

# 2018 CARIS Phase 2 Base Case Follow up and Additional Results

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# 2018 CARIS Phase 2 Schedule

- August 8<sup>th</sup> ESPWG
  - Base Case Assumptions and Preliminary results
- August 22<sup>th</sup> ESPWG
  - Preliminary Base Case comments follow-up
  - Final Base Case results
- September BIC
  - Review and comment of Final Base Case

# NYCA Generation Updates

- **Comments: Ogdensburg in Zone E operating status.**
- **Response: Unit met 2018 CARIS Phase 2 inclusion rules.**

# CO<sub>2</sub> Emission Updates

- **Comments:** Needs more clarification on CO<sub>2</sub> allowance price step change starting 2027.
- **Response:** Separate presentation given at today's meeting.

# Projected Demand Congestion by Constraint

- **Comments: Reason for LEEDS to PLEASANT VALLEY constraint congestion drop from 2021 to 2022.**
- **Response: Due to NYCA load forecast reduction and shift in Thunder Storm Alert pattern from year to year.**

# Projected Demand Congestion by Constraint

- **Comments: Reason for DUNWOODIE to LONG ISLAND constraint congestion increase from 2025-2027.**
- **Response: Increase in congestion cost from 2024 to 2025 is due to increased gas price difference between Hudson Valley and Long Island as well as nuclear refurbishment schedule. Increase in congestion from 2026 to 2027 is due to CO<sub>2</sub> allowance price change.**

# 2018 CARIS Phase 2 Base Case Additional Results

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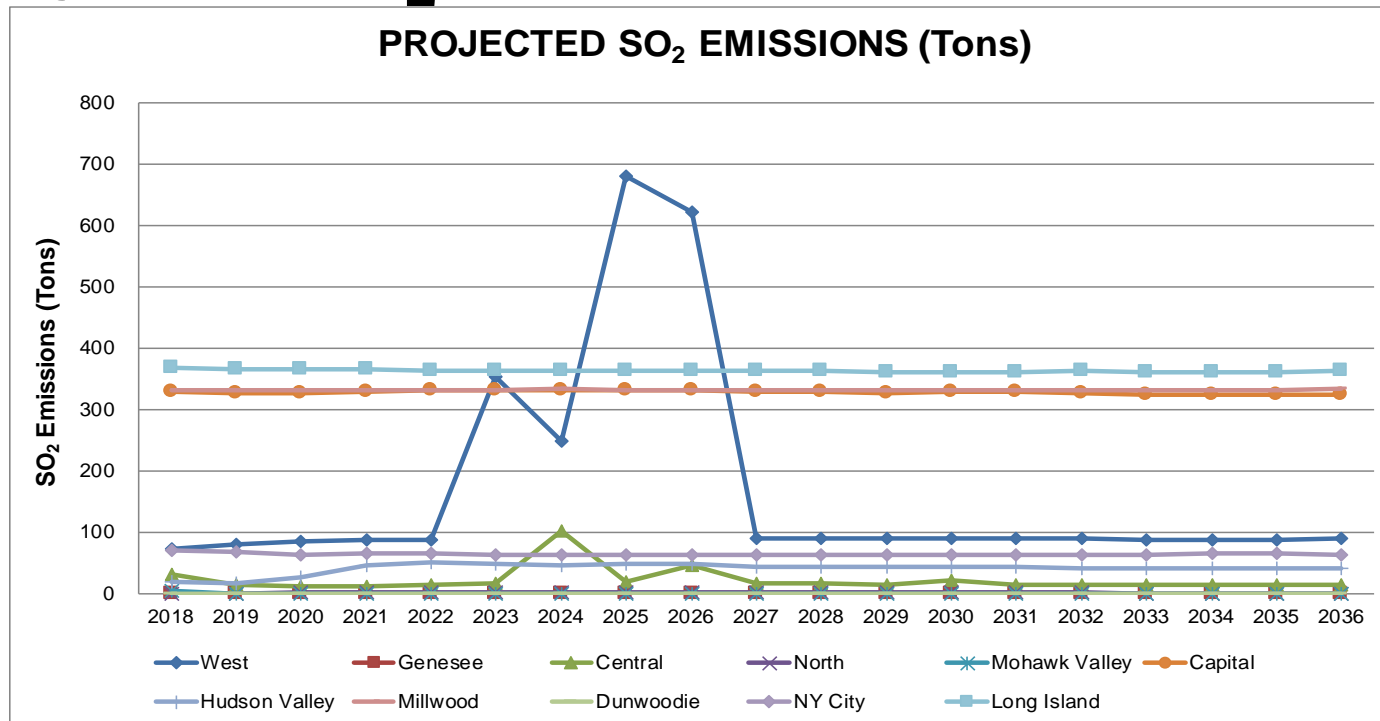


