

2015 CARIS 1 Scenario Results

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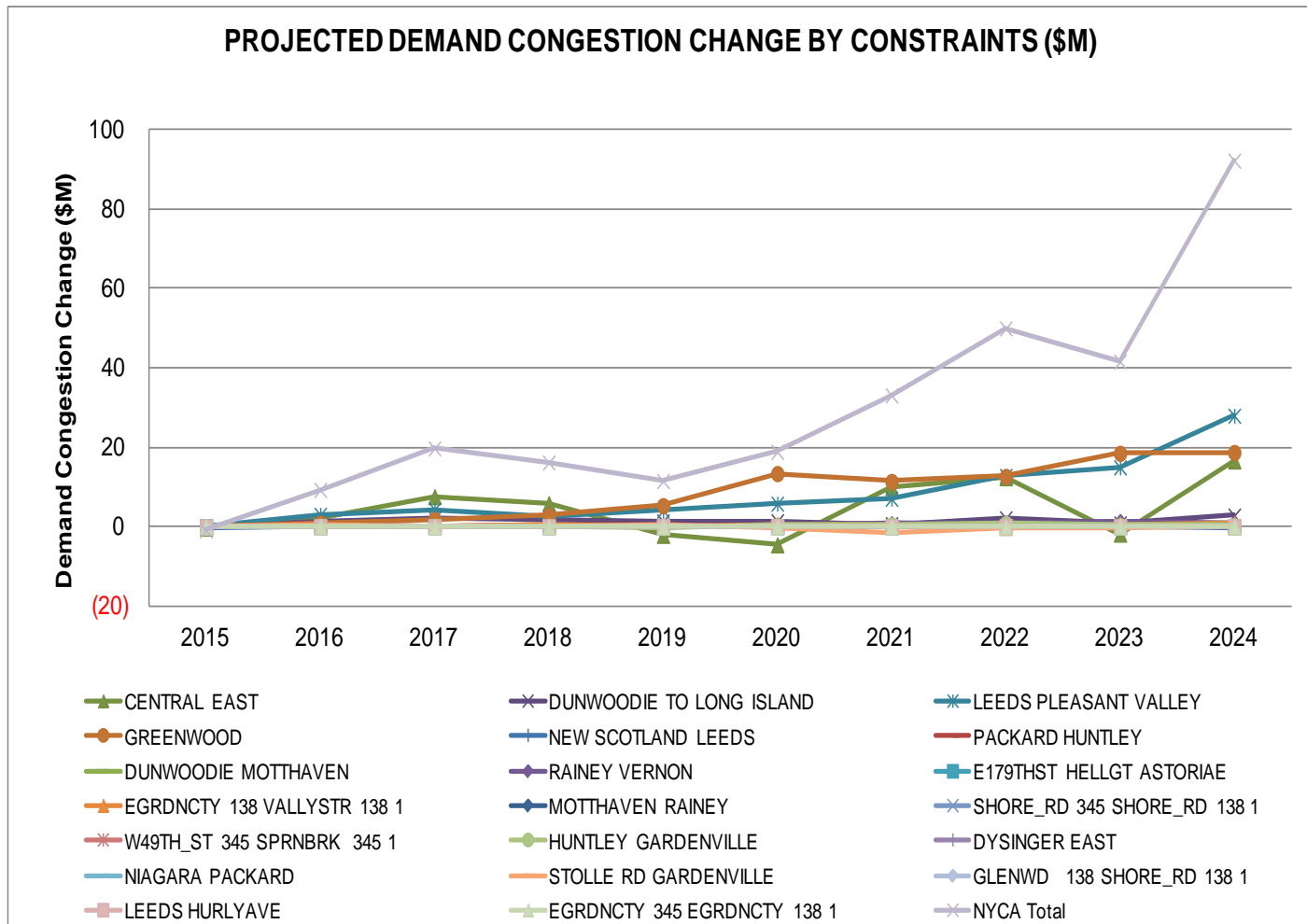
2015 CARIS 1 Scenarios

Scenario	New/Previously Studied	Description
High Load Forecast	Previously Studied	Higher growth rate
Low Load Forecast	Previously Studied	Lower growth rate
Athens SPS Out of Service	Previously Studied	2015-2024 (June)
High Solar Penetration	New	4,500 MWs of Solar-PV (distributed state-wide) by 2024; NY-SUN*1.5
Higher Natural Gas Prices	Previously Studied	Derived from 2015 EIA AEO High Forecast
Lower Natural Gas Prices	Previously Studied	Derived from 2015 EIA AEO Low Forecast
Higher CO ₂ Emissions Cost	New	Increased growth rate for CO ₂ Allowance Costs (high range of forecasted values)
Double Natural Gas Prices Differential	Previously Studied	Midstate & New England / Upstate differential doubled
Half Natural Gas Prices Differential	New	Midstate & New England / Upstate differential halved

High Load Forecast: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	(0.33)	1.92	7.58	5.81	(2.16)	(4.57)	9.87	12.36	(1.85)	16.59
DUNWOODIE TO LONG ISLAND	(0.09)	1.30	2.07	1.50	1.35	1.40	0.63	2.12	0.84	2.83
LEEDS PLEASANT VALLEY	(0.09)	3.03	4.36	2.50	4.10	5.81	7.06	12.81	14.97	27.99
GREENWOOD	0.03	0.86	1.79	2.76	5.31	13.40	11.42	12.67	18.51	18.72
NEW SCOTLAND LEEDS	(0.18)	0.01	0.12	0.13	0.00	0.01	0.03	0.51	0.03	(0.18)
PACKARD HUNTLEY	(0.04)	0.34	0.14	0.37	0.54	0.16	0.68	0.64	1.36	(0.07)
DUNWOODIE MOTT HAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	0.00	(0.02)	0.11	0.16	0.21	0.40	0.77	0.82	1.33	0.96
E179THST HELLGT ASTORIAE	0.00	0.00	0.00	0.02	0.01	0.00	(0.03)	0.00	0.02	(0.04)
EGRDNCTY 138 VALLYSTR 138 1	0.00	0.05	0.24	0.27	0.25	0.52	0.45	(0.15)	0.66	0.74
MOTT HAVEN RAINEY	0.00	0.01	0.05	0.00	0.00	0.02	0.01	0.10	0.08	0.00
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	(0.02)	0.11	0.04	0.03	(0.16)	0.28	0.47	0.82	0.30	0.26
DYSINGER EAST	0.00	(0.01)	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
NIAGARA PACKARD	0.00	0.00	0.00	0.00	0.04	0.02	(0.01)	0.03	0.04	0.02
STOLLE RD GARDENVILLE	0.00	0.34	0.15	(0.04)	0.31	(0.55)	(1.42)	(0.30)	(0.20)	0.06
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY 345 EGRDNCTY 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	(0.92)	9.28	19.76	16.19	11.52	18.88	33.11	50.00	41.64	92.29

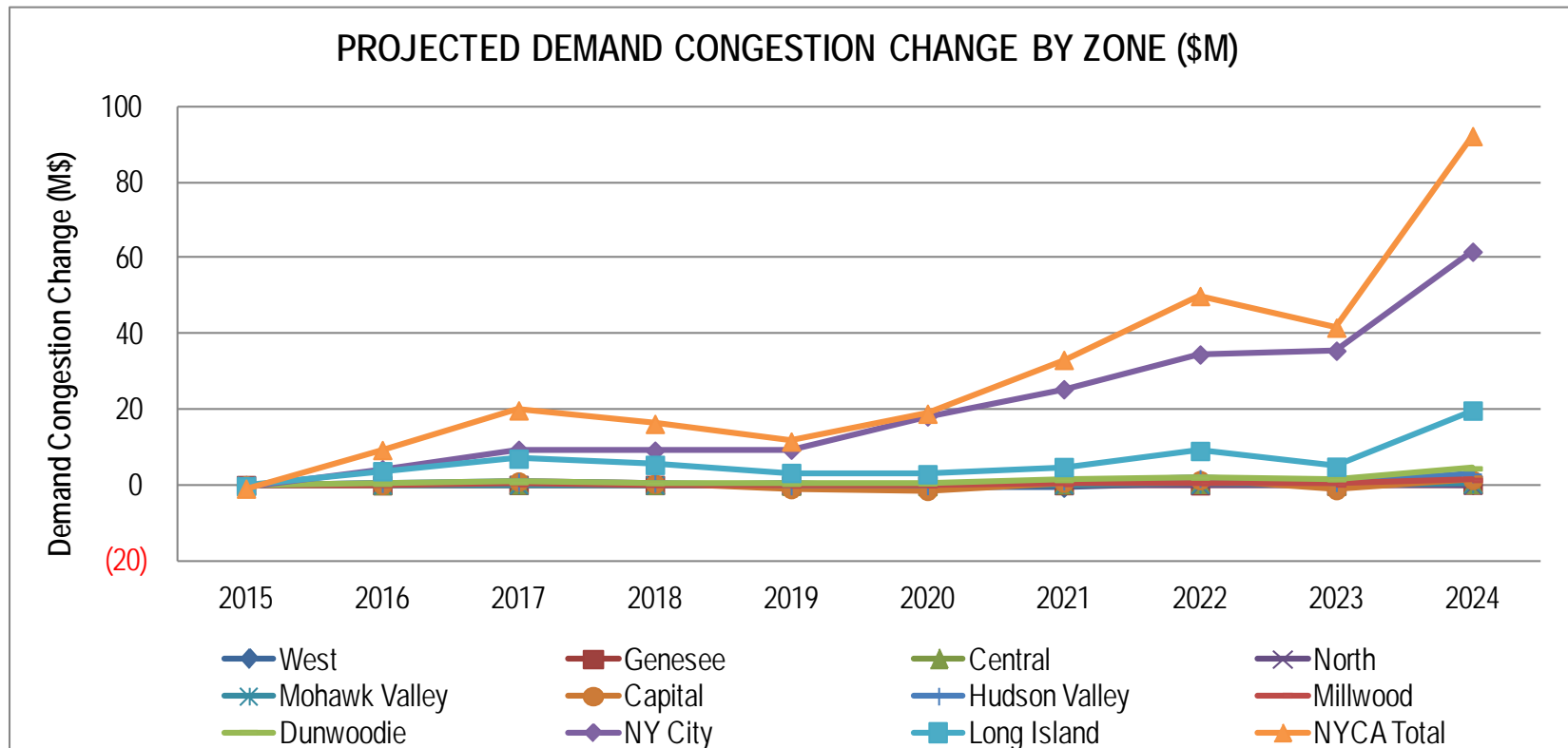
High Load Forecast: Demand Congestion by Constraint (\$M)



High Load Forecast: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	(0.03)	0.48	0.26	0.13	0.23	(0.51)	(0.66)	0.33	0.38	0.06
Genesee	0.00	(0.02)	0.05	0.03	(0.06)	(0.08)	0.00	(0.04)	(0.16)	0.12
Central	(0.01)	0.02	0.14	0.06	(0.14)	(0.25)	0.20	0.32	(0.05)	0.29
North	0.00	0.00	0.00	(0.01)	(0.01)	0.01	(0.02)	(0.02)	(0.03)	(0.01)
Mohawk Valley	(0.01)	0.02	0.09	0.03	(0.01)	(0.04)	0.09	0.18	0.08	0.28
Capital	(0.05)	0.05	0.95	0.36	(1.05)	(1.52)	0.66	1.31	(1.31)	1.36
Hudson Valley	(0.06)	0.39	0.89	0.46	(0.26)	(0.22)	1.03	1.77	0.61	2.97
Millwood	(0.02)	0.09	0.27	0.12	(0.12)	(0.05)	0.32	0.57	0.16	1.37
Dunwoodie	(0.04)	0.35	0.78	0.55	0.35	0.49	1.36	2.01	1.56	4.43
NY City	(0.41)	4.22	9.34	9.11	9.37	18.17	25.35	34.54	35.54	61.71
Long Island	(0.29)	3.68	6.99	5.35	3.22	2.88	4.78	9.03	4.86	19.71
NYCA Total	(0.92)	9.28	19.76	16.19	11.52	18.88	33.11	50.00	41.64	92.29

