Chapter 9 - Appendix A
Candidate Resource Plans

Table 9A.1 2014 IRP Renewable Compliance Filing Model

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	10 Year Sum (2015-2024)
TERM 1											
Unconstrained Full RES REC Requirement met with new builds											
MW's Installed New Solar	5	0	0	0	0	0	0	0	0	0	5
MW's Installed New LFG	0	0	0	0	5	0	0	0	0	0	5
MW's Installed New Wind	0	0	0	137	389	0	438	10	6	23	1,003
RES Requirement within 1% Rate Cap Limit											
MW's Installed New Solar	5	10	0	0	0	0	2	0	0	0	16
MW's Installed New LFG	0	0	0	0	5	0	0	0	0	0	5
MW's Installed New Wind	0	0	0	0	50	50	0	0	0	0	100

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	10 Year Sum (2025-2034)	20 Year Sum (2015-2034)
TERM 2												
Unconstrained Full RES REC Requirement met with new builds												
MW's Installed New Solar	40	9	1	1	0	1	1	1	1	1	54	59
MW's Installed New LFG	0	0	0	0	0	0	0	0	0	0	0	5
MW's Installed New Wind	50	6	11	11	2	5	5	10	3	6	110	1,114
RES Requirement within 1% Rate Cap Limit												
MW's Installed New Solar	10	0	0	0	0	0	0	0	0	0	10	26
MW's Installed New LFG	0	0	0	0	0	0	0	0	0	0	0	5
MW's Installed New Wind	0	142	0	0	0	0	0	0	0	0	142	242

Table 9A.2 Type, Size, Timing of Resource Addition/Retirement[1]

	Plan A: Combined Cycle - RES Compliance - RAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022																		
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,657	721	656	650	603	523	469	431	397	359	321	279	233
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	-47	-96	-147	-146	-145	-146	-153	-149	-153	-158	-156	-155	-156	-161	-166	-161
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
+ New Secondary Supply Side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,043	946	56	51	119	146	133	138	139	158	170	168	180	194
Purchases (+) or sales (-)	980	1,008	1,036	1,011	1,073	1,206	1,043	946	56	51	119	146	133	138	139	158	170	168	180	194

[1] 4 CSR 240-22.060(4)(B)9

Plan B: Nuke - Combined Cycle - RES Compliance - RAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,657	721	656	650	603	523	469	431	397	359	321	279	233
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	47	-96	147	146	145	146	153	149	153	158	156	155	156	161	166	161
+ New Primary Supply Side (Nuke)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	450
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,043	946	56	51	119	146	133	138	139	158	170	168	180	256
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,043	-946	-56	-51	-119	-146	-133	-138	-139	-158	-170	-168	-180	-256

Plan C: Simple Cycle - RES Compliance - RAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,657	721	656	650	603	523	469	431	397	359	321	279	233
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	-47	-96	-147	-146	-145	-146	-153	-149	-153	-158	-156	-155	-156	-161	-166	-161
+ New Primary Supply Side (SC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	704
+ New Secondary Supply Side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,043	946	56	51	119	146	133	138	139	158	170	168	180	90
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,043	-946	-56	-51	-119	-146	-133	-138	-139	-158	-170	-168	-180	90

Plan D: Pumped Hydro - RES Compliance - RAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,657	721	656	650	603	523	469	431	397	359	321	279	233
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	93	93	106	106	106	367	367	367	367	367	367	367	367	367	367	367	367	367	367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	-47	-96	-147	-146	-145	-146	-153	-149	-153	-158	-156	-155	-156	-161	-166	-161
+ New Primary Supply Side (Pumped Hydro)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
+ New Secondary Supply Side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,043	946	56	51	119	146	133	138	139	158	170	168	180	-194
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,043	-946	-56	-51	-119	-146	-133	-138	-139	-158	-170	-168	-180	194

Plan E: Wind&SC - CC - RES Compliance - RAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,657	721	656	650	603	523	469	431	397	388	378	364	346
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	834	834	834	834	834	834	834	834	834	834	834	834	834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	47	-96	147	146	145	146	153	149	153	158	156	155	156	161	166	161
+ New Primary Supply Side (Wind)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	352
+ New Primary Supply Side (SC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	56	85	113
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,043	946	56	51	119	146	133	138	139	158	198	224	264	271
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,043	-946	-56	-51	-119	-146	-133	-138	-139	-158	-198	-224	-264	-271

Plan F: CC - RES Compliance - RAP EE Only - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	932	950	939	1,633	696	630	623	577	497	442	404	370	332	294	250	205
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-30	65	111	169	220	270	313	360	421	484	543	606	660	700	755	803	833	883	929
- Demand Response	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
= Capacity position after adjustment	980	1,008	1,036	1,011	1,018	1,094	872	776	-115	-120	-61	-28	-46	-47	-44	-24	-13	-22	-16	217
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,018	-1,094	-872	-776	115	120	61	28	46	47	44	24	13	22	16	-217

Plan G: CC - RES Compliance - MAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,066	1,061	996	950	979	980	1,678	745	683	681	639	562	511	476	445	410	374	333	288
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-41	91	155	236	306	376	435	499	581	668	747	832	904	958	1,030	1,094	1,135	1,194	1,248
- Demand Response	0	0	0	0	47	96	147	146	145	146	153	149	153	158	156	155	156	161	166	161
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
+ New Secondary Supply Side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,021	1,066	1,061	1,150	1,306	1,166	1,088	218	239	334	386	398	425	441	482	511	521	545	180
Purchases (+) or sales (-)	-980	-1,021	-1,066	-1,061	-1,150	-1,306	-1,166	-1,088	-218	-239	-334	-386	-398	-425	-441	-482	-511	-521	-545	-180

Plan H: Nuke - CC - Balanced - RAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,065	1,058	995	945	972	969	1,663	727	662	656	609	529	475	437	403	365	327	285	239
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	2	2	2	9	16	18	32	32	46	48	62	64	64	69	74	84	84	84	84
- Energy Efficiency	0	-30	65	111	169	220	270	313	360	421	484	543	606	660	700	755	803	833	883	929
- Demand Response	0	0	0	0	47	96	147	146	145	146	153	149	153	158	156	155	156	161	166	161
+ New Primary Supply Side (Nuke)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	169
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,045	962	71	81	148	170	159	164	169	194	216	214	225	20
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,045	-962	-71	-81	-148	-170	-159	-164	-169	-194	-216	-214	-225	-20

Plan I: CC - Balanced - RAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,657	721	656	650	603	523	469	431	397	359	321	279	233
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	24	38	38	52	54	68	70	70	75	80	90	90	90	90
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	47	96	147	146	145	146	153	149	153	158	156	155	156	161	166	161
+ New Primary Supply Side (Nuke)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,045	962	71	81	148	170	159	164	169	194	216	214	225	-148
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,045	-962	-71	-81	-148	-170	-159	-164	-169	-194	-216	-214	-225	148

Plan J: Nuke - CC - Balanced - MEEIA - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,060	1,047	973	906	915	894	1,580	633	558	539	484	392	328	283	240	193	149	97	45
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	24	38	38	52	54	68	70	70	75	80	90	90	90	90
- Energy Efficiency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Demand Response	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ New Primary Supply Side (Nuke)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	169	169	169	169
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	600	600	600	600	600	600	600	600	600	600	600	1,800
= Capacity position after adjustment	980	974	961	883	823	839	560	425	78	17	1	-41	-131	-195	-235	-273	-140	-184	-236	-58
Purchases (+) or sales (-)	-980	-974	-961	-883	-823	-839	-560	-425	-78	-17	-1	41	131	195	235	273	140	184	236	58

Plan K: CC - Balanced - MEEIA - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,060	1,047	973	906	915	894	1,580	633	558	539	484	392	328	283	240	193	149	97	45
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	834	834	834	834	834	834	834	834	834	834	834	834	834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	93	93	106	106	106	367	367	367	367	367	367	367	367	367	367	367	367	367	367
+ Renewables	1	3	3	8	15	22	24	38	38	52	54	68	70	70	75	80	90	90	90	90
- Energy Efficiency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Demand Response	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	600	600	600	600	600	600	600	600	600	600	600	600
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600	600	600	1,200
= Capacity position after adjustment	980	974	961	883	823	839	560	425	78	17	1	-41	-131	-195	-235	-273	291	247	195	-227
Purchases (+) or sales (-)	-980	-974	-961	-883	-823	-839	-560	-425	-78	-17	-1	41	131	195	235	273	-291	-247	-195	227

Plan L: Wind - RES Compliance - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,060	1,047	973	906	1,031	1,127	1,929	633	674	772	832	392	328	283	240	426	615	795	45
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	8	8	8	8	8	8	10	10	10	10	10	10	10	10	10	10
- Energy Efficiency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Demand Response	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ New Primary Supply Side (Wind)	0	0	0	0	0	0	0	0	465	465	465	465	465	465	465	465	465	465	465	465
+ New Secondary Supply Side (Wind)	0	0	0	0	0	0	0	0	0	0	0	0	465	465	465	465	465	465	465	1,396
= Capacity position after adjustment	980	974	961	883	816	941	776	745	-86	-45	55	115	140	75	31	-12	174	363	543	-246
Purchases (+) or sales (-)	-980	-974	-961	-883	-816	-941	-776	-745	86	45	-55	-115	-140	-75	-31	12	-174	-363	-543	246

