Gas System Long-Term Plan Update
Appendices

Consolidated Edison Company of New York, Inc.
Orange & Rockland Utilities, Inc.

November 29, 2023

Appendix A

Title	Environmental Justice Policy Statement
GSLTP Reference(s)	Chapter III, Section a, Subsection ii
Purpose	This appendix provides the Companies' Environmental Justice Policy Statement
Contents	Environmental Justice Policy Statement in a word doc
Pages	1

At Consolidated Edison Company of New York, Inc. (CECONY) and Orange & Rockland Utilities, Inc (O&R) we are privileged to serve some of the most diverse communities in the world. We understand the importance of serving the greater good by considering the potential environmental impacts of our activities and investments on all customers. Our commitment to Environmental Justice (EJ) is reflected in our Clean Energy Commitment and Environmental Justice Commitment and demonstrated by the intentional, purposeful, and collective work of our employees. CECONY and O&R established an internal EJ Working Group and Executive Steering Committee to develop educational resources and a roadmap for institutionalizing EJ considerations into everything we do. This group will also inform and enable consistent conversations with external stakeholders.

In the coming years, the Company will:

- **Benchmark with EJ best practices to evaluate opportunities to enhance community engagement strategies**
- **Develop internal GIS mapping of Disadvantaged Communities (DACs) in our service territory**
- **Consider how GIS information can inform capital planning and investment opportunities in a consistent way**
- **Evaluate the impact of our activities on DACs in our service territory**

Appendix B

Title	Forecast Related Information
GSLTP Reference(s)	Chapter VI, Section a Chapter V, Section a, Subsection ii Chapter V, Section b, Subsection ii Chapter V, Section c, Subsection ii
Purpose	This appendix provides our reliability standards, drivers for the sales forecast for the Hybrid and Deep Electrification pathways, and the peak forecast, volume forecast, and customer count figures
Contents	Chart of reliability standards, chart of drivers for the Hybrid and Deep Electrification pathways, a chart each for the peak forecast, volume forecast, and customer count by Company in a word document
Pages	3

Reliability Standards

	Firm Gas Peak Day		Annual Delivered Volume (Firm and Interruptible Non-Generator)	
	CECONY	O&R	CECONY	O&R
Model Type	Deterministic	Deterministic	Deterministic	Deterministic
Temperature Profile	Winter 1933/1934	Winter 1933/1934	30 year normal per last rate case	10 year normal per last rate case
Wind Speed	10 mph	10 mph		
Weather Station	Central Park	Spring Valley	Central Park	Spring Valley
Temperature Variable (Peak) **Heating Degree Day (Volume)**	0°F TV [30% of prior Gas Day (10 AM – 10 AM) Average Dry Bulb Temperature + 70% of the current Gas Day Average Dry Bulb Temperature]	0°F TV [20% of prior Gas Day (10 AM – 10 AM) Average Dry Bulb Temperature + 80% of the current Gas Day Average Dry Bulb Temperature]	62 HDD	63 HDD
Pressure Requirement	Maintain pressure at or above 150 psig (inlet to distribution regulator stations)	Maintain pressure at or above 150 psig (inlet to distribution regulator stations)	N/A	N/A

Drivers for the hybrid and deep electrification forecasts

	Hybrid	Deep Electrification
Energy Efficiency	2030: 9% reduction in energy consumed per square foot in buildings due to appliance and building shell improvements; 2042: 22%	2030: 16% reduction in space heating load per square foot; 2042: 32% reduction in space heating load per square foot
Electrification	Electrification driven by incentives and lower complexity for low-rise buildings reduces volumes. Hybrid configurations are used in some buildings to mitigate upfront capital costs and ensure resiliency	Electrification of space and water heating aligned with CAC Integration Analysis Scenario 3
New Business	New business is assumed to continue through 2030, but at lower levels than the Reference Case	No new business in the mid-to-long-term as customers are required to electrify
Oil-to-Gas Conversions	Oil-to-gas conversions continue through 2030; however, some oil customers elect to electrify instead	Oil customers electrify in the mid-to-long-term; OTG is discontinued within 5 years
Other	COVID-19 and climate change Impacts not considered	COVID-19 and climate change Impacts not considered
Growth in Floorspace	Floorspace growth by building type and region within NYS are aligned with those provided in the CAC Integration Analysis	Floorspace growth by building type and region within NYS are aligned with those provided in the CAC Integration Analysis
Peak Demand	Same Volume-to-Peak ratio from Reference Case is applied	Same Volume-to-Peak ratio from Reference Case is applied

Peak Forecast Figures

Con Edison																						
MDt/day	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	1,674	1,698	1,708	1,713	1,713	1,705	1,697	1,682	1,672	1,657	1,638	1,620	1,600	1,581	1,563	1,542	1,522	1,503	1,484	1,467	1,447
Hybrid	1,674	1,698	1,710	1,728	1,743	1,726	1,698	1,642	1,613	1,579	1,541	1,499	1,441	1,383	1,324	1,265	1,209	1,154	1,112	1,077	1,046
Deep Electrification	1,674	1,698	1,673	1,646	1,610	1,538	1,453	1,342	1,273	1,199	1,122	1,039	940.67	842	743	645	548	452	367	325	291

O&R																					
MDt/day	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	235	235	235	234	232	231	229	225	221	217	214	210	206	202	198	193	187	182	177	172	167
Hybrid	242	242	239	239	235	228	216	202	198	194	190	185	178	171	164	157	151	144	140	135	132
Deep Electrification	242	242	235	230	222	210	197	181	174	166	158	150	140	130	120	110	100	90	81	77	74

Volume Forecast Figures

Con Edison																					
TBTU	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	190	192	191	188	184	182	179	177	176	175	173	171	169	167	165	162	160	158	156	155	152
Hybrid	190	192	191	189	187	184	179	173	170	166	162	158	152	146	139	133	127	122	117	113	110
Deep Electrification	190	192	187	180	173	164	153	141	134	126	118	109	99	89	78	68	58	48	39	34	31

O&R																					
TBTU	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	26	27	27	27	26	26	26	25	25	24	24	24	23	23	22	22	21	21	20	19	19
Hybrid	26	27	27	26	26	25	24	22	22	21	21	20	19	19	18	17	16	16	15	15	14
Deep Electrification	26	27	26	26	24	23	21	20	19	18	17	16	15	14	13	12	11	10	9	8	8

Customer Count Figures

Con Edison																				
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Reference	1,078,790	1,079,443	1,078,143	1,074,451	1,070,019	1,065,512	1,060,758	1,051,869	1,046,112	1,037,412	1,027,009	1,016,968	1,005,973	995,786	986,315	975,449	965,103	955,455	946,441	937,876
Hybrid	1,078,790	1,079,443	1,078,143	1,074,451	1,070,019	1,065,512	1,060,758	1,028,341	995,924	963,507	931,090	898,673	866,256	833,839	801,422	769,005	736,588	704,171	671,754	639,337
Deep Electrification	1,078,790	1,079,443	1,078,143	1,074,451	1,070,019	1,065,512	1,060,758	1,010,247	959,736	909,224	858,713	808,202	757,690	707,179	656,668	606,156	555,645	505,133	454,622	404,111

O&R																				
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Reference	141,561	142,067	142,639	142,480	142,388	142,473	142,601	140,291	138,073	135,882	133,752	131,665	129,611	127,619	125,687	122,998	120,438	118,001	115,680	113,471
Hybrid	141,561	141,561	138,839	136,116	133,394	130,672	127,949	125,227	122,505	119,782	117,060	114,338	111,615	108,893	106,171	103,448	100,726	98,004	95,281	92,559
Deep Electrification	141,561	141,561	136,117	130,673	125,229	119,785	114,342	108,898	103,454	98,010	92,566	87,122	81,678	76,234	70,791	65,347	59,903	54,459	49,015	43,571

Appendix C

Title	Supply Related Information
GSLTP Reference(s)	Chapter III Section d Chapter IV, Section c Chapter IV, Section d, Subsection iv Chapter V, Section a, Subsection v Chapter V, Section b, Subsection v Chapter V, Section c, Subsection v
Purpose	This appendix provides the Companies' Pipeline and Storage contracts, descriptions of pending pipeline capacity projects, contract expiration chart, detailed fuel cost assumptions, RNG potential, and the the fuel mix figures
Contents	List Companies' Pipeline and Storage contracts, descriptions of pending pipeline capacity projects, load duration curve, contract expiration chart, assumptions for the cost of gas, RNG potential and fuel mix figures separated by Company in a word document
Pages	11

List of Pipeline and Storage Delivery Contracts

Pipeline Company Name	Rate Schedule	Daily Quantity (DT)	Winter Quantity (MDT)	Annual Quantity (MDT)	Expiration Date
Flowing Gas To Citygate					
Algonquin	AFT-11	5,470	826	1,997	10/31/25
Algonquin	AFT-14	246	37	90	10/31/25
Algonquin	AFT-1Z	225	34	82	10/31/25
Algonquin	T-1	5,292	799	1,932	8/1/25
Algonquin	AFT-1	20,000	3,020	7,300	10/31/24
Columbia Transmission	FTS	51,294	7,745	18,722	3/31/25
Iroquois	RTS	20,234	3,055	7,385	11/1/28
Iroquois	RTS	20,000	3,020	7,300	11/1/27
Millennium	FT-1	10,000	1,510	3,650	3/31/34
Millennium	FT-1	5,500	831	2,008	3/31/25
Tennessee	FT-A	5,035	760	1,838	10/31/28
Tennessee	FT-A	31,212	4,713	11,392	10/31/28
Tennessee	FT-A	25,000	3,775	9,125	10/31/28
Tennessee	FT-A	30,625	3,869	11,178	10/31/26
Tennessee	FT-A	115,000	17,365	41,975	10/31/2043
Texas Eastern	CDS	55,238	8,341	20,162	10/31/24
Texas Eastern	FT-1	14,770	2,230	5,391	10/31/25
Texas Eastern	FTS	3,075	464	1,122	10/31/25
Texas Eastern	FT-1	10,000	1,510	3,650	10/31/24
Texas Eastern	FT-1	130,000	19,630	47,450	6/25/27
Texas Eastern	FT-1	14,000	2,114	5,110	10/31/33
Texas Eastern	FT-1	3,500	529	1,278	10/31/33
Texas Eastern	FT-1	100,000	15,100	36,500	10/31/24
Texas Eastern	FT-1	30,000	4,530	10,950	10/31/33
Transco	FT	2,084	315	761	3/22/24
Transco	FT	3,800	574	1,387	4/1/25
Transco	FT	4,500	680	1,643	11/1/25
Transco	FT	30,344	4,582	11,076	10/31/24
Transco	FT	235,880	35,618	86,096	10/31/27
Transco (Dec - Feb)	FT	10,143	923	923	3/31/26
National Fuel/Millennium/Algonquin/Iroquois	FT	61,129	9,230	22,312	3/31/29
Tennessee Release	FT	40,000	6,080	14,640	10/31/26
Transco	FT	50,000	7,600	18,300	3/31/25
Transco	FT	30,000	4,560	10,980	10/31/28
Total		**1,173,596**	**175,969**	**425,703**	
Upstream Pipeline Support [1]					
Dominion	FT	7,575	1,144	2,765	10/31/23
Tennessee	FT-A	12,440	1,878	4,541	10/31/28
Tennessee	FT-A	10,000	1,510	3,650	4/2/27
Texas Eastern	CDS	12,047	1,819	4,397	10/31/24
Texas Eastern	CDS	384	58	140	10/31/29
Texas Eastern	FT-1	10,836	1,636	3,955	10/31/29
Texas Eastern	CDS	507	77	185	10/31/29
Millennium	FT-1	125,000	18,875	45,625	3/31/29

