

# **Congestion in the Dominion Service Territory in North Carolina: 2022/2023 and 2023/2024**

MMUAC

December 6, 2024

IMM

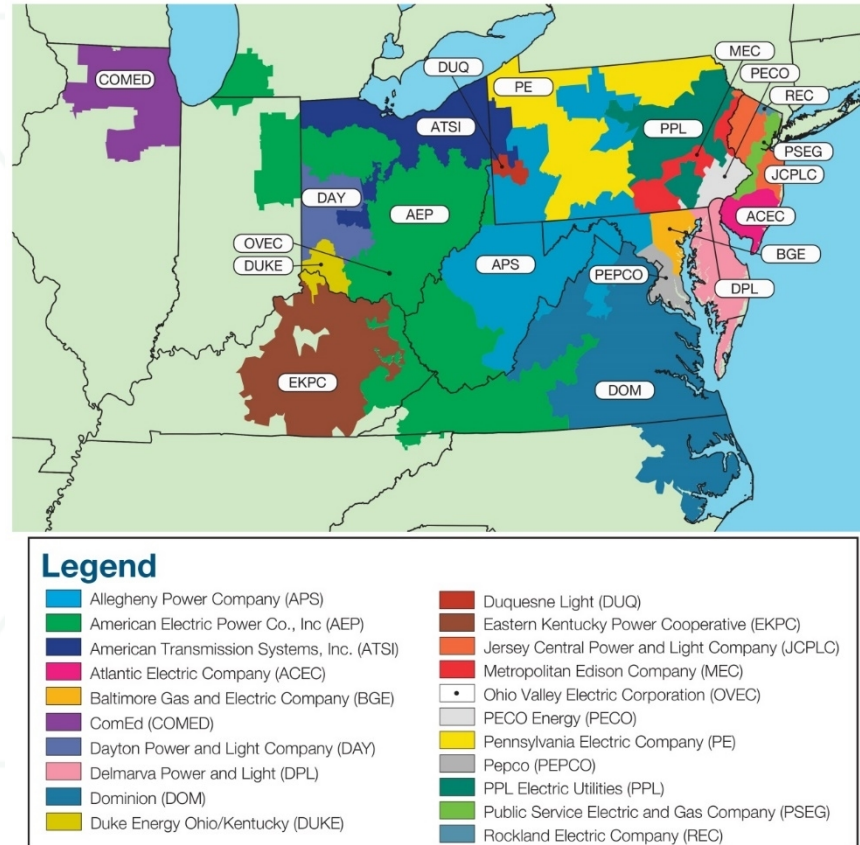


Monitoring Analytics

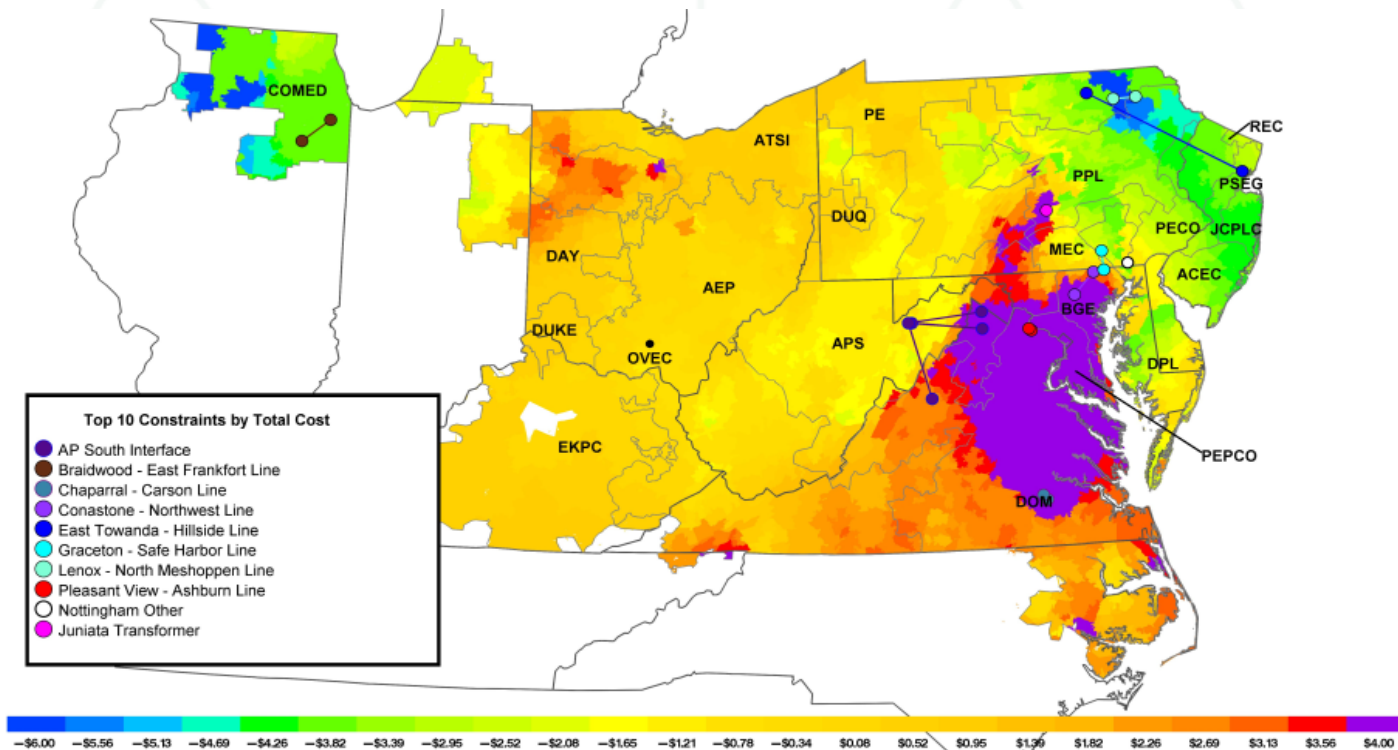
# Total Congestion Cost in DNCP

- **Congestion equals the total congestion charges paid by load in DNCP minus the total congestion credits received by all generation that supplied that load, given the transmission constraints, regardless of the location of the generation in PJM.**

# PJM's footprint and its 21 control zones



# Location of the top 10 constraints by total congestion costs: January through June, 2024



# PJM and DNCP real-time load-weighted average LMP components (Dollars per MWh): 2012/2013 through 2023/2024 planning period

Planning Period	PJM				DNCP			
	Real-Time LMP	Energy Component	Congestion Component	Loss Component	Real-Time LMP	Energy Component	Congestion Component	Loss Component