Plan M: CC - RES Compliance - MAP - Labadie Retire 12/31/2023 - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,066	1,061	996	950	979	980	1,724	811	-1,605	-1,607	-1,649	-1,726	-1,777	-1,812	-1,843	-1,878	-1,914	-1,955	-2,000
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ Labadie retirement	0	0	0	0	0	0	0	0	0	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-41	-91	-155	-236	-306	-376	-435	-499	-581	-668	-747	-832	-904	-958	-1,030	-1,094	-1,135	-1,194	-1,248
- Demand Response	0	0	0	0	47	96	147	146	145	146	153	149	153	158	156	155	156	161	166	161
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	0	600	600	600	600	600	600	600	600	600	600	600
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	2,400
= Capacity position after adjustment	980	1,021	1,066	1,061	1,150	1,306	1,166	1,134	284	-249	-154	-102	-90	-63	-47	-6	23	33	57	292
Purchases (+) or sales ( )	980	1,021	1,066	1,061	1,150	1,306	1,166	1,134	284	249	154	102	90	63	47	6	-23	33	57	292

Plan N: CC - RES Compliance - MAP - Rush Island Retire 12/31/2024 - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,066	1,061	996	950	979	980	1,678	745	683	-501	-543	-620	-671	-706	-737	-772	-808	-849	-894
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	834	834	834	834	834	834	834	834	834	834	834	834	834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ Rush Island retirement	0	0	0	0	0	0	0	0	0	0	-1,182	-1,182	-1,182	-1,182	-1,182	-1,182	-1,182	-1,182	-1,182	-1,182
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-41	-91	-155	-236	-306	-376	-435	-499	-581	-668	-747	-832	-904	-958	-1,030	-1,094	-1,135	-1,194	-1,248
- Demand Response	0	0	0	0	-47	-96	-147	-146	-145	-146	-153	-149	-153	-158	-156	-155	-156	-161	-166	-161
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	600	600	600	600	600	600	600	600	600	600
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200
= Capacity position after adjustment	980	1,021	1,066	1,061	1,150	1,306	1,166	1,088	218	239	-248	-196	-184	-157	-141	-100	-71	-61	-37	198
Purchases (+) or sales (-)	-980	-1,021	-1,066	-1,061	-1,150	-1,306	-1,166	-1,088	-218	-239	248	196	184	157	141	100	71	61	37	-198

Plan O: Nuke - CC - Balanced - RAP - Labadie Retire 12/31/2023 - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,703	787	-1,632	-1,638	-1,685	-1,765	-1,819	-1,857	-1,891	-1,929	-1,967	-2,009	-2,055
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ Labadie retirement	0	0	0	0	0	0	0	0	0	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374	-2,374
+ CTG Retirements	0	93	93	106	106	106	367	367	367	367	367	367	367	367	367	367	367	367	367	367
+ Renewables	1	3	3	8	15	22	24	38	38	52	54	68	70	70	75	80	90	90	90	90
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	-47	-96	-147	-146	-145	-146	-153	-149	-153	-158	-156	-155	-156	-161	-166	-161
+ New Primary Supply Side (Nuclear)	0	0	0	0	0	0	0	0	0	0	169	169	169	169	169	169	169	169	169	169
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	3,000
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,045	1,008	137	-407	-171	-149	-160	-155	-150	-125	-103	-106	-94	132
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,045	-1,008	-137	407	171	149	160	155	150	125	103	106	94	-132

Plan P: Nuke - CC - Balanced - RAP - Rush Island Retire 12/31/2024 - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,064	1,057	989	939	966	963	1,657	721	656	532	579	659	713	751	785	823	861	903	949
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ Rush Island retirement	0	0	0	0	0	0	0	0	0	0	1,182	1,182	1,182	1,182	1,182	1,182	1,182	1,182	1,182	1,182
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	24	38	38	52	54	68	70	70	75	80	90	90	90	90
- Energy Efficiency	0	-30	-65	-111	-169	-220	-270	-313	-360	-421	-484	-543	-606	-660	-700	-755	-803	-833	-883	-929
- Demand Response	0	0	0	0	-47	-96	-147	-146	-145	-146	-153	-149	-153	-158	-156	-155	-156	-161	-166	-161
+ New Primary Supply Side (Nuke)	0	0	0	0	0	0	0	0	0	0	169	169	169	169	169	169	169	169	169	169
+ New Secondary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	600	600	600	600	600	600	600	600	600	1,800
= Capacity position after adjustment	980	1,008	1,036	1,011	1,073	1,206	1,045	962	71	81	-265	-243	-254	-249	-244	-219	-197	-200	-188	38
Purchases (+) or sales (-)	-980	-1,008	-1,036	-1,011	-1,073	-1,206	-1,045	-962	-71	-81	265	243	254	249	244	219	197	200	188	-38

Plan Q: Nuke - Balanced - MAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,066	1,061	996	950	979	980	1,678	745	683	681	639	562	511	476	445	410	374	333	288
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	834	834	834	834	834	834	834	834	834	834	834	834	834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	24	38	38	52	54	68	70	70	75	80	90	90	90	90
- Energy Efficiency	0	-41	-91	-155	-236	-306	-376	-435	-499	-581	-668	-747	-832	-904	-958	-1,030	-1,094	-1,135	-1,194	-1,248
- Demand Response	0	0	0	0	47	96	147	146	145	146	153	149	153	158	156	155	156	161	166	161
+ New Primary Supply Side (Nuke)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	169
+ New Secondary Supply Side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,021	1,066	1,061	1,150	1,306	1,168	1,104	234	269	364	410	424	451	472	517	557	567	591	206
Purchases (+) or sales (-)	-980	-1,021	-1,066	-1,061	-1,150	-1,306	-1,168	-1,104	-234	-269	-364	-410	-424	-451	-472	-517	-557	-567	-591	-206

Plan R: CC - Balanced - MAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,066	1,061	996	950	979	980	1,678	745	683	681	639	562	511	476	445	410	374	333	288
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	24	38	38	52	54	68	70	70	75	80	90	90	90	90
- Energy Efficiency	0	-41	-91	-155	-236	-306	-376	-435	-499	-581	-668	-747	-832	-904	-958	-1,030	-1,094	-1,135	-1,194	-1,248
- Demand Response	0	0	0	0	-47	-96	-147	-146	-145	-146	-153	-149	-153	-158	-156	-155	-156	-161	-166	-161
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
+ New Secondary Supply Side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,021	1,066	1,061	1,150	1,306	1,168	1,104	234	269	364	410	424	451	472	517	557	567	591	226
Purchases (+) or sales (-)	-980	-1,021	-1,066	-1,061	-1,150	-1,306	-1,168	-1,104	-234	-269	-364	-410	-424	-451	-472	-517	-557	-567	-591	-226

Plan S: CC - RES Compliance - MAP - Sioux Retire 12/31/2033 - Meramec Retire 12/31/2022

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Existing Capacity Position	979	1,066	1,061	996	942	964	956	1,653	720	658	655	613	536	484	449	418	383	346	304	261
+ Total plant upgrades	0	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
+ Meramec retirement	0	0	0	0	0	0	0	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834	-834
+ Sioux retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-969
+ CTG Retirements	0	-93	-93	-106	-106	-106	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367	-367
+ Renewables	1	3	3	8	15	22	22	22	22	22	24	45	45	45	45	45	45	45	45	45
- Energy Efficiency	0	-41	-91	-155	-236	-306	-376	-435	-499	-581	-668	-747	-832	-904	-958	-1,030	-1,094	-1,135	-1,194	-1,248
- Demand Response	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ New Primary Supply Side (CC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
+ New Secondary Supply Side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Capacity position after adjustment	980	1,021	1,066	1,061	1,095	1,194	996	918	48	68	154	212	219	240	258	299	328	332	350	-9
Purchases (+) or sales (-)	-980	-1,021	-1,066	-1,061	-1,095	-1,194	-996	-918	-48	-68	-154	-212	-219	-240	-258	-299	-328	-332	-350	9

Table 9A.3 Deviation and Probability: Project Cost Grid, Project Cost, FOM, VOM, Project Schedule, EFOR, Environmental CapEx, and Transmission[2]

Project Cost Uncertainty Grid[3]

Estimate Class	Degree of Project Definition (Expressed as % of complete definition)	Established Standard	Maturing	Evolving	Emerging
Class 5	0% to 2%	Low: -20%, High: +30%	Low: -25%, High: +45%	Low: -30%, High: +75%	Low: -35%, High: +120%
Class 4	1% to 15%	Low: -15%, High: +20%	Low: -20%, High: +35%	Low: -25%, High: +55%	Low: -30%, High: +90%
Class 3	10% to 40%	Low: -10%, High: +10%	Low: -15%, High: +25%	Low: -20%, High: +45%	Low: -25%, High: +70%
Class 2	30% to 75%	Low: -5%, High: +5%	Low: -10%, High: +15%	Low: -15%, High: +35%	Low: -20%, High: +55%
Class 1	65% to 100%	Low: -3%, High: +3%	Low: -5%, High: +8%	Low: -10%, High: +17%	Low: -15%, High: +40%

