA Implementation Plan
  - Annual filings thereafter
  - 2023:https://documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=315556&MatterSeq=54153
- December 1, 2019: Filed initial Annual NPA Report
  - Annual filings thereafter
  - 2023:https://documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=316971&MatterSeq=54153
- August 10, 2022: Filed Proposals for Non-Pipe Alternative Screening and Suitability Criteria
  - https://documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=291791&MatterSeq=62227

Transportation Mode Alternatives

- The Company has a target of at least 15 miles of Leak-Prone Pipe (LPP) replacement per year
- Replaces gas using equipment (heating and appliances) with electric devices.
- Also considered in “unique” scenarios
- 100% participation required in each case location
- Overview: 48 Cases, 11 Municipalities,
- Average case: 2-3 dwelling, ~500 feet
- 5 cases fully converted (4 in DACs, 8 SF, 2 MF homes,)
- LPP eliminated: 2,139 feet



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TMA Process Workflow

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Whole Home Beneficial Electrification Upgrade

- Full Electric Conversion
  - “Heat Pump installations in compliance with NYS Clean Heat guidelines
  - Heat pump water heater
  - Electric cooking range
  - Other appliances as needed (ex: electric clothes dryer)
- “Make-Ready” as needed
  - Electric panel and wiring upgrades
- Targeted marketing strategy, followed by customer education and enrollment.
- Central Hudson covers the equipment & installation costs

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Targeted Marketing Approach

- Custom letters
- Single point of contact
- Follow up phone call
- On the ground follow up and education
- Brochure
- Website: https://www.cenhud.com/en/my-energy/invitation-only/

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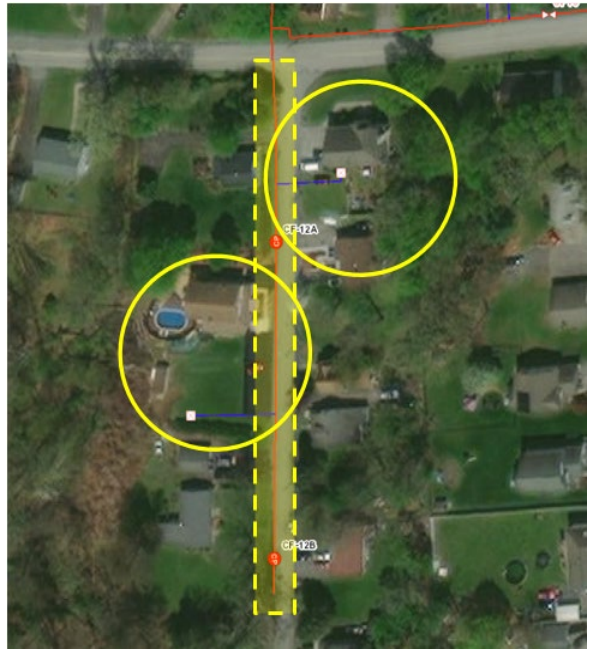
Example Projects

- 2019 Newburgh, NY:
  - 360 ft. Leak Prone Pipe (4” Steel)
  - Avoided replacement cost: $65k
  - NPA Cost: Est $56k, Actual $50k
  - Final SCT: 1.26
  - Building Overview:
    - House 1: 2,264 sq. ft., panel upgrade, mini-split and ducted HVAC, appliance upgrade
    - House 2: service line relocation



- 2021 Fishkill, NY:
  - 560 ft. Leak Prone Pipe (4” Steel)
  - Avoided Replacement Cost: $217k
  - NPA Cost: Est $239k, Actual $253k
  - Final SCT: 0.81
  - Building Overview:
    - 5 homes. Average size: 1,997 sq. ft., make ready needs, mini-split and ducted HVAC solutions, appliance upgrade, retired NG generator, heated basement, multi-level.
  - Customer education “Fine-tuning” for comfort and efficiency

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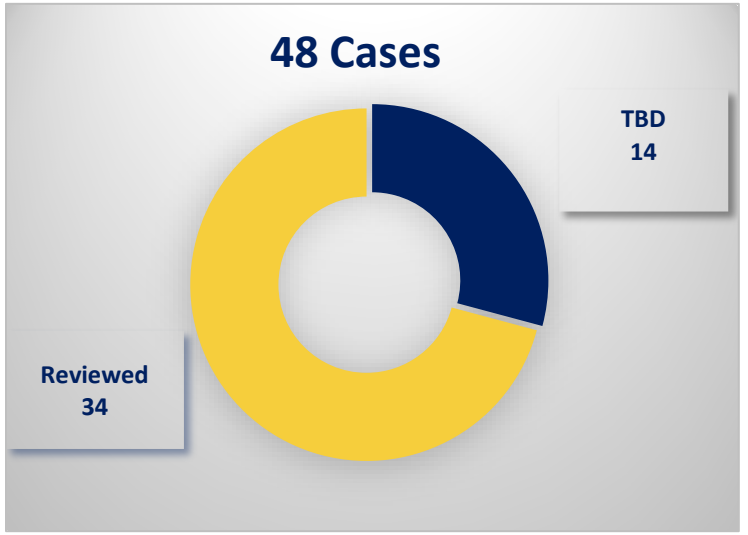
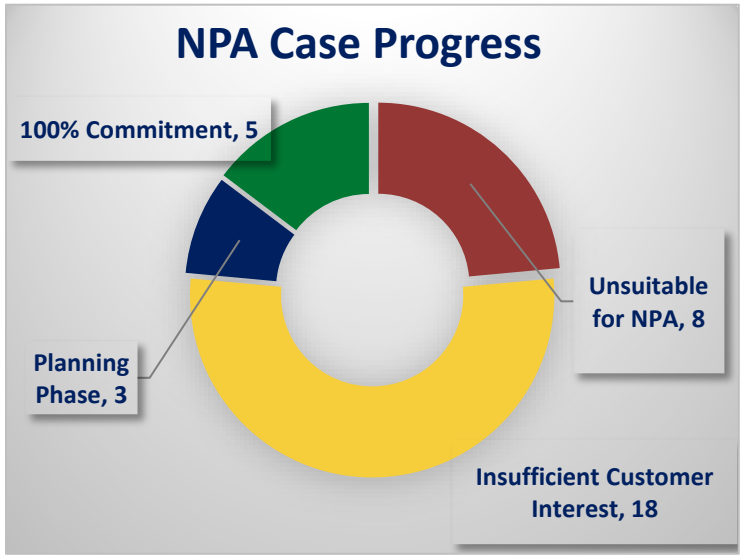
TMA Challenges / Risks

- Project-level Challenges:
  - 100% participation for each case
  - Short timeline to coordinate with municipal projects
  - New customer requests prior to retiring pipe main

- Customer-level Challenges:
  - Unique property layouts
  - Approving Boards / Powers of Attorney
  - Multi-family, Landlord / Tenant
  - Customers change in position
  - Sale of property during solicitation period
  - Preference for natural gas





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Customer Experience

Customer feedback	Cooking gas only customer. "I was going to replace my oil furnace with natural gas. I would sign if Central Hudson were to replace heating as well"
	Full home conversion. Not interested in converting away from gas range. “no, still not interested. We are moving to a retirement home soon”
	Personal circumstances. COVID-19-related loss of job and caretaking of others.
	"Will my electric bill go up?"
	The Board highly inclined to convert in-scope dwelling. Future plans, however, exist to construct a new 10,000 sq. ft. multi-unit building on adjacent site. Preference is for natural gas heat and backup generation. Concerns: "Cost of electrical infrastructure … Geothermal cost prohibitive... costs of an electric [storage] or diesel generator" and fuel delivery requirements.
	Indicated a preference to keep gas service. Customer thought it was "important to have" .. and indicated they "already have AC and it’s just the furnace that runs on gas" .... Also if "we ever wanted to do a generator onsite, we’d want to consider using Natural Gas."
	"We understand the eventual full-electrification of the grid and its benefits to the environment, but we like our natural gas. We are uncomfortable changing what we've relied upon for so many years."
	"We are fully invested in gas equipment: gas heating system, gas generator, 2 gas stoves, gas grill (we love cooking with gas and don't want an electric or induction stove). Also, we are not motivated by the cash incentive."

BCAs and Project Summaries

Societal Cost Test (SCT):

The SCT considers the costs and benefits to society as a whole. It includes not only the direct costs and benefits associated with the project, but also factors such as environmental impacts, health benefits, and economic effects, providing a more comprehensive assessment of its overall value.

Proposed	Case	Location	SCT	Customer Count	Located in a DAC	Status
2019	1	Spruce St. Newburgh, NY	1.14	2	✓	Completed
	2	Rt. 9W (South Section)	6.54	2		Unsuitable for NPA
	3	Rt. 9W (North Section)	2.87	18		
2020	4	Roe Ave. - Highland Falls,	1.94	2	✓	Insufficient customer interest
	5	Blackburn Ave. - Beacon, NY	5.18	1	✓	Completed
	6	Brookside Ave. -	4.66	1	✓	Insufficient customer interest
	7	Hutton St. - Kingston, NY	1.13	2		Insufficient customer interest
	8	Tubby St. - Kingston, NY	2.04	2		Insufficient customer interest
	9	Main St. - Highland Falls, NY	0.42	5		Unsuitable for NPA
	10	VanGaasbeck St. - Kingston,	0.49	3		Unsuitable for NPA
	11	N Pierpont Ave. -	2.50	5		Insufficient customer interest
	12	Boulevard Knls. -	0.95	3	✓	Unsuitable for NPA
	13	Eden Tr. - Poughkeepsie, NY	1.16	2	✓	Insufficient customer interest
	14	Villa Parkway - Highland	1.66	1	✓	Insufficient customer interest
	15	West Main St. Wappingers	N/A	5	✓	Insufficient customer interest
2021	16	Albany Ave. - Kingston, NY	2.01	1	✓	Insufficient customer interest
	17	Woodvale Ave. - Fishkill, NY	0.86	5	✓	Completed
	18	Charles St. - Poughkeepsie,	0.81	3	✓	Completed
	19	Violet Ave. - Poughkeepsie,	1.51	3	✓	Insufficient customer interest
	20	North Bridge St.	0.90	4	✓	Insufficient customer interest
	21	West Pierpont St. -	1.15	2	✓	Unsuitable for NPA
2022	22	Fairview Ave. Ext. -	1.27	1	✓	Insufficient customer interest
	23	Eagle Head Rd. - Cornwall,	1.90	2		Insufficient customer interest
	24	Duggan Ln. - Cornwall, NY	0.50	2		Unsuitable for NPA
	25	Morehouse Rd. -	0.77	3	✓	Unsuitable for NPA
	26	Wodenethe Dr. - Beacon,	0.65	2	✓	Unsuitable for NPA
	27	Tilden St. - Esopus, NY	2.20	2	✓	Insufficient customer interest
2023	28	D'alfonso Rd. - Newburgh,	2.10	6	✓	Insufficient customer interest
	29	Partridge Rd. - Cornwall, NY	1.00	1		Unsuitable for NPA
	30	Bellwood Rd. - Cornwall, NY	1.34	1		Completed
	31	Stillwood Rd. - Cornwall, NY	1.32	3		Insufficient customer interest
2024	32	Noone Ln. - Kingston, NY	1.32	1		Planning phase
	33	Greenkill Ave. - Kingston,	1.91	1	✓	Planning phase
	34	Verplanck Ave. - Beacon, NY	1.52	1	✓	Planning phase
Total			1.75	98	21	

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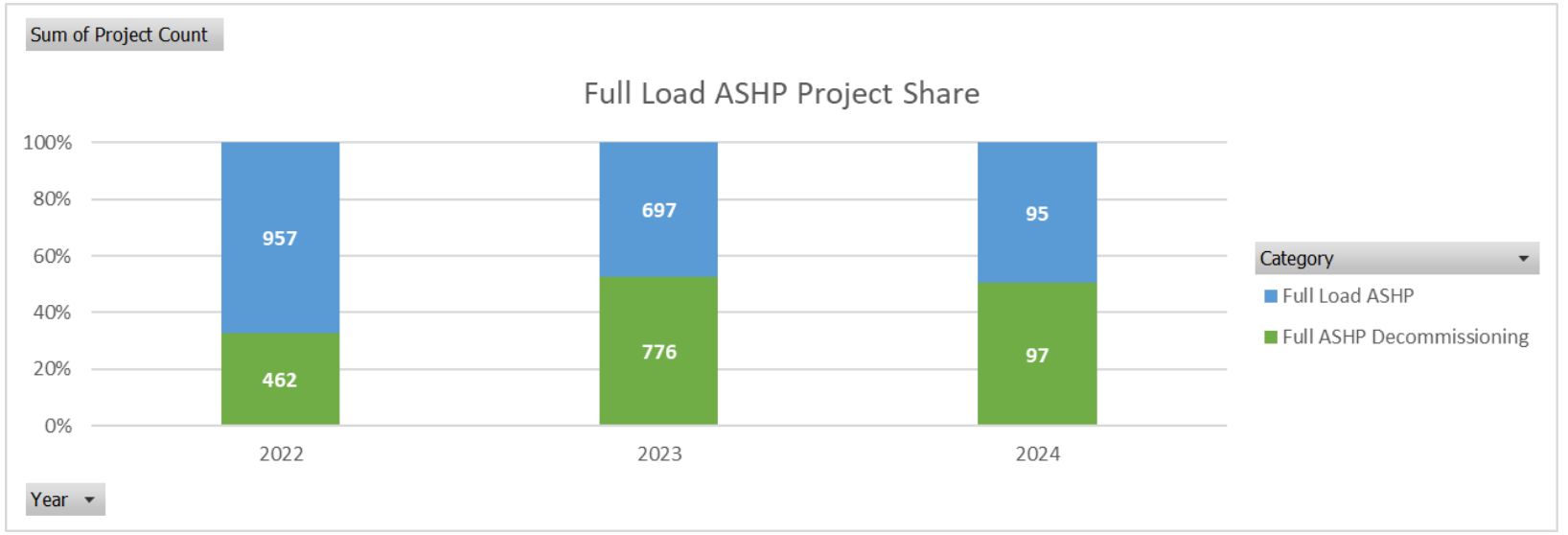
Success of Clean Heat Decommissioning



- Category 2B decommissioning implemented March 2022
  - Steady adoption increase through 2022
  - Decommissioning projects overtook standard Full Load ASHP installs in 2023 as most common measure
- Existing fuel; 51% oil, 19% electric,16% natural gas, 11% propane, 3% other

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Beneficial Location Analysis

