

Appendix H

2021-2040 System & Resource Outlook (The Outlook)

**A Report from the New York
Independent System Operator**

September 22, 2022

Appendix H: Detailed Baseline and Contract Case Results Tables

H.1. Baseline Case Results

Figure 101: Projected Baseline Case Results 2021-2040 (nominal \$M)

Case Summary	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NYCA-Wide Production Cost (\$M)	2,906	2,767	3,039	3,006	3,098	3,196	3,286	3,532	3,656	3,856
NYCA Demand Congestion (\$M)	819	442	238	125	103	122	119	130	148	157
Load LBMP Payment (\$M)	4,915	4,641	5,260	5,194	5,519	5,855	6,117	6,500	6,978	7,307
Generator LBMP Payment (\$M)	3,601	3,526	4,235	4,218	4,523	4,776	5,032	5,325	5,715	5,985
Load Payment Losses (\$M)	322	317	372	333	351	364	384	404	445	464
SO2 Costs (\$M)	0	0	0	0	0	0	0	0	0	0
SO2 Emission (Short Tons)	532	544	548	550	547	546	544	548	545	548
CO2 Costs (\$M)	225	268	305	331	355	379	405	442	473	517
CO2 Emission (Short Tons)	25,571	28,286	30,027	30,302	29,986	29,704	29,432	29,832	29,615	29,996
NOX Costs (\$M)	5.38	2.07	0.75	0.33	0.16	0.08	0.09	0.09	0.08	0.09
NOX Emission (Short Tons)	9,795	10,496	11,017	11,029	10,979	10,789	10,760	10,857	10,847	10,861
NYCA Avg. LBMP (\$/MWh)	30.06	28.49	32.40	31.91	34.16	36.35	37.89	40.10	42.76	44.57

Case Summary	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NYCA-Wide Production Cost (\$M)	3,985	4,303	4,523	4,798	5,042	5,357	5,614	5,996	6,254	6,763
NYCA Demand Congestion (\$M)	172	188	209	209	234	256	270	308	341	345
Load LBMP Payment (\$M)	7,628	8,060	8,457	8,854	9,341	9,823	10,277	10,892	11,328	12,203
Generator LBMP Payment (\$M)	6,253	6,555	6,860	7,146	7,478	7,910	8,212	8,669	8,969	9,616
Load Payment Losses (\$M)	492	519	555	577	620	652	692	732	775	830
SO2 Costs (\$M)	0	0	0	0	0	0	0	0	0	0
SO2 Emission (Short Tons)	549	550	549	551	551	556	557	562	566	570
CO2 Costs (\$M)	564	605	653	716	769	848	922	1,012	1,091	1,215
CO2 Emission (Short Tons)	30,357	30,255	30,266	30,828	30,753	31,513	31,830	32,475	32,545	33,688
NOX Costs (\$M)	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10
NOX Emission (Short Tons)	11,084	10,946	11,086	11,117	11,221	11,400	11,500	11,706	11,776	12,189
NYCA Avg. LBMP (\$/MWh)	46.30	48.59	50.53	52.44	54.69	56.98	58.87	61.72	63.29	67.12

Figure 102: Projected Baseline Case Production Costs (2021-2040) by Zone (nominal \$M)

Production Cost (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	30	39	55	55	71	85	86	92	96	103
Genesee	43	42	44	48	49	52	57	55	57	64
Central	310	343	395	408	442	456	475	491	523	535
North	1	1	3	6	8	9	9	7	9	9
Mohawk Valley	1	2	2	3	5	6	6	4	7	6
Capital	454	442	493	484	491	524	540	575	609	657
Hudson Valley	208	235	269	272	281	298	304	317	341	370
Millwood	22	6	6	6	6	6	6	6	6	7
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	820	752	908	865	908	922	974	1,051	1,104	1,146
Long Island	290	263	270	274	275	282	295	310	332	351
NYCA Total	2,180	2,125	2,445	2,423	2,535	2,639	2,752	2,909	3,084	3,248
NYCA Imports	1,023	920	1,004	922	1,038	1,184	1,208	1,286	1,403	1,467
NYCA Exports	297	278	411	339	476	627	674	664	831	858
NYCA + Imports - Exports	2,906	2,767	3,039	3,006	3,098	3,196	3,286	3,532	3,656	3,856
Total IESO	1,269	1,296	1,477	1,439	1,795	2,558	2,732	2,778	3,394	3,676
Total PJM	14,175	13,602	15,501	15,483	16,360	16,899	17,597	18,570	19,208	19,937
Total ISONE	2,485	2,342	2,570	2,597	2,724	2,894	3,085	3,299	3,555	3,832
Total System	20,109	19,365	21,993	21,942	23,415	24,990	26,166	27,556	29,241	30,692

Production Cost (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	110	112	113	118	124	133	135	146	142	160
Genesee	61	64	69	65	67	74	70	71	79	76
Central	567	578	604	622	638	663	690	709	731	759
North	9	10	10	8	10	11	11	10	11	13
Mohawk Valley	7	7	8	6	7	7	7	9	9	11
Capital	679	736	748	792	829	888	921	990	1,010	1,121
Hudson Valley	386	402	402	428	464	496	512	547	555	606
Millwood	7	7	7	7	7	7	7	7	8	8
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	1,198	1,231	1,342	1,391	1,438	1,502	1,582	1,656	1,749	1,834
Long Island	365	382	404	417	443	469	487	512	537	571
NYCA Total	3,388	3,529	3,706	3,853	4,025	4,251	4,423	4,658	4,830	5,158
NYCA Imports	1,508	1,618	1,689	1,767	1,864	1,963	2,027	2,173	2,264	2,428
NYCA Exports	911	844	872	822	848	857	835	835	839	823
NYCA + Imports - Exports	3,985	4,303	4,523	4,798	5,042	5,357	5,614	5,996	6,254	6,763
Total IESO	3,830	3,514	3,452	3,471	3,540	3,577	3,648	3,721	3,764	3,805
Total PJM	20,702	21,113	21,913	22,697	23,127	23,800	24,657	25,163	25,887	26,933
Total ISONE	3,953	4,136	4,335	4,475	4,650	4,837	4,997	5,212	5,386	5,607
Total System	31,873	32,291	33,406	34,497	35,344	36,464	37,724	38,753	39,866	41,503

Figure 103: Projected Baseline Case Generation (2021-2040) by Zone (GWh)

