

Chapter 9 - Appendix A
Alternative Resource Plans

Table 9A.1 Unconstrained RES Compliance Model with RAP DSM

Table with 2 main sections: TERM 1 and TERM 2. Each section shows resource additions (MW's Installed New Solar, MW's Installed New Wind), revenue requirements, and percentage increase over time (2021-2030 for Term 1, 2031-2040 for Term 2).

Table 9A.2 Type, Size, Timing of Resource Addition/Retirement1

Large data table with 19 columns (years 2020-2040) and 7 main sections: Plan A - RAP DSM - RES Compliance, Plan B - Renewable Expansion, Plan C - No New DSM - CC, Plan D - No New DSM - All Solar, Plan E - No New DSM - Pumped Hydro, and two sections for Existing Resources and Purchases.

1 20 CSR 4240-22.060(4)(B)9

how much project costs might deviate and the probabilities associated with that. This approach was an attempt to standardize and add more objectivity to a subjective step and also was consistent with Ameren's project approval and project management practices.

Project Cost Uncertainty Distribution

Technology	Estimate Class	Item	Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Combined Cycle	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	10%	20%	50%	15%	5%
Simple Cycle	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	10%	20%	50%	15%	5%
Nuclear	Class 5	Deviation	-20%	-10%	0%	60%	120%
		Probability	5%	15%	40%	25%	15%
Pumped Storage	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	40%	25%	5%
Hydro	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	40%	25%	5%
Li-Ion 4hr - Battery	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	40%	25%	15%
Wind	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	20%	50%	20%	5%
Solar PV	Class 5	Deviation	-10%	-5%	0%	5%	10%
		Probability	5%	20%	50%	20%	5%

FOM Uncertainty Distribution ⁴

Technology	Item	Low Cost	Low Mid Point Cost	Expected Value	High Mid Point Cost	High Cost
Combined Cycle	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Simple Cycle	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Nuclear	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	20%	35%	30%	10%
Pumped Storage	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Hydro	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Li-Ion 4hr - Battery	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Wind	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Solar PV	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%

VOM Uncertainty Distribution

Technology	Item	Low Cost	Low Mid Point Cost	Expected Value	Mid High Point Cost	High Mid Point Cost	High Cost
Combined Cycle	Deviation		-50%	0%	33%	38%	
	Probability		25%	45%	25%	5%	
Simple Cycle	Deviation		-50%	0%	50%		
	Probability		25%	50%	25%		
Nuclear	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Pumped Storage	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Hydro	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Li-Ion 4hr - Battery	Deviation	Assumed all O&M costs are fixed					
	Probability	Assumed all O&M costs are fixed					
Wind	Deviation	Assumed all O&M costs are fixed					
	Probability	Assumed all O&M costs are fixed					
Solar PV	Deviation	Assumed all O&M costs are fixed					
	Probability	Assumed all O&M costs are fixed					

⁴ 20 CSR 4240-22.060(5)(I)

Project Schedule Uncertainty Distribution ⁵

Technology	Item	Low	Low Mid Point	Expected Value	High Mid Point	High
Combined Cycle	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	50%	15%	5%
Simple Cycle	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	50%	15%	5%
Nuclear	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Pumped Storage	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Hydro	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Li-Ion 4hr - Battery	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Wind	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Solar PV	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%

EFOR Uncertainty Distribution ⁶

Technology	Item	Low	Low Mid Point	Expected Value	High Mid Point	High
Combined Cycle	Deviation		-1%	0%	2%	
	Probability		25%	50%	25%	
Simple Cycle	Deviation		-4%	0%	4%	
	Probability		25%	50%	25%	
Nuclear	Deviation		-1%	0%	1%	
	Probability		20%	50%	30%	
Pumped Storage	Deviation		-4%	0%	4%	
	Probability		25%	50%	25%	
Hydro	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Li-Ion 4hr - Battery	Deviation	Included as part of capacity factor				
	Probability	Included as part of capacity factor				
Wind	Deviation	Included as part of capacity factor				
	Probability	Included as part of capacity factor				
Solar PV	Deviation	Included as part of capacity factor				
	Probability	Included as part of capacity factor				

⁵ 20 CSR 4240-22.060(5)(F)

⁶ 20 CSR 4240-22.060(5)(J)

Environmental CapEx Uncertainty Distribution

Technology	Item	Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Labadie - Ash Landfill	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	10%	55%	20%	10%
Labadie - DSI	Deviation	-20%	-10%	0%	15%	30%
	Probability	10%	20%	40%	20%	10%
Rush Island - FGD	Deviation	-20%	-10%	0%	15%	30%
	Probability	10%	20%	40%	20%	10%

Retirement Transmission CapEx Uncertainty Distribution⁷

Technology	Item	Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Sioux	Deviation	-40%	-20%	0%	35%	70%
	Probability	5%	15%	40%	30%	10%
Labadie	Deviation	-40%	-20%	0%	35%	70%
	Probability	5%	15%	40%	30%	10%
Rush Island	Deviation	-40%	-20%	0%	35%	70%
	Probability	5%	15%	40%	30%	10%

⁷ 20 CSR 4240-22.060(5)(E)

Table 9A.4 Sensitivity Analysis: *Change in PVRR Ranking*⁸

Plan	Integration Ranking	DSM Load Impact & Cost			DSM Cost Only			ROE-Interest Rate			Project Cost			Project Schedule			Fixed and Variable O&M			Coal Price			EFOR		
		PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High
A-RAP DSM - RES Compliance	4	0	0	0	0	0	0	0	2	-2	0	3	-3	0	0	-3	0	1	-3	0	-1	3	0	0	0
B-Renewable Expansion	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	4	0	0	0
C-No New DSM - CCs	18	0	0	0	0	0	-2	0	-1	0	0	-2	0	0	0	0	0	-2	0	0	0	0	0	0	0
D-No New DSM - All Solar	15	0	0	0	-1	0	-7	0	-3	0	0	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0
E-No New DSM - Bumped Hydro	20	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F-No New DSM - AP1000	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G-No New DSM - Simple Cycles	17	0	0	0	0	0	-2	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
H-MAP DSM - Renewable Expansion	14	0	-1	-1	1	-4	3	0	0	0	0	0	-3	0	0	0	0	0	-1	0	0	0	0	0	0
I-MAP DSM - RES Compliance	10	0	-1	1	2	-2	4	0	5	-1	0	5	-2	-1	1	-1	-1	3	-2	0	-1	1	0	0	0
J-DOPE1 DSM	13	0	1	1	0	1	0	0	0	0	0	-1	0	0	0	-1	0	-1	1	0	0	0	0	0	0
K-DOPE2 DSM	11	1	-1	1	-1	2	1	0	0	0	0	0	-1	0	-1	0	0	-2	0	0	0	1	0	0	0
L-Labadie Early Retirement - 1 units	8	0	0	0	0	1	1	0	0	0	0	2	1	0	0	0	0	0	1	0	0	0	0	0	0
M-Labadie Early Retirement - 2 units	7	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0	-1	0	0	0
N-Sioux Early Retirement	2	0	0	0	0	0	0	0	0	1	0	0	5	0	0	1	0	1	1	1	0	2	0	0	0
O-Rush Early Retirement	5	0	0	0	0	0	0	0	-1	0	0	-1	-3	0	0	0	0	-1	0	0	0	-4	0	0	0
P-Sioux-Rush Early Retirement	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	-1	1	-1	1	0	0	0	0
Q-Sioux-Rush Early Retirement - No CCs	12	-1	0	-2	-1	0	-1	0	-3	0	0	-4	3	0	0	1	0	-1	0	0	0	-3	0	0	0
R-Rush Early Retirement 2	6	0	0	0	0	0	0	0	-1	0	0	-1	-1	0	0	0	0	0	0	0	0	-4	0	0	0
S-Rush FGD	9	0	2	0	0	2	1	0	1	1	0	0	3	1	0	1	1	1	1	0	1	1	0	0	0
T-Rush FGD - Labadie DSI	19	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U-Rush Early Retirement 2 - Labadie DSI	16	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0

⁸ 20 CSR 4240-22.060(6)

*** Table 9A.5 Sensitivity Analysis: *Change in PVR*⁹

Plan	Integration Ranking	DSM Load Impact & Cost			DSM Cost Only			ROE-Interest Rate			Project Cost			Project Schedule			Fixed and Variable O&M			Coal Price			EFOR		
		PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High	PWA	Low	High
A-RAP DSM - RES Compliance	65,981	(26)	36	(293)	19	(260)	447	(128)	(1,715)	436	37	(782)	1,149	1	(14)	19	(1)	(99)	91	53	(258)	792	2	6	15
B-Renewable Expansion	65,921	(26)	36	(293)	19	(260)	447	(140)	(1,885)	480	36	(1,041)	1,403	9	(27)	117	5	(136)	186	53	(258)	792	0	1	3
C-No New DSM - CCs	67,880	-	-	-	-	-	-	(148)	(1,991)	508	38	(1,256)	1,632	10	(45)	143	4	(291)	331	53	(258)	792	4	12	29
D-No New DSM - All Solar	66,709	-	-	-	-	-	-	(150)	(2,018)	515	34	(1,166)	1,506	10	(37)	133	6	(127)	187	53	(258)	792	-	-	-
E-No New DSM - Bumped Hydro	68,384	-	-	-	-	-	-	(151)	(2,028)	518	37	(1,314)	1,687	11	(67)	174	4	(246)	286	53	(258)	792	3	15	18
F-No New DSM - AP1000	75,700	-	-	-	-	-	-	(203)	(2,736)	706	268	(5,352)	8,034	13	(505)	640	9	(370)	461	53	(258)	792	1	(9)	23
G-No New DSM - Simple Cycles	67,877	-	-	-	-	-	-	(148)	(1,988)	507	38	(1,252)	1,627	10	(45)	143	4	(261)	306	53	(258)	792	3	10	24
H-MAP DSM - Renewable Expansion	66,687	(17)	(51)	(121)	71	(498)	1,210	(139)	(1,860)	474	36	(1,005)	1,365	9	(24)	113	5	(113)	168	53	(258)	792	-	-	-
I-MAP DSM - RES Compliance	66,540	(17)	(51)	(121)	71	(498)	1,210	(124)	(1,669)	425	36	(697)	1,060	0	(6)	9	(1)	(46)	39	53	(258)	792	1	3	6
J-DOPE1 DSM	66,636	-	-	-	43	(161)	587	(143)	(1,915)	488	37	(1,098)	1,464	9	(32)	124	5	(174)	221	53	(258)	792	1	4	9
K-DOPE2 DSM	66,563	-	-	-	35	(137)	486	(143)	(1,916)	488	37	(1,098)	1,464	9	(32)	124	5	(174)	221	53	(258)	792	1	4	9
L-Labadie Early Retirement - 1 units	66,378	(26)	36	(293)	19	(260)	447	(139)	(1,862)	474	26	(971)	1,233	9	(34)	128	5	(218)	268	30	(174)	476	3	8	20
M-Labadie Early Retirement - 2 units	66,137	(26)	36	(293)	19	(260)	447	(138)	(1,857)	473	30	(944)	1,240	9	(27)	117	5	(136)	186	38	(204)	589	0	1	3
N-Sioux Early Retirement	65,954	(26)	36	(293)	19	(260)	447	(140)	(1,877)	478	36	(1,060)	1,424	9	(27)	117	5	(136)	186	50	(245)	746	0	1	3
O-Rush Early Retirement	66,016	(26)	36	(293)	19	(260)	447	(139)	(1,861)	474	31	(990)	1,299	9	(29)	120	5	(151)	203	38	(195)	578	1	2	6
P-Sioux-Rush Early Retirement	65,958	(26)	36	(293)	19	(260)	447	(140)	(1,873)	477	34	(1,042)	1,380	9	(29)	120	5	(151)	203	46	(225)	685	1	2	6
Q-Sioux-Rush Early Retirement - No CCs	66,583	(26)	36	(293)	19	(260)	447	(149)	(1,996)	509	34	(1,297)	1,634	14	(38)	180	9	(180)	266	46	(225)	685	-	-	-
R-Rush Early Retirement 2	66,079	(26)	36	(293)	19	(260)	447	(138)	(1,853)	472	30	(977)	1,274	9	(29)	120	5	(151)	203	35	(179)	531	1	2	6
S-Rush FGD	66,537	(26)	36	(293)	19	(260)	447	(143)	(1,917)	489	39	(1,147)	1,536	9	(27)	117	5	(136)	186	52	(247)	765	0	1	3
T-Rush FGD - Labadie DSI	68,200	(26)	36	(293)	19	(260)	447	(144)	(1,927)	491	40	(1,187)	1,586	9	(27)	117	5	(136)	186	44	(239)	675	0	1	3
U-Rush Early Retirement 2 - Labadie DSI	67,742	(26)	36	(293)	19	(260)	447	(139)	(1,863)	475	31	(1,017)	1,324	9	(29)	120	5	(151)	203	27	(171)	441	1	2	6

⁹ 20 CSR 4240-22.060(6)

Table 9A.6 DSM Participant Costs (\$Million)¹⁰

DSM Program	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
RAP	56	58	60	62	64	71	48	50	52	55	68	74	79	80	80	85	76	73	73
MAP	2	3	4	3	2	2	2	2	2	2	2	4	5	6	5	4	4	4	4
DOPE1	1	1	1	2	2	3	21	40	58	61	62	64	66	72	49	51	53	57	69
DOPE2	23	24	25	26	27	29	25	26	27	28	28	29	30	30	30	36	36	36	37

¹⁰ 20 CSR 4240-22.060(2)(A)3

Figure 9A.1 Combined Impact of DSM on Summer Peak Demand¹¹

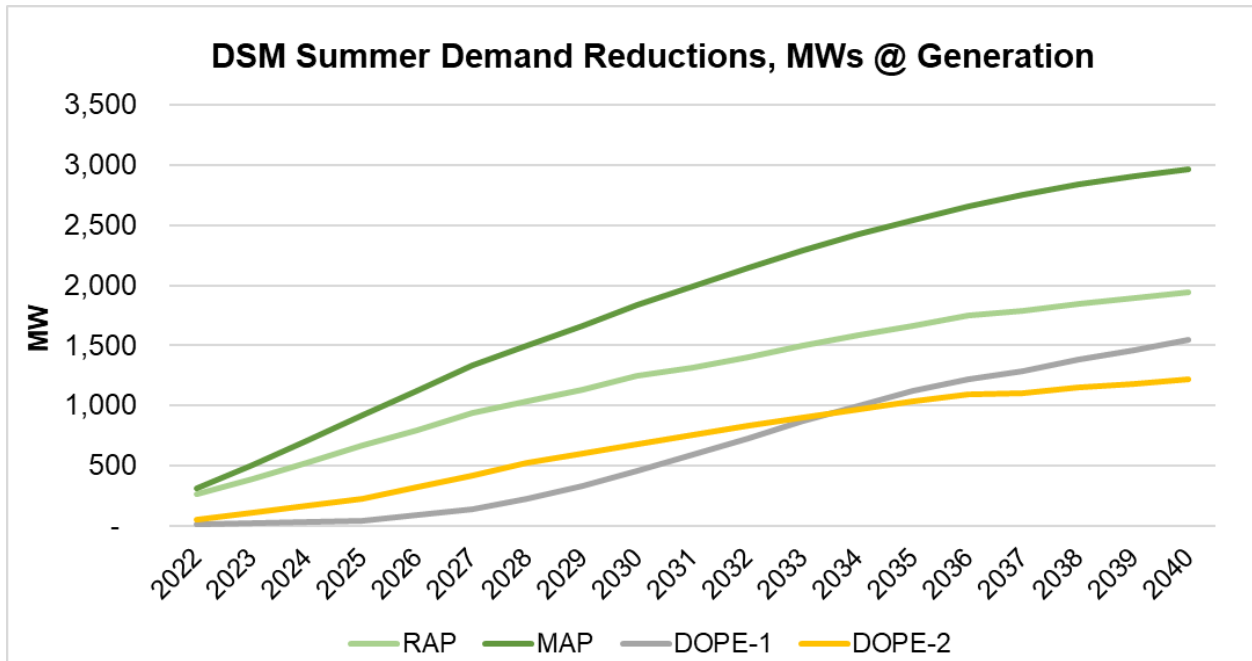
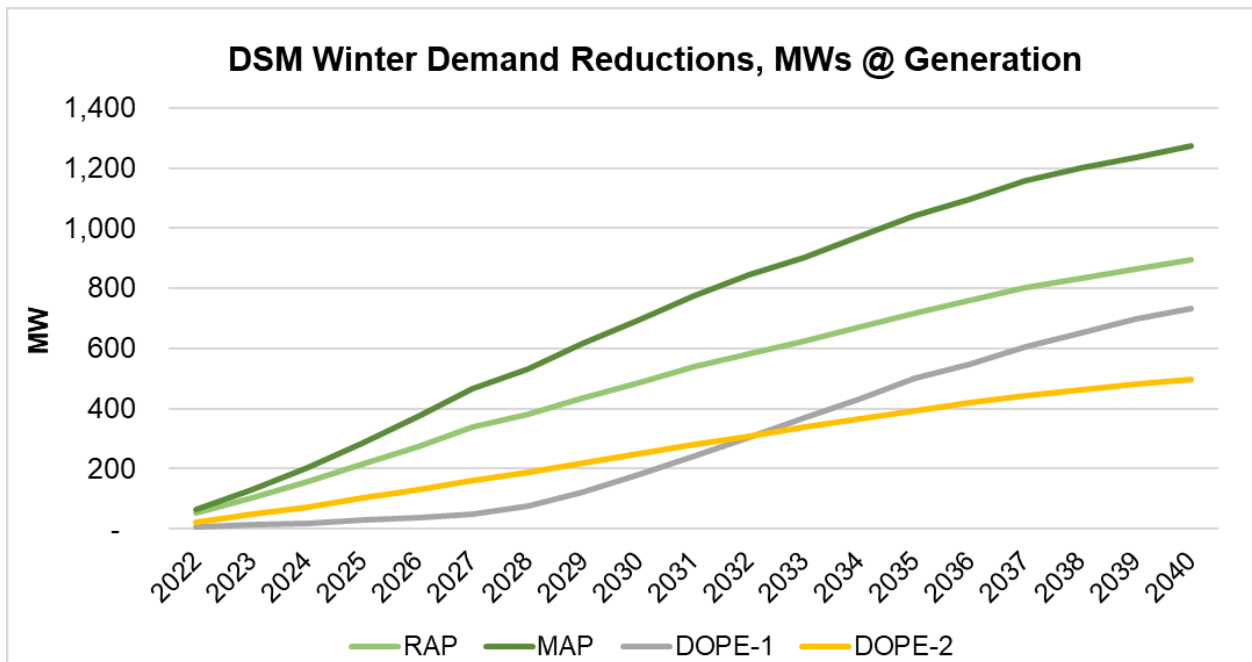


Figure 9A.2 Combined Impact of DSM on Winter Peak Demand¹²



¹¹ 20 CSR 4240-22.060(4)(B)1

¹² 20 CSR 4240-22.060(4)(B)1

Figure 9A.3 Stacked Programs for RAP DSM Capacity¹³

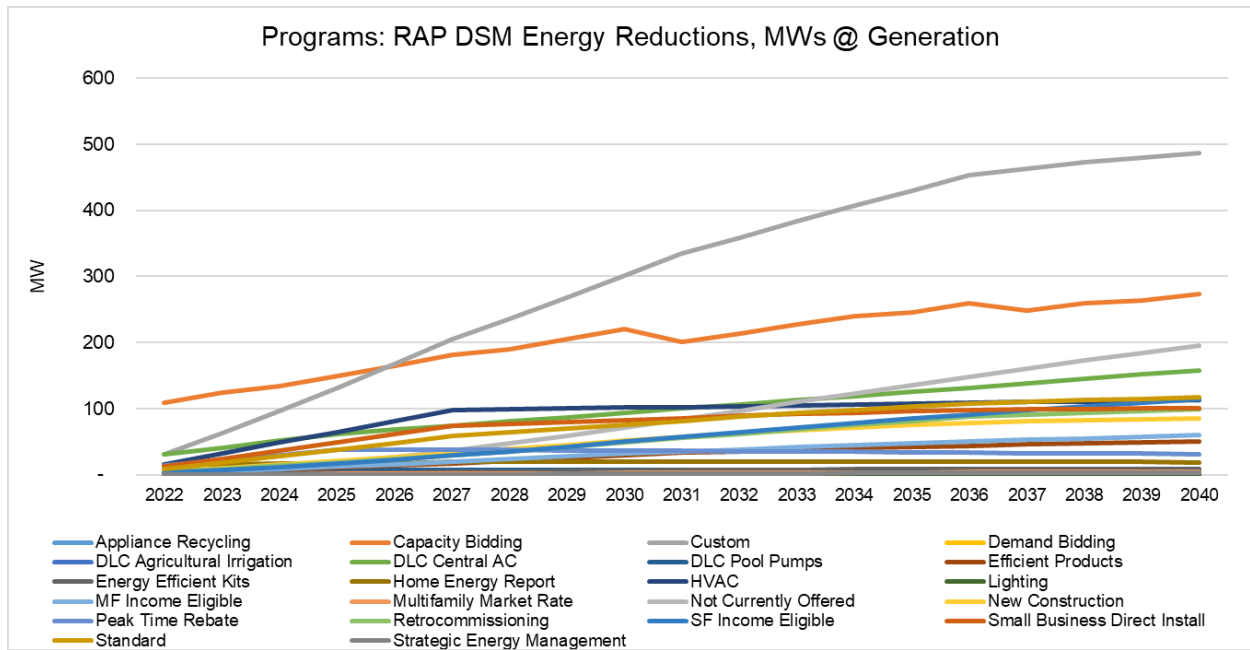
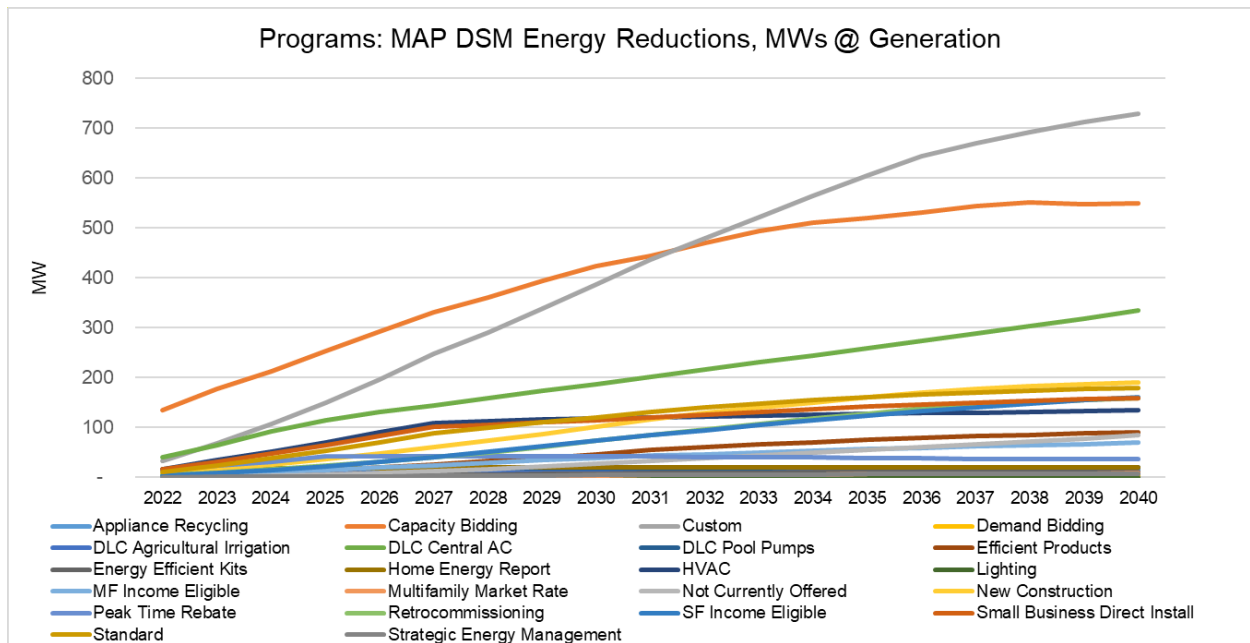


Figure 9A.4 Stacked Programs for MAP DSM Capacity¹⁴



¹³ 20 CSR 4240-22.060(4)(B)2

¹⁴ 20 CSR 4240-22.060(4)(B)2

Figure 9A.5 Stacked Programs for DOPE 1 DSM Capacity¹⁵

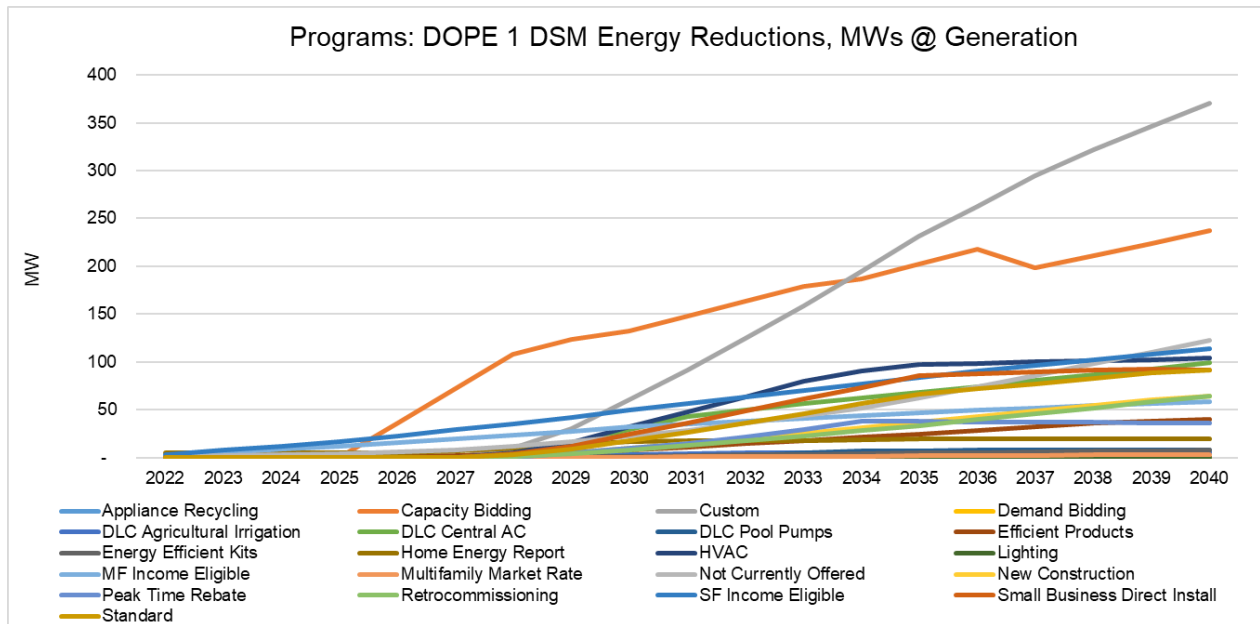
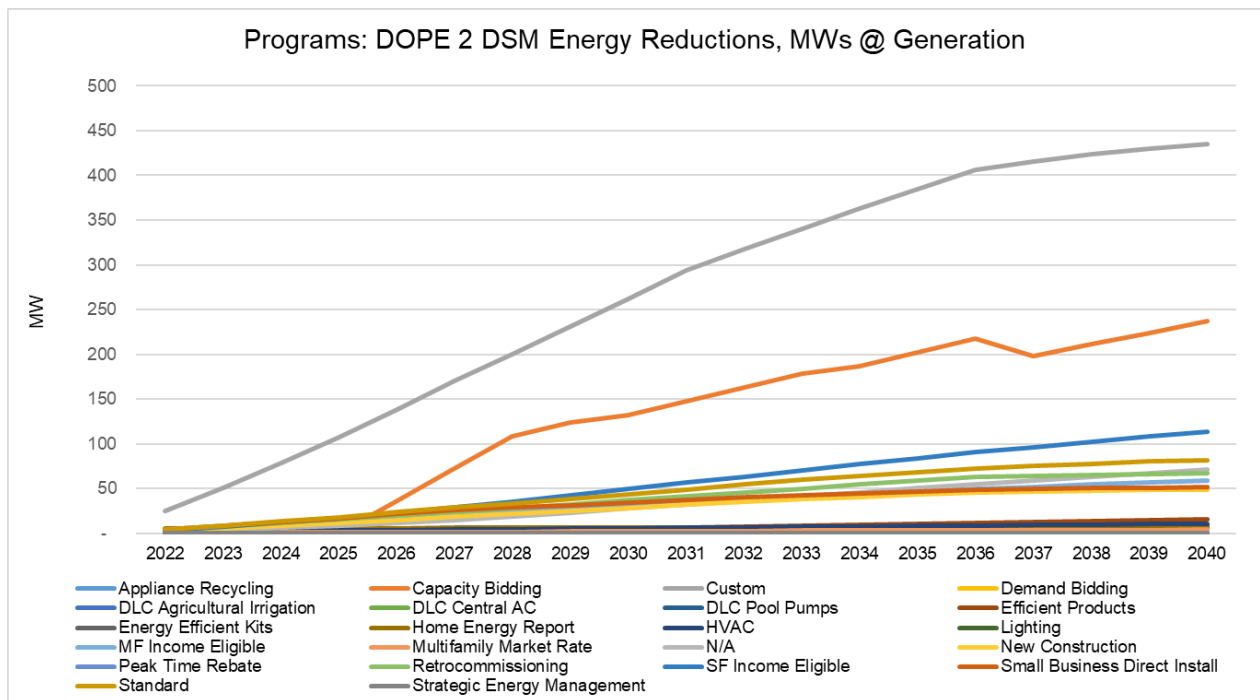


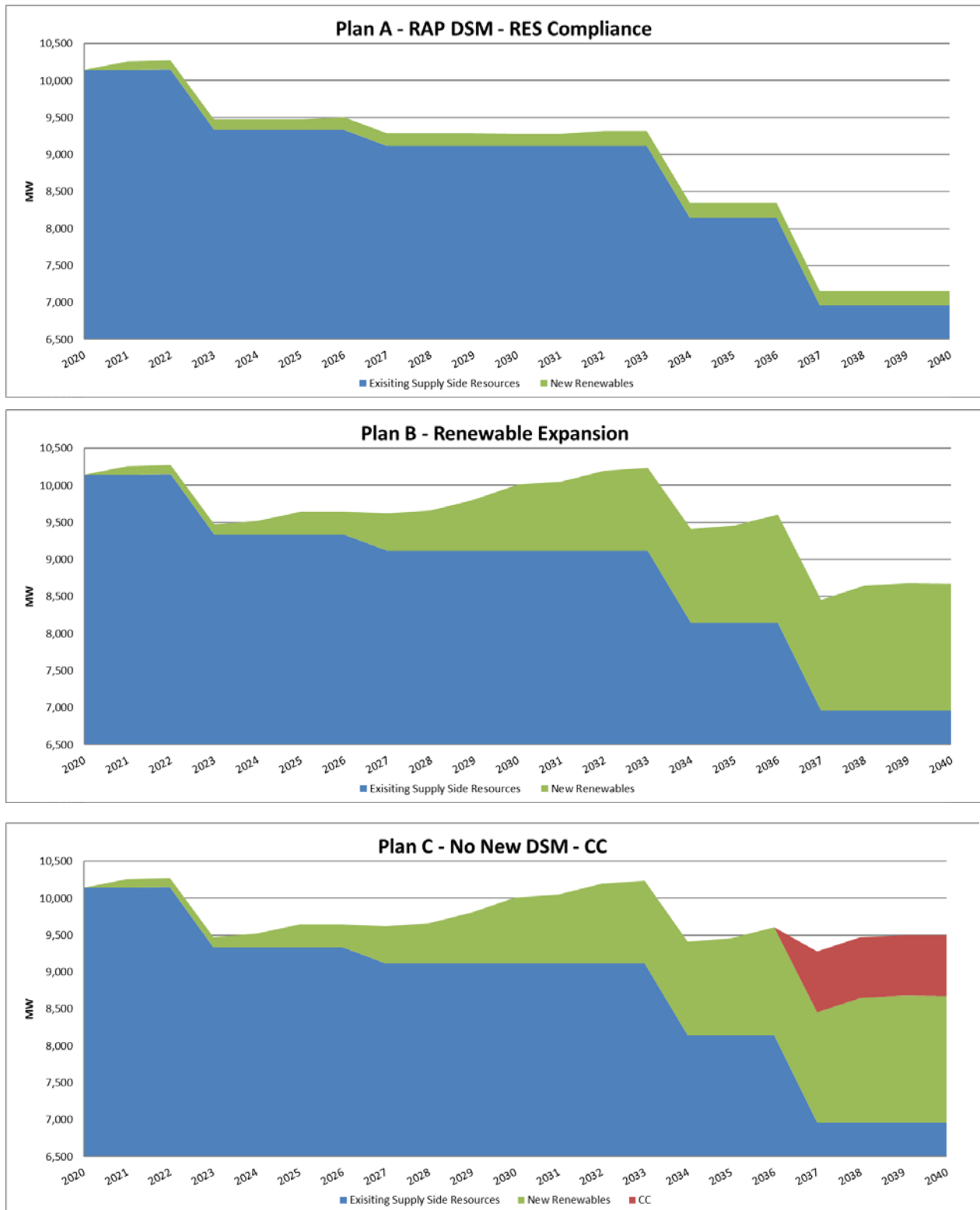
Figure 9A.6 Stacked Programs for DOPE 2 DSM Capacity¹⁶



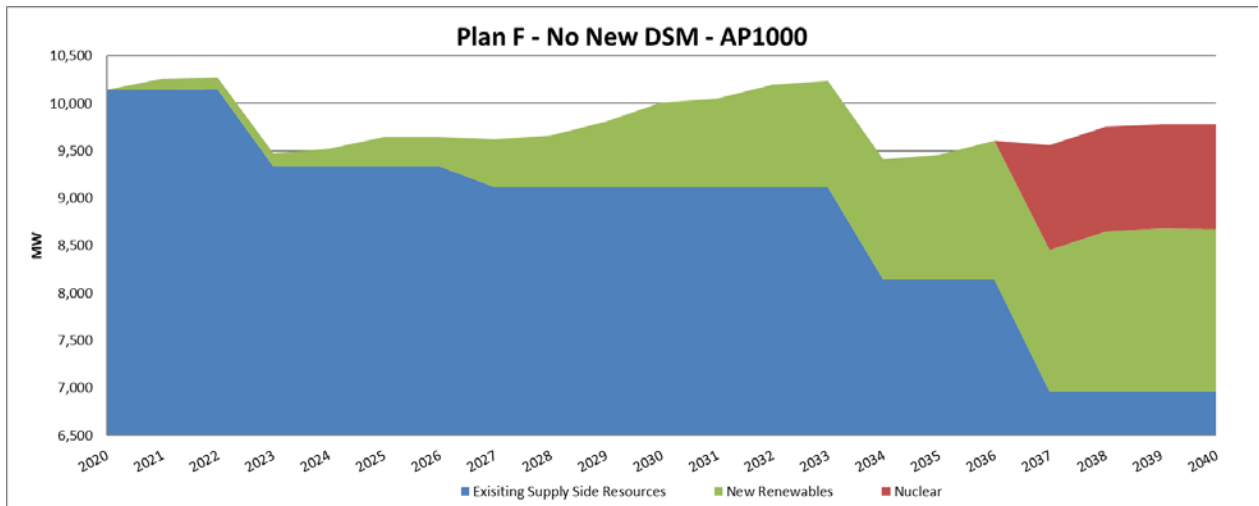
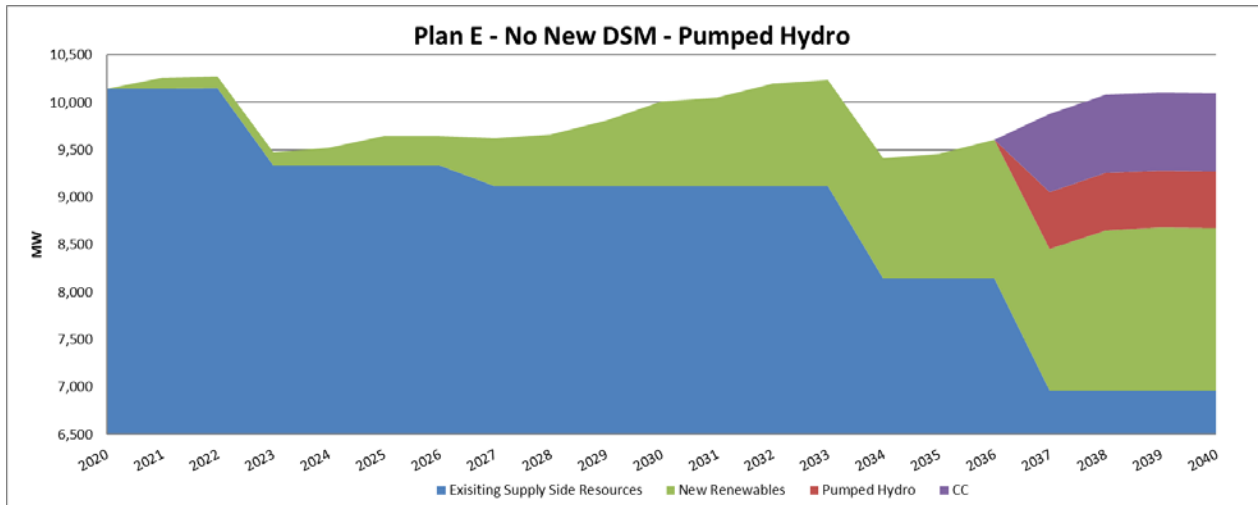
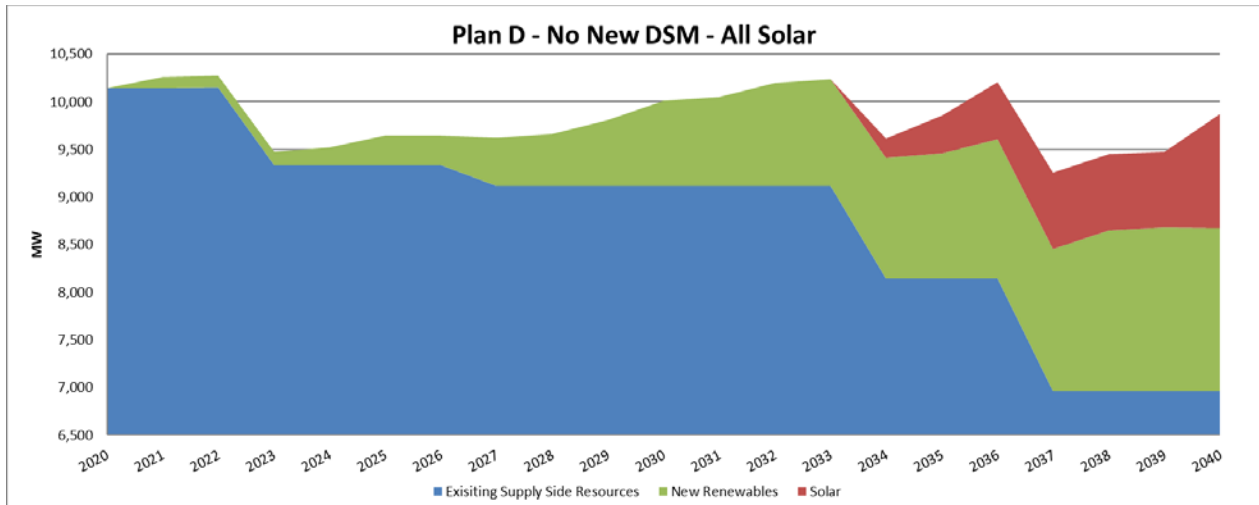
¹⁵ 20 CSR 4240-22.060(4)(B)2