# Projected SO<sub>2</sub> Emissions (Tons)

SO <sub>2</sub> Emissions (Tons)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	72	80	84	86	87	354	248	682	621	89	89	89	89	89	89	88	88	88	88
Genesee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central	31	15	12	13	14	17	103	18	46	16	15	15	20	15	15	14	14	13	14
North	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Mohawk Valley	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital	328	326	327	330	331	331	332	332	331	328	329	327	328	328	327	324	325	324	325
Hudson Valley	18	17	27	46	50	48	47	48	48	44	44	42	43	42	42	41	41	41	40
Millwood	331	332	332	331	332	331	333	332	332	331	332	331	331	332	333	332	332	331	333
Dunwoodie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NY City	69	67	62	66	66	64	63	63	63	63	62	62	62	63	63	63	64	64	64
Long Island	367	365	365	365	364	363	364	363	363	362	363	361	362	362	363	362	362	362	363
<b>NYCA Total</b>	<b>1,222</b>	<b>1,202</b>	<b>1,210</b>	<b>1,237</b>	<b>1,245</b>	<b>1,510</b>	<b>1,490</b>	<b>1,840</b>	<b>1,805</b>	<b>1,233</b>	<b>1,236</b>	<b>1,230</b>	<b>1,235</b>	<b>1,231</b>	<b>1,231</b>	<b>1,224</b>	<b>1,227</b>	<b>1,224</b>	<b>1,227</b>



