

## Appendix E

### Current & Alternative Resources

Draft 2023 WA IRP

## **Appendix E - Introduction**

The purpose of this document is to transparently describe the transportation and supply inputs that were utilized in the preferred portfolio described in the Resource Integration chapter. Pages 3-4 of this appendix provides annual commodity costs, annual supply amounts, and the annual unit commodity cost at a dollar per dekatherm for supply. Pages 5-14 provides fuel rates, Maximum daily quantity (MDQ), reservation rates, and transportation rates for Cascade's transportation contracts. Also, pages 15-28 show the multiple scenarios Cascade ran as well as cost and served/unserved results for each scenario. Cascade has also provided the Company's current Annual Hedge Plan.

### **Types of Supply - Summary**

- Base – Can be listed as “Base” or “Fixed”; this is an annual supply that we must take if we contract it.
- Winter – This is another supply that we must take but is only available during the winter season (November-March).
- Day Gas – Can be broken down by winter and summer day gas. We only have to take what we need of this type of gas, and because it is more flexible, it is more expensive than Base or Winter gas.
- Peak – Used to serve demand when all other options are exhausted. It is also the most expensive type of gas.



Supply	Data Item	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
ROCK DAY S	Max Take Daily by Supply														
ROCK DAY S	Take Monthly by Supply (D00)	530	806	3,550	1,241	1,211	840	1,171	1,651	1,700	652	743	648	753	763
ROCK DAY S	Commodity Cost (\$/D00)	\$ 3,314.4	\$ 4,040	\$ 5,907.06	\$ 4,388.14	\$ 4,104.13	\$ 1,107.36	\$ 1,886.96	\$ 5,749.74	\$ 5,814.10	\$ 2,268.33	\$ 2,643.30	\$ 2,313.72	\$ 2,754.75	\$ 2,836.37
ROCK DAY S	Unit Commodity Cost (\$/D00) (\$/M)	\$ 6.63	\$ 4.46	\$ 3.79	\$ 3.52	\$ 3.28	\$ 3.26	\$ 3.32	\$ 3.40	\$ 3.42	\$ 3.46	\$ 3.56	\$ 3.57	\$ 3.66	\$ 3.72
ROCK DAY W	Max Take Daily by Supply	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
ROCK DAY W	Take Monthly by Supply (D00)	2,977	3,203	3,350	3,351	3,033	3,214	3,151	3,043	2,752	1,703	934	1,387	1,037	1,177
ROCK DAY W	Commodity Cost (\$/D00)	\$ 19,881.09	\$ 14,495	\$ 12,206.44	\$ 11,276.71	\$ 10,054.47	\$ 7,328.31	\$ 10,629.22	\$ 11,647.21	\$ 9,549.79	\$ 6,025.17	\$ 3,370.26	\$ 5,745.74	\$ 3,844.42	\$ 4,438.90
ROCK DAY W	Unit Commodity Cost (\$/D00) (\$/M)	\$ 6.64	\$ 4.51	\$ 3.84	\$ 3.57	\$ 3.33	\$ 3.31	\$ 3.37	\$ 3.45	\$ 3.47	\$ 3.53	\$ 3.63	\$ 3.62	\$ 3.71	\$ 3.77
ROCK FEED	Max Take Daily by Supply	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
ROCK FEED	Take Monthly by Supply (D00)	7,418	8,387	-	-	-	-	-	-	-	-	-	-	-	-
ROCK FEED	Commodity Cost (\$/D00)	\$ 26,674.86	\$ 30,259	-	-	-	-	-	-	-	-	-	-	-	-
ROCK FEED	Unit Commodity Cost (\$/D00) (\$/M)	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62	\$ 3.62
ROCK FEEDW	Max Take Daily by Supply	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
ROCK FEEDW	Take Monthly by Supply (D00)	-	1,511	1,065	-	-	-	-	-	-	-	-	-	-	-
ROCK FEEDW	Commodity Cost (\$/D00)	\$ -	\$ 6,283	\$ 12,414.42	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ROCK FEEDW	Unit Commodity Cost (\$/D00) (\$/M)	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.05
ROCK INDEX	Max Take Daily by Supply	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
ROCK INDEX	Take Monthly by Supply (D00)	-	7,050	-	-	-	-	-	-	-	-	-	-	-	-
ROCK INDEX	Commodity Cost (\$/D00)	\$ -	\$ -	\$ 25,164.21	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ROCK INDEX	Unit Commodity Cost (\$/D00) (\$/M)	\$ 6.42	\$ 4.28	\$ 3.50	\$ 3.22	\$ 3.08	\$ 3.06	\$ 3.12	\$ 3.20	\$ 3.22	\$ 3.28	\$ 3.36	\$ 3.37	\$ 3.46	\$ 3.52
ROCK INDEW	Max Take Daily by Supply	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
ROCK INDEW	Take Monthly by Supply (D00)	-	-	-	1,987	1,001	2,096	2,123	5,888	3,117	3,019	4,882	3,055	4,833	4,147
ROCK INDEW	Commodity Cost (\$/D00)	\$ -	\$ -	\$ -	\$ 19,865.44	\$ 19,112.33	\$ 21,671.67	\$ 22,848.32	\$ 18,841.10	\$ 10,680.74	\$ 11,024.21	\$ 16,334.08	\$ 11,974.74	\$ 16,079.90	\$ 15,052.28
ROCK INDEW	Unit Commodity Cost (\$/D00) (\$/M)	\$ 6.43	\$ 4.28	\$ 3.50	\$ 3.32	\$ 3.08	\$ 3.06	\$ 3.12	\$ 3.20	\$ 3.22	\$ 3.28	\$ 3.36	\$ 3.37	\$ 3.46	\$ 3.52
ROCK PEAR	Max Take Daily by Supply	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
ROCK PEAR	Take Monthly by Supply (D00)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ROCK PEAR	Commodity Cost (\$/D00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ROCK PEAR	Unit Commodity Cost (\$/D00) (\$/M)	\$ 3.18	\$ 3.03	\$ 4.34	\$ 4.07	\$ 3.83	\$ 3.81	\$ 3.87	\$ 3.95	\$ 3.97	\$ 4.03	\$ 4.11	\$ 4.12	\$ 4.21	\$ 4.27
STANBALSUN	Max Take Daily by Supply	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
STANBALSUN	Take Monthly by Supply (D00)	179	147	147	142	116	15	57	90	90	29	1	1	1	96
STANBALSUN	Commodity Cost (\$/D00)	\$ 1,048.58	\$ 853	\$ 940.96	\$ 922.47	\$ 402.48	\$ 92.50	\$ 199.02	\$ 321.30	\$ 323.02	\$ 108.14	\$ 1.75	\$ 3.77	\$ 1.81	\$ 370.75
STANBALSUN	Unit Commodity Cost (\$/D00) (\$/M)	\$ 5.88	\$ 4.17	\$ 3.98	\$ 3.53	\$ 1.44	\$ 1.47	\$ 1.51	\$ 1.57	\$ 1.59	\$ 1.66	\$ 3.75	\$ 3.77	\$ 3.81	\$ 3.87
STAT2 INDEX	Max Take Daily by Supply	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
STAT2 INDEX	Take Monthly by Supply (D00)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STAT2 INDEX	Commodity Cost (\$/D00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
STAT2 INDEX	Unit Commodity Cost (\$/D00) (\$/M)	\$ 6.54	\$ 4.13	\$ 3.70	\$ 3.18	\$ 3.10	\$ 3.10	\$ 3.14	\$ 3.28	\$ 3.24	\$ 3.31	\$ 3.40	\$ 3.40	\$ 3.45	\$ 3.48
WA Offsets	Max Take Daily by Supply	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WA Offsets	Take Monthly by Supply (D00)	-	136	232	167	-	309	-	-	-	233	-	-	-	385
WA Offsets	Commodity Cost (\$/D00)	\$ -	\$ 2,787	\$ 5,167.60	\$ 3,042.91	\$ -	\$ 7,636.37	\$ -	\$ -	\$ -	\$ 7,514.91	\$ -	\$ -	\$ -	\$ 6,796.91
WA Offsets	Unit Commodity Cost (\$/D00) (\$/M)	\$ 20.50	\$ 20.50	\$ 20.50	\$ 21.75	\$ -	\$ 23.25	\$ 24.75	\$ 26.25	\$ 27.75	\$ 29.25	\$ 30.75	\$ 32.25	\$ 33.75	\$ 35.25
WA Green Hydrogen	Max Take Daily by Supply	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WA Green Hydrogen	Take Monthly by Supply (D00)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WA Green Hydrogen	Commodity Cost (\$/D00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WA Green Hydrogen	Unit Commodity Cost (\$/D00) (\$/M)	\$ -	\$ -	\$ 15.36	\$ 17.24	\$ 15.80	\$ 14.37	\$ 12.93	\$ 11.49	\$ 11.02	\$ 10.74	\$ 10.46	\$ 10.18	\$ 9.89	\$ 9.61
WA On System RNG	Max Take Daily by Supply	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WA On System RNG	Take Monthly by Supply (D00)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WA On System RNG	Commodity Cost (\$/D00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WA On System RNG	Unit Commodity Cost (\$/D00) (\$/M)	\$ -	\$ -	\$ 11.24	\$ 13.50	\$ 11.50	\$ 10.50	\$ 9.50	\$ 8.50	\$ 8.00	\$ 7.75	\$ 7.50	\$ 7.25	\$ 7.00	\$ 6.75





Table with columns for Transport Data Item, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036. Rows include various transport items like FHLS2023, FHLS2024, etc., with numerical values for fuel volume and rate.







Table with columns for Transport, Data Item, and years 2037-2050. Rows include various transport items like FHLS2023, FHLS2024, FHLS2025, etc., with associated fuel volume and rate data.







Firm Transportation #17025 (#00152, December 1, 1997)	kingsgate	Prineville	GTN	Oregon	10/31/2033	0.18311	827	827	827	827									827	827
Firm Transportation #17026 (#00152, December 1, 1997)	kingsgate	Redmond	GTN	Oregon	10/31/2033	0.18728	662	662	662	662									662	662
Firm Transportation #17028 (#00152, December 1, 1997)	kingsgate	Bend	GTN	Oregon	10/31/2033	0.19314	4,137	4,137	4,137	4,137									4,137	4,137
Firm Transportation #17031 (#00152, December 1, 1997)	kingsgate	Stearns	GTN	Oregon	10/31/2033	0.19846	1,241	1,241	1,241	1,241									1,241	1,241
Firm Transportation #17034 (#00152, December 1, 1997)	kingsgate	Gilchrist	GTN	Oregon	10/31/2033	0.20996	248	248	248	248									248	248
Firm Backhaul Transportation #13687 (April 1, 2018)	turquoise flats	stanfield	GTN	Oregon	10/31/2039	0.14895	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
<b>Firm Backhaul Transportation #13688 (November 1, 2014)</b>	turquoise flats	stanfield	GTN	Oregon	10/31/2039	0.14895	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Firm Transportation #18507 (December 1, 2017)	kingsgate	malin	GTN	Oregon	10/31/2032	0.25032	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
<b>NOVA AND FOOTHILLS</b>																				
2002 Service Agreement November 2, 2002 (CNG FS-2)	AB/C border	kingsgate	ANG	Oregon	10/31/2022	0.04581	3,126													
Service Agreement (ANG) September 11, 2001 (#CNG FS-3)	AB/C border	kingsgate	ANG	Oregon	10/31/2028	0.04581	21583	21583	21583	21583	21583	21583	21583	21583	21583	21583	21583	21583	21583	21583
Service Agreement (NOVA) September 4, 2001 (#2003039348-1)	NIT	AB/C border	NOVA	Oregon	10/31/2028	0.124398	21973	21973	21973	21973	21973	21973	21973	21973	21973	21973	21973	21973	21973	21973
<b>FS-1 Transportation (ANG) June 12, 1991 (CNG FS-1)</b>	AB/C border	kingsgate	ANG	Oregon	10/31/2023	0.04581	7602	7602	7602	7602										
<b>ENBRIDGE</b>																				
Westcoast Service Agreement January 3, 2002 (#FI-2583-B-013)	station 2	huntingdon	WESTCOAST	Washington		45596	0.427612	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000
<b>RUBY PIPELINE LLC</b>																				
Firm Service Agreement #61036000B, November 1, 2014	pearl creek	turquoise flats	RUBY	system		51074	0.75	15000	15000	15000	15000	15000							15000	15000

PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO		NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)					
	Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. All additional resources to meet demand and carbon reduction goals are considered. All items in <b>RED</b> mean those elements were excluded from the scenario.	KEY ELEMENTS IN SENDOUT SCENARIO									
All-In	Current Station2	JP1	Washington	Washington	Washington	Washington					
	Current NOVA	JP2									
	Current GTN	JP3									
	Current NWP	JP4									
	Current Foothills	PLY-1					7,340,322	\$ 0.6648	0	11,041,841	
	Current Ruby	PLY-2									
		MIST 1 & 2									
	Incremental NGTL	Spire Storage					DSM	Oregon	Oregon	Oregon	Oregon
	Incremental GTN N-S	Gill Ranch Storage					Resource Mix - 3 Basins				
	NWP I-5 Mainline EXP	Wild Goose Storage					Renewable Natural Gas				
	Incremental Ruby	Aeco Hub Storage					Hydrogen		\$ 1.1778		4,744,633
	NWP Wen lateral EXP	Magnum Storage					Offsets				
Incremental Foothills	Clay Basin Storage	Allowances									
NWP Z20 lateral EXP		Community Climate Investments									
T-South-So Crossing											
Trails West (Palomar)											
NWP East OR Mainline EXP											
Incremental GTN S-N											
Incremental Enbridge Pacific Connector											
			System	System	System	System					
			12,928,647	\$ 0.8190	27	15,786,473					

PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO			NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)
	Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. No new elements considered. All items in RED mean those elements were excluded from the scenario.						
AS-IS	KEY ELEMENTS IN SENDOUT SCENARIO						
	Current Station2	JP1	AECO Base/Fixed, Winter, Day W/S, Peak	Washington	Washington	Washington	Washington
	Current NOVA	JP2	SUMAS Base/Fixed, Winter, Day W/S, Peak	Washington	Washington	Washington	Washington
	Current GTN	JP3	ROCKIES Base/Fixed, Winter, Day W/S, Peak	Washington	Washington	Washington	Washington
	Current NWP	JP4	HUNT Base/Fixed, Winter, Day W/S	Washington	Washington	Washington	Washington
	Current Foothills	PLY-1	KINGSGATE BASE	2,940,657	\$ 0.8534	455,010	3,445,815
	Current Ruby	PLY-2	OPAL BASE				
			MIST 1 & 2				
	Incremental NGTL	Spire Storage	DSM	Oregon	Oregon	Oregon	Oregon
	Incremental GTN N-S	Gill Ranch Storage	Resource Mix - 3 Basins	Oregon	Oregon	Oregon	Oregon
	NWP I-5 Mainline EXP	Wild Goose Storage	Renewable Natural Gas	1,080,574	\$ 0.5120	190,737	2,110,697
	Incremental Ruby	Aeco Hub Storage	Hydrogen				
	NWP Wen lateral EXP	Magnum Storage	Offsets				
Incremental Foothills	Clay Basin Storage	Allowances					
NWP Z20 lateral EXP		Community Climate Investments					
T-South-So Crossing							
Trails West (Palomar)							
NWP East OR Mainline EXP							
Incremental GTN S-N							
Incremental Enbridge Pacific Connector							
			System	System	System	System	
			4,021,231	\$ 0.7237	645,747	5,556,512	



PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO	NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)	
<p>Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. All Resources except DSM are additional resources considered to meet demand and carbon reduction goals. All items in <b>RED</b> mean those elements were excluded from the scenario.</p>	<p>KEY ELEMENTS IN SENDOUT SCENARIO</p>	Washington	Washington	Washington	Washington	
	Current Station2					AECO Base/Fixed, Winter, Day W/S, Peak
	Current NOVA					SUMAS Base/Fixed, Winter, Day W/S, Peak
	Current GTN					ROCKIES Base/Fixed, Winter, Day W/S, Peak
	Current NWP					HUNT Base/Fixed, Winter, Day W/S
	Current Foothills					KINGSGATE BASE
	Current Ruby					OPAL BASE
						KERN WINTER
						STAT2 BASE
	<p>All In Less DSM</p>					<p>Incremental NGTL</p> <p>Incremental GTN N-S</p> <p>NWP I-5 Mainline EXP</p> <p>Incremental Ruby</p> <p>NWP Wen lateral EXP</p> <p>Incremental Foothills</p> <p>NWP Z20 lateral EXP</p> <p>T-South-So Crossing</p> <p>Trails West (Palomar)</p> <p>NWP East OR Mainline EXP</p> <p>Incremental GTN S-N</p> <p>Incremental Enbridge</p> <p>Pacific Connector</p>
Spire Storage		<b>DSM</b>				
Gill Ranch Storage		Resource Mix - 3 Basins				
Wild Goose Storage		Renewable Natural Gas				
Aeco Hub Storage		Hydrogen				
Magnum Storage		Offsets				
Clay Basin Storage		Allowances				
		Community Climate Investments				

PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO	NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)	
Transportation Only	Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. Transportation is the only additional resource considered to meet demand and carbon reduction goals. All items in RED mean those elements were excluded from the scenario.					
	KEY ELEMENTS IN SENDOUT SCENARIO					
	Current Station2	JP1	Washington	Washington	Washington	
	Current NOVA	JP2				
	Current GTN	JP3				
	Current NWP	JP4				
	Current Foothills	PLY-1	2,724,298	\$ 0.7906	406,009	3,445,815
	Current Ruby	PLY-2				
		MIST 1 & 2				
		STAT2 BASE				
		DSM				
	Incremental NGTL	<i>Spire Storage</i>				
	Incremental GTN N-S	<i>Gill Ranch Storage</i>				
	NWP I-5 Mainline EXP	<i>Wild Goose Storage</i>				
	Incremental Ruby	<i>Aeco Hub Storage</i>	1,004,636	\$ 0.4760	171,145	2,110,698
	NWP Wen lateral EXP	<i>Magnum Storage</i>				
	Incremental Foothills	<i>Clay Basin Storage</i>				
NWP Z20 lateral EXP						
T-South-So Crossing						
Trails West (Palomar)						
NWP East OR Mainline EXP						
Incremental GTN S-N						
Incremental Enbridge						
Pacific Connector		3,728,934	\$ 0.6711	577,155	5,556,512	



PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO		NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)
	Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. Renewable Natural Gas is the only additional resource considered to meet demand and carbon reduction goals. All items in RED mean those elements were excluded from the scenario.	KEY ELEMENTS IN SENDOUT SCENARIO				
RNG Only	Current Station2	JP1	Washington	Washington	Washington	Washington
	Current NOVA	JP2				
	Current GTN	JP3				
	Current NWP	JP4				
	Current Foothills	PLY-1				
	Current Ruby	PLY-2				
		MIST 1 & 2				
		STAT2 BASE				
		AECO Base/Fixed, Winter, Day W/S, Peak				
		SUMAS Base/Fixed, Winter, Day W/S, Peak				
		ROCKIES Base/Fixed, Winter, Day W/S, Peak				
		HUNT Base/Fixed, Winter, Day W/S				
		KINGSGATE BASE				
		OPAL BASE				
		KERN WINTER				
		STAT2 BASE				
		DSM				
Incremental NGTL	Spire Storage	Resource Mix - 3 Basins				
Incremental GTN N-S	Gill Ranch Storage	Renewable Natural Gas				
NWP I-5 Mainline EXP	Wild Goose Storage	Hydrogen				
Incremental Ruby	Aeco Hub Storage	Offsets				
NWP Wen lateral EXP	Magnum Storage	Allowances Community Climate Investments				
Incremental Foothills	Clay Basin Storage					
NWP Z20 lateral EXP						
T-South-So Crossing						
Trails West (Palomar)						
NWP East OR Mainline EXP						
Incremental GTN S-N						
Incremental Enbridge Pacific Connector						
			Oregon	Oregon	Oregon	Oregon
			5,883,193	1.2400	0	4,744,633
			System	System	System	System
			8,434,560	1.0256	404,289	8,224,300

PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO		NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)	
Hydrogen Only	Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. Hydrogen is the only additional resource considered to meet demand and carbon reduction goals. All items in <b>RED</b> mean those elements were excluded from the scenario.		Washington	Washington	Washington	Washington	
	KEY ELEMENTS IN SENDOUT SCENARIO						
	Current Station2	JP1	AECO Base/Fixed, Winter, Day W/S, Peak				
	Current NOVA	JP2	SUMAS Base/Fixed, Winter, Day W/S, Peak				
	Current GTN	JP3	ROCKIES Base/Fixed, Winter, Day W/S, Peak				
	Current NWP	JP4	HUNT Base/Fixed, Winter, Day W/S				
	Current Foothills	PLY-1	KINGSGATE BASE	3,517,982	\$ 0.8181	4,299,970	
	Current Ruby	PLY-2	OPAL BASE				
		MIST 1 & 2	KERN WINTER				
			STAT2 BASE				
	<b>Incremental NGTL</b>	<b>Spire Storage</b>	<b>DSM</b>	Oregon	Oregon	Oregon	Oregon
	<b>Incremental GTN N-S</b>	<b>Gill Ranch Storage</b>	<b>Resource Mix - 3 Basins</b>				
	<b>NWP I-5 Mainline EXP</b>	<b>Wild Goose Storage</b>	<b>Renewable Natural Gas</b>				
	<b>Incremental Ruby</b>	<b>Aeco Hub Storage</b>	<b>Hydrogen</b>				
	<b>NWP Wen lateral EXP</b>	<b>Magnum Storage</b>	<b>Offsets</b>				
	<b>Incremental Foothills</b>	<b>Clay Basin Storage</b>	<b>Allowances Community Climate Investments</b>				
	<b>NWP Z20 lateral EXP</b>			1,321,902	\$ 0.5394	156,197	2,450,844
	<b>T-South-So Crossing</b>						
	<b>Trails West (Palomar)</b>						
<b>NWP East OR Mainline EXP</b>							
<b>Incremental GTN S-N</b>							
<b>Incremental Enbridge Pacific Connector</b>			System	System	System	System	
			4,839,885	\$ 0.7169	524,683	6,750,814	

PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO	NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)	
<p>Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. Renewable Natural Gas and Hydrogen are the only additional resources considered to meet demand and carbon reduction goals. All items in <b>RED</b> mean those elements were excluded from the scenario.</p>	<p>KEY ELEMENTS IN SENDOUT SCENARIO</p> <p><b>Current Station2</b></p>	Washington	Washington	Washington	Washington	
	<b>JP1</b>	AECO Base/Fixed, Winter, Day W/S, Peak	<b>JP2</b>	SUMAS Base/Fixed, Winter, Day W/S, Peak	<b>JP3</b>	ROCKIES Base/Fixed, Winter, Day W/S, Peak
	<b>JP4</b>	HUNT Base/Fixed, Winter, Day W/S	<b>PLY-1</b>	KINGSGATE BASE	<b>PLY-2</b>	OPAL BASE
	<b>Current Foothills</b>		<b>Current Ruby</b>	KERN WINTER	<b>MIST 1 &amp; 2</b>	STAT2 BASE
	<b>Renewables Only</b>		<b>Incremental NGTL</b>	DSM	<b>Incremental GTN N-S</b>	<b>Resource Mix - 3 Basins</b>
	<b>NWP I-5 Mainline EXP</b>	<i>Spire Storage</i>	<b>Incremental Ruby</b>	<b>Gill Ranch Storage</b>	<b>NWP I-5 Mainline EXP</b>	<b>Renewable Natural Gas</b>
	<b>NWP Wen lateral EXP</b>	<i>Wild Goose Storage</i>	<b>Incremental Foothills</b>	<b>Aeco Hub Storage</b>	<b>NWP Wen lateral EXP</b>	<b>Hydrogen</b>
	<b>NWP Z20 lateral EXP</b>	<i>Magnum Storage</i>	<b>T-South-So Crossing</b>	<b>Magnum Storage</b>	<b>NWP Z20 lateral EXP</b>	<b>Offsets</b>
	<b>Trails West (Palomar)</b>	<i>Clay Basin Storage</i>	<b>NWP East OR Mainline EXP</b>	<b>Clay Basin Storage</b>	<b>Trails West (Palomar)</b>	<b>Allowsances Community Climate Investments</b>
	<b>Incremental GTN S-N</b>	<b>Incremental Enbridge Pacific Connector</b>	<b>Incremental Enbridge Pacific Connector</b>		<b>Incremental GTN S-N</b>	<b>Incremental Enbridge Pacific Connector</b>
			8,940,046	\$ 0.9848	366,766	9,078,455

PORTFOLIO NAME	KEY ELEMENTS IN PLEXOS PORTFOLIO		NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)
	Expected Load Growth, Expected Pricing, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. All additional resources to meet demand and carbon reduction goals are considered. All items in <b>RED</b> mean those elements were excluded from the scenario.					
Top Ranking Candidate Portfolio	KEY ELEMENTS IN SENDOUT SCENARIO		Washington	Washington	Washington	Washington
	Current Station2	JP1	AECO Base/Fixed, Winter, Day W/S, Peak			
	Current NOVA	JP2	SUMAS Base/Fixed, Winter, Day W/S, Peak			
	Current GTN	JP3	ROCKIES Base/Fixed, Winter, Day W/S, Peak			
	Current NWP	JP4	HUNT Base/Fixed, Winter, Day W/S			
	Current Foothills	PLY-1	KINGSGATE BASE	7,340,322	\$ 0.6648	11,041,841
	Current Ruby	PLY-2	OPAL BASE			
		MIST 1 & 2	KERN WINTER			
			STAT2 BASE			
	Incremental NGTL	Spire Storage	DSM	Oregon	Oregon	Oregon
	Incremental GTN N-S	Gill Ranch Storage	Resource Mix - 3 Basins			
	NWP I-5 Mainline EXP	Wild Goose Storage	Renewable Natural Gas			
	Incremental Ruby	Aeco Hub Storage	Hydrogen			
	NWP Wen lateral EXP	Magnum Storage	Offsets			
Incremental Foothills	Clay Basin Storage	Allowances				
NWP Z20 lateral EXP		Community Climate Investments				
T-South-So Crossing						
Trails West (Palomar)						
NWP East OR Mainline EXP						
Incremental GTN S-N						
Incremental Enbridge						
Pacific Connector			System	System	System	
			12,928,647	\$ 0.8190	27	15,786,473

SCENARIO NAME	KEY ELEMENTS IN PLEXOS SCENARIO		NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)
	Expected Load Growth, 10% Downward Pricing Adjustment. Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. All additional resources to meet demand and carbon neutral reduction goals are considered. All items in RED mean those elements were excluded from the scenario.					
Carbon Neutral by 2050	KEY ELEMENTS IN SENDOUT SCENARIO					
	Current Station2	JP1	AECO Base/Fixed, Winter, Day W/S, Peak			
	Current NOVA	JP2	SUMAS Base/Fixed, Winter, Day W/S, Peak			
	Current GTN	JP3	ROCKIES Base/Fixed, Winter, Day W/S, Peak			
	Current NWP	JP4	HUNT Base/Fixed, Winter, Day W/S			
	Current Foothills	PLY-1	KINGSGATE BASE	6,963,109	\$ 0.6390	10,897,369
	Current Ruby	PLY-2	OPAL BASE			
		MIST 1 & 2	KERN WINTER			
			STAT2 BASE			
			DSM			
	Incremental NGTL	Spire Storage	Resource Mix - 3 Basins			
	Incremental GTN N-S	Gill Ranch Storage	Renewable Natural Gas			
	NWP I-5 Mainline EXP	Wild Goose Storage	Hydrogen			
	Incremental Ruby	Aeco Hub Storage	Offsets	5,436,577	\$ 1.1458	4,744,633
	NWP Wen lateral EXP	Magnum Storage	Allowances			
	Incremental Foothills	Clay Basin Storage	Community Climate Investments			
NWP Z20 lateral EXP						
T-South-So Crossing						
Trails West (Palomar)						
NWP East OR Mainline EXP						
Incremental GTN S-N						
Incremental Enbridge						
Pacific Connector			12,399,686	\$ 0.7927	15,642,002	





SCENARIO NAME	KEY ELEMENTS IN PLEXOS SCENARIO		NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)	
	Current Station2	KEY ELEMENTS IN SENDOUT SCENARIO					
Increased Electrification	Decreasing Load Growth beginning in 2025, 10% Downward Pricing Adjustment, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. All additional resources to meet demand and carbon reduction goals are considered. All items in <b>RED</b> mean those elements were excluded from the scenario.		Washington	Washington	Washington	Washington	
	Current Station2	KEY ELEMENTS IN SENDOUT SCENARIO					
	Current NOVA	JP1	AECO Base/Fixed, Winter, Day W/S, Peak				
	Current GTN	JP2	SUMAS Base/Fixed, Winter, Day W/S, Peak				
	Current NWP	JP3	ROCKIES Base/Fixed, Winter, Day W/S, Peak				
	Current Foothills	JP4	HUNT Base/Fixed, Winter, Day W/S				
	Current Ruby	PLY-1	KINGSGATE BASE	4,637,805	\$ 0.5847	7,932,217	
		PLY-2	OPAL BASE				
		MIST 1 & 2	KERN WINTER				
			STAT2 BASE				
		Incremental NGTL	Spire Storage	Oregon	Oregon	Oregon	
		Incremental GTN N-S	Gill Ranch Storage				
		NWP I-5 Mainline EXP	Wild Goose Storage				
	Incremental Ruby	Aeco Hub Storage					
	NWP Wen lateral EXP	Magnum Storage					
	Incremental Foothills	Clay Basin Storage					
	NWP Z20 lateral EXP						
	T-South-So Crossing						
	Trails West (Palomar)						
	NWP East OR Mainline EXP						
	Incremental GTN S-N						
	Incremental Enbridge						
	Pacific Connector						
		DSM					
		Resource Mix - 3 Basins					
		Renewable Natural Gas					
		Hydrogen					
		Offsets					
		Allowances					
		Community Climate Investments					
			2,801,057	\$ 0.8156	15	3,434,216	
			System	System	System	System	
			7,438,861	\$ 0.6545	15	11,366,433	

SCENARIO NAME	KEY ELEMENTS IN PLEXOS SCENARIO	KEY ELEMENTS IN SENDOUT SCENARIO	NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)	
High Customer Growth	High Load Growth, 10% Upward Pricing Adjustment, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. All additional resources to meet demand and carbon reduction goals are considered. All items in <b>RED</b> mean those elements were excluded from the scenario.	<p>KEY ELEMENTS IN SENDOUT SCENARIO</p> <p>Current Station2</p> <p>Current NOVA</p> <p>Current GTN</p> <p>Current NWP</p> <p>Current Foothills</p> <p>Current Ruby</p>	Washington	Washington	Washington	Washington	
	JP1	AECO Base/Fixed, Winter, Day W/S, Peak	7,863,437	\$ 0.6604	0	11,907,968	
	JP2	SUMAS Base/Fixed, Winter, Day W/S, Peak					
	JP3	ROCKIES Base/Fixed, Winter, Day W/S, Peak					
	JP4	HUNT Base/Fixed, Winter, Day W/S					
	PLY-1	KINGSGATE BASE					
	PLY-2	OPAL BASE					
	MIST 1 & 2	KERN WINTER					
		STAT2 BASE					
	Incremental NGTL	Spire Storage	DSM	Oregon	Oregon	Oregon	Oregon
	Incremental GTN N-S	Gill Ranch Storage	Resource Mix - 3 Basins	Oregon	Oregon	Oregon	Oregon
	NWP I-5 Mainline EXP	Wild Goose Storage	Renewable Natural Gas	Oregon	Oregon	Oregon	Oregon
	Incremental Ruby	Aeco Hub Storage	Hydrogen	Oregon	Oregon	Oregon	Oregon
	NWP Wen lateral EXP	Magnum Storage	Offsets	Oregon	Oregon	Oregon	Oregon
Incremental Foothills	Clay Basin Storage	Allowances	Oregon	Oregon	Oregon	Oregon	
NWP Z20 lateral EXP		Community Climate Investments	Oregon	Oregon	Oregon	Oregon	
T-South-So Crossing			Oregon	Oregon	Oregon	Oregon	
Trails West (Palomar)			Oregon	Oregon	Oregon	Oregon	
NWP East OR Mainline EXP			Oregon	Oregon	Oregon	Oregon	
Incremental GTN S-N			Oregon	Oregon	Oregon	Oregon	
Incremental Enbridge			Oregon	Oregon	Oregon	Oregon	
Pacific Connector			Oregon	Oregon	Oregon	Oregon	

SCENARIO NAME	KEY ELEMENTS IN PLEXOS SCENARIO		NPV 28 Year Costs in \$000s	Average Cost Per Therm	Max Year Unserved Demand (000s of Therms)	Total Served Demand (000s of Therms)	
	Current Station2	Current Station1					
High Price - Interrupted Supply	Expected Load Growth, Expected Pricing with Stochastic Price Spikes, Expected Weather w/ Peak Event and Climate Change Impacts, SCC w/ 2.5% Discount Rate Carbon Forecast. All additional resources to meet demand and carbon reduction goals are considered. All items in <b>RED</b> mean those elements were excluded from the scenario. Items in <b>BLUE</b> were limited during interruptions.		Washington	Washington	Washington	Washington	
	KEY ELEMENTS IN SENDOUT SCENARIO						
	Current Station2	JP1	AECO Base/Fixed, Winter, Day W/S, Peak				
	Current NOVA	JP2	SUIMAS Base/Fixed, Winter, Day W/S, Peak				
	Current GTN	JP3	ROCKIES Base/Fixed, Winter, Day W/S, Peak				
	Current NWP	JP4	HUNT Base/Fixed, Winter, Day W/S				
	Current Foothills	PLY-1	KINGSGATE BASE	7,447,884	\$ 0.6749	5,830	11,036,011
	Current Ruby	PLY-2	OPAL BASE				
		MIST 1 & 2	KERN WINTER				
			STAT2 BASE				
	Incremental NGTL	Spire Storage	DSM	Oregon	Oregon	Oregon	Oregon
	Incremental GTN N-S	Gill Ranch Storage	Resource Mix - 3 Basins				
	NWP I-5 Mainline EXP	Wild Goose Storage	Renewable Natural Gas				
Incremental Ruby	Aeco Hub Storage	Hydrogen	5,617,162	\$ 1.1839	27	4,744,606	
NWP Wen lateral EXP	Magnum Storage	Offsets					
Incremental Foothills	Clay Basin Storage	Allowances					
NWP Z20 lateral EXP		Community Climate Investments					
T-South-So Crossing							
Trails West (Palomar)							
NWP East OR Mainline EXP							
Incremental GTN S-N							
Incremental Enbridge			System	System	System	System	
Pacific Connector			13,065,047	\$ 0.8279	5,857	15,780,617	



*In the Community to Serve®*

# ANNUAL HEDGE PLAN

(UG-\_\_\_\_\_)

SEPTEMBER 15, 2022

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## I. Program Goals

On March 13, 2017, the Washington Utilities and Transportation Commission (WUTC) issued its Policy and Interpretative Statement on Local Distribution Companies' (LDCs) Natural Gas Hedging Practices in Docket UG-132019. This statement provided guidance on how LDCs should develop and implement more robust risk management strategies, analyses, and reporting related to hedging activities.