Generation (GWh)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	18,200	18,882	19,667	19,723	20,129	20,411	20,385	20,484	20,508	20,595
Genesee	5,548	5,235	5,308	5,827	5,483	5,554	6,010	5,592	5,617	6,079
Central	30,659	31,813	34,474	34,488	35,951	34,959	35,929	34,966	36,137	34,964
North	9,469	9,544	9,626	9,704	9,747	9,770	9,778	9,768	9,779	9,779
Mohawk Valley	3,807	4,272	4,632	4,813	4,918	5,002	5,055	5,066	5,154	5,175
Capital	15,097	16,850	17,503	17,864	17,237	17,301	17,059	17,425	17,248	17,815
Hudson Valley	7,795	9,540	9,965	10,296	10,090	10,172	10,038	10,060	10,097	10,549
Millwood	2,638	454	461	471	474	479	484	490	491	494
Dunwoodie	75	83	89	99	104	108	112	117	122	125
NY City	22,596	23,248	25,575	24,666	24,448	23,818	24,017	24,487	24,174	23,948
Long Island	8,149	8,435	8,084	8,264	8,130	7,999	8,053	8,078	8,080	8,225
NYCA Total	124,032	128,356	135,384	136,214	136,710	135,574	136,918	136,532	137,407	137,747
Total IESO	154,707	151,934	144,492	150,996	145,892	145,595	146,639	149,180	152,171	154,251
Total PJM	807,913	812,614	823,605	823,484	831,111	838,249	839,805	844,395	846,465	847,978
Total ISONE	104,628	107,241	107,648	108,995	109,644	110,492	111,728	113,707	114,732	117,371
Total HQ *	25,204	25,650	25,619	25,640	25,544	25,520	25,495	25,672	25,566	25,543
Total System	1,216,484	1,225,795	1,236,746	1,245,330	1,248,901	1,255,432	1,260,585	1,269,486	1,276,341	1,282,891

Generation (GWh)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	20,634	20,613	20,585	20,627	20,686	20,779	20,732	20,824	20,720	20,945
Genesee	5,653	5,685	6,085	5,659	5,680	6,124	5,681	5,686	6,125	5,714
Central	36,388	35,219	36,275	35,353	36,182	35,348	36,478	35,415	36,512	35,612
North	9,769	9,800	9,802	9,786	9,795	9,806	9,798	9,777	9,811	9,842
Mohawk Valley	5,211	5,262	5,276	5,278	5,314	5,334	5,345	5,373	5,371	5,413
Capital	17,773	18,297	18,002	18,634	18,587	19,275	19,490	20,169	19,953	20,980
Hudson Valley	10,587	10,584	10,294	10,547	10,852	11,190	11,197	11,451	11,320	11,774
Millwood	497	501	503	505	505	509	510	511	511	512
Dunwoodie	129	132	134	136	139	142	144	145	144	146
NY City	24,432	24,152	24,695	25,051	24,790	24,963	25,464	25,745	26,323	26,779
Long Island	8,384	8,373	8,476	8,554	8,744	8,814	8,901	9,000	9,154	9,320
NYCA Total	139,458	138,616	140,127	140,129	141,274	142,286	143,740	144,095	145,944	147,035
Total IESO	153,938	154,739	154,764	155,490	155,663	155,780	155,747	155,950	155,988	156,233
Total PJM	847,815	849,118	849,311	849,427	850,240	850,995	851,111	852,202	852,997	853,337
Total ISONE	117,585	117,784	117,887	118,546	118,444	118,926	119,619	120,032	120,303	120,937
Total HQ *	25,532	25,569	25,614	25,593	25,568	25,591	25,517	25,494	25,616	25,645
Total System	1,284,328	1,285,826	1,287,703	1,289,184	1,291,189	1,293,578	1,295,734	1,297,773	1,300,848	1,303,187

Figure 104: Projected Baseline Case Generator Payments (2021-2040) by Zone (nominal \$M)

Generator Payment (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	490	499	606	609	673	725	754	806	859	901
Genesee	141	134	159	174	180	193	217	217	233	260
Central	729	760	963	976	1,093	1,150	1,232	1,268	1,386	1,409
North	212	222	272	278	303	324	339	359	382	398
Mohawk Valley	88	101	129	136	151	163	171	182	198	208
Capital	525	517	581	566	585	623	646	695	740	793
Hudson Valley	240	272	319	326	342	363	374	395	426	459
Millwood	90	13	15	15	16	18	19	20	21	22
Dunwoodie	3	3	3	3	4	4	4	5	5	6
NY City	754	710	881	831	868	892	941	1,020	1,078	1,118
Long Island	328	294	306	303	309	320	335	358	387	412
NYCA Total	3,601	3,526	4,235	4,218	4,523	4,776	5,032	5,325	5,715	5,985

Generator Payment (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	938	985	1,022	1,059	1,110	1,170	1,204	1,273	1,295	1,392
Genesee	253	266	293	286	296	334	322	339	372	373
Central	1,500	1,542	1,611	1,654	1,722	1,810	1,882	1,950	2,013	2,106
North	411	435	452	466	487	508	522	547	562	599
Mohawk Valley	215	229	238	247	261	272	281	297	303	327
Capital	824	891	911	968	1,012	1,084	1,129	1,214	1,237	1,376
Hudson Valley	479	502	507	541	584	624	645	690	700	770
Millwood	23	24	25	27	28	29	31	32	33	35
Dunwoodie	6	7	7	7	8	8	9	9	10	10
NY City	1,175	1,216	1,306	1,380	1,426	1,495	1,581	1,672	1,763	1,893
Long Island	430	458	487	511	545	576	606	647	681	735
NYCA Total	6,253	6,555	6,860	7,146	7,478	7,910	8,212	8,669	8,969	9,616

Figure 105: Projected Baseline Case Load Payments (2021-2040) by Zone (nominal \$M)

Load Payment (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	403	417	522	527	579	629	658	700	748	782
Genesee	265	264	308	309	331	352	364	387	413	430
Central	439	444	514	526	575	622	643	683	728	755
North	125	157	208	216	240	261	277	294	313	326
Mohawk Valley	215	214	251	251	272	290	304	323	345	361
Capital	415	370	406	412	432	457	477	509	545	570
Hudson Valley	309	280	315	302	320	338	354	376	402	421
Millwood	92	85	96	95	100	106	112	119	127	133
Dunwoodie	189	174	197	192	201	212	222	236	253	265
NY City	1,633	1,501	1,672	1,630	1,708	1,799	1,884	2,004	2,158	2,262
Long Island	829	733	771	734	762	790	821	870	945	1,001
NYCA Total	4,915	4,641	5,260	5,194	5,519	5,855	6,117	6,500	6,978	7,307

Load Payment (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	815	859	894	931	978	1,033	1,072	1,135	1,170	1,255
Genesee	447	472	491	512	538	566	588	623	643	692
Central	779	815	847	875	915	961	1,001	1,056	1,094	1,174
North	338	357	370	384	401	420	433	455	467	498
Mohawk Valley	373	393	411	429	450	471	487	514	531	569
Capital	596	630	665	696	728	765	797	841	871	932
Hudson Valley	438	462	485	508	535	562	585	620	645	694
Millwood	138	146	153	160	169	178	186	197	205	221
Dunwoodie	277	293	308	324	342	360	379	402	419	452
NY City	2,364	2,505	2,634	2,769	2,930	3,088	3,249	3,446	3,595	3,902
Long Island	1,062	1,127	1,199	1,266	1,356	1,420	1,502	1,603	1,688	1,817
NYCA Total	7,628	8,060	8,457	8,854	9,341	9,823	10,277	10,892	11,328	12,203