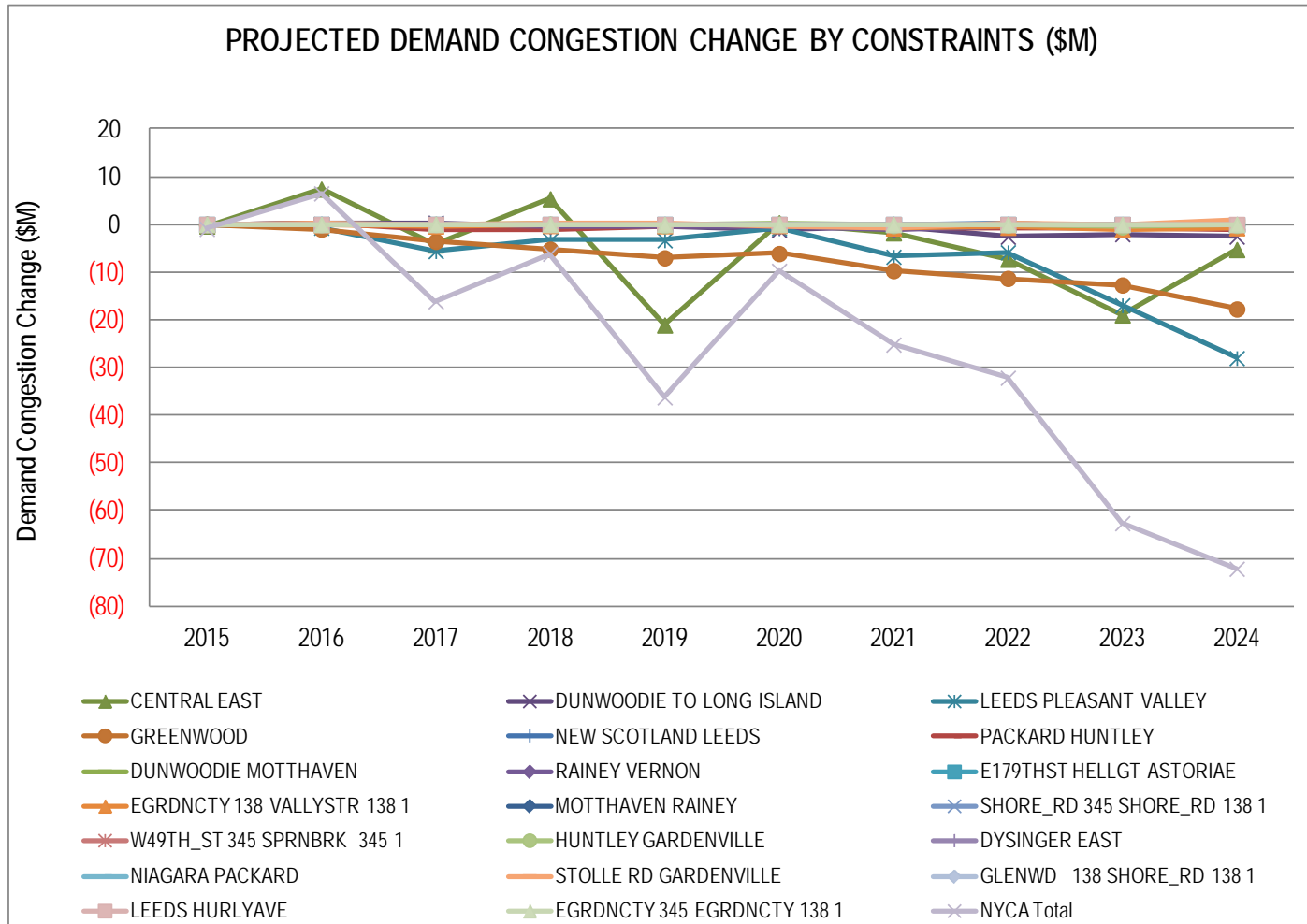
High Load Forecast: Demand Congestion by Zone (\$M)



Low Load Forecast: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	(0.33)	7.39	(4.30)	5.37	(21.07)	0.36	(1.77)	(7.30)	(18.96)	(5.27)
DUNWOODIE TO LONG ISLAND	(0.09)	0.08	0.35	(0.52)	(0.47)	(1.19)	(0.60)	(2.58)	(2.05)	(2.55)
LEEDS PLEASANT VALLEY	(0.09)	(0.70)	(5.59)	(3.33)	(3.32)	(0.81)	(6.78)	(5.83)	(16.95)	(28.01)
GREENWOOD	0.03	(0.99)	(3.54)	(5.21)	(7.00)	(6.10)	(9.68)	(11.31)	(12.69)	(17.72)
NEW SCOTLAND LEEDS	(0.18)	0.16	(0.15)	(0.27)	0.04	0.02	(0.12)	0.16	(0.42)	(0.13)
PACKARD HUNTLEY	(0.04)	0.18	(1.22)	(1.08)	(0.34)	0.00	(0.93)	(0.64)	(0.77)	(1.15)
DUNWOODIE MOTT HAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	0.00	(0.06)	(0.07)	(0.38)	(0.41)	(0.53)	(1.12)	(0.47)	(0.57)	(0.87)
E179THST HELLGT ASTORIAE	0.00	0.00	0.00	(0.01)	0.00	(0.01)	(0.01)	0.00	(0.01)	(0.05)
EGRDNCTY138 VALLYSTR 138 1	0.00	(0.08)	(0.33)	(0.22)	(0.27)	(0.23)	(0.73)	(0.60)	(1.07)	(0.70)
MOTT HAVEN RAINEY	0.00	0.00	0.02	0.01	0.01	(0.03)	0.02	(0.04)	(0.04)	0.00
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	(0.02)	(0.07)	0.00	0.05	(0.24)	0.06	(0.24)	(0.14)	(0.52)	(0.21)
DYSINGER EAST	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00
NIAGARA PACKARD	0.00	0.00	0.01	(0.01)	(0.01)	0.01	(0.03)	(0.02)	0.01	0.00
STOLLE RD GARDENVILLE	0.00	0.20	(0.01)	0.19	0.26	(0.37)	(0.80)	0.08	(0.18)	0.81
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY345 EGRDNCTY138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	(0.92)	6.50	(16.11)	(6.14)	(36.24)	(9.72)	(25.18)	(32.14)	(62.61)	(72.16)

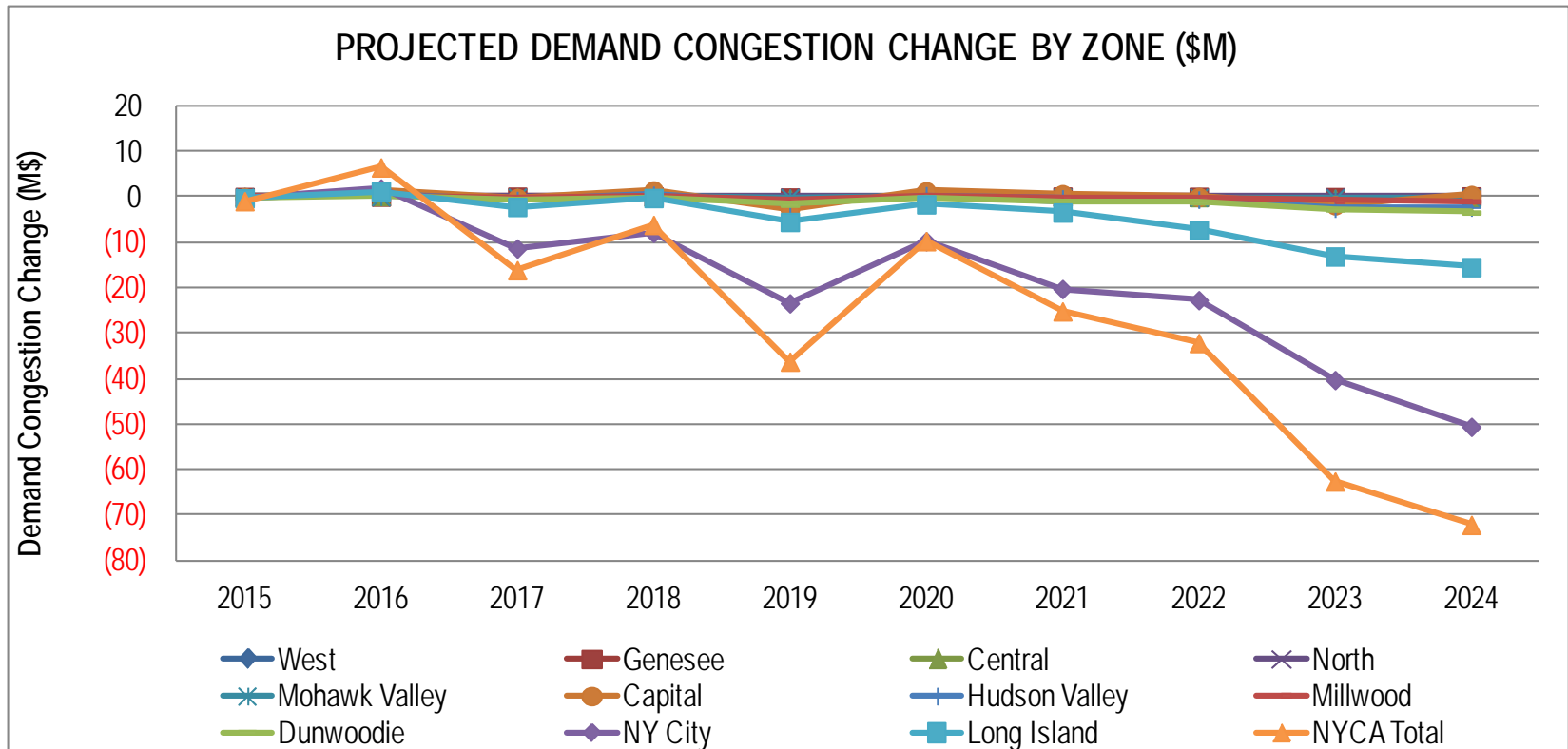
Low Load Forecast: Demand Congestion by Constraint (\$M)



Low Load Forecast: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	(0.03)	0.47	(0.55)	(0.13)	(0.14)	0.02	(0.97)	(0.17)	(0.63)	0.39
Genesee	0.00	0.08	0.07	0.14	(0.12)	0.04	0.09	0.03	(0.03)	0.12
Central	(0.01)	0.19	(0.13)	0.11	(0.36)	0.09	0.08	(0.03)	(0.37)	(0.20)
North	0.00	0.02	0.01	0.01	(0.01)	0.00	(0.01)	(0.01)	(0.01)	0.00
Mohawk Valley	(0.01)	0.06	(0.05)	0.03	(0.16)	0.01	(0.04)	(0.09)	(0.24)	(0.18)
Capital	(0.05)	1.38	(0.23)	1.43	(2.70)	1.27	0.62	(0.02)	(1.82)	0.43
Hudson Valley	(0.06)	0.70	(0.67)	0.47	(1.67)	0.37	(0.33)	(0.58)	(2.55)	(2.31)
Millwood	(0.02)	0.20	(0.19)	0.19	(0.49)	0.14	(0.06)	(0.15)	(0.86)	(0.96)
Dunwoodie	(0.04)	0.28	(0.84)	(0.24)	(1.70)	(0.30)	(0.89)	(1.18)	(2.73)	(3.42)
NY City	(0.41)	1.87	(11.34)	(7.92)	(23.40)	(9.74)	(20.25)	(22.70)	(40.28)	(50.59)
Long Island	(0.29)	1.25	(2.19)	(0.23)	(5.49)	(1.62)	(3.42)	(7.24)	(13.09)	(15.44)
NYCA Total	(0.92)	6.50	(16.11)	(6.14)	(36.24)	(9.72)	(25.18)	(32.14)	(62.61)	(72.16)

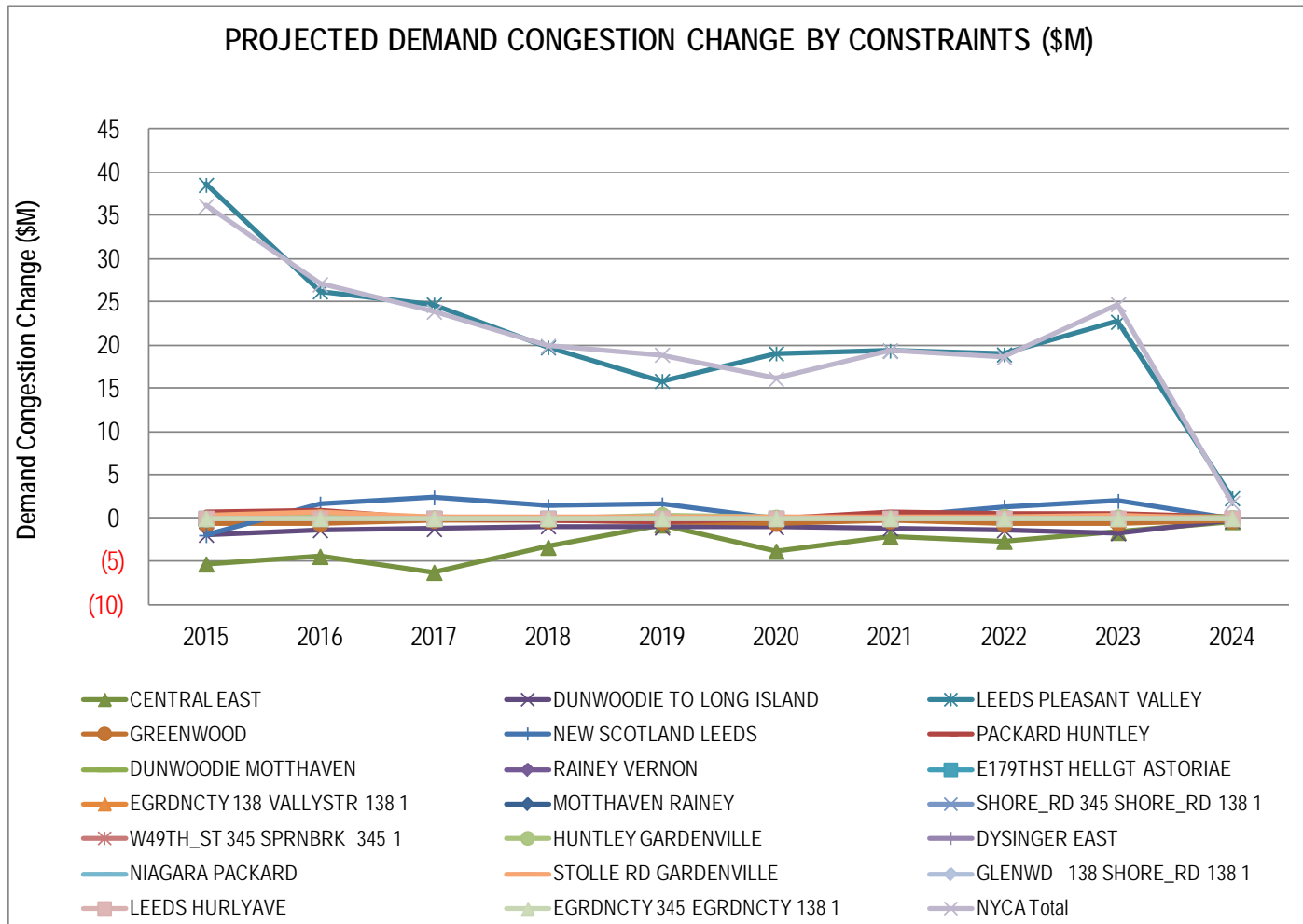
Low Load Forecast: Demand Congestion by Zone (\$M)



