

# Gas System Long-Term Plan

Technical Session 05.15.24 Focus Topic – Hydraulic Modeling Cases 20-G-0131 & 23-G-0676



# **Logistics and Background**

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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 hydraulic modeling.
- Questions will be taken throughout the presentation. 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).



### Agenda

- Overview
- Local Gas System Historical Trends and Forecasting
- Planning Process and Hydraulic Modeling



### **Overview**

Josh Bode Demand Side Analytics





# Gas planning focuses on maintaining system pressure above a minimum level

- Central Hudson reinforces distribution networks when gas pressure is projected to drop below 50% of the normal operating pressure
- Before upgrade criteria is met, Central Hudson has base risk criteria that triggers flow studies, identification of reinforcements, and project funding requests
- Planning is for conditions where the average daily temperature reaches -8°F.



### **Overview of location long-term forecasts**



People. Power. Possibilities Central Hudson

# Local Gas System Historical Trends and Forecasting

Josh Bode Demand Side Analytics





### Process for developing the local Gas System historical trend Forecasts





### Example using one system

### **Clean the pressure data**

- Convert to hourly data
- Identify and remove anomalies





# Estimate pressure to demand conversion factors

- Calculate daily demand for each gas system
- Estimate relationship between daily demand and daily pressure drops





### Calculate hourly gas demand

- Conversions used to understand impact of changes in demand on pressure
- Used to assess the impact of heating electrification, weatherization, and avoided connections on pressure drops





### Example using one system

### Identify High Loaded Systems

- No modeling (yet)
- Passed on local systems that were highly loaded to hydraulic team to identify solutions/costs



#### **Estimate econometric model**

- Daily peak pressure drop as a function of weather, day-of-week seasonality, and year
- Use to weather adjust pressure drop for planning conditions
- Isolated year-by-year changes not due to weather



### **Produce probabilistic forecast**

- Produce probabilistic 20-year forecasts of pressure drops and demand (flow), assuming no incremental interventions occur (historical trend)
- Used to quantify the infrastructure investments and carbon emissions absent the interventions included as part of the Gas System Long-Term Plan (GSLTP)





Several local gas system are highly loaded and growing





### 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	
СК	Coxsackie	
SM	Carmel- Mahopac	
KM	Kingston Medium Pressure	
KLP	Kingston LP	
CFNM	Cronomer Hill - Fullerton Ave/Newburgh Medium	
NFW	Elmendorf St- West King	
В	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	



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.



Some local systems are experiencing growth, others are declining



### Key stats for highly loaded systems

#### Rankings

System	Name							Loading	-8 Ava. te
PLP	Poughkeepsie LP								
PN	Poughkeepsie- Newburgh							0.0%	125.0%
KS40	Kingston-Saugerties (40#)								
HM	Highland Mills								
GLP	Glasco LP								
MLP	Malden Low Pressure								
PM	Poughkeepsie Medium								
CW	Cornwall Medium Pressure								
CLP	Catskill LP								
TVPV	Titusville/Pleasant Valley								
KS95	Kingston -Saugerties (9.5#)								
HH	Hopewell- Hughsonville								
SP	Sharon Dr- Poughkeepsie								
NFE	North Kingston - Foxhall								
СК	Coxsackie								
SM	Carmel- Mahopac								
KM	Kingston Medium Pressure								
KLP	Kingston LP								
CFNM	Cronomer Hill - Fullerton Ave/Newburgh Medium								
NFW	Elmendorf St- West King								
В	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/Newb								
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								
		0%	50% 100%	0% 20% 40% 60% 80% 100%	0% 10% 20%	0K 2K 4K 6K 8K	1.0% 2.0% 3.0% 4.0% 5.0%		
			Loading Factor (-8) 🗐	Loading Factor (Actual)	Growth Rate	Number of sites (meters)	HP Penetration (% of Sites)		