Figure 106: Projected Baseline Case Loss Payments (2021-2040) by Zone (nominal \$M)

Loss Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	13	15	19	14	18	18	18	18	18	17
Genesee	7	9	11	9	11	12	11	12	12	12
Central	13	13	16	15	16	17	17	18	19	19
North	-4	-3	-3	-3	-2	-2	-2	-3	-3	-3
Mohawk Valley	9	9	11	9	10	10	11	11	12	13
Capital	21	19	23	19	21	21	23	24	27	28
Hudson Valley	25	24	28	24	26	27	28	30	33	35
Millwood	8	8	9	8	9	9	10	10	12	12
Dunwoodie	16	16	19	17	18	18	20	21	23	24
NY City	151	146	168	156	159	164	175	185	206	217
Long Island	64	60	70	64	67	69	73	77	87	91
NYCA Total	322	317	372	333	351	364	384	404	445	464

Loss Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	19	17	17	18	18	18	20	20	22	23
Genesee	13	13	12	14	14	14	16	16	16	19
Central	20	21	21	22	23	24	25	28	28	31
North	-3	-4	-4	-4	-4	-4	-4	-5	-5	-6
Mohawk Valley	13	14	15	15	16	17	18	19	20	21
Capital	29	31	33	34	36	38	40	41	44	46
Hudson Valley	36	39	41	43	46	48	51	54	57	61
Millwood	13	14	15	15	16	17	18	19	20	21
Dunwoodie	25	27	29	30	32	34	36	38	41	43
NY City	228	244	262	272	294	311	329	349	370	396
Long Island	97	104	113	118	128	136	144	153	162	173
NYCA Total	492	519	555	577	620	652	692	732	775	830

Figure 107: Projected Baseline Case SO₂ Emissions Costs (2021-2040) by Zone (nominal \$M)

SO ₂ Emissions Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SO ₂ Emissions Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 108: Projected Baseline Case SO₂ Emissions (2021-2040) by Zone (Tons)

SO ₂ Emissions (Tons)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	188	188	189	190	190	191	191	192	191	191
Genesee	0	0	0	0	1	1	1	1	1	1
Central	10	14	16	17	18	18	17	18	18	18
North	0	0	0	0	0	0	0	0	0	0
Mohawk Valley	0	0	0	0	0	0	0	0	0	0
Capital	57	59	60	61	60	60	59	60	59	60
Hudson Valley	17	18	19	20	19	19	19	19	19	20
Millwood	106	106	106	106	106	106	106	106	106	106
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	57	59	64	62	61	59	60	61	60	59
Long Island	98	98	92	93	92	91	91	91	91	91
NYCA Total	532	544	548	550	547	546	544	548	545	548

SO ₂ Emissions (Tons)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	191	192	191	191	191	192	191	192	191	192
Genesee	1	1	1	1	1	1	1	1	1	1
Central	18	18	18	18	17	18	18	19	18	19
North	0	0	0	0	0	0	0	0	0	0
Mohawk Valley	0	0	0	0	0	0	0	0	0	0
Capital	60	61	60	62	61	63	63	65	64	66
Hudson Valley	20	20	19	19	20	21	21	21	21	23
Millwood	106	106	106	106	106	106	106	106	106	106
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	61	59	62	62	61	62	63	64	65	66
Long Island	92	92	92	92	92	93	93	95	99	97
NYCA Total	549	550	549	551	551	556	557	562	566	570

Figure 109: Projected Baseline Case CO₂ Emissions Costs (2021-2040) by Zone (nominal \$M)

CO ₂ Emissions Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	3.0	5.0	7.4	7.9	10.7	13.2	13.8	15.1	16.2	18.0
Genesee	0.5	0.8	0.9	1.0	1.5	1.9	2.0	2.0	2.3	2.6
Central	16.9	26.4	31.3	37.5	41.3	46.0	47.3	52.3	55.9	61.1
North	0.1	0.1	0.3	0.8	1.1	1.2	1.3	1.1	1.4	1.5
Mohawk Valley	0.1	0.1	0.2	0.3	0.5	0.7	0.7	0.5	0.9	0.8
Capital	48.9	58.0	64.3	70.7	72.9	78.9	83.3	91.5	97.2	108.8
Hudson Valley	26.6	35.3	39.0	43.2	45.2	48.8	51.4	55.4	59.5	67.3
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	98.7	108.4	127.9	132.9	143.2	148.5	161.8	178.1	190.0	201.7
Long Island	30.0	33.4	33.5	37.1	38.5	40.3	43.4	46.6	49.9	54.8
NYCA Total	224.8	267.7	304.8	331.4	354.8	379.4	405.0	442.5	473.2	516.5

CO ₂ Emissions Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	19.9	21.1	21.9	24.0	26.1	29.3	30.9	34.8	35.4	41.7
Genesee	2.7	3.0	2.9	3.1	3.4	3.5	3.8	4.1	4.4	4.8
Central	66.3	71.8	75.2	84.4	86.4	97.0	103.4	114.2	119.5	134.3
North	1.5	1.8	1.7	1.5	2.0	2.3	2.4	2.1	2.6	3.1
Mohawk Valley	0.9	1.0	1.1	0.8	1.0	1.1	1.2	1.5	1.7	2.1
Capital	116.5	129.4	135.9	151.9	162.5	182.5	198.5	221.8	235.1	268.1
Hudson Valley	72.9	78.3	81.6	90.0	99.8	111.0	120.2	132.4	140.5	158.7
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	222.4	234.7	262.1	283.5	302.9	329.1	361.0	391.3	431.3	469.3
Long Island	60.4	64.2	70.3	76.3	84.7	92.1	100.4	109.4	120.7	132.9
NYCA Total	563.6	605.3	652.7	715.5	768.9	847.9	921.6	1,011.6	1,091.0	1,214.8

Figure 110: Projected Baseline Case CO₂ Emissions (2021-2040) by Zone (1,000 Tons)