Ameren Missouri used the project cost uncertainty grid above to help guide the subject matter experts in their project cost deviation and probability assignments. Columns (Established Standard, Maturing, etc.) show the degree of technological maturity for a supply side type, whereas the rows, Estimate Classes, show the degree of project definition. Subject matter experts first determined which maturity and class level each supply side option falls under, and then, using that information, made assessments on 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

Technology	Estimate Class	Uncertainty Distribution					
		Item	Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Combined Cycle (Natural Gas)	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	0%	20%	50%	20%	10%
Simple Cycle (Natural Gas)	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	20%	50%	20%	5%
Nuclear	Class 5	Deviation	-20%	-10%	0%	60%	120%
		Probability	5%	15%	40%	25%	15%
Hydro: Pumped Storage	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	60%	15%	5%
Hydro: Keokuk Upgrade	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	60%	15%	5%
Small Hydro 1	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	60%	15%	5%
Small Hydro 2	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	60%	15%	5%
Small Hydro 3	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	60%	15%	5%
Regional Wind	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	7.5%	20%	45%	20%	7.5%
MO Wind	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	7.5%	20%	45%	20%	7.5%
Solar PV	Class 3	Deviation	-10%	-5%	0%	5%	10%
		Probability	5%	25%	40%	25%	5%

[2] 4 CSR 240-22.060(7)(C)1A; 4 CSR 240-22.060(7)(C)1B
[3] 4 CSR 240-22.060(5)(E)

FOM Uncertainty[4]

Technology	Item	Uncertainty Distribution: Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Combined Cycle (Natural Gas)	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Simple Cycle (Natural Gas)	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%
Hydro: Pumped Storage	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Hydro: Keokuk Upgrade	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Small Hydro 1	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Small Hydro 2	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Small Hydro 3	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
Regional Wind	Deviation	-20%	-10%	0%	15%	30%
	Probability	5%	25%	40%	25%	5%
MO 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

Technology	Item	Uncertainty Distribution: Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	Mid High Point Cost	High Mid Point Cost	High Project Cost
Combined Cycle (Natural Gas)	Deviation		-50%	0%	33%	83%	
	Probability		25%	45%	25%	5%	
Simple Cycle (Natural Gas)	Deviation		-50%	0%	50%		
	Probability		25%	50%	25%		
Nuclear	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Hydro: Pumped Storage	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Hydro: Keokuk Upgrade	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Small Hydro 1	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Small Hydro 2	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Small Hydro 3	Deviation	-25%	-10%	0%	10%	25%	40%
	Probability	5%	20%	40%	20%	10%	5%
Regional Wind	Deviation	**Assumed all O&M costs are fixed**					
	Probability						
MO Wind	Deviation	**Assumed all O&M costs are fixed**					
	Probability						
Solar PV	Deviation	**Assumed all O&M costs are fixed**					
	Probability						

[4] 4 CSR 240-22.060(5)(I)

Project Schedule Uncertainty[5]

Technology	Item	Uncertainty Distribution				
		Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Combined Cycle (Natural Gas)	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Simple Cycle (Natural Gas)	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Nuclear	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Hydro: Pumped Storage	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Hydro: Keokuk Upgrade	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Small Hydro 1	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Small Hydro 2	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Small Hydro 3	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Regional Wind	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
MO 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[6]

Technology	Item	Uncertainty Distribution				
		Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Combined Cycle (Natural Gas)	Deviation		-1%	0%	2%	
	Probability		25%	50%	25%	
Simple Cycle (Natural Gas)	Deviation		-4%	0%	4%	
	Probability		25%	50%	25%	
Nuclear	Deviation		-1%	0%	1%	
	Probability		20%	50%	30%	
Hydro: Pumped Storage	Deviation		-4%	0%	4%	
	Probability		25%	50%	25%	
Hydro: Keokuk Upgrade	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Small Hydro 1	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Small Hydro 2	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Small Hydro 3	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
Regional Wind	Deviation	-30%	-15%	0%	20%	40%
	Probability	5%	25%	40%	25%	5%
MO 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%

[5] 4 CSR 240-22.060(5)(F)
[6] 4 CSR 240-22.060(5)(J)

Environmental CapEx Uncertainty[7]

Technology	Estimate Class	Uncertainty Distribution					
		Item	Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Labadie - Ash Landfill	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	10%	55%	20%	10%
Labadie - Cooling Tower	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	5%	15%	40%	25%	15%
Labadie - FGD	Class 5	Deviation	-20%	-10%	0%	15%	30%
		Probability	10%	20%	40%	20%	10%
Rush Island - Ash Landfill	Class 5	Deviation	-30%	-15%	0%	37.5%	75%
		Probability	5%	10%	55%	20%	10%
Meramec - Ash Landfill	Class 5	Deviation	-30%	-15%	0%	37.5%	75%
		Probability	5%	10%	55%	20%	10%
Meramec - Fine Mesh Screens	Class 4	Deviation	-25%	-13%	0%	27.5%	55%
		Probability	5%	15%	60%	15%	5%
Meramec - Waste Water Plant	Class 4	Deviation	-15%	-10%	0%	15%	20%
		Probability	10%	20%	50%	15%	5%
Meramec - Activated Carbon (Coal)	Class 4	Deviation	-15%	-7.5%	0%	10%	20%
		Probability	5%	15%	60%	15%	5%
Meramec - Activated Carbon (NG)	Class 4	Deviation	-15%	-7.5%	0%	10%	20%
		Probability	5%	15%	60%	15%	5%

Retirement Transmission CapEx Uncertainty[8]

Technology	Estimate Class	Uncertainty Distribution					
		Item	Low Project Cost	Low Mid Point Cost	Expected Value Project Cost	High Mid Point Cost	High Project Cost
Meramec	Class 5	Deviation	-20%	-10%	0%	20%	40%
		Probability	5%	20%	40%	25%	10%
Labadie	Class 5	Deviation	-40%	-20%	0%	35%	70%
		Probability	5%	15%	40%	30%	10%
Rush Island	Class 5	Deviation	-40%	-20%	0%	35%	70%
		Probability	5%	15%	40%	30%	10%

[7] 4 CSR 240-22.060(5)(E)
[8] 4 CSR 240-22.060(5)(E)

Table 9A.4 Sensitivity Analysis: Resource Specific Uncertain Factors[9]

Change in PVRR Ranking

Plan	Plan Description	Integration	Resource Specific Uncertain Factors														
			Project Cost			Project Schedule			O&M			Wind Capcity Factor (CF)			EFOR		
			Prj Cost-PWA	Prj Cost-Low	Prj Cost-High	Prj Schedule-PWA	Prj Schedule-Low	Prj Schedule-High	O&M-PWA	O&M-Low	O&M-High	WindCF-PWA	WindCF-Low	WindCF-High	EFOR-PWA	EFOR-Low	EFOR-High
A	CC-RAP	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Nuke2-RAP	12	0	-1	1	0	0	0	0	0	0	0	0	0	0	0	0
C	SC-RAP	3	0	2	-1	0	0	0	0	1	0	0	0	0	0	0	0
D	Pumped Hydro-RAP	10	0	2	-3	0	0	0	0	0	0	0	0	0	0	0	0
E	Wind-SC-RAP	8	0	-1	1	0	-1	1	0	-1	0	0	1	-1	0	0	0
F	CC-RAP EE only	9	0	0	-1	0	0	-1	0	0	0	0	-1	0	0	0	0
G	CC-MAP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	Nuke-RAP-Balanced	11	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
I	CC-RAP-Balanced	7	0	1	-1	0	1	0	0	1	0	0	0	1	0	0	0
J	Nuke-MEEIA1-Balanced	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	CC-MEEIA1-Balanced	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	Wind-MEEIA1	19	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0
M	CC-MAP-Labadie	17	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N	CC-MAP-Rush	13	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0
O	Nuke2025-RAP-Labadie-Balanced	18	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
P	Nuke2025-RAP-Rush-Balanced	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Q	Nuke-MAP-Balanced	6	0	-3	4	0	0	0	0	0	0	0	0	0	0	0	0
R	CC-MAP-Balanced	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
S	CC-MAP EE only	4	0	0	-1	0	0	0	0	-1	0	0	0	0	0	0	0