In Docket UG-132019, the WUTC reviewed hedging practices by utilities in the State of Washington and found that local LDCs experienced costs associated with price risk mitigation techniques upwards of \$1.1 billion over a ten-year period. The WUTC discovered that many of these costs were caused by adherence to programmatic "set-it-and-forget-it" price risk mitigation practices (herein called hedging or hedging strategies) that did not respond well to the downward trending market which prevailed in recent years. The WUTC concluded that, while hedging is necessary to limit upside price risk, an effective program should have the flexibility to mitigate downside hedge losses by adjusting to changing market conditions. To achieve this goal, the Commission identified a need for a risk-responsive hedge plan with a robust analytical framework. Cascade Natural Gas (CNGC or Company) has committed to developing, maintaining and adapting risk responsive hedging policies, processes and applications. Satisfying the Commission's natural gas risk management goal is the purpose of the work associated with this document.

In preparing the Company's hedging document, CNGC has relied on the following points when interpreting the WUTC hedging policy statement:

- WUTC affirmed its preference that natural gas LDCs utilize risk responsive hedging practices.
- Hedging practices should not be speculative in nature. Hedging is an activity designed to reduce price uncertainty and manage foreseen and unforeseen price risk. Hedging is not an attempt to realize profits based on predictions of anticipated market movements.
- The Commission believes that, while there is no right mix of methods that may be applied unilaterally due to utility specific operations, LDCs must reasonably plan for market volatility and appropriately react to balance the benefits of hedging against exposure to hedge losses. This includes recognizing dual protection from upside price risk and downside hedge losses, along with annual validation of acceptable hedging outcomes.
- Based on the WUTC hedging policy statement, the Company is aware that the WUTC views the Gettings White Paper as a resource in helping LDCs develop more robust risk management programs.

In response to Docket UG-132019, CNGC's Gas Supply Oversight Committee (GSOC)<sup>1</sup> took the following actions in order to achieve full compliance the WUTC's goals. First, it formed a project team that would completely redesign the existing Hedge Program. Second, GSOC approved the hiring of an outside consultant, Gelber and Associates ("Gelber" or "G&A"), to assist the project team with the Hedge Program overhaul. Gelber has more than two decades of experience in helping utilities create and manage their hedge programs.

The CNGC Hedging Program was designed to satisfy the WUTC's objectives in a manner that is feasible and economical given CNGC's size, structure, expertise, and customer base. In January of 2019, GSOC approved

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<sup>1</sup> CNGC's Gas Supply Oversight Committee (GSOC) oversees the Company's gas supply purchasing and hedging strategy. Members of GSOC include Company senior management from Gas Supply, Regulatory, Finance and Operations.

the Company Hedge Program, while on April 28<sup>th</sup>, 2022 the newest Hedge Execution Plan (HEP) was approved. Components of both the Hedge Program and the current HEP are discussed in this document, the 2022 Annual Hedge Plan (“Hedge Plan “or “Plan”).

On October 1<sup>st</sup>, 2021, CNGC met with members of WUTC staff for an informal discussion of the 2021 Hedge Plan. During the meeting, Cascade provided a general review of the plan, including the Retrospective Report appendix and how the Compliance Matrix appendix demonstrates compliance with the Commission’s 2019 Hedging Report Acknowledgment Letter. The Company appreciates this feedback, and incorporates feedback from that discussion in this document.

## **II. Organizational Structure**

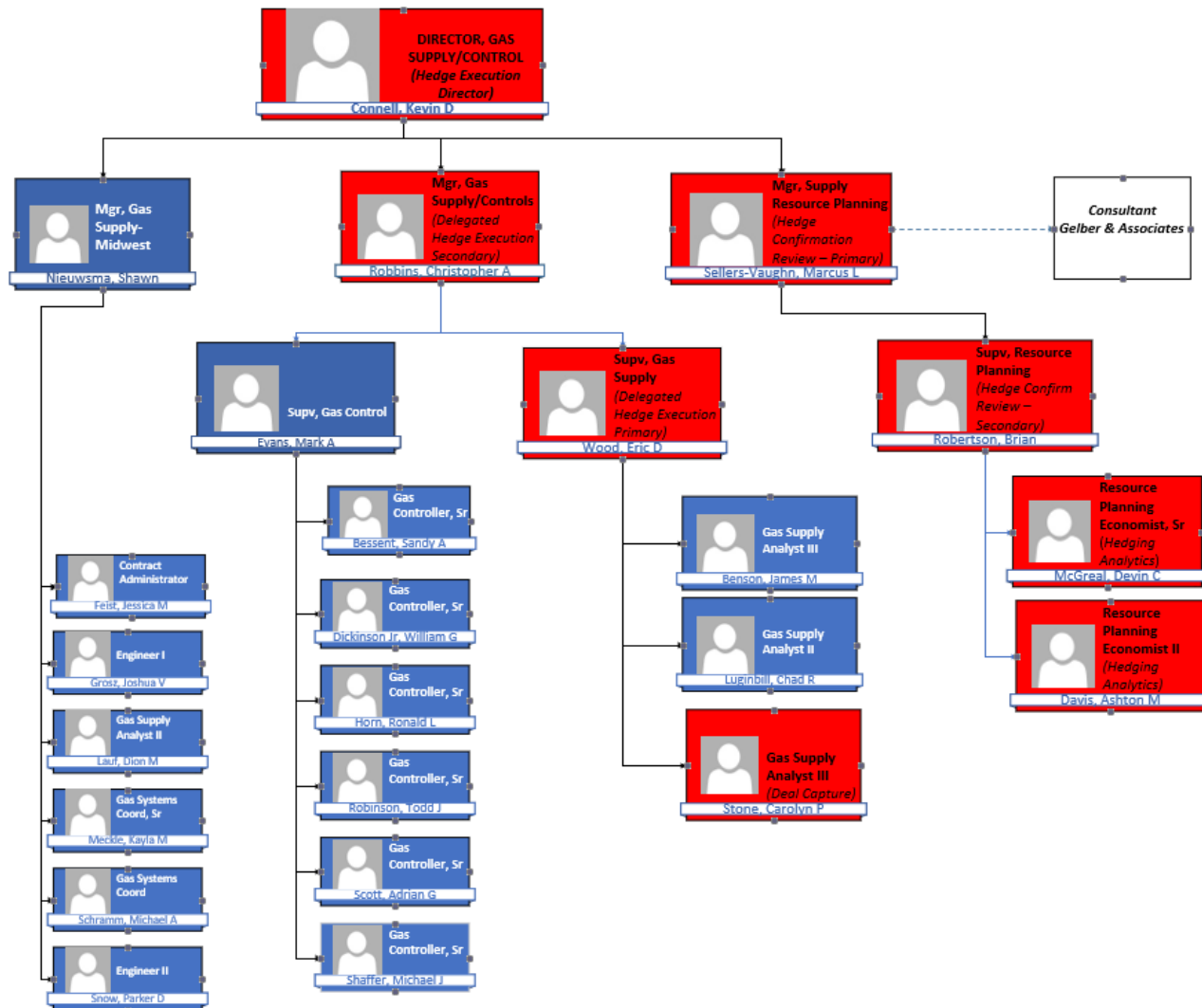
CNGC’s GSOC has ultimate authority over the Company’s Hedge Plan. This power is granted by the Company’s Management Policy Committee. Key members of CNGC’s Gas Supply department are responsible for executing the strategy set by GSOC, while individuals in the Resource Planning group of the Gas Supply department serve in analytical support and audit roles. Figure 1 outlines the personnel that will be responsible for oversight, execution, and support for the 2021 Hedge Plan. Figure 2 provides a condensed organization chart for the Director of Gas Supply and individuals that report to him who are responsible for executing the Hedge Plan (in red).



**Figure 1 - Hedge Plan Roles**

<b>ROLE</b>	<b>ASSIGNED TO</b>	<b>TITLE(S)</b>
Corporate Authority to Hedge	Management Policy Committee	President & CEO MDUR President & CEO MDUG President & CEO Knife River VP, CAO, Controller MDUR President & CEO WBI Holdings VP, CHRO MDUR VP, Gen Counsel and Secretary MDUR VP, CIO MDUR President & CEO MDU Construction VP, CFO MDUR
Oversight and authorization of CNGC's Hedge Program	Gas Supply Oversight Committee	EVP, Bus Dev & Gas Supply (Chair) EVP, Reg Affrs, Cust Srv, Admn VP, Engineering & Operation Services Controller - Utility Group Dir, Gas Supply Dir, Regulatory Affairs
Final Transaction Approval (upon receipt of signed agreement from counterparty)	Scott Madison	EVP, Business Development & Gas Supply
Final Transaction Approval (upon receipt of signed agreement from counterparty) Backup	Tammy Nygard	Controller - Utility Group
Hedge Execution Director	Kevin Connell	Director, Gas Supply
Hedge Execution Director Backup	Chris Robbins	Manager, Gas Supply & Control
Delegated Execution Primary	Eric Wood	Supervisor, Gas Supply
Delegated Execution Secondary	Chris Robbins	Manager, Gas Supply & Gas Control
Deal Capture	Carolyn Stone	Gas Supply Analyst III
Confirmation Review Primary	Mark Sellers-Vaughn	Manager, Supply Resource Planning
Confirmation Review Secondary	Brian Robertson	Supervisor, Resource Planning

Figure 2 - Hedge Team Organization Chart



### III. Hedge Program

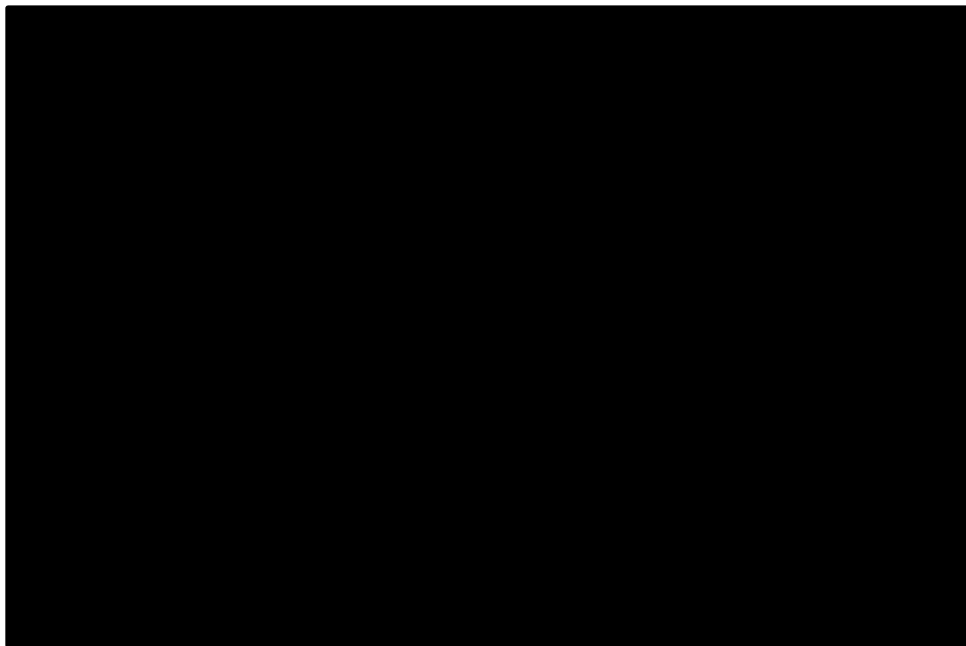
The philosophy behind the Company’s Hedging Program is to accomplish the following goals:

1. Provide essential price protection against adverse price increases which have detrimental impacts for CNGC customers.
2. Make the program “risk-responsive” and capable of adjusting to changing natural gas market conditions in compliance with the Washington Utility and Transportation Commission’s Policy Statement UG-132019.
3. Reduce hedge losses and more proactively respond to low risk or a falling market.
4. Further diversify portfolio by integrating financial hedging instruments.
5. Coordinate design features with appropriate CNGC personnel.