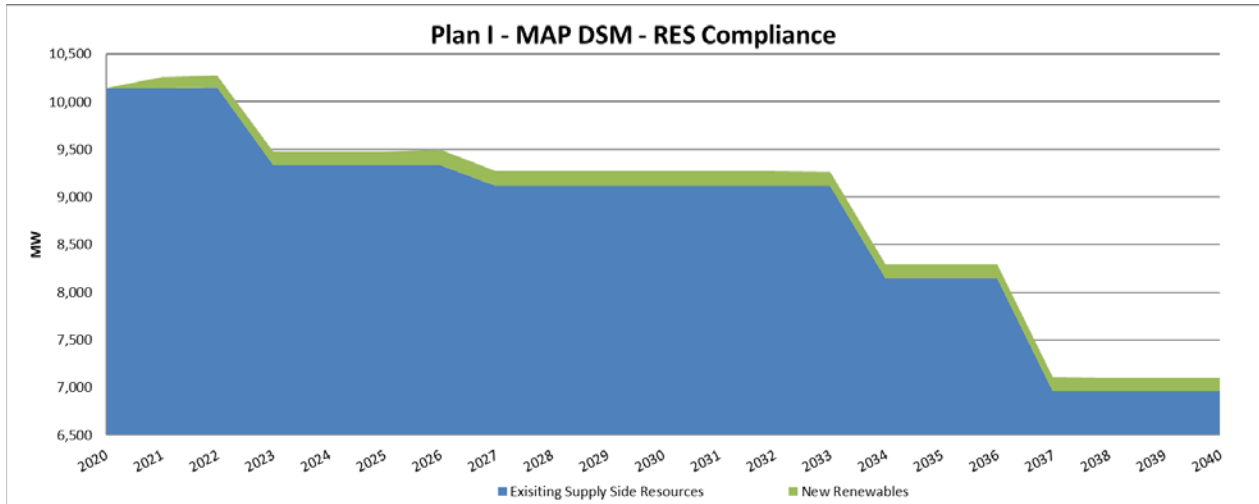
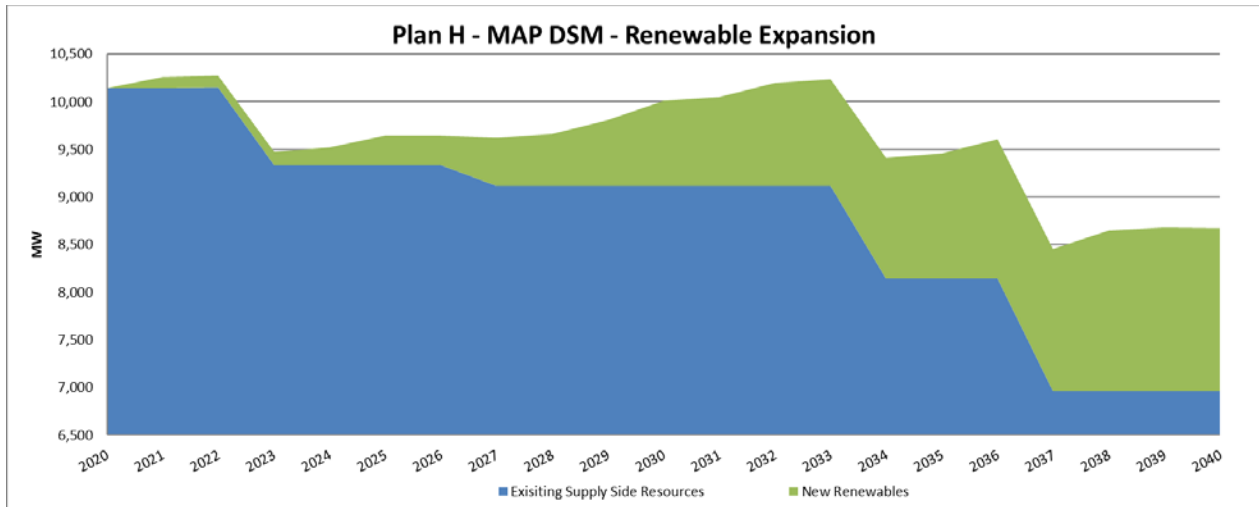
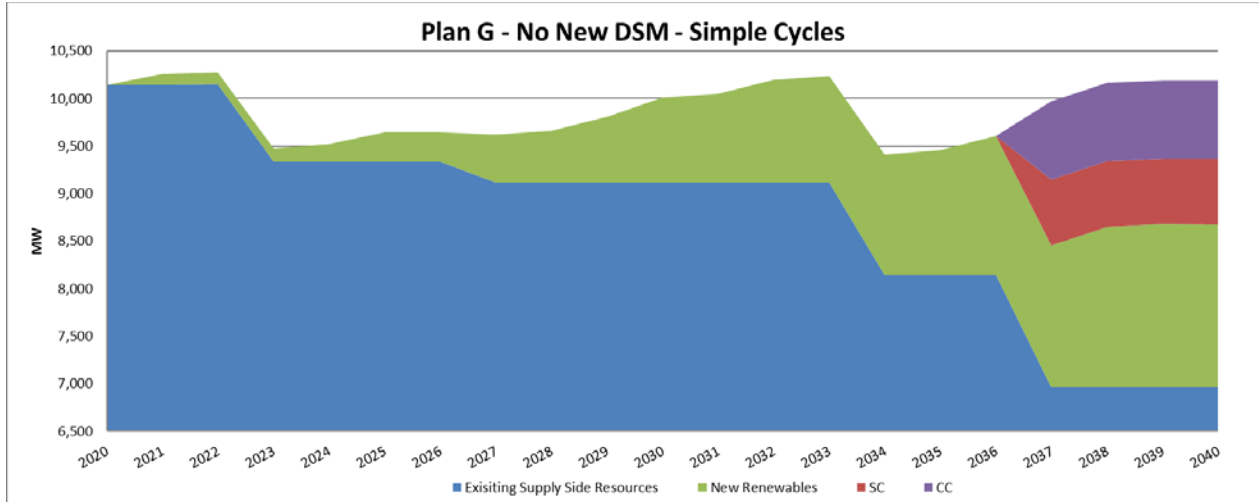
¹⁶ 20 CSR 4240-22.060(4)(B)2

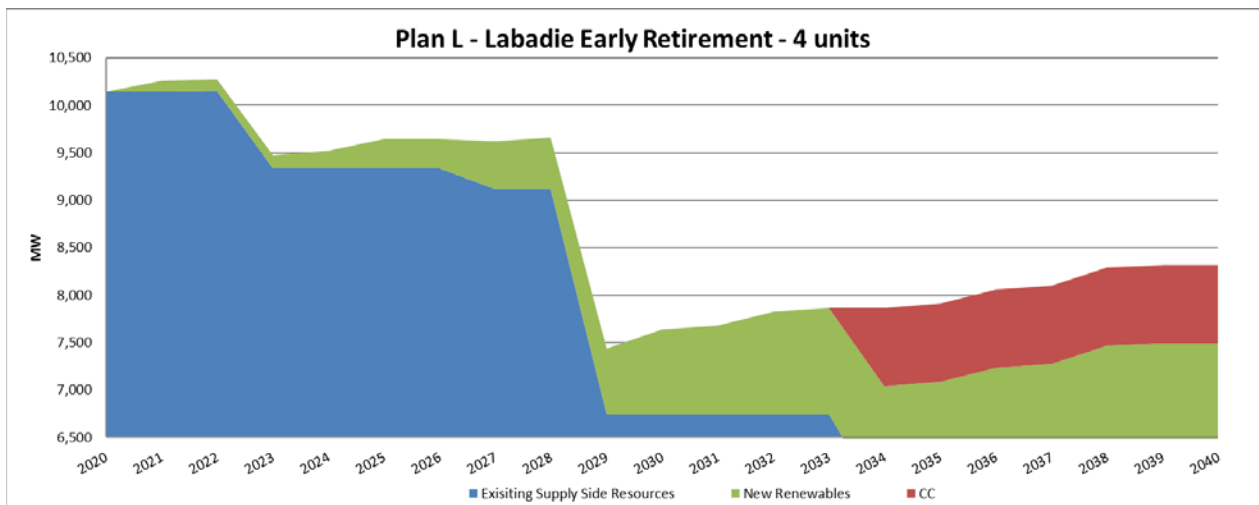
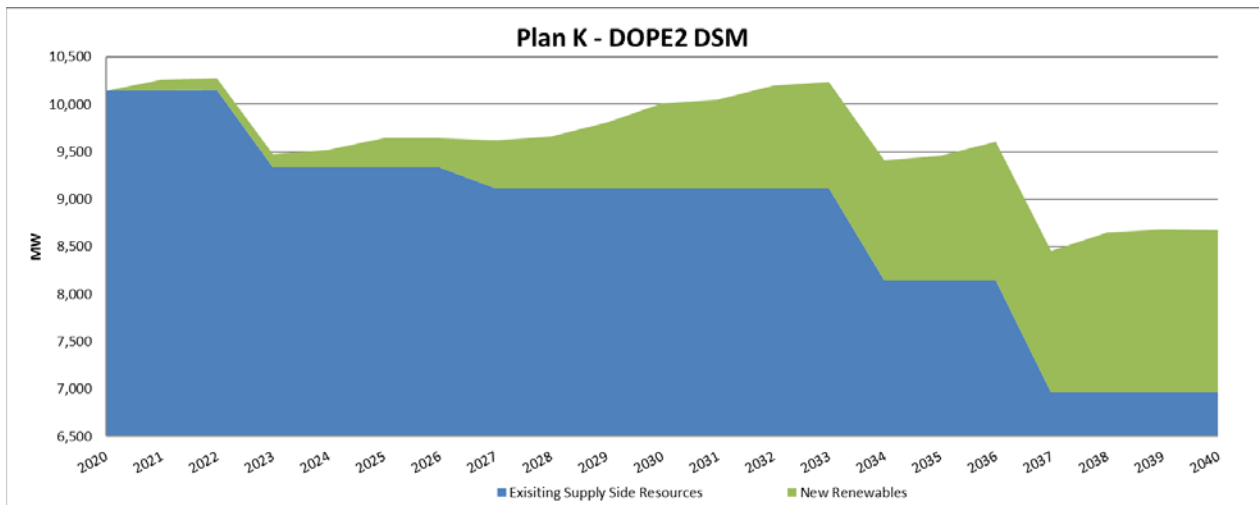
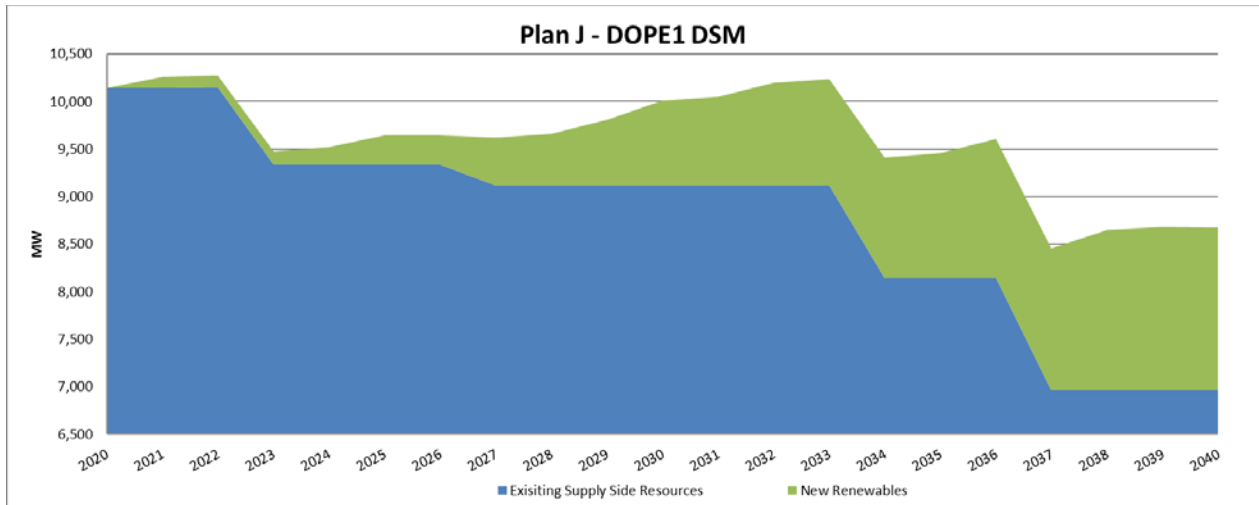
Figure 9A.7 Composition of Capacity¹⁷

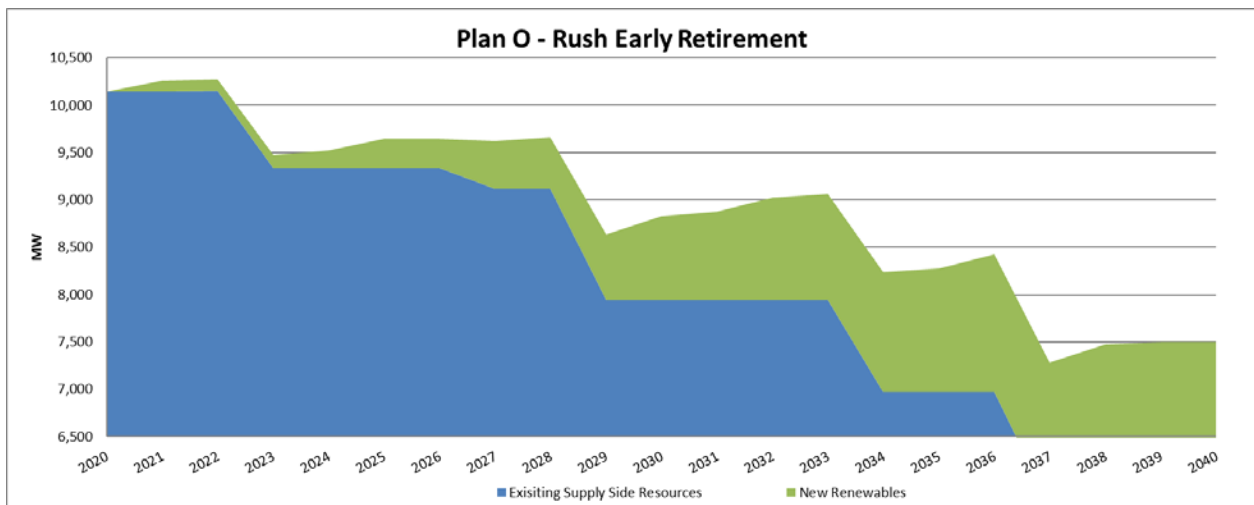
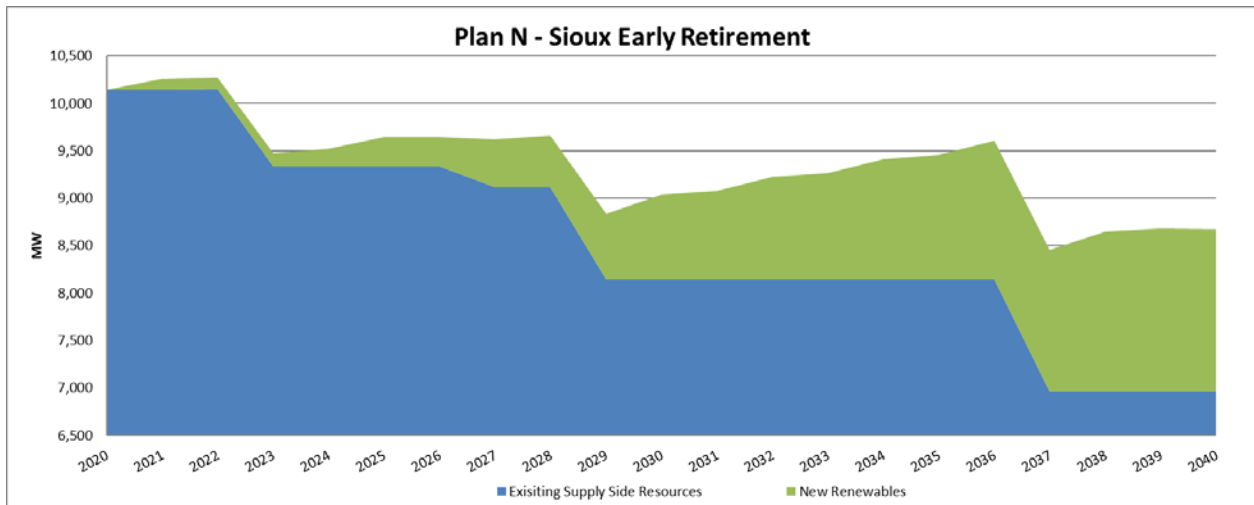
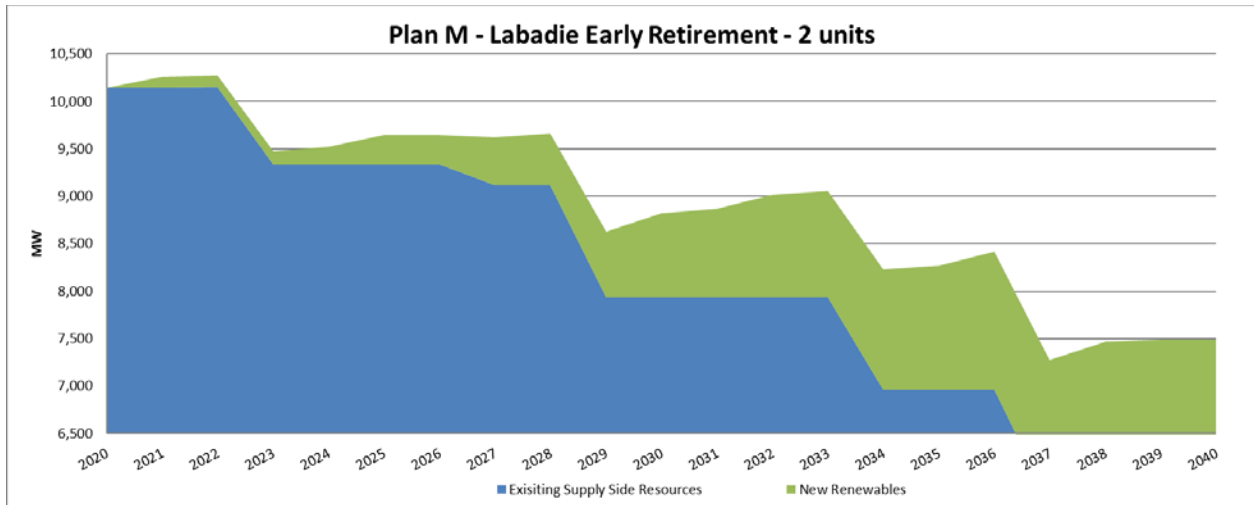


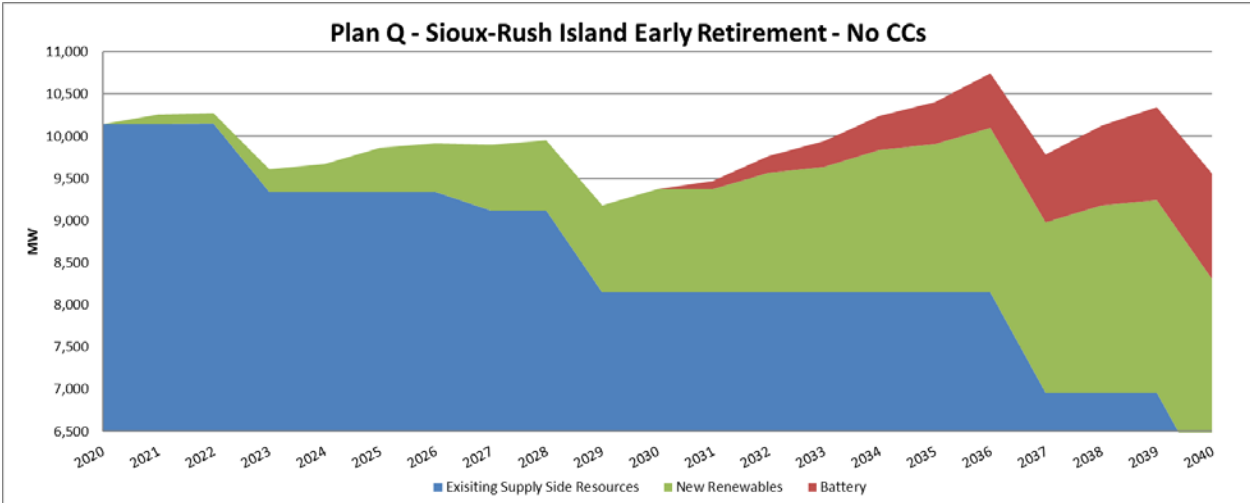
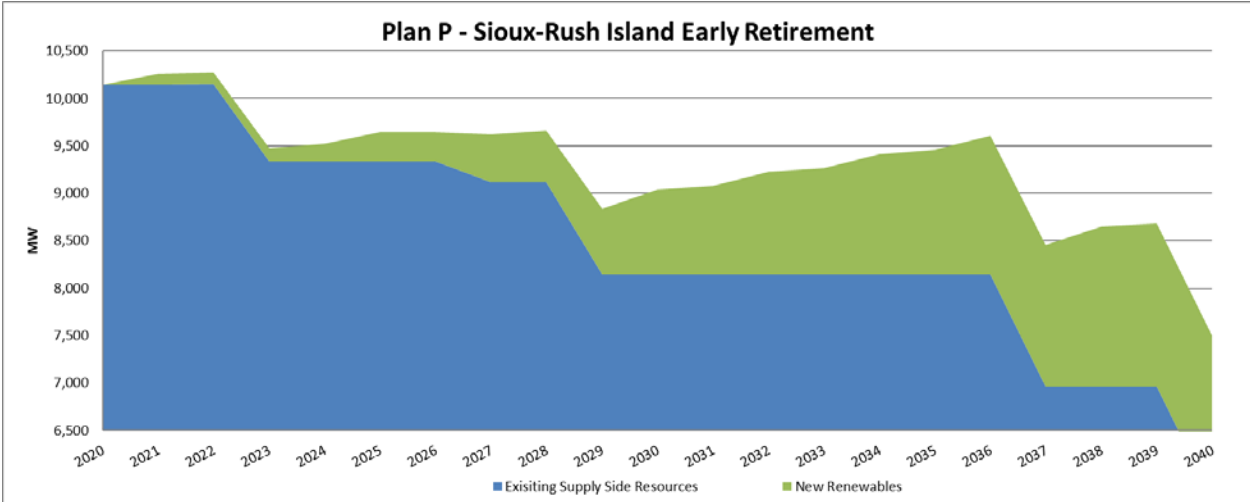
¹⁷ 20 CSR 4240-22.060(4)(B)3

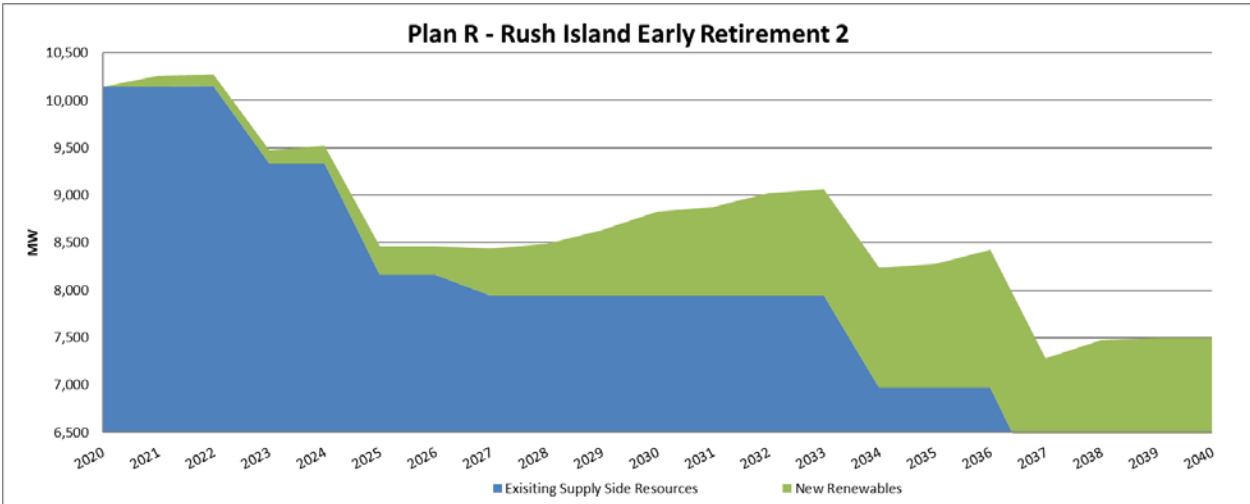


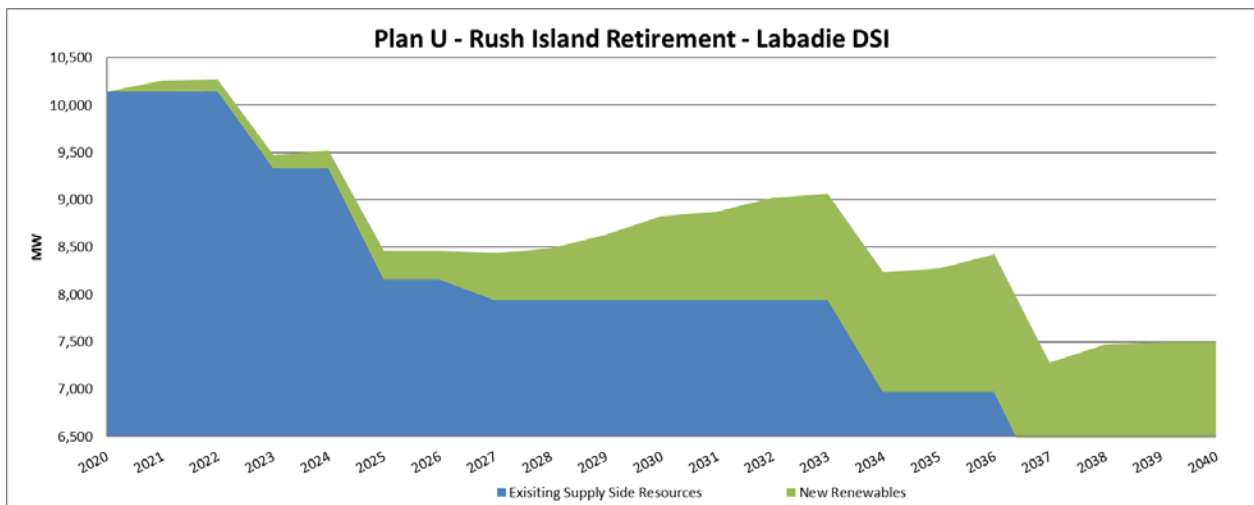
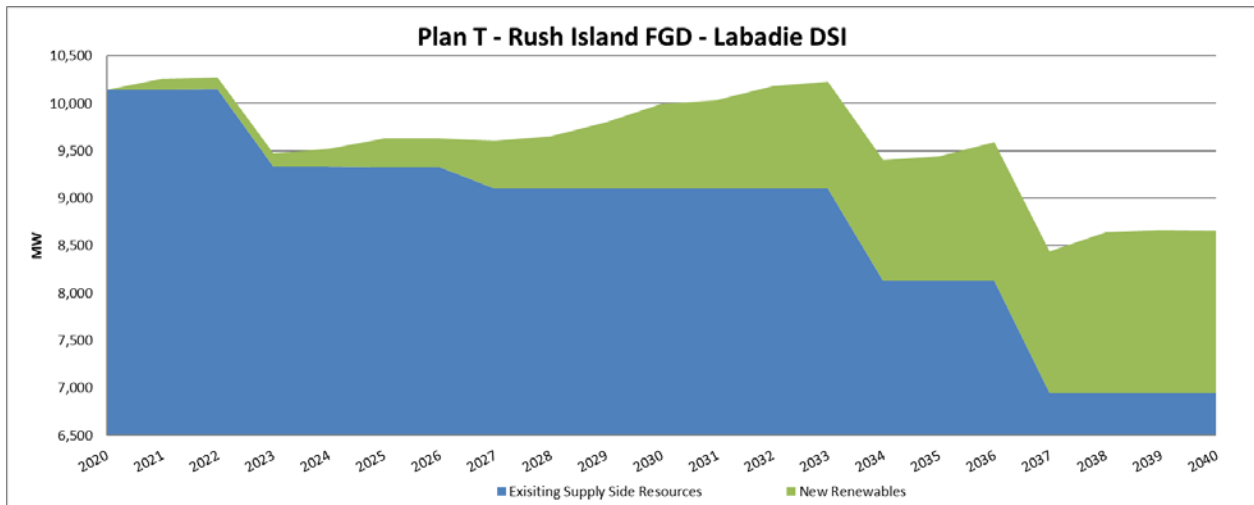
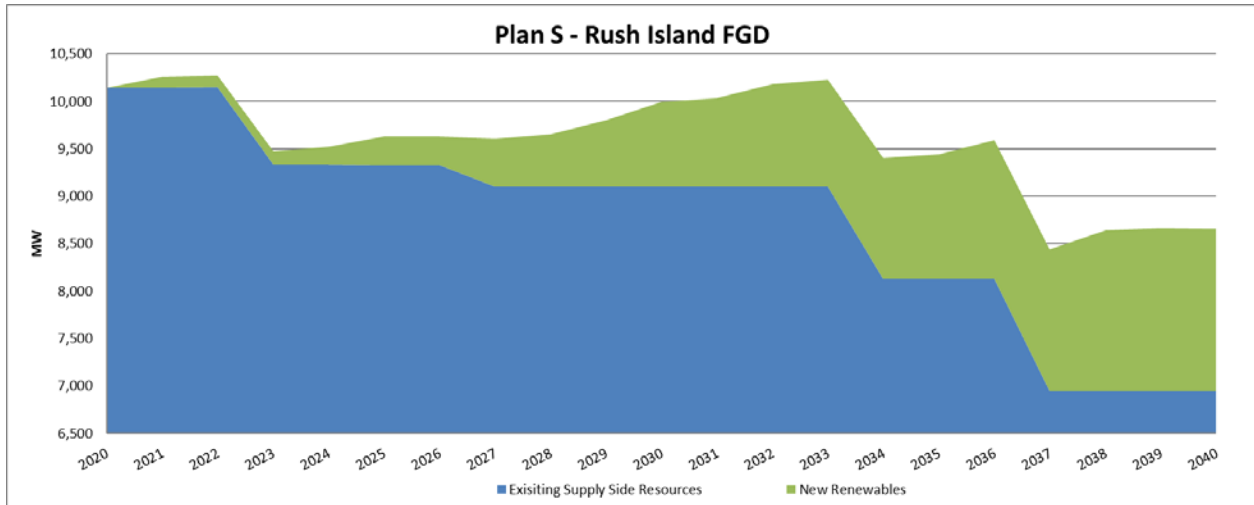


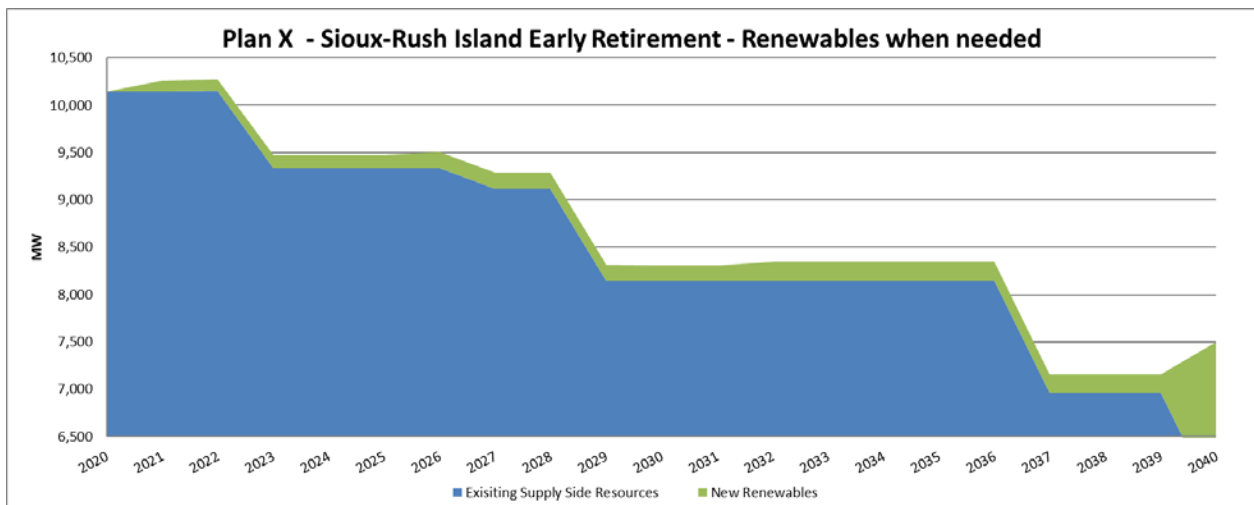
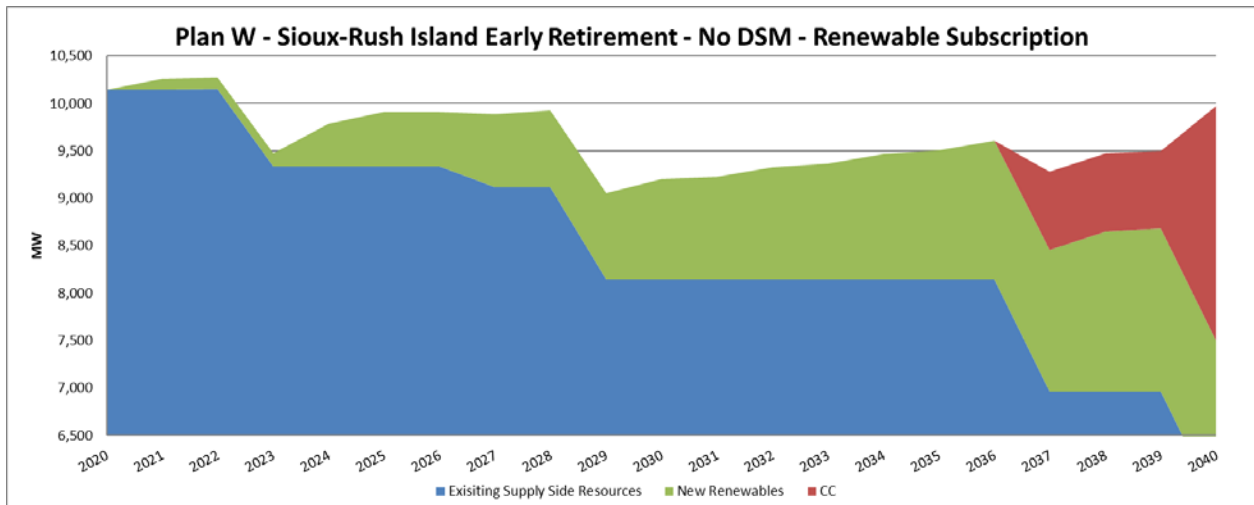
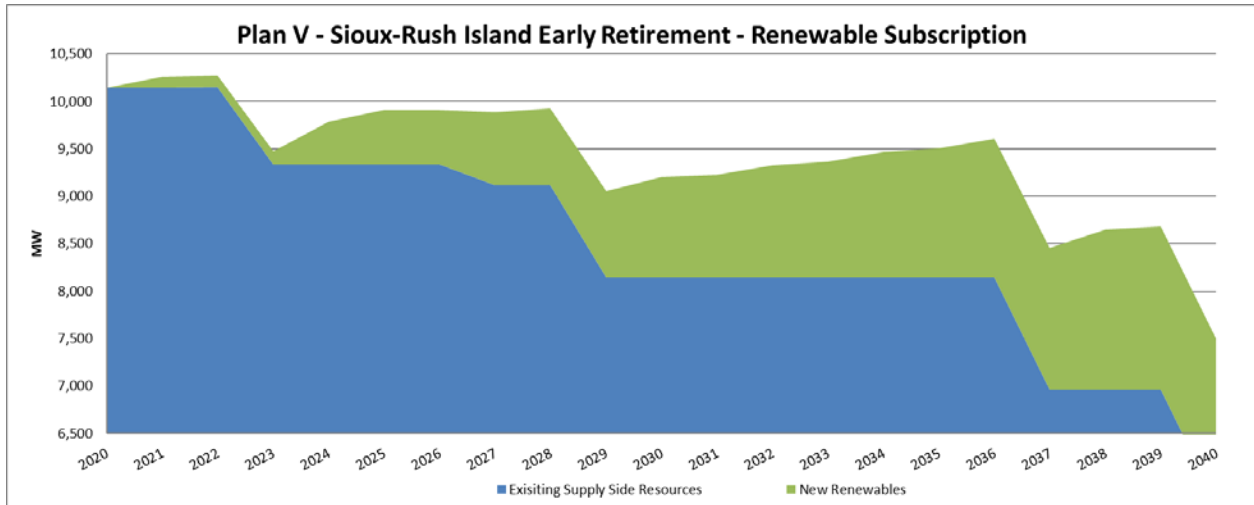