Josh Bode
Demand Side Analytics

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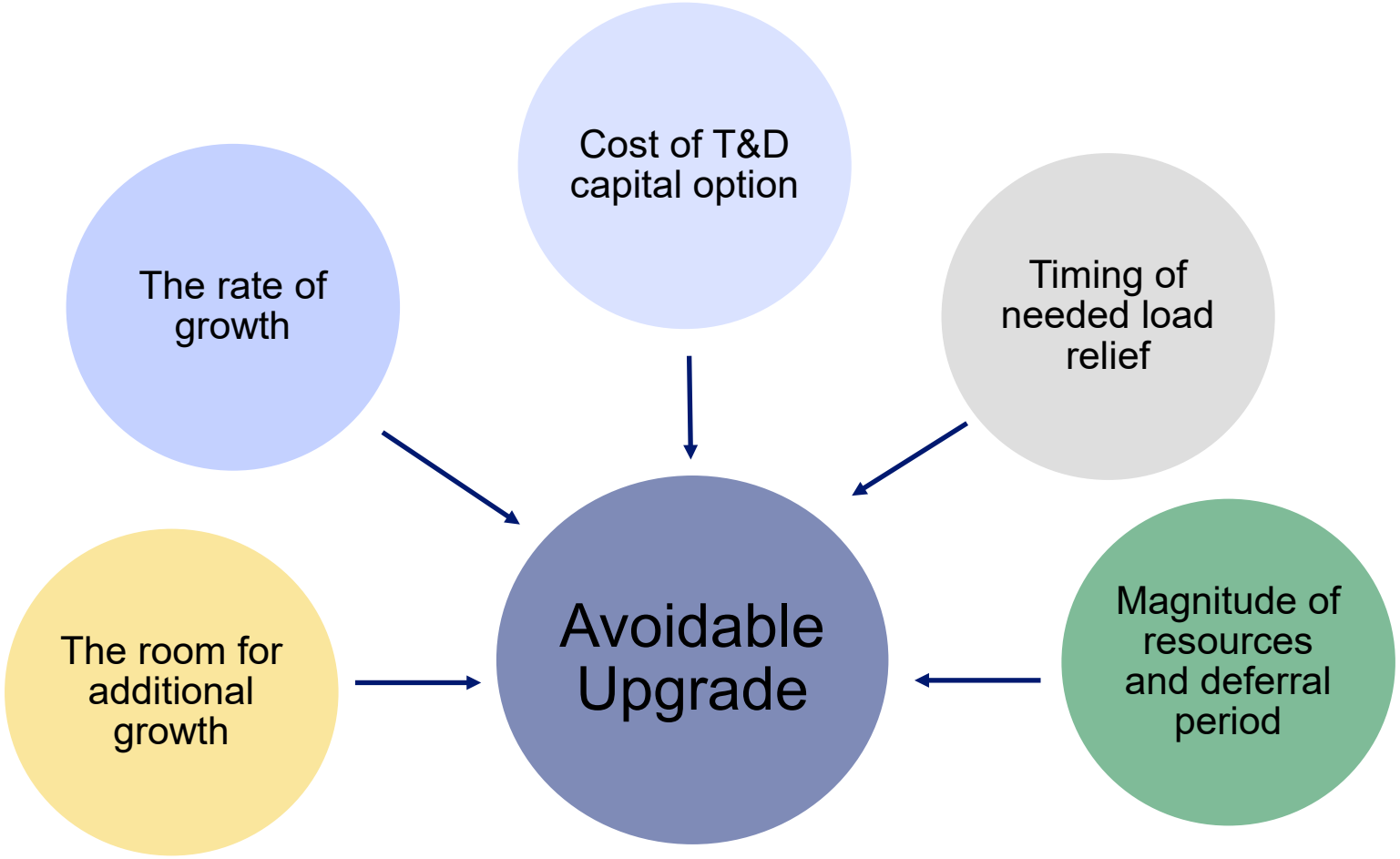
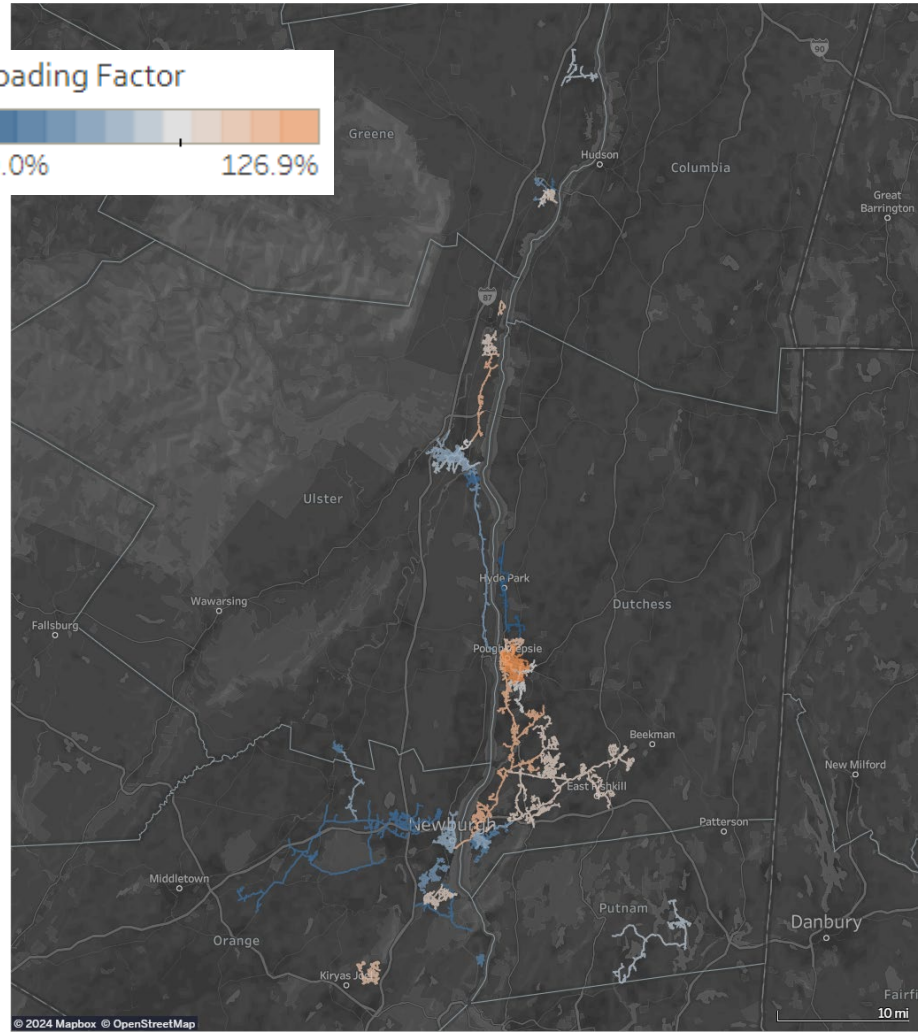
Future Potential NPAs

- Identified candidates for load growth based non-pipe alternative pilots/projects
- Utilizing the Suitability and Screening Criteria Central Hudson will be evaluating the potential beneficial locations identified in the Gas System Long Term Plan to initiate and pilot its first load growth NPA project in lieu of traditional pipeline reinforcement(s).

Several Factors Determine the Potential for Avoiding or Deferring Distribution Upgrades



A Key Goal: Identify Highly-Loaded Gas Systems



System	Name
PLP	Poughkeepsie LP
PN	Poughkeepsie- Newburgh
KS High	Kingston-Saugerties High
HM	Highland Mills
GLP	Glasco LP
MLP	Malden Low Pressure
PM	Poughkeepsie Medium
CW	Cornwall Medium Pressure
CLP	Catskill LP
TVPV	Titusville/Pleasant Valley
KS Med	Kingston -Saugerties Medium
HH	Hopewell- Hughsonville
SP	Sharon Dr- Poughkeepsie
NFE	North Kingston - Foxhall
CK	Coxsackie
SM	Carmel- Mahopac
KM	Kingston Medium Pressure
KLP	Kingston LP
CFNM	Cronomer Hill - Fullerton Ave/Newburgh Medium
NFW	Elmendorf St- West King
B	Beacon LP
NLP	Newburgh LP
W	Coldenham- Wallkill
BN	Balmville- Newburgh Holder,
LNW	Lower New Windsor
CMP	Catskill System
STCRK	Salt Point Turnpike/Creek Rd
PK	Poughkeepsie- Kingston
WK	Wallkill
HF	Highland Falls
BF	Beacon-Fishkill-Glenham
CMENP	Newburgh - Cornwall/Cocheton - Nbg Holder/Newburgh - Park P..
HLMS	Blue Point - Highland/Highland Medium Pressure
CH	Cronomer Hill-Coldenham,
AMW	Scotts Corner - Maybrook/Berea - Chandler Ln
PE	Port Ewen
WP	West Point
MA	Maybrook
BC	Browns Crossing
HV	Hyde Park- Violet Ave

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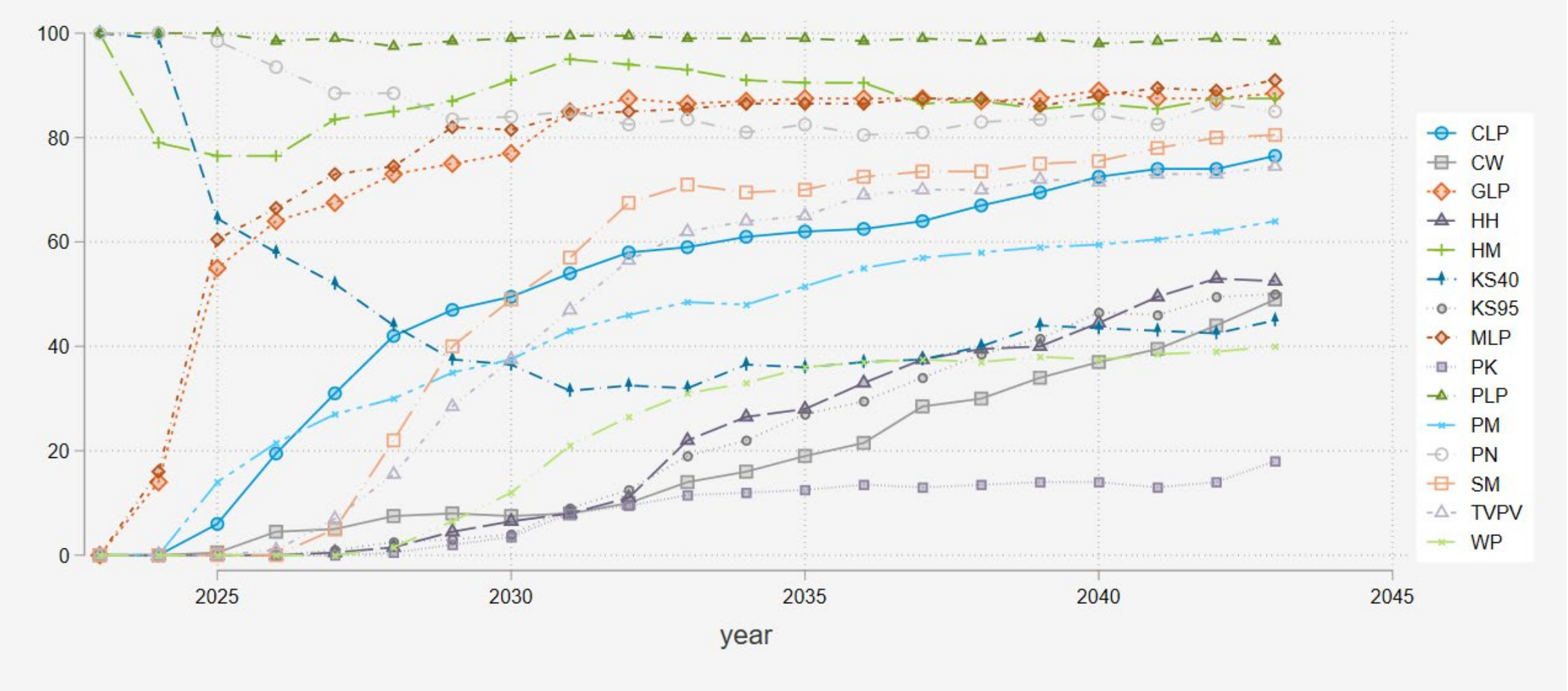
The visuals represents each local system as a single value (or color) – the difference between the inlet and lowest pressure point (i.e., the most extreme pressure drop). In practice, different customers within each local system experience different levels of pressure, and most customers do not experience the most extreme pressure drop.

We also estimated the likelihood of upgrades, absent additional interventions



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We also included the location specific distribution deferral value ($/Ccf-year)

- Developed estimates for each local system by year
- High level process for each local system
  - Estimate the capital cost if a growth-related growth rate is needed
  - Montecarlo simulation of forecasted load growth
  - Estimate the magnitude of resources needed to limit growth and avoid upgrades (for each location, run, and year)
  - Annualize costs of deferral period
  - Assess the likelihood of overloads/upgrades by year
  - Estimate the expected distribution avoided cost per Ccf-year