CO ₂ Emissions (1000 Tons)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	331	514	719	705	892	1,029	993	1,006	1,002	1,035
Genesee	51	80	80	86	118	141	141	129	139	146
Central	1,900	2,792	3,087	3,443	3,521	3,640	3,475	3,563	3,531	3,582
North	8	11	27	66	85	90	87	69	81	79
Mohawk Valley	8	11	13	27	42	49	45	28	50	42
Capital	5,444	5,998	6,225	6,363	6,073	6,082	5,955	6,075	6,001	6,236
Hudson Valley	2,986	3,680	3,812	3,908	3,797	3,790	3,715	3,712	3,709	3,886
Millwood	0	0	0	0	0	0	0	0	0	0
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	11,395	11,627	12,745	12,297	12,175	11,703	11,832	12,075	11,944	11,771
Long Island	3,449	3,573	3,319	3,409	3,281	3,180	3,189	3,174	3,158	3,219
NYCA Total	25,571	28,286	30,027	30,302	29,986	29,704	29,432	29,832	29,615	29,996

CO ₂ Emissions (1000 Tons)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	1,064	1,044	1,004	1,022	1,035	1,079	1,057	1,107	1,045	1,146
Genesee	141	144	129	126	130	126	126	126	127	128
Central	3,606	3,626	3,525	3,669	3,483	3,635	3,594	3,687	3,580	3,735
North	75	81	73	60	74	78	76	61	70	79
Mohawk Valley	44	45	47	33	39	38	39	45	45	55
Capital	6,185	6,385	6,219	6,468	6,423	6,711	6,781	7,061	6,949	7,367
Hudson Valley	3,898	3,887	3,756	3,852	3,968	4,100	4,116	4,213	4,158	4,353
Millwood	0	0	0	0	0	0	0	0	0	0
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	12,053	11,799	12,211	12,270	12,176	12,290	12,542	12,634	12,943	13,119
Long Island	3,290	3,244	3,302	3,327	3,427	3,457	3,500	3,541	3,629	3,707
NYCA Total	30,357	30,255	30,266	30,828	30,753	31,513	31,830	32,475	32,545	33,688

Figure 111: Projected Baseline Case NO_x Emissions Costs (2021-2040) by Zone (nominal \$M)

NO _x Emissions Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	2.4	0.9	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Long Island	1.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	5.4	2.1	0.8	0.3	0.2	0.1	0.1	0.1	0.1	0.1

NOx Emissions Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Figure 112: Projected Baseline Case NO_x Emissions (2021-2040) by Zone (Tons)

NOx Emissions (Tons)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	1,567	1,853	2,118	2,101	2,327	2,452	2,426	2,459	2,466	2,494
Genesee	193	202	205	208	218	228	228	220	228	230
Central	495	614	657	718	750	782	754	750	761	773
North	43	52	72	94	129	136	138	121	119	110
Mohawk Valley	42	47	49	56	67	69	69	57	70	65
Capital	745	835	812	845	804	806	777	782	775	794
Hudson Valley	404	530	527	504	514	464	459	473	465	468
Millwood	994	994	994	997	994	994	994	997	994	994
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	2,590	2,626	2,981	2,864	2,582	2,324	2,376	2,447	2,426	2,374
Long Island	2,721	2,741	2,602	2,643	2,594	2,535	2,539	2,550	2,544	2,558
NYCA Total	9,795	10,496	11,017	11,029	10,979	10,789	10,760	10,857	10,847	10,861

NOx Emissions (Tons)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	2,502	2,493	2,462	2,477	2,504	2,541	2,519	2,573	2,526	2,635
Genesee	228	233	225	220	223	223	222	221	221	222
Central	774	782	745	762	751	766	765	779	758	793
North	124	129	129	116	115	115	116	109	125	114
Mohawk Valley	69	69	66	59	63	64	66	66	65	72
Capital	790	817	794	816	813	851	842	896	880	922
Hudson Valley	493	488	477	486	487	480	510	515	524	570
Millwood	994	997	994	994	994	997	994	994	994	993
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	2,509	2,370	2,596	2,563	2,602	2,678	2,763	2,818	2,904	3,059
Long Island	2,601	2,567	2,596	2,623	2,669	2,685	2,703	2,734	2,779	2,810
NYCA Total	11,084	10,946	11,086	11,117	11,221	11,400	11,500	11,706	11,776	12,189

Figure 113: Projected Baseline Case Congestion Rents (2021-2040) (nominal \$M)

Congestion Rent (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NYCA Total	462	350	290	245	284	370	391	389	503	527

Congestion Rent (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NYCA Total	579	527	566	547	615	571	629	633	674	712

Figure 114: Projected Baseline Case LBMP (2021-2040) by Zone (\$/MWh)

LBMP (\$/MWh)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	27.20	26.53	30.94	30.70	33.41	35.97	37.39	39.64	42.30	44.18
Genesee	26.29	26.37	30.81	30.73	33.39	35.85	37.23	39.54	42.12	43.91
Central	28.01	28.05	31.77	31.91	34.77	37.59	38.94	41.30	43.99	45.76
North	22.51	23.60	28.64	28.96	31.35	33.38	34.82	36.90	39.25	40.91
Mohawk Valley	26.58	26.43	30.86	30.81	33.16	35.38	36.87	39.03	41.53	43.42
Capital	33.75	29.88	32.74	31.99	33.85	35.95	37.52	39.72	42.26	44.02
Hudson Valley	32.06	29.50	33.34	32.31	34.33	36.32	37.95	40.15	42.80	44.57
Millwood	32.39	29.82	33.66	32.80	34.80	36.80	38.46	40.71	43.43	45.21
Dunwoodie	32.22	29.72	33.58	32.78	34.76	36.73	38.39	40.63	43.35	45.12
NY City	32.53	30.06	33.84	33.06	34.92	36.95	38.63	40.81	43.56	45.39
Long Island	37.15	33.39	36.19	34.98	36.98	38.90	40.62	42.68	45.73	47.77
Average LBMP (\$/MWh)	30.06	28.49	32.40	31.91	34.16	36.35	37.89	40.10	42.76	44.57

LBMP (\$/MWh)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	45.97	48.17	49.85	51.66	53.83	56.50	58.22	61.27	62.64	66.54
Genesee	45.66	47.98	49.58	51.46	53.68	56.18	57.96	61.00	62.33	66.35
Central	47.44	49.67	51.54	53.27	55.45	58.01	60.03	62.92	64.54	68.59
North	42.32	44.65	46.32	48.01	49.99	52.18	53.76	56.40	57.77	61.35
Mohawk Valley	44.81	47.09	48.97	50.80	52.91	55.19	56.79	59.61	61.05	64.81
Capital	45.67	47.95	50.02	51.95	53.86	56.18	58.01	60.68	62.15	65.67
Hudson Valley	46.28	48.56	50.54	52.52	54.70	56.91	58.68	61.41	62.95	66.55
Millwood	46.96	49.28	51.29	53.31	55.56	57.78	59.77	62.55	64.14	67.92
Dunwoodie	46.88	49.20	51.20	53.22	55.48	57.68	59.69	62.45	64.03	67.83
NY City	47.18	49.55	51.55	53.53	55.84	58.11	60.17	62.90	64.47	68.54
Long Island	50.08	52.38	54.94	57.06	60.27	62.08	64.55	67.78	70.10	74.17
Average LBMP (\$/MWh)	46.30	48.59	50.53	52.44	54.69	56.98	58.87	61.72	63.29	67.12