2012/2013	\$37.87	\$37.82	\$0.03	\$0.02	\$39.21	\$37.74	\$1.19	\$0.28
2013/2014	\$54.05	\$54.06	(\$0.03)	\$0.02	\$61.29	\$55.33	\$5.72	\$0.25
2014/2015	\$40.23	\$40.18	\$0.03	\$0.02	\$43.57	\$40.79	\$2.27	\$0.51
2015/2016	\$28.80	\$28.75	\$0.04	\$0.01	\$31.89	\$28.95	\$2.66	\$0.27
2016/2017	\$30.57	\$30.52	\$0.03	\$0.01	\$31.97	\$30.44	\$1.24	\$0.29
2017/2018	\$36.98	\$36.93	\$0.03	\$0.02	\$42.92	\$38.12	\$4.16	\$0.64
2018/2019	\$31.67	\$31.62	\$0.03	\$0.02	\$32.15	\$31.29	\$0.56	\$0.30
2019/2020	\$23.72	\$23.68	\$0.02	\$0.02	\$24.81	\$23.42	\$1.17	\$0.22
2020/2021	\$26.02	\$25.98	\$0.03	\$0.02	\$27.29	\$25.81	\$1.20	\$0.27
2021/2022	\$52.44	\$52.35	\$0.06	\$0.03	\$57.16	\$52.37	\$4.03	\$0.77
2022/2023	\$68.07	\$67.94	\$0.08	\$0.05	\$78.78	\$71.67	\$5.44	\$1.68
2023/2024	\$31.70	\$31.61	\$0.06	\$0.02	\$36.47	\$32.06	\$3.99	\$0.42

# PJM and DNCP day-ahead load-weighted average LMP components (Dollars per MWh): 2012/2013 through 2023/2024 planning period