System	Capital Cost	10 year Levelized value	20 year Levelized value	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
B	$1,646,771	$0.00	$4.47	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
BN	$486,477	$0.00	$3.74	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
CFNM	$3,104,643	$225.01	$378.91	$0.00	$0.00	$0.00	$78.51	$308.44	$372.96	$392.17	$440.48	$556.29	$589.90
CLP	$1,128,575	$825.34	$1,127.68	$0.00	$68.47	$243.75	$581.80	$952.15	$1,152.93	$1,317.58	$1,612.87	$1,897.25	$2,009.08
CMP	$1,085,880	$0.00	$75.96	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
CSSB	$233,719	$346.71	$239.02	$299.86	$310.95	$322.46	$334.39	$346.76	$359.59	$372.90	$386.69	$401.00	$415.84
CW	$3,867,904	$594.34	$1,406.54	$0.00	$68.06	$418.97	$475.70	$686.76	$791.06	$852.29	$1,089.96	$1,200.63	$1,332.38
GLP	$95,616	$322.11	$297.55	$50.95	$208.51	$268.21	$304.73	$362.17	$388.33	$433.34	$485.80	$509.38	$528.22
HH	$10,406,216	$270.81	$1,582.99	$0.00	$0.00	$0.00	$22.29	$87.80	$209.13	$424.34	$547.91	$862.24	$1,409.51
HM	$2,310,100	$5,806.58	$4,003.10	$5,021.99	$5,207.81	$5,400.49	$5,600.31	$5,807.52	$6,022.40	$6,245.23	$6,476.31	$6,715.93	$6,964.42
KLP	$4,570,215	$0.00	$229.91	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
KM	$2,637,552	$0.00	$241.51	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
KS40	$619,970	$3,455.47	$2,382.23	$2,988.56	$3,099.14	$3,213.81	$3,332.72	$3,456.03	$3,583.91	$3,716.51	$3,854.02	$3,996.62	$4,144.49
KS95	$591,458	$120.79	$620.76	$0.00	$0.00	$0.00	$28.89	$77.41	$99.76	$152.10	$279.34	$376.22	$547.52
LNW	$2,752,868	$0.00	$30.60	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MLP	$1,441,700	$5,041.41	$4,448.16	$742.46	$3,355.93	$4,220.34	$5,111.89	$5,774.26	$6,519.43	$6,833.62	$7,164.93	$7,514.41	$7,792.44
NFE	$430,810	$0.00	$287.83	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
NFW	$842,050	$0.00	$29.96	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
NLP	$4,131,674	$66.31	$676.21	$0.00	$0.00	$0.00	$0.00	$9.04	$9.38	$52.54	$209.79	$255.36	$358.71
PK	$3,392,282	$61.43	$301.86	$0.00	$0.00	$0.00	$0.00	$0.95	$31.74	$98.14	$158.05	$237.44	$290.37
PLP	$1,052,481	$77.42	$53.37	$66.96	$69.44	$72.01	$74.67	$77.43	$80.30	$83.27	$86.35	$89.55	$92.86
PM	$539,231	$246.00	$290.03	$0.00	$87.53	$141.11	$246.40	$302.00	$342.35	$360.19	$407.70	$441.78	$469.99
PN	$5,186,000	$1,951.54	$1,345.41	$1,687.85	$1,750.30	$1,815.06	$1,882.22	$1,951.86	$2,024.08	$2,098.97	$2,176.63	$2,257.16	$2,340.68
SM	$2,816,856	$452.06	$1,012.19	$0.00	$0.00	$0.00	$51.11	$228.66	$576.52	$799.35	$1,019.62	$1,426.34	$1,670.57
SP	$3,772,428	$0.60	$364.74	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8.79
STCRK	$1,175,975	$0.00	$17.34	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
TVPV	$572,565	$172.92	$399.07	$0.00	$0.00	$1.60	$30.47	$87.57	$189.97	$327.36	$403.36	$520.88	$644.27
W	$231,743	$0.00	$1.26	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
WP	$811,426	$87.77	$309.72	$0.00	$0.00	$0.00	$0.00	$10.50	$39.65	$127.93	$234.10	$320.74	$435.15
Central Hudson Avg. (load-weighted)		$207.46	$361.03	$114.71	$125.01	$142.93	$160.19	$191.48	$223.14	$259.05	$298.89	$351.43	$416.22

Central Hudson Gas Long Term Plan, Appendix A, Table 6

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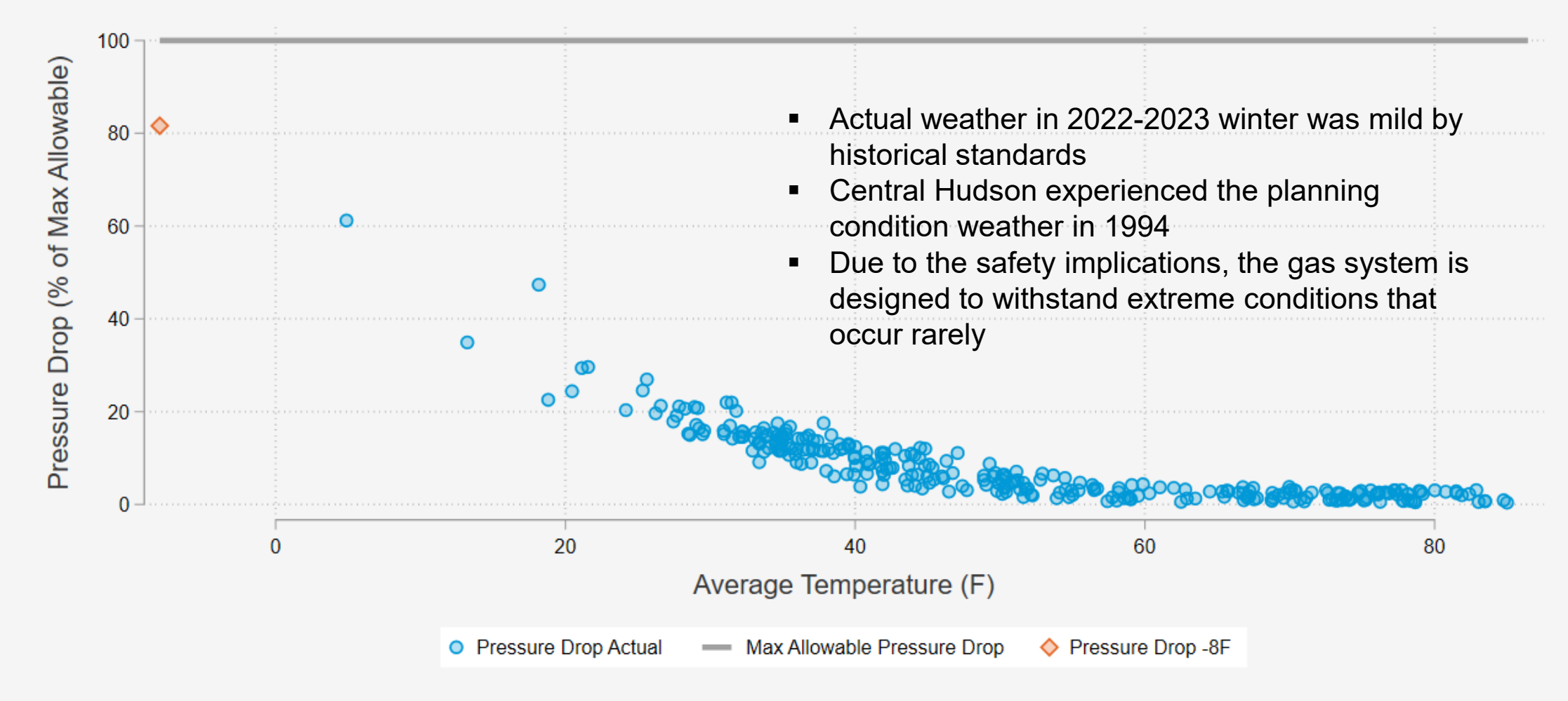
Central Hudson designs its gas system for -8 average daily temperature conditions



- Actual weather in 2022-2023 winter was mild by historical standards
- Central Hudson experienced the planning condition weather in 1994
- Due to the safety implications, the gas system is designed to withstand extreme conditions that occur rarely

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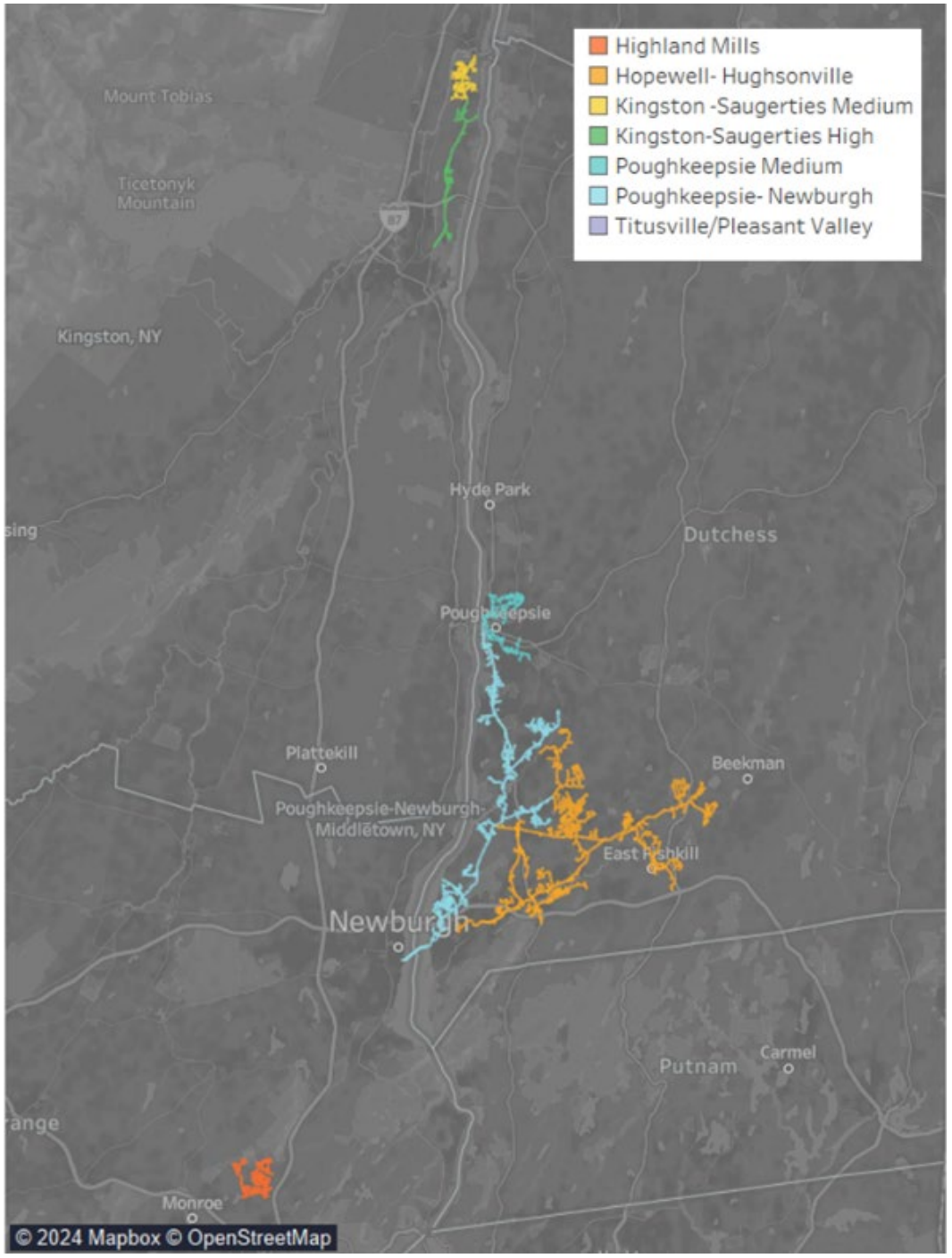
Identified 7 Local System Where Load Management is Beneficial

For each location, the report includes:

- Descriptive statistics on the size of the system;
- The composition of customers served by the line;
- Historical peak pressure drops;
- The hourly load profile on peak days;
- The pressure drop duration curve;
- Weather sensitivity of pressure drops;
- 20-year pressure drop forecasts with uncertainty; and
- The avoidable distribution capacity value



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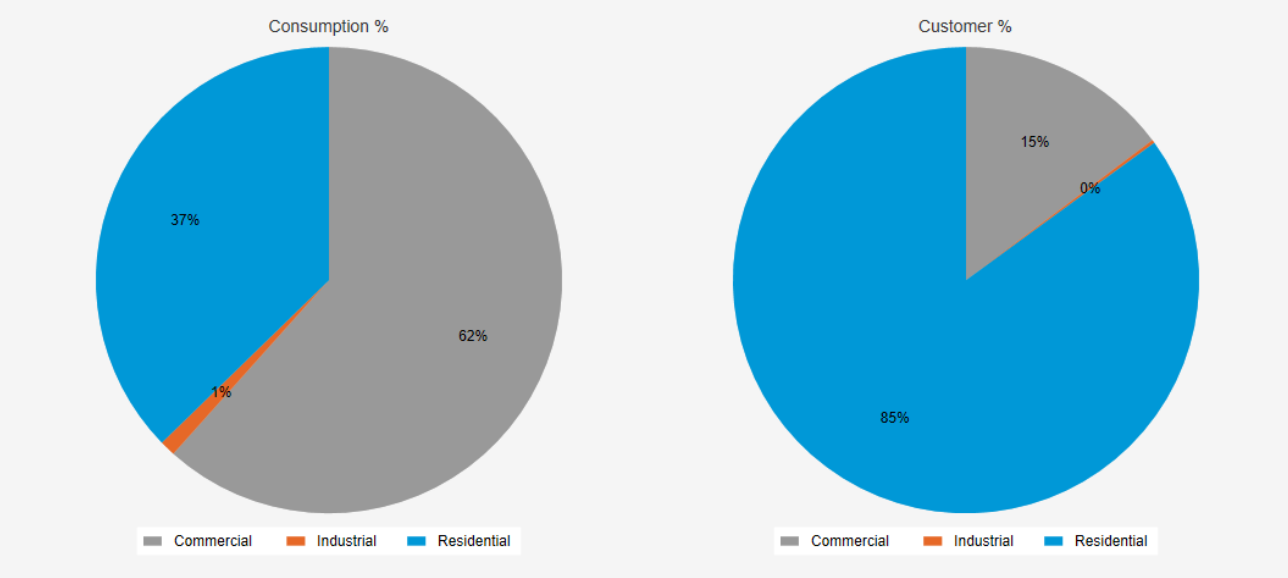
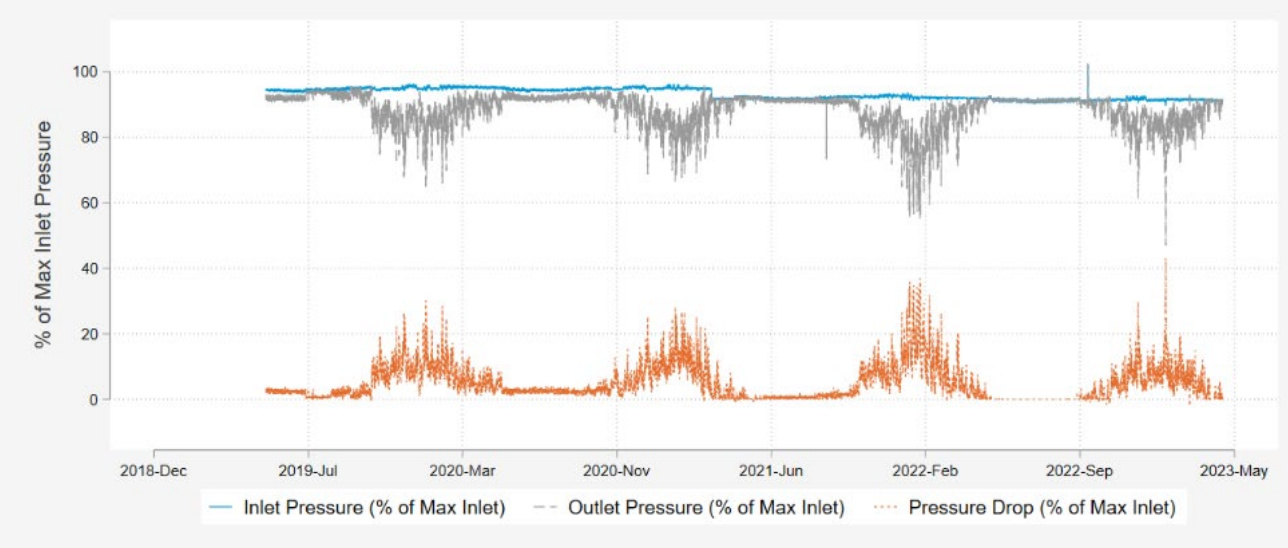
Poughkeepsie-Newburgh Local System