Change in PVRR

Plan	Plan Description	Integration	Resource Specific Uncertain Factors														
			Project Cost			Project Schedule			O&M			Wind Capcity Factor (CF)			EFOR		
			Prj Cost-PWA	Prj Cost-Low	Prj Cost-High	Prj Schedule-PWA	Prj Schedule-Low	Prj Schedule-High	O&M-PWA	O&M-Low	O&M-High	WindCF-PWA	WindCF-Low	WindCF-High	EFOR-PWA	EFOR-Low	EFOR-High
A	CC-RAP	59,642	29	(735)	1022	0	(9)	13	1	(42)	48	0	0	0	0	(1)	4
B	Nuke2-RAP	60,778	75	(1575)	2322	7	(86)	155	2	(92)	112	0	0	0	2	(10)	28
C	SC-RAP	59,579	28	(690)	968	0	(7)	9	1	(19)	28	0	0	0	0	0	(0)
D	Pumped Hydro-RAP	60,036	27	(734)	1008	2	(36)	52	1	(14)	21	0	0	0	(0)	4	(4)
E	Wind-SC-RAP	59,890	32	(918)	1241	6	(20)	80	2	(63)	78	6	93	(29)	0	(2)	4
F	CC-RAP EE only	59,941	30	(816)	1115	1	(18)	25	0	(67)	71	0	0	0	0	(3)	7
G	CC-MAP	59,266	29	(735)	1022	0	(9)	13	1	(42)	48	0	0	0	0	(1)	4
H	Nuke-RAP-Balanced	60,331	47	(1133)	1607	3	(38)	66	2	(77)	96	0	0	0	1	(4)	13
I	CC-RAP-Balanced	59,888	30	(817)	1119	0	(9)	13	1	(58)	72	0	0	0	0	(1)	4
J	Nuke-MEEIA1-Balanced	62,597	56	(1469)	2031	5	(74)	121	1	(177)	191	0	0	0	2	(9)	27
K	CC-MEEIA1-Balanced	62,029	34	(1088)	1432	2	(40)	56	1	(161)	167	0	0	0	1	(6)	15
L	Wind-MEEIA1	66,021	103	(4238)	5266	124	(177)	1415	23	(479)	707	155	2219	(673)	0	0	0
M	CC-MAP-Labadie	63,654	33	(1262)	1594	3	(81)	115	(1)	(258)	250	0	0	0	2	(10)	29
N	CC-MAP-Rush	61,433	30	(934)	1236	1	(35)	50	(0)	(126)	126	0	0	0	1	(5)	14
O	Nuke2025-RAP-Labadie-Balanced	64,702	66	(1856)	2514	8	(127)	205	1	(314)	324	0	0	0	3	(16)	48
P	Nuke2025-RAP-Rush-Balanced	62,935	64	(1608)	2250	6	(91)	152	2	(185)	204	0	0	0	2	(11)	33
Q	Nuke-MAP-Balanced	59,846	46	(1052)	1514	2	(29)	54	3	(51)	78	0	0	0	1	(3)	9
R	CC-MAP-Balanced	59,512	30	(817)	1119	0	(9)	13	1	(58)	72	0	0	0	0	(1)	4
S	CC-MAP EE only	59,582	29	(735)	1022	0	(9)	13	1	(42)	48	0	0	0	0	(1)	4

[9] 4 CSR 240-22.060(6)

Table 9A.5 Sensitivity Analysis: Non-Resource Specific Uncertain Factors[10]

Change in PVRR Ranking

			Non-Resource Specific Uncertain Factors													
			DSM Impacts			ROE/Interest Rates			Coal Price			NukeFuel			Nuke Incentives	
Plan	Plan Description	Integration	DSM-PWA	DSM-Low	DSM-High	ROE-PWA	ROE-Low	ROE-High	CoalPrice-PWA	CoalPrice-Low	CoalPrice-High	NukeFuel-PWA	NukeFuel-Low	NukeFuel-High	Nuke-Low	Nuke-High
A	CC-RAP	5	0	(1)	(1)	0	0	0	0	0	0	0	0	0	0	0
B	Nuke2-RAP	12	0	0	0	0	0	0	0	0	1	0	0	0	0	0
C	SC-RAP	3	(1)	(1)	(1)	0	1	0	0	0	0	0	0	0	0	0
D	Pumped Hydro-RAP	10	0	(1)	(2)	0	0	0	0	0	0	0	0	0	0	0
E	Wind-SC-RAP	8	0	0	(2)	0	(1)	0	0	0	0	0	0	0	0	0
F	CC-RAP EE only	9	(3)	(4)	2	0	0	0	0	0	0	0	0	0	0	0
G	CC-MAP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	Nuke-RAP-Balanced	11	0	0	(1)	0	0	0	0	0	0	0	0	0	0	0
I	CC-RAP-Balanced	7	0	0	(2)	0	1	0	0	0	0	0	0	0	0	0
J	Nuke-MEEIA1-Balanced	15	0	0	1	0	0	0	0	0	2	0	0	0	0	0
K	CC-MEEIA1-Balanced	14	0	0	0	0	0	0	0	(1)	0	0	0	0	0	0
L	Wind-MEEIA1	19	0	0	0	0	0	0	0	(1)	0	0	0	0	0	0
M	CC-MAP-Labadie	17	0	0	0	0	0	0	0	0	(1)	0	0	0	0	0
N	CC-MAP-Rush	13	0	0	0	0	0	0	0	1	(1)	0	0	0	0	0
O	Nuke2025-RAP-Labadie-Balanced	18	0	0	0	0	0	0	0	1	0	0	0	0	0	0
P	Nuke2025-RAP-Rush-Balanced	16	0	0	(1)	0	0	0	0	0	(1)	0	0	0	0	0
Q	Nuke-MAP-Balanced	6	3	4	1	0	0	0	0	0	0	0	0	0	0	0
R	CC-MAP-Balanced	2	2	4	1	0	0	0	0	0	0	0	0	0	0	0
S	CC-MAP EE only	4	(1)	(1)	5	0	(1)	0	0	0	0	0	0	0	0	0

Change in PVRR

			Non-Resource Specific Uncertain Factors													
			DSM Impacts			ROE/Interest Rates			Coal Price			NukeFuel			Nuke Incentives	
Plan	Plan Description	Integration	DSM-PWA	DSM-Low	DSM-High	ROE-PWA	ROE-Low	ROE-High	CoalPrice-PWA	CoalPrice-Low	CoalPrice-High	NukeFuel-PWA	NukeFuel-Low	NukeFuel-High	Nuke-Low	Nuke-High
A	CC-RAP	59,642	129	349	(575)	(12)	(864)	748	(109)	(3816)	2729	0	0	0	0	0
B	Nuke2-RAP	60,778	129	349	(575)	(13)	(974)	844	(109)	(3816)	2729	(2)	(31)	15	(64)	(128)
C	SC-RAP	59,579	129	349	(575)	(12)	(857)	742	(109)	(3816)	2729	0	0	0	0	0
D	Pumped Hydro-RAP	60,036	129	349	(575)	(12)	(887)	768	(109)	(3816)	2729	0	0	0	0	0
E	Wind-SC-RAP	59,890	129	349	(575)	(12)	(905)	783	(109)	(3816)	2729	0	0	0	0	0
F	CC-RAP EE only	59,941	62	156	(156)	(12)	(887)	767	(109)	(3816)	2729	0	0	0	0	0
G	CC-MAP	59,266	242	588	(463)	(12)	(861)	745	(109)	(3816)	2729	0	0	0	0	0
H	Nuke-RAP-Balanced	60,331	129	349	(575)	(12)	(926)	801	(109)	(3816)	2729	(1)	(14)	7	(24)	(48)
I	CC-RAP-Balanced	59,888	129	349	(575)	(12)	(883)	764	(109)	(3816)	2729	0	0	0	0	0
J	Nuke-MEEIA1-Balanced	62,597	0	0	0	(14)	(1011)	875	(109)	(3816)	2729	(1)	(21)	11	(29)	(58)
K	CC-MEEIA1-Balanced	62,029	0	0	0	(13)	(962)	832	(109)	(3816)	2729	0	0	0	0	0
L	Wind-MEEIA1	66,021	0	0	0	(22)	(1554)	1339	(109)	(3816)	2729	0	0	0	0	0
M	CC-MAP-Labadie	63,654	242	588	(463)	(13)	(936)	804	(65)	(2194)	1547	0	0	0	0	0
N	CC-MAP-Rush	61,433	242	588	(463)	(12)	(881)	762	(89)	(2954)	2062	0	0	0	0	0
O	Nuke2025-RAP-Labadie-Balanced	64,702	129	349	(575)	(14)	(1018)	875	(65)	(2194)	1547	(2)	(38)	20	(42)	(84)
P	Nuke2025-RAP-Rush-Balanced	62,935	129	349	(575)	(13)	(984)	852	(89)	(2954)	2062	(2)	(38)	20	(42)	(84)
Q	Nuke-MAP-Balanced	59,846	242	588	(463)	(12)	(901)	780	(109)	(3816)	2729	(1)	(14)	7	(24)	(48)
R	CC-MAP-Balanced	59,512	242	588	(463)	(12)	(880)	762	(109)	(3816)	2729	0	0	0	0	0
S	CC-MAP EE only	59,582	161	358	0	(12)	(863)	747	(109)	(3816)	2729	0	0	0	0	0

[10] 4 CSR 240-22.060(6)

Table 9A.6 DSM Participant Costs[11]