Planning Period	PJM				DNCP			
	Day-Ahead LMP	Energy Component	Congestion Component	Loss Component	Day-Ahead LMP	Energy Component	Congestion Component	Loss Component
2012/2013	\$37.44	\$37.35	\$0.10	(\$0.00)	\$38.85	\$37.60	\$1.07	\$0.17
2013/2014	\$54.59	\$54.36	\$0.23	(\$0.00)	\$59.20	\$55.51	\$4.51	(\$0.82)
2014/2015	\$40.74	\$40.49	\$0.27	(\$0.02)	\$45.77	\$41.33	\$3.82	\$0.61
2015/2016	\$29.15	\$29.02	\$0.14	(\$0.01)	\$32.69	\$29.56	\$2.85	\$0.28
2016/2017	\$30.86	\$30.78	\$0.10	(\$0.02)	\$32.61	\$31.13	\$1.39	\$0.09
2017/2018	\$35.94	\$35.86	\$0.09	(\$0.01)	\$41.55	\$37.32	\$3.83	\$0.40
2018/2019	\$32.37	\$32.24	\$0.14	(\$0.01)	\$33.86	\$32.42	\$1.36	\$0.08
2019/2020	\$23.38	\$23.35	\$0.04	(\$0.01)	\$24.68	\$23.61	\$1.17	(\$0.10)
2020/2021	\$25.94	\$25.81	\$0.11	\$0.01	\$27.01	\$25.97	\$1.14	(\$0.10)
2021/2022	\$51.94	\$51.62	\$0.22	\$0.09	\$54.84	\$51.95	\$3.03	(\$0.14)
2022/2023	\$63.72	\$63.54	\$0.09	\$0.08	\$70.89	\$66.33	\$4.32	\$0.25
2023/2024	\$32.05	\$31.93	\$0.10	\$0.02	\$35.25	\$32.41	\$2.75	\$0.10

# Total congestion costs (Dollars (Millions)) for DNCP by category: 2016/2017 through 2023/2024 planning period

Planning Period	Congestion Costs (Millions)			
	Implicit Withdrawal Charges	Implicit Injection Credits	Explicit Charges	Total
2016/2017	\$1.9	(\$2.5)	(\$0.1)	\$4.3
2017/2018	\$3.3	(\$4.6)	(\$0.3)	\$7.7
2018/2019	\$1.0	(\$2.4)	(\$0.2)	\$3.2
2019/2020	\$1.0	(\$1.8)	(\$0.3)	\$2.6
2020/2021	\$2.0	(\$1.9)	(\$0.2)	\$3.6
2021/2022	\$11.1	(\$1.7)	(\$0.5)	\$12.3
2022/2023	\$5.9	(\$6.4)	(\$1.5)	\$10.8
2023/2024	\$3.9	(\$2.7)	(\$0.4)	\$6.2

# Total day-ahead and balancing congestion costs (Dollars (Millions)) for DNCP by category: 2016/2017 through 2023/2024 planning period

Planning Period	Congestion Costs (Millions)								
	Day-Ahead				Balancing				Grand Total
	Implicit	Implicit	Explicit	Total	Implicit	Implicit	Explicit	Total	
	Withdrawal	Injection			Withdrawal	Injection			
Charges	Credits	Charges	Charges	Credits	Charges	Credits	Charges	Total	
2016/2017	\$1.9	(\$2.8)	\$0.1	\$4.8	(\$0.0)	\$0.3	(\$0.2)	(\$0.4)	\$4.3
2017/2018	\$3.0	(\$5.3)	(\$0.4)	\$7.8	\$0.4	\$0.6	\$0.1	(\$0.1)	\$7.7
2018/2019	\$1.0	(\$2.7)	\$0.1	\$3.9	(\$0.0)	\$0.3	(\$0.4)	(\$0.7)	\$3.2
2019/2020	\$1.0	(\$2.1)	\$0.2	\$3.3	\$0.0	\$0.2	(\$0.5)	(\$0.7)	\$2.6
2020/2021	\$2.5	(\$2.2)	\$0.3	\$5.0	(\$0.5)	\$0.3	(\$0.6)	(\$1.4)	\$3.6
2021/2022	\$11.9	(\$3.1)	\$0.7	\$15.8	(\$0.8)	\$1.4	(\$1.3)	(\$3.5)	\$12.3
2022/2023	\$5.7	(\$6.6)	\$0.8	\$13.1	\$0.3	\$0.3	(\$2.3)	(\$2.3)	\$10.8
2023/2024	\$3.9	(\$3.3)	\$0.8	\$8.0	\$0.0	\$0.6	(\$1.2)	(\$1.7)	\$6.2