2023 Loading Actual:	86.1%
2023 Loading Planning (-8F)	113.0%
Growth Rate:	0.12%
Number of Customers:	5,403
Probability of upgrade by 2034	81.0%
10 year levelized avoided cost	$1951.54 per Ccf-year





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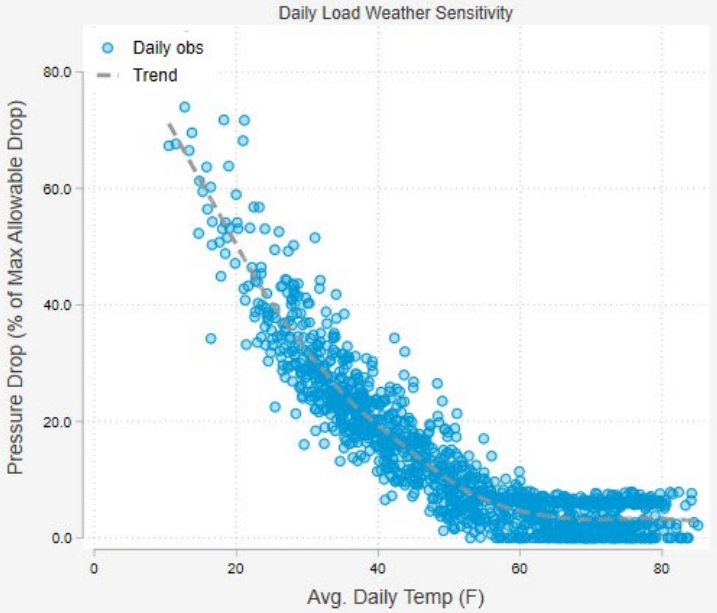

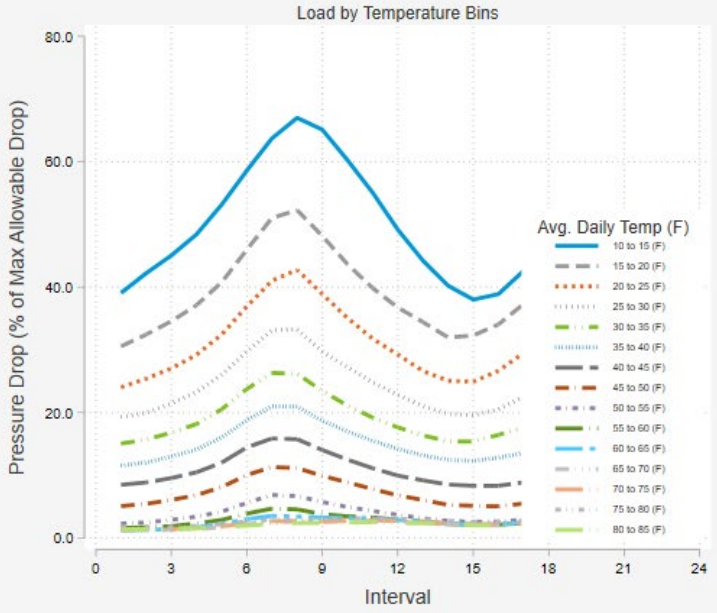

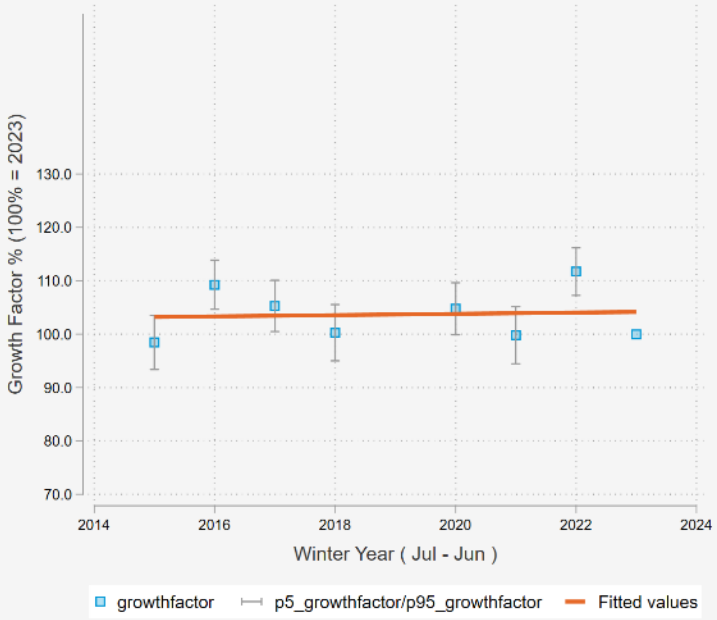

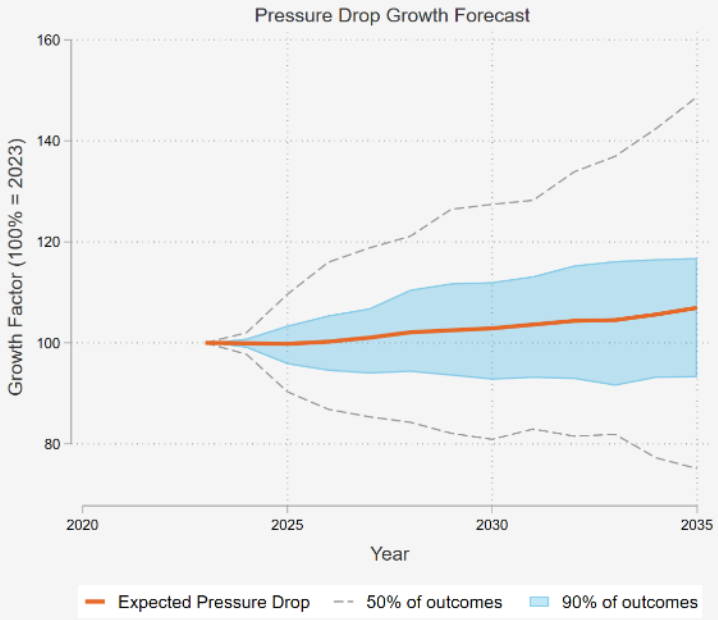

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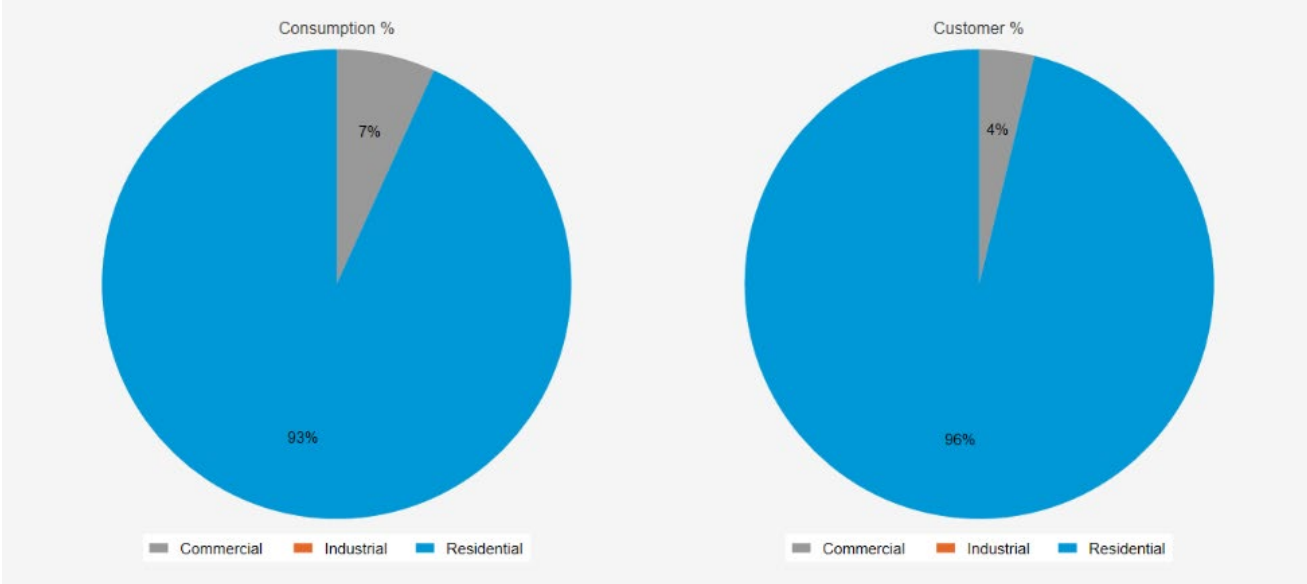
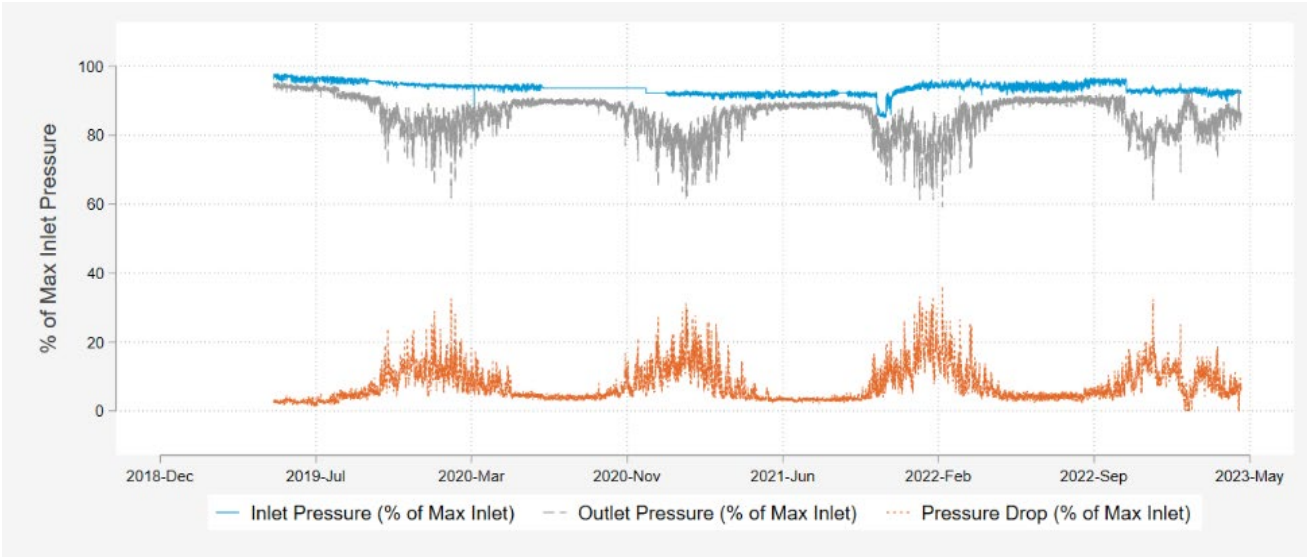
Highland Mills Local System

2023 Loading Actual:	64.8%
2023 Loading Planning (-8F)	100.1%
Growth Rate:	1.68%
Number of Customers:	1,647
Probability of upgrade by 2034	91.0%
10 year levelized avoided cost	$5,806.58 per Ccf-year





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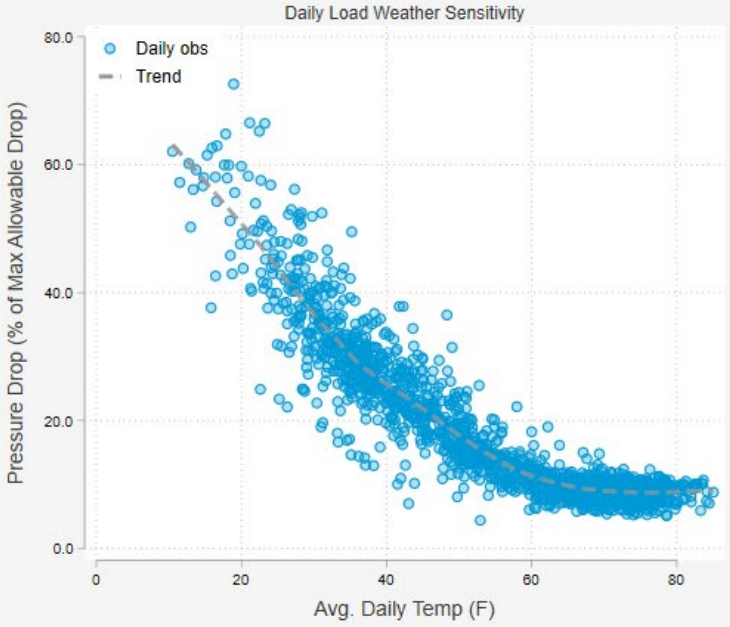
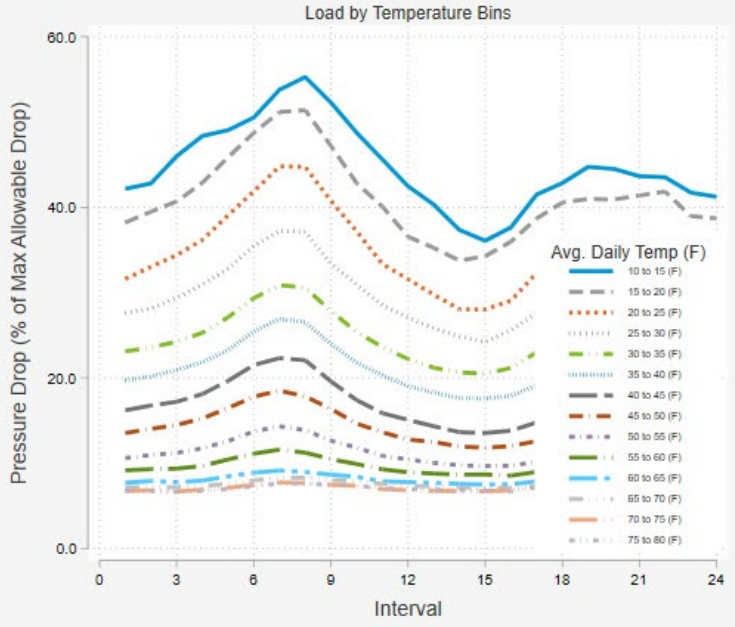
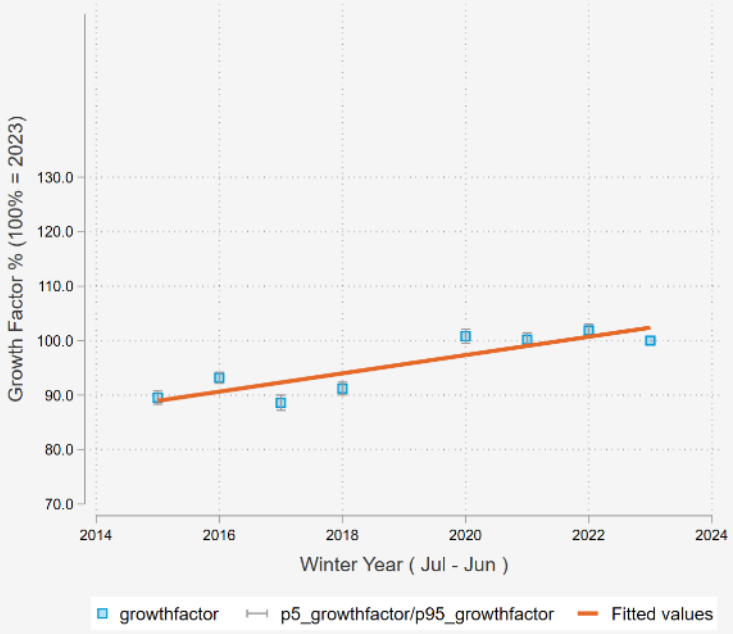
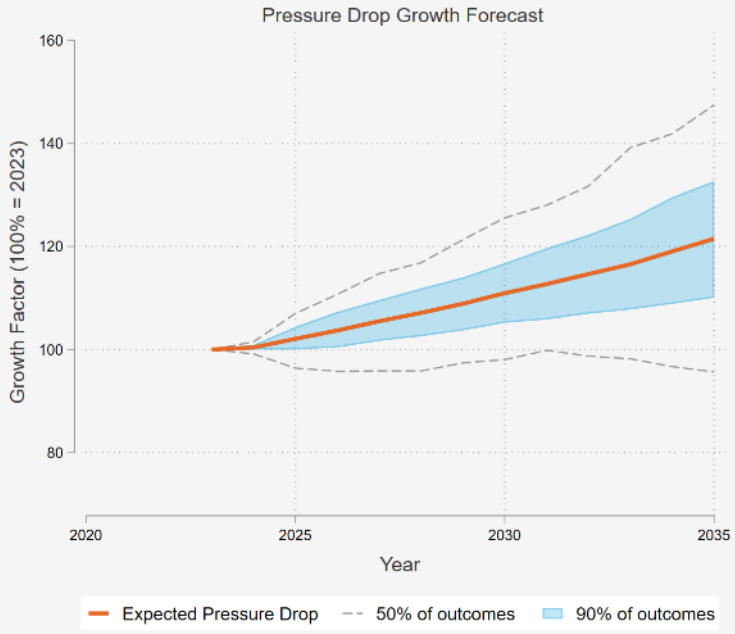
Highland Mills Local System