# Projected SO<sub>2</sub> Emissions (Tons)

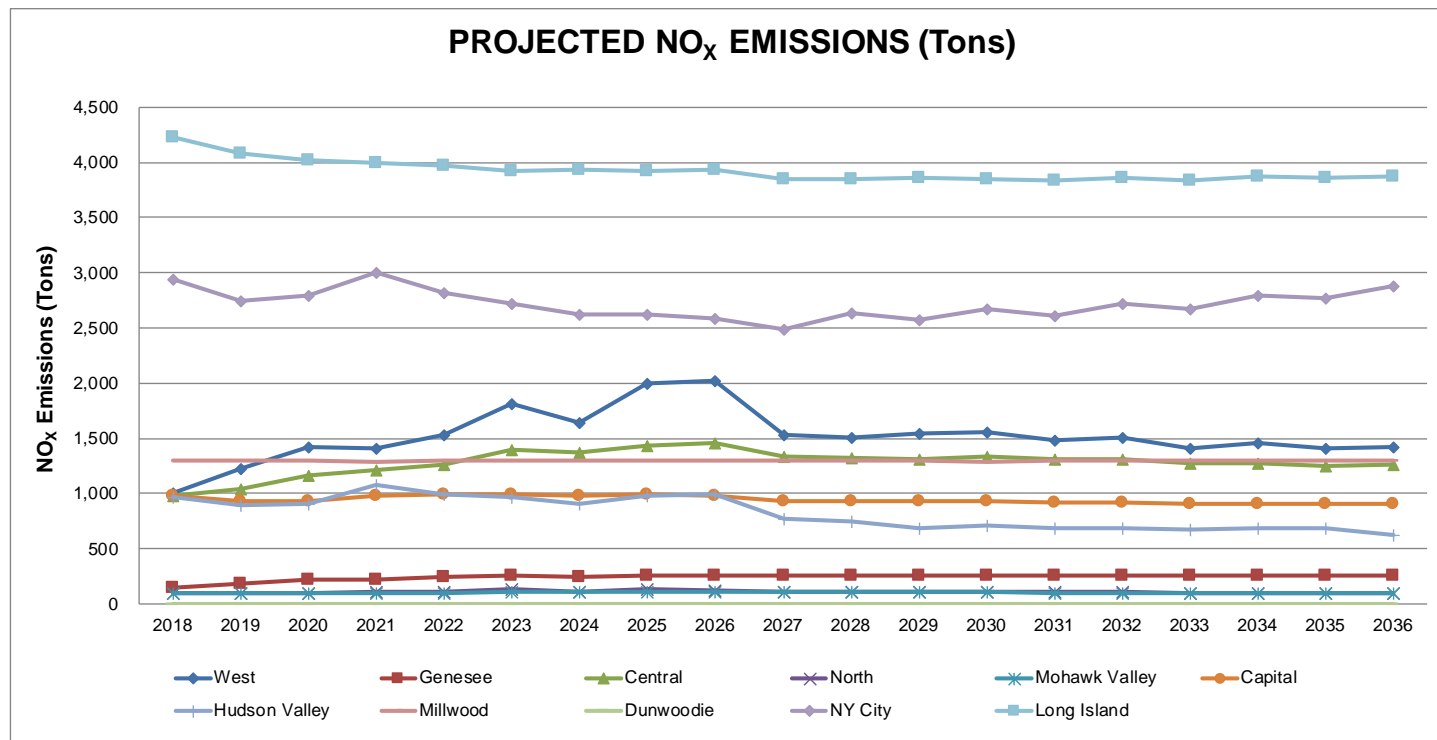


\*Total SO<sub>2</sub> emission cost is less than 0.01\$M in any year during the study period

# Projected NO<sub>x</sub> Emissions (Tons)

NO <sub>x</sub> Emissions (Tons)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	1,009	1,229	1,417	1,413	1,538	1,820	1,648	2,003	2,026	1,533	1,508	1,545	1,560	1,486	1,508	1,412	1,461	1,416	1,427
Genesee	148	181	220	227	240	260	250	263	261	259	258	256	255	256	257	255	257	253	255
Central	985	1,041	1,163	1,212	1,267	1,401	1,377	1,437	1,464	1,339	1,322	1,315	1,332	1,309	1,310	1,280	1,280	1,254	1,266
North	95	97	105	107	110	131	117	134	129	107	112	108	108	106	107	102	105	98	98
Mohawk Valley	105	102	102	103	104	111	108	114	110	106	106	106	106	104	103	103	105	101	101
Capital	979	933	932	976	997	997	986	994	984	932	933	927	930	926	923	902	907	903	904
Hudson Valley	974	899	904	1,085	998	964	911	981	991	769	751	691	713	691	693	680	693	691	624
Millwood	1,294	1,298	1,299	1,293	1,297	1,294	1,302	1,297	1,297	1,294	1,298	1,294	1,293	1,297	1,299	1,296	1,296	1,294	1,300
Dunwoodie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NY City	2,938	2,746	2,791	3,006	2,822	2,727	2,618	2,618	2,582	2,490	2,632	2,570	2,672	2,615	2,718	2,669	2,796	2,768	2,879
Long Island	4,225	4,082	4,018	3,993	3,977	3,925	3,931	3,919	3,930	3,854	3,855	3,858	3,855	3,840	3,859	3,840	3,876	3,863	3,869
<b>NYCA Total</b>	<b>12,752</b>	<b>12,607</b>	<b>12,951</b>	<b>13,414</b>	<b>13,350</b>	<b>13,630</b>	<b>13,248</b>	<b>13,762</b>	<b>13,774</b>	<b>12,682</b>	<b>12,773</b>	<b>12,669</b>	<b>12,823</b>	<b>12,629</b>	<b>12,778</b>	<b>12,539</b>	<b>12,775</b>	<b>12,641</b>	<b>12,723</b>