Athens SPS Out of Service: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	(5.28)	(4.41)	(6.25)	(3.35)	(0.77)	(3.80)	(2.14)	(2.65)	(1.62)	(0.37)
DUNWOODIE TO LONG ISLAND	(1.90)	(1.37)	(1.24)	(0.92)	(1.06)	(1.04)	(1.15)	(1.38)	(1.72)	(0.27)
LEEDS PLEASANT VALLEY	38.56	26.25	24.73	19.77	15.88	19.07	19.39	18.95	22.73	2.32
GREENWOOD	(0.65)	(0.64)	(0.21)	(0.28)	(0.42)	(0.57)	(0.28)	(0.69)	(0.56)	(0.25)
NEW SCOTLAND LEEDS	(1.95)	1.71	2.41	1.41	1.61	(0.13)	0.06	1.34	2.01	0.00
PACKARD HUNTLEY	0.69	0.86	0.03	(0.17)	(0.38)	(0.14)	0.61	0.53	0.57	0.11
DUNWOODIE MOTTHAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	(0.07)	(0.03)	(0.02)	(0.04)	(0.03)	(0.02)	(0.03)	(0.05)	(0.02)	(0.04)
E179THST HELLGT ASTORIAE	(0.01)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.02)	0.00
EGRDNCTY138 VALLYSTR 138 1	0.04	0.00	0.01	(0.02)	0.00	(0.01)	0.01	(0.04)	(0.07)	(0.01)
MOTTHAVEN RAINEY	0.00	(0.01)	0.00	(0.01)	(0.01)	(0.03)	(0.02)	(0.03)	(0.03)	(0.01)
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	(0.06)	0.16	0.05	(0.07)	0.40	0.12	0.03	0.22	0.14	0.07
DYSINGER EAST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NIAGARA PACKARD	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STOLLE RD GARDENVILLE	0.35	0.68	0.20	0.21	0.16	0.12	0.10	0.05	0.25	0.00
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY345 EGRDNCTY138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	36.13	27.06	23.90	19.93	18.92	16.13	19.35	18.62	24.76	1.78

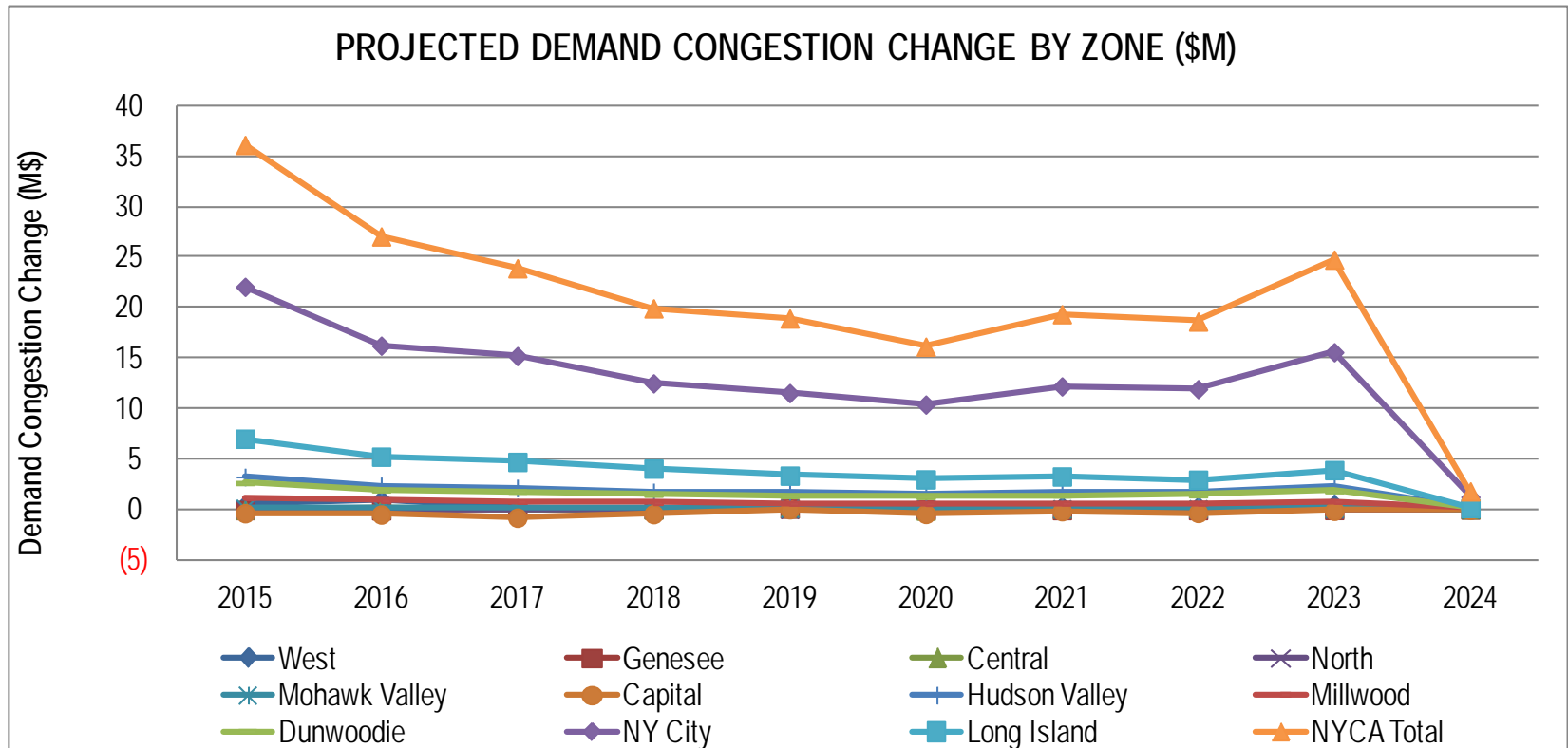
Athens SPS Out of Service: Demand Congestion by Constraint (\$M)



Athens SPS Out of Service: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	0.47	1.00	0.13	0.00	0.20	0.06	0.33	0.33	0.51	0.07
Genesee	(0.07)	(0.09)	(0.03)	0.00	0.07	(0.02)	(0.07)	(0.07)	(0.06)	(0.02)
Central	(0.04)	0.06	0.01	(0.01)	0.12	(0.12)	0.07	0.13	0.11	0.01
North	0.01	(0.01)	(0.01)	0.00	(0.01)	0.02	0.01	0.00	0.00	0.00
Mohawk Valley	0.12	0.09	0.08	0.06	0.10	0.03	0.07	0.07	0.10	0.01
Capital	(0.38)	(0.51)	(0.83)	(0.47)	0.01	(0.45)	(0.18)	(0.35)	(0.14)	(0.06)
Hudson Valley	3.21	2.33	2.12	1.73	1.66	1.47	1.68	1.65	2.20	0.19
Millwood	1.14	0.85	0.77	0.64	0.58	0.55	0.60	0.60	0.77	0.06
Dunwoodie	2.61	1.89	1.76	1.45	1.32	1.23	1.39	1.40	1.80	0.16
NY City	22.06	16.23	15.20	12.49	11.53	10.39	12.19	11.92	15.58	1.23
Long Island	7.00	5.22	4.70	4.04	3.34	2.97	3.26	2.94	3.89	0.13
NYCA Total	36.13	27.06	23.90	19.93	18.92	16.13	19.35	18.62	24.76	1.78

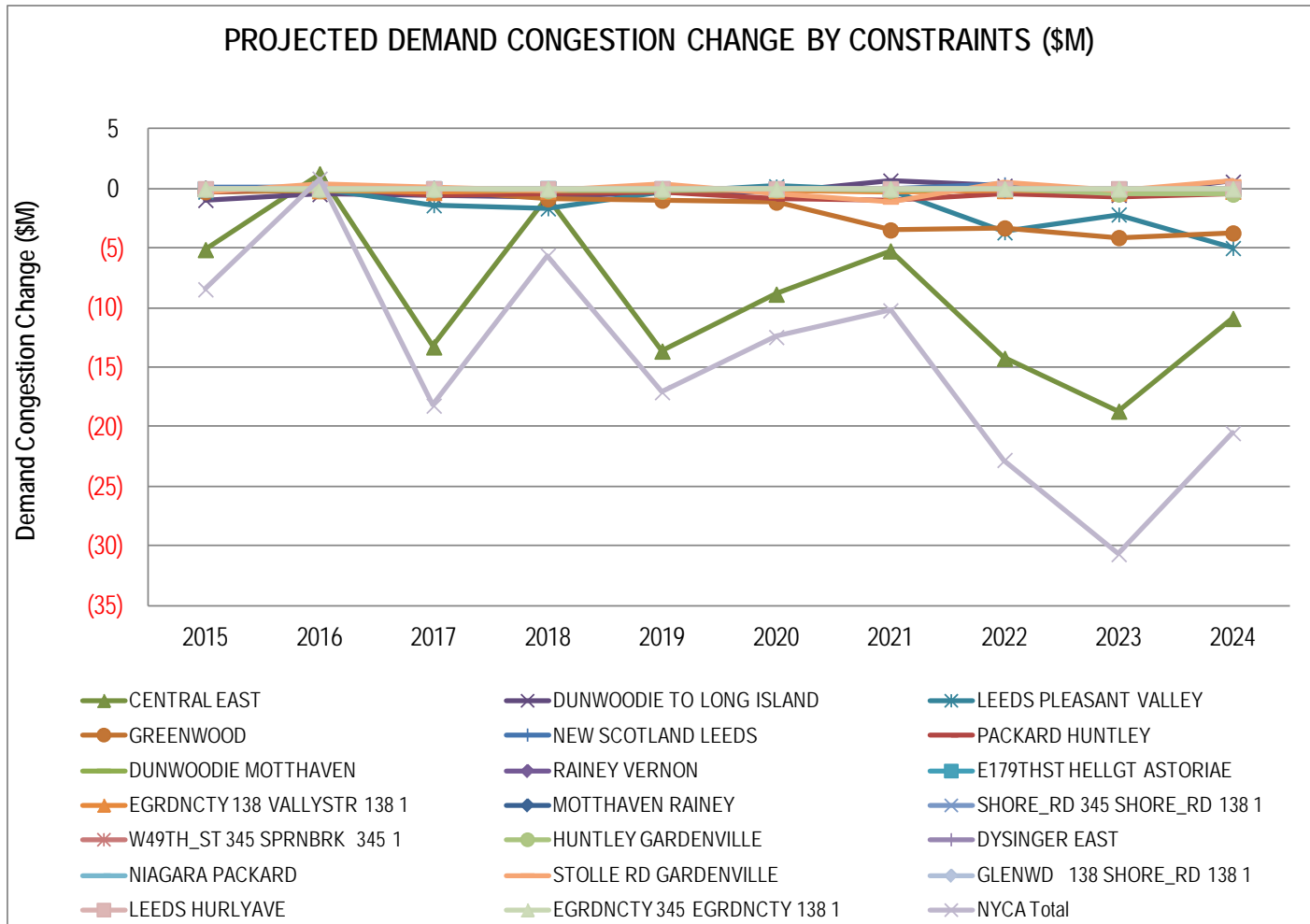
Athens SPS Out of Service: Demand Congestion by Zone (\$M)



High Solar Penetration: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	(5.11)	1.26	(13.28)	(0.69)	(13.63)	(8.85)	(5.22)	(14.24)	(18.67)	(10.89)
DUNWOODIE TO LONG ISLAND	(0.94)	(0.45)	(0.63)	(0.72)	(0.30)	(0.37)	0.69	0.25	(0.52)	0.59
LEEDS PLEASANT VALLEY	(0.24)	0.00	(1.39)	(1.65)	(0.35)	0.20	(0.21)	(3.66)	(2.16)	(4.98)
GREENWOOD	(0.25)	(0.10)	(0.21)	(0.85)	(0.96)	(1.12)	(3.46)	(3.29)	(4.10)	(3.71)
NEW SCOTLAND LEEDS	0.13	0.13	(0.08)	(0.16)	0.02	(0.01)	(0.07)	0.38	(0.47)	0.01
PACKARD HUNTLEY	(0.32)	0.14	(0.63)	(0.46)	(0.34)	(0.85)	(0.97)	(0.48)	(0.71)	(0.41)
DUNWOODIE MOTT HAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	(0.02)	(0.02)	0.02	(0.05)	(0.11)	(0.10)	(0.15)	(0.15)	(0.27)	(0.10)
E179THST HELLG T ASTORIAE	(0.01)	0.00	0.00	0.01	0.00	0.00	0.00	(0.01)	(0.01)	(0.01)
EGRDNCTY 138 VALLYSTR 138 1	0.04	(0.16)	(0.31)	(0.20)	(0.21)	(0.13)	(0.28)	(0.15)	(0.35)	(0.21)
MOTT HAVEN RAINEY	0.00	0.00	0.02	0.00	0.00	(0.01)	0.02	(0.06)	(0.02)	0.04
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	(0.05)	(0.10)	(0.08)	(0.16)	(0.20)	(0.08)	(0.13)	0.02	(0.44)	(0.45)
DYSINGER EAST	0.00	0.01	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00
NIAGARA PACKARD	0.01	0.02	0.01	0.01	0.04	(0.01)	0.00	0.01	(0.03)	0.01
STOLLE RD GARDENVILLE	(0.24)	0.32	0.05	(0.19)	0.40	(0.49)	(1.11)	0.49	(0.20)	0.66
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY 345 EGRDNCTY 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	(8.44)	0.85	(18.21)	(5.60)	(17.08)	(12.45)	(10.21)	(22.77)	(30.67)	(20.52)