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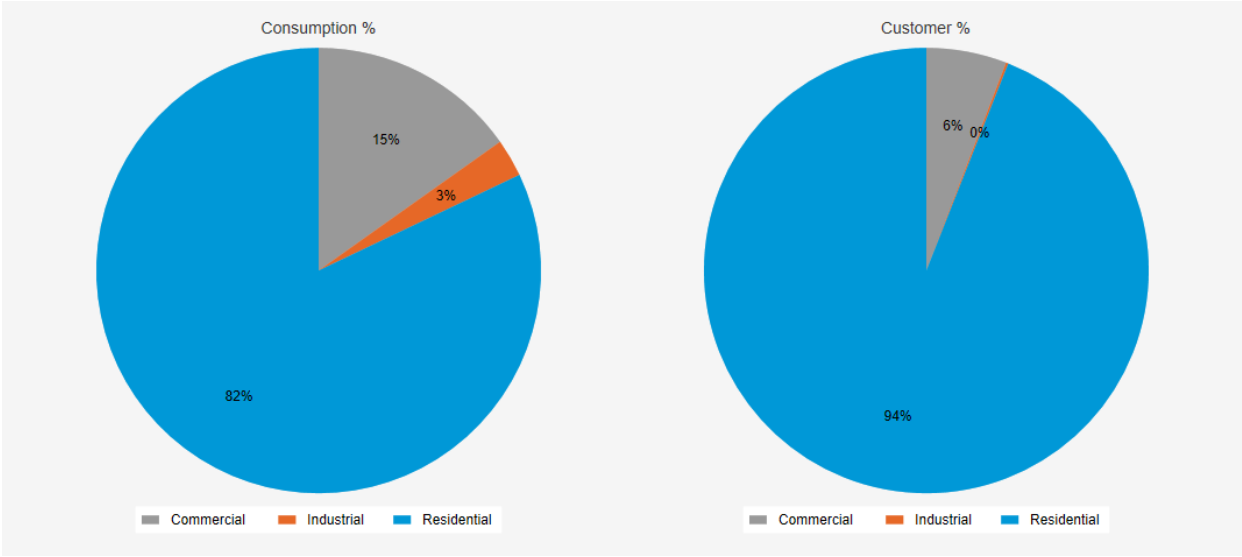
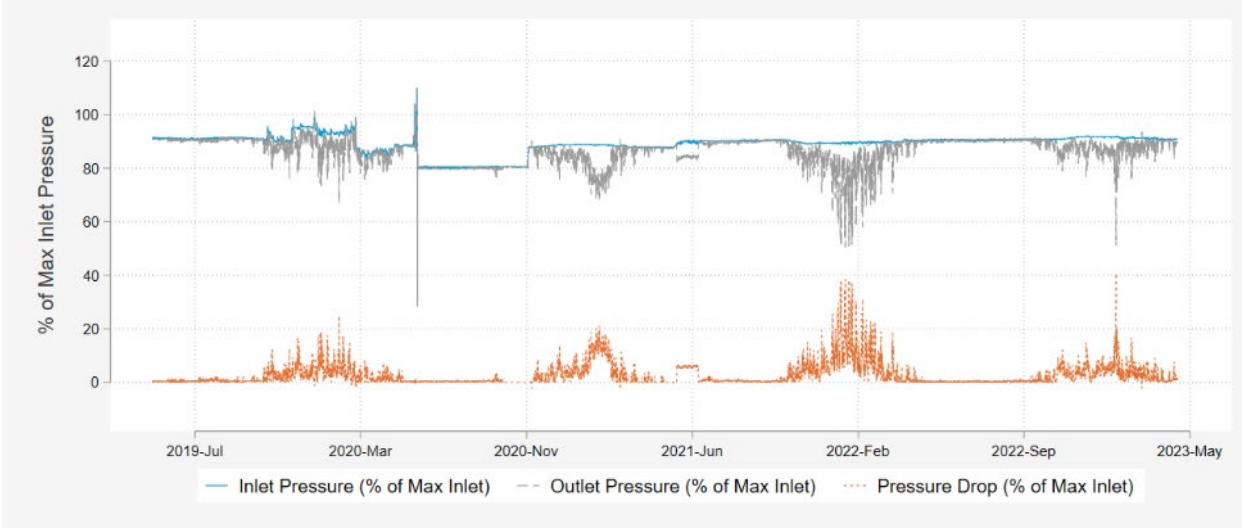
Kingston-Saugerties High Pressure System

2023 Loading Actual:	81.5%
2023 Loading Planning (-8F)	112.4%
Growth Rate:	-3.14%
Number of Customers:	585
Probability of upgrade by 2034	91.0%
10 year levelized avoided cost	$5,806.58 per Ccf-year





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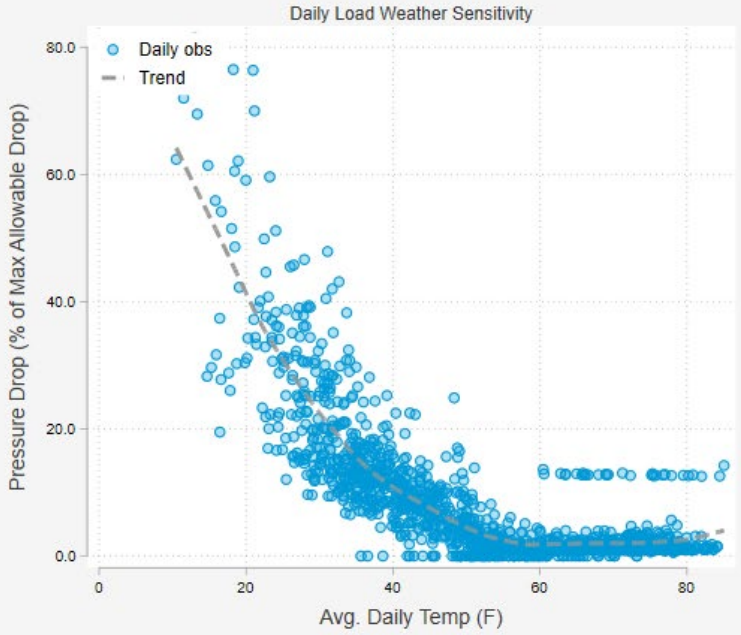
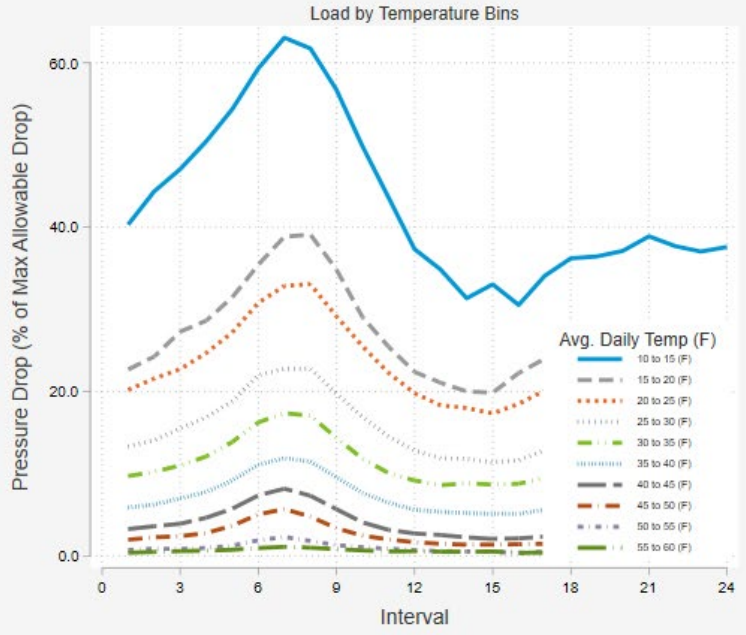
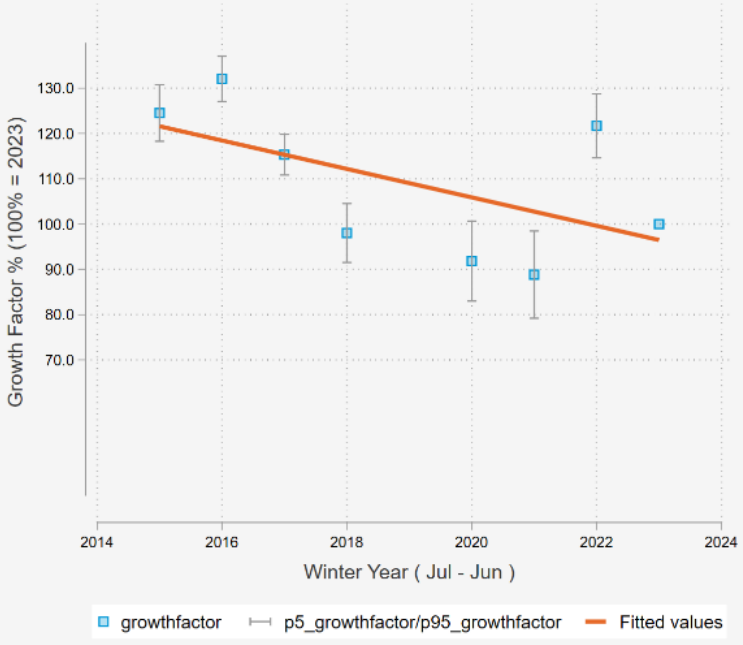
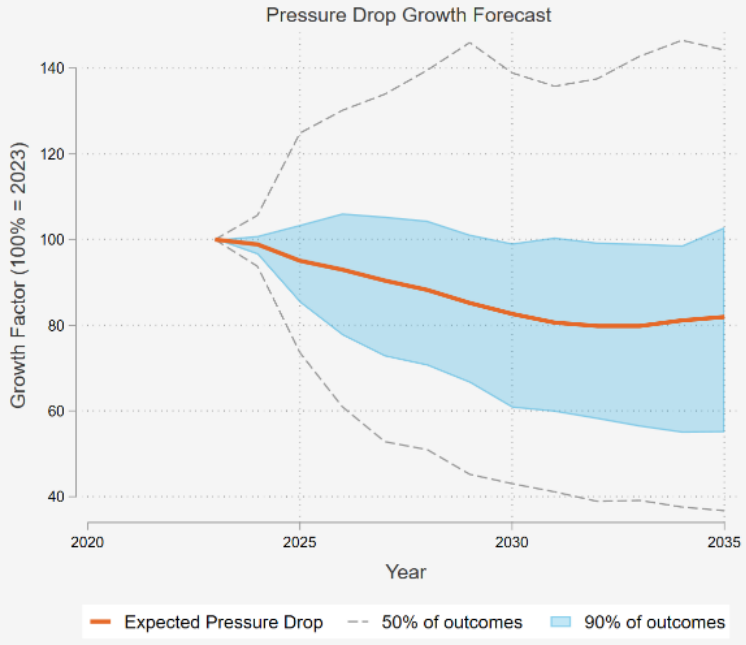
Kingston-Saugerties High Pressure