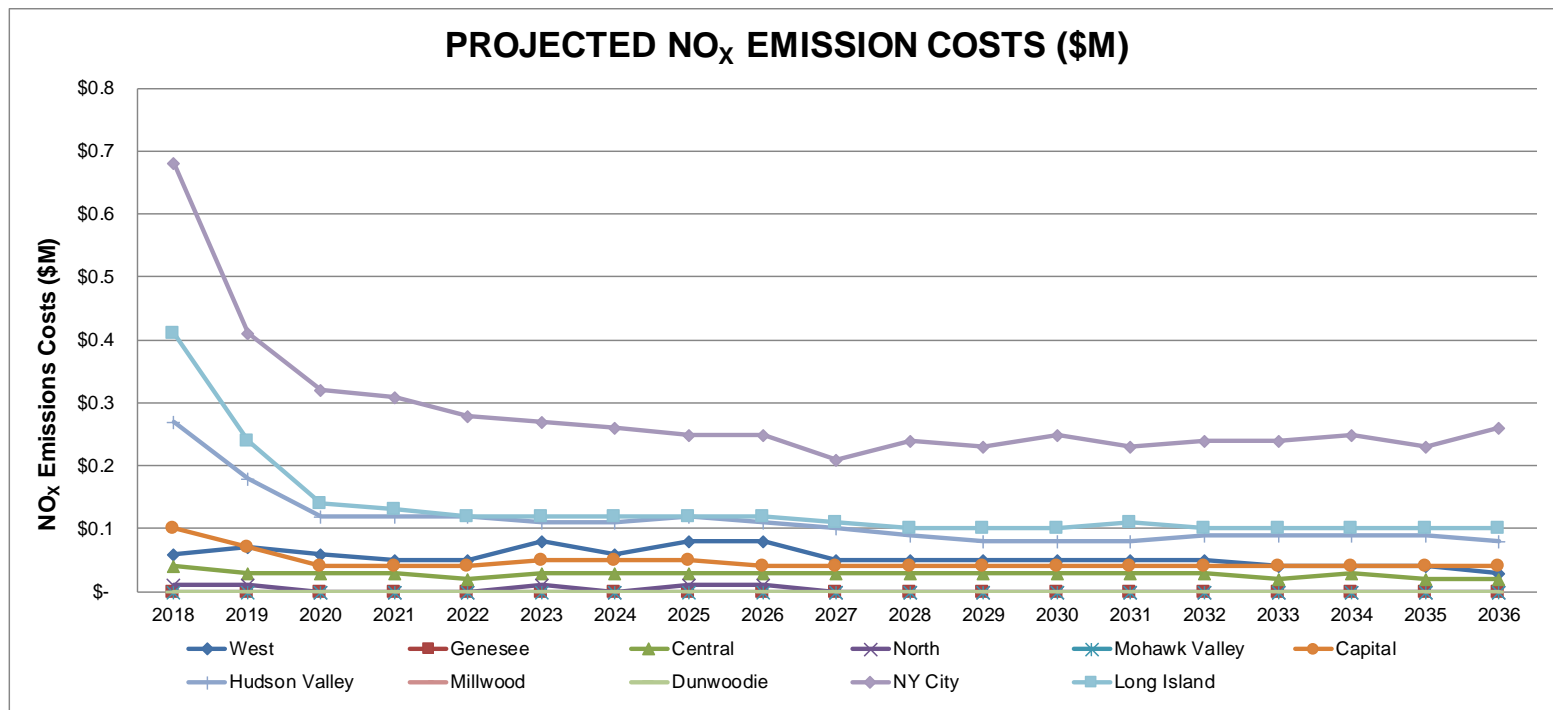
# Projected NO<sub>x</sub> Emissions (Tons)