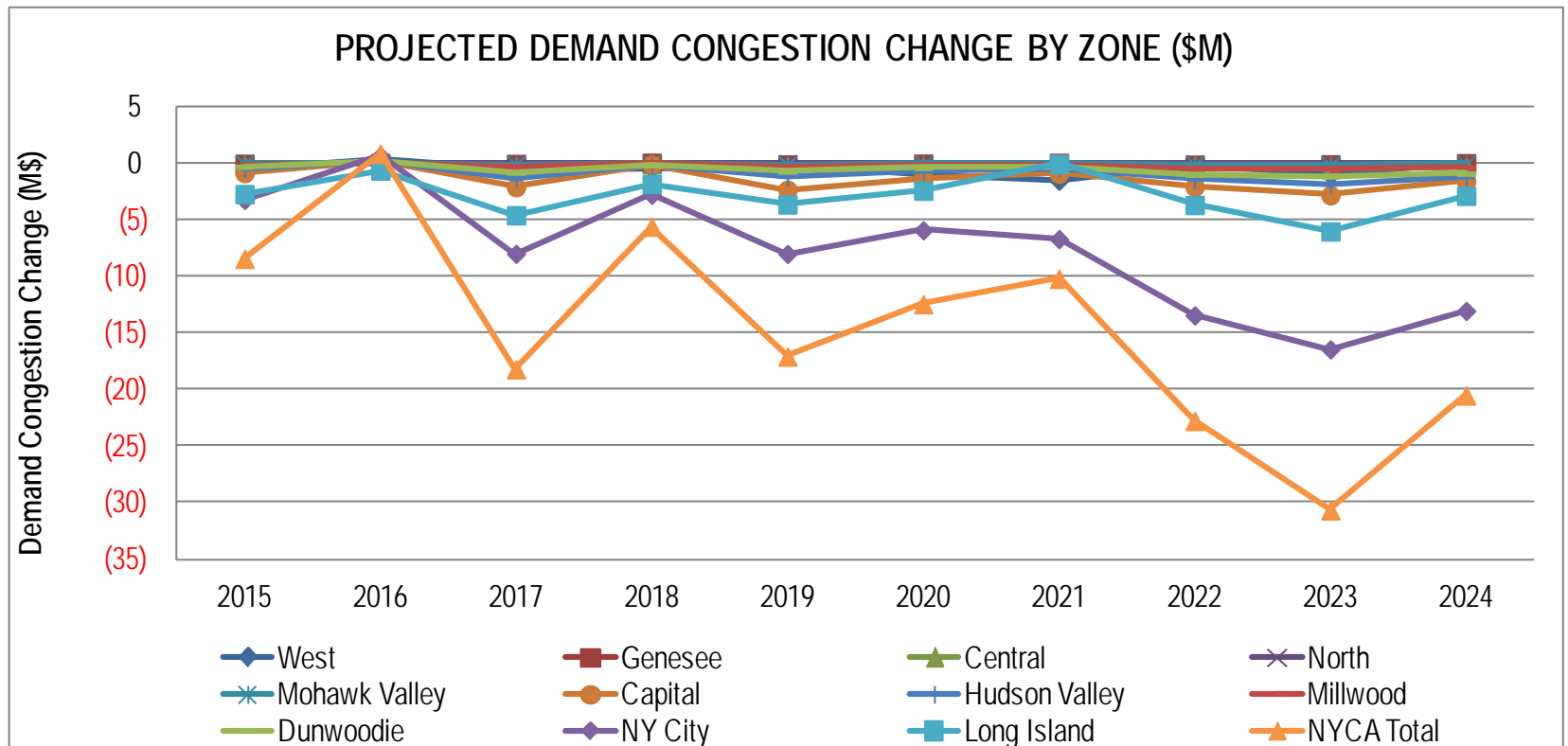
High Solar Penetration: Demand Congestion by Constraint (\$M)



High Solar Penetration: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	(0.45)	0.34	(0.47)	(0.46)	(0.19)	(1.06)	(1.54)	(0.19)	(1.03)	(0.05)
Genesee	(0.04)	0.02	(0.06)	0.05	(0.10)	(0.03)	0.04	(0.12)	(0.09)	0.01
Central	(0.15)	0.01	(0.34)	(0.07)	(0.33)	(0.26)	(0.15)	(0.22)	(0.50)	(0.29)
North	0.00	0.01	(0.01)	0.00	(0.01)	(0.01)	(0.01)	(0.03)	(0.04)	(0.01)
Mohawk Valley	(0.06)	0.01	(0.11)	(0.02)	(0.12)	(0.08)	(0.05)	(0.10)	(0.16)	(0.06)
Capital	(0.86)	0.20	(2.11)	(0.09)	(2.33)	(1.37)	(0.92)	(2.08)	(2.83)	(1.60)
Hudson Valley	(0.48)	0.12	(1.30)	(0.21)	(1.24)	(0.69)	(0.45)	(1.45)	(1.83)	(1.27)
Millwood	(0.15)	0.04	(0.40)	(0.03)	(0.40)	(0.20)	(0.10)	(0.45)	(0.57)	(0.41)
Dunwoodie	(0.30)	0.09	(0.82)	(0.17)	(0.72)	(0.41)	(0.27)	(1.01)	(1.16)	(0.92)
NY City	(3.23)	0.65	(8.00)	(2.78)	(8.01)	(5.92)	(6.70)	(13.44)	(16.44)	(13.05)
Long Island	(2.72)	(0.64)	(4.59)	(1.82)	(3.63)	(2.42)	(0.06)	(3.68)	(6.02)	(2.87)
NYCA Total	(8.44)	0.85	(18.21)	(5.60)	(17.08)	(12.45)	(10.21)	(22.77)	(30.67)	(20.52)

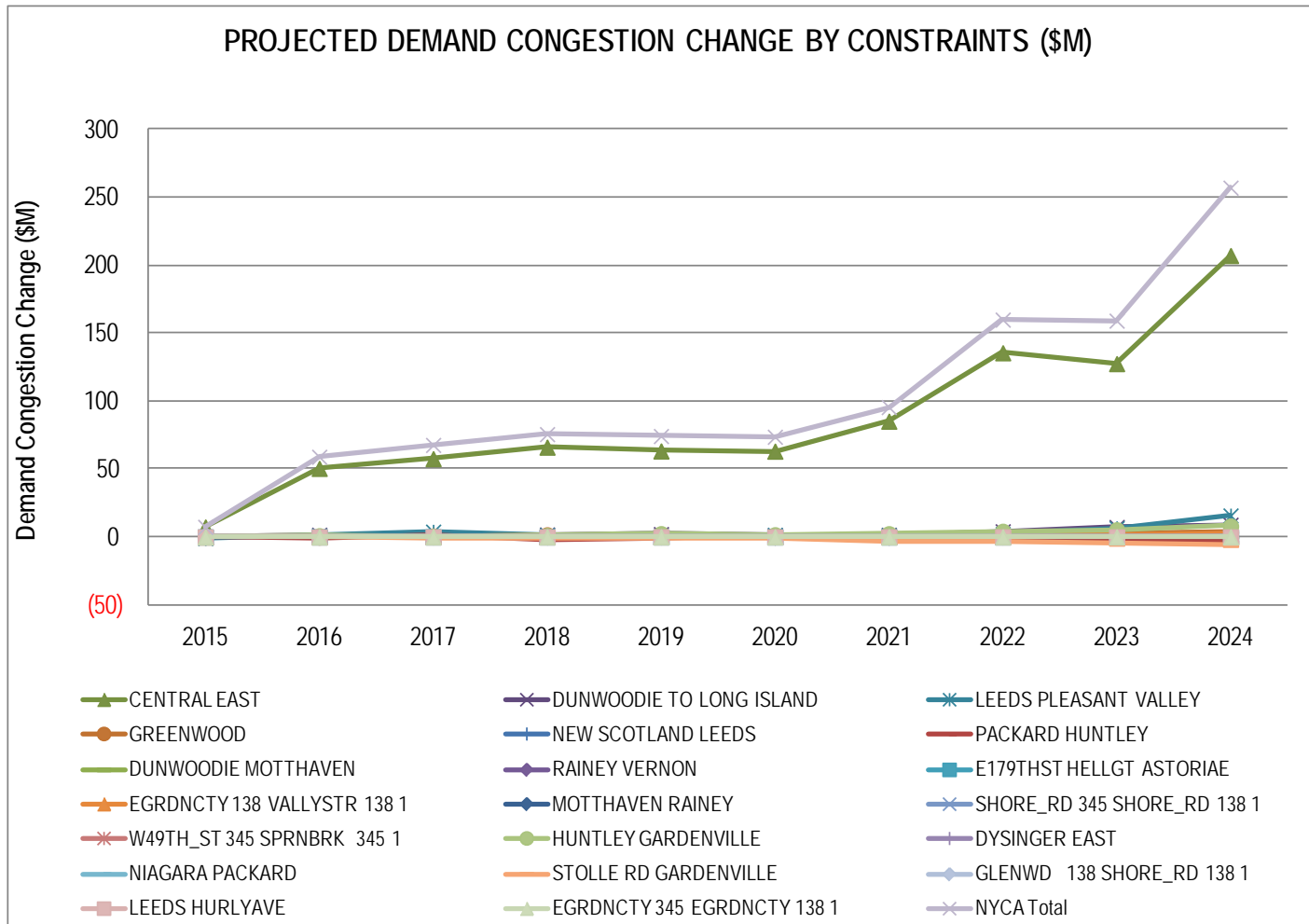
High Solar Penetration: Demand Congestion by Zone (\$M)



Higher Natural Gas Prices: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	7.29	50.45	57.58	66.07	63.26	63.11	85.17	135.54	127.56	207.11
DUNWOODIE TO LONG ISLAND	(0.15)	1.55	(0.09)	1.76	2.05	1.27	1.51	4.10	7.22	8.97
LEEDS PLEASANT VALLEY	(0.85)	0.95	3.85	1.39	(0.22)	1.48	1.21	2.11	6.40	15.76
GREENWOOD	0.37	(0.03)	0.56	1.47	1.62	0.72	0.08	2.02	2.61	3.41
NEW SCOTLAND LEEDS	(0.02)	0.57	0.03	(0.27)	(0.02)	0.08	0.52	0.95	(0.14)	(0.07)
PACKARD HUNTLEY	(0.32)	(1.23)	0.70	(2.12)	(1.46)	0.68	(0.06)	(0.75)	(2.98)	(3.93)
DUNWOODIE MOTT HAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	0.24	0.07	0.02	(0.03)	0.03	(0.13)	(0.14)	0.00	0.29	(0.34)
E179THST HELLG T ASTORIAE	(0.03)	0.00	0.00	0.00	0.00	(0.01)	(0.04)	0.00	(0.01)	(0.09)
EGRDNCTY 138 VALLYSTR 138 1	(0.01)	0.05	0.42	0.09	0.41	0.30	0.63	1.29	0.76	2.56
MOTT HAVEN RAINEY	0.00	(0.01)	0.00	0.01	0.00	(0.03)	(0.01)	0.05	0.04	(0.02)
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	0.14	0.83	0.42	1.02	2.35	1.56	2.32	4.11	5.21	7.94
DYSINGER EAST	(0.02)	(0.02)	(0.01)	(0.01)	0.00	(0.01)	0.01	(0.01)	0.00	(0.01)
NIAGARA PACKARD	0.00	0.04	0.01	0.01	(0.02)	0.02	(0.06)	0.05	0.01	0.02
STOLLE RD GARDENVILLE	(0.14)	0.17	(1.20)	(1.57)	(0.60)	(1.45)	(4.04)	(3.59)	(5.22)	(6.15)
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY 345 EGRDNCTY 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	7.35	58.97	67.68	75.63	74.23	73.69	95.56	159.93	159.17	257.06