DSM Program	Value ($1000s)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
RAP	Low	0	26,156	34,614	48,477	40,924	40,353	41,723	41,517	45,457	58,974	65,929	66,327	71,790	70,383	67,914	77,252	79,587	79,522	89,029	90,395
	Base	0	28,743	38,037	53,271	44,972	44,344	45,849	45,623	49,953	64,806	72,450	72,887	78,890	77,344	74,631	84,893	87,459	87,387	97,834	99,335
	High	0	31,330	41,460	58,065	49,019	48,335	49,976	49,729	54,448	70,639	78,970	79,447	85,990	84,305	81,347	92,533	95,330	95,251	106,639	108,275
MID	Low	0	29,705	39,501	55,152	46,417	45,338	47,063	46,634	50,938	65,964	73,562	73,930	79,726	78,241	75,380	85,417	88,046	88,624	97,697	98,041
	Base	0	34,648	46,084	64,335	54,138	52,857	54,878	54,366	59,378	76,888	85,734	86,159	92,897	91,172	87,831	99,509	102,573	103,282	113,774	114,111
	High	0	35,942	47,796	66,732	56,162	54,852	56,941	56,420	61,626	79,804	88,995	89,439	96,447	94,652	91,189	103,329	106,509	107,215	118,176	118,581
MAP	Low	0	33,254	44,388	61,827	51,910	50,323	52,403	51,750	56,420	72,955	81,195	81,533	87,661	86,100	82,846	93,582	96,504	97,726	106,365	105,687
	Base	0	40,554	54,131	75,398	63,305	61,370	63,907	63,110	68,804	88,969	99,019	99,430	106,904	105,000	101,031	114,124	117,688	119,178	129,714	128,886
	High	0	40,554	54,131	75,398	63,305	61,370	63,907	63,110	68,804	88,969	99,019	99,430	106,904	105,000	101,031	114,124	117,688	119,178	129,714	128,886

[11] 4 CSR 240-22.060(2)(A)3

Figure 9A.1 Combined Impact of DSM on Summer Peak Demand[12]

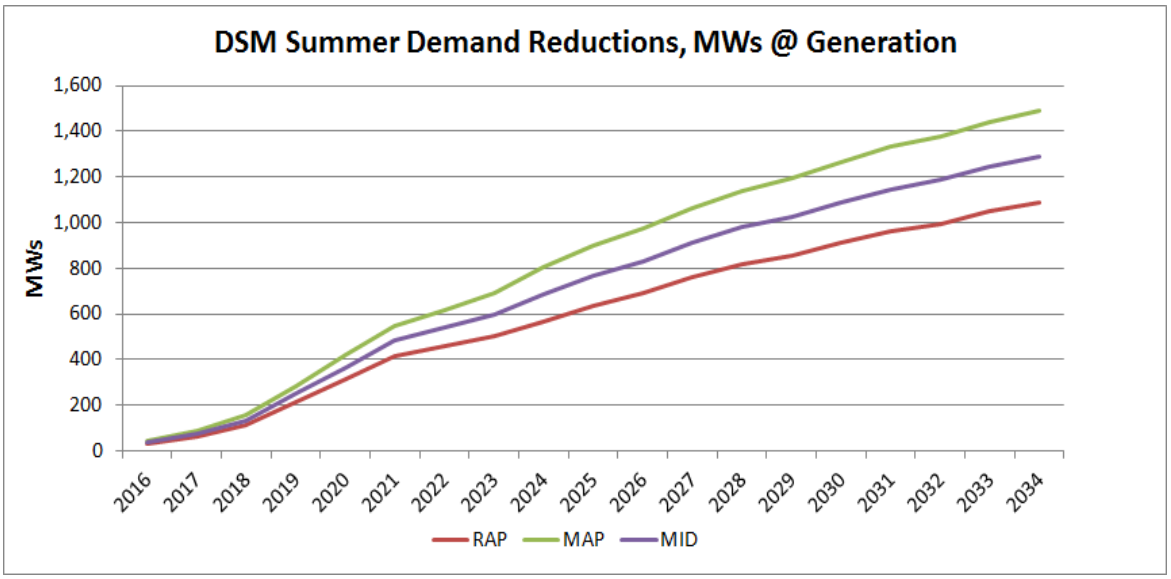
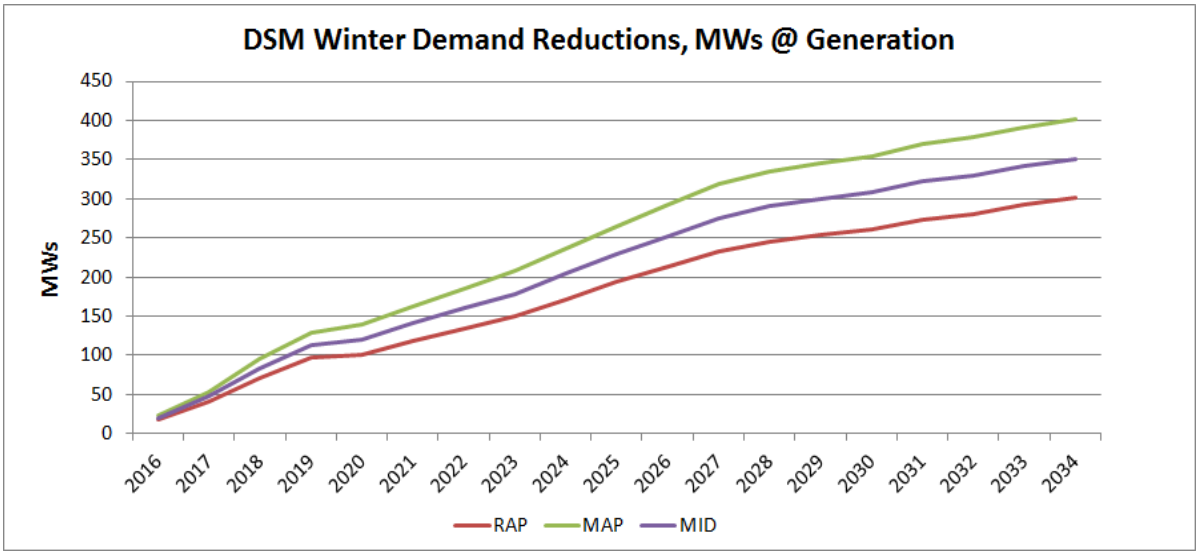


Figure 9A.2 Combined Impact of DSM on Winter Peak Demand[13]



[12] 4 CSR 240-22.060(4)B1
[13] 4 CSR 240-22.060(4)B1

Figure 9A.3 Stacked Programs for RAP DSM Capacity[14]