Algonquin	AFT-1RM	100,000	15,100	36,500	10/31/23
Union Gas	FT	20,686	3,124	7,550	10/31/25
TransCanada	FT	20,429	3,085	7,457	10/31/26
North-South Lateral (Stagecoach)	FWS	105,000	15,855	38,325	3/31/28
Marc I (Stagecoach to Transco)	FTS-2	37,500	5,663	13,688	3/31/28
Mountain Valley Pipeline and Equitrans**	FT	250,000	37,750	91,250	TBD
Total		**712,404**	**107,573**	**260,028**	
Deliveries from Storage					
Transco	WSS/ESS	100,000	15,100	36,500	3/31/25
Transco	SS-2	19,355	2,923	7,065	3/31/28
Transco	GSS	10,040	1,516	3,665	3/31/28
Dominion/Texas Eastern	FT-1	23,115	3,490	8,437	10/31/26
Texas Eastern	SS-1	64,362	9,719	23,492	4/30/29
Texas Eastern /Algonquin	SS-1	1,140	172	416	4/30/29
Texas Eastern /Algonquin	CDS	507	77	185	10/31/25
Tennessee Gas	FT-A	31,212	4,713	11,392	10/31/28
Tennessee Gas	FT-A	9,318	1,407	3,401	10/31/28
Tennessee Gas/Columbia	FT-A	12,440	1,878	4,541	3/31/25
Tennessee Gas	FT-A	31,825	4,806	11,616	10/31/28
Honeoye/Tennessee	FT-A	6,834	1,032	2,494	10/31/27
Stagecoach/Tennessee	FT-A	65,000	9,815	23,725	3/31/28
Stagecoach/Millennium/Buena-Vista	FT	55,000	8,305	20,075	3/31/29
Stagecoach/Millennium/Algonquin	FT	9,340	1,410	3,409	3/31/29
Stagecoach/Millennium/Algonquin/Iroquois	FT	40,660	6,140	14,841	3/31/29
Columbia	SST	20,000	3,020	7,300	3/31/25
National Fuel/Millennium/Algonquin/Iroquois	FT	7,871	1,189	2,873	3/31/25
Algonquin/NG-LNG	FST-LNG	20,000	3,020	7,300	10/31/24
Total		**528,019**	**79,731**	**192,727**	

* Please highlight any changes from the previous year's report.
1) Capacity used to deliver gas to pipelines that deliver to the citygate.
**Not yet in service

Supply Component Figures

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043
Exisiting Delivered Services	67	3																		
TGP East 300	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
Iroq ExC			63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
CNG	25																			
LNG	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
Rev AMA procurement	120	120	120	80	80	50	50	50	50	50	50	50								
Storage	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251
Firm Transportation with Storage Access	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277
Firm Transportation	939	939	939	939	939	939	939	939	939	939	939	939	939	939	939	939	939	939	939	939

Total Pipeline and Storage Contract Expiration Chart

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
FT (Not Yet In-Service)	55	123	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
Authorization Request for Renewal	-	-	4	78	32	92	14	27	-	-	-	-	-	-	-	-	-	-	-	-
Previously Authorized	-	4	78	15	76	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual Costs Committed	444	440	361	330	230	94	45	45	45	45	35	33	-	-	-	-	-	-	-	-

Description of Pending Pipeline Capacity Projects

Tenn 300L East

The Tenn 300L project will bring 115 MDt/d to the existing White Plains, Rye and Knollwood citygates in Westchester. The increase in capacity will be accomplished through installation of additional compressors at Station 321 in Susquehanna County, PA and Station 325 in Sussex County, NJ, as well as a new Station 327 in Passaic County, NJ. On September 2, 2022 FERC issued an order Issuing Certificate for the above-referenced docket for Tennessee Gas Pipeline Company. Tennessee Pipeline has been granted the requests issuance of a notice to proceed with construction for all three Compressor Stations (Sta 321, Sta 325, and Sta 327). The project came into service partially on November 1, 2023 and fully into service on November 16, 2023.

Iroquois ExC

The ExC Project will bring an additional capacity of 62.5 MDt/d from Waddington to Hunts Point for Con Edison and the same capacity volume to South Commack for National Grid through the Iroquois pipeline. The increase in capacity will be done by adding 3 or 4 compressors with gas cooling to existing compressor stations in NY and CT. On March 25, 2022, FERC issued a certificate of public convenience and necessity to Iroquois, authorizing it to construct and operate the proposed ExC Project facilities. Iroquois' applications for modifications to its Air State Facility permits at its Athens, New York and Dover, New York compressor stations for the ExC Project are pending before the New York State Department of Environmental Conservation. Also, Iroquois' applications to modify its existing New Source Review Permits for its Brookfield Compressor Station, located in Connecticut, for the ExC Project are pending before the Connecticut Department of Energy and Environmental Protection. In addition, On October 24, 2022, Iroquois submitted its response to the NYDEC's request to supplement the 3rd Request for Additional Information (RFAI) on the air permit application. The project has an estimated target in-service date of Winter 2025/2026.

Mountain Valley Pipeline Project

The Mountain Valley Pipeline (MVP) Project is a 42-inch natural gas pipeline system that spans approximately 303 miles from northwestern West Virginia to southern Virginia. The MVP Project is constructed and owned by Mountain Valley Pipeline, LLC. The Project is expected to provide up to two million dekatherms per day of firm transmission capacity from the Marcellus and Utica shale production area to markets in the Mid- and South Atlantic regions. The MVP Project will extend the Equitrans transmission system in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia.

On October 23, 2015, Mountain Valley filed a formal application with the FERC and on October 13, 2017, the FERC issued a Certificate of Public Convenience and Necessity for the project. Con Edison Transmission, Inc., a subsidiary of Consolidated Edison Inc., has ownership interest in MVP.

On January 21, 2016, Con Edison executed a precedent agreement for 250 MDt/d of MVP capacity and associated Equitrans capacity for a term of 20 years. Mountain Valley Pipeline has had considerable construction and legal challenges to overcome since being announced in 2014. As a result, the completion date has been pushed back a few times. On June 24, 2022, MVP filed a motion requesting a four-year certificate extension of time and on August 23, 2022, FERC staff issued an Order granting requests for such extension until October 13, 2026. Furthermore, on May 15, 2023, the Bureau of Land Management released a decision of its support to authorize a 30-year right-of-way and temporary use permit, allowing the project to cross the Jefferson National Forest. With these permits completed, the only remaining hurdle is for the West Virginia Department of Environmental Protection to re-issue their 401-stream-crossing permit. Once that is completed the Army Corps of Engineers can issue their 404-permit to allow construction to resume on the project. The target in-service date is currently early 2024.

List of Initial Review of Contract Rankings by Citygate

Contract Details			Contract Attributes							
Pipeline and Delivery Point	Contract #	Volume	Storage	Bundled Storage with FT	Multiple Company (CE/O&R/Nat Grid) Connection	Citygate Connection (if any delivery point touches a citygate it counts)	Connected with Storage	Highly Liquid	Single Pipe (if connected only to storage, it is single pipe)	Short Cancellation Notification (<=1 year)
Con Ed Algonquin Citygates										
Algonquin	510371	125,000								X
Algonquin	97033	20,000				X			X	X
Con Ed Iroquois Citygates										
Iroquois	560-18	20,000				X			X	X
Iroquois	560-01	20,234				X		X	X	X
Iroquois	560-16	110,000				X	X			X
Con Ed Transco Citygates										
Transco	9250921	50,000			X	X		X	X	
Transco	1041076	30,000			X	X		X	X	
Transco	9172578	30,000			X	X		X	X	
Transco	1005011	10,143			X	X		X	X	
Transco	1016007	30,344			X	X		X	X	X
Transco	1000658	4,500			X	X		X	X	X
Transco	1000659	3,800			X	X		X	X	X
Transco	1003967	19,355		X	X	X	X			X
Transco	1000895	10,040		X	X	X	X			
Transco	1003683	335,880			X	X	X	X	X	
Transco	1002239	2,084			X	X	X	X	X	X
Transco	9050776	600,773	X							X
Transco	1038388	353,338	X							X
Transco	1040629	12,338,940	X							
Con Ed Tennessee Citygates										
Tennessee	323455	30,000				X			X	X
Tennessee	388836	40,000				X	X	X	X	X
Tennessee	2185	31,212				X	X	X	X	X
Tennessee	32766	18,727				X	X	X	X	X
Tennessee	38105	12,485				X	X	X	X	X
Tennessee	39122	65,000			X	X	X	X	X	X
Tennessee	350	31,825			X	X	X	X	X	X
Stagecoach Wheeling	CED_S0001IWS	125,000					X	X		
Stagecoach Storage	CED_S0001FSS		X							
Tenn Northern Storage	1974	59,265	X							
Tenn Northern Storage	32767	18,727	X							
Tenn Northern Storage	38521	12,485	X							
Con Ed Texas Eastern Citygates										
Texas Eastern	330836	3,075				X				
Dominion	200398	7,575						X		X
Texas Eastern	910950	170,000				X		X		X
Texas Eastern	800410	55,238				X		X		X
Texas Eastern	911792	100,000				X		X	X	X
Texas Eastern	911704	30,000				X		X	X	X
Texas Eastern	910584	14,770				X		X	X	X
Texas Eastern	911639	14,000				X		X	X	X
Texas Eastern	910226	10,000				X		X	X	X
Texas Eastern	911640	3,500				X		X	X	X
Texas Eastern	400224	64,362		X		X	X	X	X	
Texas Eastern	830114	23,115				X	X	X	X	
Dominion GSS	600011	2,408,824	X							

O&R Algonquin Citygates										
Texas Eastern	800403	10,836						X		
Texas Eastern	800437	384						X		
Algonquin	93010C	5,470				X		X		X
Algonquin	931003	5,292				X		X		X
Texas Eastern	800438	507					X	X		
Algonquin	93406	1,104				X	X	X	X	X
Algonquin	99011	20,000			X	X	X		X	X
Algonquin	86013	978				X	X	X		X
National Grid LNG	LNG002	500,000	X							X
Texas Eastern	400514	30,420	X							
Texas Eastern	400216	99,961		X						

O&R Tennessee Citygates										
Tennessee	31585	5,035				X			X	X
Tennessee	330	25,000				X	X		X	X
Tennessee	351	6,834				X	X		X	X
Tennessee	329	9,318				X	X	X	X	X
Honeoye Storage	1225	10,220	X							
O&R Columbia Citygates										
Tennessee	36656	10,000						X		
Tennessee	8402	12,440					X			
Columbia	100384	63,734				X	X			X
Columbia	80105	20,000				X	X		X	X
Columbia Storage	38128	1,432,365	X							
O&R Millennium Citygates										
National Fuel	N11192	7,871								X
Millennium	5582	180,000				X	X	X		
Millennium	217726	4,600				X	X	X	X	
Millennium	210170	2,530				X	X	X	X	X
National Fuel Storage	O11191		X							X