# Projected NO<sub>x</sub> Emission Costs (\$M)

NO <sub>x</sub> Emissions Costs (\$M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hudson Valley	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Millwood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NY City	0.7	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3
Long Island	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<b>NYCA Total</b>	<b>1.6</b>	<b>1.0</b>	<b>0.7</b>	<b>0.7</b>	<b>0.6</b>	<b>0.7</b>	<b>0.6</b>	<b>0.7</b>	<b>0.6</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.5</b>	<b>0.5</b>

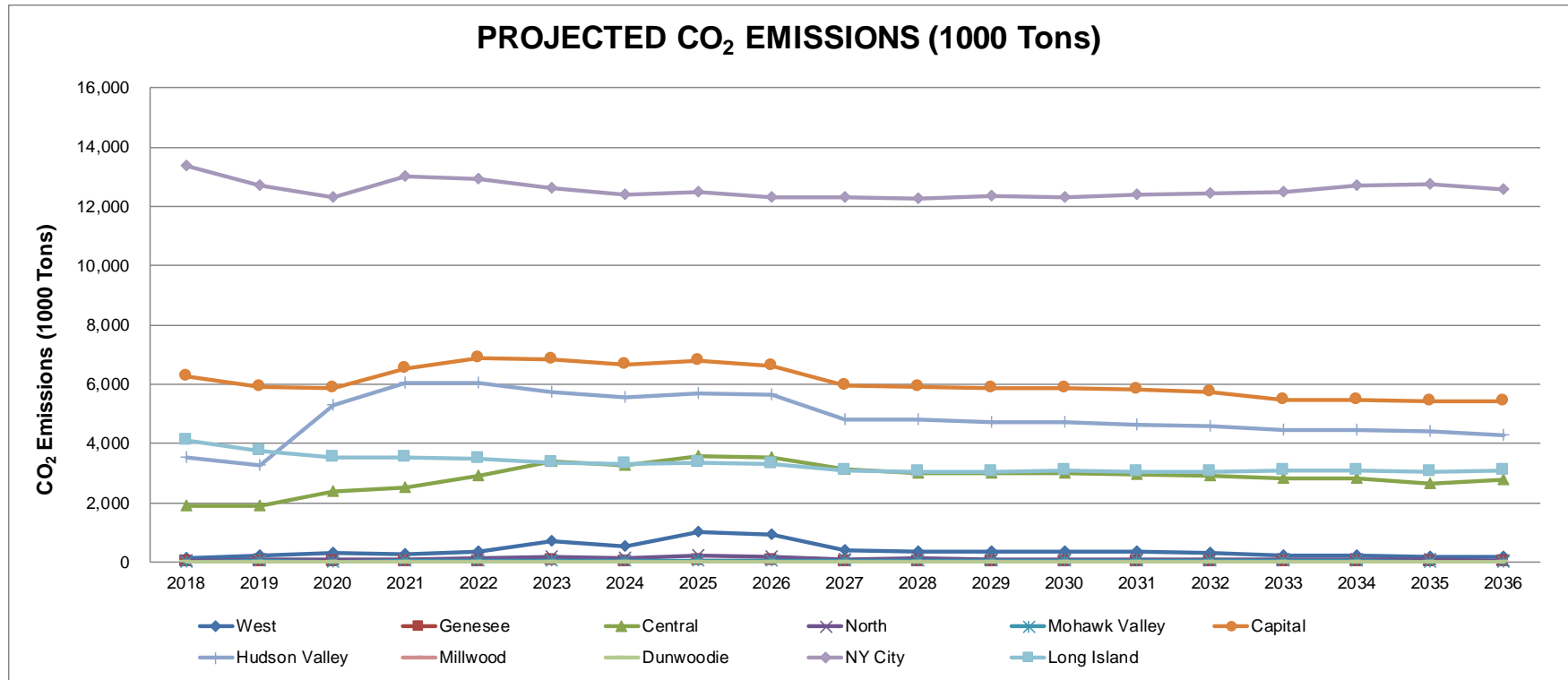
# Projected NO<sub>x</sub> Emission Costs (\$M)