### Likelihood of exceeding allowable pressure drop (Historical trend forecast)



year



### **T&D location specific demand forecasts**

Local Gas	2023																				
System	(Base)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
AMW	19.0%	19.0%	18.9%	18.9%	18.9%	18.8%	18.8%	18.8%	18.8%	18.9%	19.0%	19.2%	19.4%	19.6%	19.9%	20.1%	20.7%	21.1%	21.4%	21.7%	22.1%
В	49.9%	49.5%	48.3%	47.2%	46.2%	44.8%	43.7%	42.5%	41.9%	41.9%	42.2%	42.2%	43.2%	43.8%	44.6%	45.4%	46.2%	46.8%	47.3%	48.0%	48.8%
BC	12.1%	12.2%	12.7%	13.1%	13.6%	14.0%	14.6%	15.3%	16.0%	16.4%	16.9%	17.2%	17.5%	17.8%	18.1%	18.2%	18.5%	18.8%	19.2%	19.5%	19.9%
BF	28.2%	28.1%	27.8%	27.4%	27.0%	26.6%	26.6%	26.5%	26.4%	26.5%	26.5%	26.7%	27.1%	27.5%	27.9%	28.5%	28.9%	29.5%	29.8%	30.3%	30.8%
BN	46.2%	46.3%	46.7%	46.8%	46.9%	47.3%	47.5%	47.2%	47.5%	48.0%	48.6%	49.1%	49.7%	50.2%	50.6%	51.6%	52.8%	53.6%	54.1%	54.6%	55.2%
CFNM	52.1%	52.1%	52.2%	51.4%	51.2%	50.7%	48.9%	47.8%	47.1%	47.4%	47.7%	47.6%	48.1%	49.1%	50.2%	51.6%	52.8%	53.6%	54.3%	55.0%	56.0%
СН	21.0%	21.2%	21.7%	22.2%	22.7%	23.3%	23.9%	24.5%	25.0%	25.6%	25.9%	26.2%	26.5%	26.9%	27.1%	27.6%	28.2%	28.6%	29.0%	29.3%	29.7%
CLP	87.8%	88.2%	90.2%	92.6%	94.9%	97.0%	99.3%	101.6%	104.1%	106.0%	108.3%	110.4%	111.5%	113.6%	115.3%	117.1%	119.9%	122.1%	124.1%	125.7%	127.4%
CMENP	26.9%	26.9%	27.0%	27.1%	27.1%	27.1%	27.2%	27.2%	27.5%	27.7%	28.0%	28.1%	28.3%	29.1%	29.5%	29.7%	30.0%	30.4%	30.7%	31.3%	31.8%
CMP	45.6%	46.0%	47.6%	49.1%	50.5%	52.2%	54.0%	55.7%	57.5%	59.0%	60.2%	61.5%	62.5%	63.0%	63.8%	64.4%	65.9%	67.1%	67.8%	68.4%	69.2%
CW	91.7%	91.5%	90.5%	89.7%	88.9%	88.1%	87.0%	86.2%	85.9%	86.2%	86.6%	87.5%	88.1%	89.3%	91.1%	92.4%	94.0%	96.4%	98.2%	100.0%	101.3%
GLP	94.4%	95.8%	102.7%	110.4%	118.1%	126.7%	136.8%	147.8%	157.3%	165.2%	170.8%	175.7%	179.0%	182.7%	187.0%	190.3%	192.3%	194.8%	198.0%	199.6%	202.4%