Notes:

- Highest priority characteristics are having a citygate connection and being connected with storage which provides additional flexibility
- Contracts with the same attributes are ranked equally and listed by volume from largest to smallest
- Contracts that deliver to more than one location are only shown once to the location with the largest volume
- Storage fields are listed at the bottom

Fuel Cost Assumptions

Fuel	**Average Price**	**Assumption/Rationale**
Fossil Gas (without transport and storage costs)	$3.82	20-year average; reflects pricing at the Henry Hub based on Wood Mackenzie forecast
Fossil Gas (with transport and storage costs)	$5.64	20-year average price among pathways; transport and storage costs added to $3.82 as follows: • Starting in 2022, $1.75/Dt added (based on 2022 total demand costs divided by 2022 actual annual volumes not including plants) • Starting in 2038 for reference case, $1.90/Dt (based on 2022 total demand costs not including peaking divided by

Fuel	**Average Price**	**Assumption/Rationale**
		90% (ratio of peak to sales that our current 176 Mdt of peaking would represent) of 2022 actual annual volumes) • Starting in 2031 for Hybrid, $1.90/Dt • Starting in 2028 for Deep Electrification, $1.90/Dt
Certified Gas	$5.74	Assumes $0.10/Dt premium on top of fossil gas, per initial discussions Con Edison has had with suppliers
Renewable Natural Gas	$19.28	Uses weighted average costs by feedstock, per NYSERDA's "Potential of Renewable Natural Gas in New York State" report (2022) • Animal manure = $34.56/MMBTU (21%) • Food waste = $23.86/MMBTU (5%) • Landfill gas = $11.29/MMBTU (57%) • Wastewater resource recovery facilities = $27.68/MMBTU (3%) • Agricultural residue = $25.67/MMBTU (0.4%) • Energy crops = $25.67/MMBTU (1%) • Forestry and forest product residue = $25.67/MMBTU (0.3%) • Municipal solid waste = $25.67/MMBTU (13%)
Clean Hydrogen	$9.31	Uses NYERSDA production cost estimate from the Integration Analysis; applied DOE Hydrogen Shot goal of 80% decline in production cost, which is assumed to be achieved by 2031
Synthetic Natural Gas	$23.13	Using equation derived from data in https://doi.org/10.1016/j.apenergy.2019.113594 (Jachin Gorre, Felix Ortloff, Charlotte van Leeuwen, "Production costs for synthetic methane in 2030 and 2050 of an optimized Power-to-Gas plant with intermediate hydrogen storage"); assumed continuous operation with 0 standby hours (full load hours set to 8760); hydrogen shot goal applied to hydrogen production portion

RNG Potential

Production Type	Feedstock		Within CECONY and ORU (TBTU)	Share of Eastern US (TBTU)
		Source	*ICF's Potential of RNG in NYS for NYSERDA (Achievable Deployment Scenario)*	*Carbon Neutral NYC Study*
		Share	*100% of CECONY gas territory + 59% of Hudson Valley*	*11% of Mid-Atlantic + 3% of rest of Eastern US*
Anaerobic Digestion	Animal Manure		0.05	9.75
Anaerobic Digestion	Food Waste		0.79	1.46
Anaerobic Digestion	Landfill Gas		2.87	24.22
Anaerobic Digestion	Wastewater Resource Recovery Facilities		0.72	0.54
Thermal Gasification	Agricultural Residue		0.20	0.00
Thermal Gasification	Energy Crops		0.51	0.00
Thermal Gasification	Forestry and Forest Product Residue		0.14	0.00
Thermal Gasification	Municipal Solid Waste		6.29	0.00
	Total		**11.57**	**35.97**

47.54 TBTU total available to CECONY and ORU
41.84 TBTU available to CECONY
5.70 TBTU available to ORU

Fuel Mix Figures

CECONY

Reference Case

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Certified Natural Gas %	0%	0%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Fossil Gas	185	190	192	191	188	184	182	179	177	176	175	173	171	169	167	165	162	160	158	156	155	152
Renewable Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green Hydrogen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Synthetic Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total gas volume (TBTU)	**185**	**190**	**192**	**191**	**188**	**184**	**182**	**179**	**177**	**176**	**175**	**173**	**171**	**169**	**167**	**165**	**162**	**160**	**158**	**156**	**155**	**152**

Hybrid

Con Edison		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Certified Natural Gas %	0%	0%	10%	21%	31%	42%	52%	63%	73%	83%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fossil Gas	185	190	192	191	189	187	184	179	169	163	156	148	140	130	121	111	101	92	76	71	68	64
Renewable Natural Gas	0	0	0	0	0	0	0	0	4	7	11	14	18	21	25	29	32	36	39	39	39	39
Green Hydrogen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7
Synthetic Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total gas volume (TBTU)	**185**	**190**	**192**	**191**	**189**	**187**	**184**	**179**	**173**	**170**	**166**	**162**	**158**	**152**	**146**	**139**	**133**	**127**	**122**	**117**	**113**	**110**

Deep Electrification

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Certified Natural Gas %	0%	0%	10%	21%	31%	42%	52%	63%	73%	83%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fossil Gas	185	190	192	187	180	173	164	153	141	133	125	116	107	96	85	74	63	52	42	32	28	24
Renewable Natural Gas	0	0	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	6	6	6	6	6
Green Hydrogen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Synthetic Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total gas volume (TBTU)	**185**	**190**	**192**	**187**	**180**	**173**	**164**	**153**	**141**	**134**	**126**	**118**	**109**	**99**	**89**	**78**	**68**	**58**	**48**	**39**	**34**	**31**

O&R

Reference Case

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Certified Natural Gas %	0%	0%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Fossil Gas	26	25	25	25	25	25	25	24	24	24	24	23	23	23	22	22	21	21	21	20	20	19
Renewable Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green Hydrogen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Synthetic Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total gas volume (TBTU)	**26**	**26**	**27**	**27**	**27**	**26**	**26**	**26**	**25**	**25**	**24**	**24**	**24**	**23**	**23**	**22**	**22**	**21**	**21**	**20**	**19**	**19**

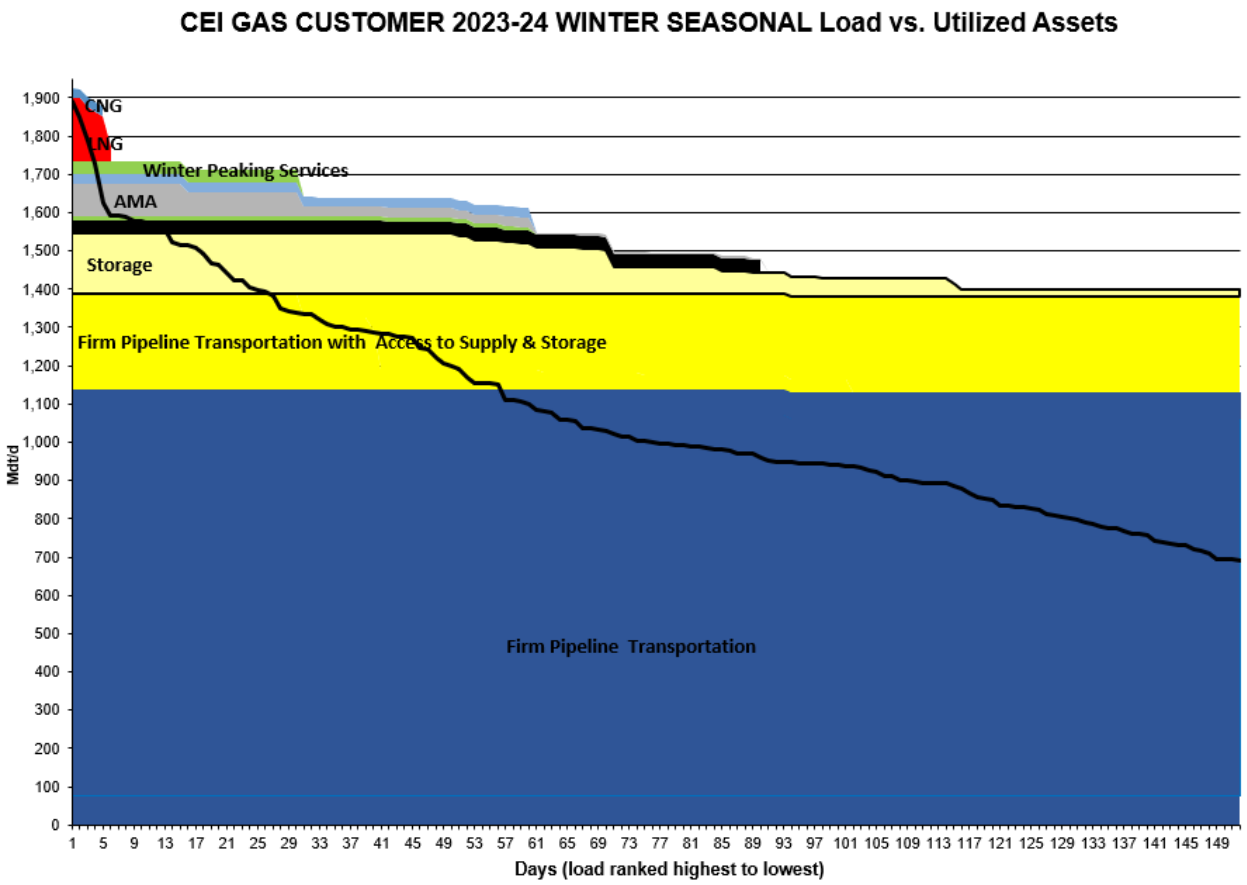
Hybrid

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Certified Natural Gas %	0%	0%	10%	21%	31%	42%	52%	63%	73%	83%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fossil Gas	26	26	27	27	26	26	25	24	22	21	20	19	18	16	15	14	13	11	9	9	8	8
Renewable Natural Gas	0	0	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	5	6	6	6	6
Green Hydrogen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Synthetic Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total gas volume (TBTU)	**26**	**26**	**27**	**27**	**26**	**26**	**25**	**24**	**22**	**22**	**21**	**21**	**20**	**19**	**19**	**18**	**17**	**16**	**16**	**15**	**15**	**14**

Deep Electrification

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Certified Natural Gas %	0%	0%	10%	21%	31%	42%	52%	63%	73%	83%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fossil Gas	26	26	27	26	26	24	23	21	19	18	17	16	15	14	13	11	10	9	8	7	6	6
Renewable Natural Gas	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Green Hydrogen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Synthetic Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total gas volume (TBTU)	**26**	**26**	**27**	**26**	**26**	**24**	**23**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**8**

Load Duration Curve



Appendix D

Title	Gas System Cost Related Information
GSLTP Reference(s)	Chapter V, Section a, Subsection iii Chapter V, Section b, Subsection iii Chapter V, Section c, Subsection iii
Purpose	To provide the components and figures for the capital, regulatory assets, and O&M costs separated by Company
Contents	Word document
Pages	2