H.2. Contract Case Results

Figure 115: Projected Contract Case Results 2021-2040 (nominal \$M)

Case Summary	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NYCA-Wide Production Cost (\$M)	2,904	2,743	2,861	2,404	2,464	2,242	2,294	2,479	2,532	2,672
NYCA Demand Congestion (\$M)	804	436	316	253	208	177	193	178	213	192
Load LBMP Payment (\$M)	4,906	4,591	5,128	4,779	5,055	5,165	5,382	5,753	6,113	6,450
Generator LBMP Payment (\$M)	3,601	3,519	4,177	4,093	4,360	4,484	4,713	5,012	5,316	5,601
Load Payment Losses (\$M)	322	314	360	296	312	299	316	335	363	383
SO2 Costs (\$M)	0	0	0	0	0	0	0	0	0	0
SO2 Emission (Short Tons)	532	544	541	529	526	515	514	517	514	516
CO2 Costs (\$M)	225	267	291	286	306	304	325	352	378	412
CO2 Emission (Short Tons)	25,577	28,248	28,703	26,096	25,791	23,622	23,434	23,570	23,450	23,715
NOX Costs (\$M)	5.43	2.06	0.69	0.26	0.13	0.06	0.06	0.06	0.06	0.06
NOX Emission (Short Tons)	9,787	10,536	10,524	9,643	9,520	9,117	9,141	9,117	9,165	9,103
NYCA Avg. LBMP (\$/MWh)	30.02	28.19	31.56	29.46	31.37	32.28	33.54	35.72	37.76	39.61

Case Summary	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NYCA-Wide Production Cost (\$M)	2,762	3,026	3,198	3,429	3,607	3,859	4,073	4,395	4,601	5,003
NYCA Demand Congestion (\$M)	225	230	239	271	289	282	304	297	309	334
Load LBMP Payment (\$M)	6,710	7,107	7,516	7,863	8,241	8,696	9,127	9,649	10,065	10,793
Generator LBMP Payment (\$M)	5,835	6,141	6,508	6,746	7,019	7,411	7,768	8,164	8,493	9,048
Load Payment Losses (\$M)	402	425	461	479	511	541	577	611	652	697
SO2 Costs (\$M)	0	0	0	0	0	0	0	0	0	0
SO2 Emission (Short Tons)	518	519	518	521	520	524	525	529	530	535
CO2 Costs (\$M)	450	486	524	575	618	680	744	823	888	992
CO2 Emission (Short Tons)	24,020	24,061	24,122	24,562	24,524	25,054	25,509	26,195	26,274	27,261
NOX Costs (\$M)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08
NOX Emission (Short Tons)	9,379	9,194	9,340	9,268	9,321	9,472	9,624	9,758	9,801	10,044
NYCA Avg. LBMP (\$/MWh)	40.98	43.10	45.15	46.85	48.54	50.74	52.67	55.09	56.65	59.81

Figure 116: Projected Contract Case Production Costs (2021-2040) by Zone (nominal \$M)

Production Cost (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	30	37	43	34	45	56	56	55	61	65
Genesee	43	42	42	45	44	46	51	48	51	56
Central	306	335	366	359	387	393	415	422	446	461
North	1	1	2	3	4	5	6	3	5	4
Mohawk Valley	1	1	1	1	2	2	2	1	3	2
Capital	456	441	474	411	418	411	421	440	474	502
Hudson Valley	208	235	255	222	232	216	222	229	252	262
Millwood	22	6	6	6	6	6	6	6	6	7
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	821	764	892	799	835	777	824	891	927	976
Long Island	291	265	271	241	243	230	241	251	268	283
NYCA Total	2,180	2,127	2,351	2,121	2,216	2,144	2,243	2,347	2,493	2,617
NYCA Imports	1,023	904	950	688	788	835	840	911	1,000	1,049
NYCA Exports	299	288	440	405	540	737	790	779	960	994
NYCA + Imports - Exports	2,904	2,743	2,861	2,404	2,464	2,242	2,294	2,479	2,532	2,672
Total IESO	1,269	1,296	1,477	1,446	1,793	2,548	2,727	2,776	3,380	3,657
Total PJM	14,177	13,586	15,437	15,260	16,121	16,575	17,264	18,199	18,836	19,554
Total ISONE	2,481	2,331	2,550	2,515	2,633	2,745	2,929	3,146	3,386	3,664
Total System	20,107	19,339	21,816	21,342	22,762	24,012	25,163	26,468	28,095	29,492

Production Cost (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	72	72	70	70	74	79	85	91	87	99
Genesee	54	56	60	57	59	65	62	63	69	66
Central	471	491	509	523	540	566	590	611	631	665
North	7	7	4	4	4	6	4	4	5	6
Mohawk Valley	3	3	2	2	2	3	2	2	2	4
Capital	529	570	577	627	647	699	731	794	803	889
Hudson Valley	282	299	302	319	348	363	377	416	423	480
Millwood	7	7	7	7	7	7	7	7	8	8
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	1,017	1,046	1,150	1,182	1,229	1,273	1,354	1,415	1,504	1,556
Long Island	294	308	326	334	353	374	392	407	425	450
NYCA Total	2,736	2,858	3,006	3,125	3,265	3,435	3,603	3,812	3,957	4,223
NYCA Imports	1,077	1,152	1,196	1,265	1,332	1,416	1,469	1,584	1,641	1,769
NYCA Exports	1,050	984	1,005	961	990	991	998	1,001	997	989
NYCA + Imports - Exports	2,762	3,026	3,198	3,429	3,607	3,859	4,073	4,395	4,601	5,003
Total IESO	3,804	3,492	3,439	3,460	3,526	3,552	3,623	3,695	3,735	3,781
Total PJM	20,312	20,730	21,458	22,237	22,642	23,349	24,181	24,660	25,344	26,343
Total ISONE	3,770	3,936	4,136	4,265	4,424	4,617	4,746	4,937	5,120	5,305
Total System	30,622	31,017	32,039	33,086	33,857	34,953	36,152	37,104	38,156	39,653

Figure 117: Projected Contract Case Generation (2021-2040) by Zone (GWh)