# Projected CO<sub>2</sub> Emissions (1000 Tons)

CO <sub>2</sub> Emissions (1000 Tons)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	158	217	301	292	379	731	540	1,028	921	392	357	368	361	342	308	225	250	204	207
Genesee	17	16	23	20	20	34	21	34	35	23	18	13	13	17	17	15	17	9	9
Central	1,910	1,913	2,382	2,533	2,899	3,415	3,256	3,575	3,553	3,155	3,029	3,002	2,993	2,954	2,934	2,825	2,818	2,657	2,775
North	69	83	102	112	121	201	146	213	192	108	122	108	108	106	106	88	94	78	72
Mohawk Valley	30	33	31	34	36	56	47	61	54	43	38	44	41	35	34	33	38	27	25
Capital	6,257	5,929	5,882	6,542	6,875	6,837	6,677	6,802	6,611	5,948	5,914	5,874	5,891	5,824	5,738	5,489	5,497	5,443	5,414
Hudson Valley	3,536	3,287	5,297	6,069	6,031	5,734	5,573	5,680	5,649	4,829	4,836	4,712	4,746	4,629	4,587	4,467	4,480	4,434	4,284
Millwood	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
NY City	13,361	12,701	12,316	12,997	12,909	12,612	12,402	12,474	12,316	12,330	12,255	12,339	12,314	12,413	12,461	12,473	12,700	12,737	12,589
Long Island	4,131	3,773	3,539	3,526	3,475	3,381	3,315	3,342	3,316	3,085	3,073	3,044	3,086	3,069	3,070	3,091	3,107	3,068	3,093
<b>NYCA Total</b>	<b>29,468</b>	<b>27,952</b>	<b>29,872</b>	<b>32,125</b>	<b>32,744</b>	<b>32,999</b>	<b>31,977</b>	<b>33,209</b>	<b>32,647</b>	<b>29,913</b>	<b>29,642</b>	<b>29,503</b>	<b>29,552</b>	<b>29,388</b>	<b>29,257</b>	<b>28,704</b>	<b>29,000</b>	<b>28,655</b>	<b>28,469</b>