Capital Cost Components

CECONY	**O&R**
Leak Prone Main Replacement Program (MRP/GIRRP)	Other Capital Programs
Non Leak Prone Main Replacement Program (DIME)	New Business
Service Replacement	Public Improvement
Pressure Control Projects	Reliability/Safety
Regulator Station Projects	LCF Capital
Supply Mains Projects	Regulatory Assets (NPAs)
Large Diameter Gas Main Program	MRP
Transmission/Generation Projects	
Meter Program (50%) / NGD (50%)	
Customer Connections	
System Reinforcement Program/Winter Load Relief	
Public Improvement	
Low Carbon Fuels	
LNG Projects	
Tunnel Projects	
AMI - Gas Meters	
Information Technology Projects	
CES Programs	
Gas Distribution Programs	
Other	

Capital and Regulatory Asset Figures

INVESTMENTS ($M)

UTILITY	Pathway	TYPE	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
CECONY	REFERENCE	CAPITAL	$988	$1,030	$1,007	$1,040	$1,071	$1,022	$1,015	$1,003	$982	$973	$966	$964	$956	$926	$905	$884	$873	$628	$293	$291	$291
CECONY	REFERENCE	REG ASSET	$59	$64	$65	$56	$43	$35	$27	$21	$18	$18	$18	$18	$4	$0	$0	$0	$0	$0	$0	$0	$0
ORU	REFERENCE	CAPITAL	$63	$63	$63	$62	$62	$61	$60	$60	$21	$21	$21	$20	$20	$20	$19	$19	$18	$18	$17	$17	$16
ORU	REFERENCE	REG ASSET	$0	$0	$2	$2	$2	$2	$2	$2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CECONY	HYBRID	CAPITAL	$1,046	$1,093	$1,071	$932	$925	$880	$702	$704	$691	$676	$668	$660	$640	$606	$583	$565	$551	$529	$254	$246	$243
CECONY	HYBRID	REG ASSET	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ORU	HYBRID	CAPITAL	$63	$63	$63	$61	$61	$50	$48	$48	$18	$17	$17	$16	$16	$16	$15	$15	$14	$14	$14	$13	$13
ORU	HYBRID	REG ASSET	$0	$0	$2	$2	$2	$1	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CECONY	DEEP	CAPITAL	$1,046	$1,100	$1,072	$865	$852	$809	$447	$437	$429	$297	$289	$282	$242	$136	$129	$122	$115	$108	$100	$93	$86
CECONY	DEEP	REG ASSET	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ORU	DEEP	CAPITAL	$63	$63	$46	$45	$45	$22	$22	$21	$8	$8	$8	$7	$7	$6	$6	$6	$5	$5	$4	$4	$3
ORU	DEEP	REG ASSET	$0	$0	$1	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CECONY	DEEP w/ Depreciation	CAPITAL	$1,046	$1,100	$1,072	$865	$852	$809	$447	$437	$429	$297	$289	$282	$242	$136	$129	$122	$115	$108	$100	$93	$86
CECONY	DEEP w/ Depreciation	REG ASSET	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ORU	DEEP w/ Depreciation	CAPITAL	$63	$63	$46	$45	$45	$22	$22	$21	$8	$8	$8	$7	$7	$6	$6	$6	$5	$5	$4	$4	$3
ORU	DEEP w/ Depreciation	REG ASSET	$0	$0	$1	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

O&M Cost Drivers

CECONY	**O&R List**
Construction	Leak Repair
GDS	Emergency Response
Shared	Inspection Activities
	Locating Activities
	Station Maintenance
	Emergency Dispatch
	Engin/Compliance/Planning/Misc

O&M Figures

O&M ($M)

UTILITY	Pathway	TYPE	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
CECONY	REFERENCE	O&M	174.0	182.7	190.1	193.9	197.7	193.9	193.8	193.7	193.6	193.6	193.6	193.6	193.6	193.7	193.8	193.9	194.0	189.6	189.8	189.9	189.9
ORU	REFERENCE	O&M	25.9	26.1	26.1	26.1	25.9	25.8	25.7	25.4	25.1	24.7	24.5	24.2	23.9	23.6	23.3	22.9	22.4	22.0	21.6	21.2	20.8
CECONY	HYBRID	O&M	174.0	182.7	190.1	191.4	193.8	191.6	190.2	186.1	181.8	177.5	173.2	169.0	164.7	160.6	156.4	152.2	148.1	179.2	172.2	167.1	161.9
ORU	HYBRID	O&M	25.9	26.1	25.8	25.4	25.1	24.7	24.4	24.0	23.7	23.3	23.0	22.6	22.3	21.9	21.6	21.2	20.9	20.5	20.2	19.8	19.5
CECONY	DEEP	O&M	174.0	182.7	190.1	191.5	193.8	191.6	189.1	181.4	173.7	164.9	157.2	149.5	136.4	128.7	121.0	113.3	105.6	92.0	82.4	74.7	67.0
ORU	DEEP	O&M	25.9	26.1	25.4	24.8	24.1	23.4	22.7	22.0	21.3	20.6	19.9	19.2	18.5	17.8	17.1	16.4	15.7	15.0	14.3	13.6	12.9
CECONY	DEEP w/ Depreciation	O&M	174.0	182.7	190.1	191.5	193.8	191.6	189.1	181.4	173.7	164.9	157.2	149.5	136.4	128.7	121.0	113.3	105.6	92.0	82.4	74.7	67.0
ORU	DEEP w/ Depreciation	O&M	25.9	26.1	25.4	24.8	24.1	23.4	22.7	22.0	21.3	20.6	19.9	19.2	18.5	17.8	17.1	16.4	15.7	15.0	14.3	13.6	12.9

Appendix E

Title	Emissions Related Information
GSLTP Reference(s)	Chapter V, Section a, Subsection iv Chapter V, Section b, Subsection iv Chapter V, Section c, Subsection iv
Purpose	Provide building assumptions and emissions figures
Contents	Tables of baseline equipment efficiency, building energy use intensity, gas emission factors and emission figures word document
Pages	2

Baseline Equipment Efficiency

	Equipment	Single Family Homes	Low-Rise Multi-Family	High-Rise Multi-Family	Low-Rise Commercial	High-Rise Commercial
Space Heating	Electric Resistance	95%	95%	95%	95%	95%
	ASHP	287%	262%	262%	262%	199%
	GSHP	338%	292%	292%	292%	346%
	Oil Boiler/Furnace	80%	80%	80%	80%	80%
	Gas Boiler/Furnace	80%	80%	80%	80%	80%
Water Heating	Electric Resistance	95%	95%	95%	95%	95%
	Heat Pump Water Heater	250%	250%	250%	250%	250%
	Gas/Oil	70%	70%	70%	70%	70%

Building Energy Use Intensity

CECONY			
MMBTU/SQFT	Space Heating	Water Heating	Cooking, Other
Single-Family	0.0475	0.0186	0.0035
Low-Rise Multi-Family	0.0613	0.0169	0.0035
High-Rise Multi-Family	0.0613	0.0169	0.0035
Low-Rise Commercial	0.1344	0.0153	0.0129
High-Rise Commercial	0.1344	0.0153	0.0129
O&R			
MMBTU/SQFT	Space Heating	Water Heating	Cooking, Other
Single-Family	0.0380	0.0186	0.0035
Low-Rise Multi-Family	0.0490	0.0169	0.0035
High-Rise Multi-Family	0.0000	0.0000	0.0000
Low-Rise Commercial	0.0696	0.0077	0.0053
High-Rise Commercial	0.0000	0.0000	0.0000

Natural Gas Emissions Factors

tCO2e/MMBTU (20-Year GWP)	2023	2030	2043
Fossil Gas	0.1039	0.1028	0.1012
Certified Gas	0.0844	0.0833	0.0818
RNG	0.0622	0.0611	0.0595
Clean Hydrogen	0.0000	0.0000	0.0000

Emissions Figures

tCO2e (millions)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	22.44	22.57	22.35	21.95	21.48	21.23	20.86	20.62	20.44	20.21	19.94	19.67	19.38	19.11	18.85	18.54	18.24	17.95	17.69	17.45	17.19
Hybrid	22.44	22.57	21.87	21.14	20.36	19.51	18.42	17.16	16.64	16.07	15.48	14.84	14.05	13.28	12.50	11.75	11.03	9.72	9.28	8.90	8.61
Deep Electrification	22.44	22.57	21.40	20.17	18.85	17.46	15.87	14.25	13.43	12.57	11.68	10.76	9.69	8.63	7.58	6.55	5.55	4.57	3.73	3.31	2.99

Appendix F

Title	Bill Impacts
GSLTP Reference(s)	Executive Summary, Chapter IV, Chapter V, Section a-c, Subsection iii
Purpose	This Appendix provides support for the bill impacts analysis presented in the GSLTP for the Hybrid and Deep Electrification Pathways and the figures for the Gas System and Fuel Supply Cost and the Gas System Rate charts separated by company
Contents	Overview, Future Rates Determination Method, Tables with figures for the Gas System and Fuel Supply Cost and Gas Rates charts separated by Company
Pages	4

Overview
The Companies have separately calculated bill impacts for select Service Classifications ("SC") using the revenue requirements and system usage profiles for each of the pathways presented in this GSLTP. For CECONY, bill impacts were modeled for the SC-1, *Residential and Religious Firm Sales Service*, SC-2, *General Firm Sales Service (Rates I and II)*, and SC-3, *Residential and Religious – Heating Firm Sales Service*. For ORU, bill impacts were modeled for SC-1, *Residential and Space Heating* and SC-2, *General Service*.

This analysis is focused on estimates of changes in base distribution rates and gas supply costs from current levels. The Companies used projected 2023 revenues[1] as the baseline for estimating long-term changes in revenues and rates in 2043 and 2050.[2] The estimated gas service costs include base revenue requirements and gas supply costs reflecting the level of LCFs / certified natural gas in each pathway. This analysis does not attempt to project future rate changes pertaining to surcharges, base revenue requirements that are not GSLTP-related, or other factors such as accelerating depreciation.

The rates and bill impacts developed for this analysis are for illustration only and rely on a relatively limited set of planning assumptions specific to the GSLTP that is likely to differ from those presented in future rate proceedings. Any future rates would continue to be informed by the prevailing costs/billing determinants and an iterative review of a cost-of-service study and bill impacts for all service classes.

Methodology
The Companies performed a series of steps to formulate indicative future rates that reflect the projected 2023, 2043 and 2050 costs and class usage in each of the Pathways for the service classes sampled. We describe each of these steps in Table 1, below. Gas supply rates for all SC's were adjusted to reflect a per-unit premium associated with Certified Natural Gas/LCF purchases applied to all remaining customer volumes. Said differently, all customers would be charged a proportional share of the Certified Natural Gas/LCF portfolio at the same rate.

[1] At current rates; Bill impacts include taxes (CECONY, O&R) and other surcharges as currently applicable (O&R).
[2] These years were chosen to show illustrative potential bill impacts at the beginning and conclusion of the GSLTP period, as well as further out into 2050.