HF	29.7%	29.5%	28.7%	28.0%	27.2%	26.4%	25.8%	25.2%	25.1%	24.9%	25.0%	25.2%	25.5%	25.9%	26.3%	26.7%	27.2%	27.6%	28.2%	28.7%	29.0%
HH	81.6%	81.8%	82.6%	83.4%	83.8%	84.7%	85.5%	86.6%	87.6%	88.7%	90.1%	91.6%	92.7%	94.1%	95.1%	96.2%	97.8%	98.8%	101.2%	103.4%	105.0%
HLMS	24.0%	23.9%	23.5%	22.8%	22.3%	21.8%	21.4%	21.1%	20.8%	20.6%	20.7%	21.0%	21.3%	21.6%	21.9%	22.4%	22.7%	23.1%	23.4%	23.7%	23.9%
HM	100.1%	100.5%	102.2%	103.8%	105.6%	107.2%	109.0%	111.1%	112.8%	114.8%	116.7%	119.2%	121.6%	123.0%	123.7%	126.2%	128.8%	131.1%	133.6%	135.2%	137.5%
ΗV	9.2%	9.2%	9.1%	9.2%	9.2%	9.3%	9.3%	9.3%	9.2%	9.2%	9.3%	9.4%	9.5%	9.5%	9.6%	9.6%	9.7%	9.8%	10.0%	10.1%	10.2%
KLP	56.4%	56.5%	57.2%	57.9%	58.4%	59.0%	59.6%	60.4%	61.2%	62.2%	63.0%	64.1%	65.3%	66.4%	67.6%	68.5%	69.8%	70.6%	71.8%	72.9%	73.8%
КМ	65.6%	65.6%	65.6%	65.7%	65.8%	66.2%	66.5%	67.0%	67.5%	68.5%	69.6%	70.3%	71.2%	72.5%	73.8%	74.5%	75.0%	75.8%	77.3%	78.1%	78.7%
KS High	112.4%	111.2%	106.9%	104.5%	101.7%	99.2%	95.8%	92.9%	90.6%	89.8%	89.7%	91.2%	92.1%	92.6%	93.7%	95.7%	97.9%	99.2%	101.0%	102.8%	104.7%
KS Med	82.2%	82.3%	82.6%	83.0%	83.4%	84.1%	84.8%	85.2%	85.6%	86.5%	87.8%	89.1%	90.4%	91.8%	93.4%	95.4%	96.8%	98.9%	101.1%	102.9%	104.4%
LNW	46.2%	46.3%	47.1%	47.9%	48.7%	49.4%	50.0%	50.8%	51.5%	52.3%	53.1%	53.9%	54.7%	55.4%	55.8%	56.4%	57.2%	57.6%	58.1%	59.3%	60.2%
MA	12.5%	12.3%	11.5%	10.5%	10.0%	10.1%	9.3%	9.6%	9.5%	9.5%	9.1%	9.1%	9.3%	9.5%	9.7%	9.9%	10.0%	10.1%	10.2%	10.3%	10.3%
MLP	94.0%	95.9%	104.8%	114.9%	128.2%	141.3%	155.4%	167.8%	180.2%	188.3%	197.5%	203.1%	206.3%	208.4%	211.3%	215.4%	217.9%	222.3%	226.3%	230.9%	234.1%
NFE	77.1%	77.1%	77.1%	77.2%	77.2%	77.3%	77.1%	77.2%	77.5%	78.1%	79.0%	80.2%	82.1%	83.4%	84.6%	85.7%	86.8%	87.6%	88.4%	90.4%	92.2%
NFW	51.5%	51.6%	52.0%	52.5%	53.0%	53.2%	53.5%	54.0%	54.6%	55.2%	55.6%	56.1%	57.2%	58.0%	59.3%	60.3%	61.0%	61.7%	62.3%	63.5%	64.0%