# Monthly congestion costs (Dollars (Millions)) for DNCP: 2022/2023 and 2023/2024 planning period

Month	Congestion Costs (Millions)					
	2022/2023			2023/2024		
	Day-Ahead	Balancing	Total	Day-Ahead	Balancing	Total
Jun	\$0.9	(\$0.2)	\$0.7	\$0.4	(\$0.1)	\$0.4
Jul	\$1.1	(\$0.2)	\$0.9	\$0.7	(\$0.2)	\$0.6
Aug	\$2.0	(\$0.3)	\$1.7	\$0.7	(\$0.1)	\$0.5
Sep	\$2.0	(\$0.2)	\$1.9	\$0.8	(\$0.1)	\$0.7
Oct	\$0.7	(\$0.1)	\$0.7	\$0.8	(\$0.1)	\$0.6
Nov	\$1.4	(\$0.2)	\$1.2	\$0.7	(\$0.2)	\$0.5
Dec	\$2.5	(\$0.4)	\$2.1	\$0.5	(\$0.1)	\$0.4
Jan	\$0.4	(\$0.1)	\$0.4	\$1.0	(\$0.3)	\$0.8
Feb	\$0.5	(\$0.1)	\$0.4	\$0.3	(\$0.1)	\$0.2
Mar	\$0.3	(\$0.1)	\$0.2	\$0.4	(\$0.1)	\$0.3
Apr	\$0.8	(\$0.2)	\$0.6	\$0.5	(\$0.1)	\$0.4
May	\$0.4	(\$0.2)	\$0.2	\$1.1	(\$0.2)	\$0.9
Total	\$13.1	(\$2.3)	\$10.8	\$8.0	(\$1.7)	\$6.2

# Congestion cost (Dollars (Millions)) details for the top 16 constraints affecting the DNCP congestion costs: 2023/2024 planning period

Constraint	Type	Location	Day-Ahead			Congestion Costs (Millions) Balancing			Total		Grand Total
			Internal	External	Total	Internal	External	Total	Internal	External	
Nottingham	Other	PECO	\$0.0	\$1.2	\$1.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$1.2	\$1.2
Conastone - Northwest	Line	BGE	\$0.0	\$0.6	\$0.6	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.6	\$0.6
Graceton - Safe Harbor	Line	BGE	\$0.0	\$0.4	\$0.4	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.4	\$0.4
AP South	Interface	500	\$0.0	\$0.5	\$0.5	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.4	\$0.4
Possum Point	Transformer	DOM	\$0.0	\$0.3	\$0.3	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.3	\$0.3
Pleasant View - Ashburn	Line	DOM	\$0.0	\$0.3	\$0.3	\$0.0	(\$0.1)	(\$0.1)	\$0.0	\$0.2	\$0.2
Coolspring - Milford	Line	DPL	\$0.0	\$0.2	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	\$0.2
East Towanda - Hillside	Line	PE	\$0.0	\$0.2	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	\$0.2
Lenox - North Meshoppen	Line	PE	\$0.0	\$0.4	\$0.4	\$0.0	(\$0.2)	(\$0.2)	\$0.0	\$0.2	\$0.2
Collins	Transformer	COMED	\$0.0	\$0.2	\$0.2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.2	\$0.2
Chaparral - Carson	Line	DOM	\$0.0	\$0.1	\$0.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.1
Bedington - Black Oak	Interface	500	\$0.0	\$0.1	\$0.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.1
Conastone	Transformer	500	\$0.0	\$0.1	\$0.1	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.1	\$0.1
Stillwell - Dumont	Line	MISO	\$0.0	\$0.1	\$0.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.1
Conastone - Peach Bottom	Line	500	\$0.0	\$0.1	\$0.1	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.1	\$0.1
Dickerson - Dickerson Station	Line	PEPCO	\$0.0	\$0.1	\$0.1	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.1	\$0.1
Top 16 Total			\$0.0	\$4.9	\$4.9	\$0.0	(\$0.5)	(\$0.5)	\$0.0	\$4.5	\$4.5
All Other Constraints			\$0.1	\$2.9	\$3.0	(\$0.0)	(\$1.3)	(\$1.3)	\$0.1	\$1.7	\$1.8
Total			\$0.1	\$7.8	\$8.0	(\$0.0)	(\$1.7)	(\$1.7)	\$0.1	\$6.1	\$6.2