Table 1: Future Rates Determination Method

Step	Description
Step 1 - Determine split of Residential and Commercial ***Volumes*** among rate classes	The GSLTP Model establishes the assumed volumes and split between residential/non-residential. For CECONY, the volumes are split between service classes based on relative historical relationship (e.g., heating vs. non-heating). For O&R, this step was not necessary because the Company does not have separate heating rates.
Step 2 - Determine split of Residential and Commercial ***Customers*** among rate classes	The GSLTP Model establishes the assumed customer level and split between residential/non-residential. For CECONY, customers are split between SC's based on relative historical relationship (e.g., heating vs. non-heating). For O&R, this step was not necessary because the Company does not have separate heating rates.
Step 3 - Determine Annual Block rate volumes	Volumes in each SC were apportioned among a two-step block structure where the first 3 ccf of usage each month is charged at the monthly minimum charge. All other usage is charged at a flat rate. It is assumed that all customers use at least 3 ccf / therms per month.
Step 4 - Determine Class-Specific Revenue Requirements	The GSLTP Model establishes the total revenue requirement, which is compared to then-current revenues to determine total incremental revenue required. The projected revenue requirement is allocated to SC's in proportion to their relative share of current delivery revenue.
Step 5 - Apply First Block Charge Revenue	Determine the portion of class revenues recovered through Customer Charge Revenue. Assumes fixed charges in current rate plans, and $1 annual increases (CECONY) and $0.50 (O&R) thereafter.
Step 6 - Determine Second Block Rates	Determine the rates necessary to recover remaining revenue through the second block.
Step 7 - Determine the per-unit Supply Costs	Convert the per-dekatherm Supply Costs into ccf (O&R)

The rates developed with the steps noted above were applied to a representative usage level for each service class to develop annual bill impacts across each of the pathways. The representative bill impacts shown in the GSLTP tables for each service class across all Pathways and all periods are based on the average monthly usage levels shown in the table below.

CECONY	
Service Class	**Therms / month**
SC-1	5
SC-2 Rate I	300
SC-2 Rate II	400
SC-3	100

O&R	
Service Class	**Ccf / month**
SC-1	100
SC-2 (Small)	300
SC-2 (Large)	3000

The usage levels in the tables above are used to illustrate the potential bill impact on "typical" households or businesses taking service under each of the stated service classes. Actual customer usage in any service class is highly situationally dependent and will vary by an individual customers' annual usage and seasonal variation.

Annual Gas Bill for Residential Customer Compared to Quintiles of NYS Income

2023						
	Con Ed			O&R		
Quintiles of Income	Reference	Hybrid	Deep Electrification	Reference	Hybrid	Deep Electrification
$ 12,858.34	20%	20%	20%	14%	14%	14%
$ 32,966.55	8%	8%	8%	6%	6%	6%
$ 59,952.80	4%	4%	4%	3%	3%	3%
$ 104,470.60	2%	2%	2%	2%	2%	2%
$ 248,717.83	1%	1%	1%	1%	1%	1%

2043						
	Con Ed			O&R		
Quintiles of Income	Reference	Hybrid	Deep Electrification	Reference	Hybrid	Deep Electrification
$ 12,858.34	39%	49%	97%	23%	40%	30%
$ 32,966.55	15%	19%	38%	9%	15%	12%
$ 59,952.80	8%	11%	21%	5%	8%	6%
$ 104,470.60	5%	6%	12%	3%	5%	4%
$ 248,717.83	2%	3%	5%	1%	2%	2%

2050						
	Con Ed			O&R		
Quintiles of Income	Reference	Hybrid	Deep Electrification	Reference	Hybrid	Deep Electrification
$ 12,858.34	41%	64%	366%	28%	72%	72%
$ 32,966.55	16%	25%	143%	11%	28%	28%
$ 59,952.80	9%	14%	79%	6%	15%	15%
$ 104,470.60	5%	8%	45%	3%	9%	9%
$ 248,717.83	2%	3%	19%	1%	4%	4%

This reflects a 100 ccf residential customer for O&R and a 300 therm residential customer for CECONY.

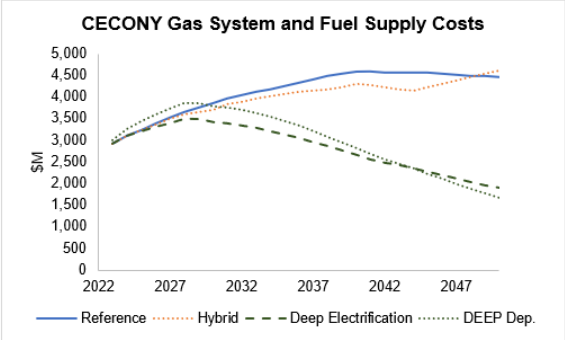
Source of quintiles: US Bureau of Labor Statistics. https://www.bls.gov/cex/tables/geographic/mean/cu-state-ny-income-quintiles-before-taxes-2-year-average-2020.htm

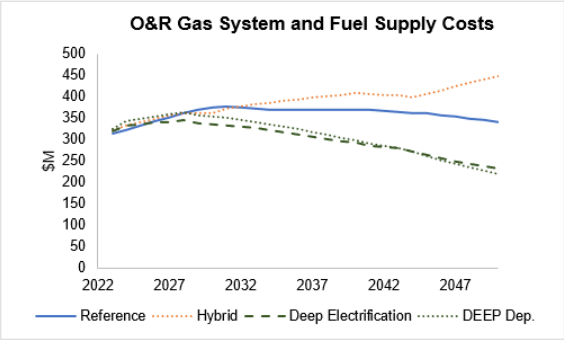
Con Edison Gas System and Fuel Supply Cost Figures

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	2,924	3,112	3,243	3,387	3,519	3,656	3,764	3,863	3,959	4,043	4,119	4,187	4,261	4,337	4,403	4,486	4,542	4,598	4,593	4,565	4,567
Hybrid	2,920	3,106	3,239	3,376	3,492	3,603	3,665	3,722	3,828	3,898	3,964	4,018	4,070	4,120	4,158	4,191	4,221	4,314	4,275	4,222	4,185
Deep Electrification	2,920	3,107	3,220	3,326	3,403	3,494	3,495	3,424	3,395	3,347	3,288	3,221	3,143	3,061	2,966	2,869	2,771	2,672	2,566	2,491	2,425
DEEP Dep.	3,000	3,266	3,450	3,607	3,729	3,858	3,866	3,798	3,768	3,709	3,636	3,554	3,455	3,343	3,217	3,088	2,957	2,824	2,684	2,572	2,468

O&R Gas System and Fuel Supply Cost Figures

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	315	324	332	343	353	363	370	375	376	375	374	371	371	371	370	371	370	371	369	367	364
Hybrid	322	335	341	350	357	363	362	362	373	378	383	387	391	395	398	401	404	411	407	405	404
Deep Electrification	322	335	337	341	342	346	339	336	334	331	327	323	318	314	308	303	298	293	287	283	281
DEEP Dep.	326	344	349	356	360	363	357	354	351	347	342	336	330	325	318	312	305	299	291	286	282



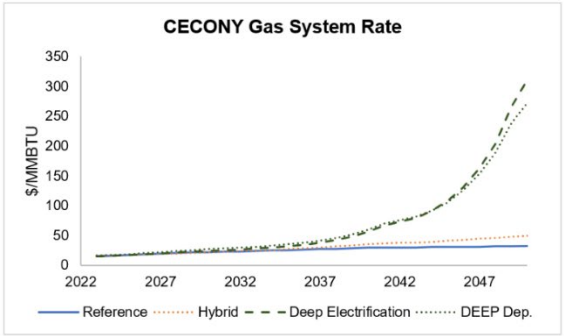


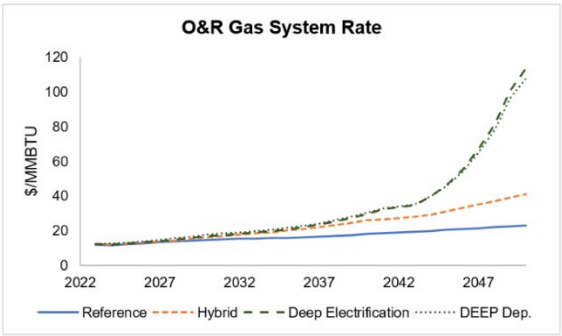
Con Edison Gas System Rate Figures

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	15.4	16.2	17.0	18.1	19.2	20.1	21.1	21.8	22.5	23.2	23.9	24.5	25.3	26.0	26.7	27.6	28.3	29.0	29.4	29.5	30.0
Hybrid	15.4	16.2	17.0	17.8	18.7	19.6	20.5	21.5	22.5	23.4	24.4	25.4	26.8	28.3	29.8	31.4	33.1	35.5	36.5	37.2	38.0
Deep Electrification	15.4	16.2	17.2	18.5	19.7	21.3	22.8	24.2	25.3	26.5	27.8	29.4	31.7	34.5	37.9	42.2	48.0	56.1	66.5	72.8	79.2
DEEP Dep.	15.8	17.0	18.5	20.0	21.6	23.5	25.3	26.9	28.1	29.4	30.8	32.5	34.9	37.7	41.1	45.5	51.2	59.3	69.5	75.2	80.6

O&R Gas System Rate Figures

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Reference	12.1	11.8	12.2	12.8	13.4	13.9	14.3	14.8	15.1	15.3	15.5	15.7	16.0	16.3	16.6	17.1	17.5	18.1	18.5	18.9	19.4
Hybrid	12.4	12.2	12.7	13.2	13.8	14.5	15.3	16.4	17.2	17.8	18.5	19.1	20.1	21.1	22.2	23.3	24.5	26.0	26.7	27.3	28.0
Deep Electrification	12.4	12.2	12.7	13.3	14.0	15.0	15.8	17.0	17.6	18.2	18.9	19.7	20.8	22.1	23.6	25.3	27.3	29.8	32.2	33.6	35.0
DEEP Dep.	12.5	12.6	13.2	13.9	14.7	15.7	16.6	17.9	18.5	19.1	19.8	20.5	21.6	22.9	24.3	26.0	27.9	30.3	32.7	33.9	35.0





Appendix G

Title	Benefit Costs Analysis
GSLTP Reference(s)	Chapter I and Chapter IV
Purpose	The appendix provides the assumptions used for the Benefit Cost Analysis
Contents	BCA Assumptions and detailed break-down of costs and benefits.
Pages	15

In the Benefit Cost Analysis (BCA) Framework Order[1], the Commission designated the Societal Cost Test ("SCT") as the primary measure of cost effectiveness. In the absence of gas-specific BCA guidance, the analysis follows previously provided guidance in the BCA Framework Order and industry best practices. The Companies performed the SCT for each of the representative pathways by comparing the NPV of each pathways benefits and costs to a baseline case over the 20-year planning horizon. To pass the BCA, a value greater than 1.0 must be achieved.

This Appendix contains a description of the benefit and cost streams included in the BCA and identifies the sources and values used to monetize them through 2043. The Figure below provides a summary of the ranges of BCAs which includes sensitivity analysis around factors such as customer economics, depreciation, and electric peak. The Pathways and sensitivities are compared to a baseline scenario that maintains current market shares of building equipment and today's costs associated with the production and delivery of energy to customers. In addition, the analysis uses the NYS DEC BCA framework cost of carbon of 3% since this is the most commonly used cost. Using a higher cost of carbon would increase the BCA ratios under all three. As the Figure indicates, none of the pathways have benefits that exceed costs through 2043. Among the CLCPA-compliant pathways, the Hybrid Pathway has the highest BCA score range. It should be noted that the BCA analysis as formulated by NYC does not include non-quantifiable benefits from reducing GHG emissions like improved public health, improved air quality, job creation over and above displaced jobs and improved economic opportunities as discussed in the Climate Action Council Final Scoping Plan. The ability to quantify those benefits may show benefits exceeding costs. This further supports the Companies' arguments for not to selecting a particular, preferred pathway.