The 2022 Hedge Plan is structured such that all hedge decisions and rationale for those decisions are recorded and are easily retrievable. Hedges percentages are not “set”, and decisions are not “forgotten”. Decisions are supported by timely data and analysis (see Section VI). Management is made aware of the downside and upside risk of hedging, as well as the risk associated with not hedging. While the underlying analysis may be complex, the output is intentionally made simple. This facilitates the flow of information and increases transparency throughout the organization.

The Hedge Program utilizes a three-year forward-looking ladder with minimum and maximum purchase levels (see Figure 3). The hedge ranges offer flexibility to respond to market conditions and risks should they shift throughout the hedge season.

**Figure 3: CNGC Hedge Program Ladder**



The start of a hedge year is November 1 and the end of the hedge year is October 31 of the next calendar year. However, the hedge ladder rolls over on April 1 to begin buying for the coming years. On this date the Year 2 becomes Year 1, Year 3 becomes Year 2, and a new Year 3 is added. The rolled off Year 1, now “Year 0”, will have several months (April through October) that have not settled and can still be hedged during this time. In terms of hedging the prompt (next) month, any fixed price purchases (hedges) will need to be performed prior to the month’s bid-week in order to be classified as a hedge. A hedge schedule is provided in the Appendix for more clarity.

As part of the Hedging Program, a prospective HEP is created before May each year by CNGC’s Resource Planning group, in collaboration with Gas Supply operations, to lay out a roadmap for the coming year’s hedge season. In preparation for the HEP creation, hedges from the previous year are marked and analyzed, the VaR and Book Model are recalibrated to take into account the latest market inputs, and years one, two, and three rollover to the new buying years. When this is complete, a meeting with the GSOC is convened to seek approval to move forward with the plan and covers the following items:

1. A review of the prior year’s hedging activities and results.
2. The CNGC Book Model as provided by Resource Planning that shows hedge positions, unhedged positions, and how these positions compare to the current market. The book model looks at the prices in CNGC’s fixed contracts and compares it to the forward prices for the months that a contract is active. The result is displayed as a Mark to Market Calculation, a snapshot of which can be found in Figure 4. The full Book Model is included with this Plan as an appendix.
3. Designation of who will be primary and who will be secondary in the performance of hedge execution and who is responsible for deal capture and confirmation.
4. A preliminary hedging outlook for the upcoming year.
  - a. Major market drivers affecting national and regional gas.
  - b. Potential market opportunities and risks for the coming buying season.
  - c. The volume distribution of purchases through the hedge year to get to the end of season hedge goal.
  - d. Recommended instruments to be used for hedging (fixed-price physicals, swaps, options etc.).
5. An end of year hedge percentage goal for Year 1, Year 2, and Year 3.

The annual HEP process is pictured in Figure 5.

Figure 4- Mark to Market Snapshot

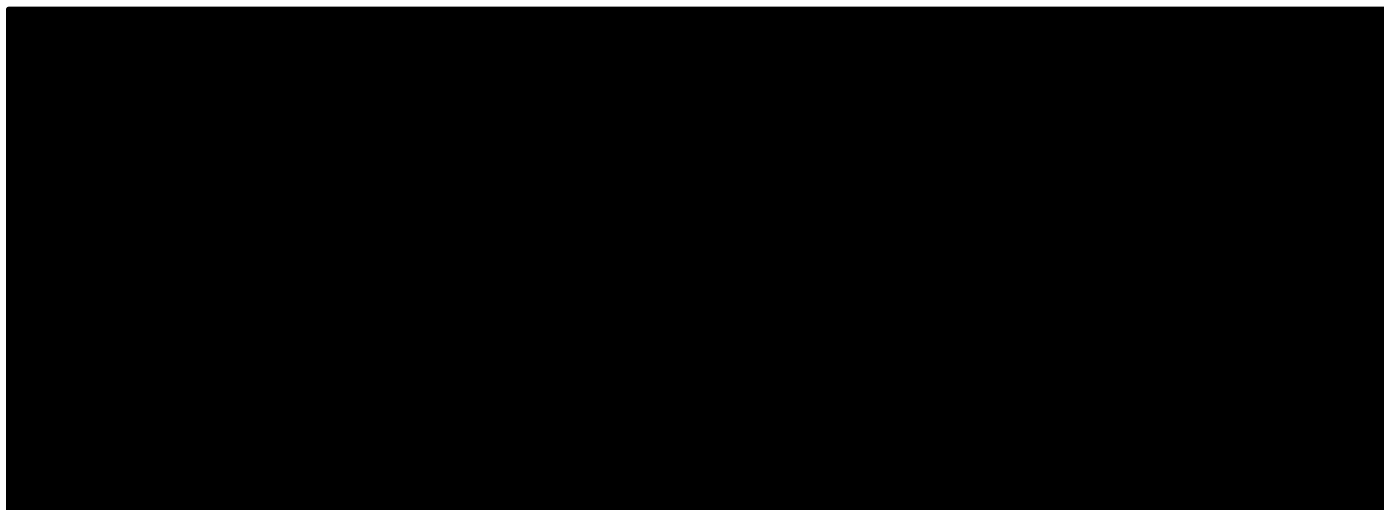
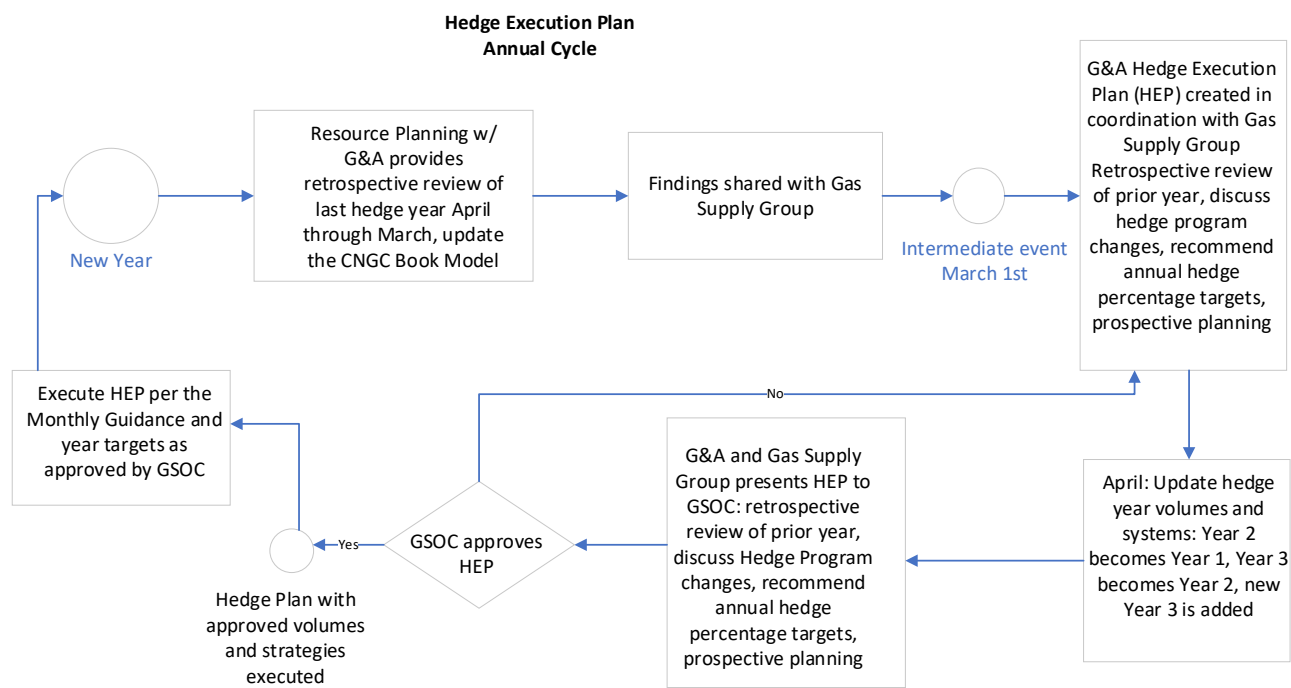


Figure 5 - HEP Annual Cycle Decision Tree



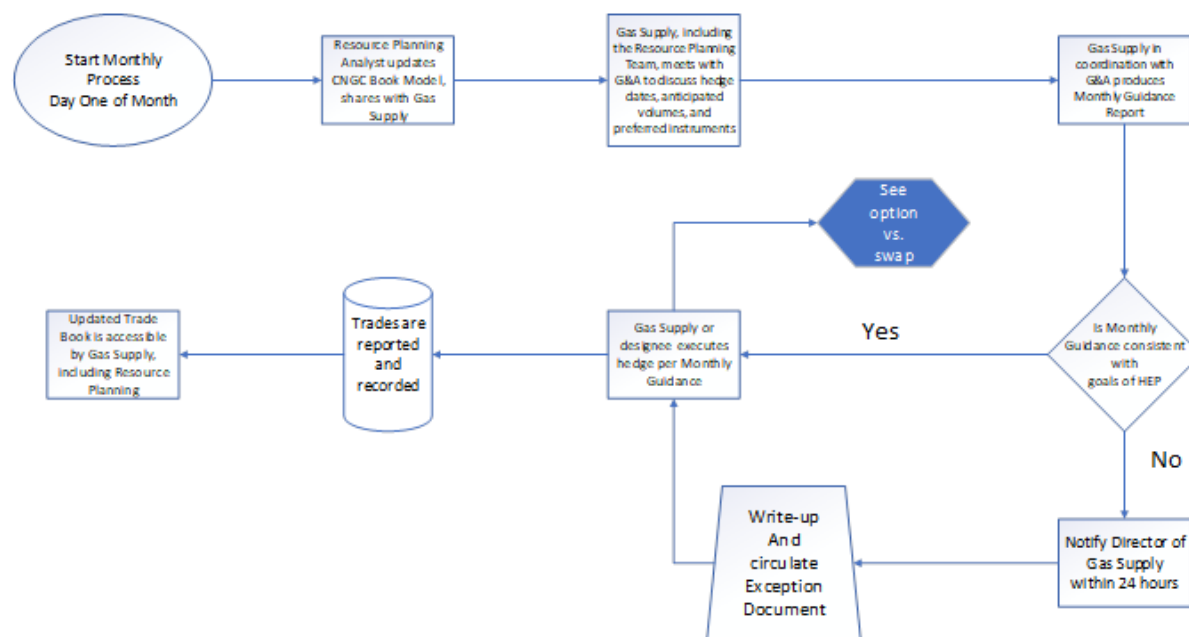
**Monthly Guidance and Trade and Execution:**