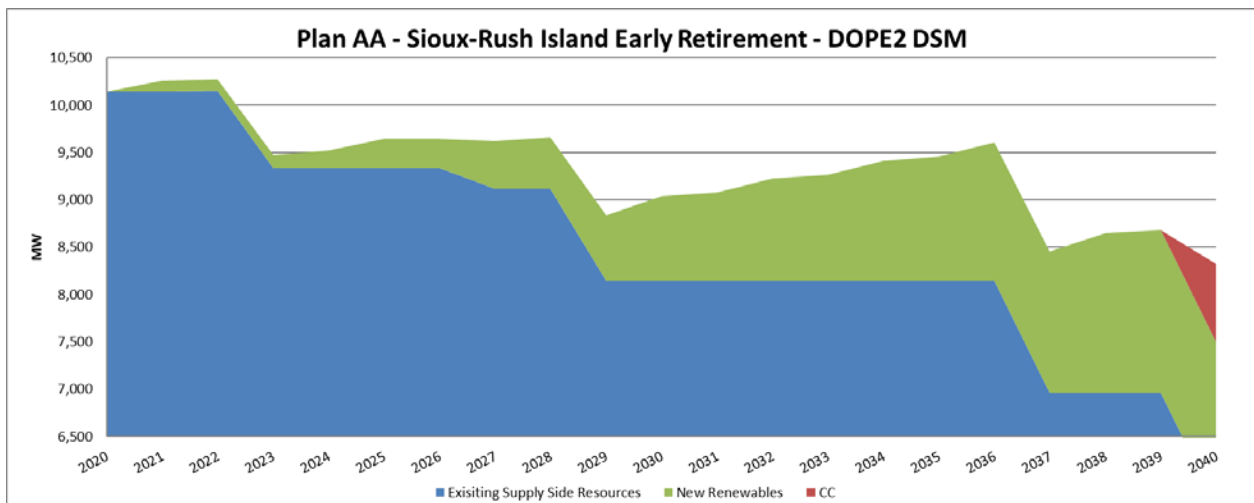
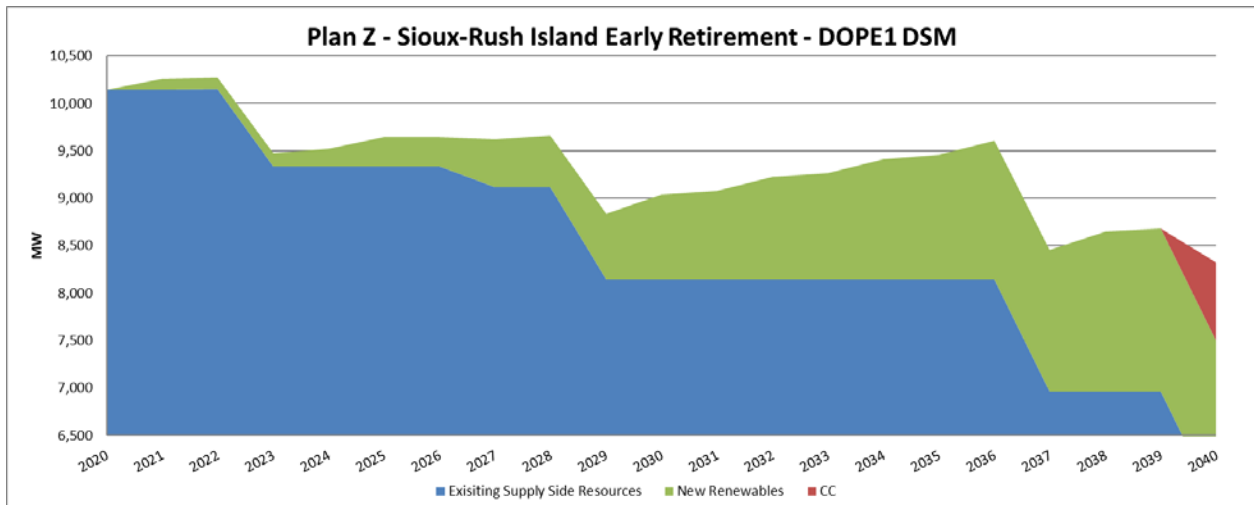
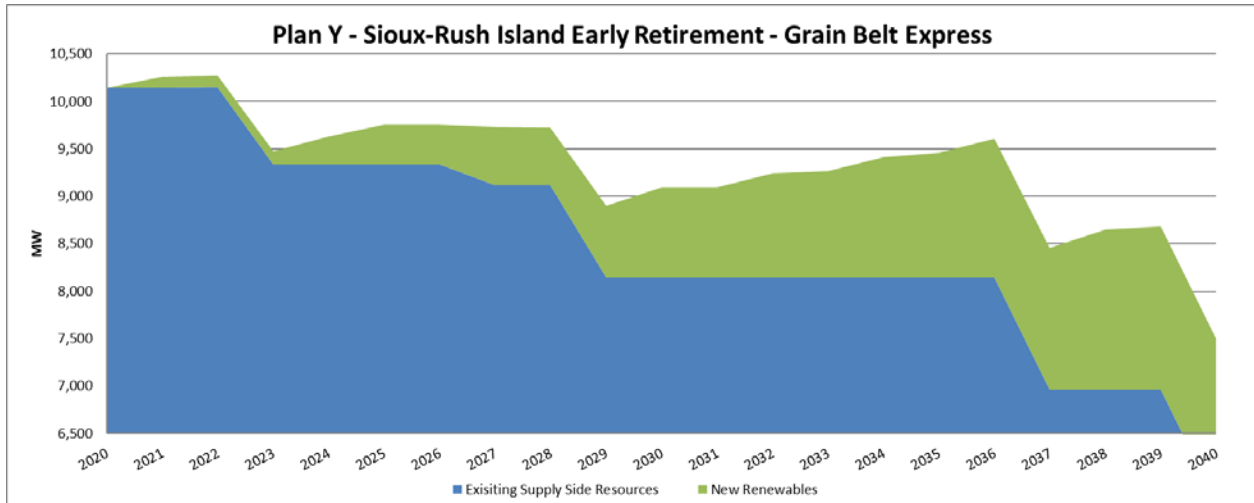












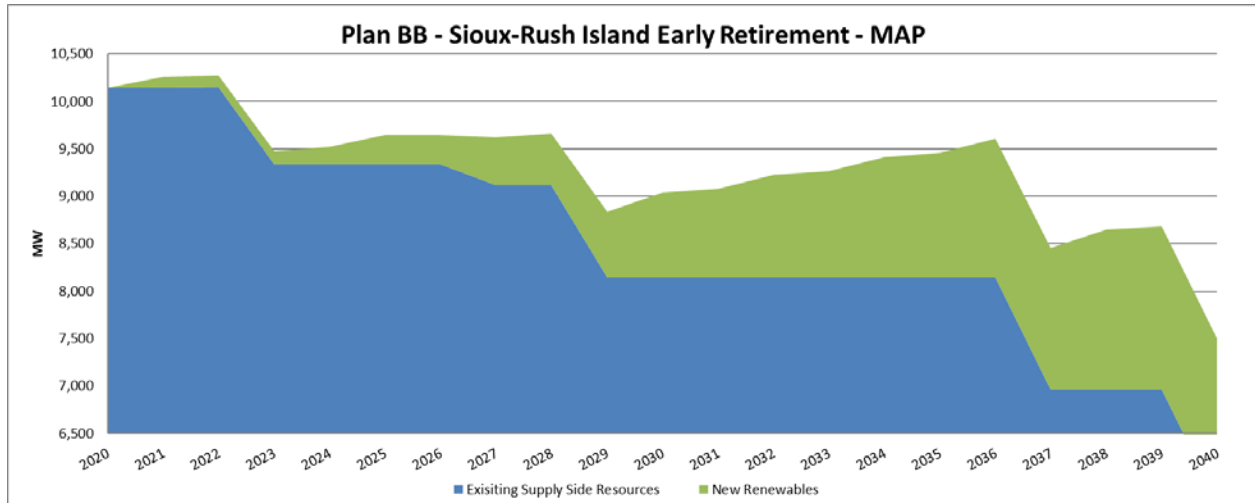
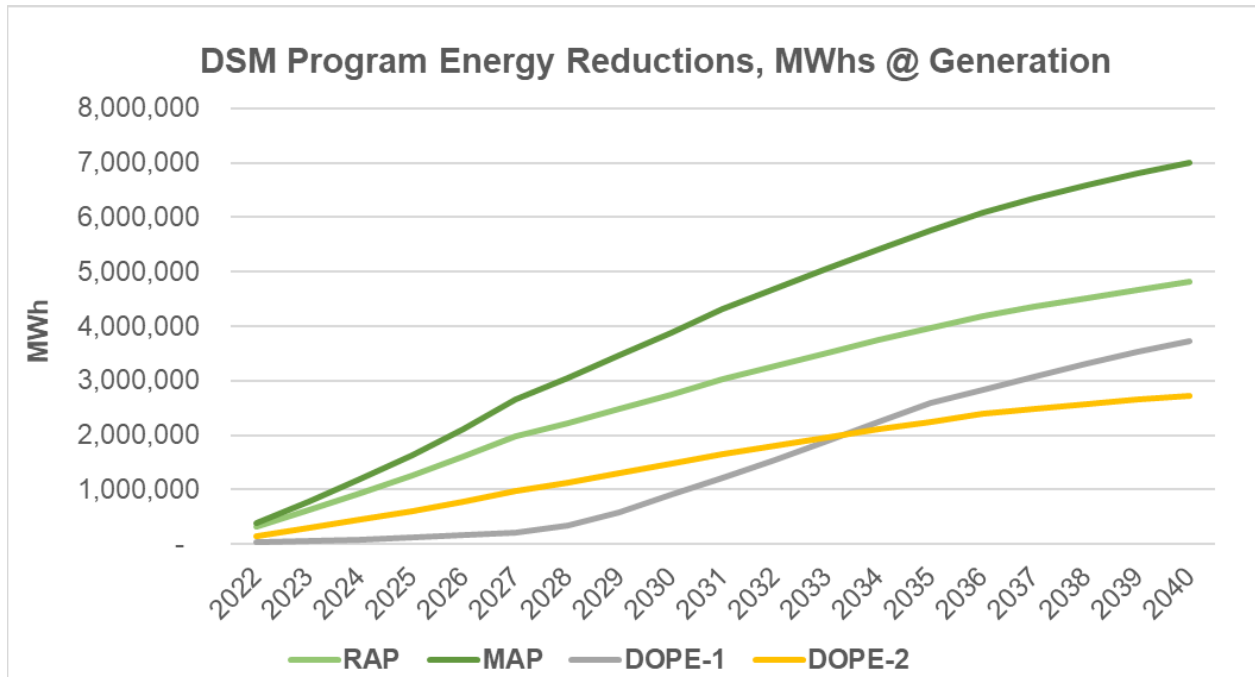


Figure 9A.8 Combined Impact of DSM Resources on Energy¹⁸



¹⁸ 20 CSR 4240-22.060(4)(B)4

Figure 9A.9 Programs for RAP DSM Energy¹⁹

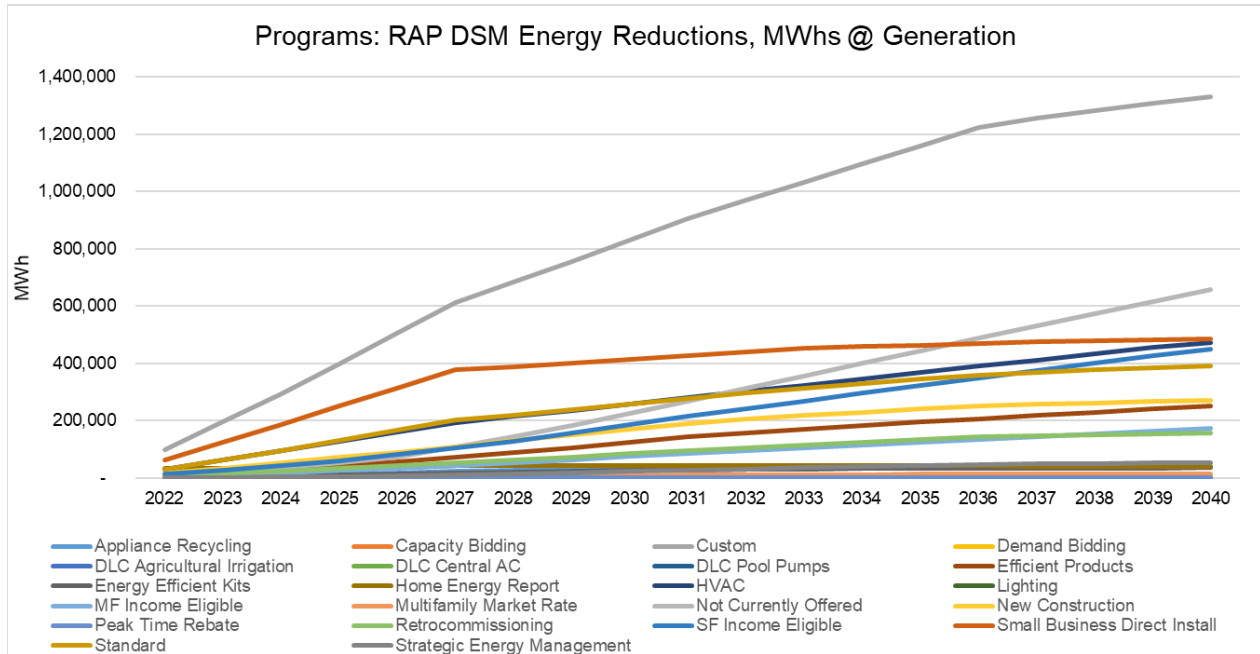
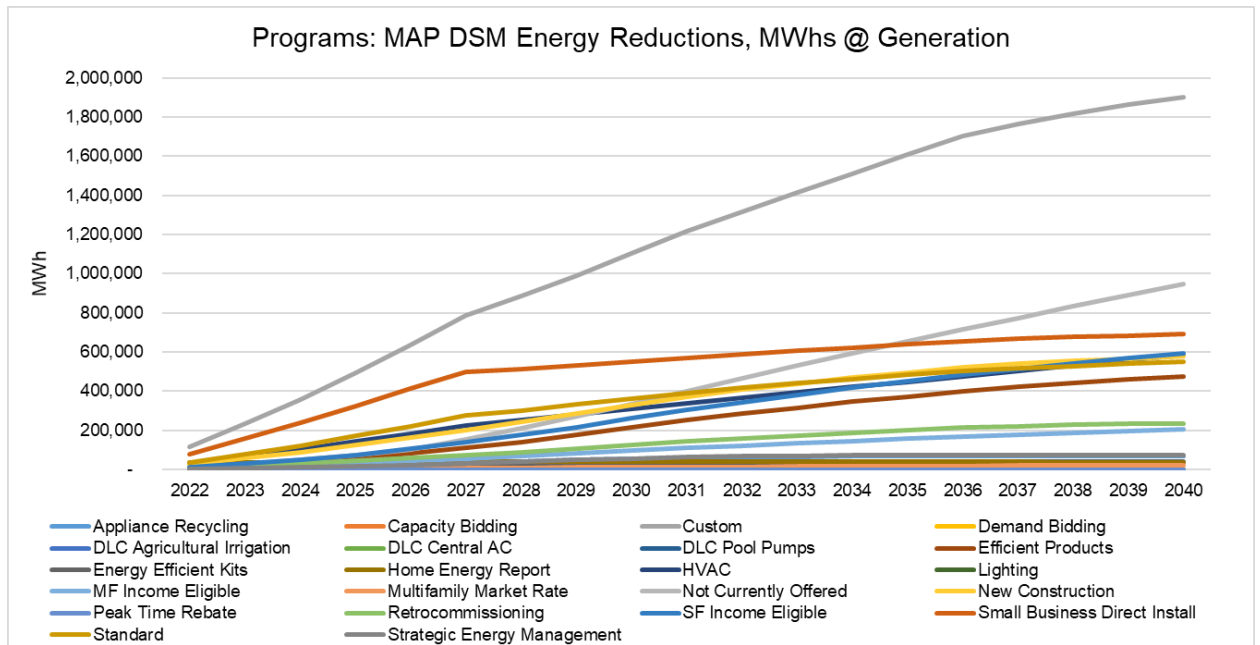


Figure 9A.10 Programs for MAP DSM Energy²⁰



¹⁹ 20 CSR 4240-22.060(4)(B)5

²⁰ 20 CSR 4240-22.060(4)(B)5

Figure 9A.11 Programs for DOPE 1 Energy²¹

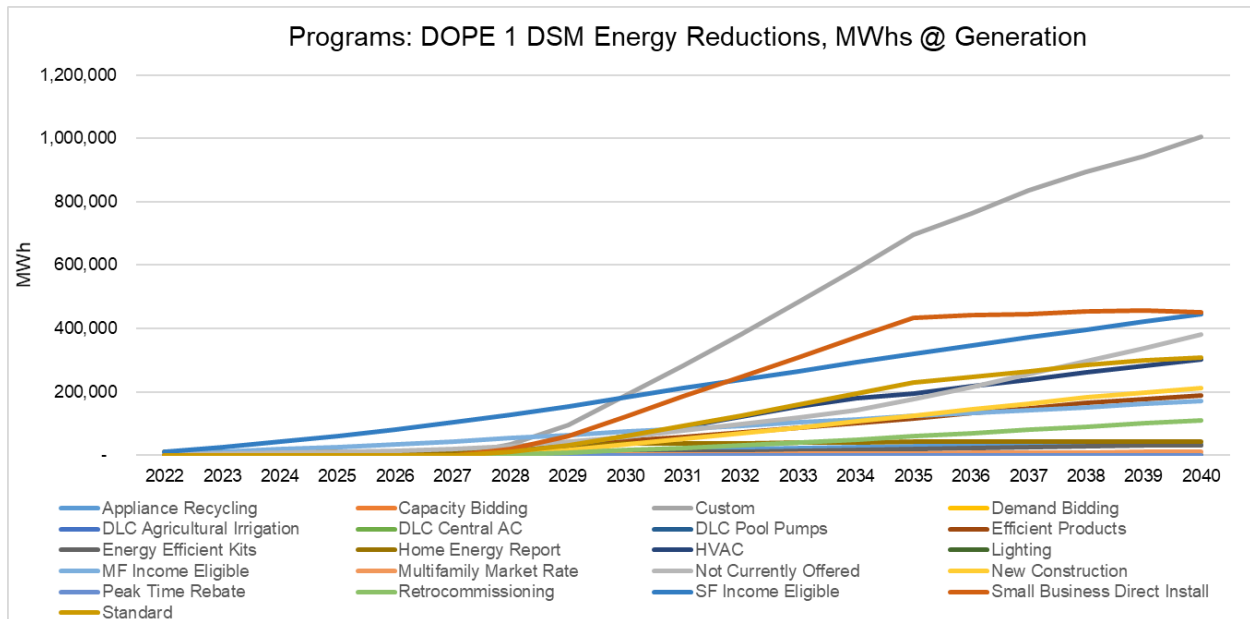
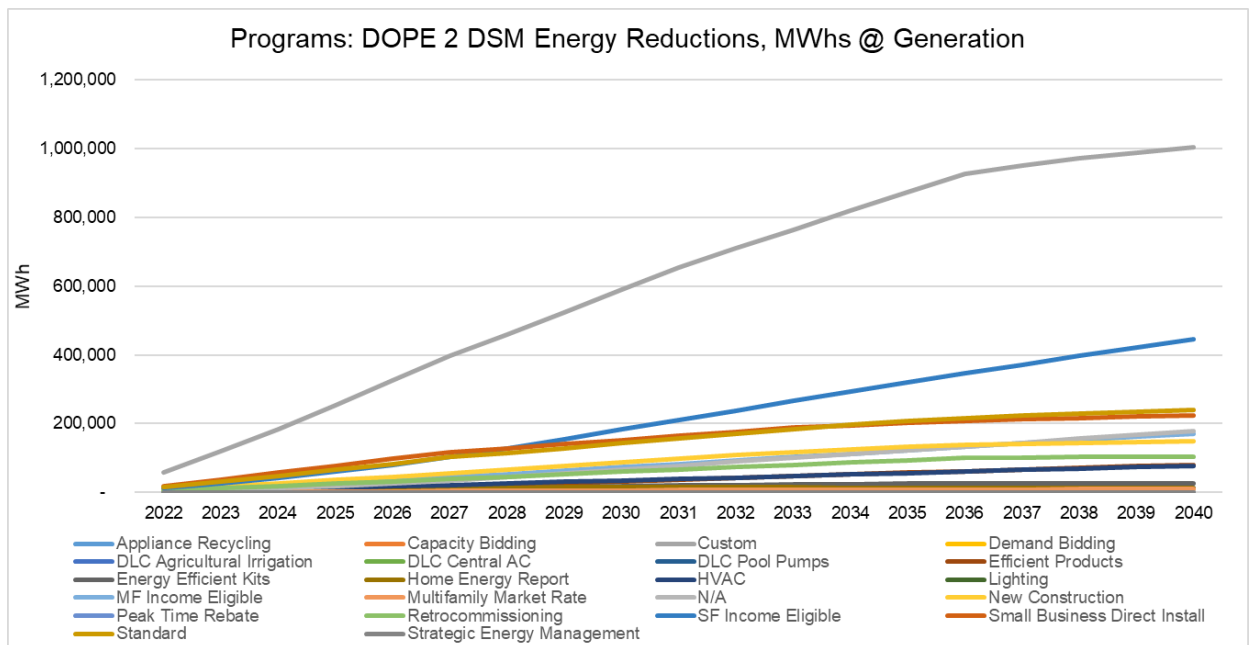


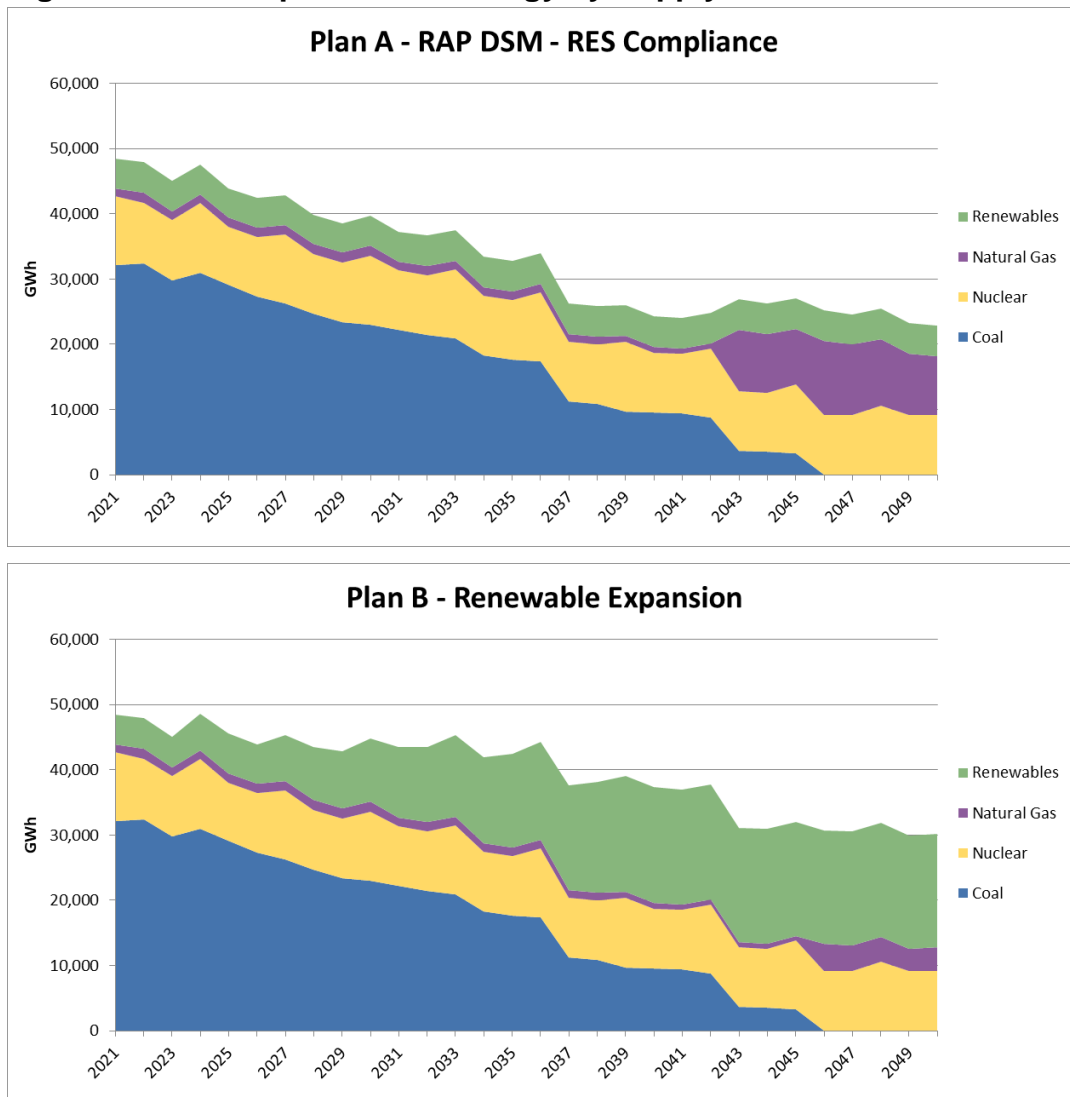
Figure 9A.12 Programs for DOPE 2 Energy²²



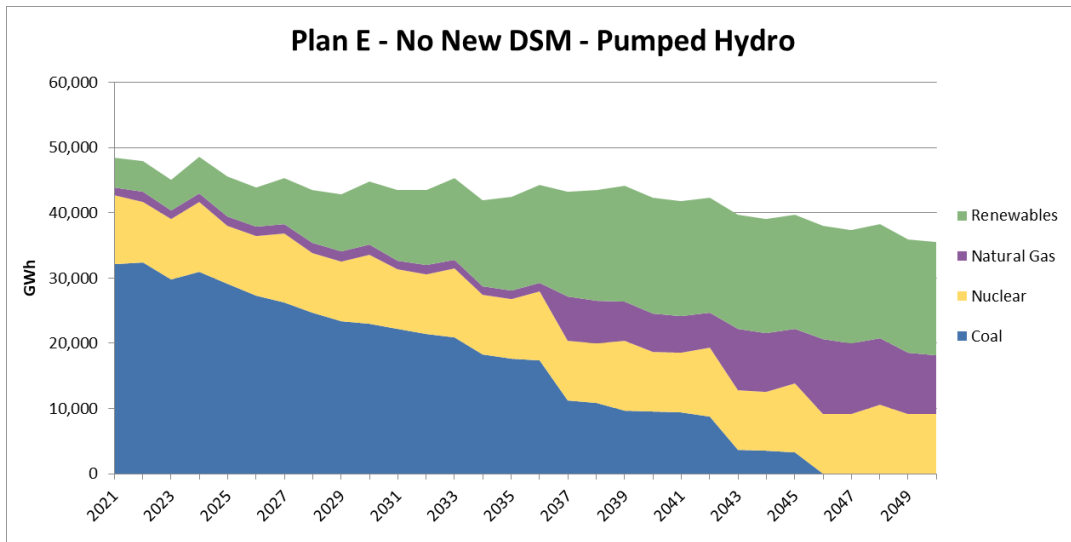
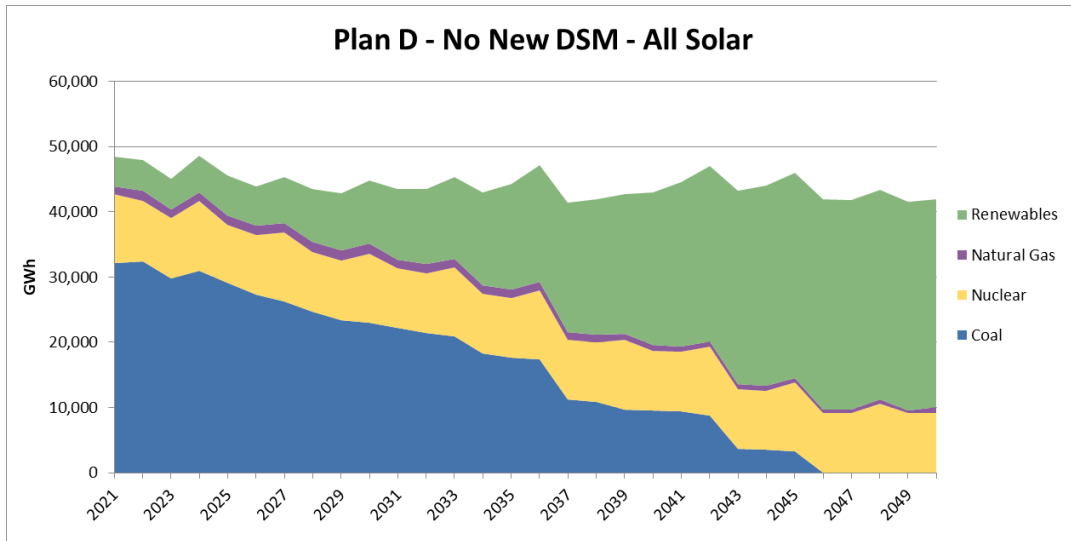
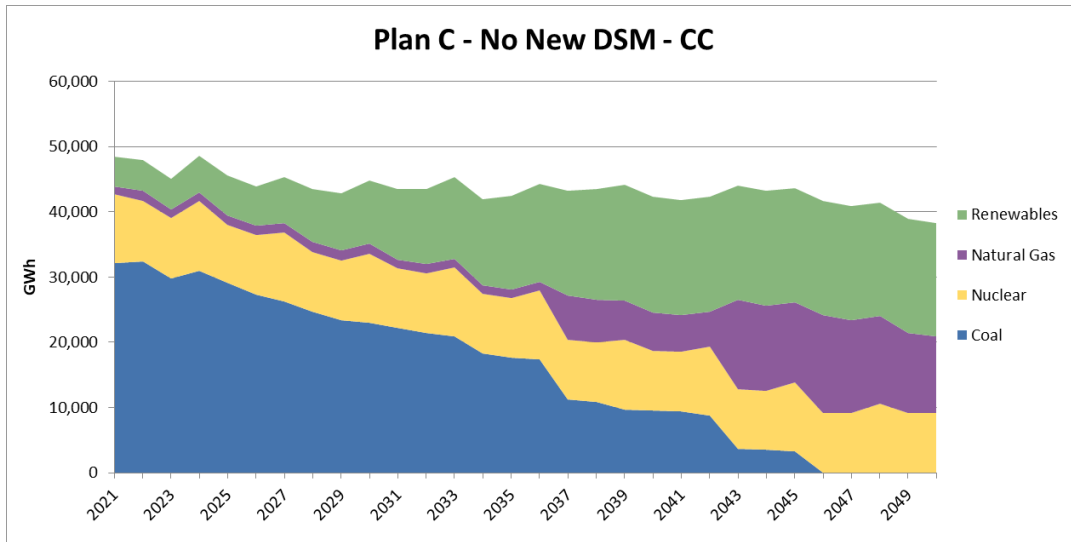
²¹ 20 CSR 4240-22.060(4)(B)5

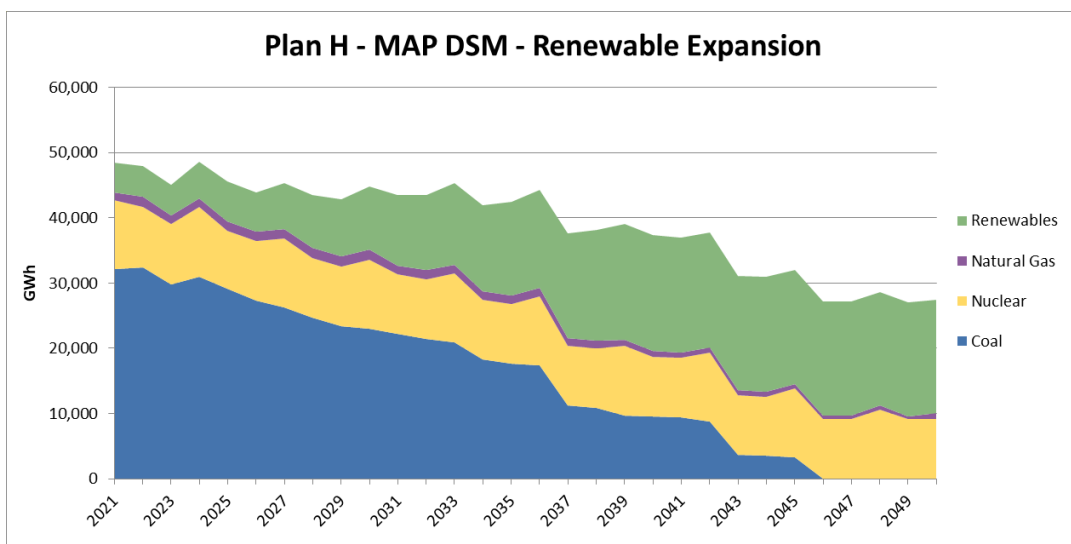
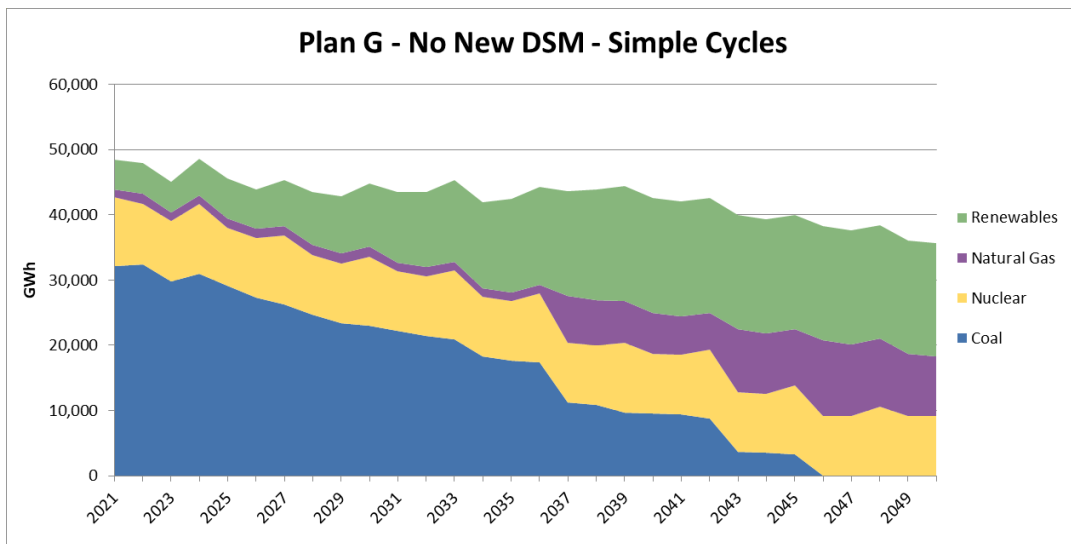
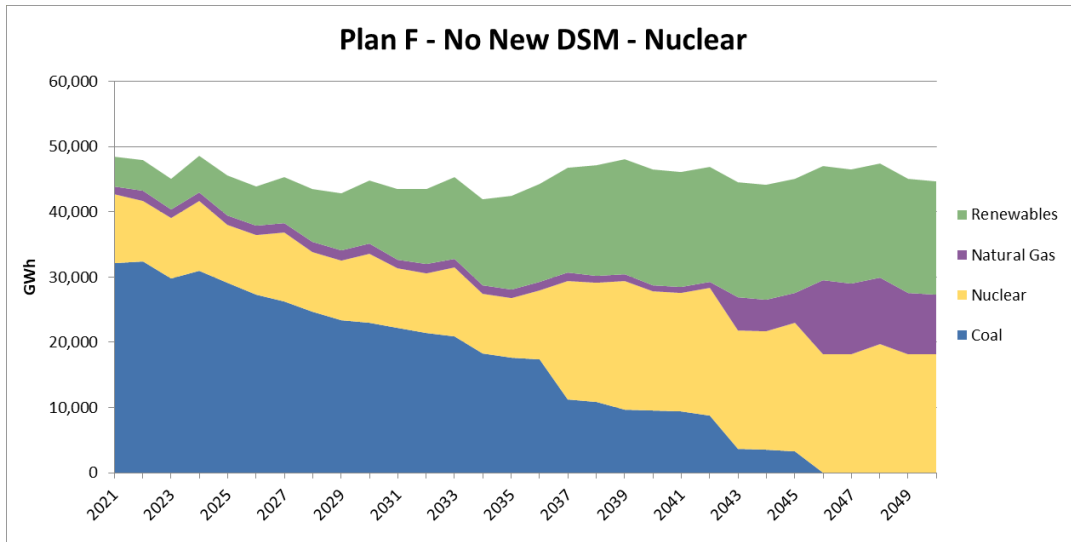
²² 20 CSR 4240-22.060(4)(B)5