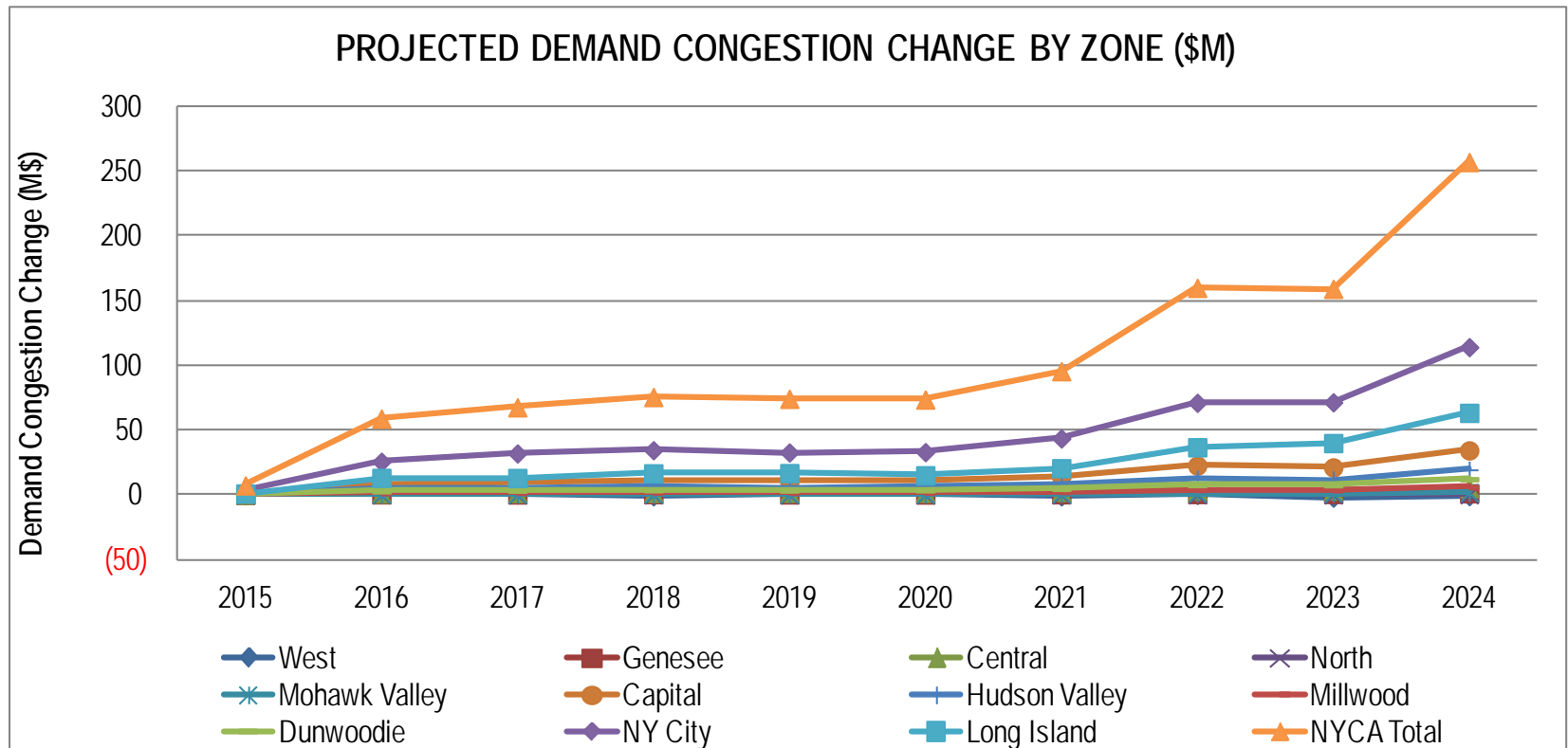
Higher Natural Gas Prices: Demand Congestion by Constraint (\$M)



Higher Natural Gas Prices: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	(0.21)	0.80	0.38	(1.00)	0.67	0.80	(1.05)	0.02	(2.04)	(0.92)
Genesee	0.05	0.50	0.41	0.62	0.43	0.37	0.54	0.73	0.78	1.29
Central	0.22	1.07	1.38	1.58	1.63	1.62	2.31	3.52	3.48	5.27
North	0.00	0.06	0.05	0.05	0.06	0.04	0.07	0.07	0.04	0.13
Mohawk Valley	0.08	0.40	0.47	0.56	0.54	0.55	0.73	1.20	1.19	1.83
Capital	1.11	8.34	9.44	11.03	10.46	10.94	14.03	22.71	21.25	34.42
Hudson Valley	0.58	4.66	5.43	6.04	5.64	5.80	7.61	12.29	11.75	19.42
Millwood	0.18	1.44	1.65	1.86	1.69	1.73	2.32	3.82	3.60	5.92
Dunwoodie	0.37	2.83	3.34	3.66	3.43	3.57	4.70	7.60	7.51	12.16
NY City	3.84	25.66	32.04	34.55	32.82	33.08	43.62	71.14	71.55	114.14
Long Island	1.13	13.21	13.09	16.68	16.86	15.19	20.68	36.83	40.06	63.40
NYCA Total	7.35	58.97	67.68	75.63	74.23	73.69	95.56	159.93	159.17	257.06

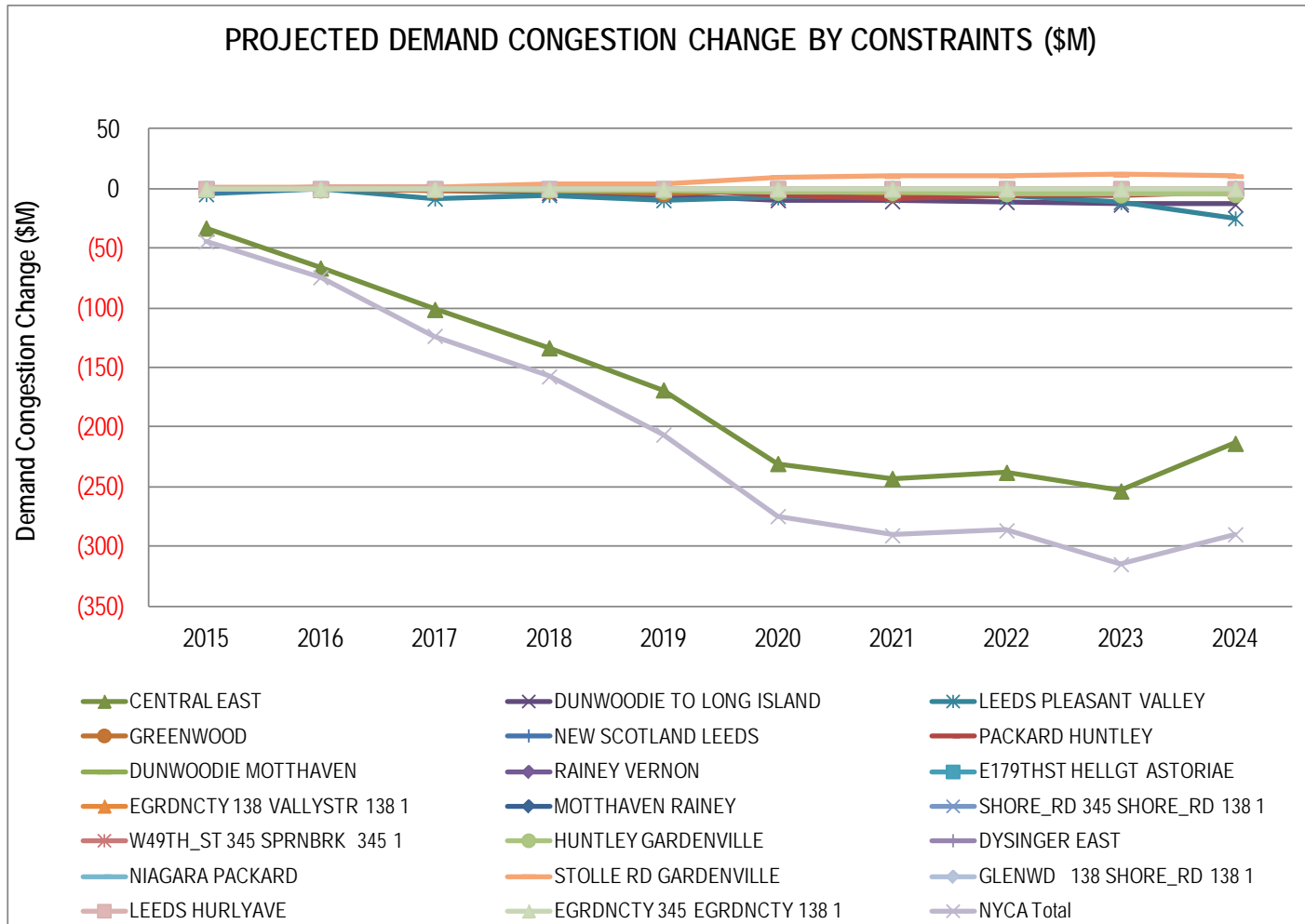
Higher Natural Gas Prices: Demand Congestion by Zone (\$M)



Lower Natural Gas Prices: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	(32.88)	(66.41)	(101.13)	(133.31)	(168.55)	(230.30)	(242.78)	(237.69)	(253.33)	(213.39)
DUNWOODIE TO LONG ISLAND	(0.99)	0.01	(2.29)	(3.50)	(5.95)	(9.48)	(10.41)	(11.12)	(13.21)	(13.21)
LEEDS PLEASANT VALLEY	(4.53)	(0.90)	(8.18)	(5.23)	(9.50)	(7.31)	(5.47)	(6.37)	(11.14)	(24.71)
GREENWOOD	(0.17)	(0.84)	(1.34)	(1.60)	(4.02)	(1.65)	(4.25)	(3.03)	(3.67)	(4.15)
NEW SCOTLAND LEEDS	(1.10)	(0.28)	(0.19)	(0.23)	0.18	(0.27)	(0.37)	(0.42)	(0.35)	(0.16)
PACKARD HUNTLEY	0.34	0.43	1.10	(1.80)	0.08	(5.24)	(7.87)	(5.86)	(6.43)	(3.68)
DUNWOODIE MOTTHAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	0.02	(0.25)	(0.01)	(0.04)	(0.39)	(0.51)	0.17	(0.42)	(0.17)	0.34
E179THST HELLGHT ASTORIAE	0.00	0.00	0.01	0.01	0.00	0.01	(0.04)	(0.01)	(0.04)	(0.09)
EGRDNCTY 138 VALLYSTR 138 1	(0.27)	(0.25)	(0.46)	(0.57)	(0.79)	(1.01)	(0.94)	(1.64)	(2.39)	(1.38)
MOTTHAVEN RAINEY	0.00	0.00	0.06	0.01	0.03	0.07	0.02	(0.02)	(0.04)	0.01
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	(0.14)	(0.55)	(0.41)	(1.00)	(1.98)	(2.86)	(2.95)	(4.03)	(5.03)	(4.75)
DYSINGER EAST	0.00	0.00	0.00	0.00	0.04	0.01	0.01	0.00	0.01	0.00
NIAGARA PACKARD	(0.04)	0.00	(0.02)	(0.01)	(0.03)	0.02	(0.06)	(0.03)	(0.05)	(0.04)
STOLLE RD GARDENVILLE	0.78	1.40	1.47	3.15	3.95	9.88	10.54	11.06	11.72	10.67
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY 345 EGRDNCTY 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	(44.03)	(74.12)	(123.27)	(157.28)	(205.98)	(274.38)	(290.51)	(286.36)	(314.69)	(289.63)

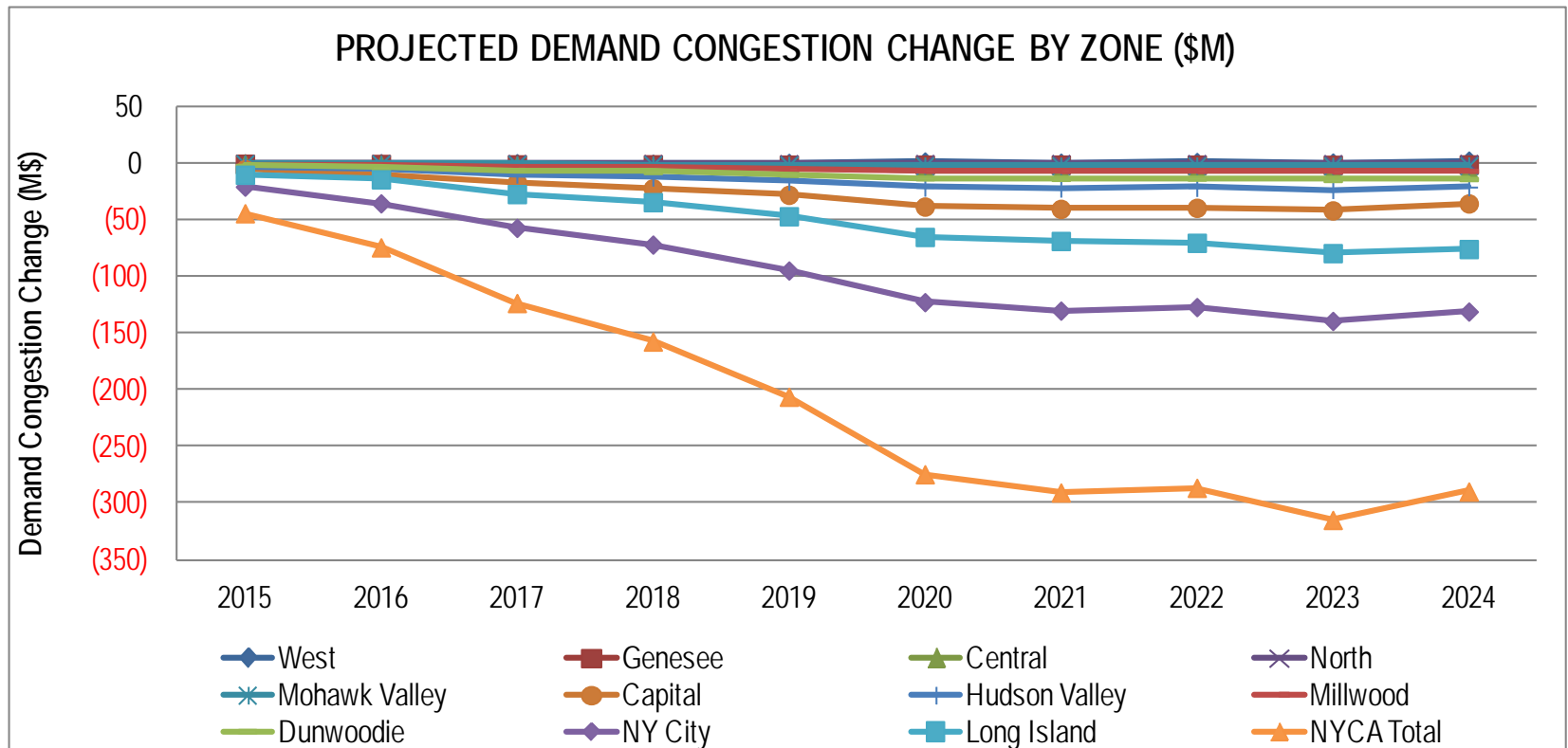
Lower Natural Gas Prices: Demand Congestion by Constraint (\$M)