In order to implement the 2022 HEP as approved by GSOC, a Monthly Guidance document is created after updating the CNGC Book Model to include the most recent transactions and analyzing the various risk metrics. The purpose of the Monthly Guidance is to promote dialogue between CNGC’s Resource Planning team, who will be responsible for tracking and updating the CNGC book and various associated risk metrics,

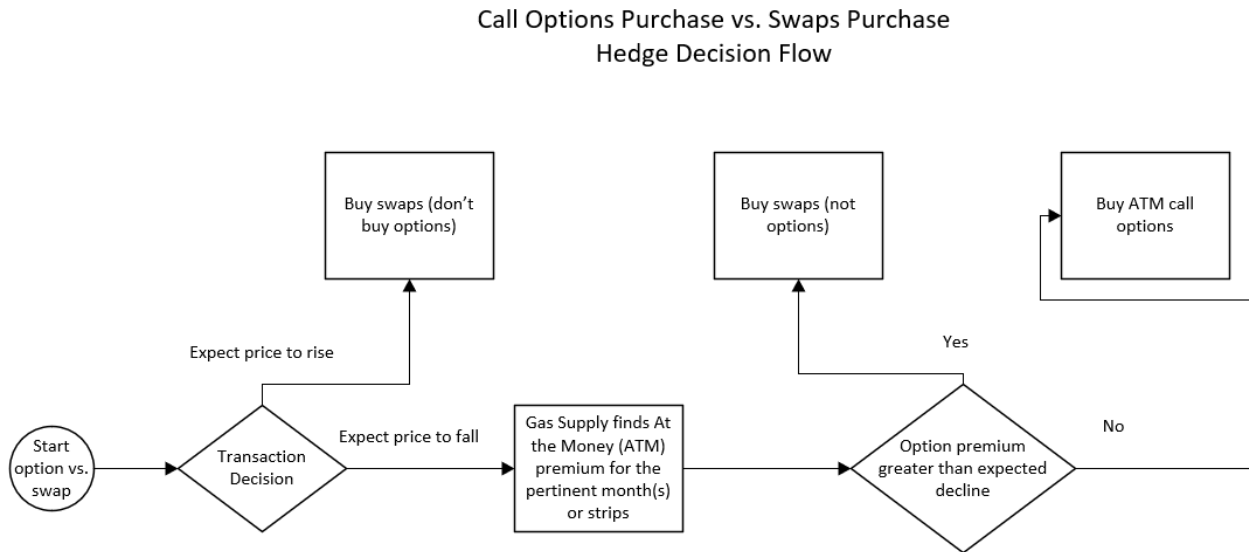
and the Gas Supply operations team, who will be negotiating and executing hedge transactions. In addition, Monthly Guidance provides documentation and transparency for future internal or external review.

Prior to the start of each month, the Resource Planning group within the Gas Supply department, with assistance from G&A, provides the Supervisor of Gas Supply with a Monthly Guidance. The Monthly Guidance gives recommendations on hedge timing, volume, and instrument type. A detailed visualization of the Monthly Guidance is shown as a decision tree in Figure 6, while a copy of a sample Monthly Guidance is included in the appendices of this Plan. Regarding instrument type, Figure 7 outlines the decision tree followed in deciding between swaps and call options. In deciding between financial and physical products, cost will be a major consideration. Typically, recommendations are written to give the gas buyer some flexibility to make cost effective decisions. For example, buy dates may be given but the exact time of day for purchasing are not provided. All guidance reports are delivered electronically and made available for review by the Gas Supply team, upper management, and regulatory bodies. Guidance reports are supported by the data-driven analysis by Gas Supply, Resource Planning, and G&A.

**Figure 6 – Monthly Guidance Decision Tree**



**Figure 7 - Call Options vs Swaps Decision Tree**



Hedging purchases are expected to occur at a minimum of once a quarter but will more typically occur once a month. Generally, once a quarter hedge purchases are reserved for locations that are less liquid, or in low volume summer months where splitting the hedge requirement into monthly increments is not cost effective. Otherwise, hedges will occur monthly per market guidance and a data-driven analytical framework as discussed earlier. However, as part of risk-responsive framework, Monthly Guidance may also recommend delaying or accelerating purchases from one month to another if the market is perceived as over or underpriced as indicated by quantitative metrics.

#### IV. Material Changes to Hedge Program

The primary purpose of the CNGC Hedge Program is to provide the structural objectives of the Company’s hedging activities. This includes the overall goals of the Hedge Plan, as well as the minimum and maximum allowed hedge percentages. In the 2022 Hedge Plan, we document one significant change to the Hedge Program: an increase in the Year 2 and 3 maximum allowed hedge percentages, from 40% to 50% and 20% to 30%, respectively. The justification for increasing the maximum can be broken down based on quantitative and qualitative rationales.

The quantitative argument for increasing the hedge maximum is from both a results-based and risk mitigation perspective. As discussed in Section II, the 2021 hedge program showed a benefit to customers of about \$41.5 million dollars versus not hedging. By increasing the hedged numbers shown in the CNGC Hedge Plan Results Appendix by 10% of the total planned volume requirement, the potential savings would have increased to approximately \$48.2 million. These theoretical savings could have been higher or lower depending on the months that would be hedged, but assuming that the same strategy would have been followed with the only variable being the quantities hedged, a delta of approximately \$6.7 million is significant. This argument is further supported by an analysis of the impact that a higher hedge target would have had on the Value at Risk (VaR) of Cascade’s portfolio. In most months, the optimizer would not suggest

hedging up to the maximum, but in January 2022 the risk-based monthly guidance recommended hedging in year 2 up to the 40% maximum. If the model was allowed to hedge up to 50% in year 2, it would elect to hedge up to approximately 45%. This flexibility would reduce Cascade's combined VaR risk by over \$150,000 by significantly decreasing the Company's exposure to rising prices, while only moderately increasing Cascade's exposure to falling prices.

The qualitative argument for increasing the cap builds on the quantitative successes seen in the first two years of Cascade's Hedge Program by emphasizing the increased expertise of the Hedge Execution Team. As the Company becomes more familiar with the various processes discussed in this document, increasing the year two and three caps, one year after successfully increasing the year one cap, signals to internal and external stakeholders that Cascade is confident in its ability to maximize savings to its customers, as it now has the resources and knowledge base to make prudent, data-driven decisions, when deemed appropriate by market conditions. Another major driver behind this recommendation is the operational flexibility that increasing the cap provides to the Hedge Execution Team. The Company has already shown that it is able to successfully hedge at the current caps during the most recent hedging season. If prices stagnate or even fall in the forward curve, there is value in being able to capitalize on these market conditions by setting a higher hedge target. If prices continue to rise, or market conditions indicate that is not beneficial to set the hedge target anywhere close to the maximums, the Company still has the flexibility to set its targets below these new caps.

In future iterations of this document, Cascade will be incorporating some renewable natural gas (RNG) purchase acquisitions into the Plan. With RNG being an integral part of the Company's plan to comply with both the Climate Commitment Act in Washington and Climate Protection Program in Oregon, Cascade expects its RNG portfolio to significantly increase in the coming years. Similar to conventional natural gas, the price of RNG can be tied to an index, a fixed price, or a combination of the two. Fixed price RNG purchases are a hedge against rising prices, but the value of this gas cannot be evaluated with the analytics discussed in this plan, as most of the value is in the environmental attributes associated with the gas versus the gas itself. The Company expects to add an expanded section on the treatment and valuation of RNG as a hedge in the 2023 Annual Hedge Plan.

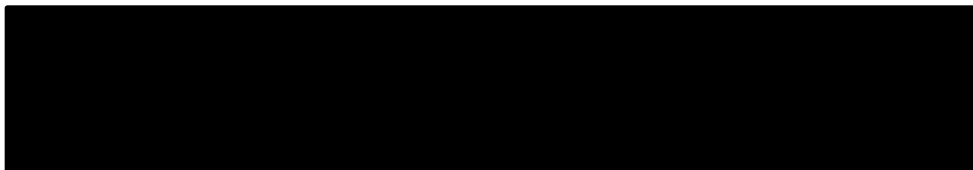
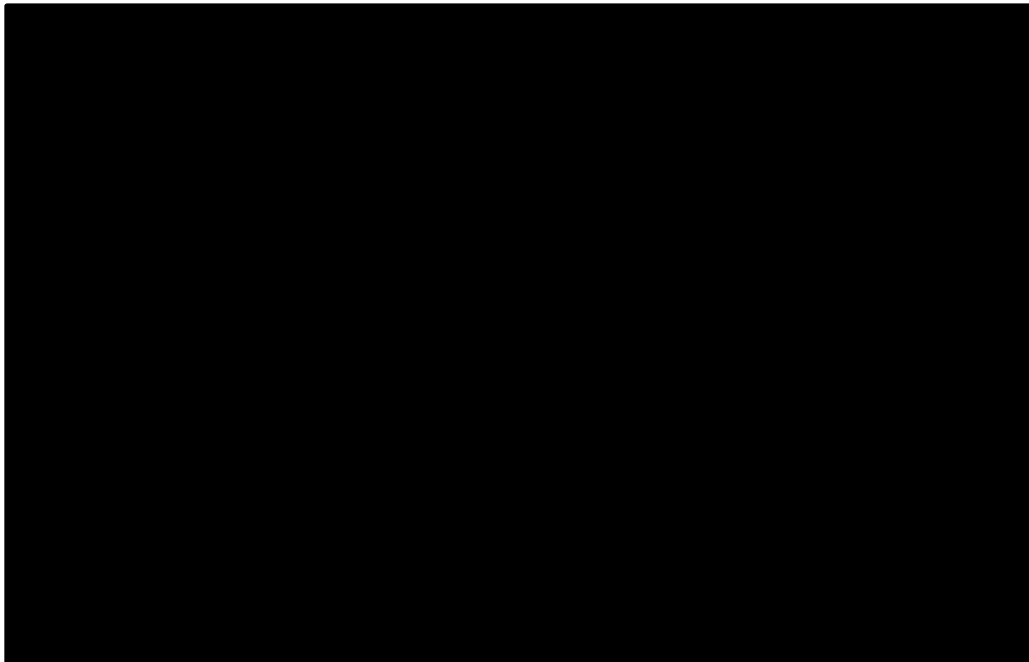
The dynamic portion of the Hedge Plan is the HEP, where hedge targets are reevaluated each year, and risk-responsive strategies are executed on an iterative basis. These changes, including the continued evolution of the Company's quantitative metrics, are discussed in Sections V and VI.