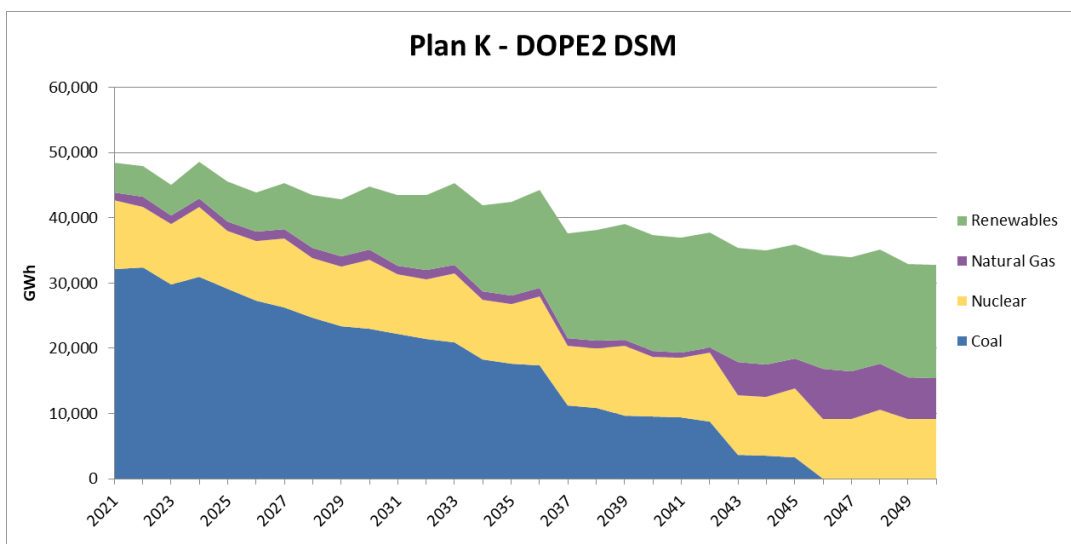
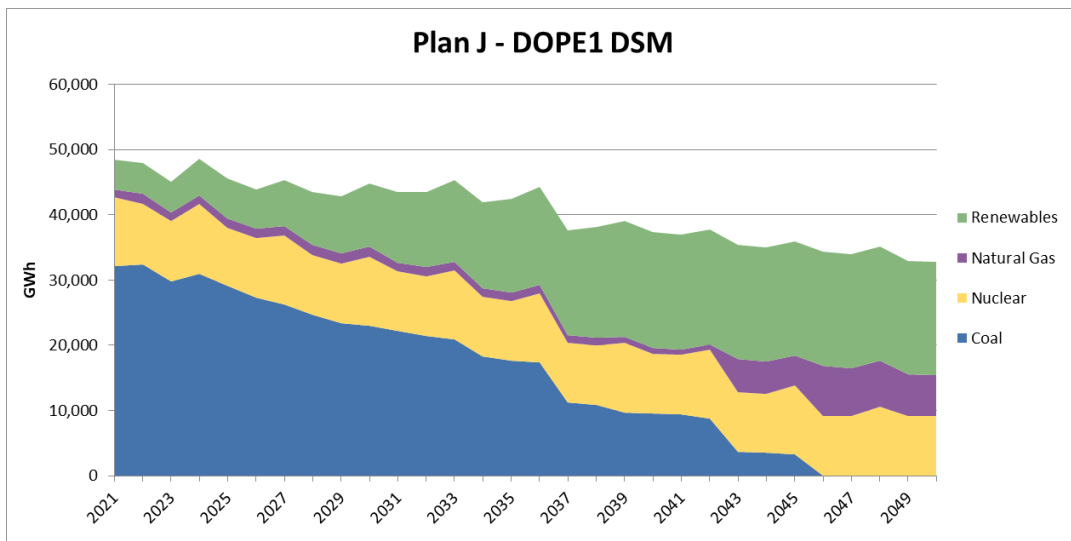
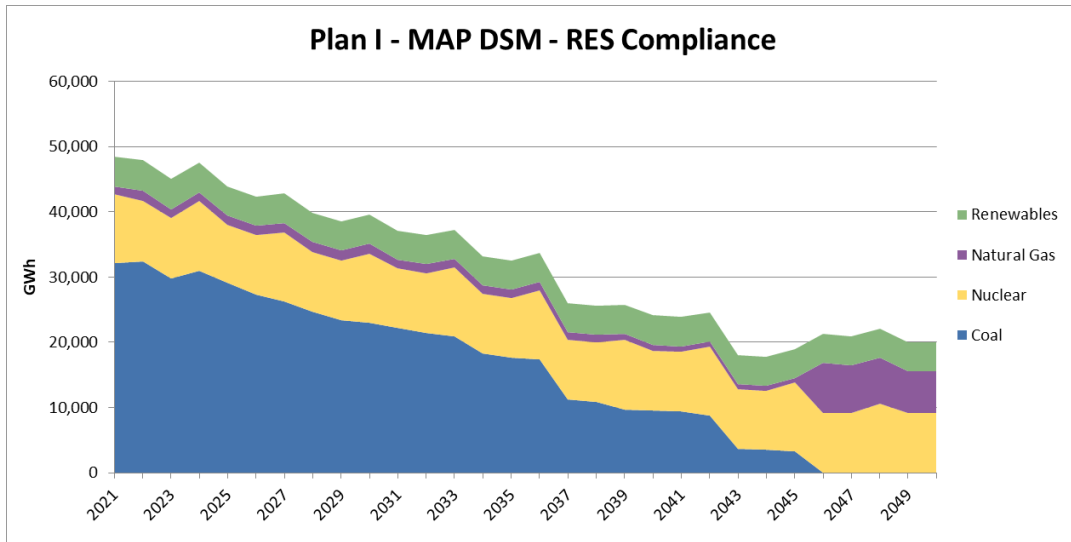
Figure 9A.13 Composition of Energy by Supply-Side Resource²³

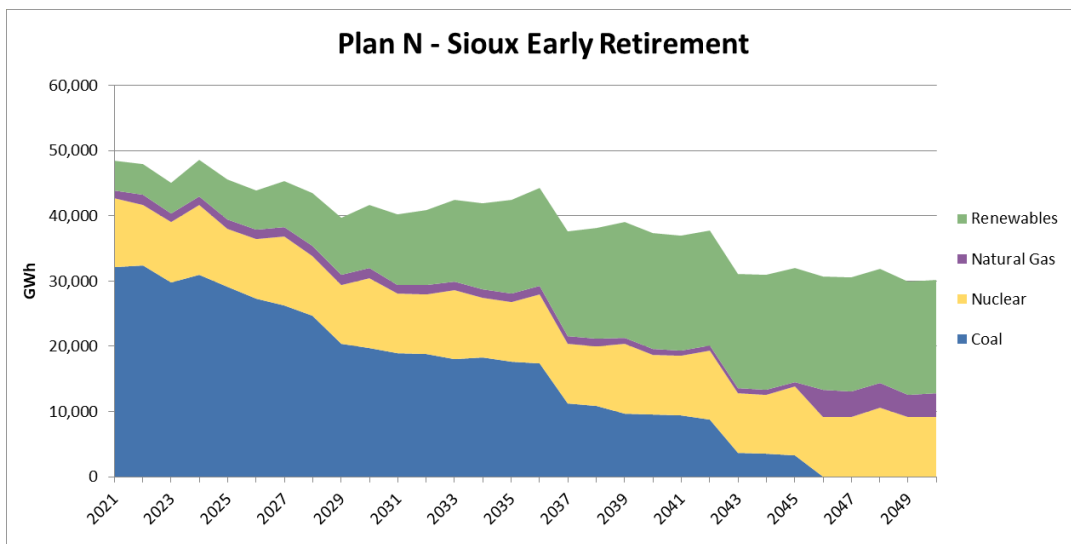
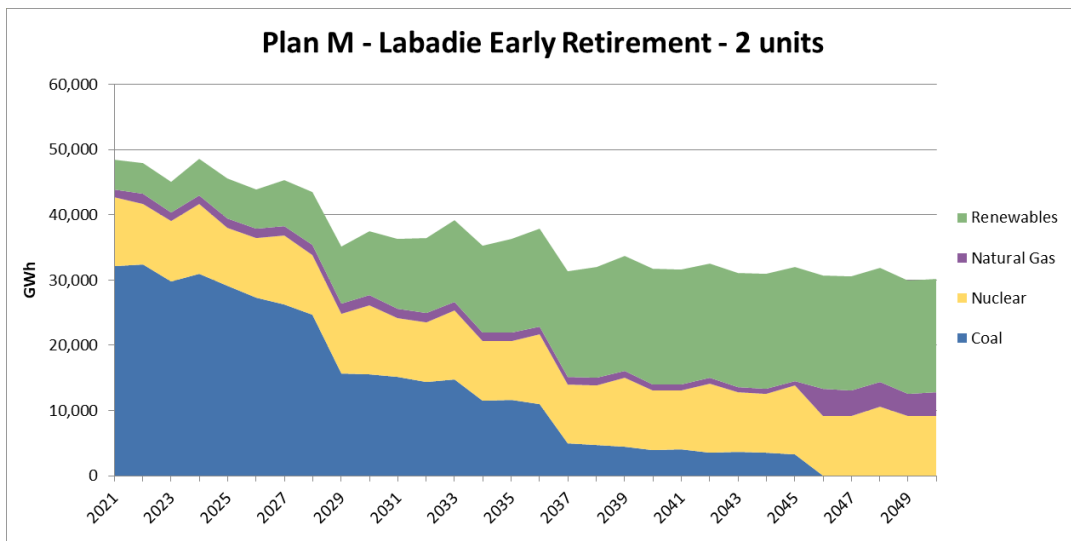
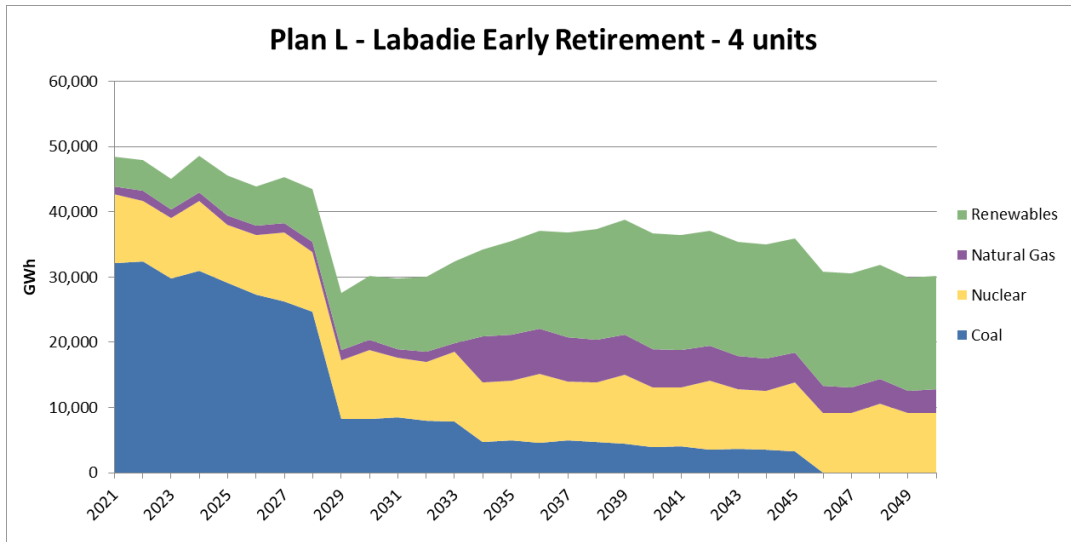


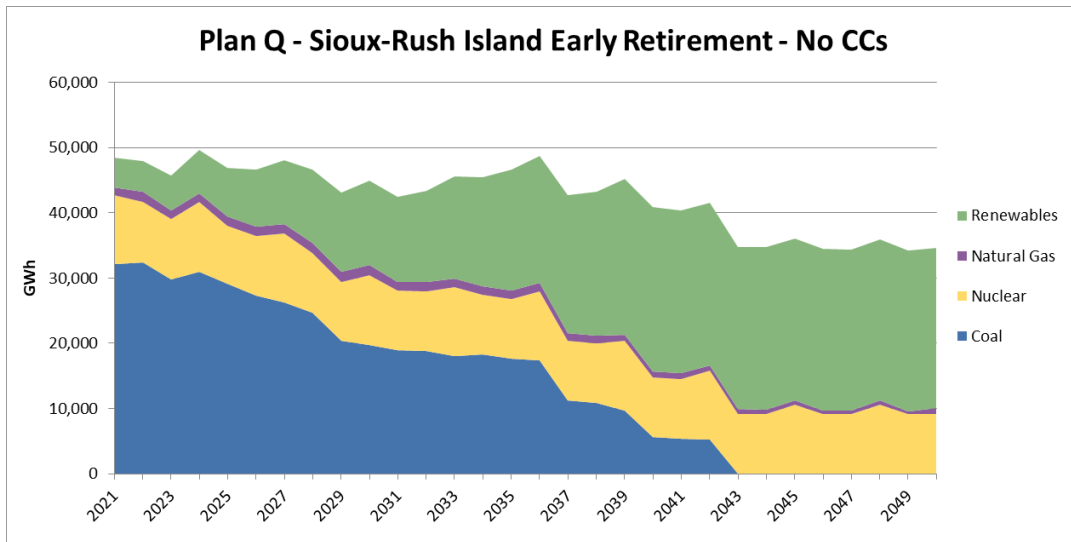
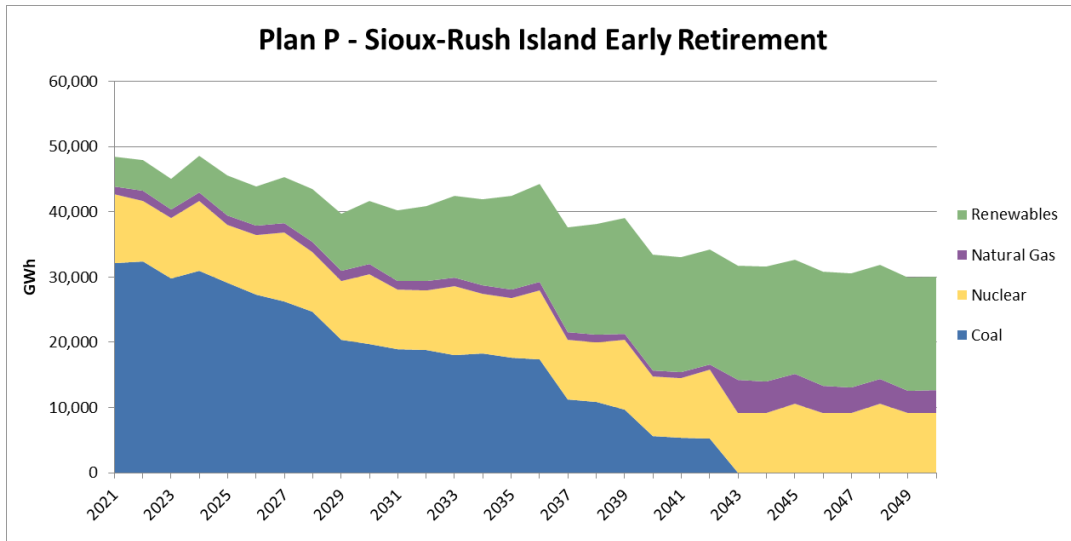
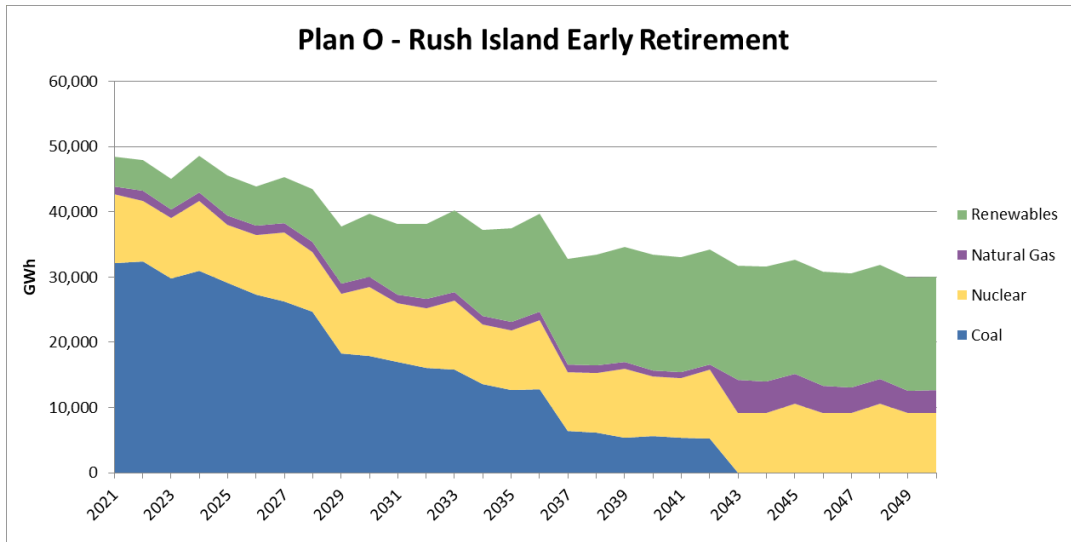
²³ 20 CSR 4240-22.060(4)(B)6; Energy from storage resources not shown since pump/charge energy is higher than produced energy.

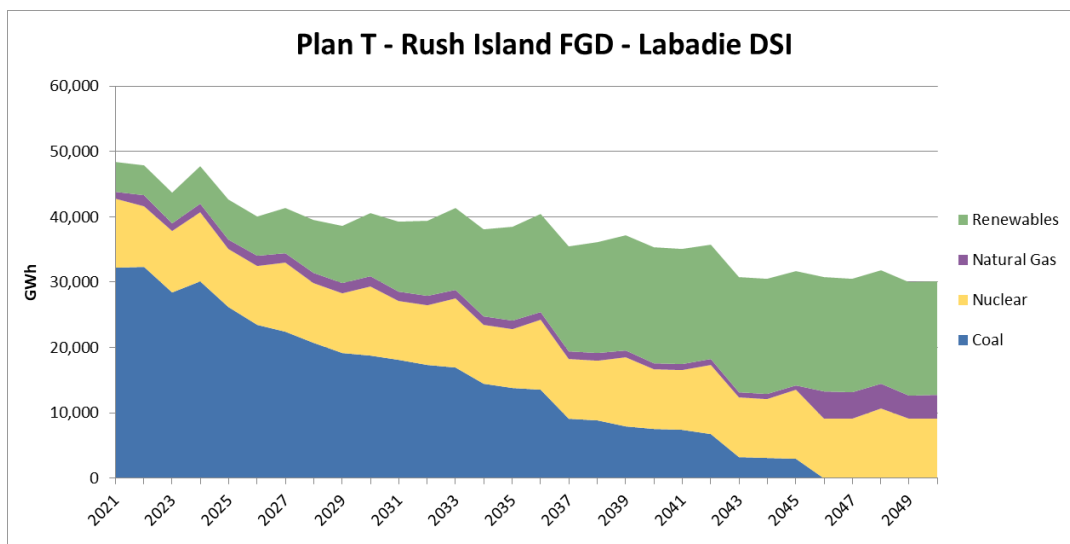
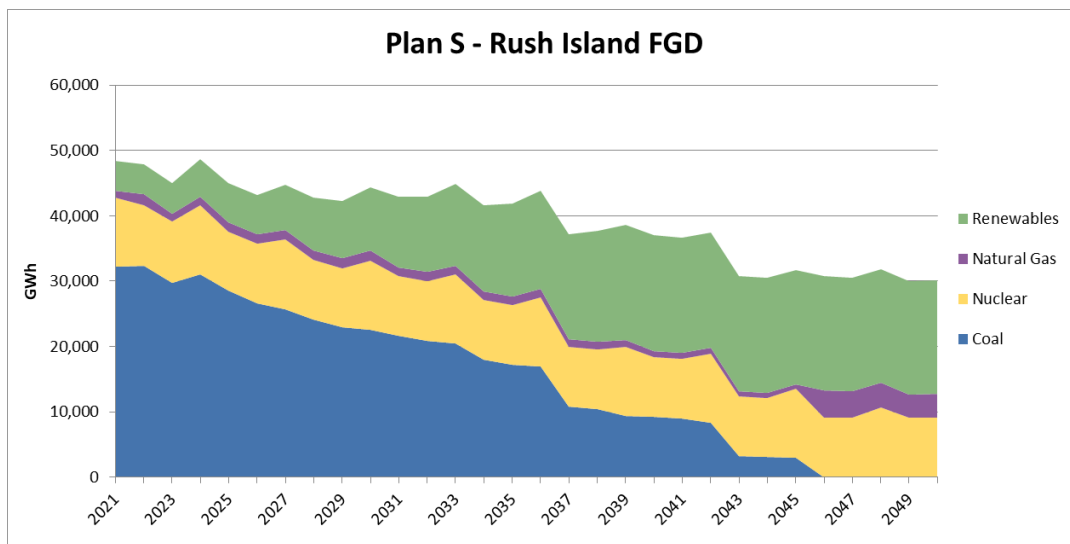
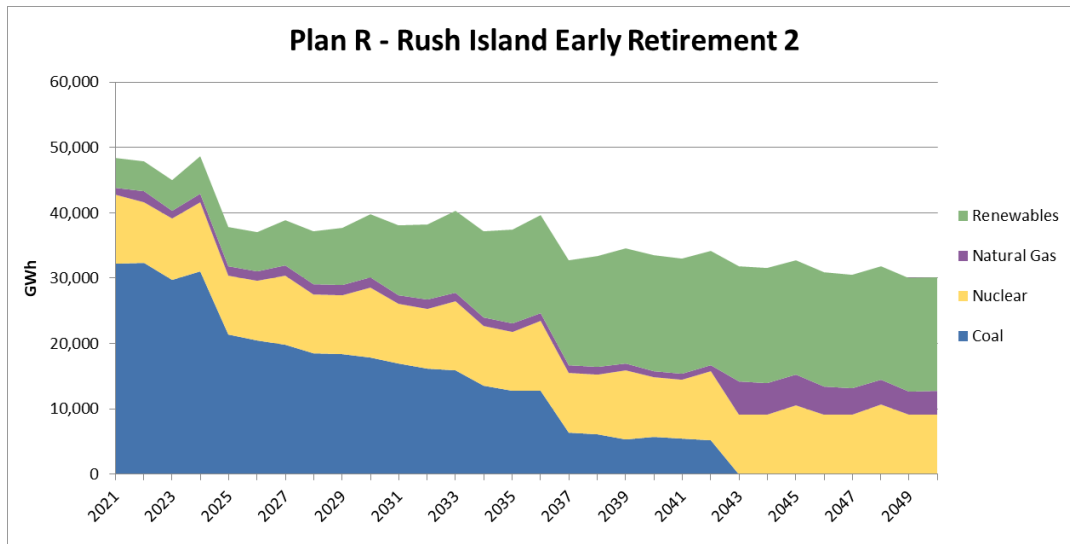


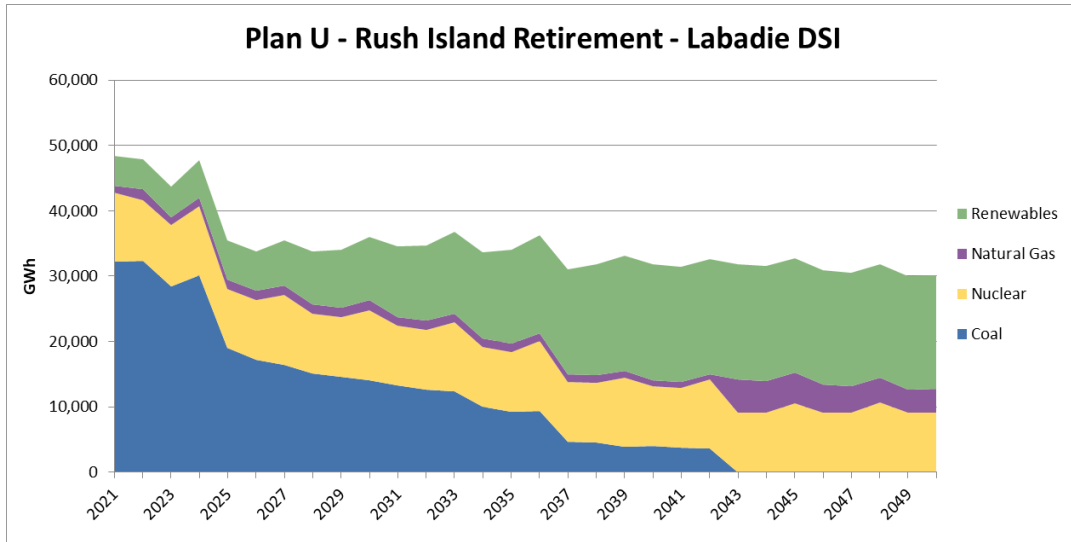


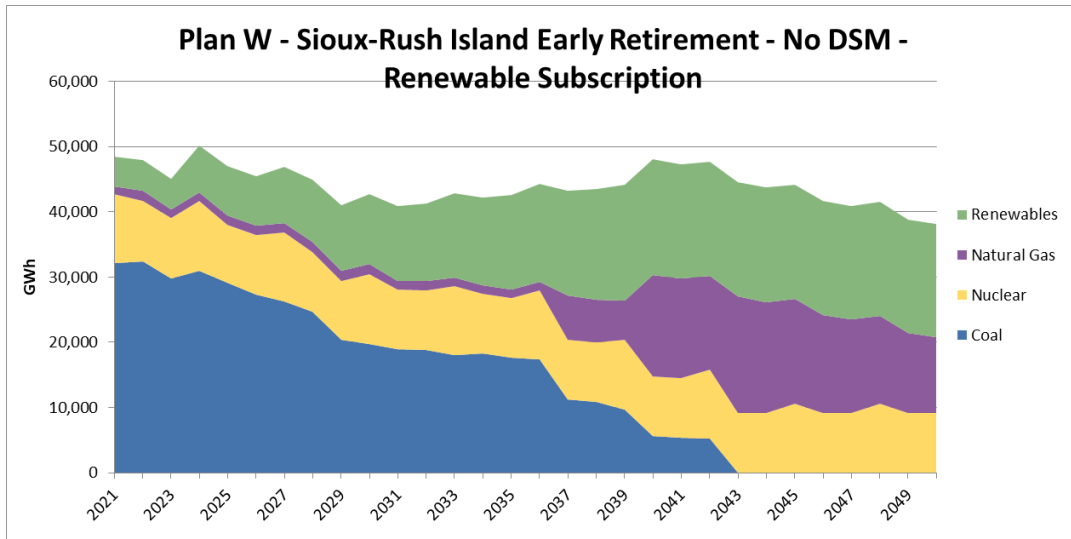
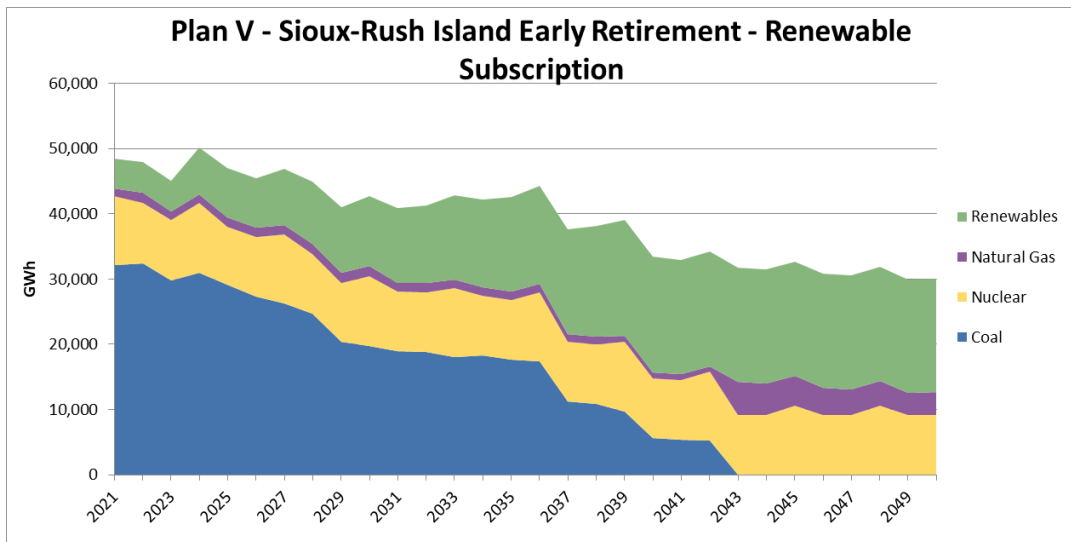


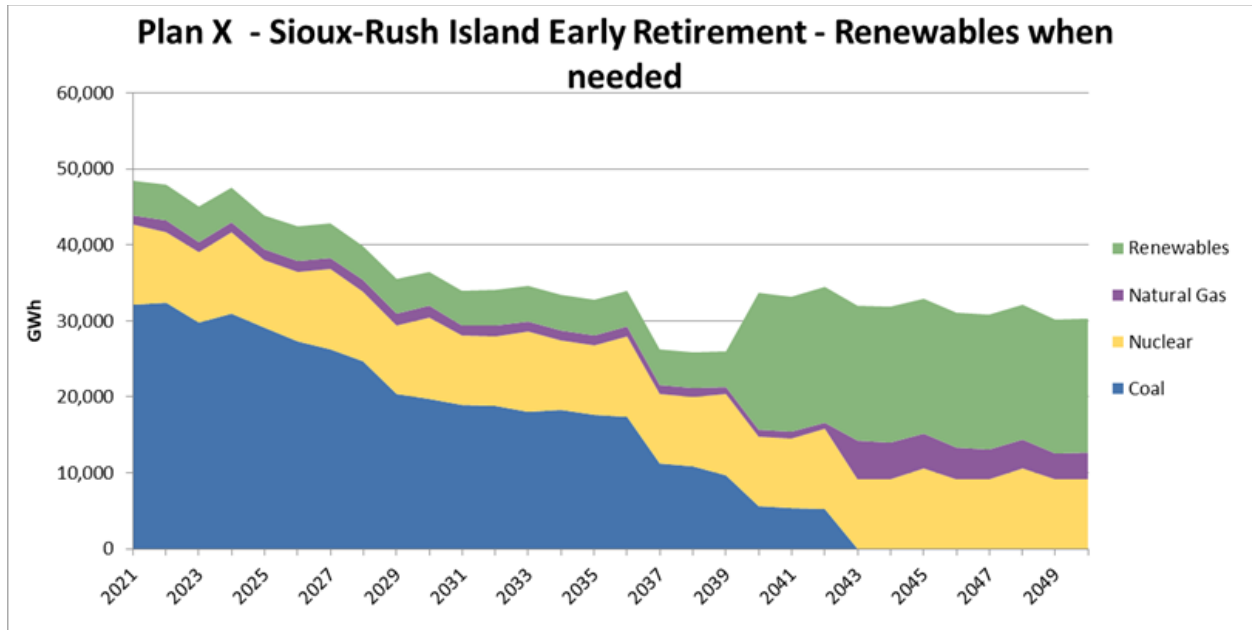


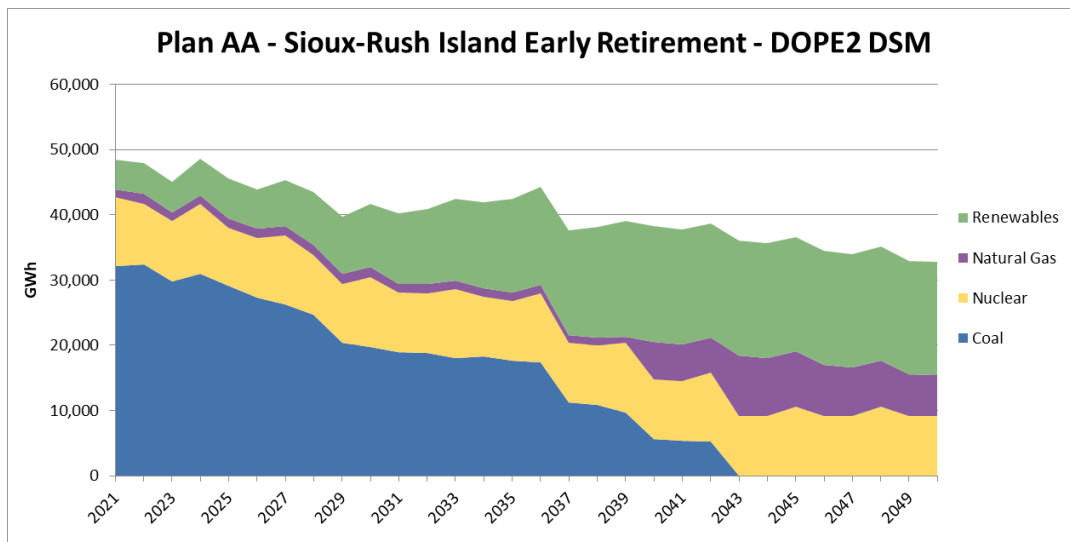
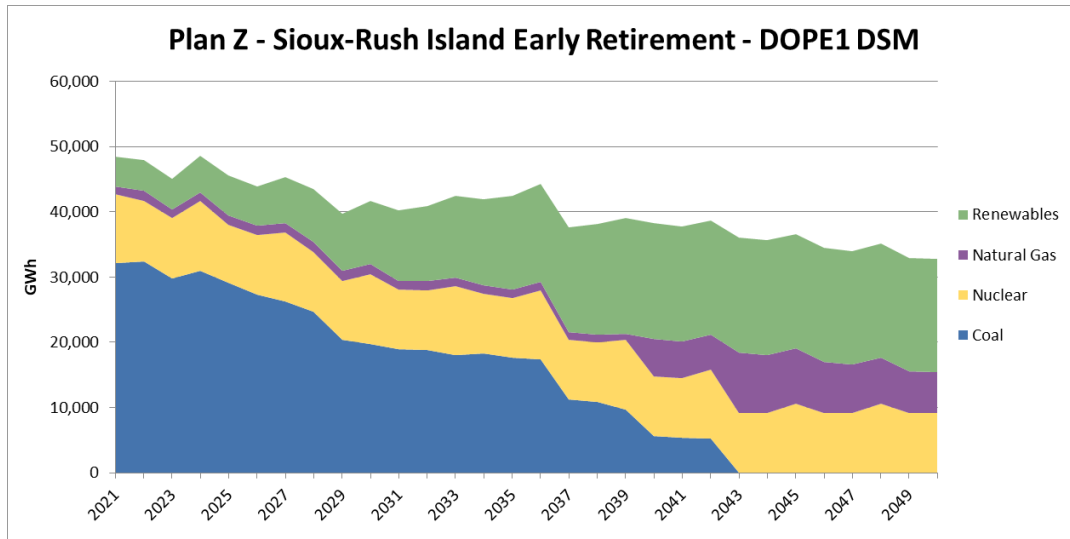
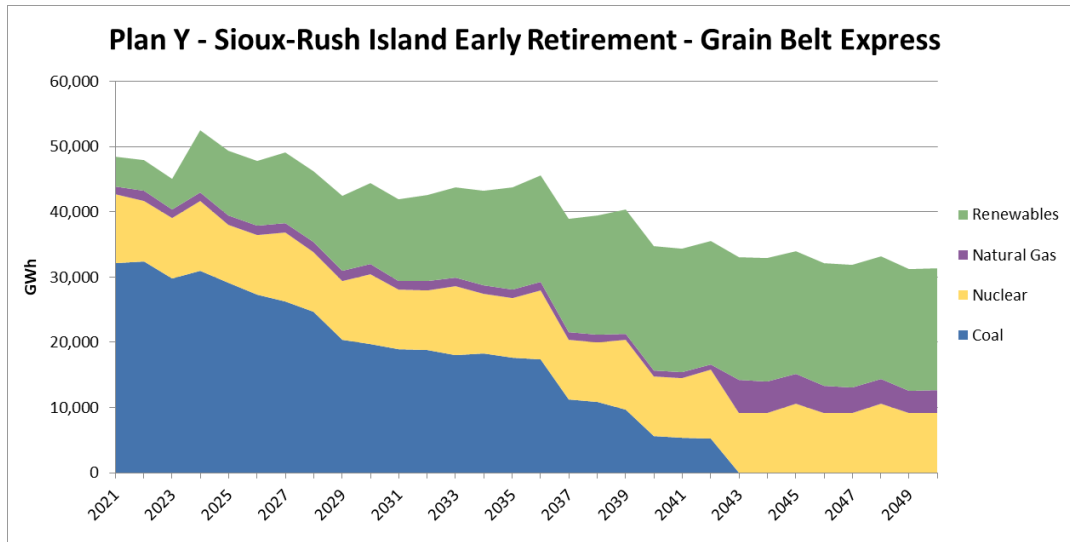












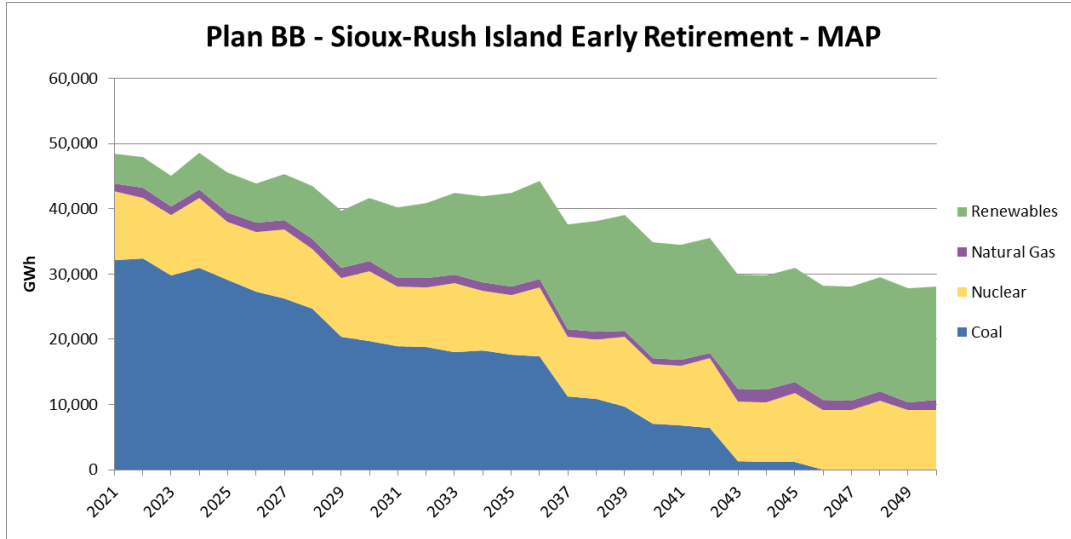
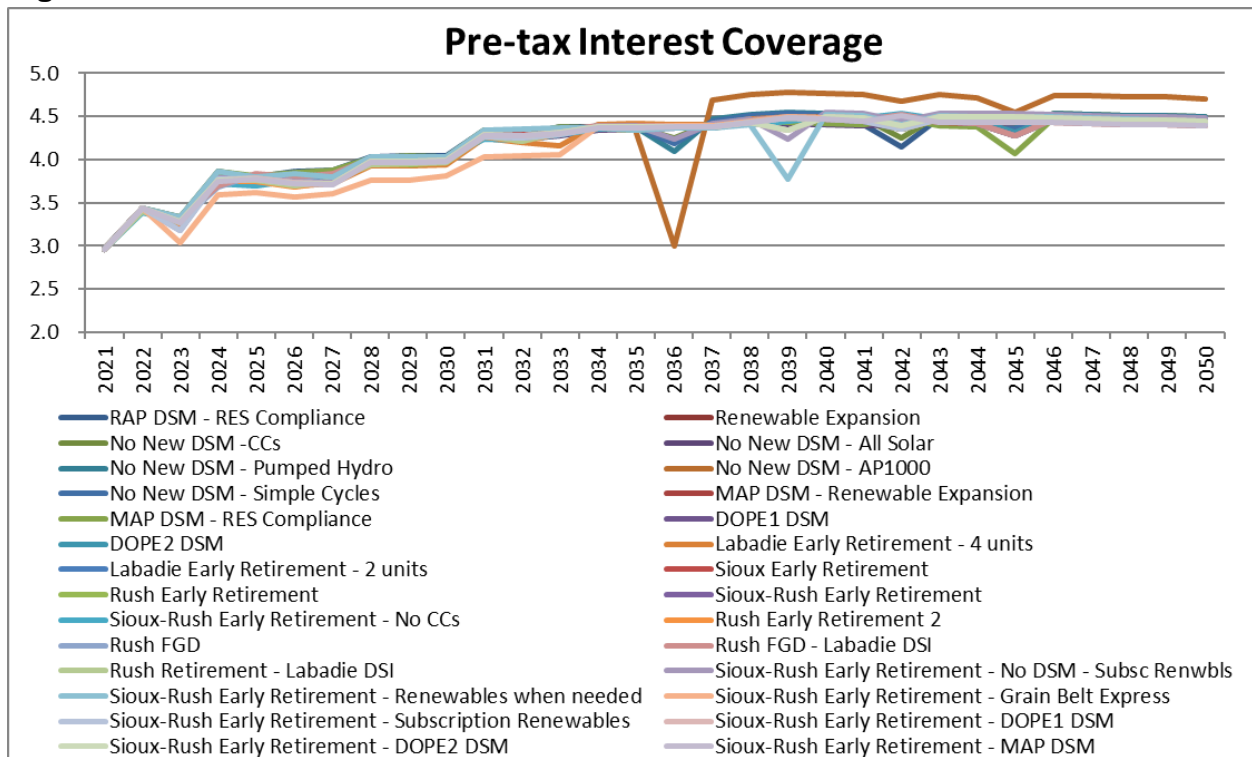
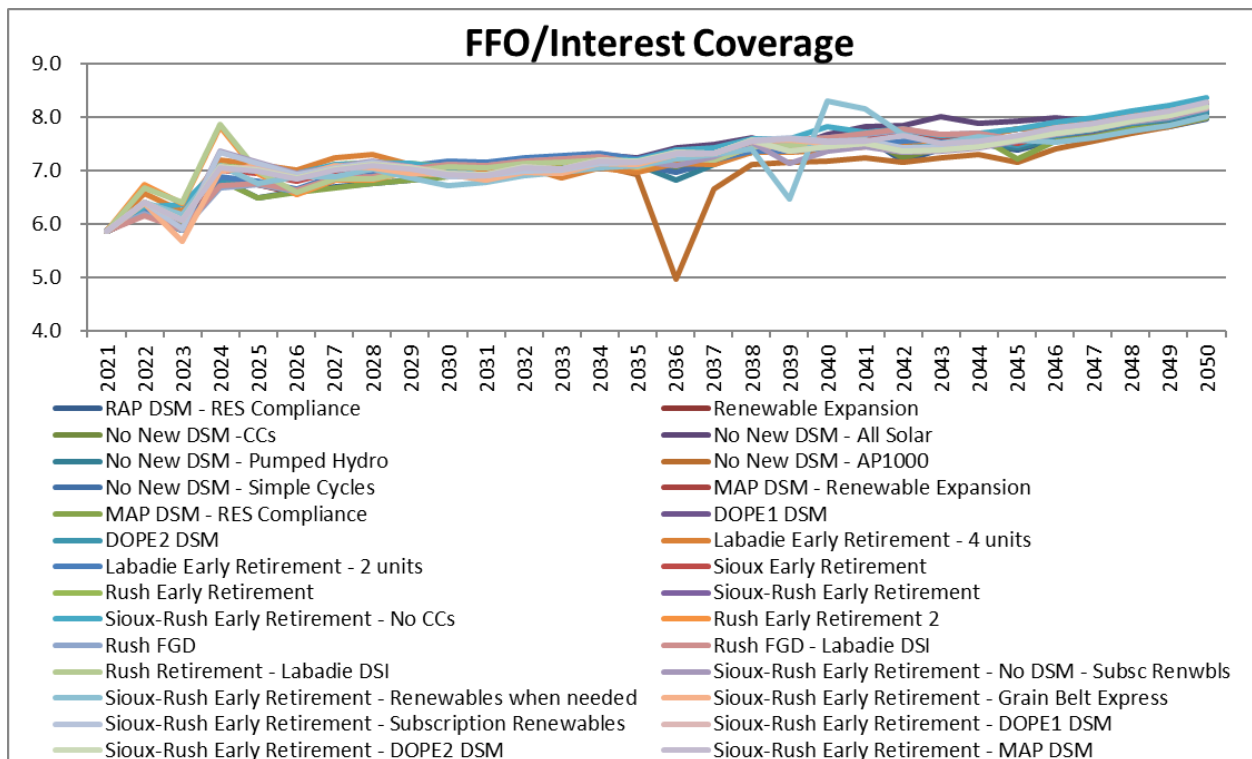