Generation (GWh)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	18,202	18,854	20,039	20,683	20,965	21,162	21,145	21,122	21,199	21,249
Genesee	5,555	5,647	6,519	8,804	8,411	8,463	8,914	8,502	8,525	8,970
Central	30,602	31,685	34,484	34,696	36,083	34,915	36,035	34,980	35,995	35,028
North	9,465	9,539	9,634	9,993	10,021	10,047	10,063	10,045	10,055	10,044
Mohawk Valley	3,813	4,492	5,795	6,728	6,845	6,928	6,987	7,023	7,079	7,103
Capital	15,145	17,015	17,764	16,597	16,272	15,250	14,947	15,085	15,193	15,498
Hudson Valley	7,804	9,641	9,864	9,069	8,879	8,108	8,038	8,075	8,207	8,328
Millwood	2,638	454	461	471	474	479	484	490	491	494
Dunwoodie	75	83	89	99	104	108	112	117	122	125
NY City	22,667	23,304	25,004	25,955	25,608	28,336	28,508	28,995	28,513	28,625
Long Island	8,159	8,381	8,078	11,646	11,550	13,542	13,567	13,565	13,559	13,698
NYCA Total	124,125	129,095	137,730	144,740	145,213	147,340	148,798	147,999	148,938	149,162
Total IESO	154,692	151,957	144,433	151,089	145,803	145,405	146,540	149,128	151,998	154,080
Total PJM	807,901	812,128	822,017	817,181	825,260	830,766	831,952	836,705	838,935	840,429
Total ISONE	104,560	106,989	107,105	106,808	107,286	106,735	107,974	110,201	111,064	113,856
Total HQ *	25,204	25,650	25,614	25,640	25,544	25,517	25,490	25,671	25,565	25,545
Total System	1,216,482	1,225,819	1,236,899	1,245,458	1,249,106	1,255,762	1,260,754	1,269,705	1,276,501	1,283,071

Generation (GWh)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	21,353	21,334	21,272	21,273	21,323	21,367	21,436	21,493	21,438	21,574
Genesee	8,559	8,595	8,991	8,570	8,602	9,036	8,603	8,621	9,046	8,643
Central	35,893	35,106	36,075	35,121	36,095	35,348	36,504	35,568	36,668	36,013
North	10,079	10,092	10,071	10,075	10,063	10,079	10,051	10,063	10,087	10,116
Mohawk Valley	7,149	7,200	7,190	7,220	7,252	7,277	7,279	7,302	7,301	7,341
Capital	15,603	16,006	15,729	16,469	16,305	16,949	17,189	17,897	17,667	18,546
Hudson Valley	8,504	8,653	8,526	8,658	8,929	9,061	9,083	9,545	9,433	10,061
Millwood	497	501	503	505	505	509	510	511	511	512
Dunwoodie	129	132	134	136	139	142	144	145	144	146
NY City	29,031	28,795	29,379	29,572	29,435	29,506	30,121	30,279	30,865	31,048
Long Island	13,859	13,875	13,926	13,989	14,184	14,238	14,324	14,354	14,506	14,647
NYCA Total	150,657	150,288	151,795	151,588	152,831	153,514	155,244	155,775	157,666	158,644
Total IESO	153,674	154,504	154,588	155,339	155,507	155,518	155,462	155,649	155,656	155,893
Total PJM	840,521	841,445	841,293	841,773	842,570	843,509	843,779	845,034	845,564	846,268
Total ISONE	113,993	114,031	114,300	114,836	114,648	115,334	115,640	115,852	116,330	116,648
Total HQ *	25,527	25,568	25,614	25,594	25,570	25,595	25,519	25,498	25,619	25,651
Total System	1,284,372	1,285,835	1,287,589	1,289,130	1,291,127	1,293,470	1,295,645	1,297,808	1,300,835	1,303,104

Figure 118: Projected Contract Case Generator Payments (2021-2040) by Zone (nominal \$M)

Generator Payment (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	489	491	585	561	612	635	657	707	743	789
Genesee	142	143	184	223	228	234	257	265	278	310
Central	728	753	939	906	1,010	1,028	1,101	1,146	1,231	1,265
North	213	220	262	259	281	292	304	324	341	358
Mohawk Valley	89	105	150	153	166	174	181	195	206	218
Capital	526	516	570	493	510	490	504	543	579	618
Hudson Valley	240	272	308	269	282	263	272	288	313	329
Millwood	90	13	15	15	16	16	17	18	19	20
Dunwoodie	2	2	3	3	3	4	4	4	5	5
NY City	755	709	857	838	872	963	1,015	1,094	1,144	1,203
Long Island	327	295	305	373	382	384	401	428	457	486
NYCA Total	3,601	3,519	4,177	4,093	4,360	4,484	4,713	5,012	5,316	5,601

Generator Payment (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	818	865	906	938	976	1,027	1,070	1,128	1,157	1,235
Genesee	305	324	354	353	362	403	399	421	453	462
Central	1,327	1,375	1,465	1,487	1,547	1,623	1,722	1,767	1,845	1,936
North	370	391	409	422	436	458	474	497	512	544
Mohawk Valley	225	240	251	262	271	285	297	313	322	345
Capital	644	695	720	777	800	863	904	980	996	1,100
Hudson Valley	349	372	383	405	438	458	476	521	534	599
Millwood	21	22	23	25	25	27	28	30	30	32
Dunwoodie	6	6	6	7	7	8	8	8	9	9
NY City	1,263	1,312	1,416	1,473	1,530	1,598	1,692	1,770	1,871	1,970
Long Island	507	538	574	599	626	663	698	729	763	816
NYCA Total	5,835	6,141	6,508	6,746	7,019	7,411	7,768	8,164	8,493	9,048

Figure 119: Projected Contract Case Load Payments (2021-2040) by Zone (nominal \$M)

Load Payment (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	403	411	496	466	508	535	558	599	631	669
Genesee	265	260	291	270	288	296	304	327	343	363
Central	439	435	484	460	501	525	541	579	608	640
North	126	156	200	196	217	229	242	259	273	287
Mohawk Valley	215	211	236	215	230	238	247	265	278	294
Capital	414	366	395	380	398	411	428	459	489	515
Hudson Valley	308	279	311	282	299	307	320	341	361	380
Millwood	92	85	95	90	95	98	103	109	116	122
Dunwoodie	189	173	195	184	192	196	205	218	232	244
NY City	1,629	1,488	1,657	1,564	1,632	1,659	1,734	1,849	1,975	2,079
Long Island	827	726	768	671	695	673	700	747	806	856
NYCA Total	4,906	4,591	5,128	4,779	5,055	5,165	5,382	5,753	6,113	6,450

Load Payment (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	693	734	771	804	839	887	925	979	1,013	1,083
Genesee	376	398	418	436	456	481	502	532	551	591
Central	658	689	721	745	774	816	853	900	935	1,000
North	296	312	327	338	352	369	384	404	415	441
Mohawk Valley	304	321	337	352	365	385	402	425	440	471
Capital	535	567	603	631	655	690	720	758	789	837
Hudson Valley	394	416	440	461	482	507	529	560	586	627
Millwood	127	134	142	148	156	164	172	182	190	203
Dunwoodie	255	270	286	300	316	333	351	372	389	416
NY City	2,167	2,300	2,439	2,558	2,698	2,847	3,000	3,178	3,325	3,578
Long Island	906	965	1,031	1,090	1,149	1,217	1,287	1,361	1,432	1,546
NYCA Total	6,710	7,107	7,516	7,863	8,241	8,696	9,127	9,649	10,065	10,793