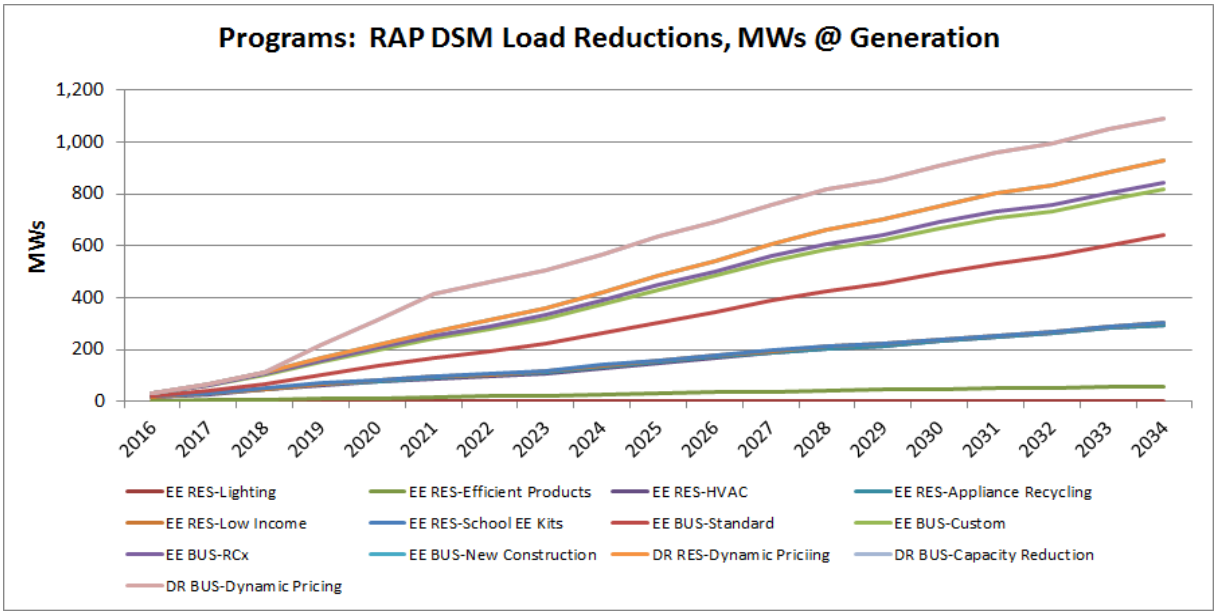
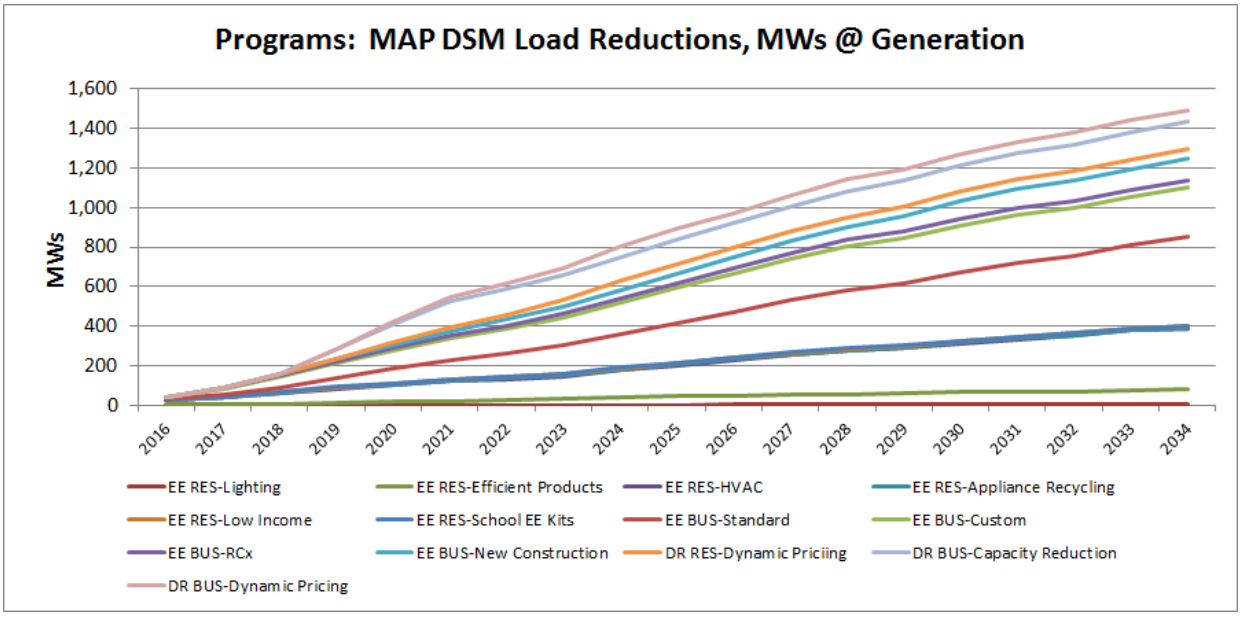
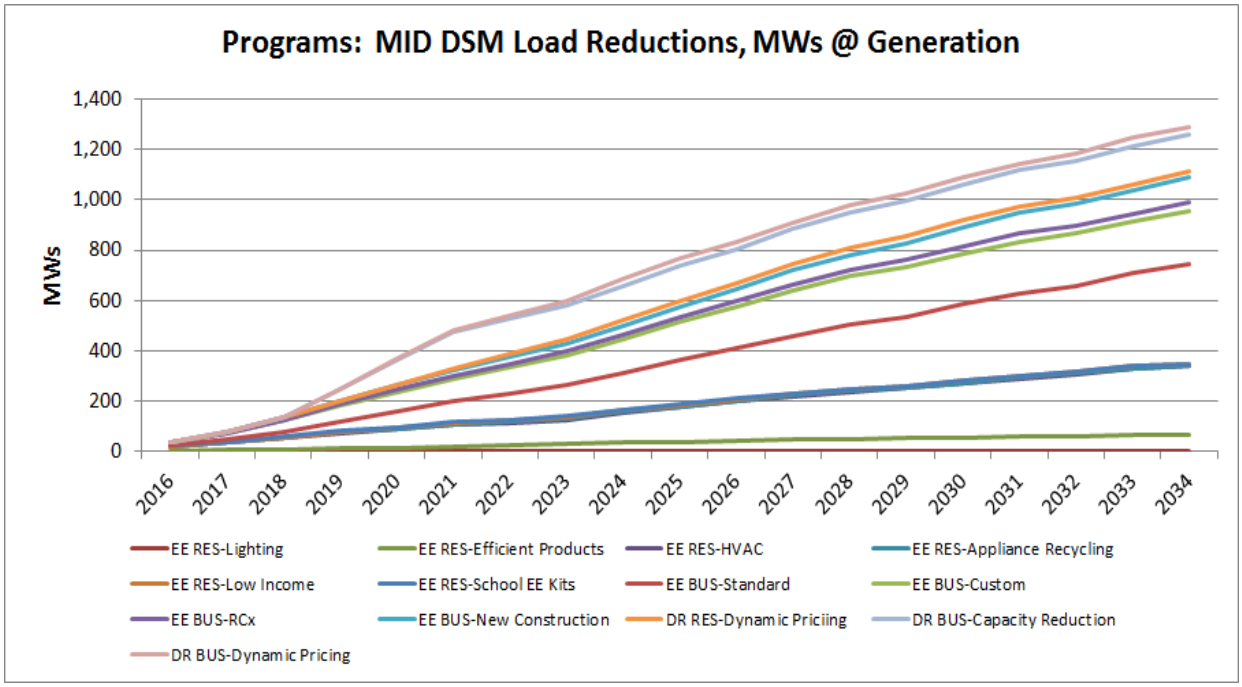


Figure 9A.4 Stacked Programs for MAP DSM Capacity[15]



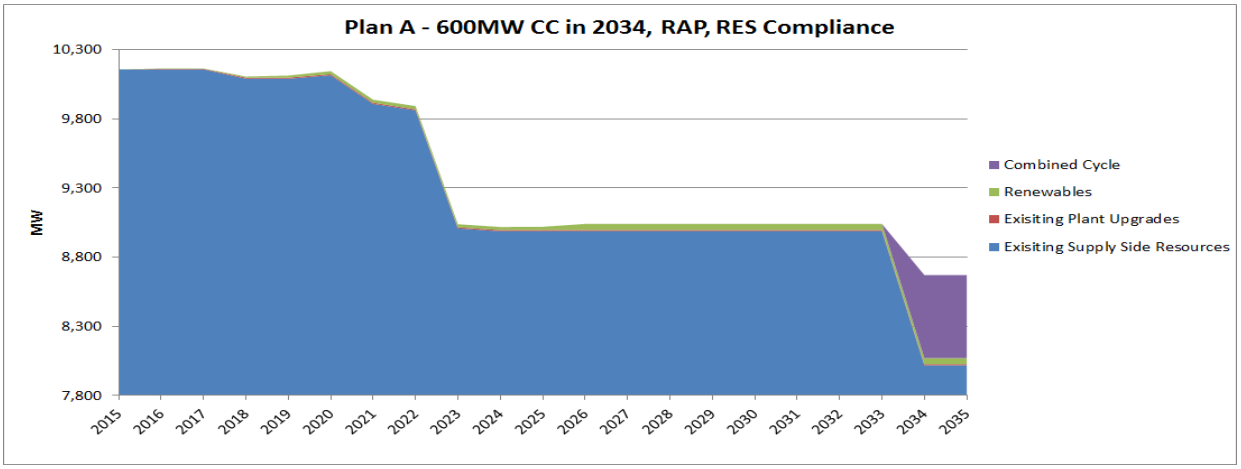
[14] 4 CSR 240-22.060(4)(B)2
[15] 4 CSR 240-22.060(4)(B)2

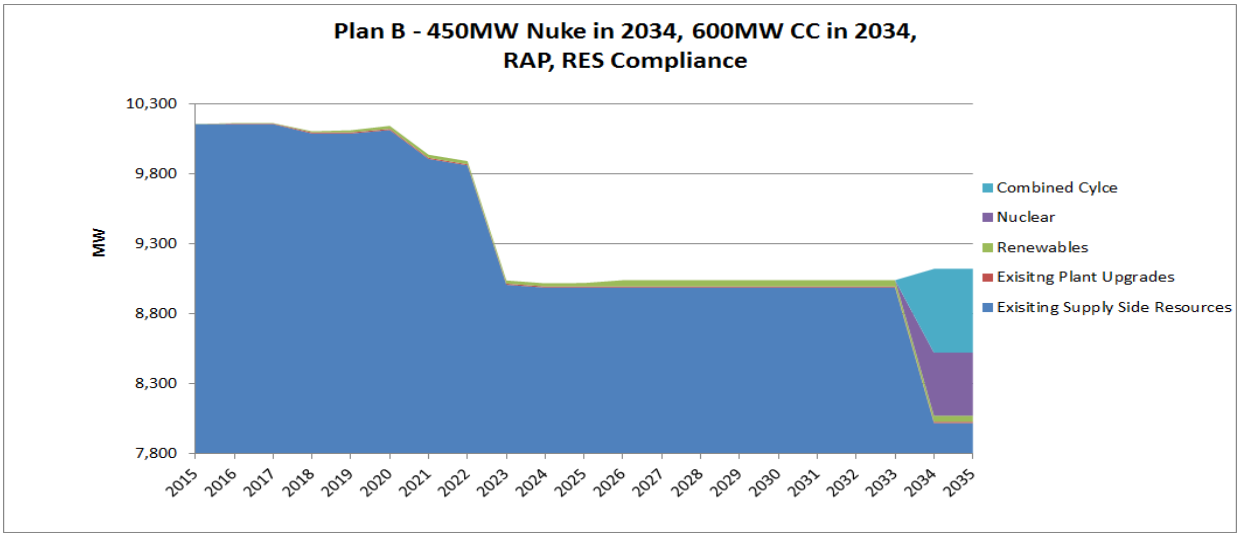
Figure 9A.5 Stacked Programs for MID DSM Capacity[16]