Figure 9A.14 Financial Measures²⁴ ***HC and Confidential***

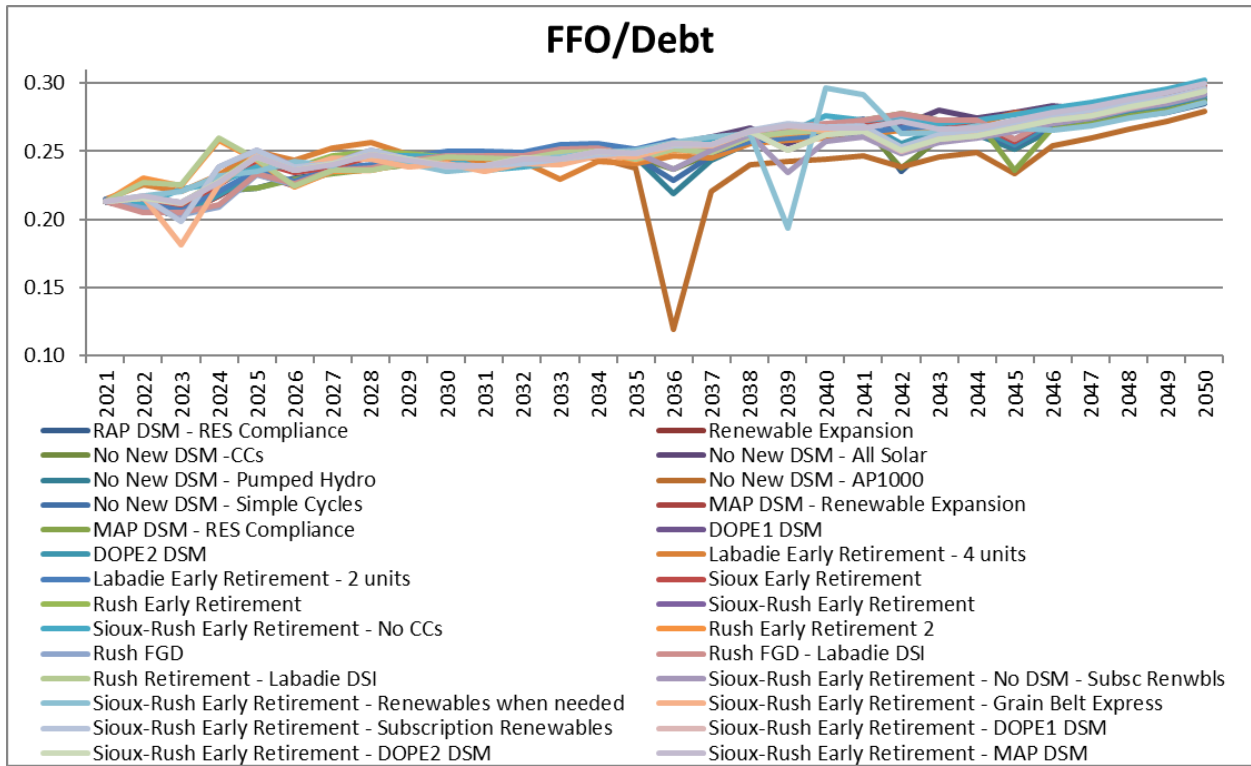


HC and Confidential

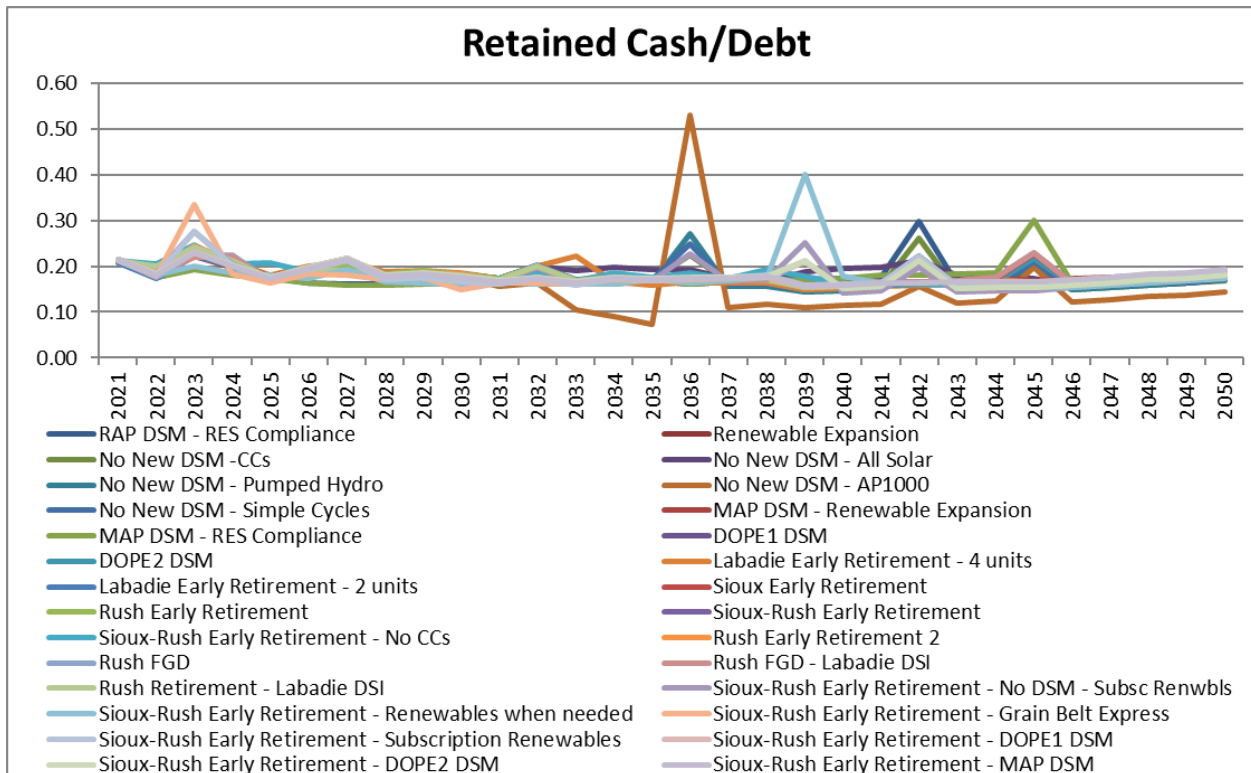


²⁴ 20 CSR 4240-22.060(2)(A)6

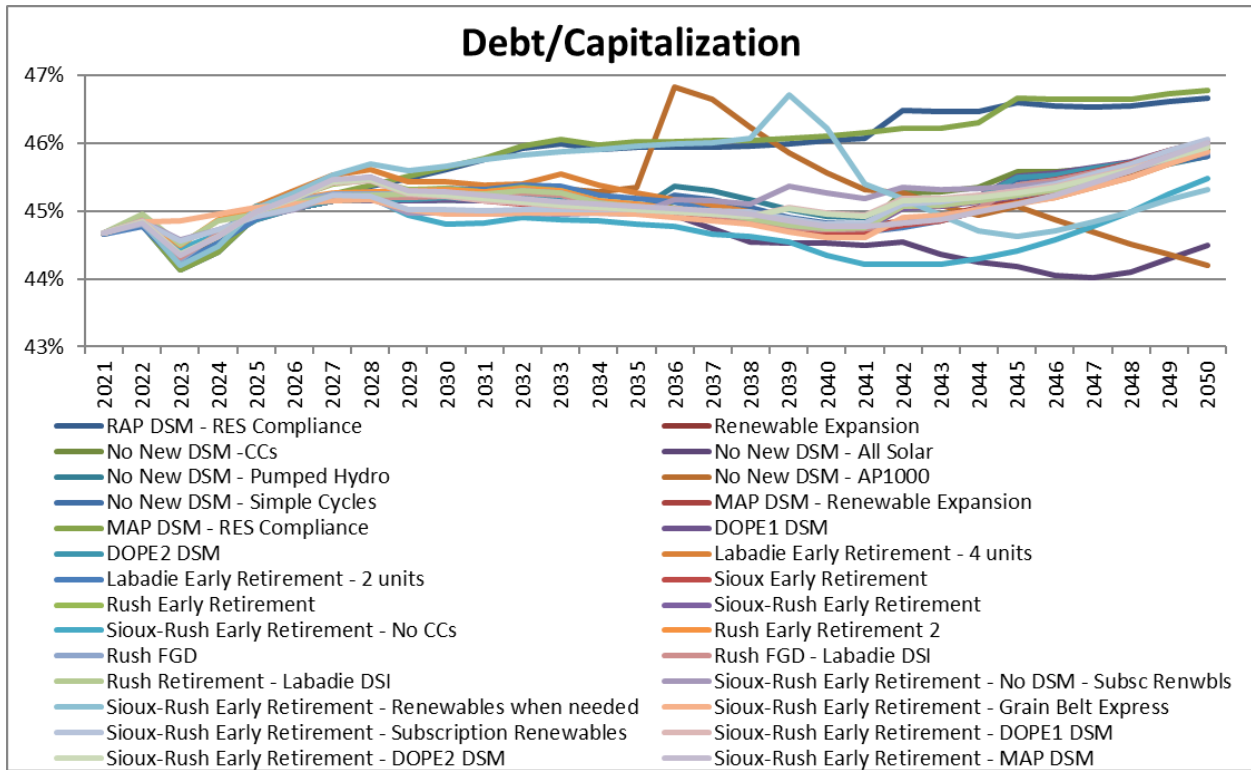
HC and Confidential



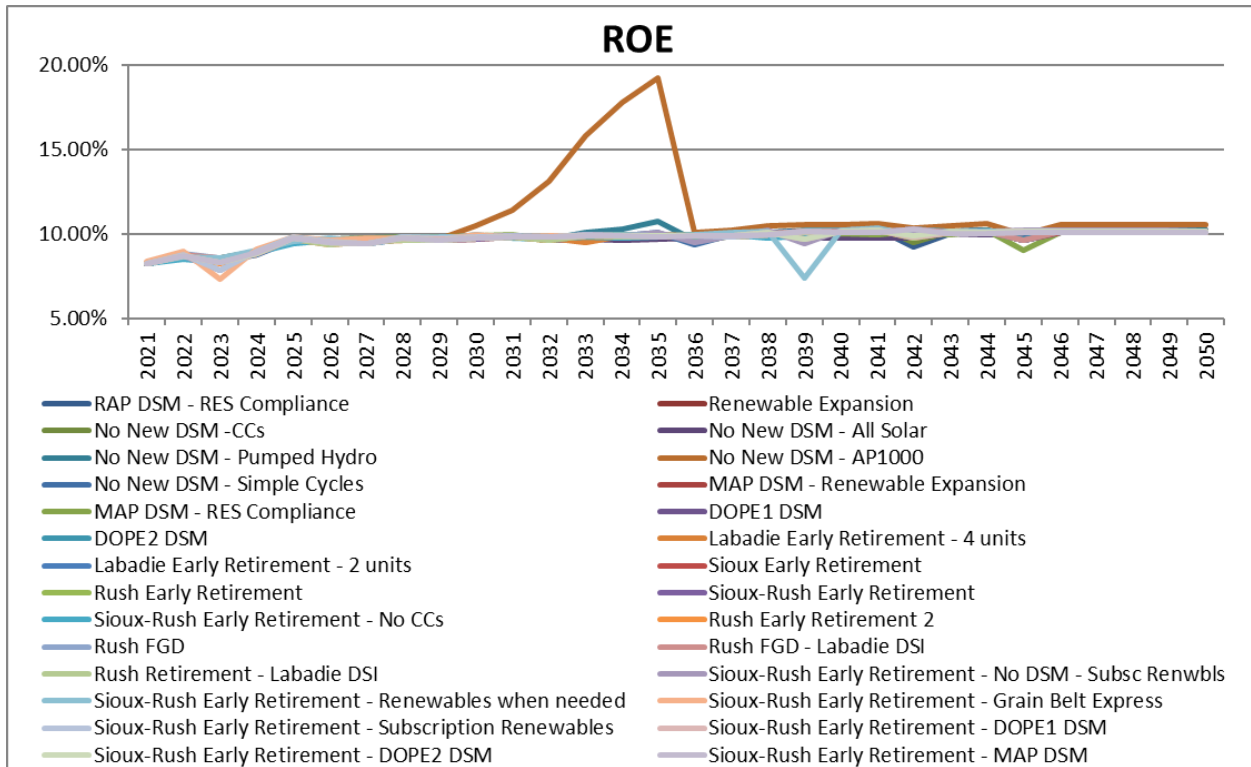
HC and Confidential



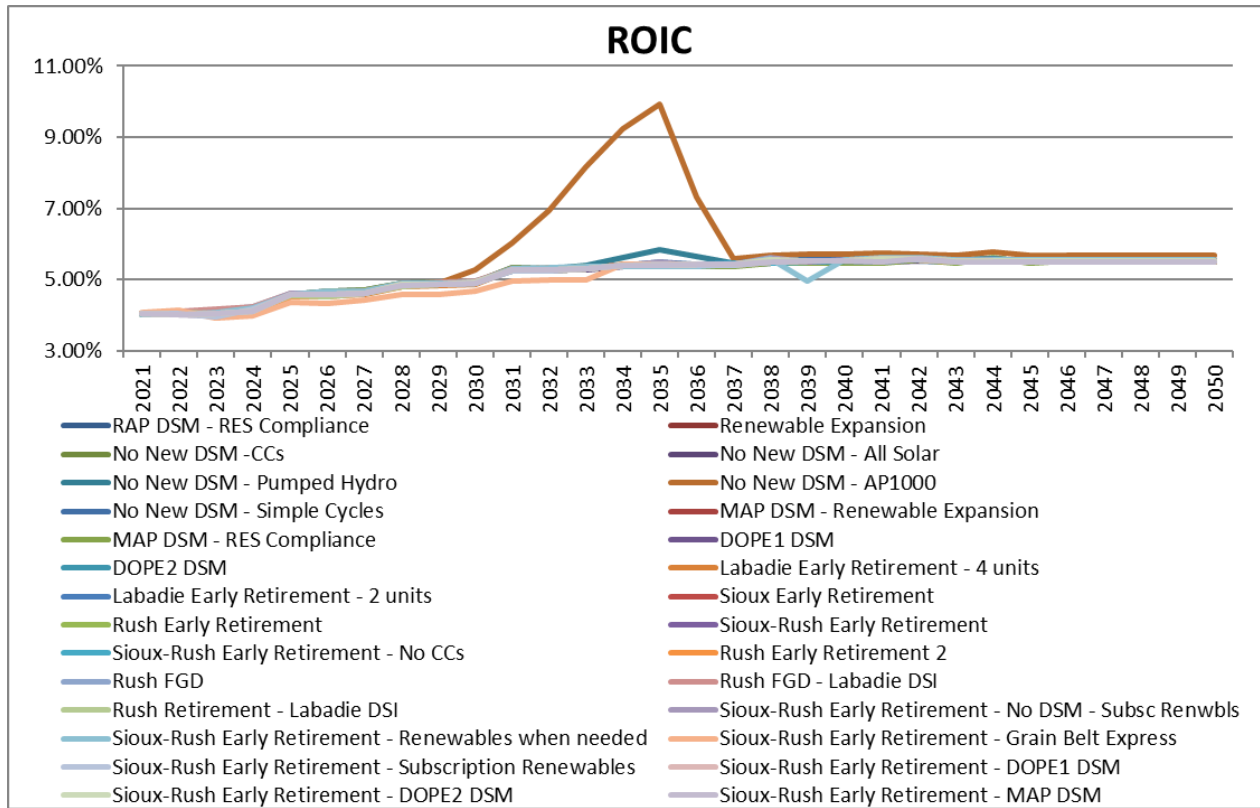
HC and Confidential



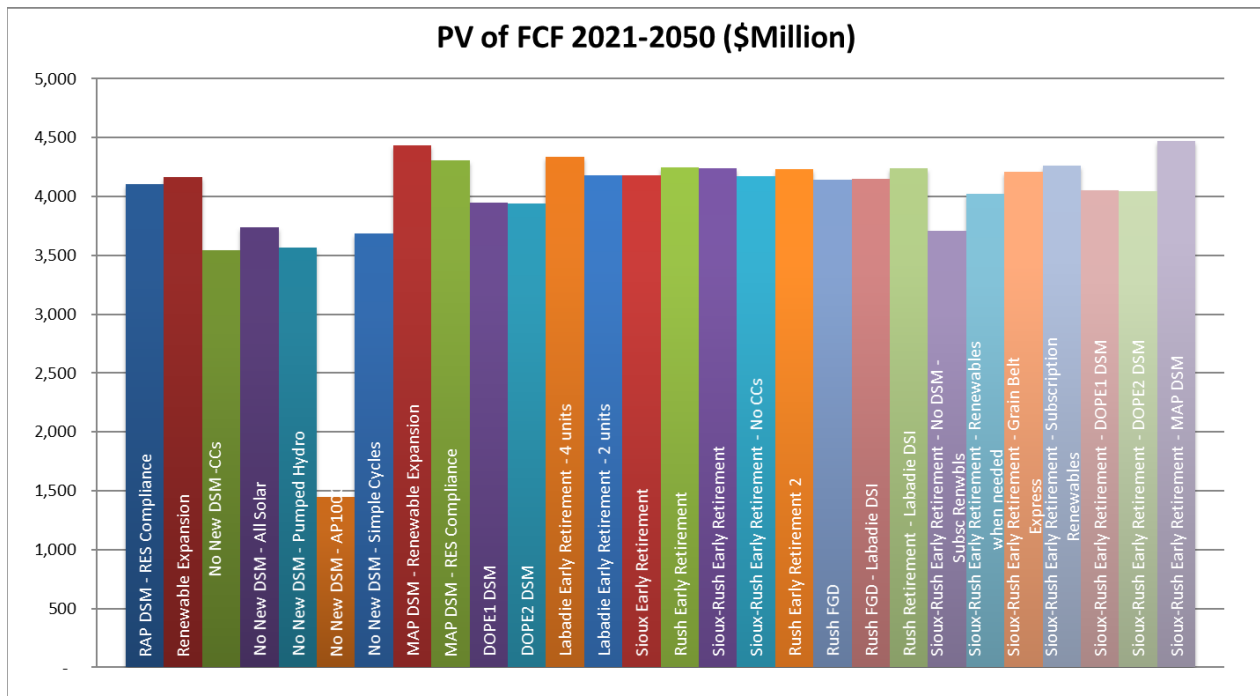
HC and Confidential



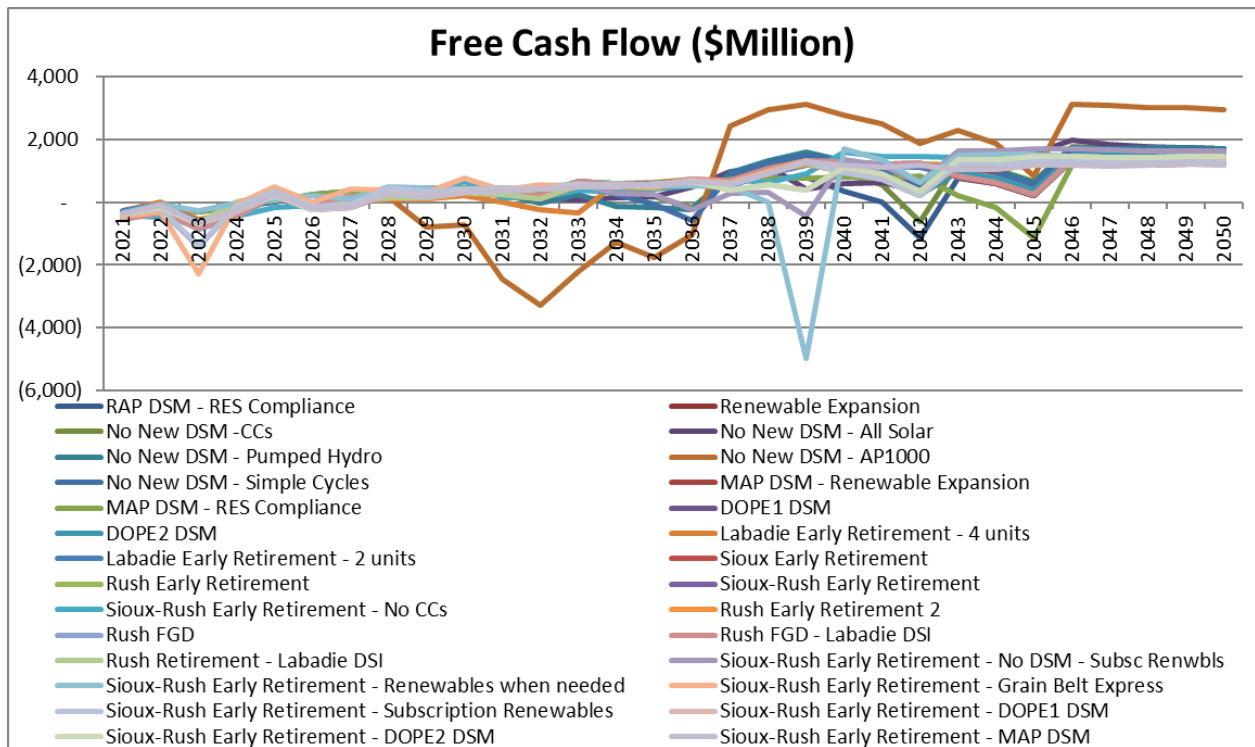
HC and Confidential



***HC ***



HC and Confidential



HC and Confidential

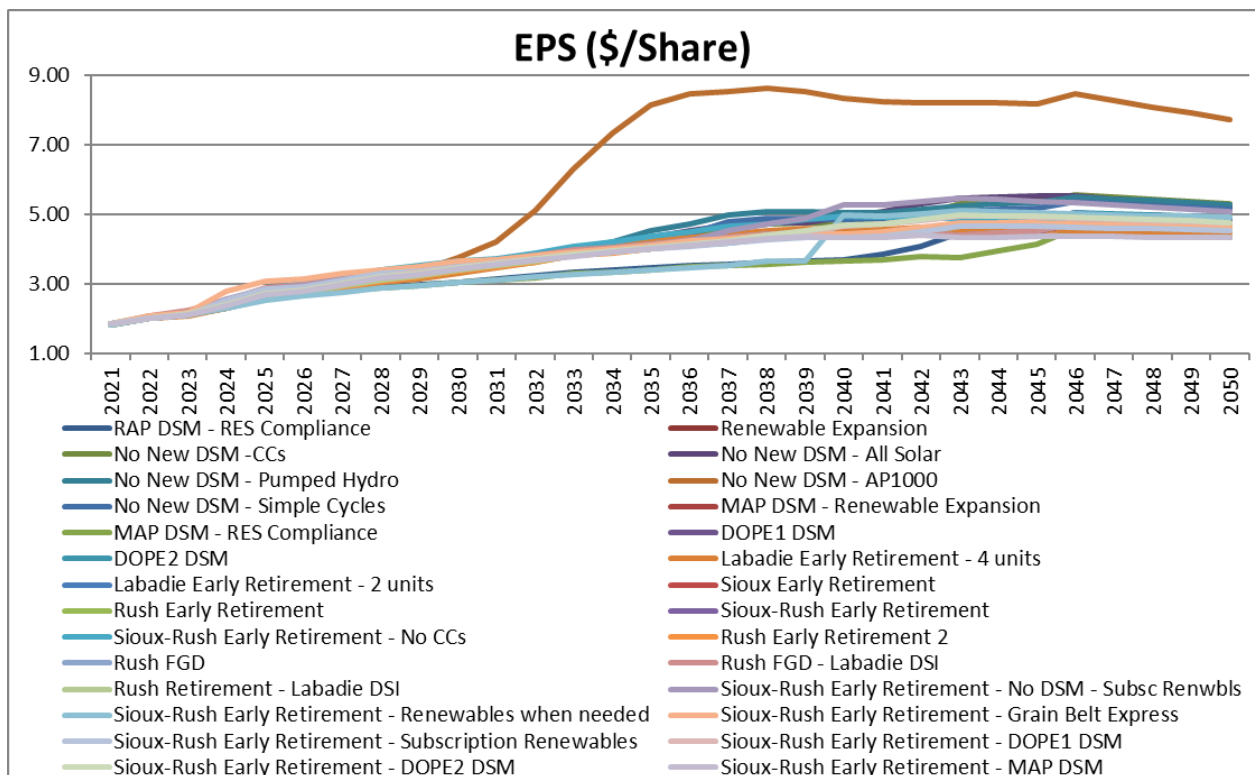
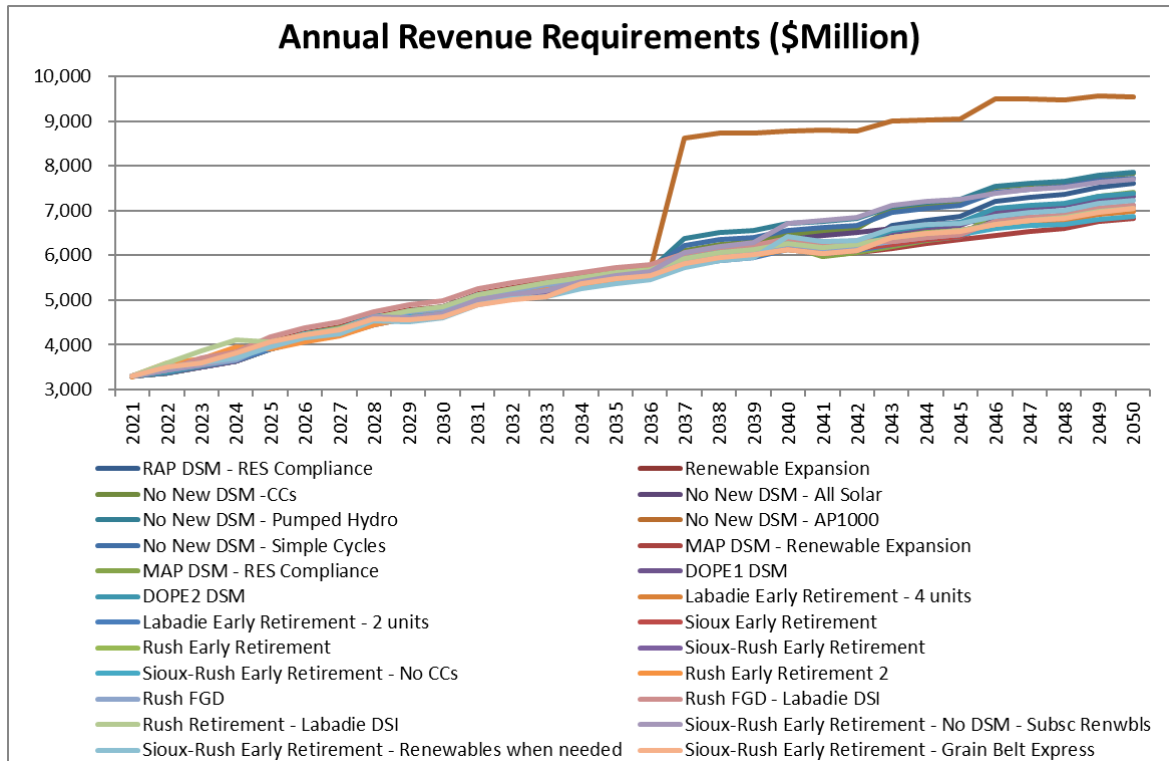


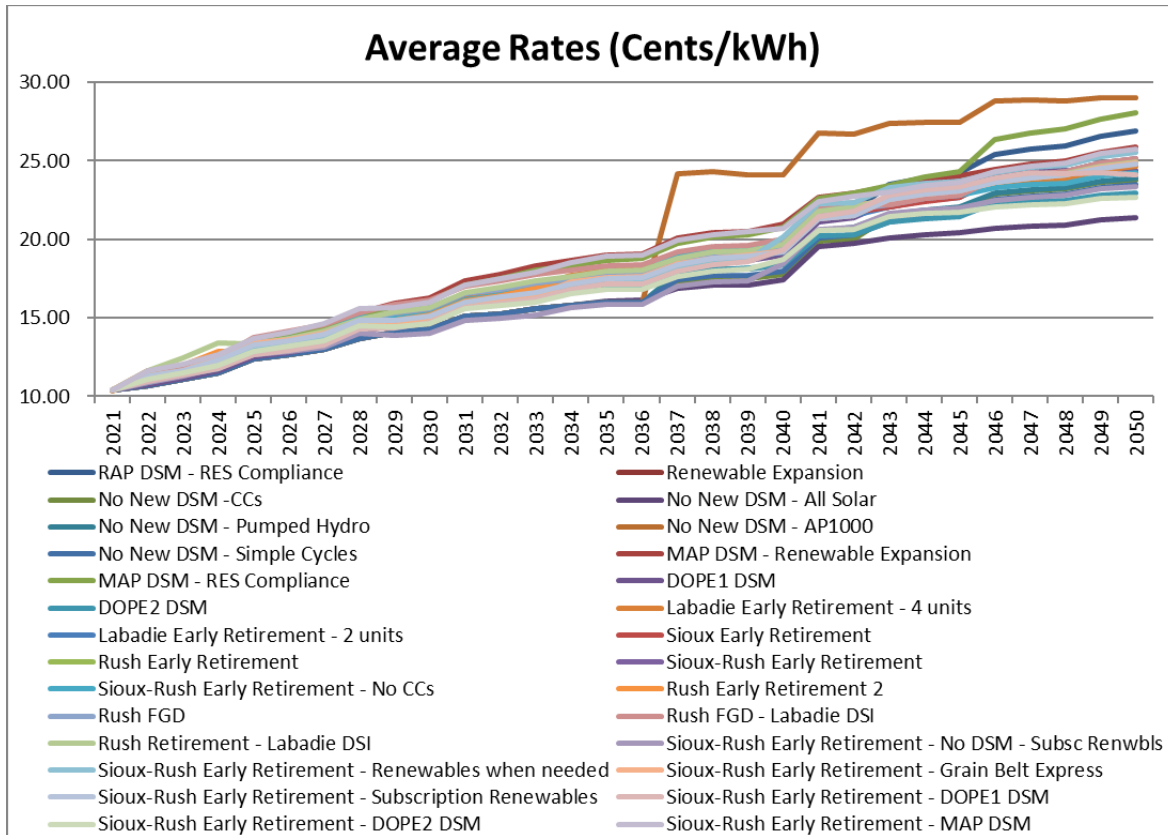
Figure 9A.15 Revenue Requirements and Rates²⁵ ***HC and Confidential***



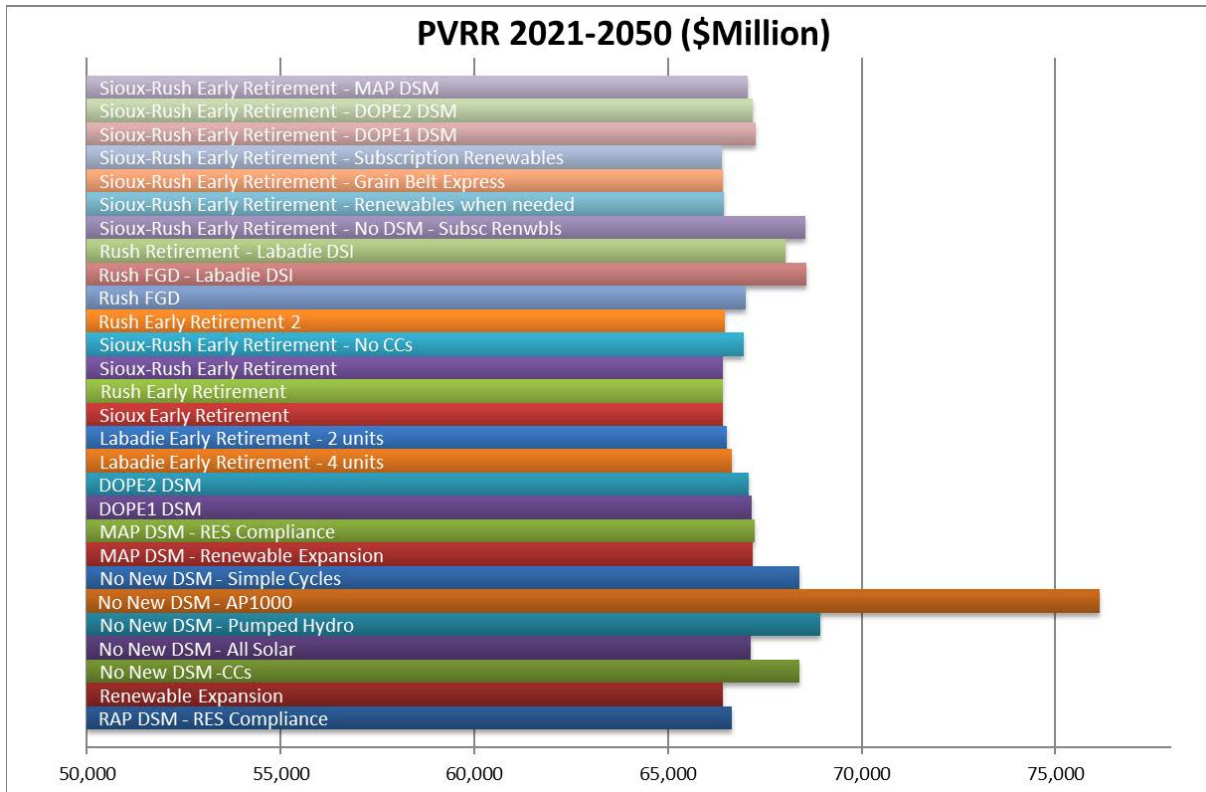
²⁵ 20 CSR 4240-22.060(2)(A)4; 20 CSR 4240-22.060(2)(A)5