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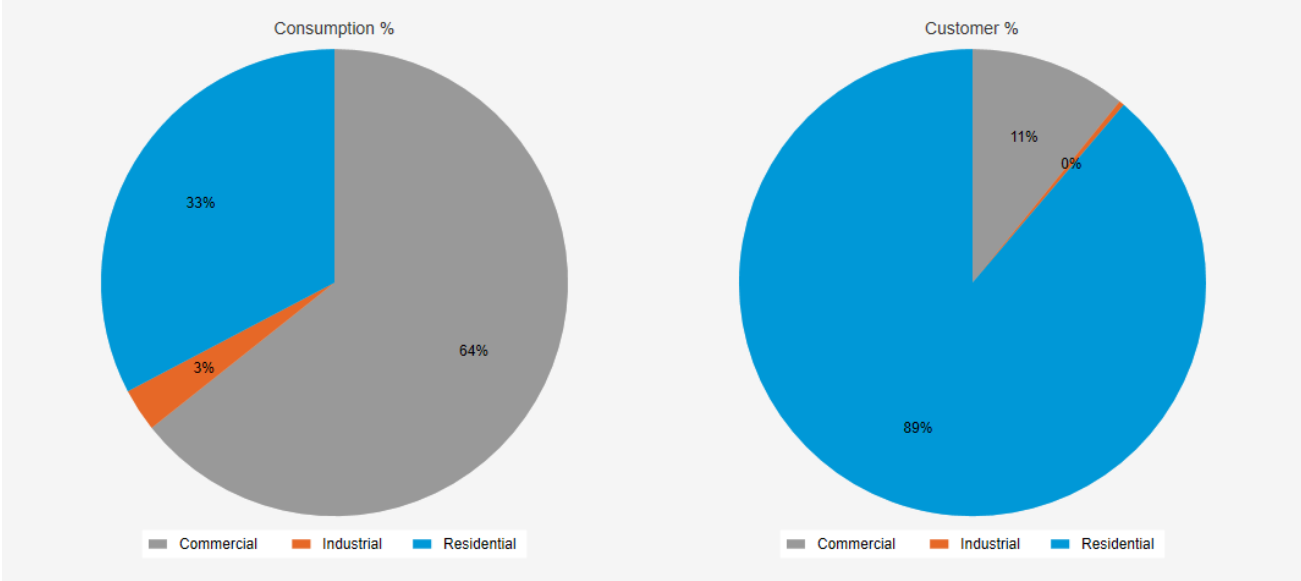
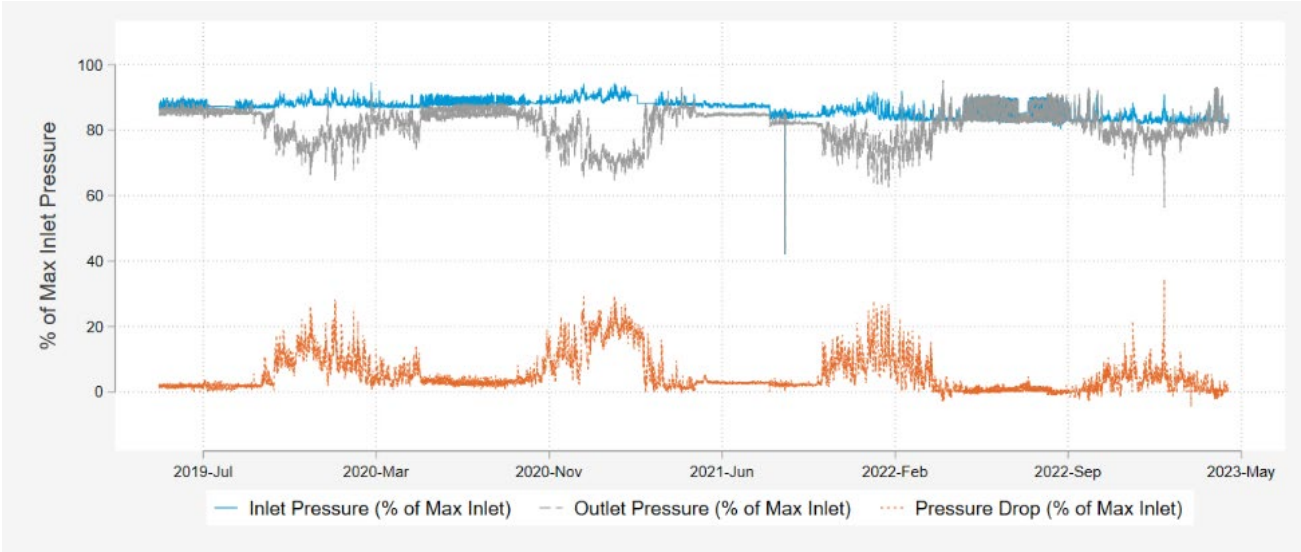
Poughkeepsie Medium Pressure System

2023 Loading Actual:	69.1%
2023 Loading Planning (-8F)	92.6%
Growth Rate:	0.59%
Number of Customers:	1,970
Probability of upgrade by 2034	48.0%
10 year levelized avoided cost	$246.00 per Ccf-year





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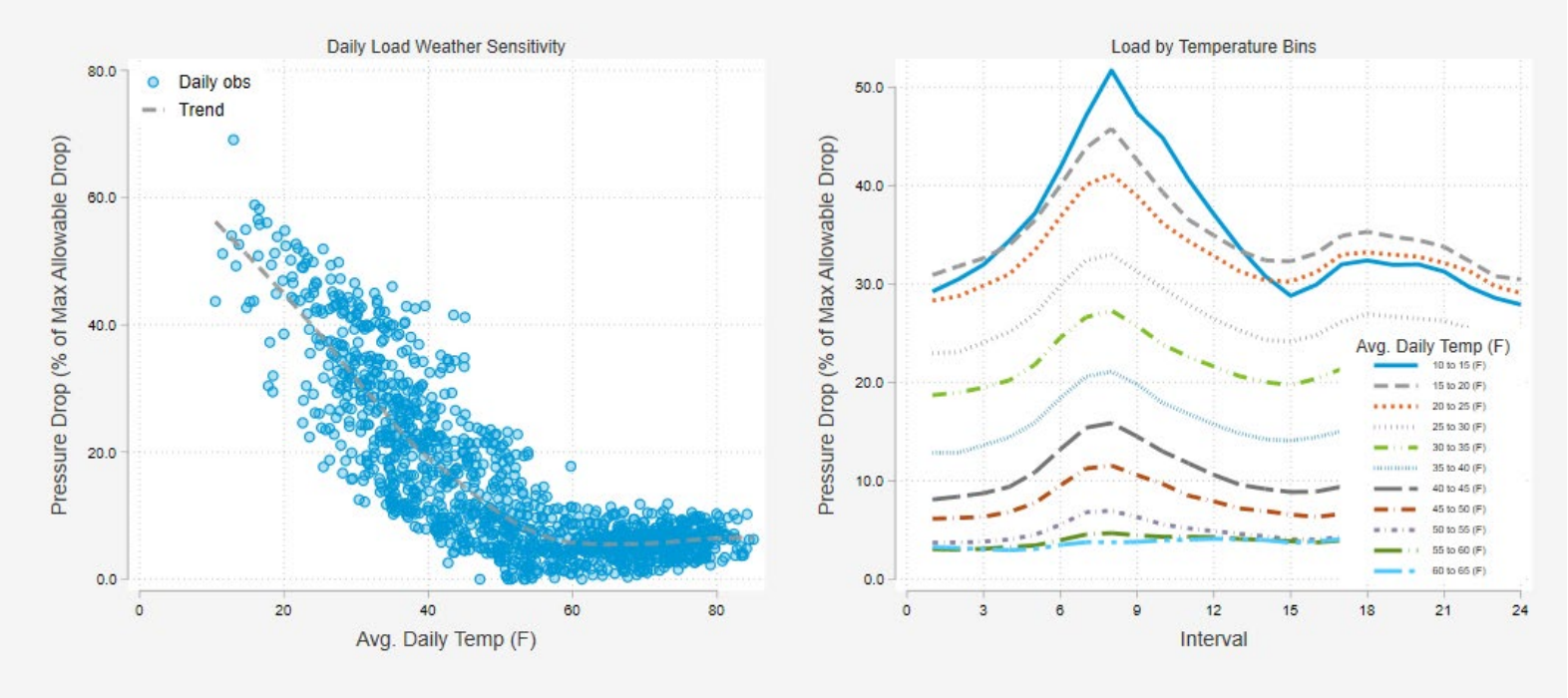
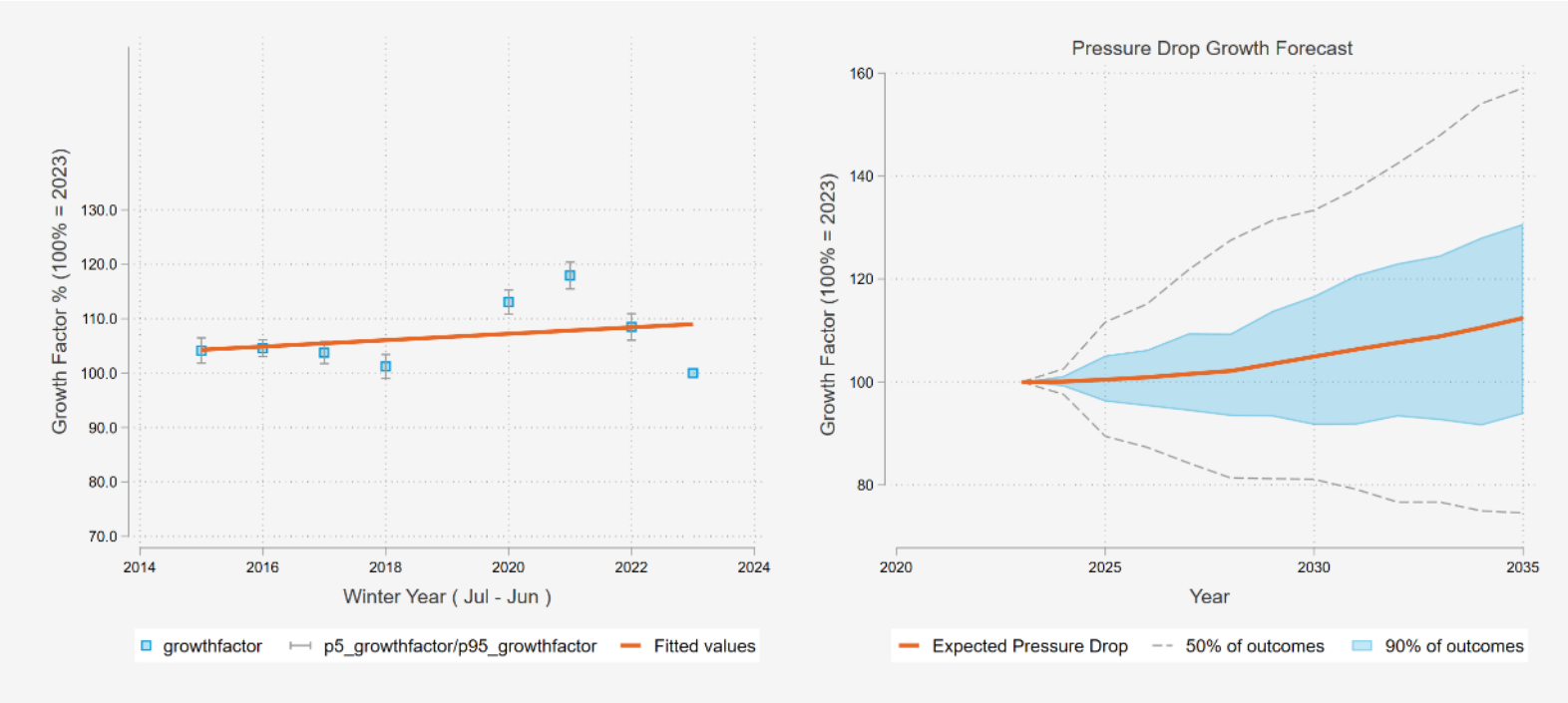
Poughkeepsie Medium Pressure System





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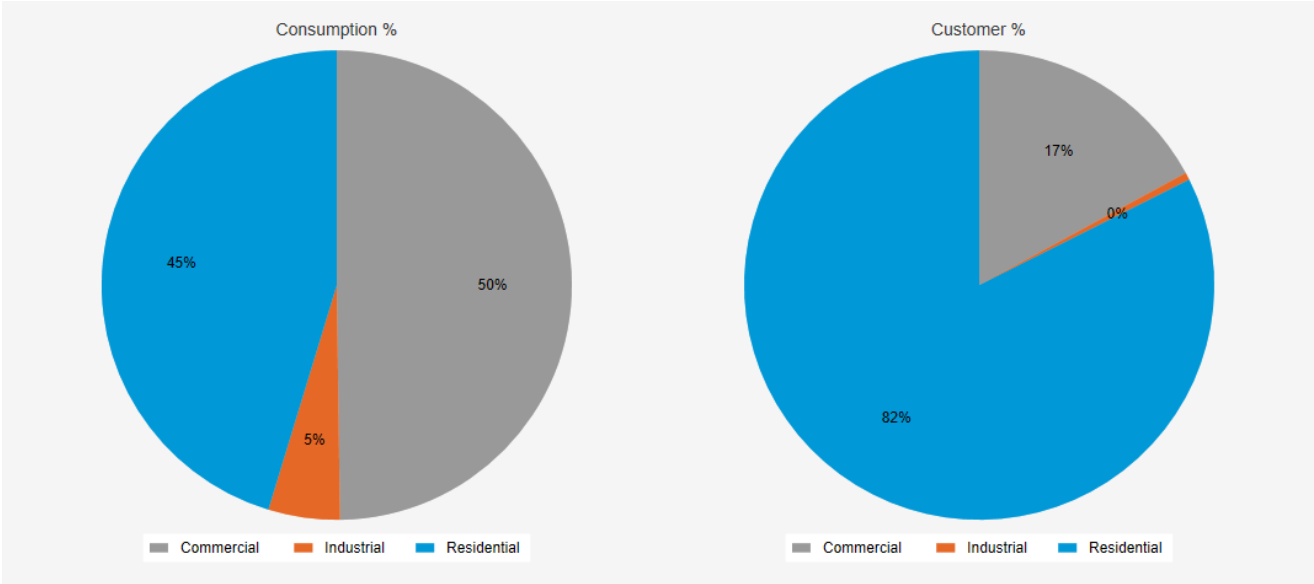
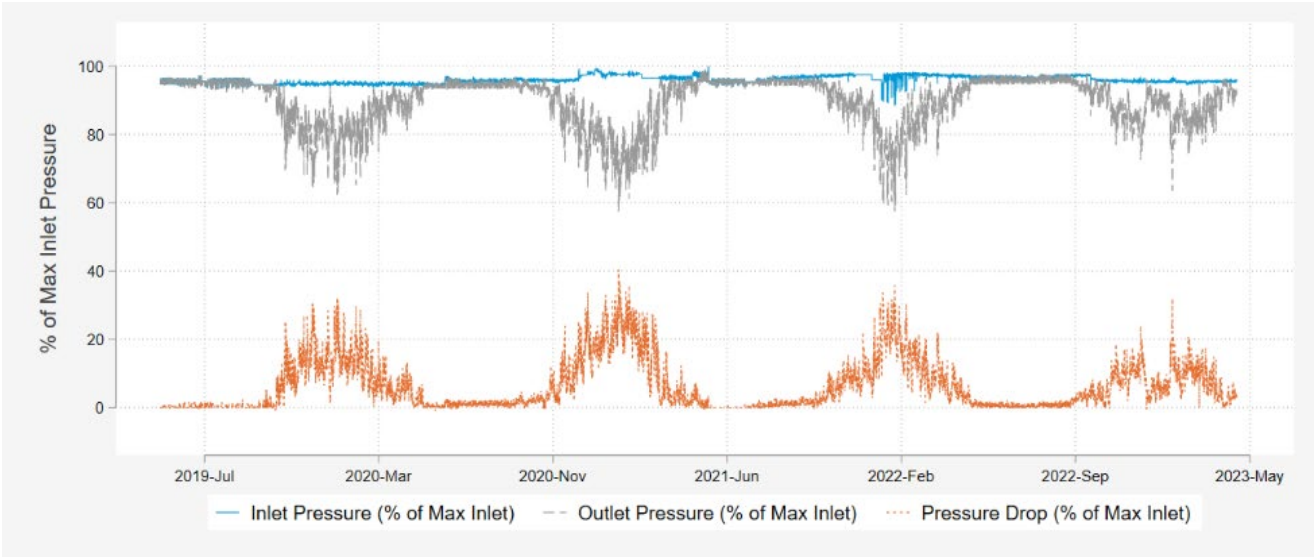
Titusville-Pleasant Valley System