Lower Natural Gas Prices: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	0.05	0.17	0.13	(0.40)	0.41	1.63	0.57	1.20	0.70	2.44
Genesee	(0.34)	(0.54)	(0.92)	(0.85)	(1.17)	(1.19)	(1.14)	(1.19)	(1.31)	(0.97)
Central	(0.78)	(1.55)	(2.21)	(3.30)	(4.08)	(6.47)	(6.84)	(6.64)	(6.86)	(5.98)
North	(0.04)	(0.07)	(0.09)	(0.11)	(0.16)	(0.07)	(0.06)	(0.10)	(0.13)	(0.07)
Mohawk Valley	(0.33)	(0.53)	(0.82)	(1.11)	(1.41)	(2.04)	(2.13)	(2.09)	(2.20)	(1.97)
Capital	(5.11)	(10.81)	(16.57)	(22.00)	(27.76)	(38.14)	(40.16)	(39.22)	(41.53)	(35.38)
Hudson Valley	(3.53)	(5.97)	(9.69)	(12.32)	(15.88)	(21.21)	(22.04)	(21.46)	(23.29)	(20.89)
Millwood	(1.10)	(1.79)	(3.01)	(3.71)	(4.88)	(6.43)	(6.61)	(6.59)	(7.18)	(6.59)
Dunwoodie	(2.26)	(3.65)	(6.07)	(7.56)	(9.83)	(13.05)	(13.64)	(13.33)	(14.61)	(13.82)
NY City	(20.55)	(35.29)	(56.93)	(71.68)	(94.54)	(122.48)	(129.96)	(126.82)	(139.05)	(130.79)
Long Island	(10.04)	(14.09)	(27.09)	(34.24)	(46.68)	(64.93)	(68.50)	(70.12)	(79.23)	(75.61)
NYCA Total	(44.03)	(74.12)	(123.27)	(157.28)	(205.98)	(274.38)	(290.51)	(286.36)	(314.69)	(289.63)

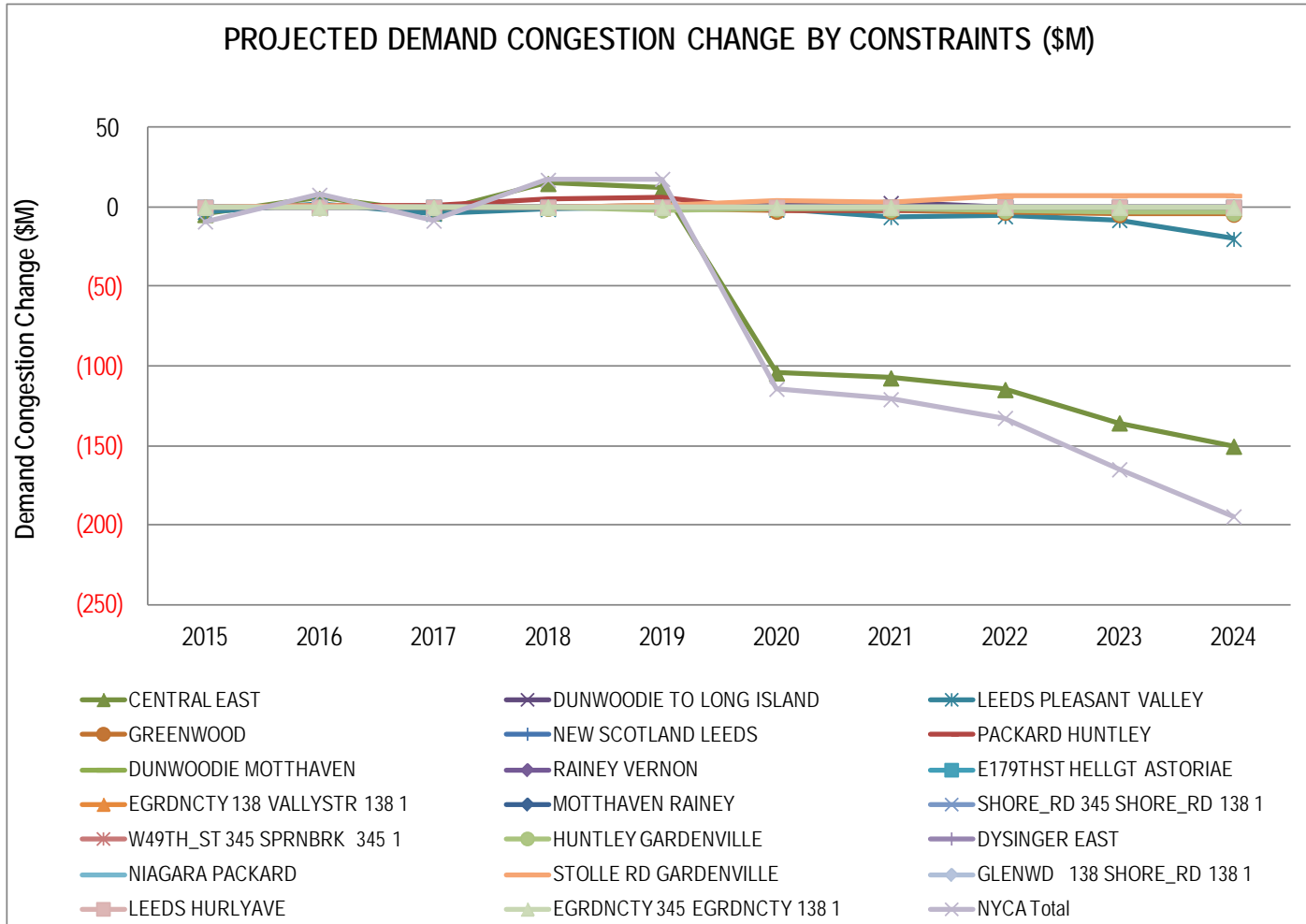
Lower Natural Gas Prices: Demand Congestion by Zone (\$M)



Higher CO2 Emission Cost: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	(4.52)	5.63	(3.45)	15.01	12.10	(104.20)	(107.33)	(114.68)	(135.66)	(150.33)
DUNWOODIE TO LONG ISLAND	(0.18)	(0.47)	(0.21)	(0.15)	0.79	0.56	2.70	(0.45)	(2.80)	(0.27)
LEEDS PLEASANT VALLEY	(2.87)	1.53	(4.09)	(1.09)	0.10	(1.49)	(6.18)	(5.64)	(8.01)	(19.91)
GREENWOOD	(0.05)	(0.18)	(0.21)	(0.56)	(1.04)	(2.48)	(2.42)	(3.07)	(4.58)	(4.32)
NEW SCOTLAND LEEDS	(0.02)	(0.08)	0.12	(0.35)	(0.01)	0.17	0.38	(0.33)	(0.65)	(0.11)
PACKARD HUNTLEY	0.06	0.79	1.14	5.11	5.92	(1.66)	(2.32)	(1.43)	(3.18)	(2.41)
DUNWOODIE MOTTHAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	0.04	0.03	0.01	0.06	0.16	0.15	0.29	(0.03)	(0.22)	0.14
E179THST HELLGT ASTORIAE	0.00	0.00	0.01	0.01	0.00	0.00	(0.04)	(0.01)	(0.03)	(0.05)
EGRDNCTY138 VALLYSTR 138 1	0.09	0.09	0.32	0.39	0.52	0.06	(0.21)	(0.08)	0.17	(0.28)
MOTTHAVEN RAINEY	0.00	0.00	0.04	0.02	0.01	0.00	0.04	(0.01)	(0.03)	(0.04)
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	(0.05)	(0.14)	(0.21)	(0.47)	(1.70)	(0.97)	(1.37)	(2.06)	(3.34)	(3.54)
DYSINGER EAST	(0.01)	(0.02)	0.00	0.00	0.02	0.01	0.01	0.00	0.01	0.00
NIAGARA PACKARD	(0.03)	0.00	(0.01)	(0.02)	0.01	0.02	(0.06)	(0.02)	(0.03)	(0.04)
STOLLE RD GARDENVILLE	(0.15)	0.68	0.28	0.15	0.98	3.78	3.08	6.72	7.20	7.36
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY345 EGRDNCTY 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	(8.90)	7.84	(8.41)	17.24	17.85	(114.20)	(120.75)	(132.52)	(164.83)	(194.48)

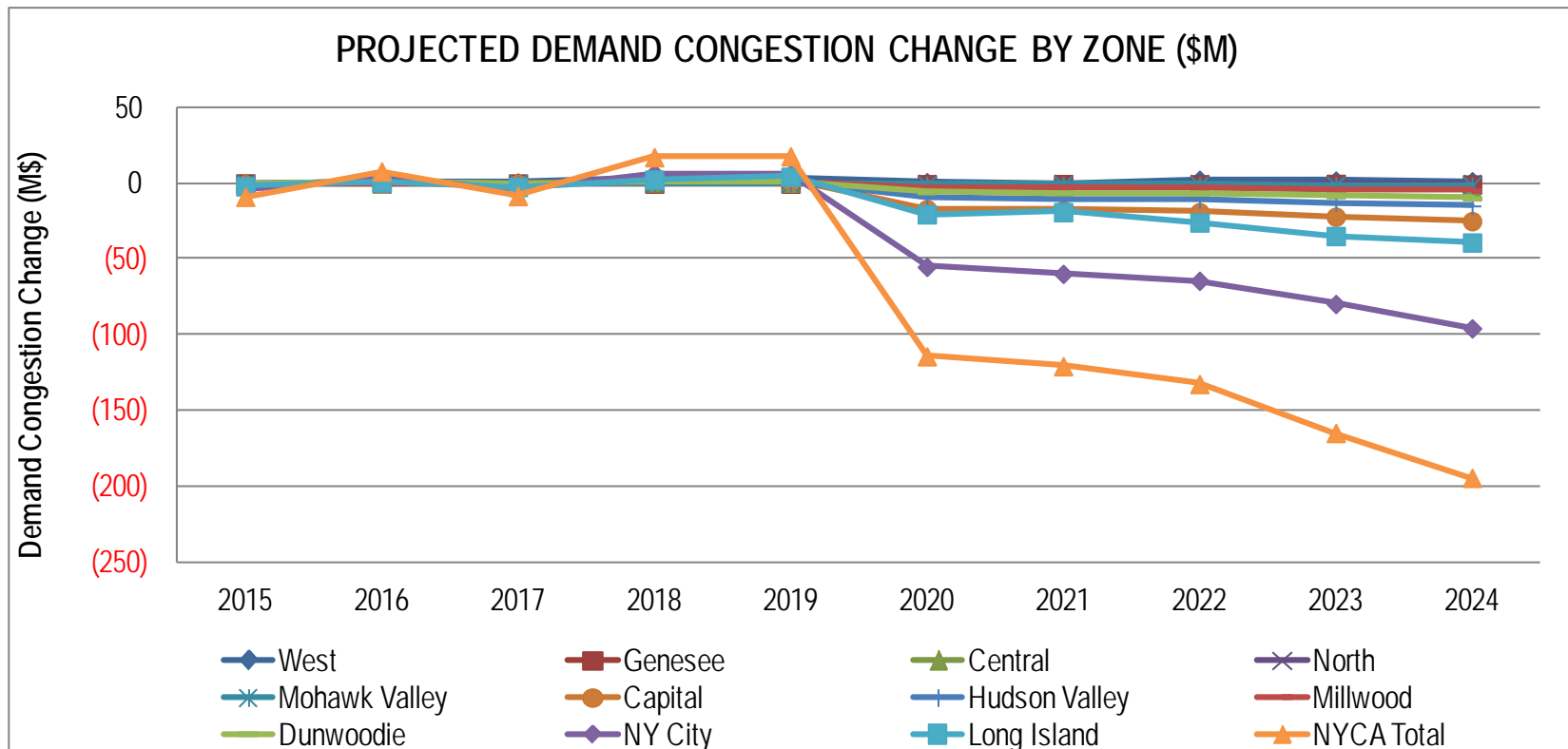
Higher CO2 Emission Cost: Demand Congestion by Constraint (\$M)