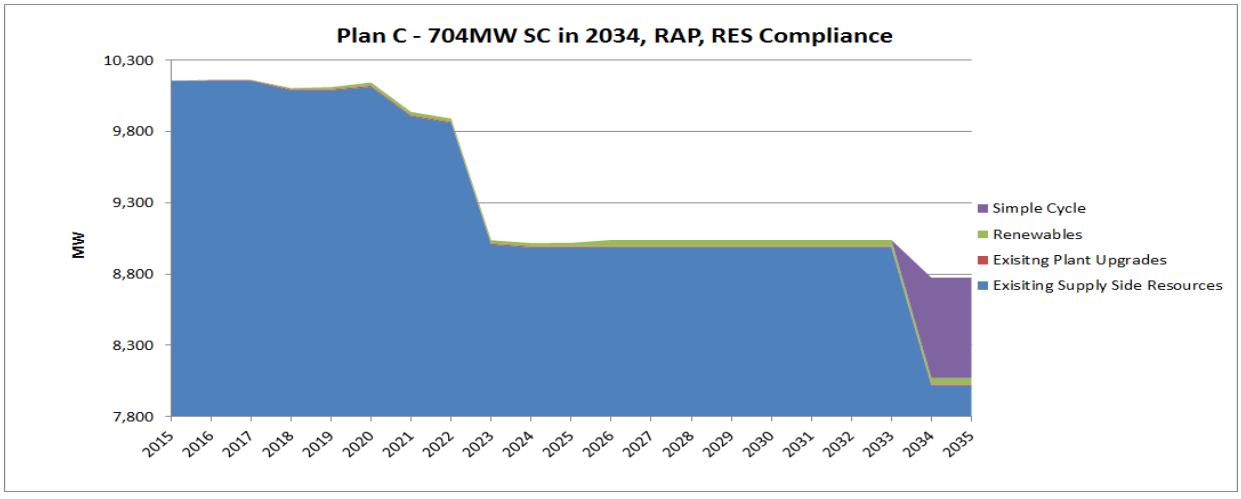


[16] 4 CSR 240-22.060(4)(B)2

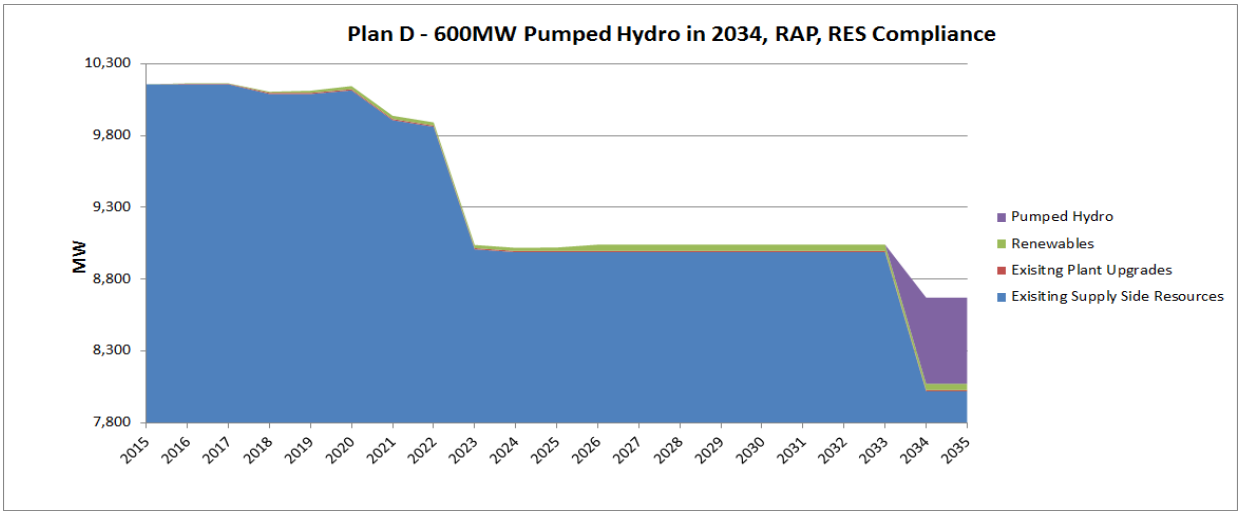
Figure 9A.6 Composition of Capacity[17]