## V. 2022 HEP Meeting and Final Recommendations

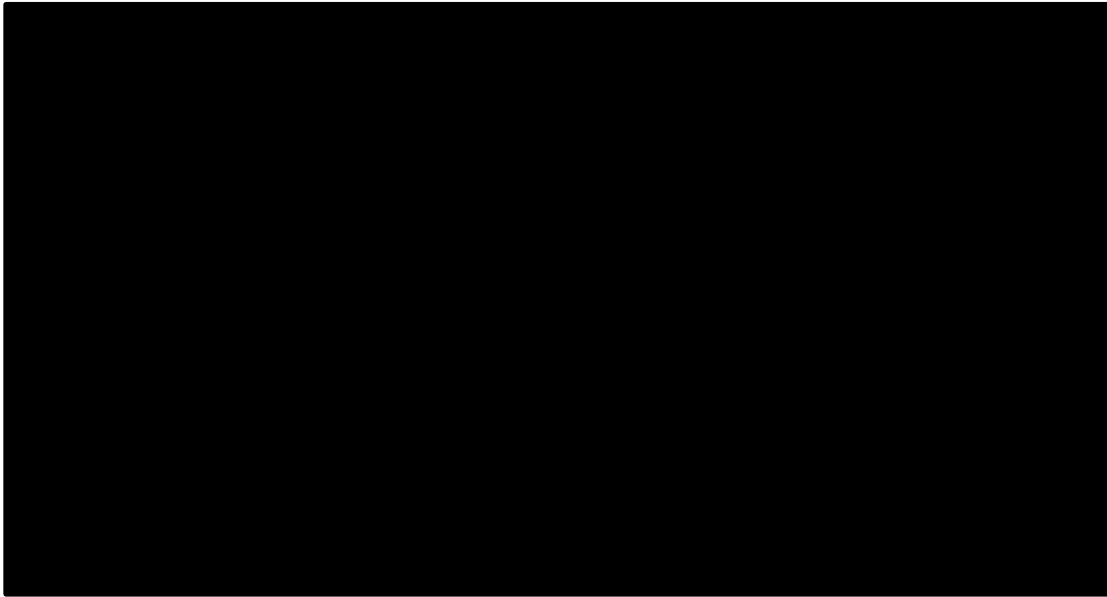
On April 28<sup>th</sup>, 2022, G&A and the CNGC Hedge Project Team provided an overview of the 2022 HEP for GSOC’s consideration. GSOC inquired about whether the targets as presented would be filled entirely with fixed price physicals and were informed that while fixed price physicals will be used for a majority of hedges, CNGC will be looking to continue executing financial hedges when economically appropriate. Ultimately, following ample discussion, GSOC authorized the CNGC Hedge Project Team to proceed with the Hedge Project Team recommendations for the 2022 HEP as presented. Figure 8 shows the final end-of-season hedge volumes (as a percentage of forecasted usage):

*Figure 8: CNGC Hedge Program Ladder and 2022 Targets*



For clarification, the hedge minimum, maximum, and targets are calculated as percentages of forecasted annual usage provided by the Resource Planning team. Hedge percentages are treated as a portion of the larger percentage of base supply (80% in Year 1, 60% in Year 2, and 20% in Year 3) that CNGC contracts based on Portfolio Design targets (see Figure 9).

**Figure 9: CNGC 2022 Portfolio and Hedge Targets as a Percentage of Annual Usage Forecast in Dekatherms**



CNGC successively implemented its first financial transaction in Q3 2019 and again in Q3 2020. Going forward, G&A recommends further increasing the percentage of hedges covered by financial swaps to offer additional flexibility and reduce the costs of hedging, eventually covering 15-20% of the portfolio with financials. After requesting quotes for call options in late 2020, it was determined that a transaction was not practical at the time. However, this instrument would have proven valuable at times in the recent 2020-21 winter. In the coming year, G&A recommends working with counterparties once again to create a viable market for call options in the Pacific Northwest.

All volume added above the minimum hedging percentage is recognized as a discretionary hedge. However, hedging below the maximum volume percentages is a recognition of the lack of an overriding bullish signal that would cause price spikes in the coming year. Thus, splitting the minimum and maximum hedge percentages mitigates upward price risk while minimizing risk of hedge losses. This approach also acknowledges the high level of uncertainty currently in the market and will offer additional flexibility should market conditions shift quickly.

## VI. Data Driven Hedging

### Programmatic Hedges:

The programmatic portion of CNGC's Hedge Program consists of two main components. The minimum hedge percentage requires that CNGC cover at least a portion of its expected purchases in Years 3 to 1 (5% after Year 3, 10% after Year 2, and 15% prior to Year 1). Additionally, the accumulation of hedges on a calendar schedule, in accordance with each Monthly Guidance, is also considered programmatic.<sup>2</sup>

### Discretionary Hedges:

Non-programmatic (discretionary) hedges are data-driven decisions that CNGC makes above the minimum purchase boundary each hedge year. Data-driven, discretionary hedges now fall under two categories within the CNGC program: market-based and risk-based recommendations.

Naturally, if prices are expected to increase in the medium-term, analysis and forecasting will recommend a higher hedge percentage in a certain month, and vice versa if prices are expected to fall. Key market metrics for forecasting such fluctuations include, but are not limited to, US storage levels, weather forecasts, production outlooks, LNG exports, fuel switching for power generators, and a host of other fundamental factors. G&A plays an active role in providing and shaping market intelligence when hedge decisions are made in this way. On the risk side, a Value-at-Risk (VaR) model developed by G&A and operated and expanded by CNGC contributes to hedge decisions that are forecasted to reduce the overall exposure of CNGC's portfolio to both upward and downward price fluctuations.

### VaR and Risk Calculations:

To effectively manage and respond to price risk, CNGC must understand and measure the risks in its hedge book. The first step was the creation of the CNGC Book Model. The CNGC Book Model contains CNGC's hedges, which includes fixed-price physical purchases and financial instruments (swaps and call options). The Book Model calculates the volume of gas that is hedged and the volume of gas that is unhedged using forecast data from the most recent IRP load demand models. The hedged and unhedged portfolio is calculated for the next three hedge years for each of CNGC's three supply basins. These figures, along with a hedge schedule, create volume recommendations for the HEP and the Monthly Guidance. Comparing the portfolio to the current market allows for mark-to-market calculation of the hedges already completed.

Over the past several seasons, CNGC has worked diligently to develop and expand its ability to quantify various risk metrics. The premier result of these efforts has been the integration of robust VaR calculations into each month's recommendations. The underlying principles of CNGC's VaR modeling are straightforward. The volume of gas that will need to be purchased and is not hedged presents an upward price risk for CNGC's customers, as they will need to pay more if natural gas prices rise. Conversely, the hedged portion of CNGC's portfolio presents a downward loss risk to CNGC hedge book if prices decline. G&A and CNGC have developed two different but interrelated but methods for calculating VaR. The "VaR to Life" segment of the models looks at each futures contract in CNGC's portfolio and calculated the potential risk through the life of the contract, and the "VaR Monthly" model looks at a shorter-time period, calculating

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<sup>2</sup> This is consistent with the definition of a programmatic hedge from Gettings White Paper page 19 as referenced on page 10 of Docket UG-132019.

the potential exposure of CNGC's entire portfolio over a one-month time frame. Both VaR calculations are made using a proprietary Monte Carlo method with formulas and factors derived from historical pricing behaviors. CNGC and G&A, the primary developer of the VaR model, have given special consideration to the independent trading behavior of CNGC's procurement basins.

The CNGC Book model and the VaR modeling are updated prior to HEP and Monthly Guidance discussions. This allows for dynamic analysis of current market information. In summary, the VaR results provide GSOC and Gas Supply with potential losses, of a set probability, for both the hedged and unhedged portfolio. The Monthly Guidance also indicates favorable months to hedge based on which months provide the greatest net risk reduction. These calculations influence decisions. A goal of the VaR calculation is to balance VaR-down of CNGC's hedged portfolio with the VaR-up of floating volumes and to ensure that the Company is aware of the potential exposure of CNGC's portfolio to extreme price events in either direction. A proper balance provides a safeguard against a hedge position which would be opposed to the natural market position of CNGCs customers. In other words, lower price should be a benefit for gas consumers.

## VII. Procurement Strategies

CNGC's GSOC oversees the Company's gas supply purchasing and hedging strategy. The Company's current gas procurement strategy is to have physical gas supplies under contract for 80% of year one's estimated core needs. Under this procurement strategy, roughly 10% of the winter load would come from storage utilization while the remaining amount of the portfolio will be met with spot purchases. Spot purchases consist of either First of the Month deals, executed during bid week for the upcoming month, or day purchases which are utilized to meet incremental daily needs.

CNGC's goal is to have a gas procurement strategy which achieves diversity and flexibility in its gas supply portfolio through a combination of index based physical, fixed price physical structures and financial derivatives such as swaps and options. This goal encompasses not only supply basin origination and capacity limitations, but also includes a combination of pricing options that will assist CNGC in minimizing exposure to price volatility. The buying approach to locking in a significant portion of gas prices maintains a balanced supply portfolio that continues to represent stable pricing as well as secure physical supplies for the Company's core customers.

CNGC employs a number of processes when procuring fixed-price physical and indexed-priced spot physical. There is a separate process for financial derivatives as discussed throughout this Hedge Plan.

### Physical Supply

CNGC utilizes TruMarx's COMET transaction bulletin board system to assist in communicating, tracking and awarding most activities involving the Company's physical supply portfolio. In the procurement process for physical natural gas the Company posts an RFP to its 25+ physical supply parties to solicit offers on needed supply. The Company then collect bids from these parties over a period, depending on the number or time requirements of the packages sought, comparing the indicative pricing to each party as well as comparing the information to market intelligence available at the time. Ideally, after monitoring these indicatives and

the market, CNGC awards the posted packages. Note that posting on COMET does not obligate CNGC to execute any proposal made by physical suppliers.

Naturally, price is the principle factor; however, CNGC also considers reliability, financial health, past performance, and the party's share of the overall portfolio as to ensure party diversity. It should be noted that there is always the possibility the lowest market price may be during period when the Company is initially gathering the price indicatives; in that situation there is a risk that a sudden price run-up may lead to filling the transaction at the higher end of the bids over time or delay the acquisition to another time. However, the reverse is also true—the initial price indicatives may start high and drop over time, allowing CNGC to capture the transaction on the downward swing. In the end, timing is always a factor as the market cannot be perfectly predicted.

Occasionally, an operational situation may occur where time is of essence, such as a need to acquire spot gas to meet sudden swings in load demand or in response to an upstream pipeline operational event. In such situations, CNGC may make a short procurement purchase within a narrow time window to procure and schedule the supply. The Company contacts one to three reliable physical parties to meet these short-term supply needs. Again, price is the principle but not the only driver for the awarding of these supply needs. Also, the Company always encourages physical suppliers to propose other transactions or packages that they feel may be of interest in helping CNGC secure cost effective and operationally flexible transactions to meet CNGC's needs. In addition to analysis using Excel, CNGC also uses the SENDOUT® resource optimization model, which is a useful tool for examining logical, operationally, and financially feasible physical packages that best utilizes CNGC's various transportation, storage and operational capabilities.

### **Financial Derivatives**

For financial derivatives, CNGC contacts Company-approved financial counterparties ("counterparties") to request bids consistent with the GSOC approved HEP. Naturally, this process requires additional analysis regarding financial reasonableness, timing, hedging strategy, and volumes. The Monthly Guidance and CNGC Book Model are the primary tools used to identify and analyze potential financial derivatives possibilities. Price comparisons may also become more complicated since pricing could be tiered; part of a structure deal may be tied to an index or contains floors, caps, etc. Bids are received from the counterparties and, similar to the physical portfolio, the Company then collect bids from these parties over a period, depending on the number or time requirements of the packages sought, comparing the indicative pricing to each party as well as applying the information from market intelligence available at the time. Furthermore, G&A uses Marketview, and CNGC has access to ICE. Both deliver real-time market pricing information for hedging transactions. Ideally, after monitoring these indicatives and the market, CNGC will award the specific packages to individual parties. Again, CNGC is not obligated to execute any offer received.