Higher CO2 Emission Cost: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	(0.24)	1.05	0.57	2.90	3.27	0.70	(0.44)	2.34	1.78	1.34
Genesee	(0.06)	0.03	(0.13)	(0.18)	(0.19)	(0.59)	(0.54)	(0.65)	(0.42)	(0.79)
Central	(0.09)	0.12	0.03	0.64	0.46	(2.78)	(2.76)	(3.12)	(3.72)	(4.04)
North	0.00	0.01	(0.01)	(0.01)	(0.01)	(0.05)	(0.02)	(0.07)	(0.03)	(0.08)
Mohawk Valley	(0.05)	0.04	(0.02)	0.14	0.09	(0.89)	(0.92)	(1.03)	(1.21)	(1.38)
Capital	(0.70)	0.93	(0.37)	2.45	1.80	(17.03)	(17.79)	(19.05)	(22.04)	(24.98)
Hudson Valley	(0.69)	0.67	(0.65)	1.29	1.15	(9.33)	(10.10)	(10.62)	(12.71)	(14.90)
Millwood	(0.22)	0.21	(0.27)	0.36	0.27	(2.80)	(3.03)	(3.34)	(3.92)	(4.84)
Dunwoodie	(0.46)	0.41	(0.50)	0.70	0.69	(5.78)	(6.29)	(6.71)	(8.07)	(9.96)
NY City	(4.39)	3.62	(4.68)	6.51	6.03	(55.18)	(59.80)	(64.38)	(79.69)	(95.76)
Long Island	(2.00)	0.75	(2.38)	2.44	4.29	(20.47)	(19.06)	(25.89)	(34.80)	(39.09)
NYCA Total	(8.90)	7.84	(8.41)	17.24	17.85	(114.20)	(120.75)	(132.52)	(164.83)	(194.48)

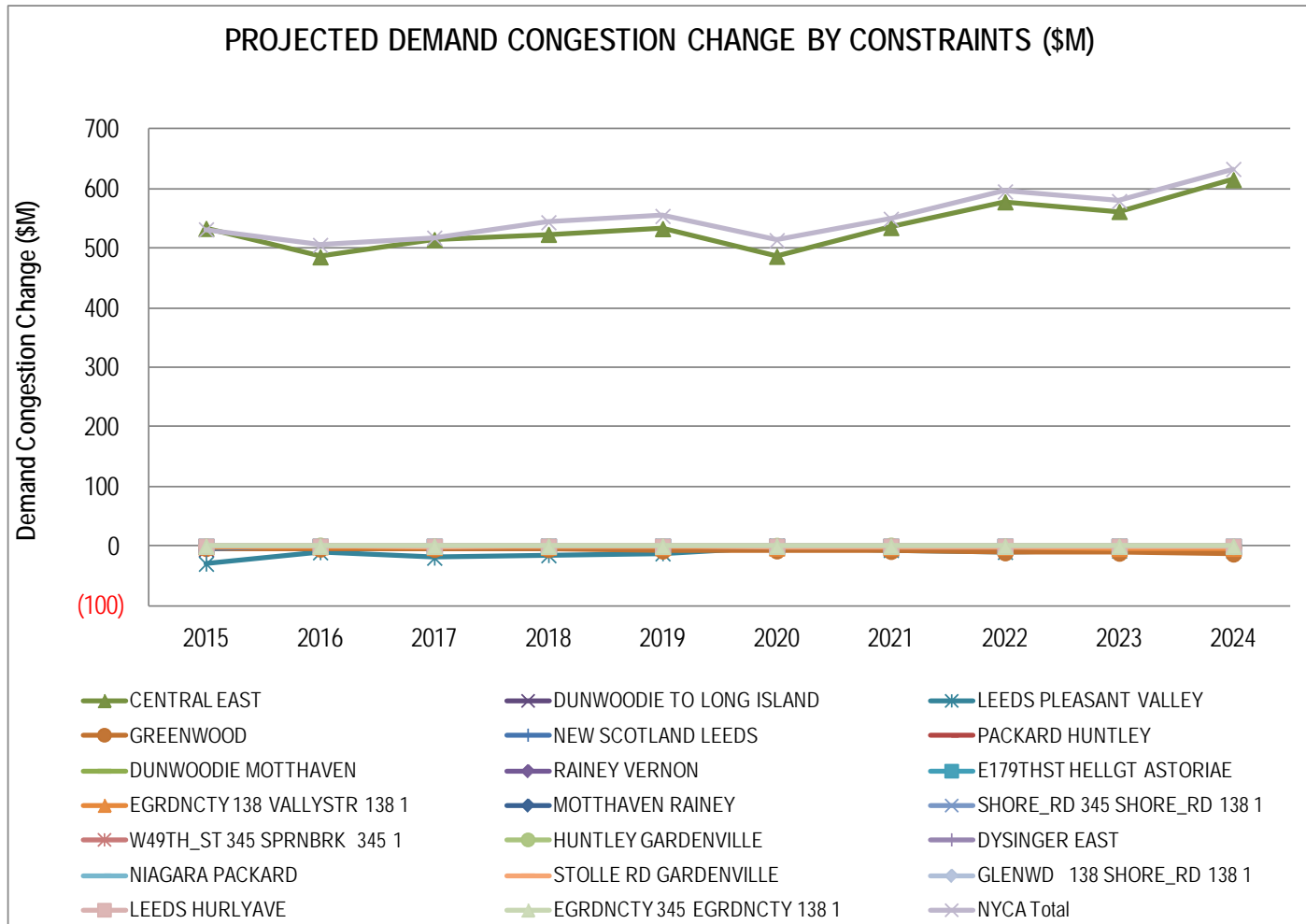
Higher CO2 Emission Cost: Demand Congestion by Zone (\$M)



Double Natural Gas Prices Differential: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	533.65	485.93	514.80	523.68	533.30	486.83	535.17	578.30	562.16	615.47
DUNWOODIE TO LONG ISLAND	(4.98)	(0.15)	(2.66)	0.55	0.33	1.07	(4.17)	(3.35)	0.43	(2.00)
LEEDS PLEASANT VALLEY	(29.39)	(10.21)	(19.33)	(15.09)	(11.98)	(2.45)	(6.27)	(9.52)	(7.34)	(7.22)
GREENWOOD	(3.58)	(4.58)	(5.14)	(5.25)	(7.88)	(7.66)	(8.54)	(10.87)	(11.56)	(12.93)
NEW SCOTLAND LEEDS	(4.40)	(0.59)	(0.44)	0.14	0.24	1.28	0.31	(0.41)	(0.60)	0.73
PACKARD HUNTLEY	(1.99)	(0.45)	(1.96)	2.01	1.72	1.42	0.55	0.96	(0.56)	1.58
DUNWOODIE MOTTHAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	(0.43)	(0.66)	(0.74)	(1.16)	(1.19)	(1.13)	(1.80)	(1.16)	(1.59)	(1.45)
E179THST HELLGT ASTORIAE	(0.06)	(0.02)	(0.01)	(0.01)	0.00	(0.01)	(0.03)	0.01	(0.01)	(0.12)
EGRDNCTY 138 VALLYSTR 138 1	(1.02)	(0.79)	(1.97)	(1.68)	(1.97)	(2.85)	(2.21)	(1.74)	(3.67)	(3.49)
MOTTHAVEN RAINEY	0.00	(0.01)	(0.01)	(0.03)	(0.01)	(0.04)	(0.04)	(0.14)	(0.11)	(0.09)
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	0.20	1.66	0.33	0.38	0.05	1.29	1.61	0.25	(0.12)	(0.42)
DYSINGER EAST	0.01	0.02	(0.03)	0.00	0.00	0.01	0.01	0.00	0.01	0.00
NIAGARA PACKARD	(0.04)	0.03	0.01	0.03	(0.04)	0.02	0.00	0.02	0.00	0.05
STOLLE RD GARDENVILLE	0.22	0.15	(0.82)	(0.44)	0.40	(1.70)	(2.14)	(2.25)	(1.41)	(2.05)
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY 345 EGRDNCTY 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	531.96	505.87	518.11	543.93	554.52	513.87	549.75	595.75	579.54	633.44

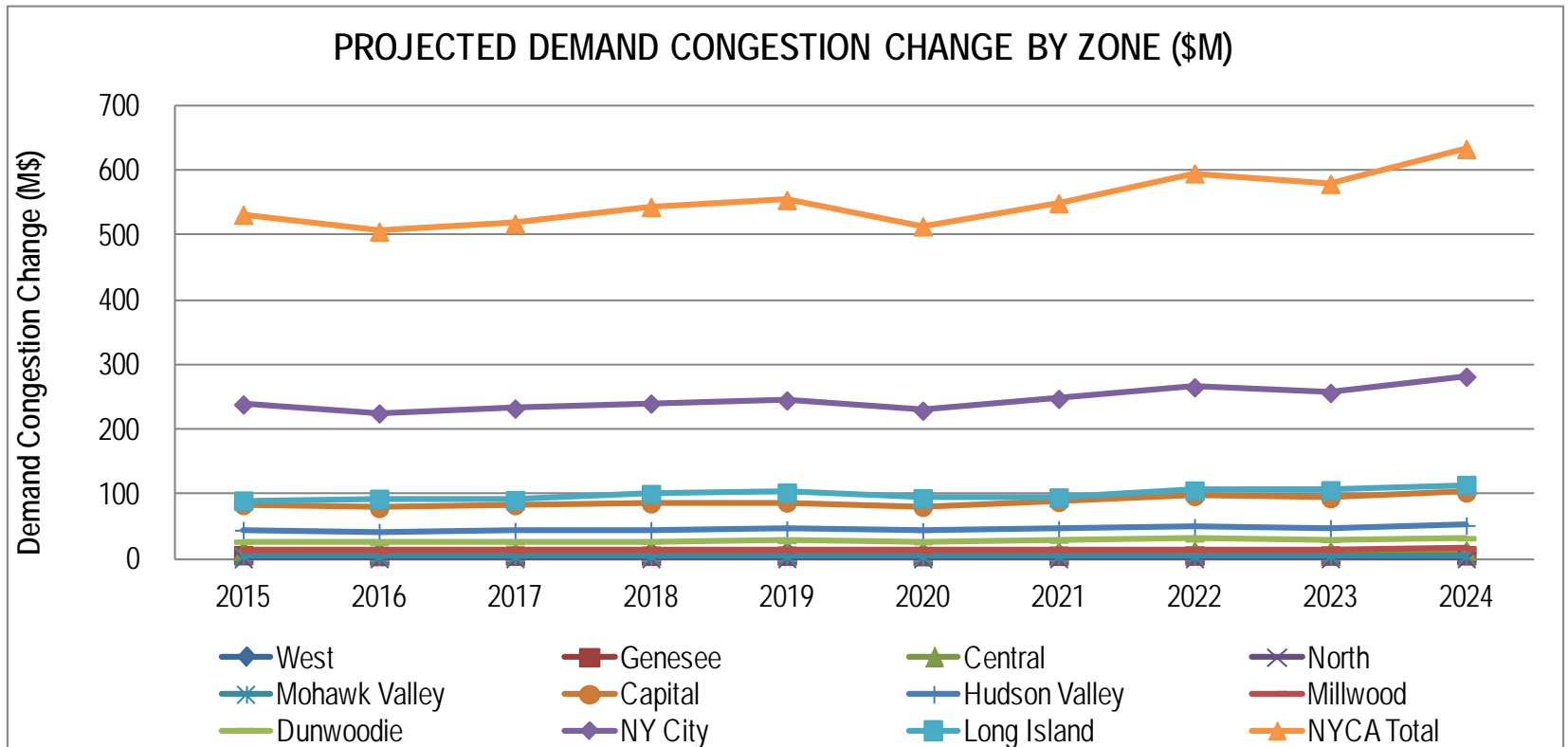
Double Natural Gas Prices Differential: Demand Congestion by Constraint (\$M)



Double Natural Gas Prices Differential: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	11.03	10.38	8.70	11.49	11.87	9.60	9.83	10.07	9.42	10.84
Genesee	6.01	4.71	5.21	5.07	5.11	4.54	5.00	5.41	5.36	5.75
Central	12.31	10.40	10.88	11.34	11.23	10.40	11.45	12.41	11.83	12.89
North	0.45	0.54	0.59	0.55	0.59	0.52	0.58	0.54	0.52	0.60
Mohawk Valley	4.95	3.65	3.82	4.03	4.01	3.79	4.19	4.59	4.40	4.83
Capital	83.48	78.88	83.43	86.11	87.38	80.65	88.29	97.39	94.04	102.86
Hudson Valley	44.59	41.59	43.18	44.51	45.55	42.51	45.77	49.09	47.46	51.84
Millwood	13.30	12.48	12.96	13.32	13.44	12.78	13.93	14.94	14.39	15.62
Dunwoodie	26.89	25.27	25.95	27.00	27.84	26.02	28.33	30.32	29.42	32.15
NY City	238.68	224.95	232.41	240.16	244.97	229.21	247.37	265.27	256.57	281.63
Long Island	90.27	93.02	90.98	100.35	102.53	93.85	95.01	105.72	106.13	114.43
NYCA Total	531.96	505.87	518.11	543.93	554.52	513.87	549.75	595.75	579.54	633.44