NLP	48.7%	49.0%	50.6%	53.0%	54.9%	56.7%	58.8%	61.3%	64.6%	66.5%	68.1%	69.4%	70.1%	70.4%	71.7%	72.7%	73.3%	73.9%	74.9%	76.3%	77.5%
PE	18.6%	18.3%	17.4%	16.6%	15.9%	15.1%	14.3%	13.7%	13.3%	13.0%	12.9%	13.0%	13.2%	13.4%	13.6%	13.9%	14.1%	14.4%	14.6%	14.8%	15.0%
РK	36.4%	36.9%	39.3%	41.2%	43.8%	47.1%	50.6%	53.9%	56.9%	59.1%	61.0%	62.3%	63.3%	64.5%	65.9%	66.5%	66.7%	67.3%	68.1%	69.1%	70.4%
PLP	136.6%	139.2%	150.8%	163.1%	175.3%	188.6%	204.1%	217.6%	228.8%	241.3%	249.0%	254.7%	260.3%	264.2%	266.7%	271.5%	274.8%	277.8%	283.4%	287.8%	290.8%
PM	92.6%	92.7%	93.0%	93.4%	94.0%	94.6%	95.9%	97.2%	98.5%	99.7%	100.8%	102.4%	104.1%	106.0%	107.6%	109.4%	111.5%	112.8%	114.0%	115.5%	117.8%
PN	113.0%	112.9%	112.8%	113.2%	114.1%	115.3%	115.8%	116.2%	117.1%	117.9%	118.1%	119.3%	120.8%	122.9%	125.2%	126.8%	128.3%	130.6%	132.8%	134.8%	137.0%
SM	66.1%	67.3%	72.3%	77.2%	83.0%	89.2%	96.2%	102.3%	107.5%	111.8%	115.3%	118.3%	120.1%	122.3%	123.8%	125.6%	126.8%	128.3%	130.6%	132.0%	133.3%
SP	77.3%	77.2%	76.8%	76.3%	75.6%	75.5%	74.8%	74.3%	74.1%	73.6%	74.1%	75.2%	76.2%	77.4%	78.4%	79.1%	79.9%	80.6%	81.2%	82.4%	83.8%
STCRK	43.2%	43.3%	43.7%	44.2%	44.8%	45.6%	46.3%	46.9%	47.3%	47.9%	48.6%	49.2%	50.0%	51.1%	52.0%	52.9%	53.8%	54.9%	55.8%	56.1%	56.6%
TVPV	83.9%	84.4%	86.4%	88.7%	91.0%	93.2%	95.4%	97.7%	99.9%	101.8%	103.6%	105.8%	107.4%	109.1%	111.1%	112.4%	113.3%	115.3%	117.2%	118.4%	119.2%
W	46.9%	47.0%	47.8%	48.7%	49.5%	50.5%	51.4%	52.4%	53.2%	54.2%	55.2%	56.2%	57.5%	58.6%	59.3%	60.5%	61.8%	62.4%	63.1%	64.6%	66.2%
WK	33.0%	33.1%	33.4%	33.7%	34.0%	34.3%	34.6%	34.9%	35.2%	35.6%	36.2%	36.7%	37.1%	37.5%	38.3%	39.0%	39.7%	40.3%	40.9%	41.6%	42.2%
WP	16.7%	17.6%	21.8%	27.0%	33.5%	41.0%	50.9%	60.0%	70.5%	79.7%	86.5%	91.2%	93.3%	94.3%	96.0%	97.6%	99.7%	101.6%	103.7%	105.4%	106.9%