# Top 16 constraints affecting DNCP congestion costs: 2023/2024 planning period

Constraint	Type	Location	Event Hours	
			Day-Ahead	Real-Time
Nottingham	Other	PECO	5,676	3,407
Conastone - Northwest	Line	BGE	923	553
Graceton - Safe Harbor	Line	BGE	2,821	1,627
AP South	Interface	500	284	110
Possum Point	Transformer	DOM	424	102
Pleasant View - Ashburn	Line	DOM	345	67
Coolspring - Milford	Line	DPL	324	127
East Towanda - Hillside	Line	PE	1,468	1,234
Lenox - North Meshoppen	Line	PE	2,880	3,327
Collins	Transformer	COMED	1,510	-
Chaparral - Carson	Line	DOM	513	-
Bedington - Black Oak	Interface	500	149	-
Conastone	Transformer	500	119	114
Stillwell - Dumont	Line	MISO	626	-
Conastone - Peach Bottom	Line	500	445	255
Dickerson - Dickerson Station	Line	PEPCO	275	164
Top 16 Total			18,782	11,087
All Other Constraints			21,694	15,270
Total			40,476	26,357

# Congestion cost details for the top 16 constraints affecting DNCP: 2022/2023 planning period

			Congestion Costs (Millions)								
			Day-Ahead			Balancing			Total		
Constraint	Type	Location	Internal	External	Total	Internal	External	Total	Internal	External	Total
Brambleton - Evergreen Mills	Line	DOM	\$0.0	\$2.3	\$2.3	\$0.0	(\$0.5)	(\$0.5)	\$0.0	\$1.8	\$1.8
Nottingham	Other	PECO	\$0.0	\$1.5	\$1.5	\$0.0	(\$0.1)	(\$0.1)	\$0.0	\$1.5	\$1.5
AP South	Interface	500	\$0.0	\$0.8	\$0.8	\$0.0	(\$0.1)	(\$0.1)	\$0.0	\$0.8	\$0.8
Beaumeade	Other	DOM	\$0.0	\$0.8	\$0.8	\$0.0	(\$0.2)	(\$0.2)	\$0.0	\$0.6	\$0.6
Conastone - Northwest	Line	BGE	\$0.0	\$0.5	\$0.5	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.5	\$0.5
Cumberland - Juniata	Line	PPL	\$0.0	\$0.4	\$0.4	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.4	\$0.4
Bull Run - Clifton	Line	DOM	\$0.0	\$0.3	\$0.3	\$0.0	\$0.0	\$0.0	\$0.0	\$0.3	\$0.3
Boonetown - South Reading	Line	MEC	\$0.0	\$0.3	\$0.3	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.3	\$0.3
Pleasant View	Transformer	DOM	\$0.0	\$0.3	\$0.3	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	\$0.2
Lauschtown	Transformer	500	\$0.0	\$0.2	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	\$0.2
Maroa E - Goose Creek	Flowgate	MISO	\$0.0	\$0.2	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	\$0.2
Ashburn - Cochran Mill	Line	DOM	\$0.0	\$0.2	\$0.2	\$0.0	(\$0.1)	(\$0.1)	\$0.0	\$0.2	\$0.2
Allen - R.P. Mone	Line	AEP	\$0.0	\$0.2	\$0.2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.2	\$0.2
Dauphin - Juniata	Line	PPL	\$0.0	\$0.2	\$0.2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.2	\$0.2
Graceton - Safe Harbor	Line	BGE	\$0.0	\$0.2	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	\$0.2
Bedington - Black Oak	Interface	500	\$0.0	\$0.2	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	\$0.2
Top 16 Total			\$0.0	\$8.6	\$8.6	\$0.0	(\$1.0)	(\$1.0)	\$0.0	\$7.5	\$7.5
All Other Constraints			\$0.0	\$4.5	\$4.5	(\$0.0)	(\$1.3)	(\$1.3)	\$0.0	\$3.2	\$3.3
Total			\$0.0	\$13.1	\$13.1	(\$0.0)	(\$2.3)	(\$2.3)	\$0.0	\$10.8	\$10.8

# Top 16 constraints affecting DNCP congestion costs: 2022/2023 planning period

Constraint	Type	Location	Event Hours	
			Day-Ahead	Real-Time
Brambleton - Evergreen Mills	Line	DOM	638	479
Nottingham	Other	PECO	5,673	3,485
AP South	Interface	500	430	97
Beaumeade	Other	DOM	457	386
Conastone - Northwest	Line	BGE	785	291
Cumberland - Juniata	Line	PPL	495	255
Bull Run - Clifton	Line	DOM	155	50
Boonetown - South Reading	Line	MEC	1,631	1,021
Pleasant View	Transformer	DOM	86	65
Lauschtown	Transformer	500	345	107
Maroa E - Goose Creek	Flowgate	MISO	325	181
Ashburn - Cochran Mill	Line	DOM	132	107
Allen - R.P. Mone	Line	AEP	2,109	162
Dauphin - Juniata	Line	PPL	291	0
Graceton - Safe Harbor	Line	BGE	1,344	435
Bedington - Black Oak	Interface	500	111	1
Top 16 Total			15,007	7,122
All Other Constraints			26,623	14,993
Total			41,630	22,115