Figure 120: Projected Contract Case Loss Payments (2021-2040) by Zone (nominal \$M)

Loss Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	13	15	17	10	13	13	13	12	12	11
Genesee	7	9	9	5	7	7	7	7	7	7
Central	13	13	14	11	12	12	12	13	13	14
North	-4	-3	-2	-2	-2	-2	-1	-2	-2	-2
Mohawk Valley	9	9	8	5	6	6	6	6	7	7
Capital	21	19	22	18	19	20	21	23	25	26
Hudson Valley	25	24	28	23	25	24	25	27	29	31
Millwood	8	8	9	8	8	8	9	9	10	11
Dunwoodie	16	16	18	16	17	16	17	18	20	21
NY City	151	146	167	147	150	142	151	162	176	187
Long Island	64	60	70	54	57	52	55	59	65	70
NYCA Total	322	314	360	296	312	299	316	335	363	383

Loss Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	13	11	11	11	12	11	13	12	13	14
Genesee	8	7	7	8	8	8	9	9	9	11
Central	14	14	15	16	16	17	18	19	20	22
North	-2	-2	-2	-3	-3	-3	-3	-3	-3	-4
Mohawk Valley	7	8	8	9	9	9	10	11	11	12
Capital	27	28	31	32	34	35	37	39	41	43
Hudson Valley	32	34	37	38	41	43	46	48	52	55
Millwood	11	12	13	13	14	15	16	17	18	19
Dunwoodie	22	24	26	26	28	30	32	34	36	39
NY City	195	209	227	236	253	270	287	305	325	348
Long Island	74	79	88	91	99	105	112	120	129	138
NYCA Total	402	425	461	479	511	541	577	611	652	697

Figure 121: Projected Contract Case SO₂ Emissions Costs (2019-2028) by Zone (nominal \$M)

SO ₂ Emissions Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SO ₂ Emissions Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 122: Projected Contract Case SO₂ Emissions (2021-2040) by Zone (Tons)

SO ₂ Emissions (Tons)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	188	188	189	188	188	189	189	189	189	189
Genesee	0	0	0	0	0	0	0	0	0	0
Central	9	13	13	13	14	14	13	13	13	14
North	0	0	0	0	0	0	0	0	0	0
Mohawk Valley	0	0	0	0	0	0	0	0	0	0
Capital	57	59	59	56	55	53	53	53	53	53
Hudson Valley	16	19	19	17	16	14	14	14	14	14
Millwood	106	106	106	106	106	106	106	106	106	106
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	58	59	63	57	57	50	51	52	51	51
Long Island	98	98	92	90	90	88	88	88	88	88
NYCA Total	532	544	541	529	526	515	514	517	514	516

SO ₂ Emissions (Tons)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	189	190	189	189	189	189	189	189	189	189
Genesee	0	0	0	0	0	0	0	0	0	0
Central	13	13	13	13	13	14	14	14	14	15
North	0	0	0	0	0	0	0	0	0	0
Mohawk Valley	0	0	0	0	0	0	0	0	0	0
Capital	54	54	54	55	55	56	56	58	57	59
Hudson Valley	15	15	15	15	15	16	16	17	16	18
Millwood	106	106	106	106	106	106	106	106	106	106
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	52	51	53	53	53	53	54	55	56	56
Long Island	88	88	88	89	89	90	90	89	90	92
NYCA Total	518	519	518	521	520	524	525	529	530	535

Figure 123: Projected Contract Case CO₂ Emissions Costs (2021-2040) by Zone (nominal \$M)

CO ₂ Emissions Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	3.0	4.7	5.6	4.4	6.3	8.2	8.5	8.6	9.7	10.7
Genesee	0.4	0.8	0.6	0.5	0.7	1.0	1.0	0.9	1.2	1.2
Central	16.5	25.4	26.8	29.2	31.9	35.0	36.4	39.6	41.6	47.0
North	0.1	0.1	0.2	0.4	0.5	0.7	0.8	0.4	0.7	0.6
Mohawk Valley	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.3	0.2
Capital	49.1	57.8	61.8	59.9	62.8	63.3	66.1	71.2	77.3	85.0
Hudson Valley	26.6	35.4	37.3	35.9	37.7	36.3	38.5	41.1	45.0	49.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	98.9	109.8	125.4	123.3	132.1	126.8	138.6	152.4	161.8	173.6
Long Island	30.1	33.2	33.6	32.6	34.1	32.8	35.4	37.6	40.3	44.2
NYCA Total	224.9	267.3	291.4	286.2	306.3	304.3	325.4	351.9	377.9	411.5

CO ₂ Emissions Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	12.4	12.8	12.8	13.5	14.8	16.5	18.5	20.7	20.8	24.8
Genesee	1.4	1.5	1.2	1.3	1.7	1.5	1.7	2.0	1.9	2.2
Central	46.9	54.0	55.3	62.6	64.2	74.1	78.6	89.2	92.6	108.3
North	1.1	1.0	0.6	0.6	0.8	1.0	0.7	0.8	1.0	1.3
Mohawk Valley	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.6
Capital	92.7	102.7	107.3	122.4	129.4	146.0	159.9	180.1	190.3	216.4
Hudson Valley	54.7	59.9	62.9	68.8	76.3	83.8	91.0	104.0	109.7	127.8
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	191.4	201.6	226.9	243.9	262.2	283.0	313.0	338.7	375.5	404.5
Long Island	48.7	51.8	56.6	61.4	68.1	73.6	80.8	87.2	95.9	105.5
NYCA Total	449.7	485.6	523.8	574.7	617.8	679.7	744.5	823.0	888.0	991.6

Figure 124: Projected Contract Case CO₂ Emissions (2021-2040) by Zone (1000 Tons)

CO ₂ Emissions (1000 Tons)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	331	484	540	381	511	616	591	553	582	593
Genesee	46	75	54	37	53	68	63	52	65	64
Central	1,853	2,677	2,633	2,646	2,688	2,735	2,630	2,669	2,583	2,710
North	7	9	16	28	41	49	48	25	38	30
Mohawk Valley	9	8	4	5	8	14	13	5	17	8
Capital	5,462	5,988	5,986	5,363	5,211	4,826	4,675	4,690	4,726	4,832
Hudson Valley	2,987	3,696	3,654	3,261	3,163	2,809	2,764	2,757	2,799	2,830
Millwood	0	0	0	0	0	0	0	0	0	0
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	11,420	11,758	12,489	11,390	11,216	9,933	10,074	10,285	10,118	10,083
Long Island	3,462	3,551	3,327	2,985	2,901	2,572	2,577	2,533	2,521	2,565
NYCA Total	25,577	28,248	28,703	26,096	25,791	23,622	23,434	23,570	23,450	23,715