Ameren Missouri

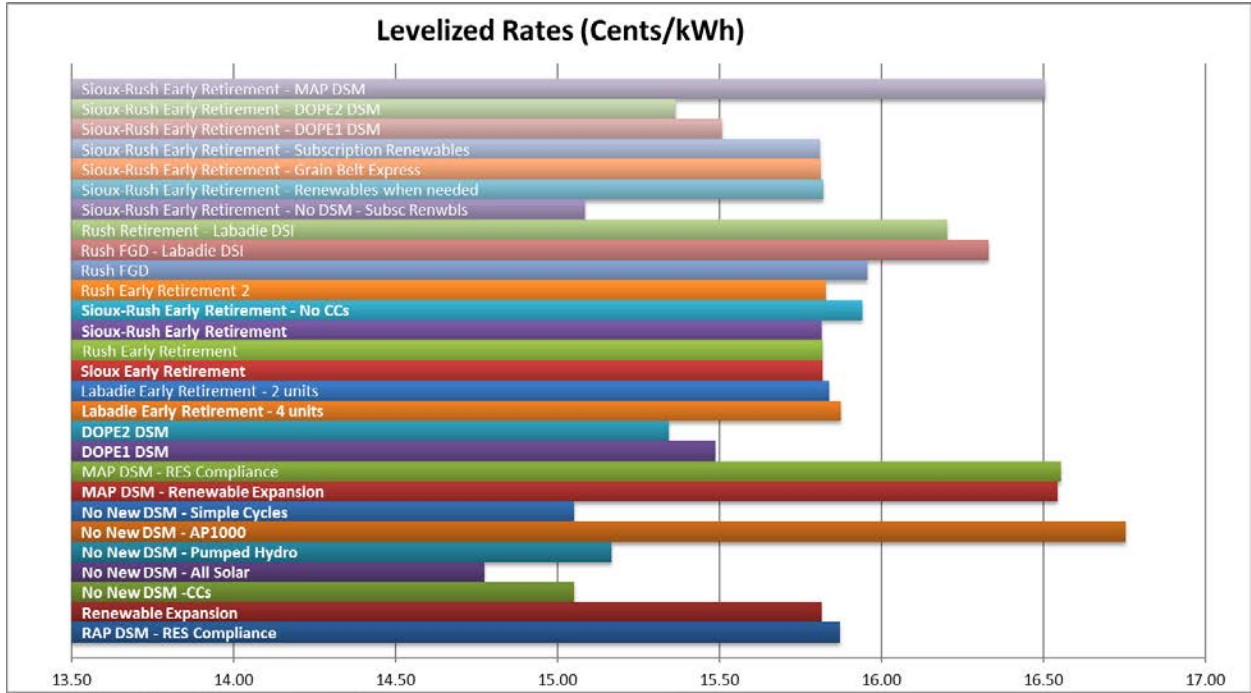
HC and Confidential



HC



***HC ***



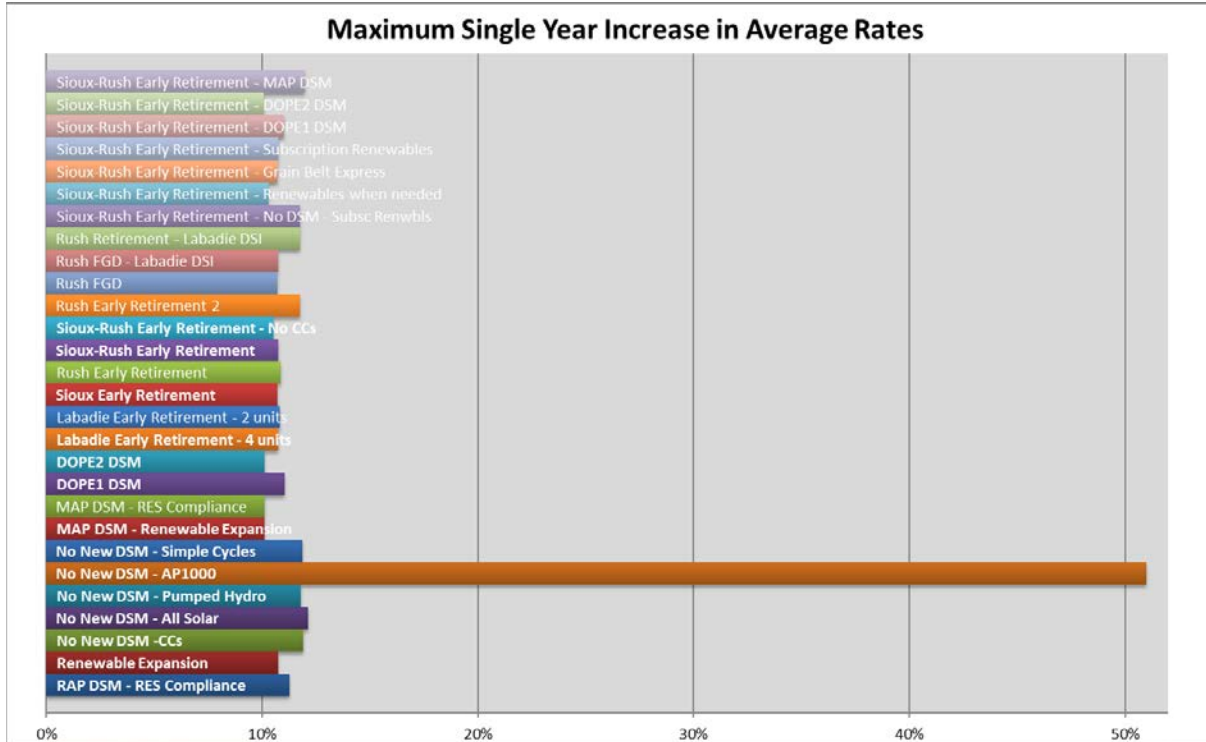
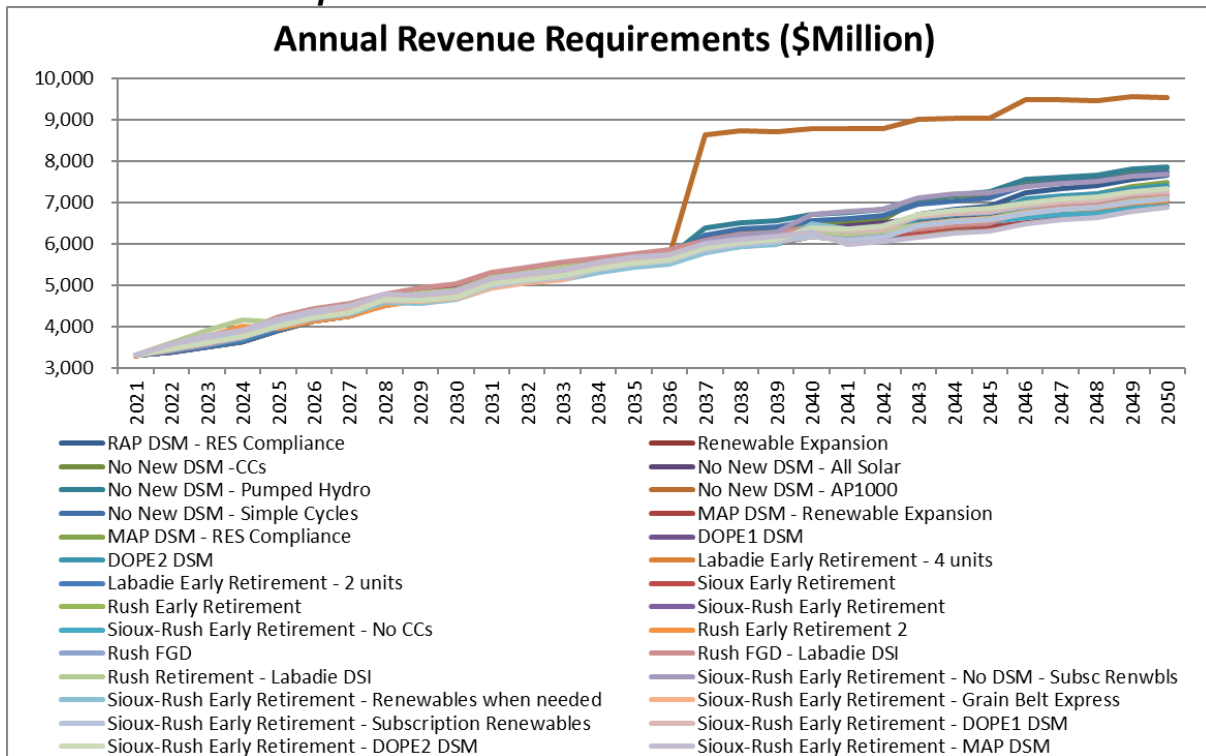


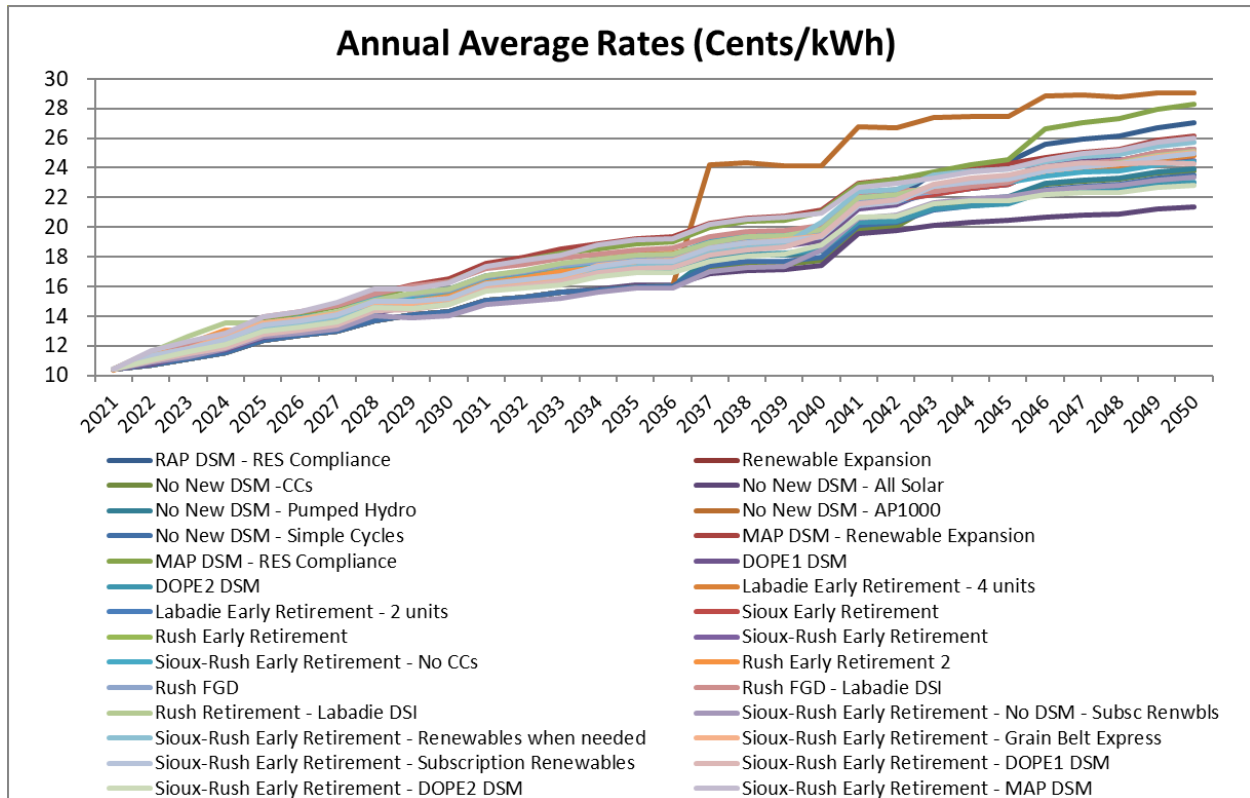
Figure 9A.16 Results with Financial Incentives for DSM²⁶ ***HC and Confidential Annual Revenue Requirements²⁷



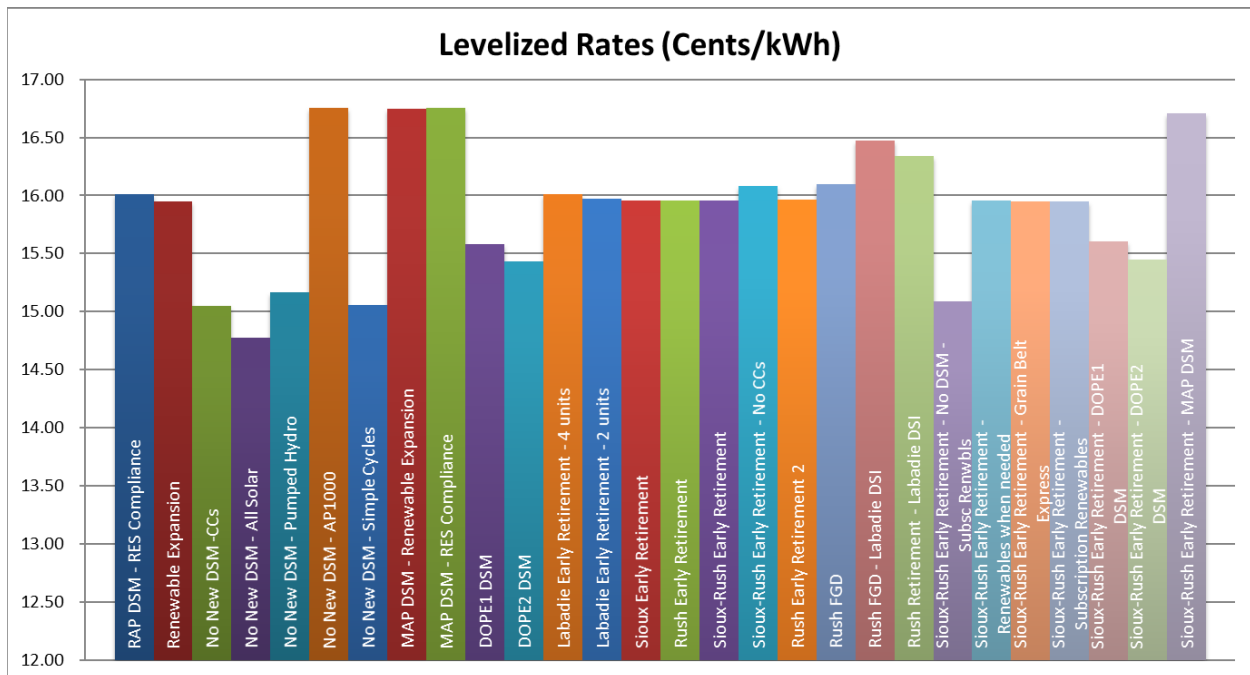
²⁶ 20 CSR 4240-22.060(4)(C)

²⁷ 20 CSR 4240-22.060(4)(C)1A

Annual Average Rates²⁸ ***HC and Confidential***



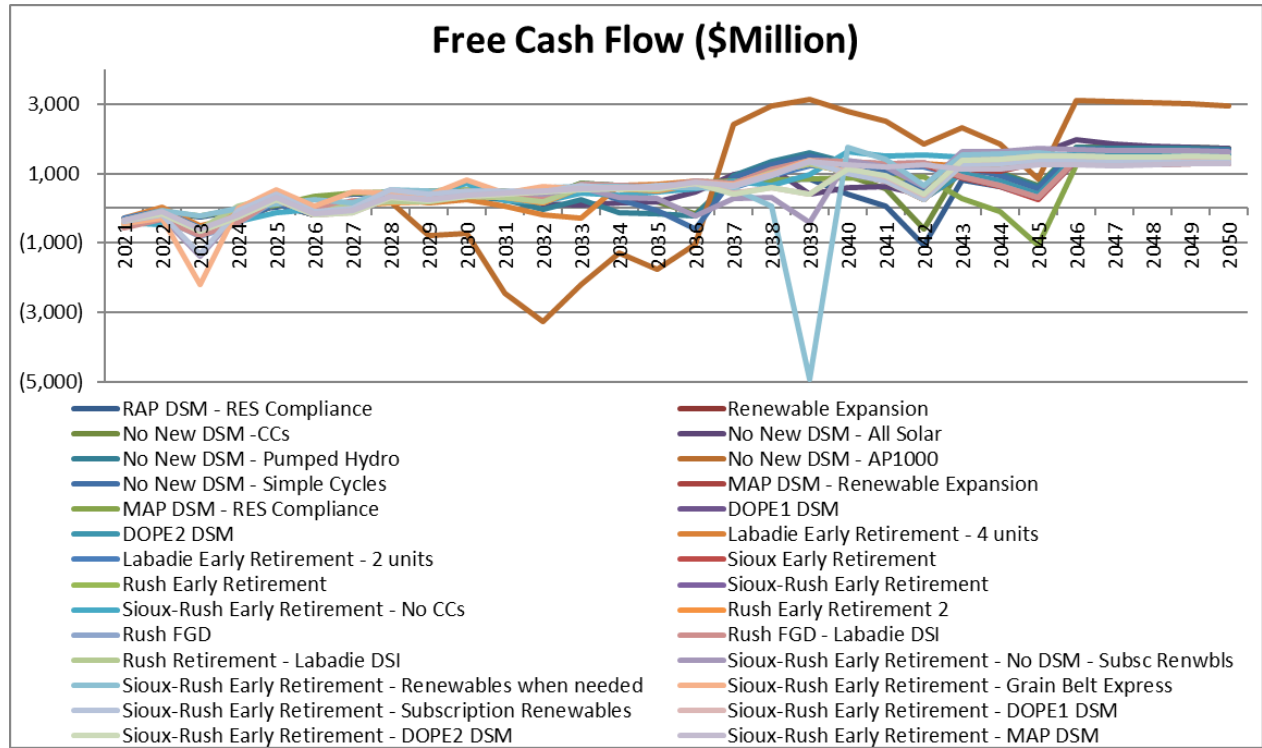
HC



²⁸ 20 CSR 4240-22.060(4)(C)1B; 20 CSR 4240-22.060(4)(C)1C

Tabulation for annual % increases in rates with and without financial incentives is provided in the workpapers.

Free Cash Flows *HC and Confidential*****



HC

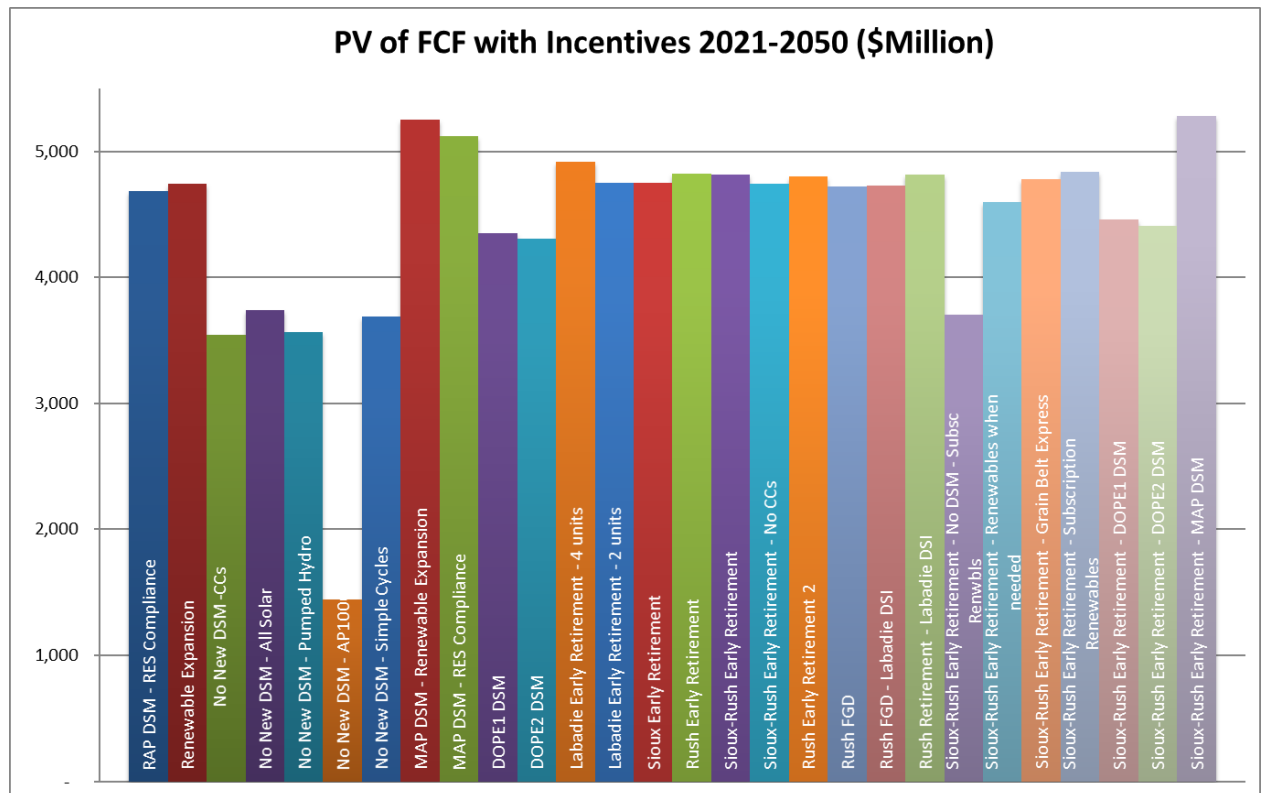
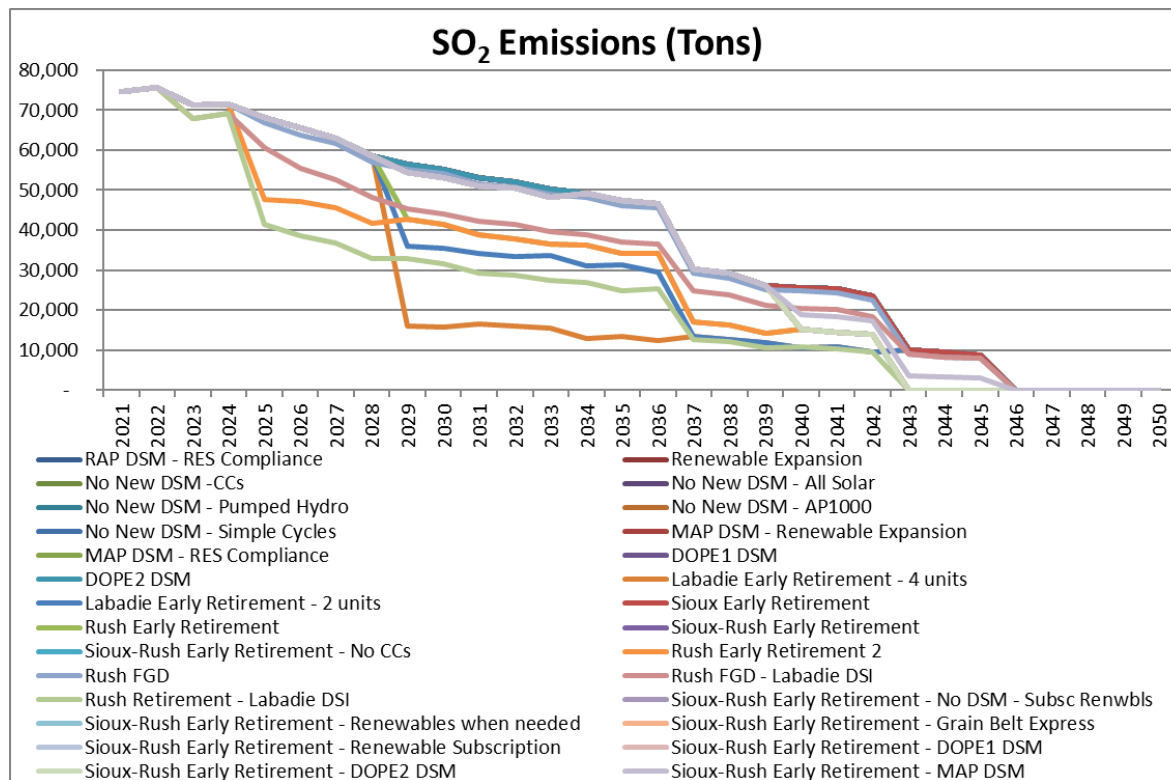
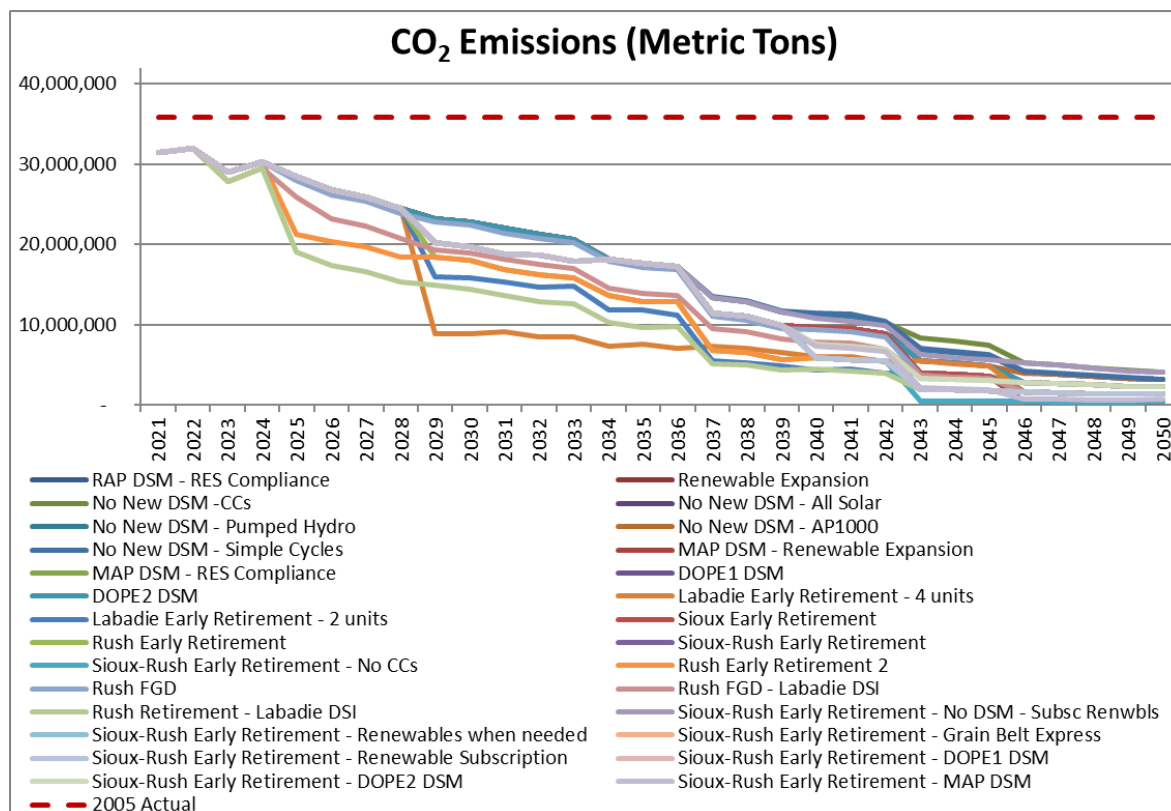
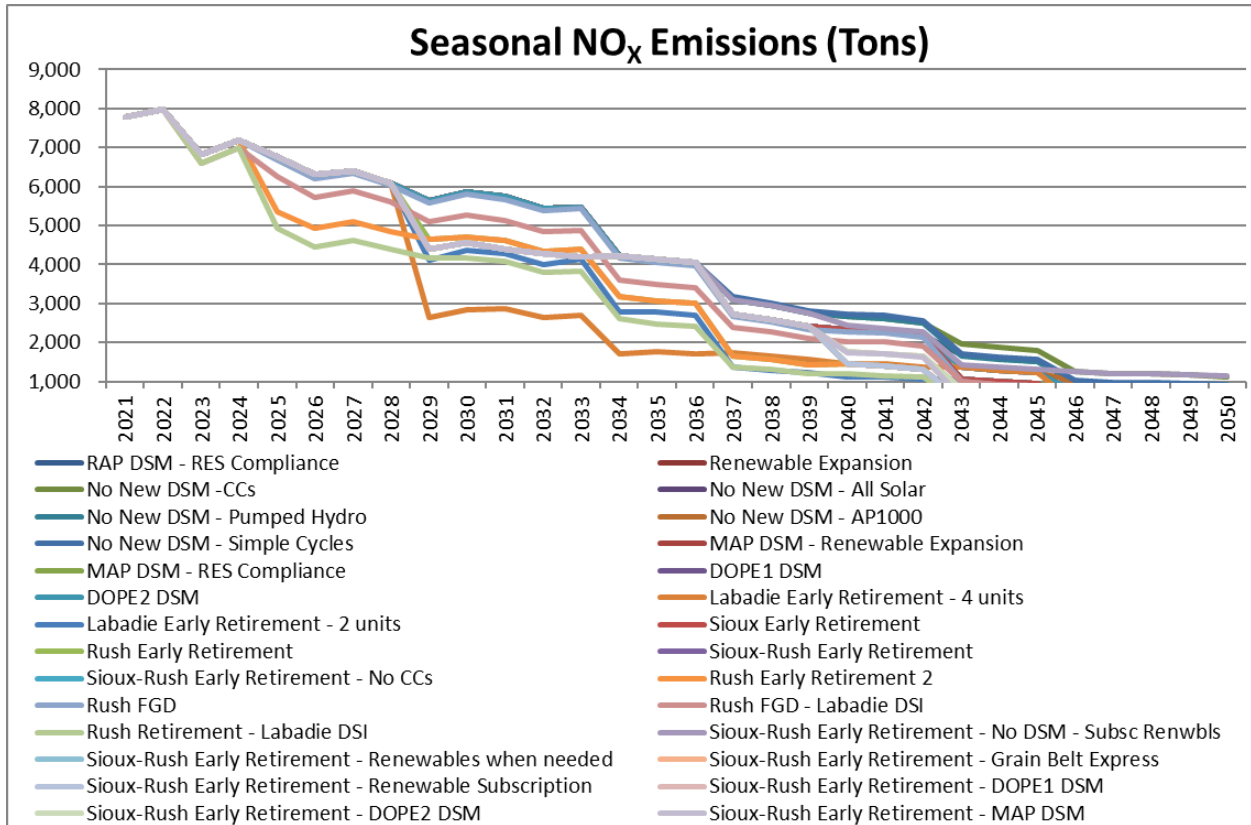
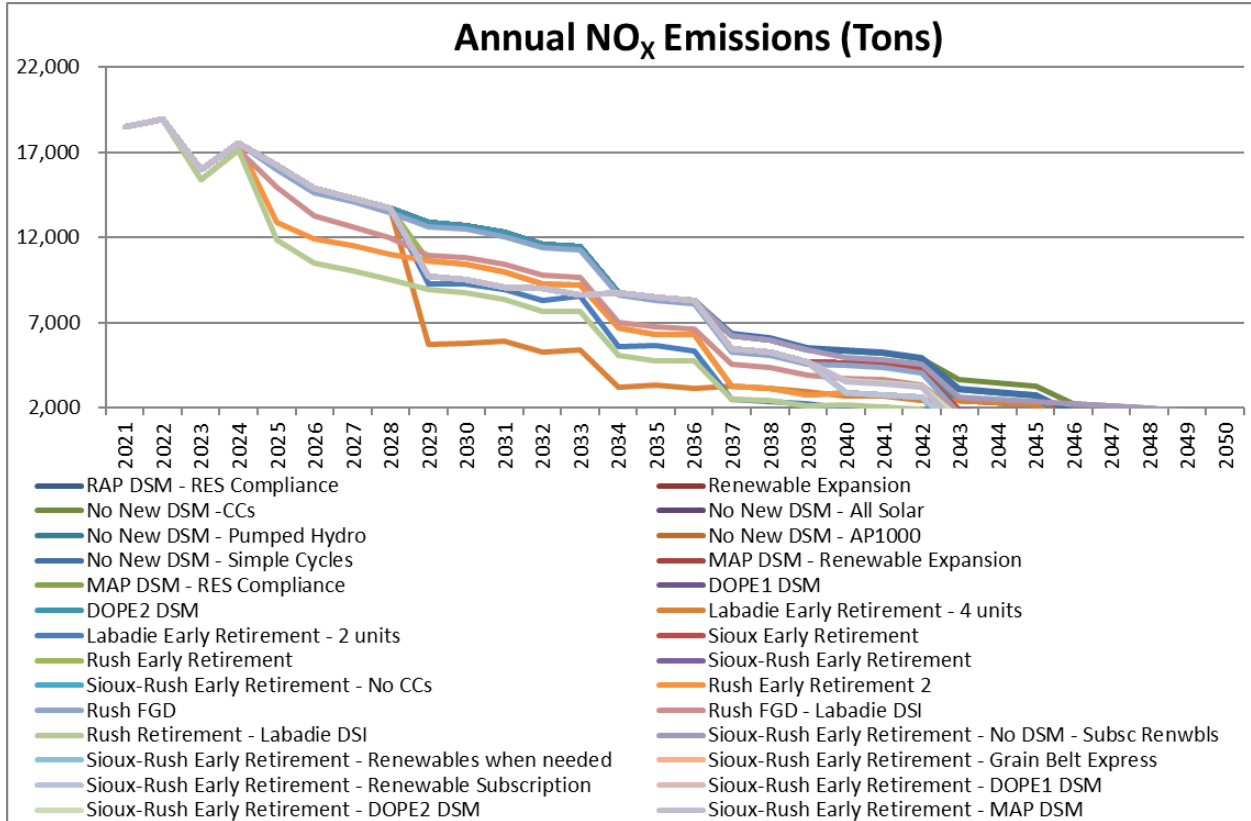


Figure 9A.17 Annual Emissions²⁹ ***HC***



²⁹ 20 CSR 4240-22.060(4)(B)7



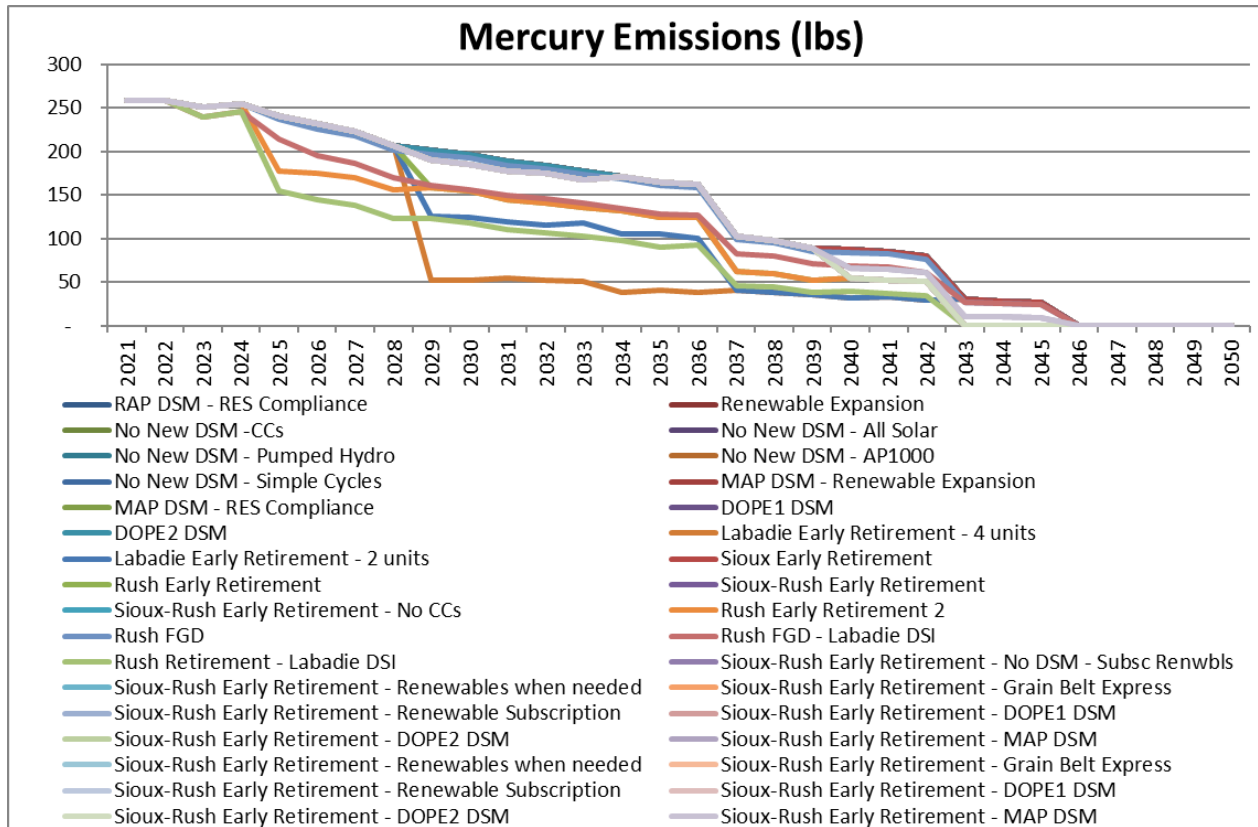
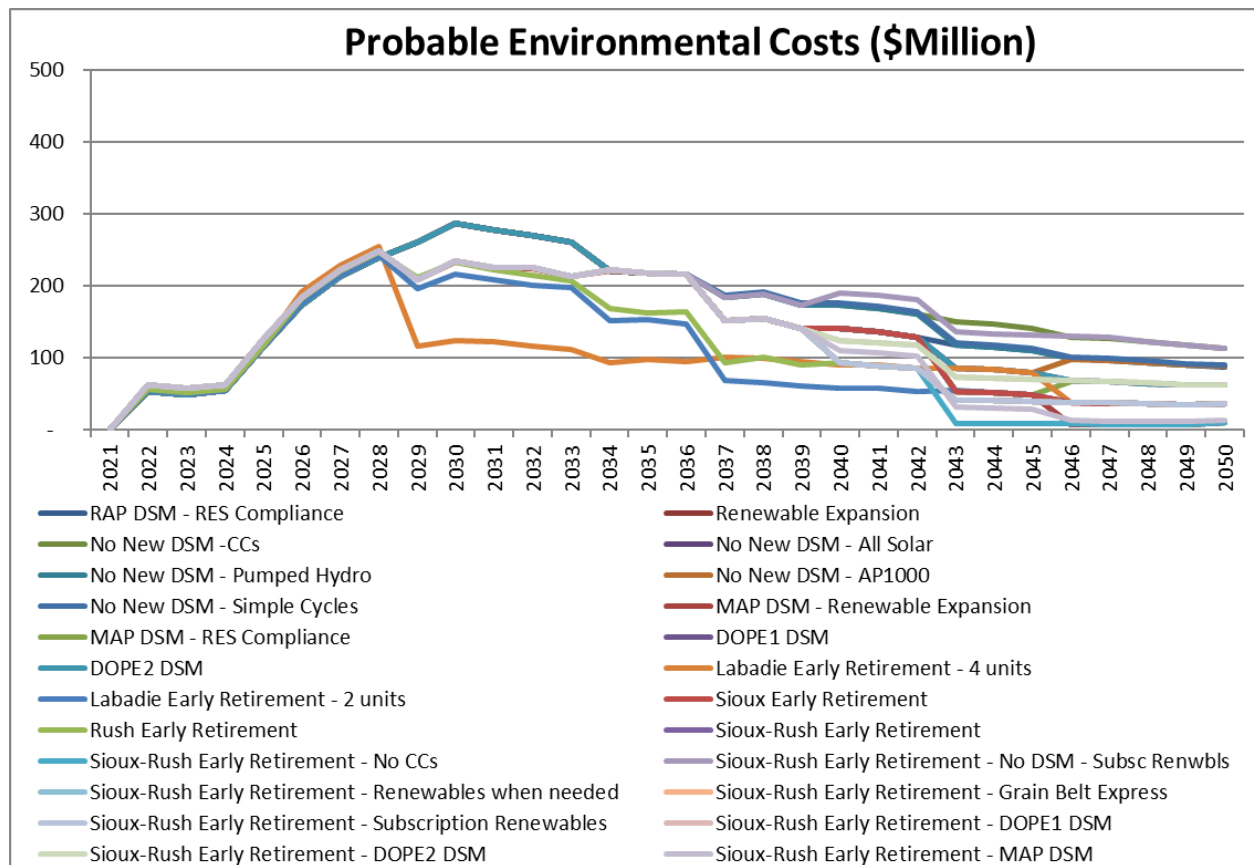
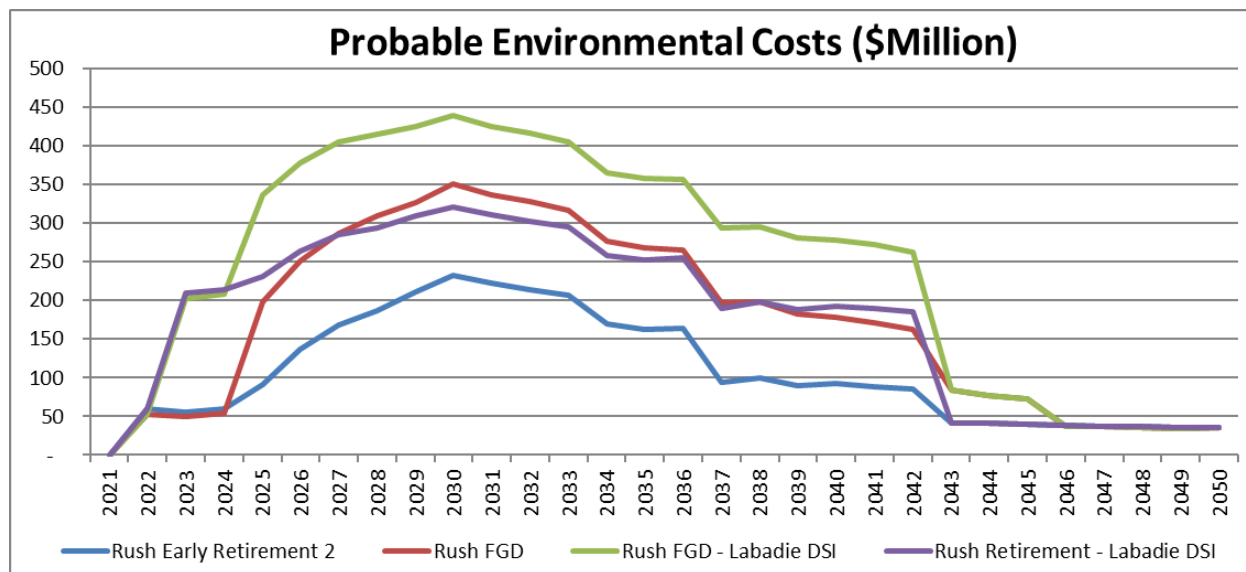