[1] Case 14-M-0101, Reforming the Energy Vision, Order, Establishing the Benefit Cost Analysis Framework, January 21, 2016.

Figure 1: Summary of BCA Results for the Reference, Hybrid, and Deep Electrification Pathways

NPV ($B, 2024 - 2043)	Reference		Hybrid		Deep Electrification	
Company	CECONY	ORU	CECONY	ORU	CECONY	ORU
Benefits (Low - High)	$14 - $14	$2 - $2	$23 - $23	$3 - $4	$33 - $39	$5 - $5
Costs (Low - High)	$55 - $28	$3 - $2	$77 - $42	$9 - $6	$142 - $87	$12 - $8
Net Benefit (Low - High)	$(41) - $(15)	$(2) - $(0.2)	$(54) - $(19)	$(5) - $(2)	$(109) - $(48)	$(7) - $(2)
BCA Score (Low - High)	0.25 - 0.48	0.47 - 0.91	0.30 - 0.54	0.40 - 0.68	0.23 - 0.45	0.39 - 0.68
CEI Total BCA Score (Low - High)	0.26 - 0.51		0.31 - 0.56		0.25 - 0.47	

The majority of the benefits accrue from the avoided fuel costs and as well as from avoided emissions, while the majority of the costs accrue from incremental electric costs and implementation costs.

Definitions of Benefit Categories

The following categories of benefits are quantified and included in the SCT:

- Customer benefits associated with avoiding the following: space heating, water heating, cooking/drying, energy efficiency, industrial costs, and paying CEI incentives;
- Customer benefits associated with avoiding the following: CEI electric T&D, CEI gas T&D, incentive program implementation, Non-CEI gas T&D and CEI steam;
- Customer benefits associated with avoiding the supply of: electric, gas, steam and other fuels; and
- Customer benefits associated with avoided emissions.

Definitions of Cost Categories

The following categories of costs are quantified and included in the SCT:

- Incremental customer costs for: space heating, hybrid heating, water heating, cooking/drying, energy efficiency, industrial costs, CEI incentives.
- Incremental utility costs, including: incremental CEI electric T&D, incremental CEA gas T&D, incremental incentive program implementation, incremental non-CEI gas T&D and incremental CEA steam.
- Incremental supply costs, including: electric, gas, steam, gasoline and other fuels.

BCA Modeling Assumptions

Category		Baseline	Assumptions
	Avoided emissions	• 2023 emissions levels held constant through 2050 • Excluded emissions from transportation sector, and "baseload" electric sector	• Social cost of carbon based on New York DEC guidance, in line with other BCA's submitted • Lowest value of CO_2 reflected in BCA calculation (3% discount rate)
	Utility T&D investment	• 2022 revenue requirement (less purchased power/fuel and reg assets) • Escalated with inflation (3%) from 2023-2050	• Electric investments increase at the same CAGR as electric peak by pathway (excluded investments associated with EV adoption) • Steam investments increase below inflation • Gas investments as filed in GSLTP
	Supply	• Modeled 2023 supply costs and volumes • Per-unit costs escalated at inflation	• Electric CAGR based on NYISO policy cases • $/MMBTU gas costs aligned with GSLTP filing • Steam assumed to increase at same CAGR as gas • Oil prices escalated at 3% inflation, using 4-year historical average for starting value (2018-2021)
Customer Costs	**Buildings**	• Existing equipment replaced like-in-kind • No energy efficiency • Replacement costs escalated at 3% inflation	• $/sqft costs aligned with NENY filing, where possible • Range of costs developed based on CAC Integration Analysis • Includes space heating, water heating, cooking/drying, and EE • Growth in total floorspace, per CAC Integration Analysis
Industrial		• n/a	• Incremental industrial costs assumed to be 10% of incremental building costs, based on estimate of today's energy usage

Figure 2: Benefits and Costs for the Max BCA Reference CECONY Case

1)	Reference
MAX BCA CASE:	CECONY
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$0**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$0
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$3,468**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$3,468
Emissions	**$10,087**
Avoided Emissions	$10,087
Total	**$13,555**
	0%
Costs	**0**
Customer	**$19,224**
Incremental Space Heating	$3,954
Hybrid Heating	$0
Incremental Water Heating	$2,432
Incremental Cooking/Drying	$6
Incremental Energy Efficiency	$11,085
Incremental Industrial	$1,748
Incremental CEI Incentives	$0
Utility	**$6,328**
Incremental CEI Electric T&D Rev Req	$354
Incremental CEI Gas T&D Rev Req	$1,457
Incremental Incentive Program Implementation	$0
Incremental Non-CEI Gas T&D Rev Req	$1,603
Incremental CEI Steam Rev Req	$2,914
Supply	**$2,513**
Incremental Electric	$1,360
Incremental Gas	$988
Incremental Steam	$165
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$28,065**

Figure 3: Benefits and Costs for the Max BCA Reference ORU Case

2)	Reference
MAX BCA CASE:	ORU
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$459**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$459
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$551**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$551
Emissions	**$909**
Avoided Emissions	$909
Total	**$1,919**
	0%
Costs	**0**
Customer	**$1,946**
Incremental Space Heating	$473
Hybrid Heating	$0
Incremental Water Heating	$232
Incremental Cooking/Drying	$1
Incremental Energy Efficiency	$1,062
Incremental Industrial	$177
Incremental CEI Incentives	$28
Utility	**$3**
Incremental CEI Electric T&D Rev Req	$0
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$3
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$0
Supply	**$157**
Incremental Electric	$9
Incremental Gas	$148
Incremental Steam	$0
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$2,107**

Figure 4: Benefits and Costs for the Max BCA Hybrid CECONY Case

3)	Hybrid
MAX BCA CASE:	CECONY
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$0**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$0
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$4,172**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$4,172
Emissions	**$18,928**
Avoided Emissions	$18,928
Total	**$23,099**
	0%
Costs	**0**
Customer	**$29,217**
Incremental Space Heating	$7,734
Hybrid Heating	$368
Incremental Water Heating	$4,517
Incremental Cooking/Drying	$10
Incremental Energy Efficiency	$13,932
Incremental Industrial	$2,656
Incremental CEI Incentives	$772
Utility	**$3,567**
Incremental CEI Electric T&D Rev Req	$4,807
Incremental CEI Gas T&D Rev Req	($2,022)
Incremental Incentive Program Implementation	$93
Incremental Non-CEI Gas T&D Rev Req	($2,225)
Incremental CEI Steam Rev Req	$2,914
Supply	**$9,680**
Incremental Electric	$5,961
Incremental Gas	$2,864
Incremental Steam	$855
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$42,464**

Figure 5: Benefits and Costs for the Max BCA Hybrid ORU Case

4)	Hybrid
MAX BCA CASE:	ORU
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$555**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$555
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$1,567**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$1,567
Emissions	**$1,806**
Avoided Emissions	$1,806
Total	**$3,929**
	0%
Costs	**0**
Customer	**$3,989**
Incremental Space Heating	$1,597
Hybrid Heating	$24
Incremental Water Heating	$568
Incremental Cooking/Drying	$4
Incremental Energy Efficiency	$1,432
Incremental Industrial	$363
Incremental CEI Incentives	$395
Utility	**$893**
Incremental CEI Electric T&D Rev Req	$845
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$47
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$0
Supply	**$884**
Incremental Electric	$535
Incremental Gas	$349
Incremental Steam	$0
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$5,766**

Figure 6: Benefits and Costs for the Max BCA Deep Electrification CECONY Case

5)	Deep Electrification
MAX BCA CASE:	CECONY
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$6,165**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$2,936
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$3,229
Avoided CEI Steam Rev Req	$0
Supply	**$7,851**
Avoided Electric	$0
Avoided Gas	$2,677
Avoided Steam	$0
Avoided Other Fuels	$5,175
Emissions	**$25,445**
Avoided Emissions	$25,445
Total	**$39,461**
	0%
Costs	**0**
Customer	**$48,364**
Incremental Space Heating	$21,050
Hybrid Heating	$0
Incremental Water Heating	$5,754
Incremental Cooking/Drying	$134
Incremental Energy Efficiency	$18,770
Incremental Industrial	$2,656
Incremental CEI Incentives	$4,532
Utility	**$21,267**
Incremental CEI Electric T&D Rev Req	$18,313
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$544
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$2,410
Supply	**$17,347**
Incremental Electric	$17,302
Incremental Gas	$0
Incremental Steam	$44
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$86,978**

Figure 7: Benefits and Costs for the Max BCA Deep Electrification ORU Case

6)	Deep Electrification
MAX BCA CASE:	ORU
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$548**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$548
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$2,334**
Avoided Electric	$0
Avoided Gas	$177
Avoided Steam	$0
Avoided Other Fuels	$2,157
Emissions	**$2,205**
Avoided Emissions	$2,205
Total	**$5,086**
	0%
Costs	**0**
Customer	**$5,334**
Incremental Space Heating	$2,387
Hybrid Heating	$0
Incremental Water Heating	$672
Incremental Cooking/Drying	$10
Incremental Energy Efficiency	$1,903
Incremental Industrial	$363
Incremental CEI Incentives	$664
Utility	**$1,243**
Incremental CEI Electric T&D Rev Req	$1,163
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$80
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$0
Supply	**$925**
Incremental Electric	$925
Incremental Gas	$0
Incremental Steam	$0
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$7,502**

Figure 8: Benefits and Costs for the Min BCA Reference CECONY Case

7)	Reference
MIN BCA CASE:	CECONY
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$0**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$0
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$3,468**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$3,468
Emissions	**$10,087**
Avoided Emissions	$10,087
Total	**$13,555**
	0%
Costs	**0**
Customer	**$28,506**
Incremental Space Heating	$6,496
Hybrid Heating	$0
Incremental Water Heating	$3,474
Incremental Cooking/Drying	$9
Incremental Energy Efficiency	$15,935
Incremental Industrial	$2,591
Incremental CEI Incentives	$643
Utility	**$20,952**
Incremental CEI Electric T&D Rev Req	$6,166
Incremental CEI Gas T&D Rev Req	$5,616
Incremental Incentive Program Implementation	$77
Incremental Non-CEI Gas T&D Rev Req	$6,178
Incremental CEI Steam Rev Req	$2,914
Supply	**$5,367**
Incremental Electric	$4,214
Incremental Gas	$988
Incremental Steam	$165
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$54,824**

Figure 9: Benefits and Costs for the Min BCA Reference ORU Case

8)	Reference
MIN BCA CASE:	ORU
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$57**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$57
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$551**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$551
Emissions	**$909**
Avoided Emissions	$909
Total	**$1,518**
	0%
Costs	**0**
Customer	**$2,902**
Incremental Space Heating	$777
Hybrid Heating	$0
Incremental Water Heating	$332
Incremental Cooking/Drying	$2
Incremental Energy Efficiency	$1,527
Incremental Industrial	$264
Incremental CEI Incentives	$202
Utility	**$24**
Incremental CEI Electric T&D Rev Req	$0
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$24
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$0
Supply	**$289**
Incremental Electric	$141
Incremental Gas	$148
Incremental Steam	$0
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$3,216**