# DNCP ARR and FTR total congestion offset (in millions) for ARR holders: 2018/2019 through 2023/2024 planning period

Planning Period	ARR Credits	FTR Credits	Balancing + M2M Charge	Surplus Allocation	Total Offset	Day-Ahead Congestion	Balancing Congestion	M2M Payments	Total Congestion	Offset
2018/2019	\$0.3	\$1.6	(\$0.7)	\$0.3	\$1.6	\$3.9	(\$0.7)	(\$0.1)	\$3.0	54.6%
2019/2020	\$0.4	\$1.2	(\$0.8)	\$0.5	\$1.2	\$3.3	(\$0.7)	(\$0.0)	\$2.5	48.9%
2020/2021	\$1.0	\$3.6	(\$1.6)	\$0.0	\$3.0	\$5.0	(\$1.4)	(\$0.0)	\$3.5	84.9%
2021/2022	\$1.3	\$14.9	(\$3.6)	\$0.0	\$12.6	\$15.8	(\$3.5)	(\$0.1)	\$12.2	103.1%
2022/2023	\$2.2	\$18.7	(\$3.7)	\$0.4	\$17.6	\$13.1	(\$2.3)	(\$0.9)	\$9.9	177.7%
2023/2024	\$5.6	\$10.4	(\$1.9)	\$0.2	\$14.2	\$8.0	(\$1.7)	(\$0.2)	\$6.0	236.0%
Total	\$10.8	\$50.3	(\$12.3)	\$1.4	\$50.3	\$49.0	(\$10.4)	(\$1.4)	\$37.2	135.1%

# Offset available to load if all ARRs self scheduled: 2018/2019 through 2023/2024 planning period

Planning Period	SS FTR	Bal+M2M	Congestion +M2M	Offset
2018/2019	\$2.1	(\$0.7)	\$3.0	46.0%
2019/2020	\$1.3	(\$0.7)	\$2.5	24.9%
2020/2021	\$4.9	(\$1.6)	\$3.5	93.6%
2021/2022	\$25.3	(\$3.6)	\$12.2	177.8%
2022/2023	\$28.4	(\$3.7)	\$9.9	249.9%
2023/2024	\$14.0	(\$1.9)	\$6.0	200.0%
Total	\$75.9	(\$12.1)	\$37.2	171.5%

# Share of ARR and congestion that source in/out of the Dominion Zone : 2020/2021 through 2023/2024 planning period

Planning Period	Stage 1A		Stage 1B		Stage 2		Total		Congestion	
	Out of Zone	In Zone	Out of Zone	In Zone	Out of Zone	In Zone	Out of Zone	In Zone	Out of Zone	In Zone
2020/2021	0.4%	64.1%	0.0%	34.2%	0.0%	1.4%	0.4%	99.6%	75.1%	24.9%
2021/2022	0.3%	61.1%	0.0%	37.6%	0.0%	0.9%	0.4%	99.6%	54.7%	45.3%
2022/2023	0.1%	67.4%	0.0%	31.7%	0.0%	0.8%	34.6%	65.4%	75.0%	25.0%
2023/2024	0.4%	85.4%	0.1%	5.8%	0.0%	8.4%	0.4%	99.6%	87.8%	12.2%



# Stage 1A overallocated ARR MW by source in/out of Dominion Zone: 2020/2021 through 2023/2024 planning period

Planning Period	Out of Zone MW	In Zone MW
2020/2021	0	250.9
2021/2022	0	661.9
2022/2023	0	1,072.0
2023/2024	3.9	4,757.3

**Monitoring Analytics, LLC**

**2621 Van Buren Avenue**

**Suite 160**

**Eagleview, PA**

**19403**

**(610) 271-8050**

**[MA@monitoringanalytics.com](mailto:MA@monitoringanalytics.com)**

**[www.MonitoringAnalytics.com](http://www.MonitoringAnalytics.com)**