Figure 9A.18 Probable Environmental Costs³⁰

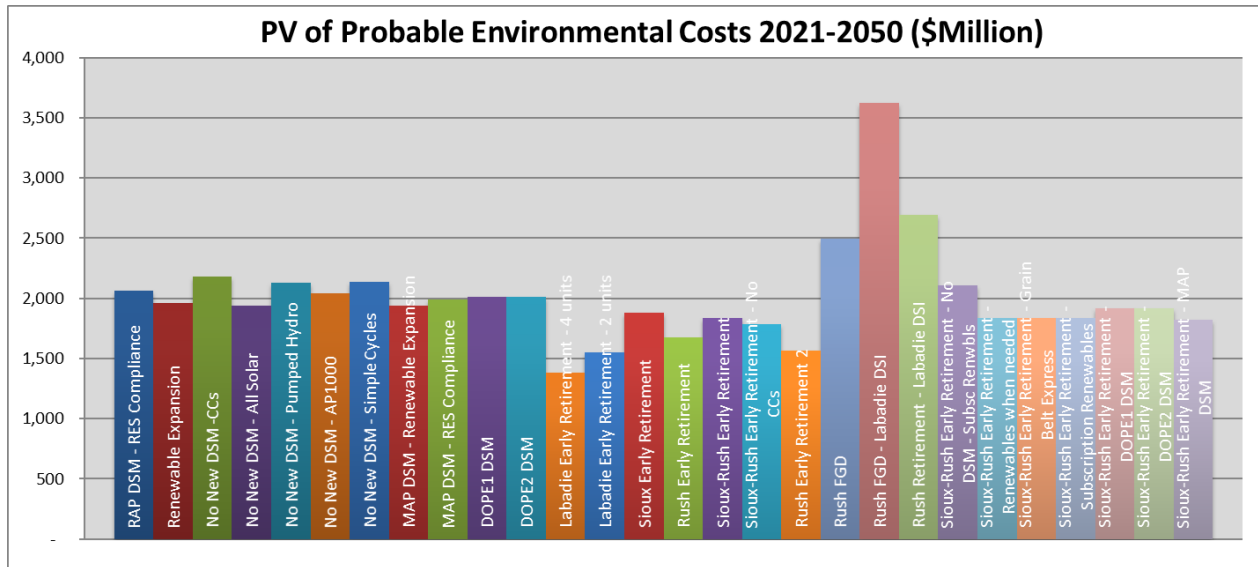


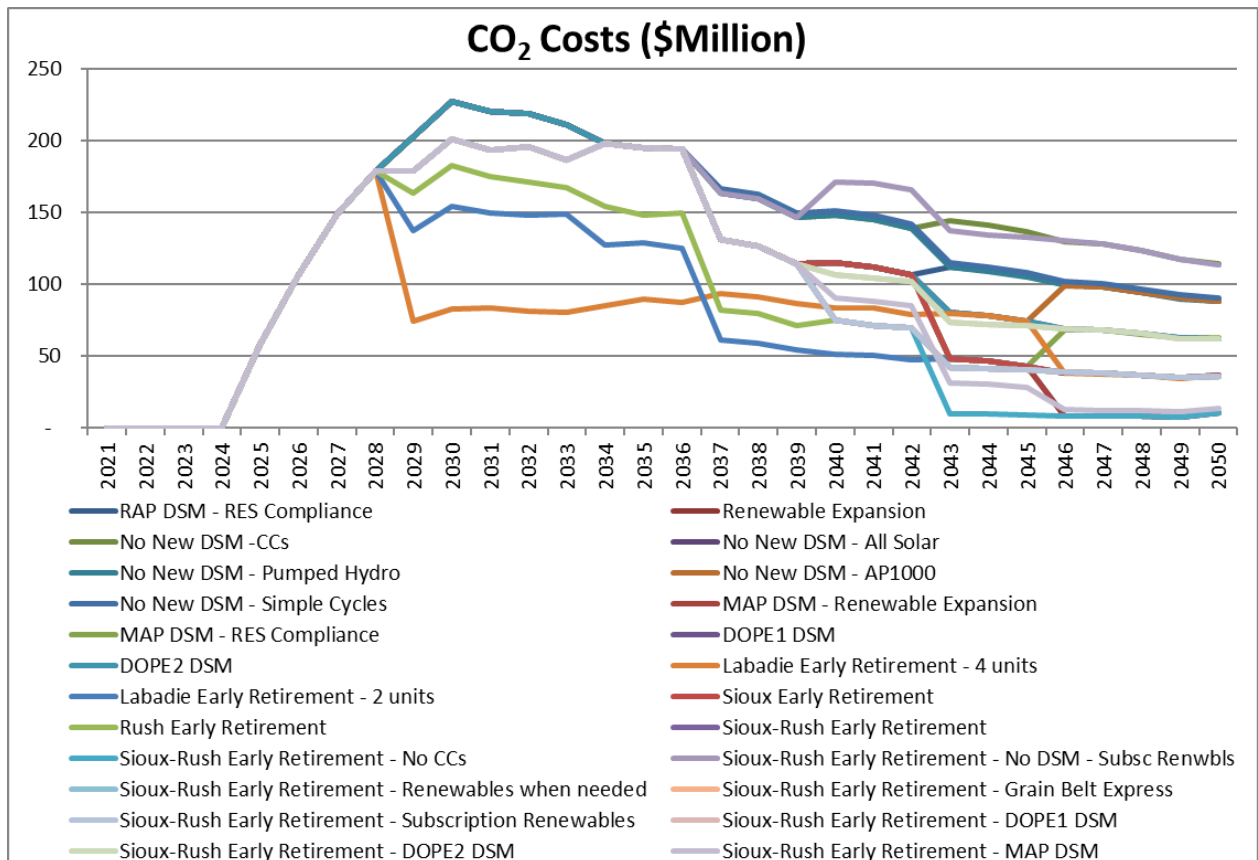
HC



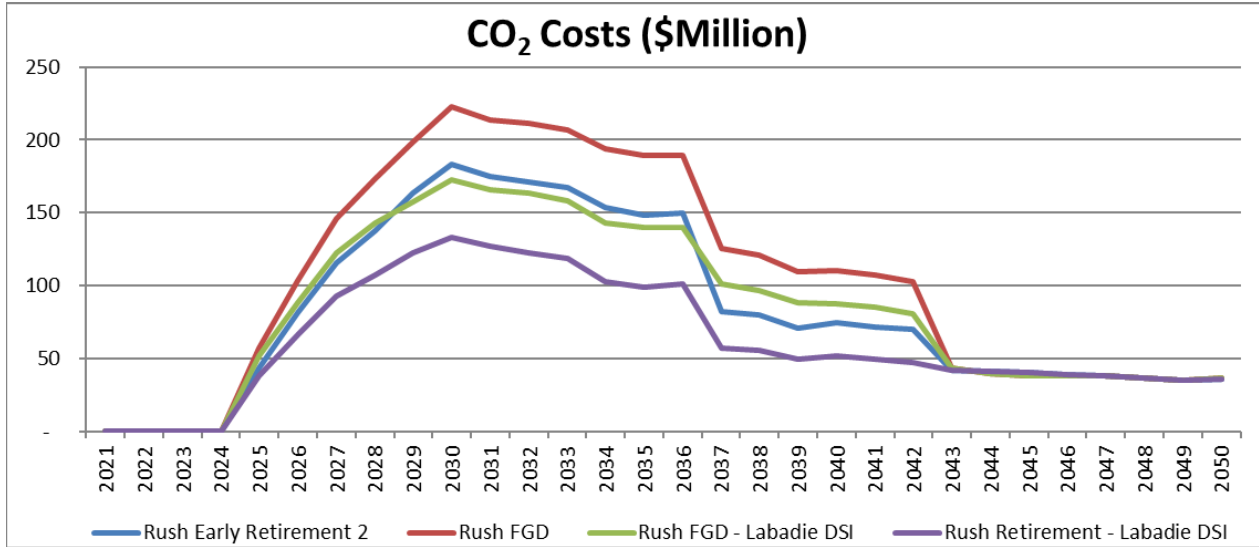
³⁰ 20 CSR 4240-22.060(2)(A)2; 20 CSR 4240-22.060(4)(B)8

HC

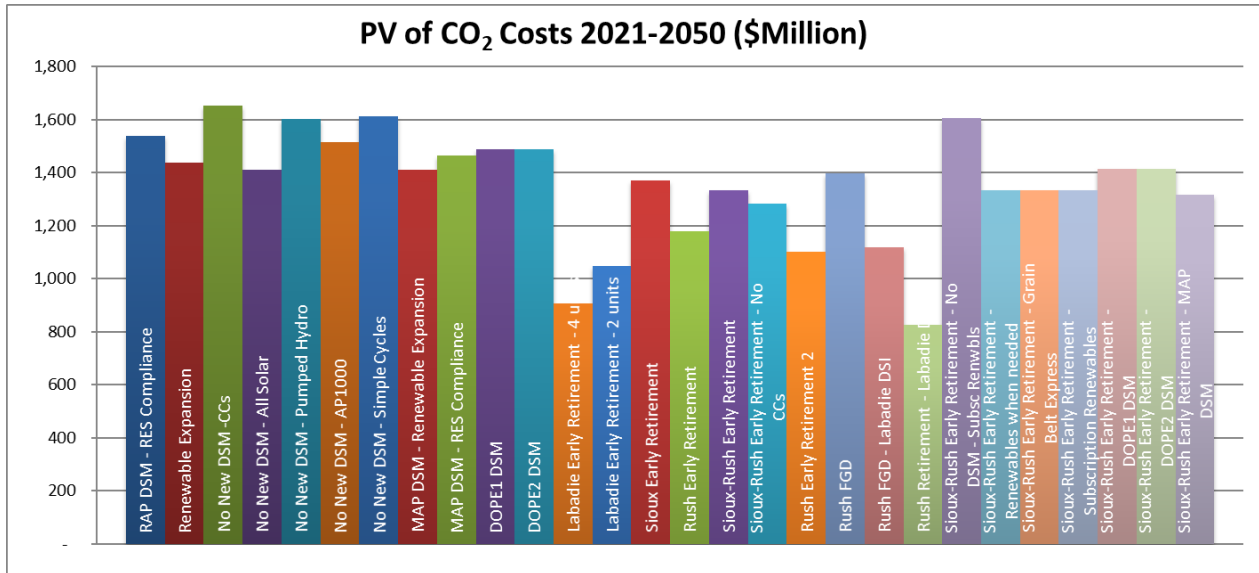


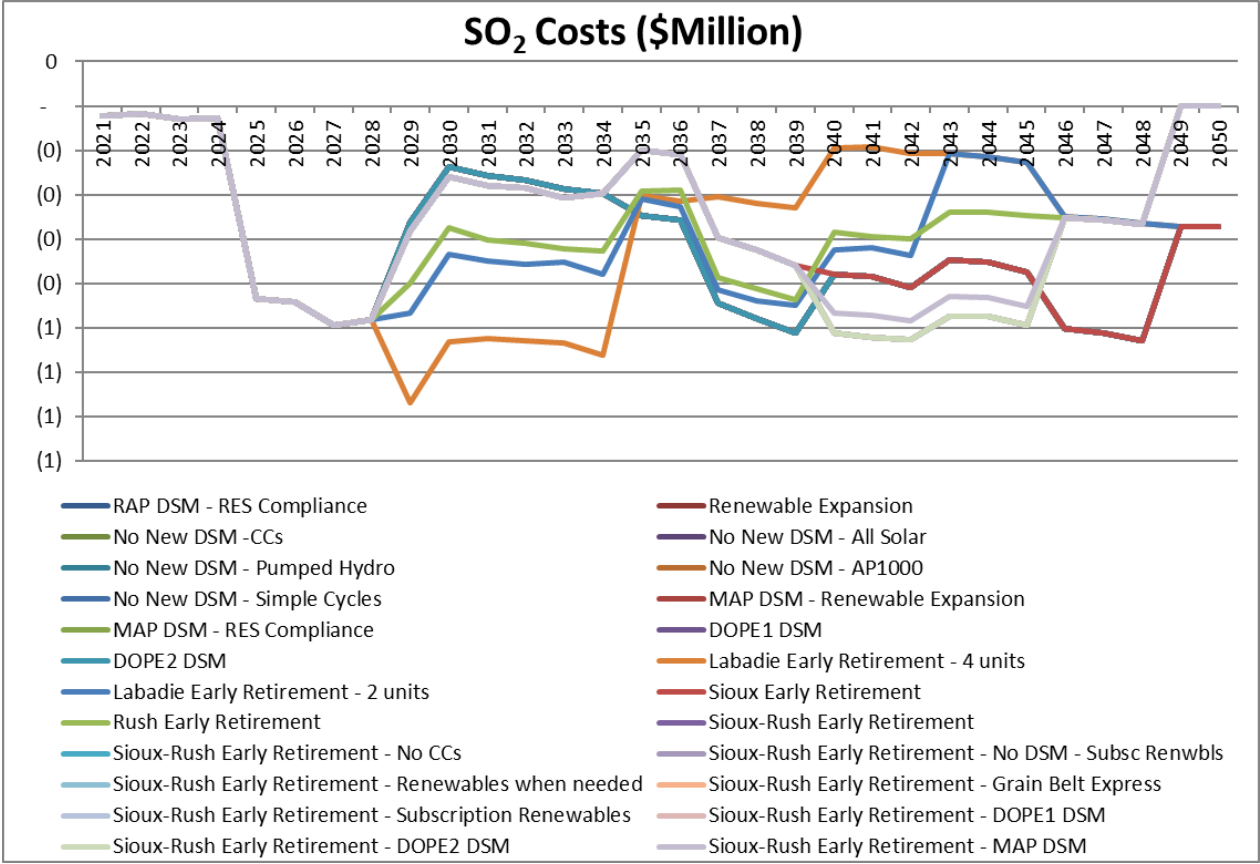


HC

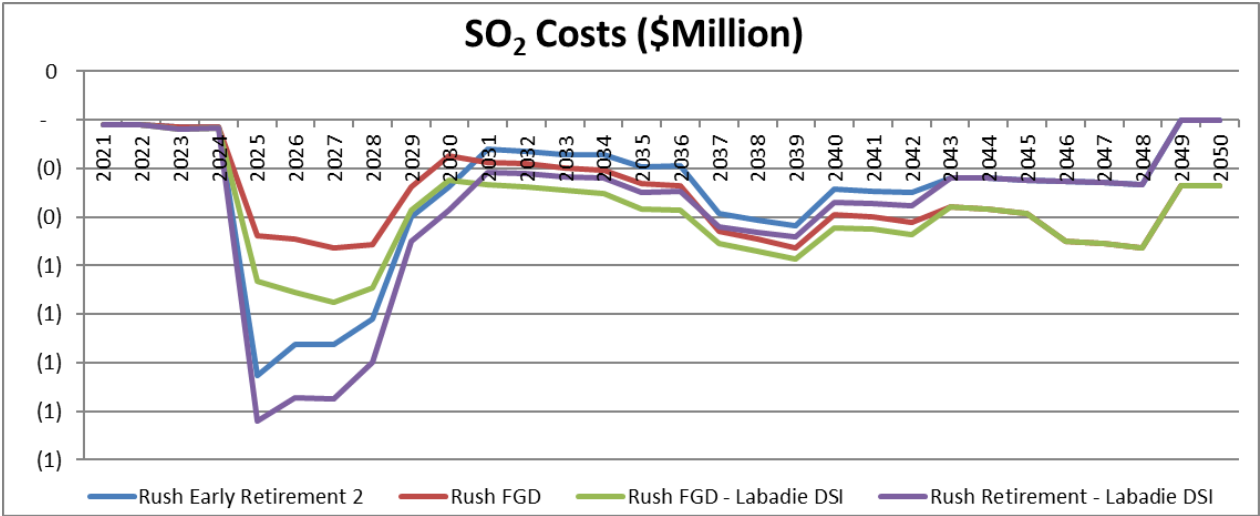


HC

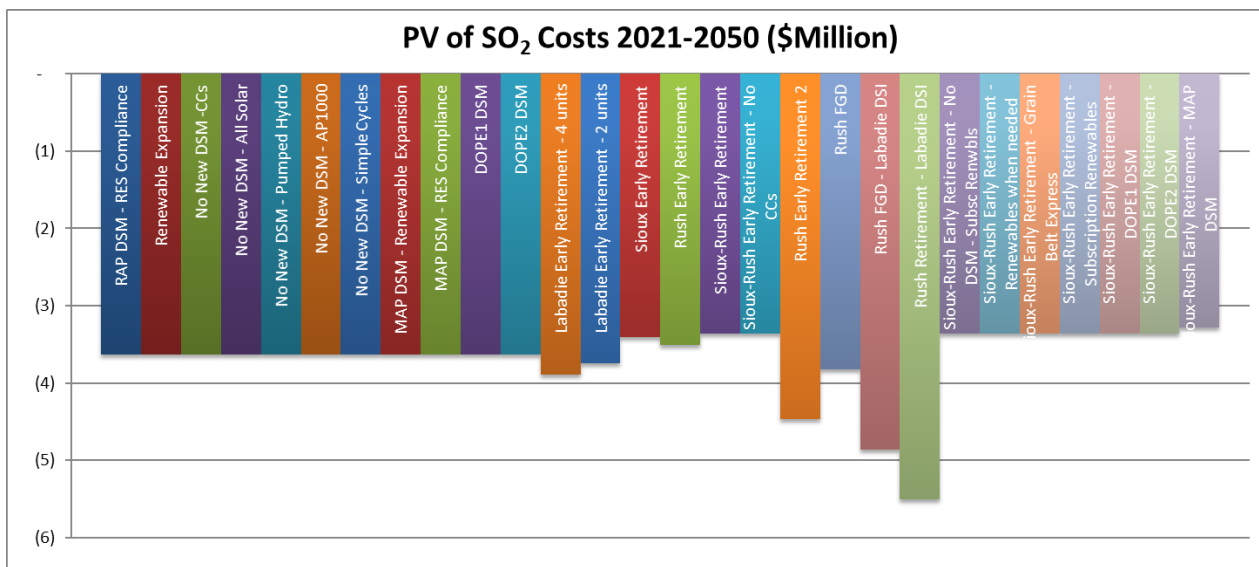


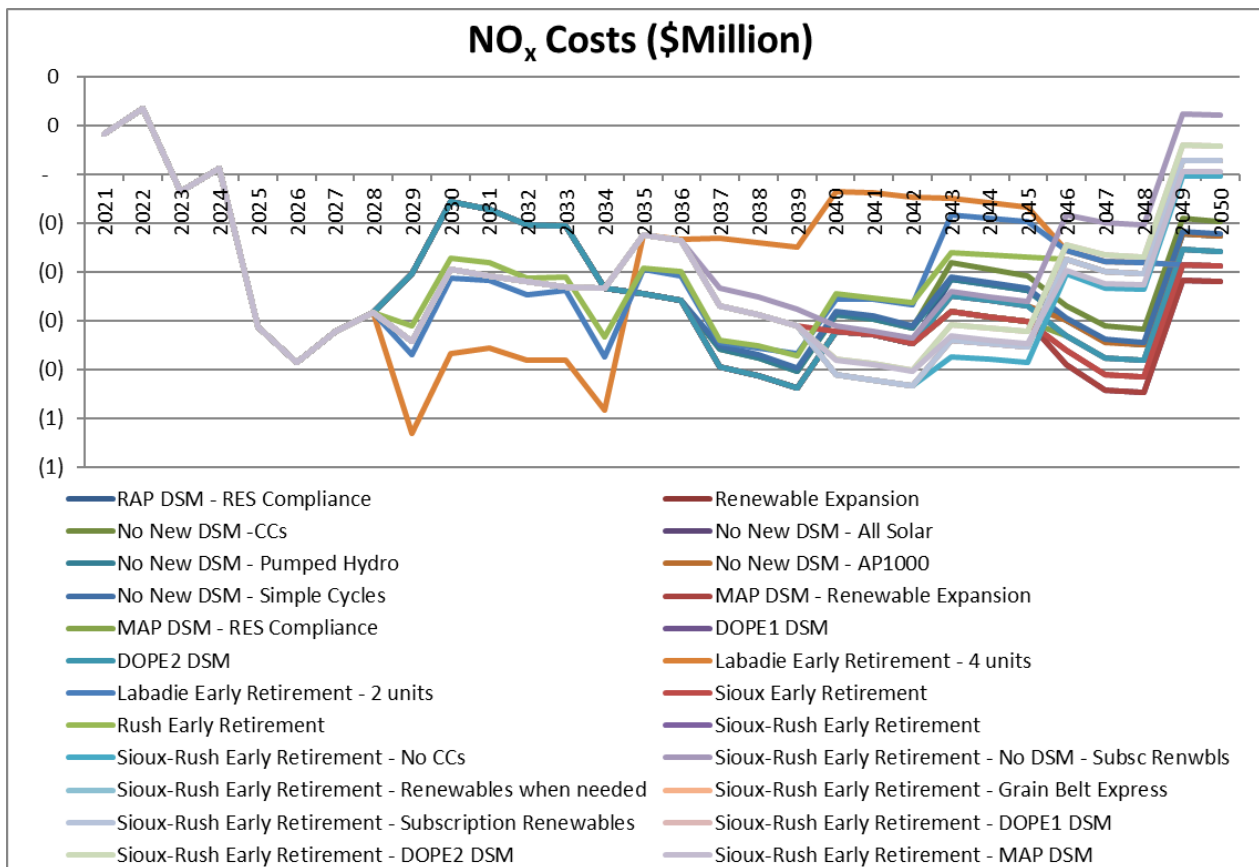


HC

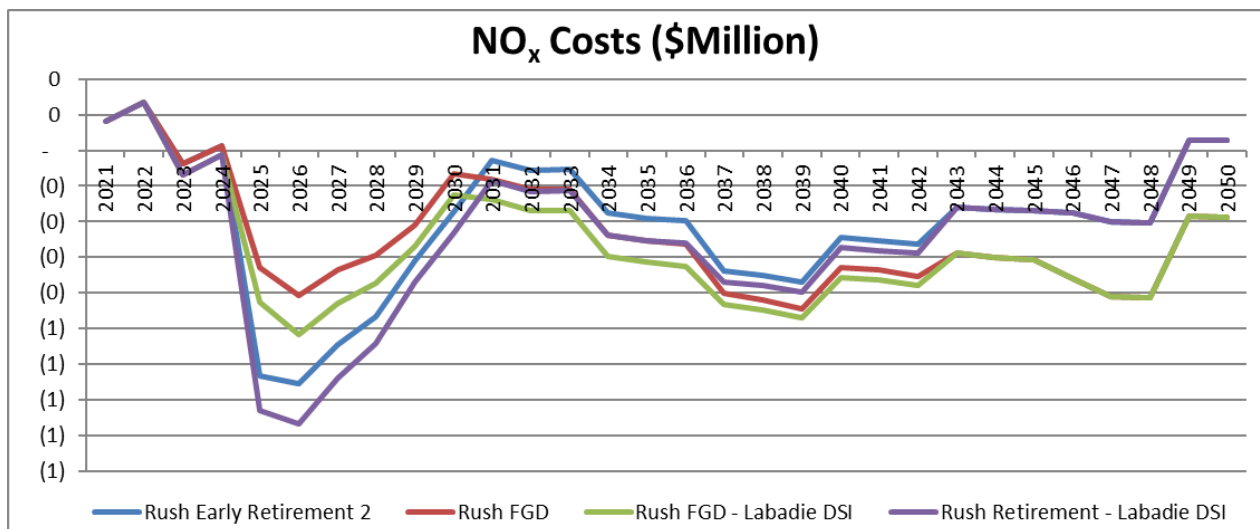


HC

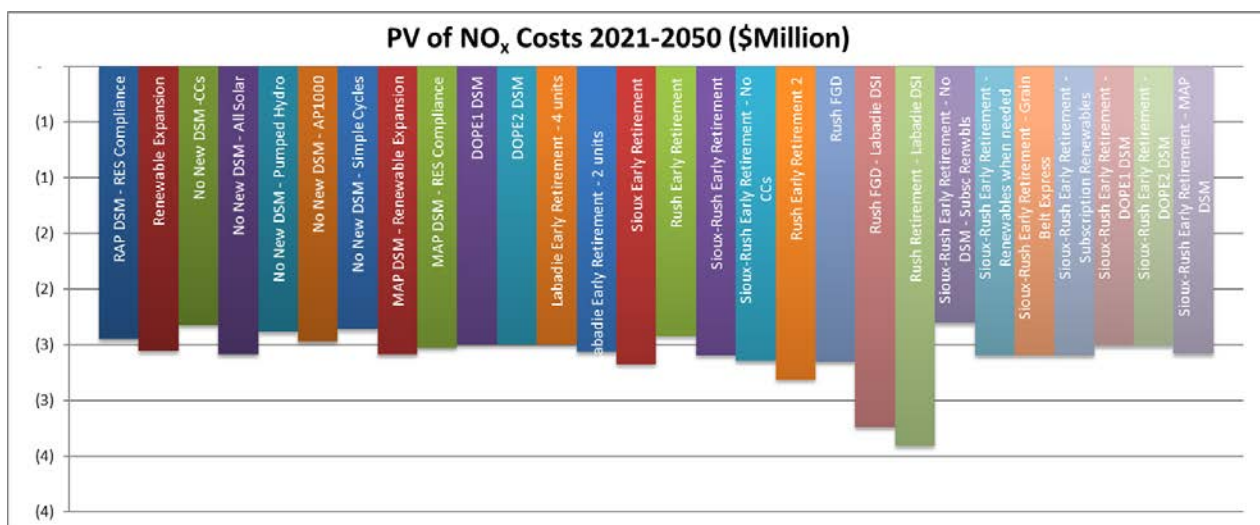




HC



HC



Expected Values, Rankings and Cumulative Probability Distributions for Selected Performance Measures³¹

Ameren Missouri first examined the ranks of the alternative resource plans using the probability-weighted averages or the expected values for the selected performance measures. The electronic workpapers also provide data for the alternative resource plans and the performance of each plan by each selected performance measure: PVRR, PVRR with utility financial incentives, PVRR with PV of out-of-pocket costs to participants in DSM programs, PV of probable environmental costs, emissions, levelized annual average rates, annual and maximum single-year increase in average rates, pre-tax interest coverage, FFO/interest coverage, FFO/debt, debt/capitalization, ROE, PV of FCF, EPS and FTE jobs.³²

The expected value data for the measures and their ranks on each measure are shown in Table 9A.7 and Table 9A.8, respectively.

Since Ameren Missouri is a market participant in MISO, the modeling used in integration analysis assumes electric energy can be bought and sold within MISO market. Any energy unable to be served with Ameren Missouri resources is served with other MISO market resources; therefore, the unserved hours will always be zero.³³

³¹ 20 CSR 4240-22.060(7)

³² 20 CSR 4240-22.060(2)

³³ 20 CSR 4240-22.060(7)(C)4

Table 9A.7 Expected Values for Selected Performance Measures³⁴ ***HC***

Plan	EXPECTED VALUE														
	PVRR \$MM	PVRR w/ Incentives \$MM	Levelized Rates Cents/kWh	Max Single Yr Rate Increase	PV of Participant Cost \$MM	PV of Probable Environmental Cost \$MM	Avg CO2 Emissions (MM Tons)	PreTax Interest Coverage	FFO-Interest Coverage	FFO/Debt	Debt/ Capitalization	ROE	FCF \$MM	EPS	Jobs
A-RAP DSM - RES Compliance	66,647	67,222	15.87	11%	673	2,067	16	4.18	7.10	25%	46%	10%	4,109	3.52	23,091
B-Renewable Expansion	66,410	66,984	15.82	11%	673	1,964	16	4.16	7.22	25%	45%	10%	4,166	3.79	36,750
C-No New DSM -CCs	68,395	68,395	15.05	12%	0	2,180	17	4.18	7.16	25%	45%	10%	3,546	4.10	28,174
D-No New DSM - All Solar	67,143	67,143	14.78	12%	0	1,936	15	4.15	7.30	25%	45%	10%	3,740	4.15	28,173
E-No New DSM - Pumped Hydro	68,922	68,922	15.17	12%	0	2,129	17	4.18	7.14	25%	45%	10%	3,565	4.18	30,494
F-No New DSM - AP1000	76,139	76,139	16.76	51%	0	2,043	16	4.25	6.96	24%	45%	11%	1,446	6.09	45,879
G-No New DSM - Simple Cycles	68,402	68,402	15.05	12%	0	2,140	17	4.18	7.18	25%	45%	10%	3,688	4.07	32,201
H-MAP DSM - Renewable Expansion	67,197	68,010	16.54	10%	32	1,936	15	4.16	7.23	25%	45%	10%	4,437	3.71	53,155
I-MAP DSM - RES Compliance	67,238	68,051	16.55	10%	32	1,992	16	4.17	7.11	25%	46%	10%	4,306	3.39	38,562
J-DOPE1 DSM	67,167	67,574	15.49	11%	324	2,015	16	4.17	7.20	25%	45%	10%	3,946	3.88	36,083
K-DOPE2 DSM	67,094	67,459	15.35	10%	293	2,015	16	4.17	7.20	25%	45%	10%	3,938	3.89	34,654
L-Labadie Early Retirement - 4 units	66,657	67,231	15.87	11%	673	1,383	12	4.15	7.26	25%	45%	10%	4,340	3.77	35,369
M-Labadie Early Retirement - 2 units	66,507	67,081	15.84	11%	673	1,552	13	4.15	7.23	25%	45%	10%	4,177	3.75	35,131
N-Sioux Early Retirement	66,425	66,999	15.82	11%	673	1,880	15	4.16	7.23	25%	45%	10%	4,178	3.78	35,995
O-Rush Early Retirement	66,425	67,000	15.82	11%	673	1,675	13	4.15	7.24	25%	45%	10%	4,246	3.76	34,630
P-Sioux-Rush Early Retirement	66,412	66,986	15.82	11%	673	1,836	15	4.16	7.24	25%	45%	10%	4,237	3.78	35,470
Q-Sioux-Rush Early Retirement - No CCs	66,942	67,517	15.94	11%	673	1,785	14	4.16	7.34	26%	45%	10%	4,169	3.99	47,861
R-Rush Early Retirement 2	66,470	67,044	15.83	12%	673	1,564	13	4.15	7.25	25%	45%	10%	4,229	3.75	34,050
S-Rush FGD	67,011	67,586	15.96	11%	673	2,496	15	4.17	7.23	25%	45%	10%	4,143	3.83	37,530
T-Rush FGD - Labadie DSI	68,582	69,156	16.33	11%	673	3,623	14	4.17	7.24	25%	45%	10%	4,151	3.85	37,716
U-Rush Retirement - Labadie DSI	68,040	68,615	16.20	12%	673	2,691	11	4.15	7.26	25%	45%	10%	4,237	3.77	34,236
V-Sioux-Rush Early Retirement - Renewable Subscription	66,391	66,965	15.81	11%	673	1,836	15	4.15	7.25	25%	45%	10%	4,259	3.78	35,890
W-Sioux-Rush Early Retirement - No DSM - Renewable Subscripti	68,549	68,549	15.82	12%	0	2,108	15	4.17	7.20	25%	45%	10%	3,707	4.12	37,530
X-Sioux-Rush Early Retirement - Renewables when needed	66,431	67,222	15.81	10%	673	1,836	15	4.17	7.18	25%	45%	10%	4,026	3.69	37,716
Y-Sioux-Rush Early Retirement - Grain Belt Express	66,408	66,982	15.08	11%	673	1,836	16	4.09	7.20	25%	45%	10%	4,206	3.90	34,236
Z-Sioux-Rush Early Retirement - DOPE1 DSM	67,255	67,662	15.51	11%	324	1,915	15	4.16	7.22	25%	45%	10%	4,051	3.88	31,621
AA-Sioux-Rush Early Retirement - DOPE2 DSM	67,183	67,548	15.37	10%	293	1,915	15	4.16	7.22	25%	45%	10%	4,043	3.89	27,010
BB-Sioux-Rush Early Retirement - MAP	67,048	67,861	16.51	12%	32	1,820	15	4.15	7.26	25%	45%	10%	4,469	3.68	51,530

³⁴ 20 CSR 4240-22.060(4)(A); 20 CSR 4240-22.060(7)(A); 20 CSR 4240-22.060(7)(C)3

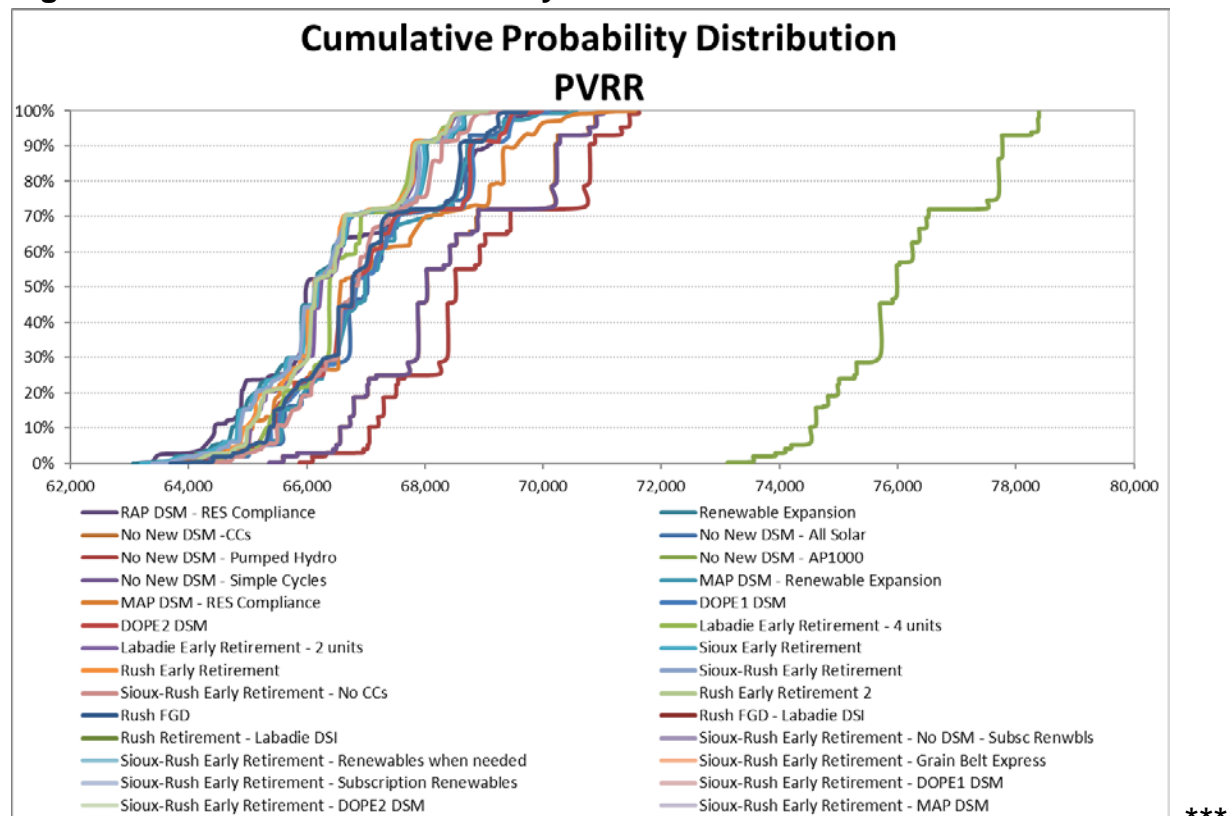
Table 9A.8 Rankings for Selected Performance Measures ***HC***