CO ₂ Emissions (1000 Tons)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	642	613	570	553	566	584	613	637	595	660
Genesee	67	67	51	50	59	50	54	59	53	56
Central	2,515	2,685	2,544	2,682	2,552	2,738	2,701	2,850	2,744	2,989
North	49	45	26	23	27	33	21	22	26	33
Mohawk Valley	17	13	6	6	9	9	6	7	8	14
Capital	4,871	5,015	4,873	5,162	5,075	5,317	5,406	5,671	5,569	5,897
Hudson Valley	2,912	2,960	2,894	2,939	3,032	3,087	3,106	3,296	3,238	3,503
Millwood	0	0	0	0	0	0	0	0	0	0
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	10,319	10,077	10,529	10,498	10,473	10,501	10,816	10,861	11,185	11,195
Long Island	2,628	2,587	2,628	2,649	2,731	2,734	2,785	2,792	2,856	2,913
NYCA Total	24,020	24,061	24,122	24,562	24,524	25,054	25,509	26,195	26,274	27,261

Figure 125: Projected Contract Case NO_x Emissions Costs (2021-2040) by Zone (nominal \$M)

NO _x Emissions Costs (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	2.5	0.9	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Long Island	1.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	5.4	2.1	0.7	0.3	0.1	0.1	0.1	0.1	0.1	0.1

NOx Emissions Costs (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genesee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mohawk Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunwoodie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYCA Total	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Figure 126: Projected Contract Case NO_x Emissions (2021-2040) by Zone (Tons)

NOx Emissions (Tons)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	1,566	1,814	1,914	1,672	1,839	1,939	1,912	1,893	1,934	1,938
Genesee	191	200	195	184	186	189	186	183	186	186
Central	491	601	575	564	580	598	582	575	576	584
North	43	52	57	65	77	107	112	73	88	63
Mohawk Valley	43	44	41	38	37	41	42	37	43	37
Capital	749	825	753	710	688	665	655	646	643	653
Hudson Valley	403	541	494	394	411	351	355	348	337	320
Millwood	995	994	994	997	994	994	994	997	994	994
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	2,578	2,737	2,898	2,533	2,253	1,894	1,963	2,021	2,032	1,981
Long Island	2,728	2,727	2,602	2,486	2,455	2,339	2,340	2,344	2,331	2,346
NYCA Total	9,787	10,536	10,524	9,643	9,520	9,117	9,141	9,117	9,165	9,103

NOx Emissions (Tons)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	1,973	1,949	1,917	1,889	1,910	1,917	1,970	2,007	1,960	2,056
Genesee	188	191	185	184	188	188	188	189	188	191
Central	571	595	559	570	563	585	584	601	584	619
North	106	100	69	68	67	79	69	64	75	78
Mohawk Valley	44	42	37	37	39	41	39	39	39	44
Capital	661	672	661	684	666	686	701	732	720	745
Hudson Valley	377	374	363	377	335	353	386	411	391	429
Millwood	994	997	994	994	994	997	994	994	994	993
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	2,099	1,937	2,188	2,082	2,156	2,211	2,270	2,288	2,396	2,416
Long Island	2,366	2,337	2,366	2,382	2,403	2,416	2,421	2,431	2,453	2,474
NYCA Total	9,379	9,194	9,340	9,268	9,321	9,472	9,624	9,758	9,801	10,044

Figure 127: Projected Contract Case Congestion Rents (2021-2040) by Zone (nominal \$M)

Congestion Rent (\$M)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NYCA Total	455	334	307	281	326	518	545	532	662	696

Congestion Rent (\$M)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NYCA Total	744	690	693	690	745	720	741	748	766	792

Figure 128: Projected Contract Case LBMP (2021-2040) by Zone (\$/MWh)

LBMP (\$/MWh)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
West	27.17	26.19	29.52	27.52	29.71	31.09	32.21	34.49	36.33	38.32
Genesee	26.27	25.98	29.31	27.39	29.55	30.78	31.84	34.17	35.90	37.89
Central	27.98	27.51	30.09	28.34	30.75	32.28	33.33	35.63	37.51	39.51
North	22.56	23.40	27.58	26.34	28.46	29.51	30.61	32.70	34.44	36.13
Mohawk Valley	26.58	26.09	29.28	27.04	28.91	29.99	31.03	33.16	34.83	36.70
Capital	33.64	29.61	32.10	30.01	31.72	32.85	34.21	36.42	38.54	40.33
Hudson Valley	31.99	29.33	33.00	30.60	32.43	33.34	34.71	36.84	39.01	40.75
Millwood	32.32	29.63	33.34	31.47	33.21	34.04	35.48	37.66	39.91	41.72
Dunwoodie	32.15	29.54	33.29	31.51	33.23	34.00	35.45	37.62	39.87	41.68
NY City	32.46	29.82	33.58	31.84	33.46	34.14	35.61	37.74	40.03	41.84
Long Island	37.04	33.02	36.07	32.04	33.62	33.03	34.43	36.49	38.99	40.80
Average LBMP (\$/MWh)	30.02	28.19	31.56	29.46	31.37	32.28	33.54	35.72	37.76	39.61

LBMP (\$/MWh)	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
West	39.66	41.72	43.56	45.16	46.75	49.14	50.93	53.47	54.85	58.07
Genesee	39.18	41.35	43.10	44.76	46.40	48.67	50.48	53.04	54.40	57.69
Central	40.76	42.77	44.67	46.17	47.77	50.11	52.08	54.52	56.11	59.30
North	37.25	39.25	41.12	42.52	44.08	46.18	48.00	50.29	51.64	54.61
Mohawk Valley	37.86	39.82	41.67	43.21	44.64	46.82	48.67	51.02	52.43	55.45
Capital	41.65	43.82	46.05	47.84	49.25	51.44	53.26	55.55	57.13	59.97
Hudson Valley	42.18	44.30	46.44	48.24	49.96	52.02	53.84	56.25	57.93	60.96
Millwood	43.20	45.41	47.58	49.43	51.31	53.46	55.48	57.92	59.56	62.74
Dunwoodie	43.15	45.38	47.54	49.39	51.30	53.43	55.47	57.90	59.53	62.71
NY City	43.37	45.58	47.80	49.61	51.53	53.72	55.80	58.24	59.88	63.17
Long Island	42.55	44.68	47.15	49.05	50.97	53.18	55.38	57.79	59.73	63.19
Average LBMP (\$/MWh)	40.98	43.10	45.15	46.85	48.54	50.74	52.67	55.09	56.65	59.81