Appendix A Table 4 and Table 5



### **T&D location specific Distribution avoided costs**

Suctor	Capital Cost	10 year levelized	20 year levelized			oof							
Bystem	Capital Cost			2024 20	525 2 \$0.00	020 20	2/ 20	20 20 2	02g 20	30 20	131 20	032 2 ¢0.00	0 <u>33</u>
BN	\$1,040,//1 #/86/7	\$0.00	) \$4.4/	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
CENIM	\$400,47	\$0.00 \$0.00	y <u>₹3.74</u> 1 ¢278.01	\$0.00	\$0.00	\$0.00	\$0.00 ¢78 г1	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00 ¢_80.00
CLP	\$3,104,043	י \$225.01 - ¢8סרסי	¢1 127 68	\$0.00	\$0.00 ¢68.77	\$0.00	\$70.51	\$300.44	\$3/2.90	\$392.1/ \$1 217 F8	\$440.40	\$350.29	\$209.90
CMP	\$1,120,5/5	, ₽025.34 , ¢0.00	+ \$1,127.00 \$75.06	\$0.00	\$00.47	\$0.00	\$501.00	\$952.15	\$1,152.93	\$1,31/.50	\$1,012.07	\$0.00	\$2,009.00
CSSB	\$222.710	\$0.00 \$246.71	1 \$220.02	\$200.86	\$210.05	\$0.00	\$0.00	\$0.00	\$250.50	\$0.00	\$286.60	\$0.00	\$115.00
CW	±1,165,24¢ \$0,0,78,52	\$540.73	41.06 Γ.	\$0.00	\$68.06	\$418.07	\$47E 70	\$540.70	\$701.06	\$372.90	\$1.080.06	\$1,200,62	¢1 222 28
GLP	\$05.616	+ + +	+ \$1,400.54	\$50.05	\$208 E1	\$268.21	\$204.72	\$262.70	\$288.22	\$4002.29	\$4.85.80	\$500.28	\$528.22
НН	\$10,406,216	\$270.81	1 \$1.582.00	\$0.00	\$0.00	\$0.00	\$22.20	\$87.80	\$200.33	\$435.34	\$547.01	\$862.24	\$1,409,51
НМ	\$2,210,100	\$5.806.58	s \$4.003.10	\$5,021.00	\$5,207.81	\$5,400,49	\$5,600.31	\$5,807.52	\$6.022.40	\$6.245.22	\$6,476 31	\$6,715.93	\$6.964.42
KLP	\$4.570.215	\$0.00	) \$220.01	\$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	7 \$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	\$120.70	\$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	1 \$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	1 \$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	2 \$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	7 \$309.72	\$0.00	\$0.00	\$0.00	\$0.00	\$10.50	\$39.65	\$127.93	\$234.10	\$320.74	\$435.15
Central I	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

Table excludes locations with no overload risk or deferral value. Appendix A, Table 6



# Planning Process and Hydraulic Modeling

Dean Kane, Section Engineer Gas Transformation and Planning





### **T&D Planning Process – Bottom-Up Approach**





# Infrastructure Condition and Compliance Inputs



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### Load Forecasting by System

- Calculate & Maintain Peak Day load for each customer
- Factoring historic weather data, customer usage, and customer location to calculate demand factors, also known as base and heating usage factors
- Central Hudson uses a 73 heat design day (HDD),
- Peak daily usage (MSCFD) of a customer = the base usage added to the heating usage for a 73HDD
- Customer appliances and equipment operate for 20 hours of a 24-hour period
- Gather Critical System data from GIS, CMM & Pressure Monitoring Points
- Determine a 5-year growth rate based on CH criteria



### **Flow Study Evaluation of Alternatives**

### Flow & Area Studies Considerations Infrastructure Condition and Compliance

#### **Energy Resources Review** System Size Engineering Request Planned major highway reconstruction projects Study Low Pressure >1 Mcfh (1,000 cfh) 250 Mcfh (study input) / 25 Mcfh Engineering requests for new business purposes (notification only) 8-40 PSIG >2 Mcfh (2,000 cfh) 250 Mcfh (study input) / 25 Mcfh (notification only) Replacement of outmoded systems 60-120 PSIG >5 Mcfh (5,000 cfh) 250 Mcfh (study input) / 25 Mcfh (notification only) Reinforcement decisions for systems observed to be operating at less than 50% of their nominal MAOP **Emergent Issues** Location of end point monitoring pressure recorders on systems that have not been studied within the past 10 years Leaks Valve Zone modification Gas line comprised – Dig-Ins Water in the Main **Unreserved Load**

New Business Incremental Load –

**Trigger Levels** 



# **Project Development & Prioritization**

# Project Development Consideration



Central Hudson

### **Factors that Effect Prioritization**

- Main Replacement Prioritization (MRP)
- Existing & Future Load Growth
- Operating Pressure (MAOP)
- Gas Leak History (if Any)
- Corrosion Prevention
- Municipal Schedule
- Engineering Request
- Safety & Reliability

### **Construction of a Hydraulic Model**





### Hydraulic Model of an Interconnected CH System





### **Highly Loaded Systems Identified in GSLTP**



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	
В	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	

People, Power. Possibilities Central Hudson 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.

### Hydraulic Model of a Highly Loaded System





# Questions