# Projected CO<sub>2</sub> Emissions (1000 Tons)

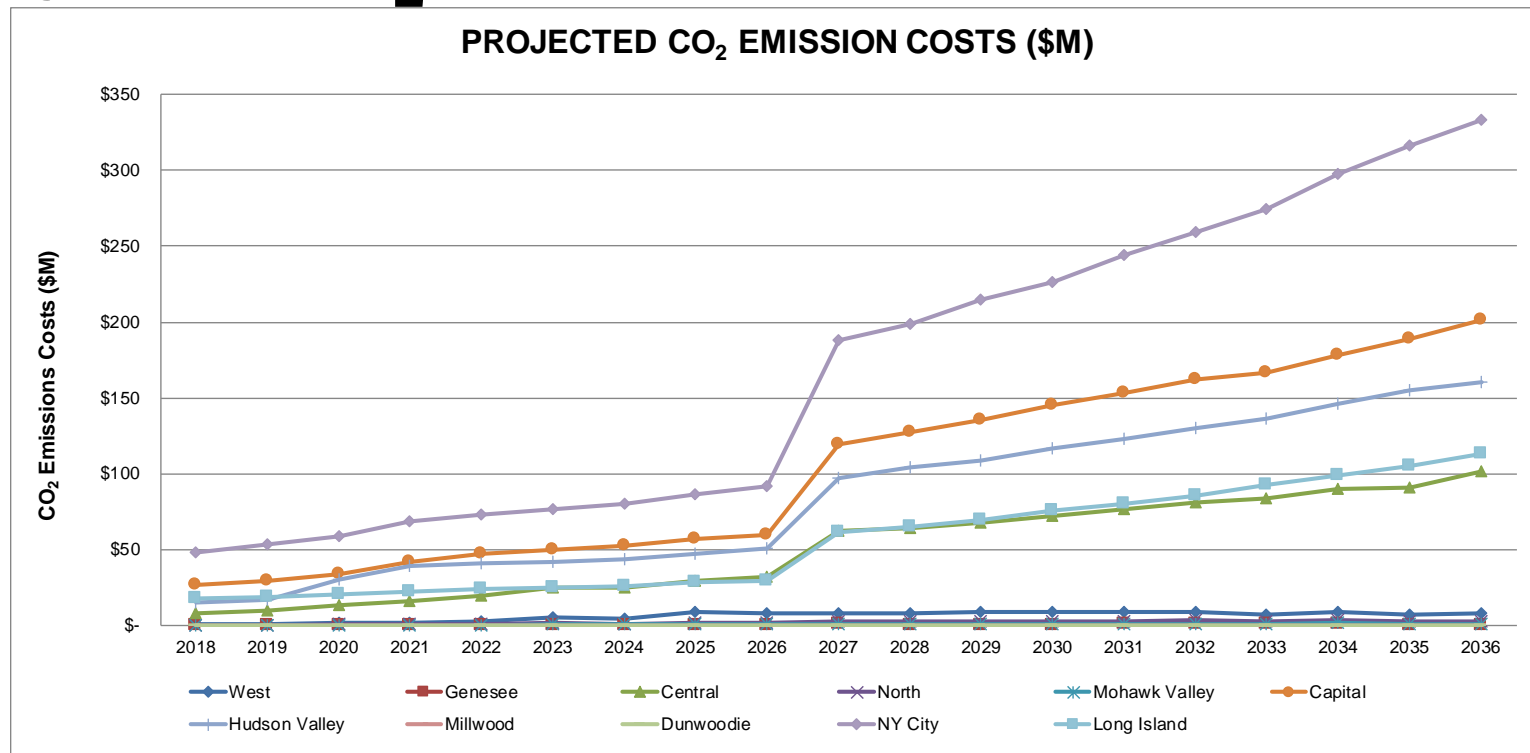


# Projected CO<sub>2</sub> Emission Costs (\$M)

CO <sub>2</sub> Emissions Costs (\$M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	1	1	2	2	3	5	4	9	8	8	8	9	9	9	9	7	9	7	8
Genesee	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0
Central	8	10	14	16	20	25	25	30	32	62	64	68	72	77	81	84	90	91	102
North	0	0	1	1	1	2	1	2	2	2	3	3	3	3	3	3	3	3	3
Mohawk Valley	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	2	1	1
Capital	27	30	34	42	47	50	52	57	60	119	127	135	145	154	162	166	178	189	201
Hudson Valley	15	17	30	39	41	42	44	48	51	97	104	108	117	123	130	136	146	155	161
Millwood	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
NY City	49	54	59	68	73	76	81	86	91	188	199	215	226	244	259	274	297	316	333
Long Island	18	19	20	23	24	25	26	28	30	61	65	70	75	80	86	92	99	105	113
<b>NYCA Total</b>	<b>118</b>	<b>130</b>	<b>160</b>	<b>191</b>	<b>209</b>	<b>226</b>	<b>235</b>	<b>260</b>	<b>274</b>	<b>540</b>	<b>572</b>	<b>609</b>	<b>649</b>	<b>691</b>	<b>733</b>	<b>765</b>	<b>825</b>	<b>867</b>	<b>922</b>



# Projected CO<sub>2</sub> Emission Costs (\$M)



# Next Steps

- Present Final Base Case to BIC for review and comment

# The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system



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