Figure 10: Benefits and Costs for the Min BCA Hybrid CECONY Case

9)	Hybrid
MIN BCA CASE:	CECONY
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$0**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$0
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$4,172**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$4,172
Emissions	**$18,928**
Avoided Emissions	$18,928
Total	**$23,099**
	0%
Costs	**0**
Customer	**$43,790**
Incremental Space Heating	$12,705
Hybrid Heating	$605
Incremental Water Heating	$6,453
Incremental Cooking/Drying	$18
Incremental Energy Efficiency	$20,028
Incremental Industrial	$3,981
Incremental CEI Incentives	$3,422
Utility	**$17,874**
Incremental CEI Electric T&D Rev Req	$8,668
Incremental CEI Gas T&D Rev Req	$2,801
Incremental Incentive Program Implementation	$411
Incremental Non-CEI Gas T&D Rev Req	$3,081
Incremental CEI Steam Rev Req	$2,914
Supply	**$15,393**
Incremental Electric	$11,674
Incremental Gas	$2,864
Incremental Steam	$855
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$77,057**

Figure 11: Benefits and Costs for the Min BCA Hybrid ORU Case

10)	Hybrid
MIN BCA CASE:	ORU
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$76**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$76
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$1,567**
Avoided Electric	$0
Avoided Gas	$0
Avoided Steam	$0
Avoided Other Fuels	$1,567
Emissions	**$1,806**
Avoided Emissions	$1,806
Total	**$3,450**
	0%
Costs	**0**
Customer	**$6,096**
Incremental Space Heating	$2,624
Hybrid Heating	$40
Incremental Water Heating	$812
Incremental Cooking/Drying	$7
Incremental Energy Efficiency	$2,059
Incremental Industrial	$554
Incremental CEI Incentives	$778
Utility	**$1,363**
Incremental CEI Electric T&D Rev Req	$1,269
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$93
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$0
Supply	**$1,231**
Incremental Electric	$881
Incremental Gas	$349
Incremental Steam	$0
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$8,689**

Figure 12: Benefits and Costs for the Min BCA Deep Electrification CECONY Case

11)	Deep Electrification
MIN BCA CASE:	CECONY
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$158**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$75
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$83
Avoided CEI Steam Rev Req	$0
Supply	**$7,851**
Avoided Electric	$0
Avoided Gas	$2,677
Avoided Steam	$0
Avoided Other Fuels	$5,175
Emissions	**$25,445**
Avoided Emissions	$25,445
Total	**$33,454**
	0%
Costs	**0**
Customer	**$73,954**
Incremental Space Heating	$34,582
Hybrid Heating	$0
Incremental Water Heating	$8,220
Incremental Cooking/Drying	$190
Incremental Energy Efficiency	$26,981
Incremental Industrial	$3,981
Incremental CEI Incentives	$9,385
Utility	**$38,818**
Incremental CEI Electric T&D Rev Req	$35,282
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$1,126
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$2,410
Supply	**$29,707**
Incremental Electric	$29,663
Incremental Gas	$0
Incremental Steam	$44
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$142,480**

Figure 13: Benefits and Costs for the Min BCA Deep Electrification ORU Case

12)	Deep Electrification
MIN BCA CASE:	ORU
Benefits	
Customer	**$0**
Avoided Space Heating	$0
Avoided Water Heating	$0
Avoided Cooking/Drying	$0
Avoided Energy Efficiency	$0
Avoided Industrial	$0
Avoided CEI Incentives	$0
Utility	**$261**
Avoided CEI Electric T&D Rev Req	$0
Avoided CEI Gas T&D Rev Req	$261
Avoided Incentive Program Implementation	$0
Avoided Non-CEI Gas T&D Rev Req	$0
Avoided CEI Steam Rev Req	$0
Supply	**$2,334**
Avoided Electric	$0
Avoided Gas	$177
Avoided Steam	$0
Avoided Other Fuels	$2,157
Emissions	**$2,205**
Avoided Emissions	$2,205
Total	**$4,799**
	0%
Costs	**0**
Customer	**$8,185**
Incremental Space Heating	$3,921
Hybrid Heating	$0
Incremental Water Heating	$960
Incremental Cooking/Drying	$15
Incremental Energy Efficiency	$2,735
Incremental Industrial	$554
Incremental CEI Incentives	$1,195
Utility	**$2,478**
Incremental CEI Electric T&D Rev Req	$2,335
Incremental CEI Gas T&D Rev Req	$0
Incremental Incentive Program Implementation	$143
Incremental Non-CEI Gas T&D Rev Req	$0
Incremental CEI Steam Rev Req	$0
Supply	**$1,555**
Incremental Electric	$1,555
Incremental Gas	$0
Incremental Steam	$0
Incremental Gasoline	$0
Incremental Other Fuels	$0
Total Costs	**$12,218**

Appendix H

Title	Comparative Customer Economics
GSLTP Reference(s)	Executive Summary
Purpose	This Appendix provides support for the analysis of expected timeline for when electric heating solutions would be more economic than gas
Contents	Overview, Methodology, Results
Pages	5

Overview
CECONY has recently updated its economic analysis for various HVAC technologies across different building topographies to show an expected crossover timeline for when electric heating solutions may become more economical than gas. This analysis compares the economics of the various applications reviewed, based on total cost of ownership ("TCO"), inclusive of upfront costs and the annual cost of operating the equipment.

Methodology
For this analysis, three space heating technologies were modeled including gas boilers, air-source heat pumps ("ASHP") and ground source heat pumps ("GSHP"). ASHP and GSHP technologies are readily available alternatives to gas boilers. Each of these technologies were modeled across three building topographies – single family homes ("SFH"), low-rise multi-family homes ("MFH") and high-rise commercial buildings ("Comm").

The analysis incorporates engineering assumptions with respect to HVAC configurations and annual energy requirements. This includes assumptions surrounding square footage for each building topography, the per-square foot installed cost of HVAC equipment, the equipment life expectancy and annual energy consumption. The square footage assumptions were derived from EPRI's *Assessment of Building Electrification Technologies for NYS*.[1] The per-square foot installed costs assumptions were derived from CECONYs recent Non-Low-and-Moderate Income Energy Efficiency and Building Electrification Portfolio Proposal Filing under case 18-M-0084 (November 2, 2023).[2] Together, these formed the basis for the assumptions for the upfront costs of the various HVAC Configurations.

The forecasted annual operating costs were then determined for each of technical specifications noted above. This was developed by applying the expected annual energy consumption for each HVAC configuration to the average forecasted electric system and gas system rates relevant to each pathway. The annual heating consumption figures were derived from a combination of sources, including the NYC PLUTO database, the NYC GHG inventory, and NYC's One City Built to Last. The electric system rate is assumed to increase at a compound annual growth rate ("CAGR") of approximately 0.57% and 1.40% for the hybrid and deep electrification pathways, while the gas system rate is assumed to increase at a CAGR of 4.51% and 11.89%, respectively.

[1] Heat Pump COPs - EPRI: "Assessment of Building Electrification Technologies for NYS"
[2] Consolidated Edison Company of New York, Inc. Non-Low-and-Moderate Income Energy Efficiency and Building Electrification Portfolio Proposal Filing

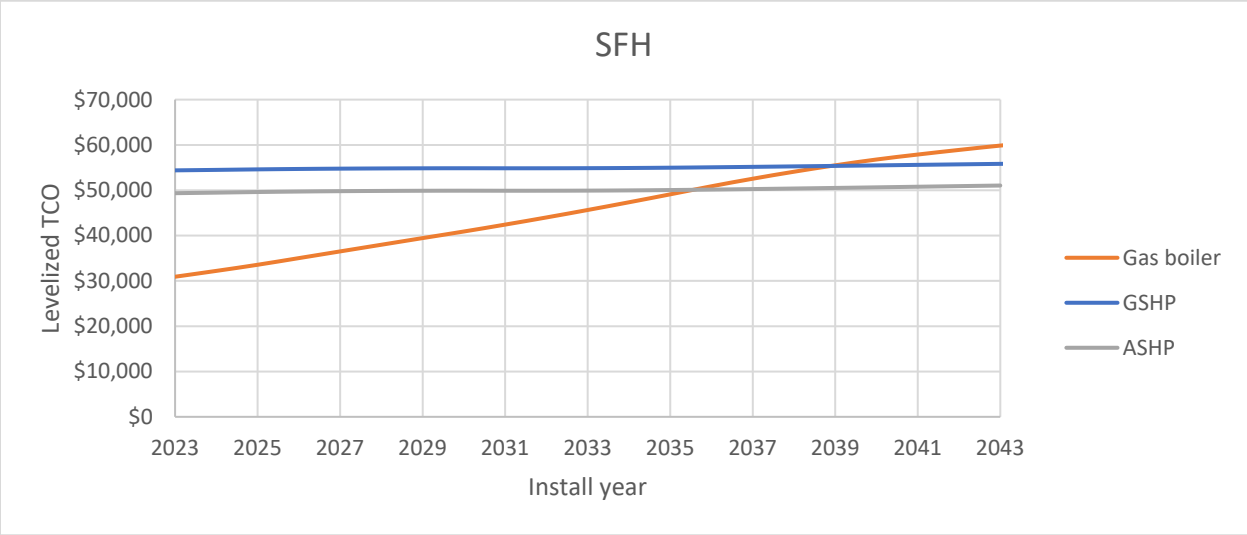
CECONY developed TCO estimates for each year based on using the upfront costs and expected annual operating costs over the expected life of the HVAC equipment. Because the equipment life expectancy varies across technologies, the Company levelized the TCO across each technology to reflect a 15-year equivalent lifecycle cost (consistent with the life expectancy of an ASHP).

Results

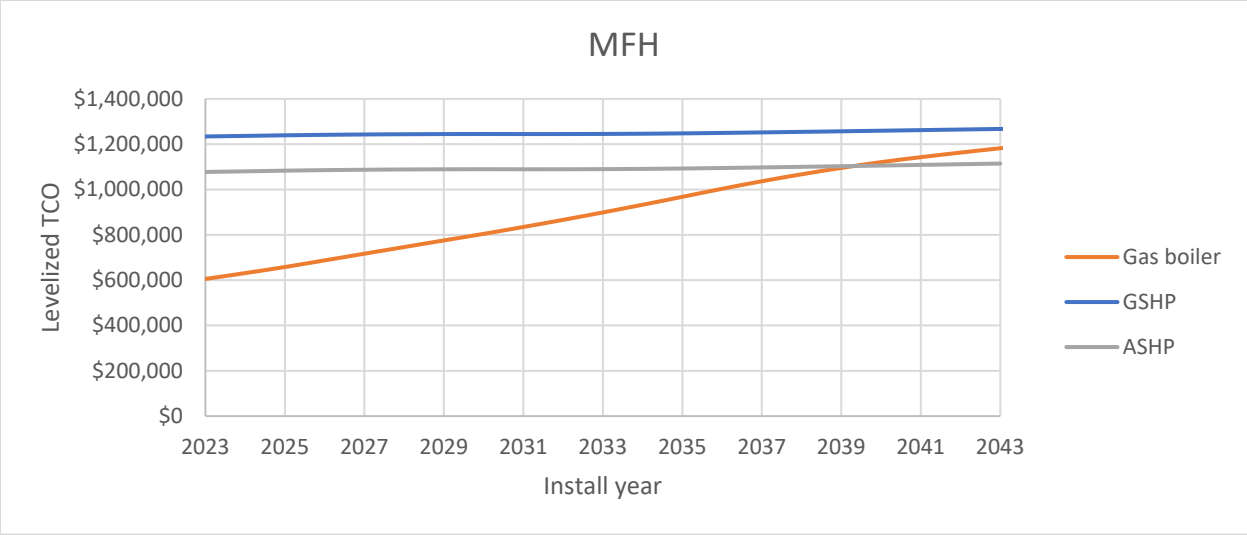
The following is to outline the potential relative economics of certain heating technologies and reflect planning assumptions, including potential rates forecasted under the Hybrid and Deep Electrification Pathways presented in the GSLTP. Forecasted rate projections in these pathways involve uncertainties and assumptions. It is intended for information purposes only.