2023 Loading Actual:	63.9%
2023 Loading Planning (-8F)	83.9%
Growth Rate:	2.41%
Number of Customers:	2,606
Probability of upgrade by 2034	64.0%
10 year levelized avoided cost	$172.92 per Ccf-year





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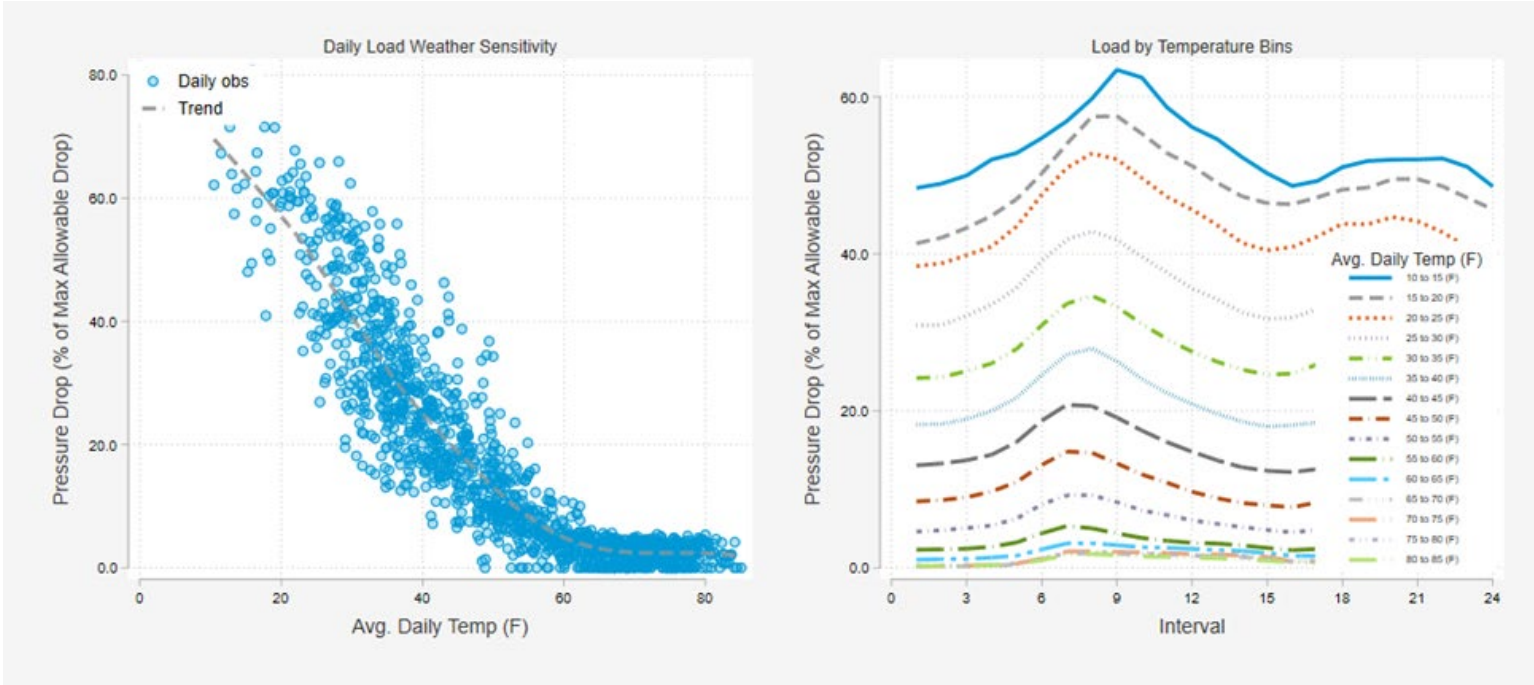
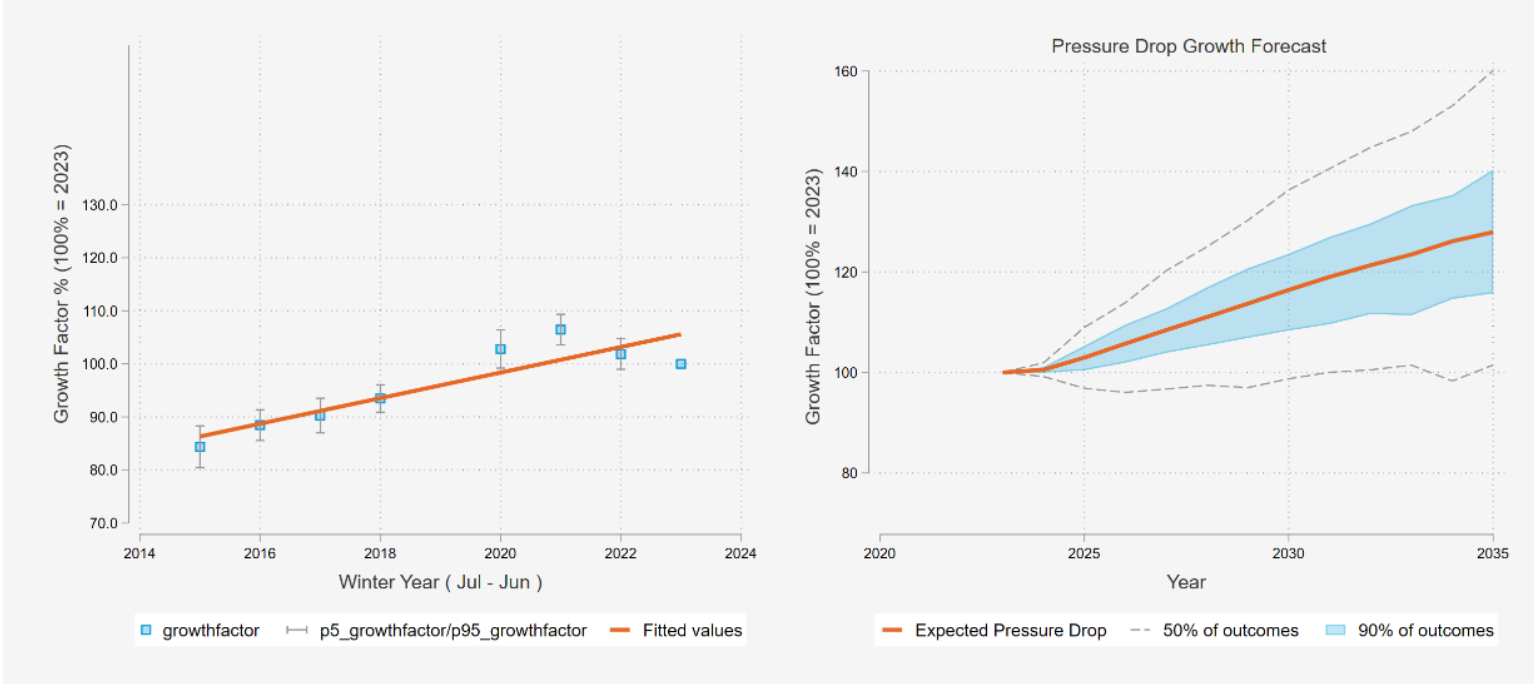
Titusville-Pleasant Valley System





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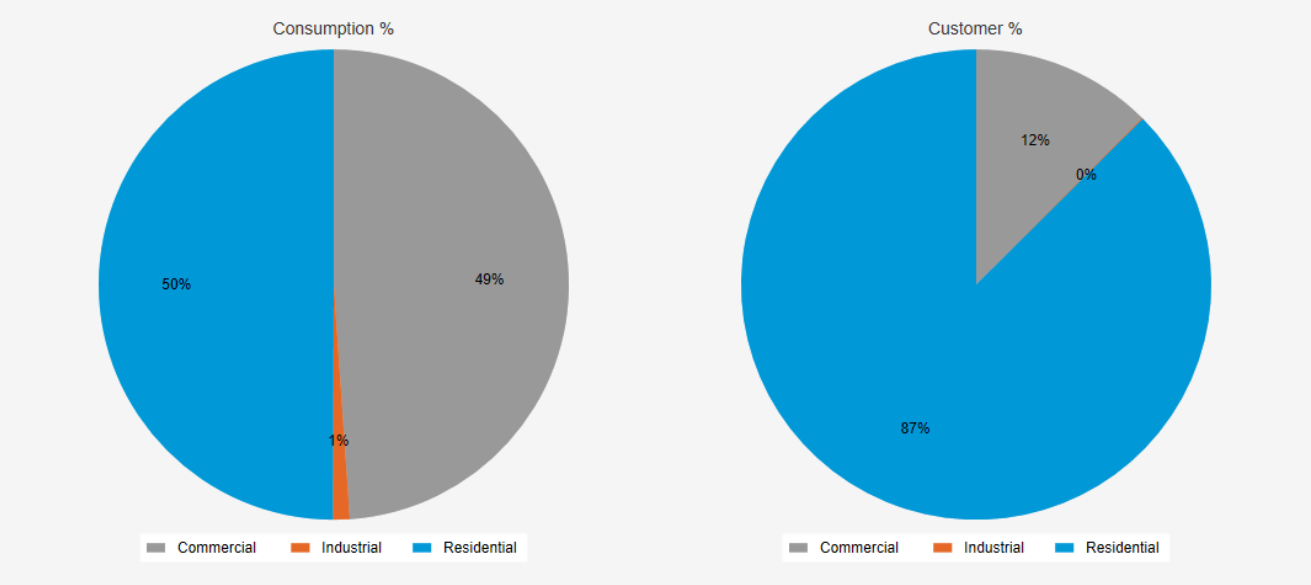
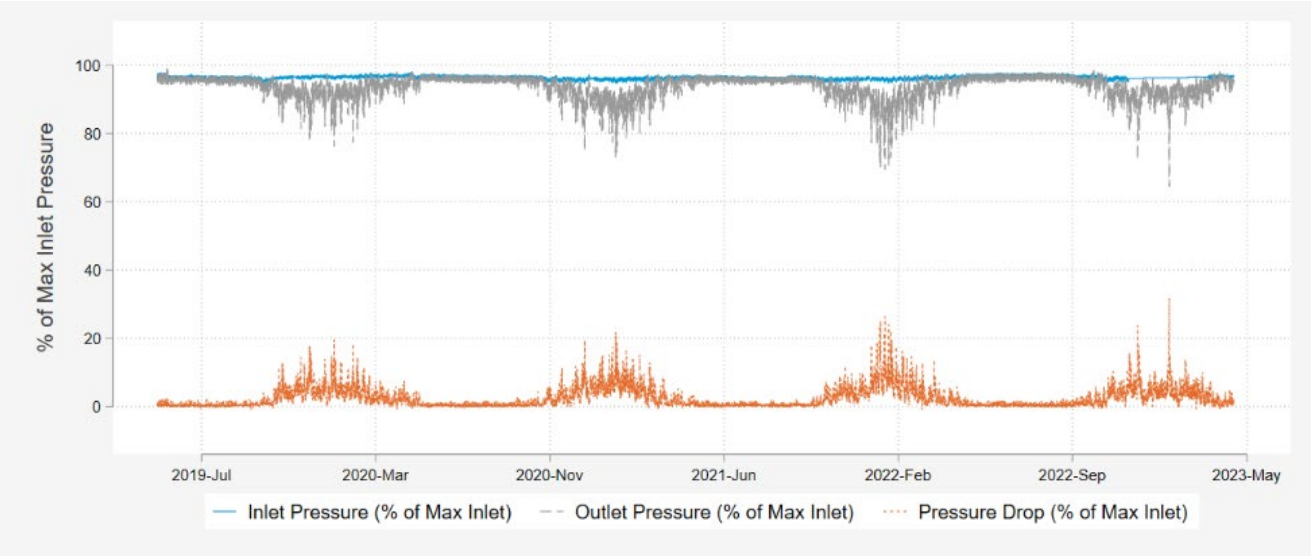
Hopewell Hughsonville System

2023 Loading Actual:	52.9%
2023 Loading Planning (-8F)	79.7%
Growth Rate:	0.96%
Number of Customers:	6,943
Probability of upgrade by 2034	26.50%
10 year levelized avoided cost	$270.81 per Ccf-year