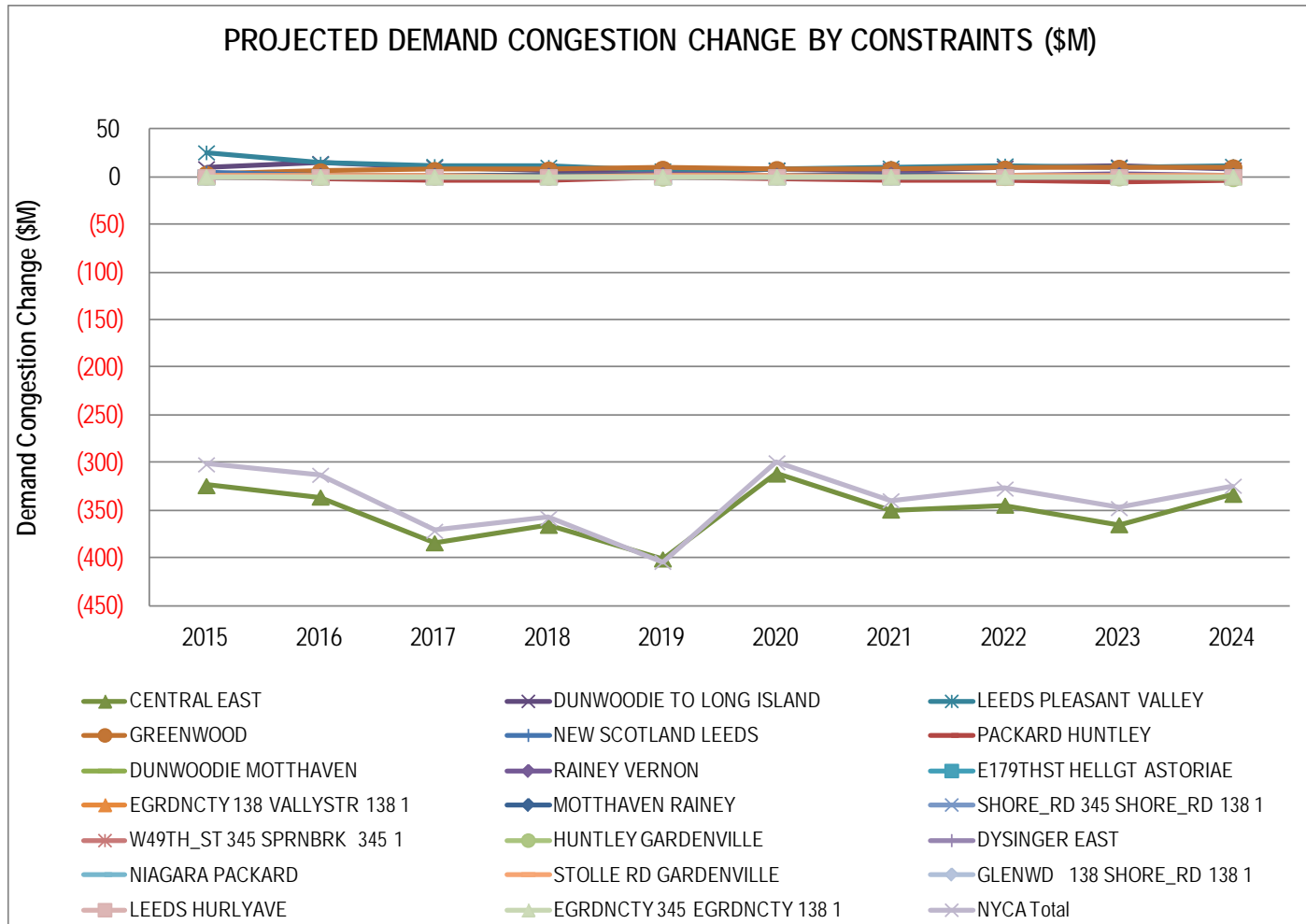
Double Natural Gas Prices Differential: Demand Congestion by Zone (\$M)



Half Natural Gas Prices Differential: Demand Congestion by Constraint (\$M)

Demand Congestion Change (\$M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CENTRAL EAST	(324.16)	(336.16)	(384.12)	(365.81)	(401.11)	(311.98)	(349.81)	(344.64)	(365.16)	(333.28)
DUNWOODIE TO LONG ISLAND	8.90	14.43	10.36	6.54	3.01	7.47	6.86	9.60	10.79	7.56
LEEDS PLEASANT VALLEY	25.56	13.87	11.29	10.42	6.55	7.46	9.58	11.86	10.02	11.41
GREENWOOD	3.33	6.14	7.49	7.92	8.78	8.50	8.43	8.97	9.89	10.31
NEW SCOTLAND LEEDS	4.10	0.69	1.25	1.03	0.22	0.02	0.36	0.32	(0.19)	(0.21)
PACKARD HUNTLEY	(0.55)	(2.59)	(3.36)	(4.38)	(0.46)	(2.50)	(3.44)	(3.68)	(4.93)	(4.13)
DUNWOODIE MOTTHAVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAINEY VERNON	0.43	1.27	1.39	1.57	2.14	1.41	2.36	1.47	2.29	1.28
E179THST HELLGT ASTORIAE	0.05	0.10	0.12	0.14	0.09	0.12	0.07	0.17	0.19	0.18
EGRDNCTY138 VALLYSTR 138 1	1.05	0.29	0.55	0.48	0.98	1.10	1.30	(0.12)	0.63	1.21
MOTTHAVEN RAINEY	0.35	0.55	0.74	0.71	0.57	0.80	0.72	1.01	1.23	1.21
SHORE_RD 345 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W49TH_ST 345 SPRNBRK 345 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNTLEY GARDENVILLE	(0.15)	(0.44)	(0.23)	(0.27)	(1.29)	0.01	0.07	(0.71)	(1.09)	(1.85)
DYSINGER EAST	0.06	0.02	0.00	0.00	0.04	0.01	0.01	(0.01)	0.01	0.00
NIAGARA PACKARD	(0.02)	0.07	(0.02)	(0.02)	(0.04)	(0.02)	(0.01)	0.00	(0.04)	(0.07)
STOLLE RD GARDENVILLE	0.76	1.18	0.81	(0.29)	0.45	1.48	(0.90)	0.89	1.47	1.59
GLENWD 138 SHORE_RD 138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEEDS HURLYAVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EGRDNCTY345 EGRDNCTY138 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NYCA Total	(301.81)	(312.80)	(371.55)	(358.04)	(404.13)	(299.70)	(339.61)	(327.25)	(347.75)	(324.26)

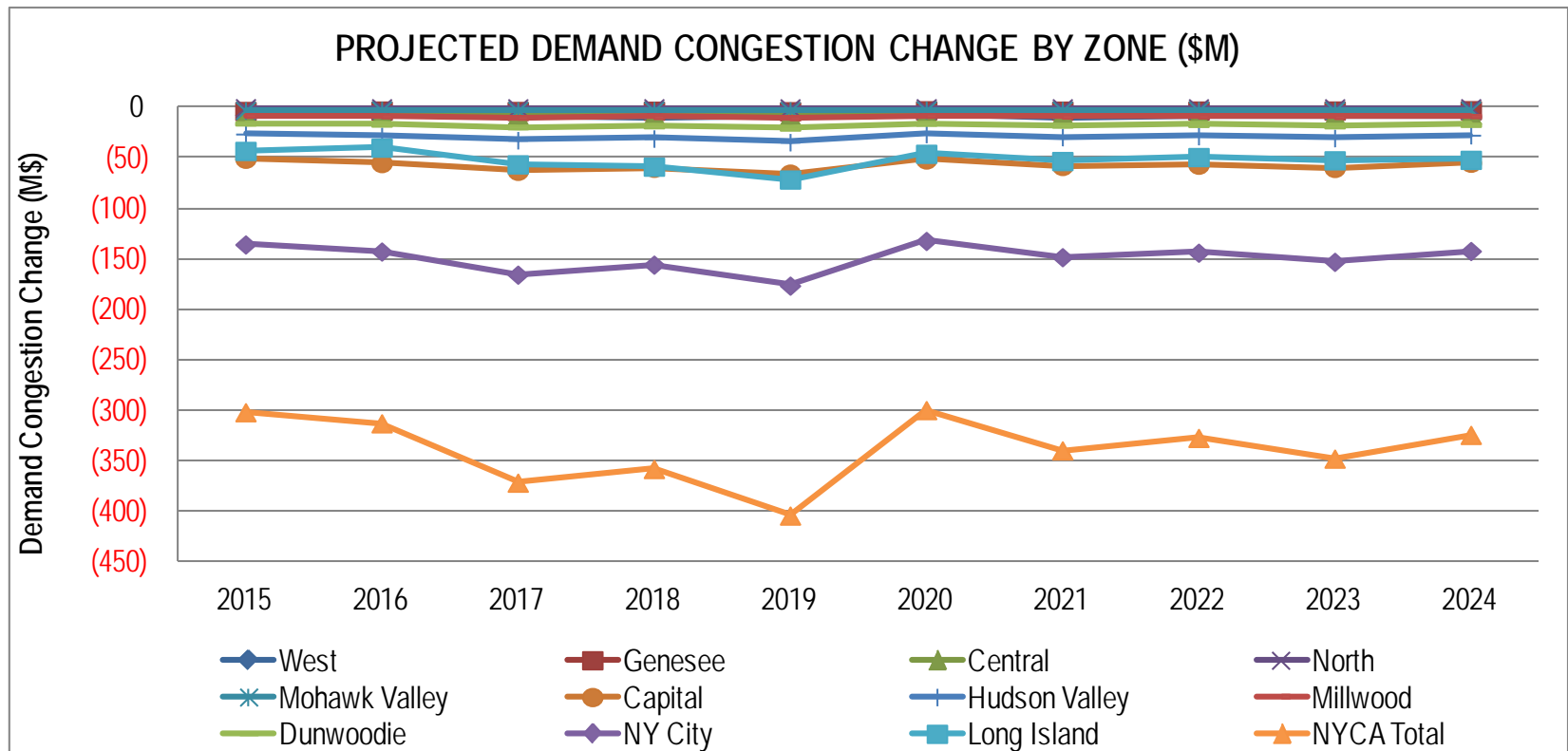
Half Natural Gas Prices Differential: Demand Congestion by Constraint (\$M)



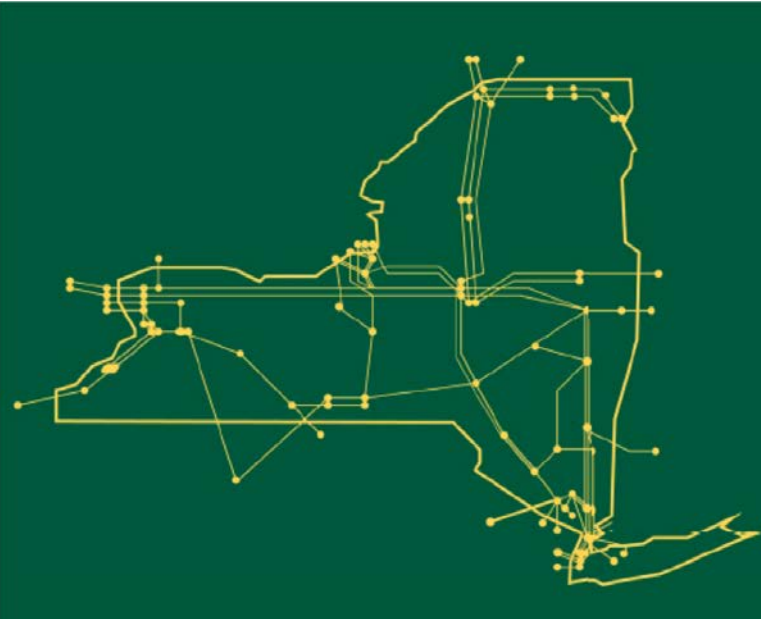
Half Natural Gas Prices Differential: Demand Congestion by Zone (\$M)

Demand Congestion Change (M\$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West	(7.28)	(7.70)	(9.21)	(10.28)	(8.59)	(6.72)	(9.93)	(8.99)	(9.54)	(8.79)
Genesee	(3.57)	(3.15)	(3.58)	(3.30)	(3.82)	(2.87)	(3.24)	(3.14)	(3.12)	(2.80)
Central	(7.68)	(7.42)	(8.49)	(8.17)	(8.74)	(6.95)	(7.63)	(7.66)	(8.18)	(7.47)
North	(0.29)	(0.37)	(0.42)	(0.38)	(0.46)	(0.37)	(0.42)	(0.44)	(0.45)	(0.35)
Mohawk Valley	(3.06)	(2.59)	(2.95)	(2.82)	(3.09)	(2.46)	(2.73)	(2.70)	(2.86)	(2.65)
Capital	(50.82)	(55.11)	(62.79)	(59.79)	(65.61)	(51.56)	(57.97)	(56.73)	(59.93)	(54.75)
Hudson Valley	(26.36)	(28.21)	(32.48)	(30.86)	(34.42)	(26.39)	(29.36)	(28.38)	(30.32)	(27.51)
Millwood	(8.10)	(8.71)	(10.07)	(9.46)	(10.57)	(8.14)	(9.02)	(8.83)	(9.37)	(8.59)
Dunwoodie	(15.82)	(16.96)	(19.54)	(18.61)	(20.91)	(16.05)	(17.89)	(17.30)	(18.65)	(17.23)
NY City	(135.73)	(142.72)	(165.60)	(155.71)	(176.49)	(132.23)	(148.31)	(143.89)	(152.93)	(142.20)
Long Island	(43.10)	(39.86)	(56.42)	(58.66)	(71.43)	(45.96)	(53.11)	(49.19)	(52.40)	(51.92)
NYCA Total	(301.81)	(312.80)	(371.55)	(358.04)	(404.13)	(299.70)	(339.61)	(327.25)	(347.75)	(324.26)

Half Natural Gas Prices Differential: Demand Congestion by Zone (\$M)



The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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