Plan	RANKING														
	PVRR \$MM	PVRR w/ Incentives \$MM	Levelized Rates Cents/kWh	Max Single Yr Rate Increase	PV of Participant Cost \$MM	PV of Probable Environmental Cost \$MM	Avg CO2 Emissions (MM Tons)	PreTax Interest Coverage	FFO-Interest Coverage	FFO/Debt	Debt/ Capitalization	ROE	FCF \$MM	EPS	Jobs
A-RAP DSM - RES Compliance	10	10	19	19	18	21	25	3	27	24	27	9	17	27	28
B-Renewable Expansion	3	3	12	10	18	16	19	15	17	15	5	21	14	15	10
C-No New DSM -CCs	23	22	2	25	1	25	28	5	24	26	17	11	27	5	25
D-No New DSM - All Solar	16	9	1	27	1	14	17	24	2	9	1	28	23	3	26
E-No New DSM - Pumped Hydro	27	26	5	23	1	23	26	2	25	27	19	2	26	2	24
F-No New DSM - AP1000	28	28	28	28	1	20	23	1	28	28	25	1	28	1	4
G-No New DSM - Simple Cycles	24	23	3	24	1	24	27	4	23	25	12	7	25	6	22
H-MAP DSM - Renewable Expansion	19	20	26	3	7	14	17	18	12	6	4	15	2	24	1
I-MAP DSM - RES Compliance	20	21	27	3	8	17	20	9	26	22	28	14	4	28	5
J-DOPE1 DSM	17	16	8	18	12	18	21	12	21	20	11	19	21	12	11
K-DOPE2 DSM	15	13	6	2	10	18	21	11	20	21	8	20	22	10	17
L-Labadie Early Retirement - 4 units	11	12	20	11	14	1	2	26	3	3	24	10	3	19	15
M-Labadie Early Retirement - 2 units	9	8	18	15	24	2	4	23	14	13	14	25	12	23	16
N-Sioux Early Retirement	5	5	14	7	18	11	15	16	11	11	6	22	11	18	12
O-Rush Early Retirement	6	6	15	16	14	4	5	20	8	8	18	18	6	21	18
P-Sioux-Rush Early Retirement	4	4	13	13	24	7	8	17	9	10	15	16	7	17	14
Q-Sioux-Rush Early Retirement - No CCs	12	14	21	6	28	5	7	19	1	1	2	23	13	7	3
R-Rush Early Retirement 2	8	7	17	21	18	3	3	27	7	7	21	27	9	22	21
S-Rush FGD	13	17	22	9	14	26	16	10	13	14	13	5	16	14	8
T-Rush FGD - Labadie DSI	26	27	24	14	24	28	6	8	10	12	7	3	15	13	6
U-Rush Retirement - Labadie DSI	22	25	23	20	14	27	1	21	4	4	16	24	8	20	19
V-Sioux-Rush Early Retirement - Renewable Subscription	1	1	10	12	27	7	8	22	6	5	9	8	5	16	13
W-Sioux-Rush Early Retirement - No DSM - Renewable Subscripti	25	24	16	22	1	22	8	6	19	23	23	6	24	4	8
X-Sioux-Rush Early Retirement - Renewables when needed	7	10	11	5	18	7	8	7	22	18	26	26	20	25	6
Y-Sioux-Rush Early Retirement - Grain Belt Express	2	2	4	8	18	7	24	28	18	19	3	4	10	8	19
Z-Sioux-Rush Early Retirement - DOPE1 DSM	21	18	9	17	12	12	13	14	16	17	22	12	18	11	23
AA-Sioux-Rush Early Retirement - DOPE2 DSM	18	15	7	1	11	12	13	13	15	16	20	13	19	9	27
BB-Sioux-Rush Early Retirement - MAP	14	19	25	26	8	6	12	25	5	2	10	17	1	26	2

Since the two uncertain factors (project cost and ROE& interest rates) that would cause variability in financial measures within the end points of each plan were not found to be critical in the sensitivity analysis, and hence, were not included in the final probability tree in the risk analysis, CDFs for these measures are not very meaningful; therefore, the CDFs for financial measures are not included in this report, but can be found in the workpapers. CDFs for the remaining performance measures are shown in Figures 9A.17 – 21.³⁵

To create the CDFs, Ameren Missouri looked at the unique outcomes for the performance measures for each of the 81 branches on the full probability tree for each alternative resource plan and their associated joint probabilities. To create the CDF for PVRR for each plan, for example, the 81 PVRR values were sorted from lowest to highest, and the associated probabilities were accumulated. The lowest PVRR would then be assigned the probability of its same branch, the second lowest PVRR would be assigned its own branch summed with the probability of the lowest PVRR, the third lowest PVRR would have a cumulative probability of its own and of the lower two, and so on. This process essentially shows the PVRR values (or the values for the other selected performance measures) and the percentiles for a plan.³⁶

Figure 9A.17 Cumulative Probability Distribution of PVRR *HC**



³⁵ 20 CSR 4240-22.060(7)(C)2

³⁶ 20 CSR 4240-22.060(7)(C)1

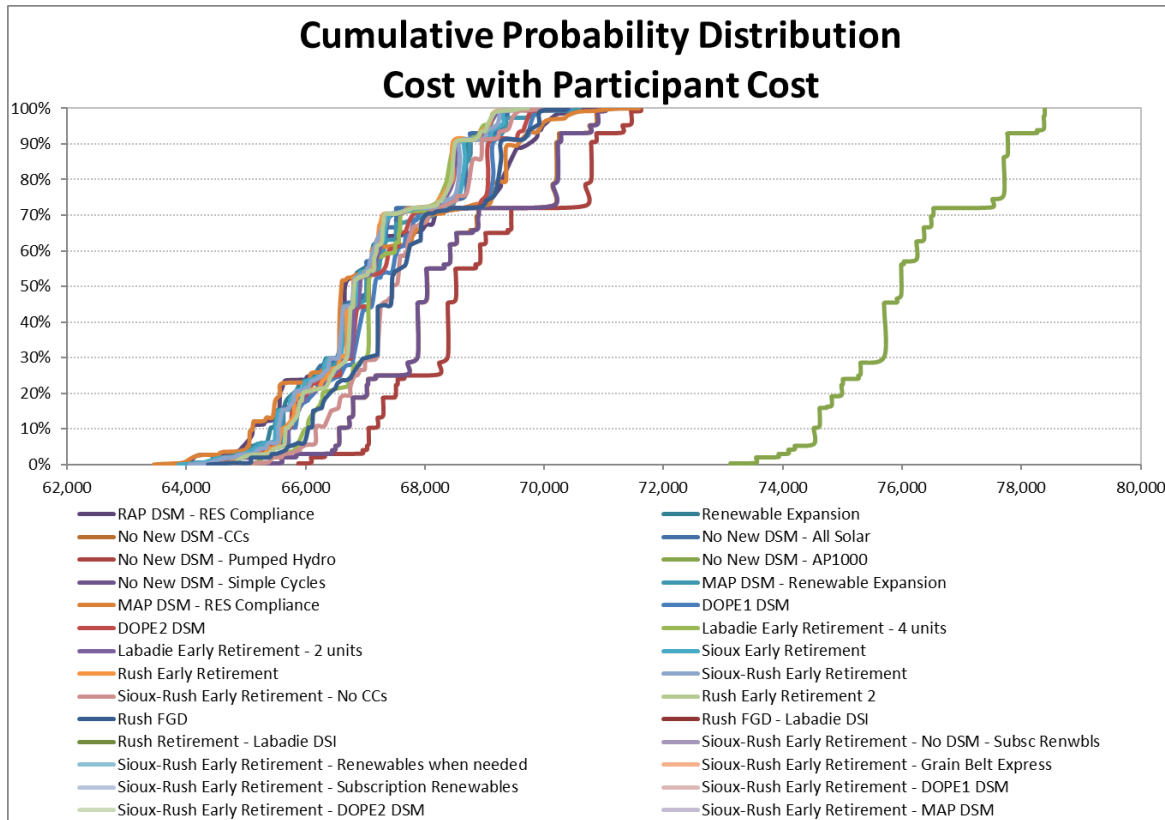
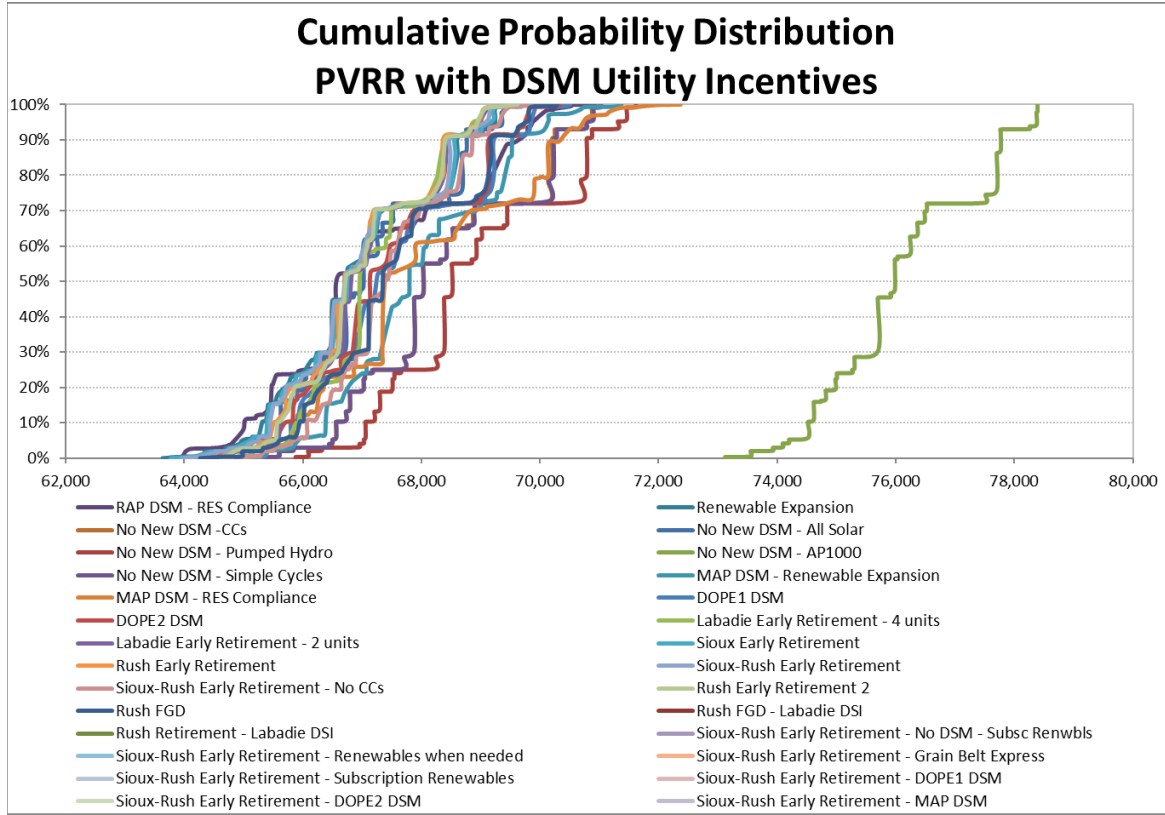


Figure 9A.18 Cumulative Probability Distribution of PV of Environmental Costs***HC

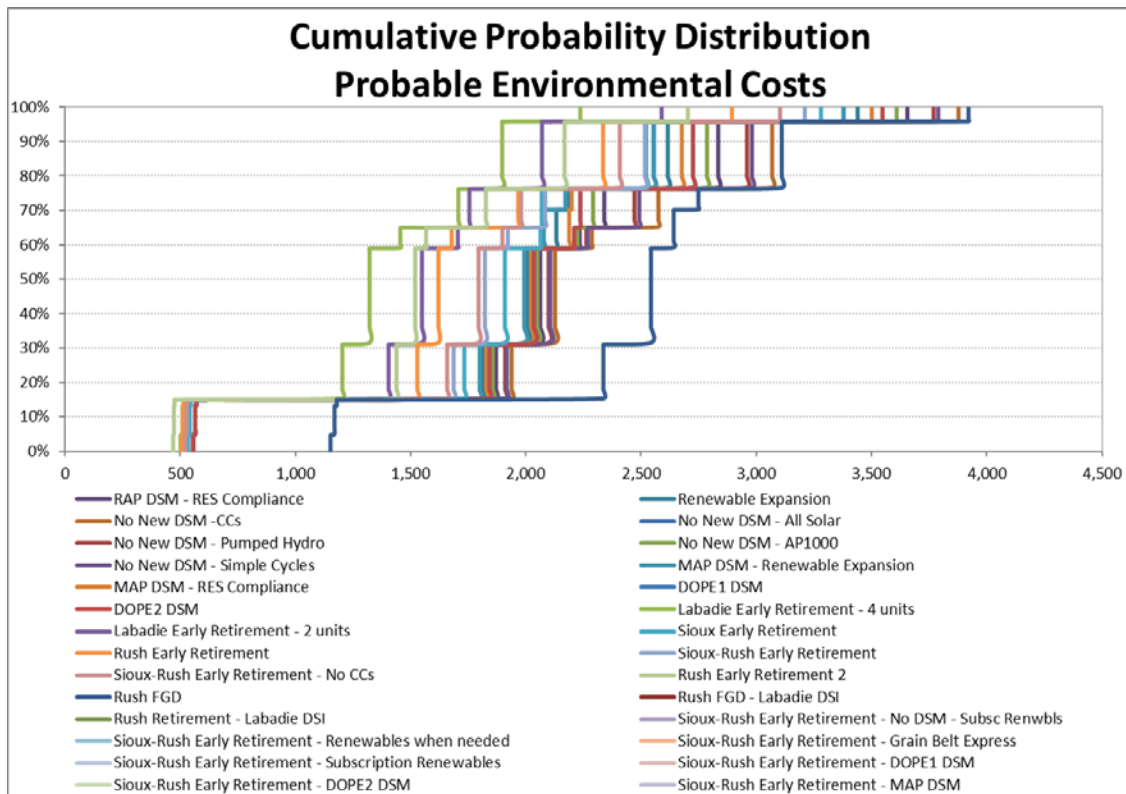
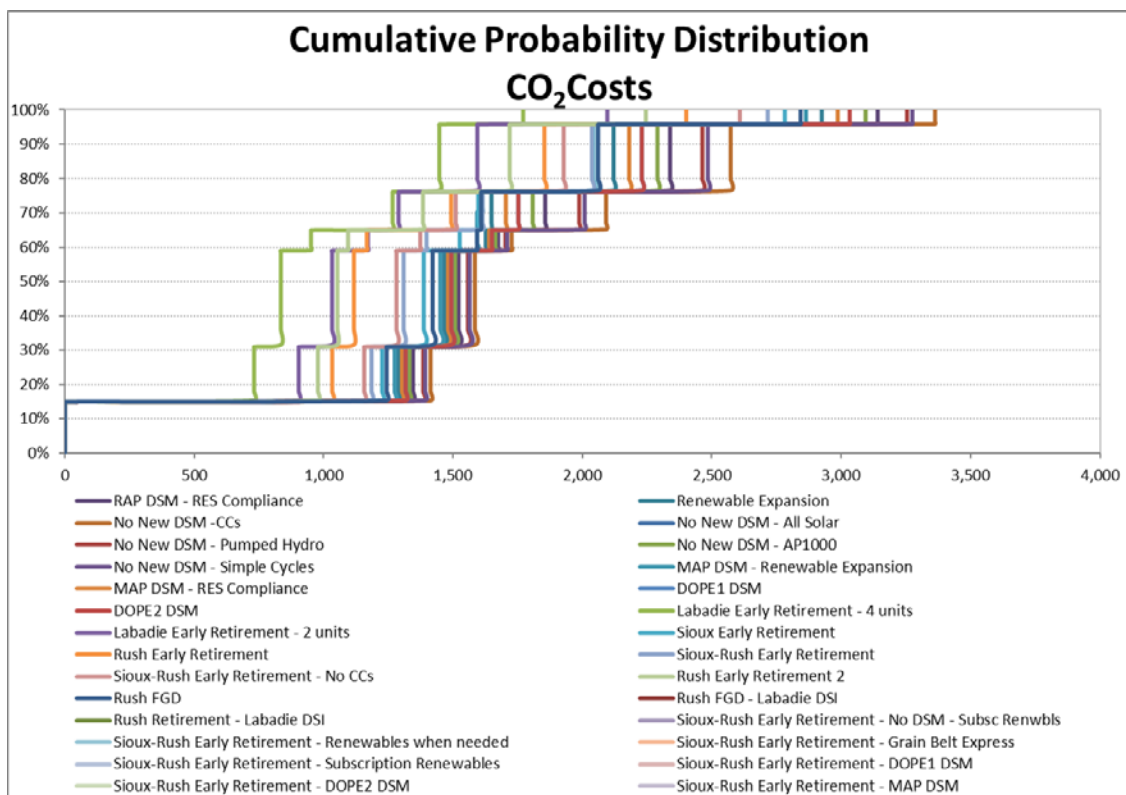


Figure 9A.19 Cumulative Probability Distribution of PV of CO₂ Costs ***HC



*** Figure 9A.20 Cumulative Probability Distribution of Levelized Rates ***HC

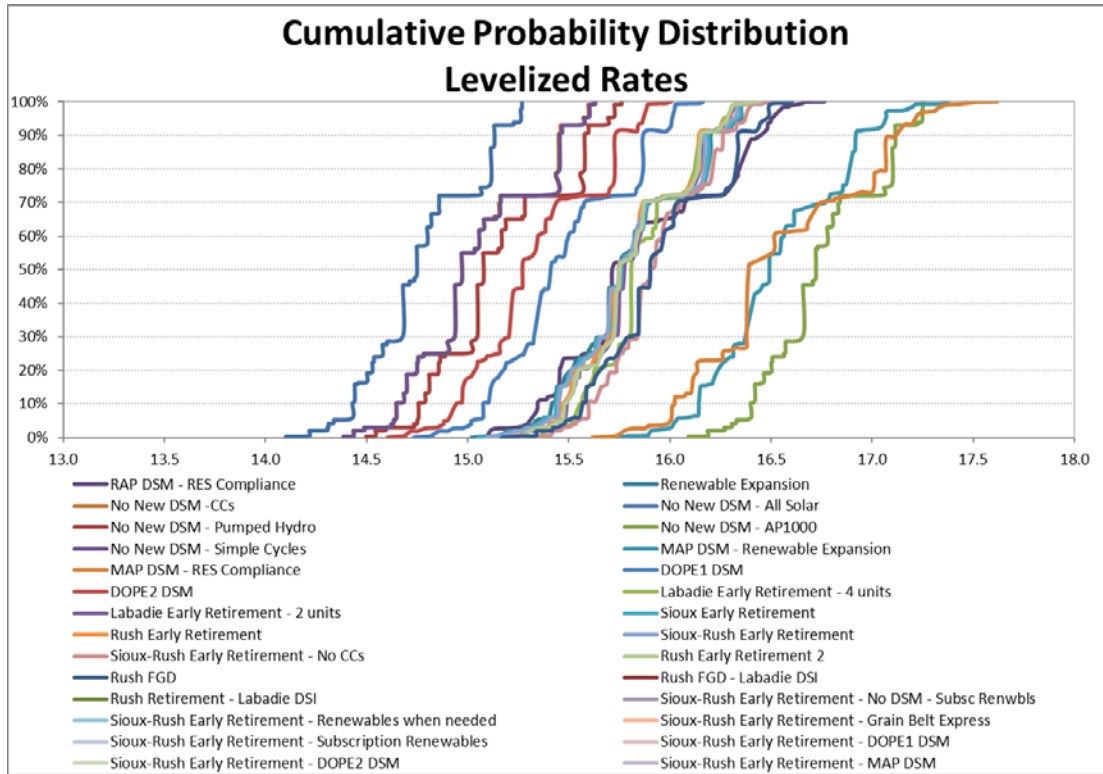
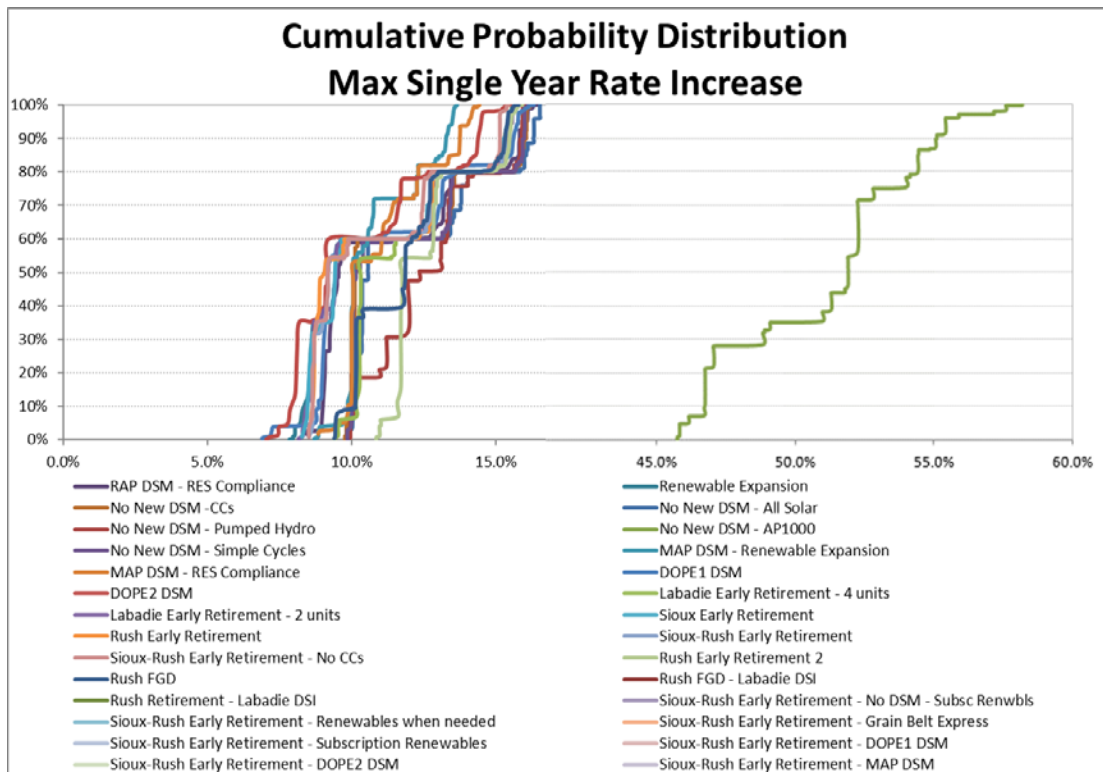


Figure 9A.21 Cumulative Probability Distribution of Max Single Year Rate Increase ***HC



Measures of Dispersion

Ameren Missouri also estimated the standard deviation of the performance measures shown as in Table 9A.9.

Table 9A.9 Standard Deviation for Selected Performance Measures³⁷ ***HC***

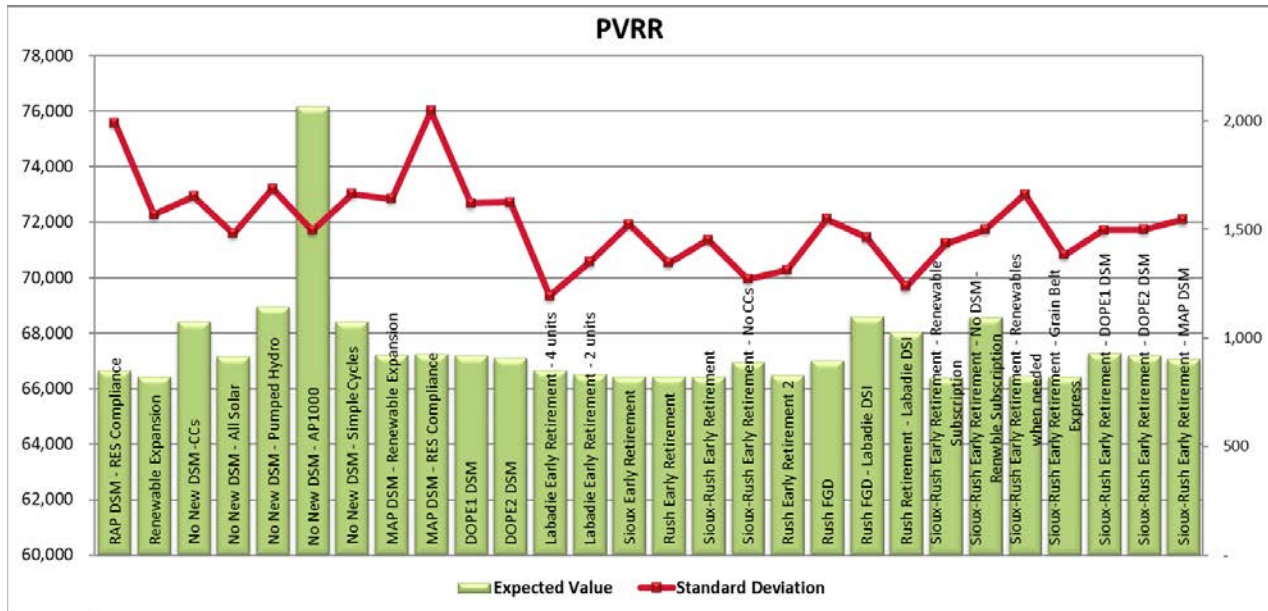
Plan	STANDARD DEVIATION														
	PVRR \$MM	PVRR w/ Incentives \$MM	Levelized Rates Cents/kWh	Max Single Yr Rate Increase	PV of Participant Cost \$MM	PV of Probable Environmental Cost \$MM	Avg CO2 Emissions (MM Tons)	PreTax Interest Coverage	FFO-Interest Coverage	FFO/Debt t	Debt/Capitalization n	ROE	FCF \$MM	EPS	Jobs
A-RAP DSM - RES Compliance	1,992	1,992	0.47	3%	0	1,041	3.97	0.00	0.00	0%	0%	0%	0	0.00	N/A
B-Renewable Expansion	1,568	1,568	0.37	3%	0	962	4.01	0.00	0.00	0%	0%	0%	0	0.00	N/A
C-No New DSM -CCs	1,652	1,652	0.36	2%	N/A	1,126	3.92	0.00	0.00	0%	0%	0%	0	0.00	N/A
D-No New DSM - All Solar	1,481	1,481	0.33	2%	N/A	941	4.03	0.00	0.00	0%	0%	0%	0	0.00	N/A
E-No New DSM - Pumped Hydro	1,689	1,689	0.37	2%	N/A	1,085	3.94	0.00	0.00	0%	0%	0%	0	0.00	N/A
F-No New DSM - AP1000	1,495	1,495	0.33	4%	N/A	1,023	3.98	0.00	0.00	0%	0%	0%	0	0.00	N/A
G-No New DSM - Simple Cycles	1,663	1,663	0.37	2%	N/A	1,093	3.94	0.00	0.00	0%	0%	0%	0	0.00	N/A
H-MAP DSM - Renewable Expansion	1,642	1,642	0.40	1%	0	941	4.03	0.00	0.00	0%	0%	0%	0	0.00	N/A
I-MAP DSM - RES Compliance	2,046	2,046	0.50	1%	0	984	4.00	0.00	0.00	0%	0%	0%	0	0.00	N/A
J-DOPE1 DSM	1,621	1,621	0.37	3%	0	1,001	3.99	0.00	0.00	0%	0%	0%	0	0.00	N/A
K-DOPE2 DSM	1,624	1,624	0.37	3%	0	1,001	3.99	0.00	0.00	0%	0%	0%	0	0.00	N/A
L-Labadie Early Retirement - 4 units	1,194	1,194	0.28	2%	0	609	2.24	0.00	0.00	0%	0%	0%	0	0.00	N/A
M-Labadie Early Retirement - 2 units	1,349	1,349	0.32	3%	0	698	2.85	0.00	0.00	0%	0%	0%	0	0.00	N/A
N-Sioux Early Retirement	1,523	1,523	0.36	3%	0	920	3.73	0.00	0.00	0%	0%	0%	0	0.00	N/A
O-Rush Early Retirement	1,345	1,345	0.32	3%	0	810	2.39	0.00	0.00	0%	0%	0%	0	0.00	N/A
P-Sioux-Rush Early Retirement	1,452	1,452	0.35	3%	0	904	3.11	0.00	0.00	0%	0%	0%	0	0.00	N/A
Q-Sioux-Rush Early Retirement - No CCs	1,271	1,271	0.30	2%	0	864	3.13	0.00	0.00	0%	0%	0%	0	0.00	N/A
R-Rush Early Retirement 2	1,313	1,313	0.31	2%	0	757	2.23	0.00	0.00	0%	0%	0%	0	0.00	N/A
S-Rush FGD	1,547	1,547	0.37	2%	0	920	3.98	0.00	0.00	0%	0%	0%	0	0.00	N/A
T-Rush FGD - Labadie DSI	1,464	1,464	0.35	2%	0	667	4.49	0.00	0.00	0%	0%	0%	0	0.00	N/A
U-Rush Retirement - Labadie DSI	1,237	1,237	0.29	2%	0	481	2.67	0.00	0.00	0%	0%	0%	0	0.00	N/A
V-Sioux-Rush Early Retirement - Renewable Subscription	1,435	1,435	0.34	3%	0	904	3.11	0.00	0.00	0%	0%	0%	0	0.00	N/A
W-Sioux-Rush Early Retirement - No DSM - Renewable Subscripti	1,500	1,500	0.33	2%	N/A	1,116	3.00	0.00	0.00	0%	0%	0%	0	0.00	N/A
X-Sioux-Rush Early Retirement - Renewables when needed	1,663	1,663	0.40	2%	0	904	3.11	0.00	0.00	0%	0%	0%	0	0.00	N/A
Y-Sioux-Rush Early Retirement - Grain Belt Express	1,382	1,382	0.33	3%	0	904	3.11	0.00	0.00	0%	0%	0%	0	0.00	N/A
Z-Sioux-Rush Early Retirement - DOPE1 DSM	1,497	1,497	0.35	3%	0	965	3.08	0.00	0.00	0%	0%	0%	0	0.00	N/A
AA-Sioux-Rush Early Retirement - DOPE2 DSM	1,499	1,499	0.34	3%	0	965	3.08	0.00	0.00	0%	0%	0%	0	0.00	N/A
BB-Sioux-Rush Early Retirement - MAP	1,546	1,546	0.38	1%	0	869	3.23	0.00	0.00	0%	0%	0%	0	0.00	N/A

Standard deviation for “Jobs” has not been estimated since there was only one estimate per plan, it would be 0.

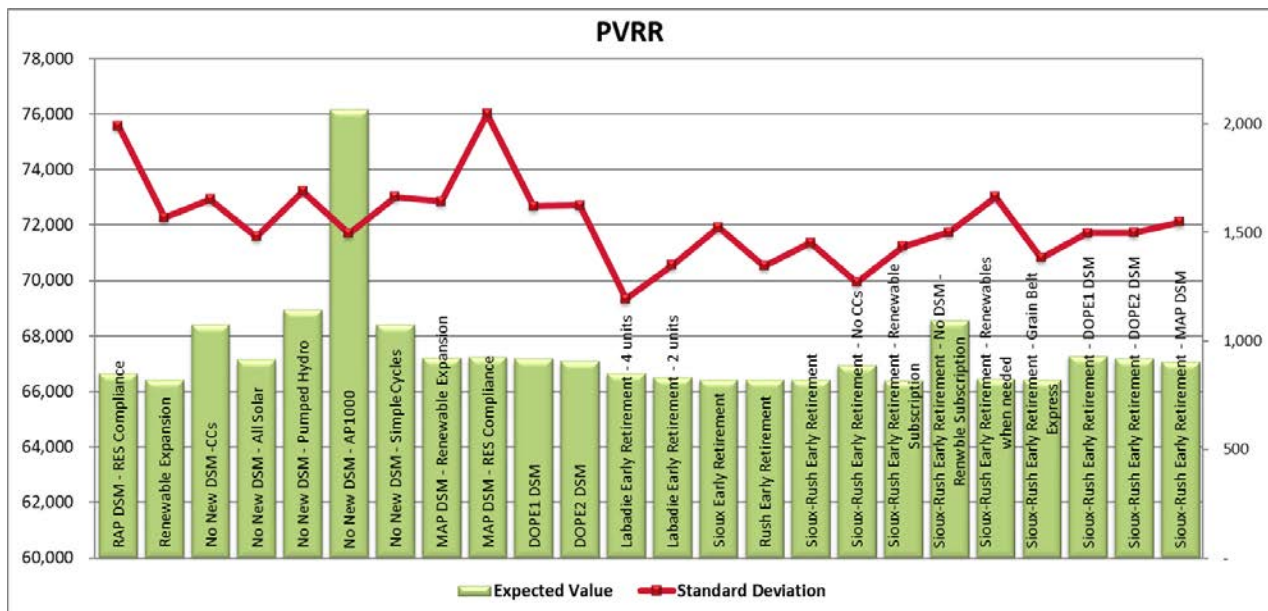
³⁷ 20 CSR 4240-22.060(7)(C)3

Charts 9A.22 displays the expected value and standard deviation for each plan’s PVRR. Also, in chart 9A.23, the 5th and 95th percentiles along with the expected PVRR are shown.³⁸

Figure 9A.22 PVRR – Expected Value and Standard Deviation***HC

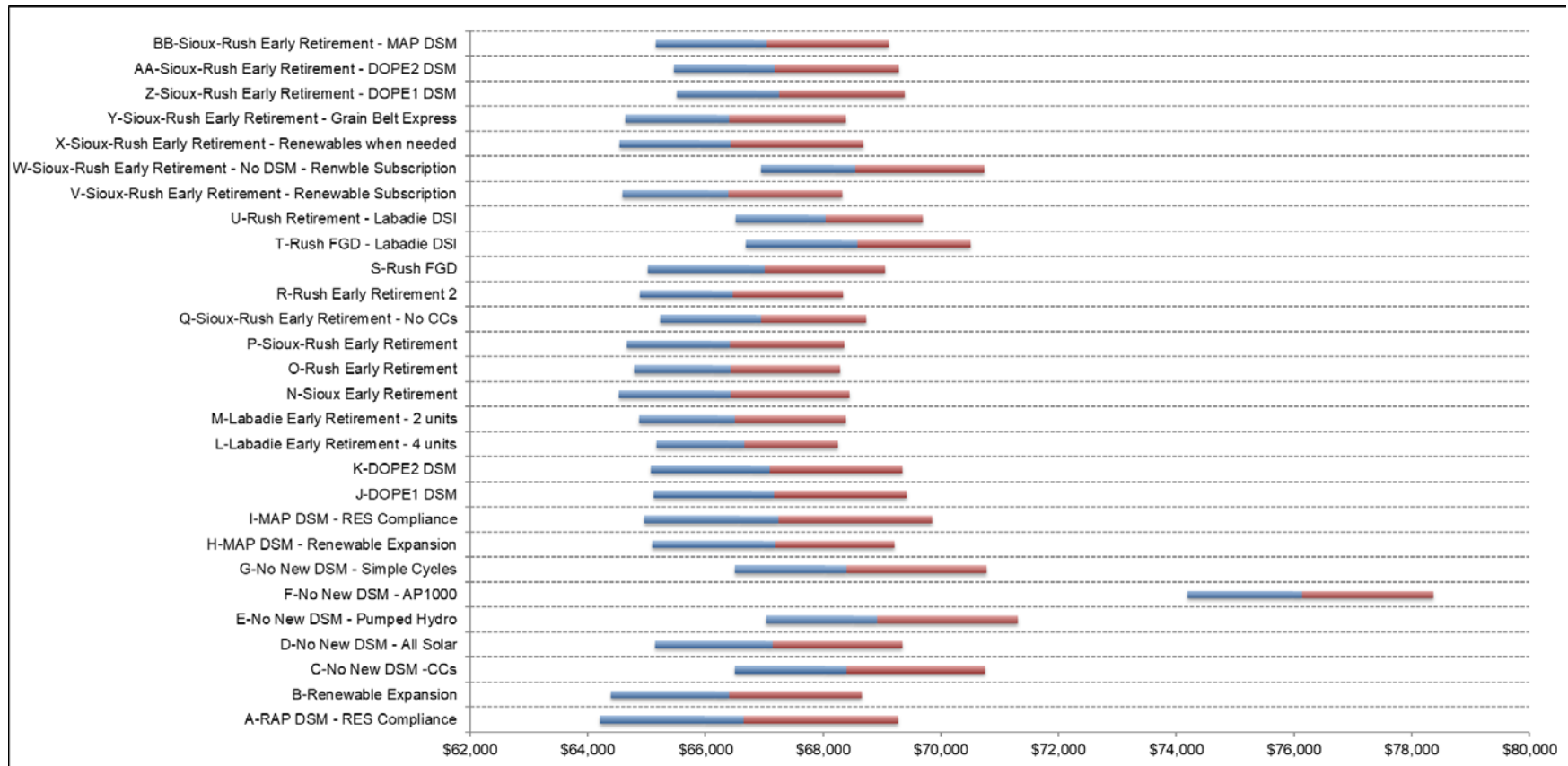


PVRR – Expected Value and Standard Deviation (without Plans R-U)



³⁸ 20 CSR 4240-22.060(7)(B)

*** Figure 9A.23 PVRR – Expected Value, 5th and 95th Percentiles ***HC***



Compliance References

20 CSR 4240-22.060(2)	58
20 CSR 4240-22.060(2)(A)2	52
20 CSR 4240-22.060(2)(A)3	11
20 CSR 4240-22.060(2)(A)4	43
20 CSR 4240-22.060(2)(A)5	43
20 CSR 4240-22.060(2)(A)6	38
20 CSR 4240-22.060(4)(A)	59
20 CSR 4240-22.060(4)(B)1	12
20 CSR 4240-22.060(4)(B)2	13, 14
20 CSR 4240-22.060(4)(B)3	15
20 CSR 4240-22.060(4)(B)4	24
20 CSR 4240-22.060(4)(B)5	25, 26
20 CSR 4240-22.060(4)(B)6	27
20 CSR 4240-22.060(4)(B)7	49
20 CSR 4240-22.060(4)(B)8	52
20 CSR 4240-22.060(4)(B)9	1
20 CSR 4240-22.060(4)(C)	46
20 CSR 4240-22.060(4)(C)1A	46
20 CSR 4240-22.060(4)(C)1B	47
20 CSR 4240-22.060(4)(C)1C	47
20 CSR 4240-22.060(5)(E)	4, 8
20 CSR 4240-22.060(5)(F)	7
20 CSR 4240-22.060(5)(I)	6
20 CSR 4240-22.060(5)(J)	7
20 CSR 4240-22.060(6)	9, 10
20 CSR 4240-22.060(7)	58
20 CSR 4240-22.060(7)(A)	59
20 CSR 4240-22.060(7)(B)	66
20 CSR 4240-22.060(7)(C)1	61
20 CSR 4240-22.060(7)(C)1A	4
20 CSR 4240-22.060(7)(C)1B	4
20 CSR 4240-22.060(7)(C)2	61
20 CSR 4240-22.060(7)(C)3	59, 65
20 CSR 4240-22.060(7)(C)4	58