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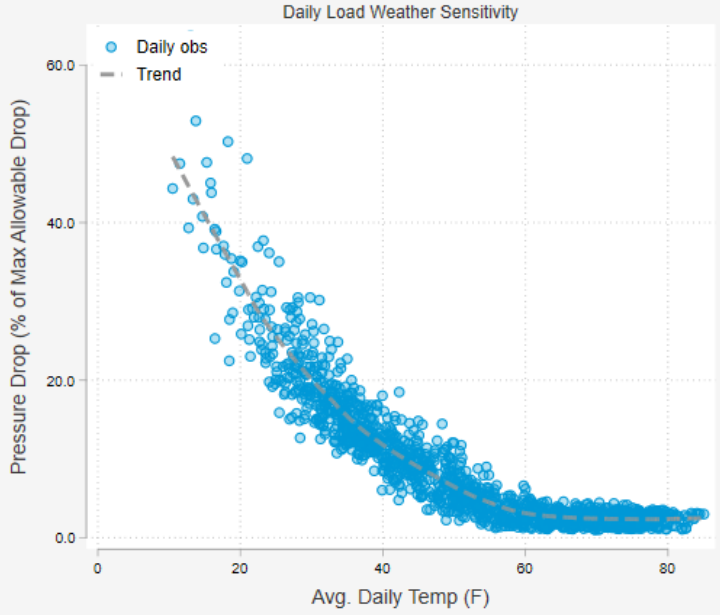
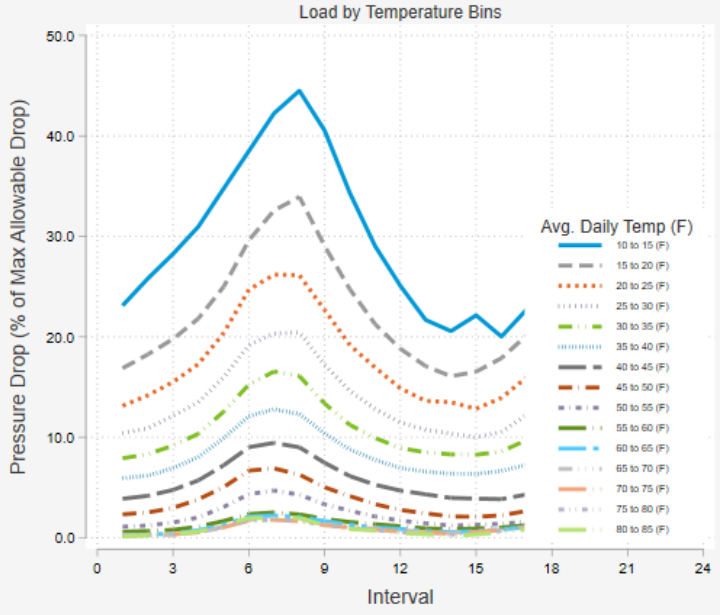
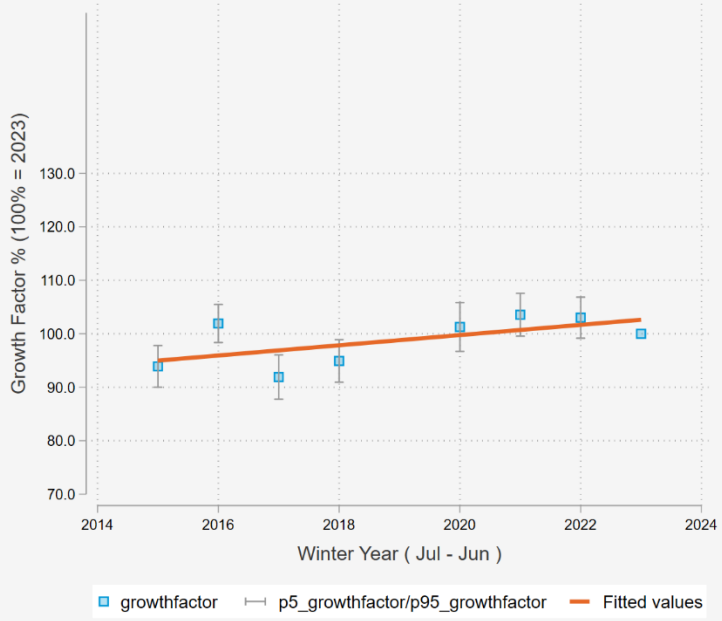
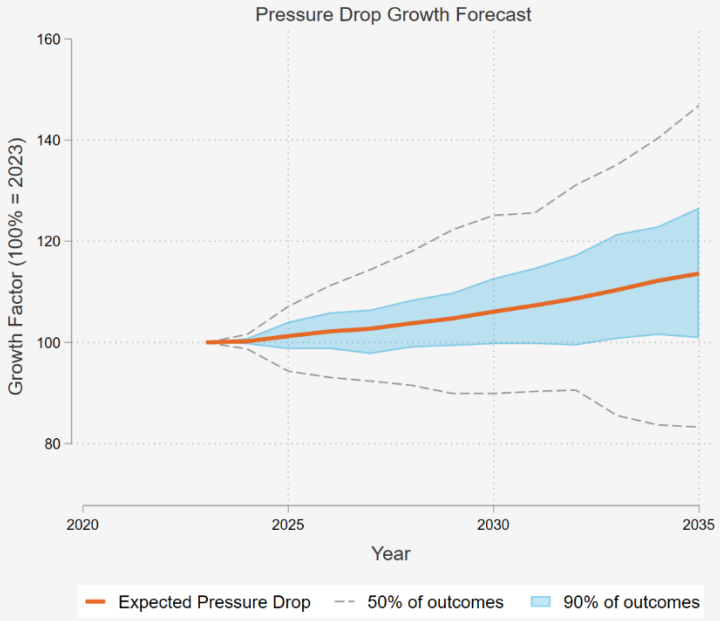
Hopewell Hughsonville System









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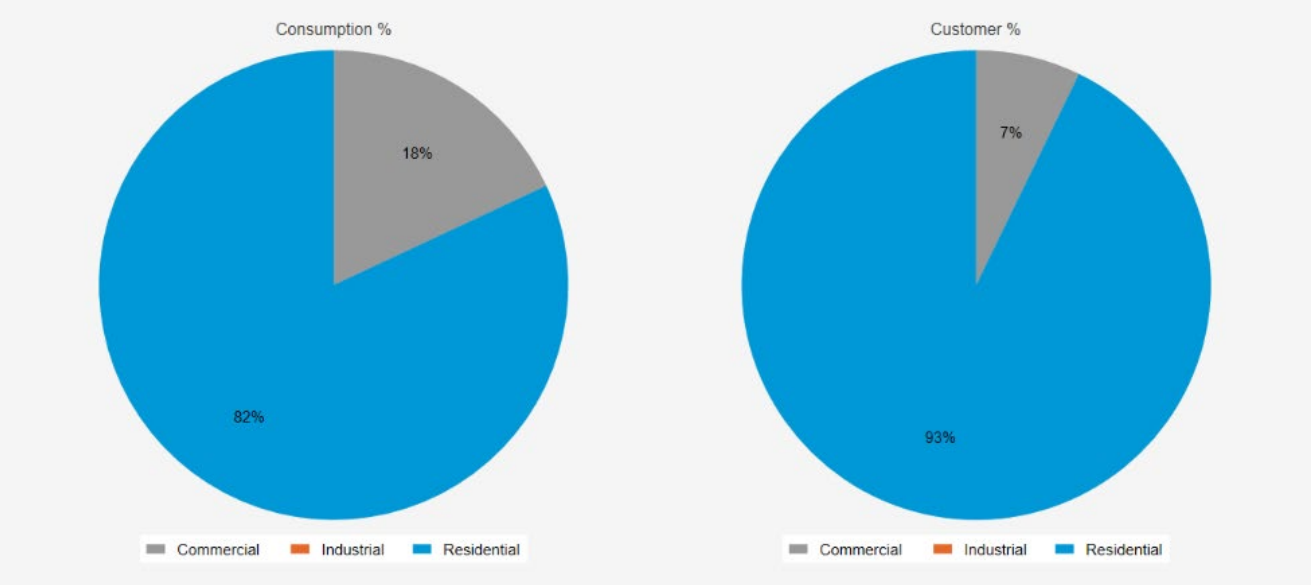
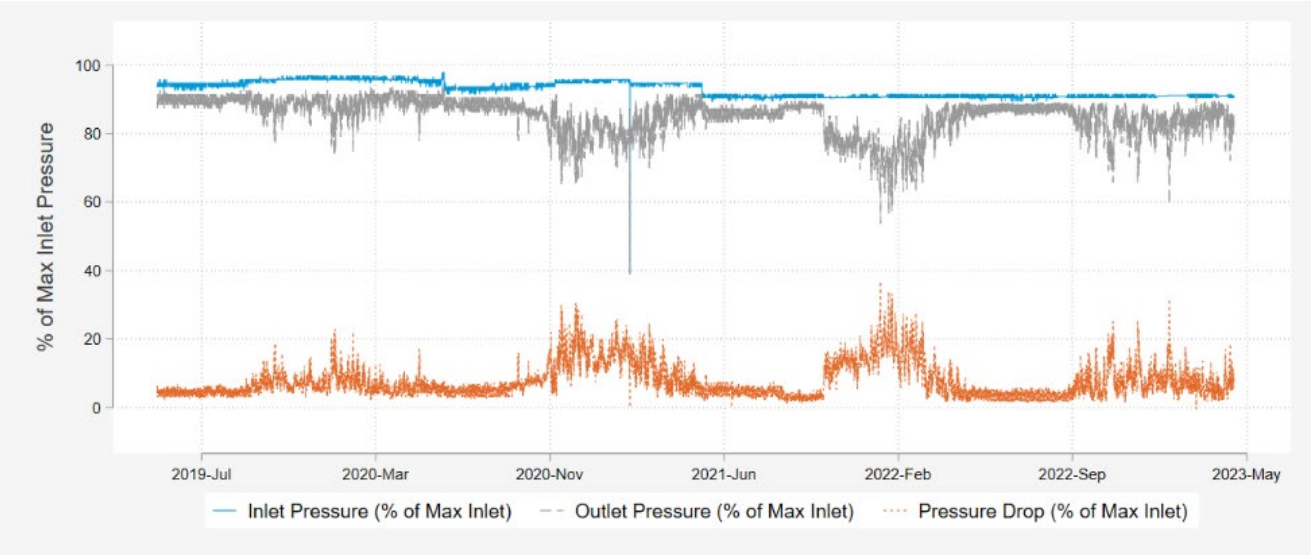
Kingston Saugerties Medium Pressure

2023 Loading Actual:	63.6%
2023 Loading Planning (-8F)	82.2%
Growth Rate:	0.45%
Number of Customers:	1,272
Probability of upgrade by 2034	22.0%
10 year levelized avoided cost	$120.79 per Ccf-year





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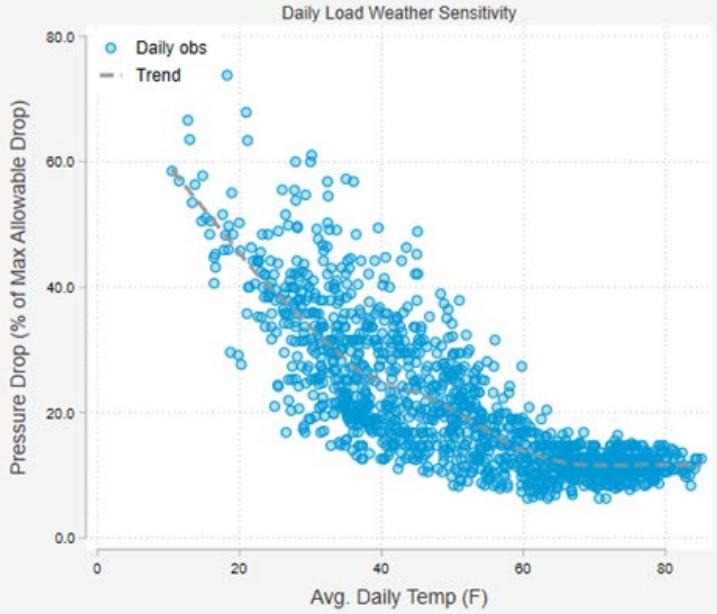
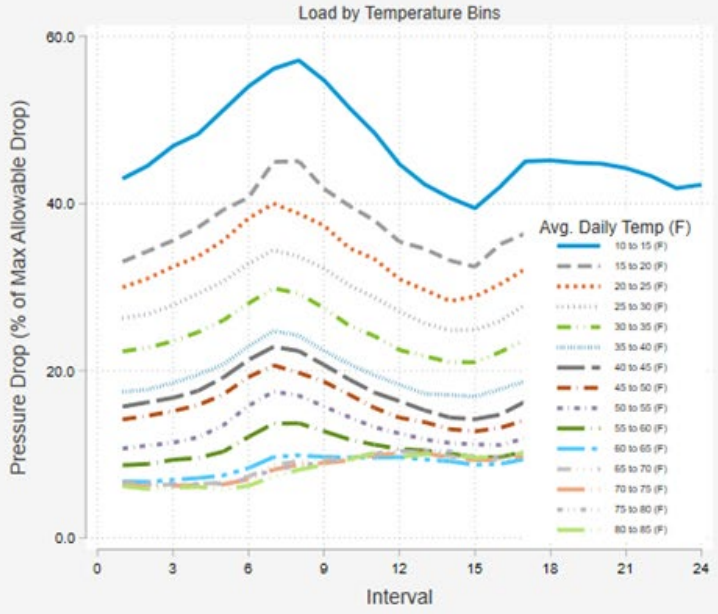
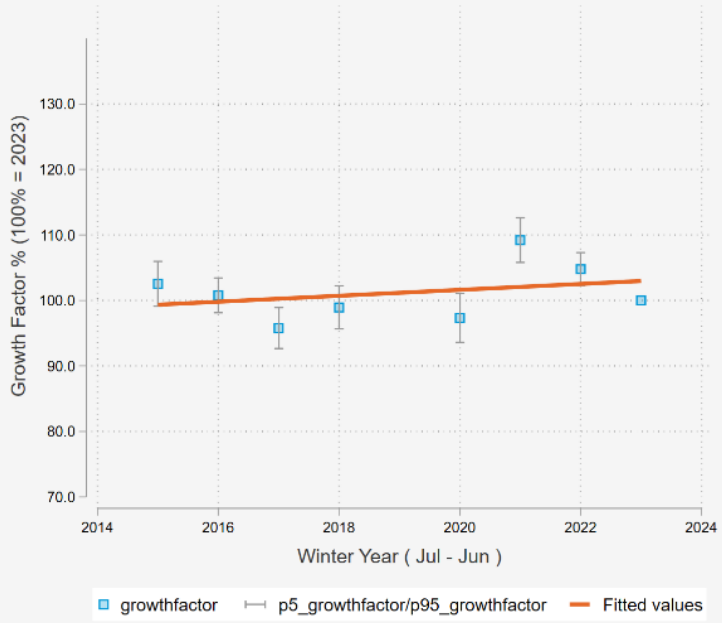
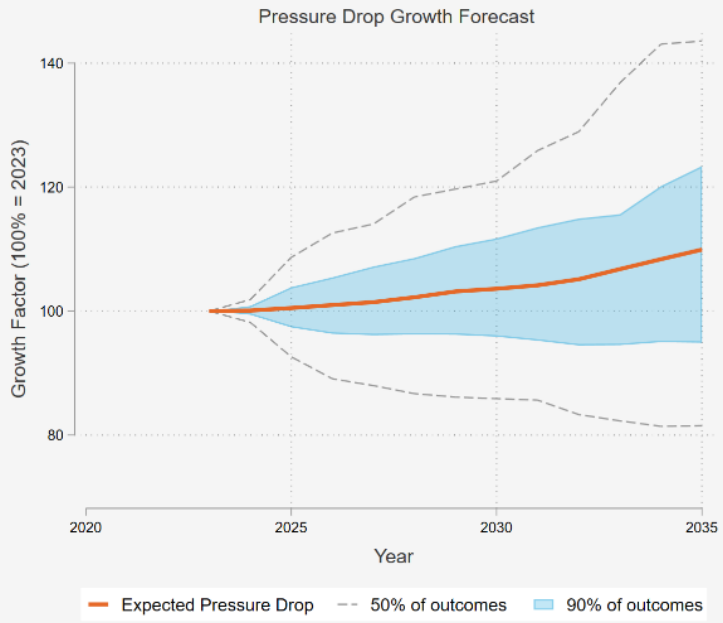
Kingston Saugerties Medium Pressure









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Questions

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