## VIII. Retrospective Report of 2021

As per WUTC guidelines, all LDC Hedge Plans must include a retrospective review of the last year's hedging results. During CNGC's last HEP cycle, GSOC authorized Cascade to hedge at the maximum percentage volume allowed by the Program (60% in Year 1, 40% in Year 2, 20% in Year 3). This decision was made based on continued low production projections, along with a recovery in demand from COVID based declines and increased LNG exports. Over the period since the approval of the 2021 HEP (April 2021-March 2022), the Cascade Hedging Plan saved customers about \$41.6 million of gas costs compared to the market. Backing out the fees paid to G&A, the program realizes a net gain of about \$41.5 million. Most of the hedging gains occurred in the 2021 heating season, including over \$15 million in savings to customers in January 2022. Figure 10 displays monthly hedge volumes that were recorded as part of 2021-2022 plan, compared to estimated volumes.

**Figure 10 - Hedged vs Plan**

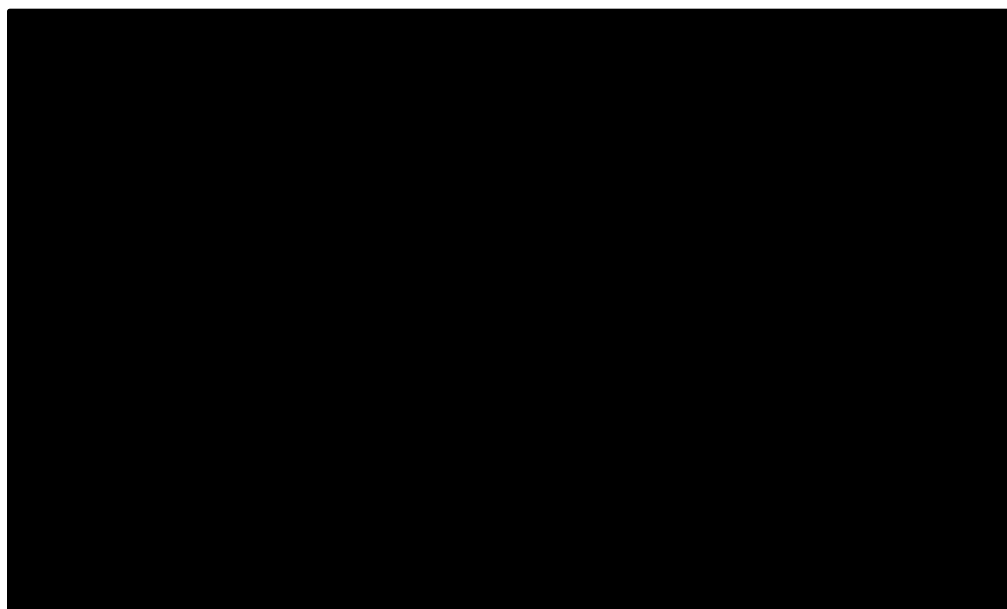
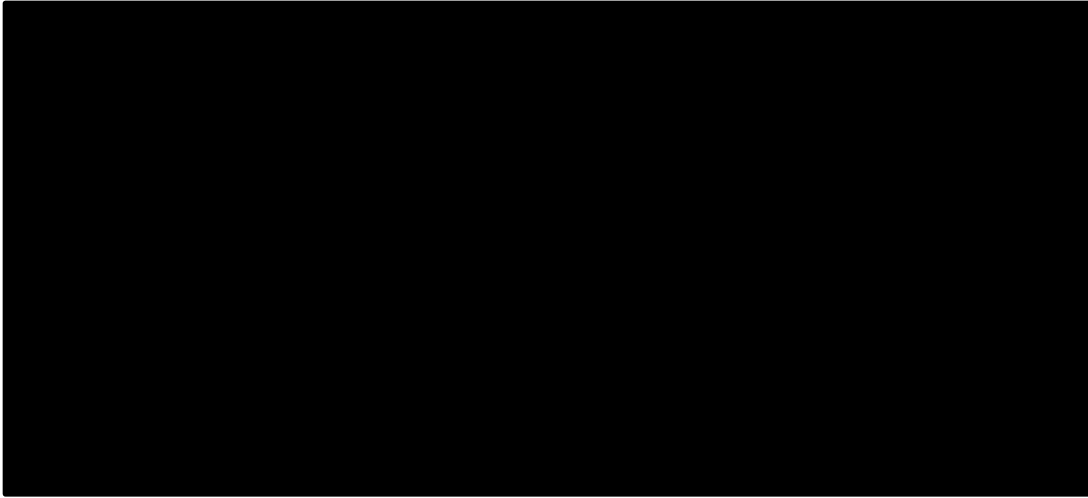


Figure 11 provides tabular results of the volume and weighted-average cost of hedges and their gain or loss compared to market prices. Detailed results of the retrospective performance of each hedge can be found in the retrospective analysis appendix.

**Figure 11 - Hedge Plan Results**



## **IX. Market Summary**

The following sections contain forward-looking statements based on the current market opinions of its authors. These views are subject to change and are used for informational purposes only. In G&A's annual Natural Gas Price Forecast, several drivers of the natural gas market were identified. There are many pricing factors at play for the remainder of 2022:

Excessively mild weather to begin the 2021/2022 winter caused prices to fall to a low of \$3.56/MMBtu. However, in late December, the US registered the coldest sustained winter period in January and early February of 2022 since the Polar Vortex of 2013/14. The brief advantage storage had built in winter's mild early days was erased, with peak demand and freeze-off crippled production supporting natural gas price increases including the largest one-day percentage climb of the Henry Hub natural gas futures contract. Repeat bouts of cold and depleted storage inventories placed the market into a much more bullish position than would have been anticipated preseason. Russia's invasion of Ukraine in late February served to compound tensions, maximizing the pull on US gas from overseas and sending oil prices above \$100/Bbls while NYMEX Henry Hub natural gas prices traded at \$5.00/MMBtu.

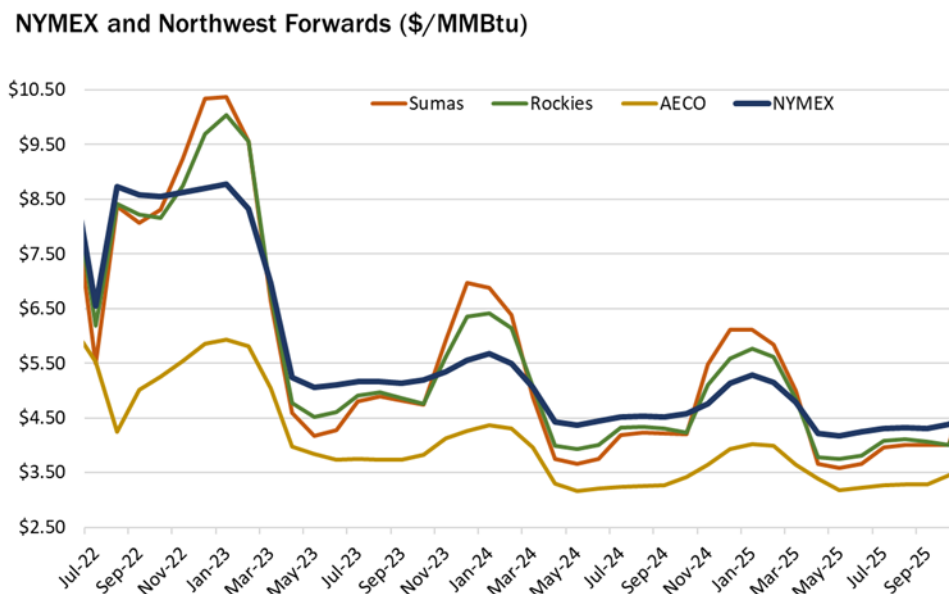
Persistent cooler than normal weather in Q1 2022 led to a delay in the onset of storage injections, while simultaneously NYMEX Henry Hub price nearly doubled between February and April, taking natural gas prices to \$9.66, the highest levels since 2008. Fortuitously and unfortunately, an explosion at Freeport LNG shut down the facility and sent prices falling in anticipation of nearly 2 Bcf/d of decreased demand associated with the LNG export terminal. In the following 27 days, prices fell nearly 45% to a low of \$5.32/MMBtu as Freeport's extended disruptions provided the market with confidence that the storage imbalance would be alleviated before the end of injection season.

This sell-off proved to be short-lived. Record electricity loads and power demand due to abnormally hot weather, combined with high spot coal prices further increased the call on natural gas, reinvigorating the market's bullish position on the backs of renewed storage fears and sending price right back to the \$8-9/MMBtu range. Coal capacity retirements in recent years and a growing reliance on volatile, intermittent

renewable power generation have placed substantial pressure on natural gas to fill in the power generation demand. Robust rig count growth and high oil prices past \$100/bbls have historically proven to be favorable growth conditions for gas production; however, this year, supply chain problems, oilfield service inflation, labor shortages, and ESG headwinds are all issues touted by oil and gas companies for slower than anticipated production growth.

Going into the latter half of 2022, there remains a persistent storage deficit. As a result, natural gas inventories still lag behind previous years. The forward curve for the remainder of 2022 and early 2023 continues to demonstrate increasing prices which may persist until the weather moderates and higher storage injections are observed. Until that time, the market will be at risk of rising prices. The anticipation of eventual accelerating natural gas production stemmed from the return to drilling, may eventually contribute to alleviating the storage imbalance and once again put downward pressure on natural gas price starting if and when storage levels begin to catch up to the required amounts expectantly in September or early autumn.

**Figure 12 – NYMEX and Northwest Basin Forwards as of July 26, 2022**



This, and other market intelligence, has informed CNGC deliberations with GSOC and its hedging goals for the coming year. However, this has been a challenging hedging year so far and the risk-responsive hedging plan has been dynamic enough to continuously react to new developments and inputs. Through its use of the Book Model and Monthly Guidance, discussed earlier, the Company continues to analyze how market developments impact the risk of its hedge targets, and how to adjust to these developments accordingly throughout the year.



## **X. Conclusion**

The 2022 Hedge Plan was designed by the Cascade Hedging Project team under the advisory of Gelber & Associates. The Hedging Program implements processes and analytics that comply with the Washington Utility and Transportation Commission UG-132019 policy statement while simultaneously complying with Oregon Public Utility Commission PGA UM-1286 integrated hedging guidelines. The Hedging Program design establishes a framework that provides flexibility to respond to price risk and market changes. Additionally, the Hedging Program establishes analytical and quantitative metrics through use of the Var to Life and Monthly VaR models. These tools are frequently updated to maintain a risk-responsive view of current market conditions.

The CNGC Hedging Program uses a three-year forward-looking ladder while establishing maximum and minimum percentage boundaries that allow hedge volumes to adjust to market conditions. In addition, the 2022 Hedge Plan recommends the continued inclusion of financial transactions such as swaps and call options to improve diversity of hedges and reduce the cost of hedging. The Hedging Program requires a HEP each spring which determines a strategy for the coming buying season after reviewing the prior year's performance. Accordingly, on April 28<sup>th</sup>, 2022, GSOC reviewed the proposed HEP and approved the aforementioned changes. To manage hedge purchasing for the 2022 HEP, CNGC will continue referencing the Monthly Guidance document produced by G&A in collaboration with the Resource Planning group. This monthly process includes an update of CNGC's Book Model and the associated mark-to-market and VaR calculations. The report then facilitates information circulation within the Company regarding these metrics and resulting recommendations for the coming month. Furthermore, Guidance documents provide a new level of transparency for decision-making, as can be seen in the included appendix.

While the Company was pleased with its 2021 Hedge Plan, CNGC will look to continually improve its hedge program in a risk-responsive manner, thereby fulfilling the objectives of UG-132019 and providing essential price protection to customers.