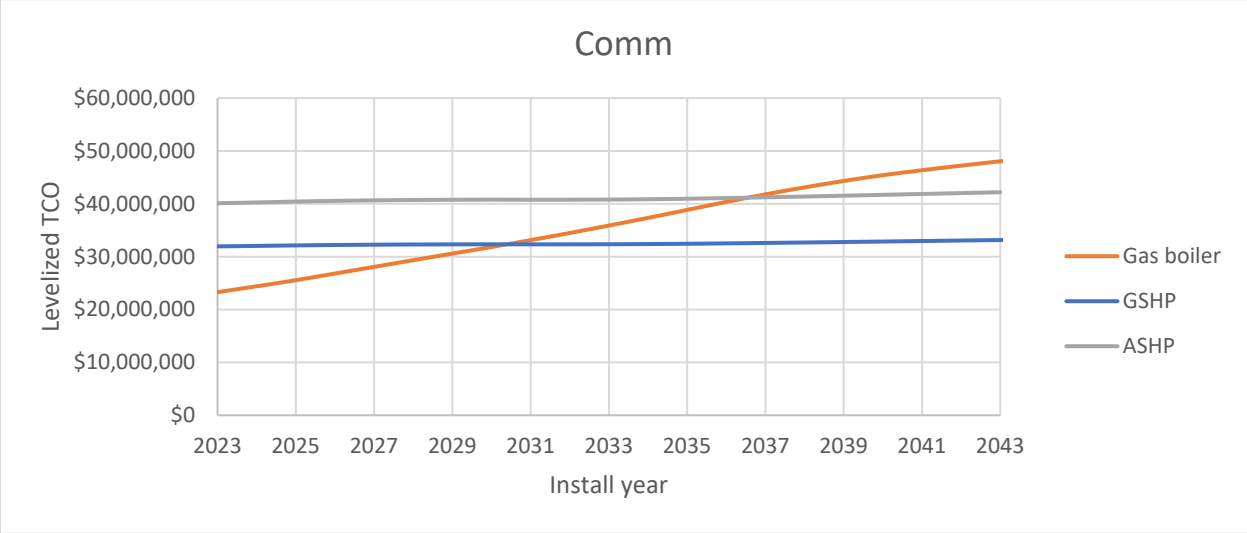
Our analysis shows that, under the Hybrid Pathway, ASHP's are projected to become more economical than gas boilers in 2036 for SFH, 2040 for MFH and GSHPs are projected to become economical in 2031 for Comm. These are the first install years in which electric heat pumps may have lower lifecycle costs than gas. Although ASHP's and GSHP's may become more cost-effective on a total lifecycle cost basis in these years, the payback period is not short enough to be "attractive" for a customer during the GSLTP period.[3]

Figure 1. Crossover of Payback Period – Hybrid Pathway



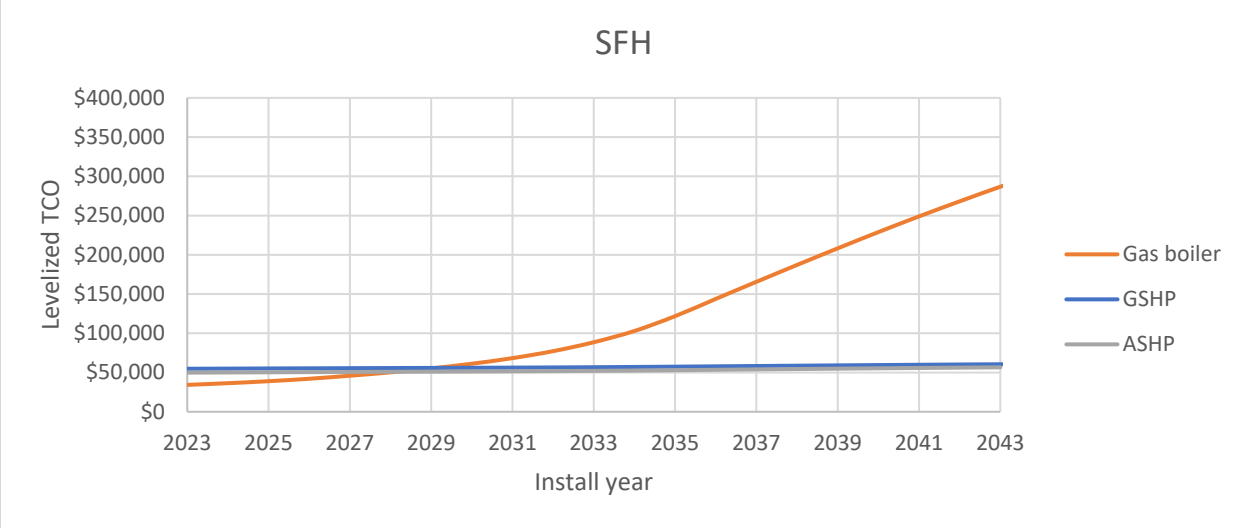
[3] An attractive payback period is defined as the time in which a customer must be paid back for their investment to make it attractive enough for them to invest. The attractive payback period is assumed as six years for residential buildings and five years for commercial buildings in the analysis, consistent with the hurdle rates from CECONYs recent Non-Low-and-Moderate Income Energy Efficiency and Building Electrification Portfolio Proposal Filing under case 18-M-0084 (November 2, 2023). See: https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={00798C8B-0000-C950-90C0-CA442D7A6B57}

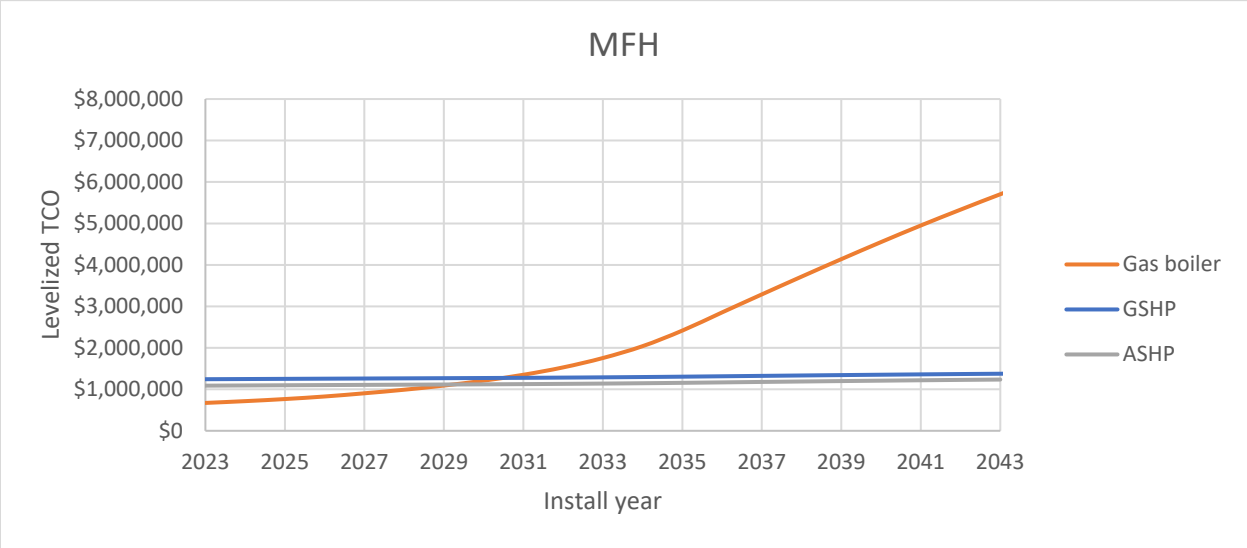




Under the Deep Electrification Pathway, the comparative economics analysis shows that GSHPs become more economic than a gas furnace in 2026 for Commercial, and ASHPs become more economical in 2029 and 2030 for SFH and MFH, respectively. ASHPs provide an attractive payback beginning in 2038 for SFH and Comm, and in 2039 for MFH under the Deep Electrification Pathway.

Figure 2. Crossover of Payback Period – Deep Electrification Pathway





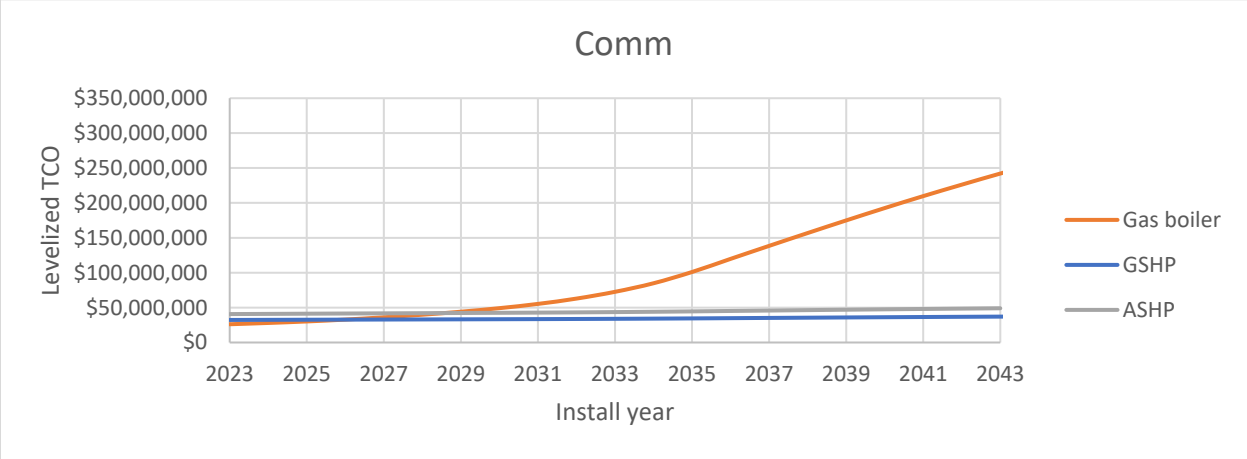


Figure 3: Installation year in which the lifecycle cost of a heat pump is lower than that of a gas boiler

	Hybrid	Deep Electrification
Single-Family	ASHP: 2036 GSHP: 2039	ASHP: 2029 GSHP: 2030
Multi-Family	ASHP: 2040 GSHP: After 2043	ASHP: 2030 GSHP: 2031
High-Rise Commercial	ASHP: 2037 GSHP: 2031	ASHP: 2029 GSHP: 2026