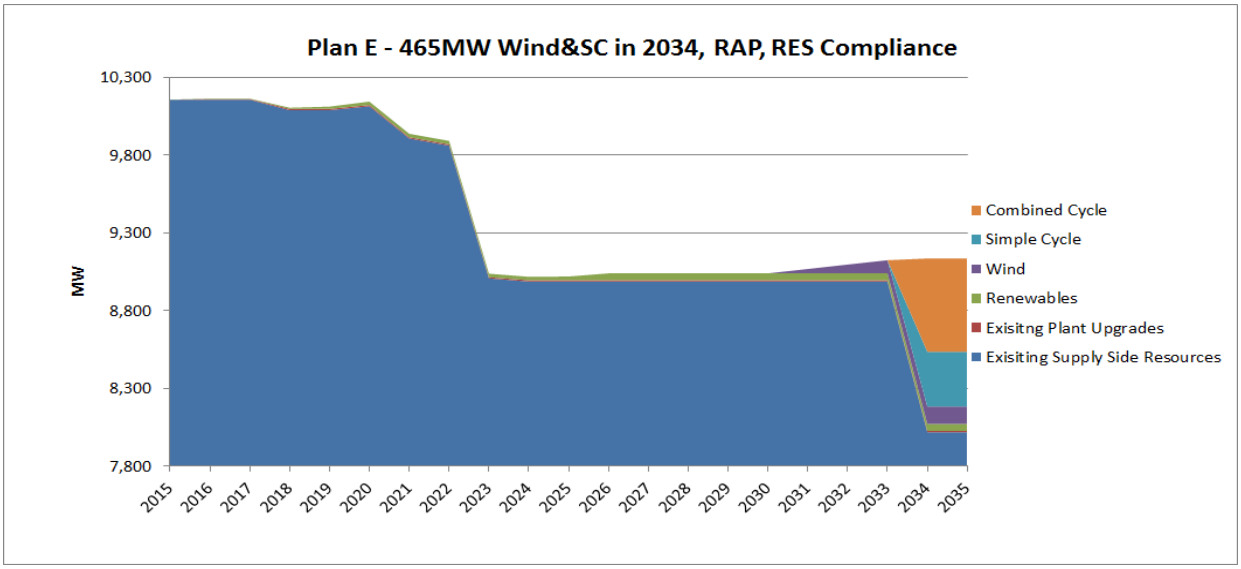


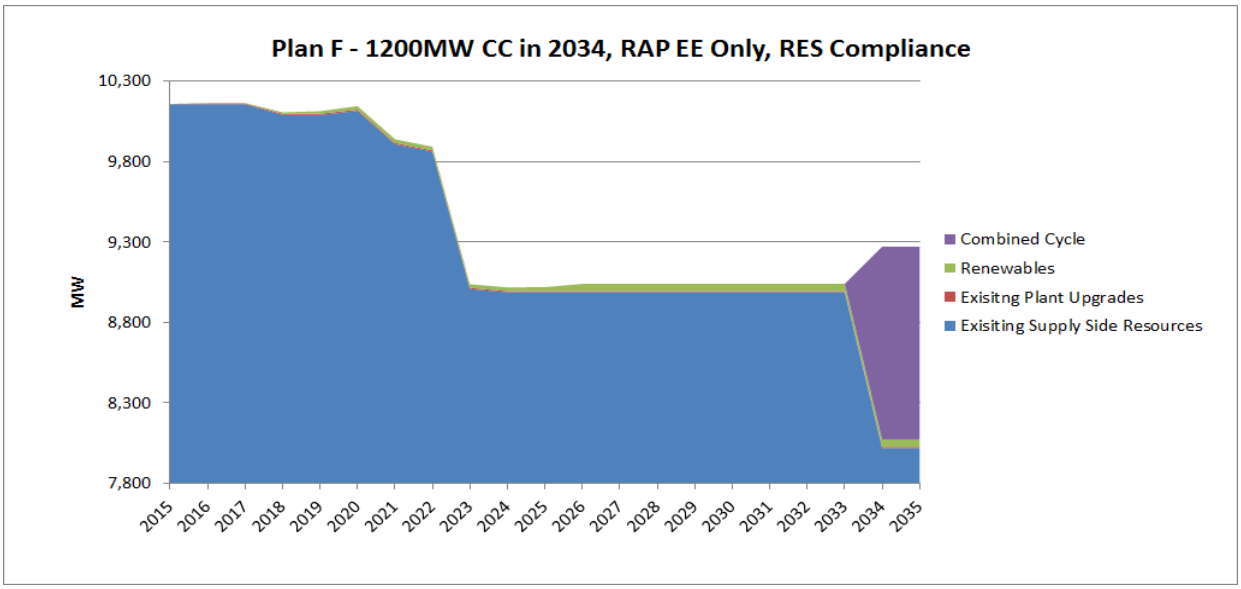


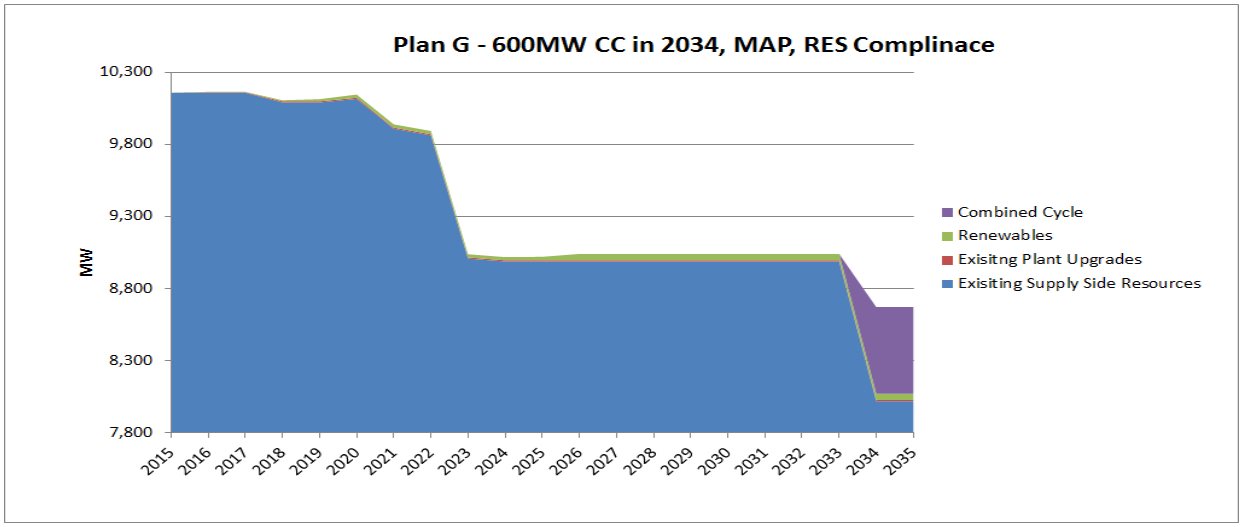


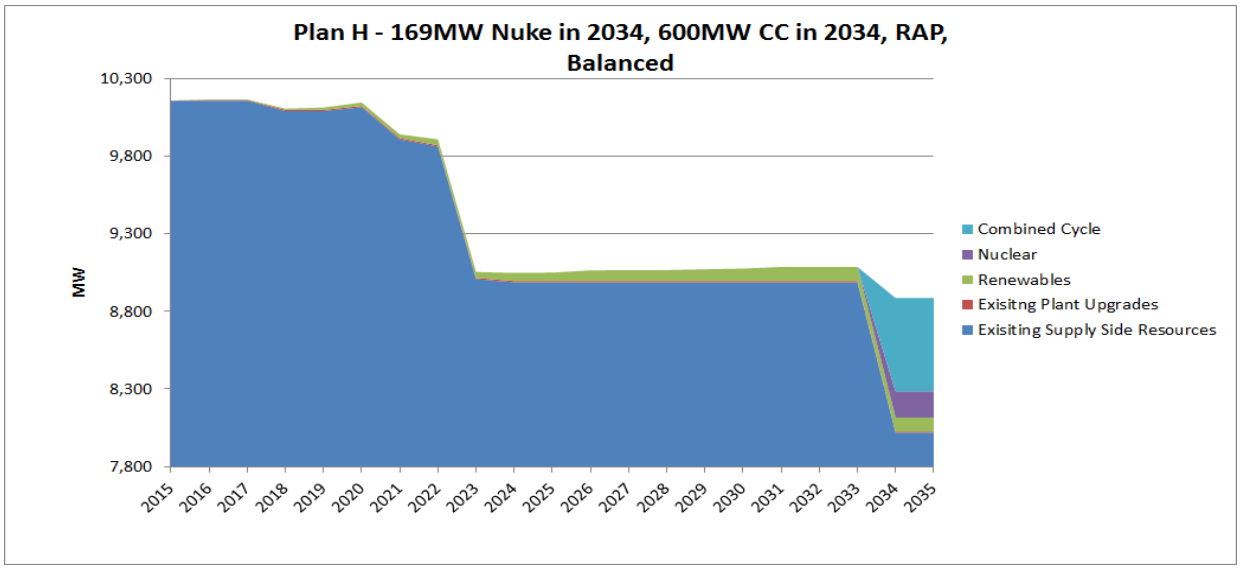
[17] 4 CSR 240-22.060(4)(B)3

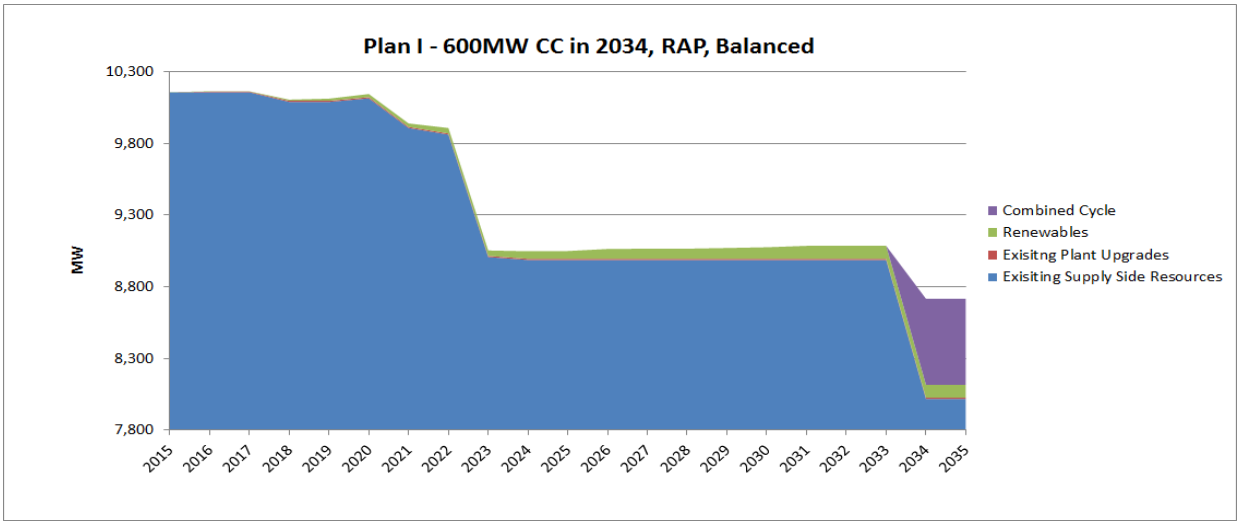

Plan D - 600MW Pumped Hydro in 2034, RAP, RES Compliance
MW
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Pumped Hydro
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

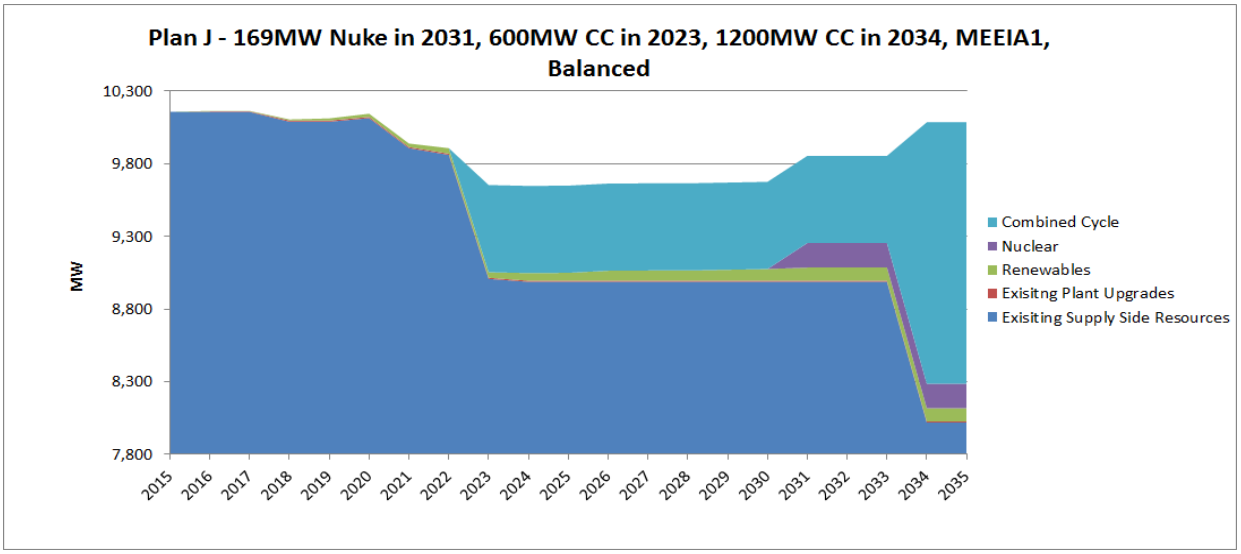

Plan E - 465MW Wind&SC in 2034, RAP, RES Compliance
MW
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Simple Cycle
Wind
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

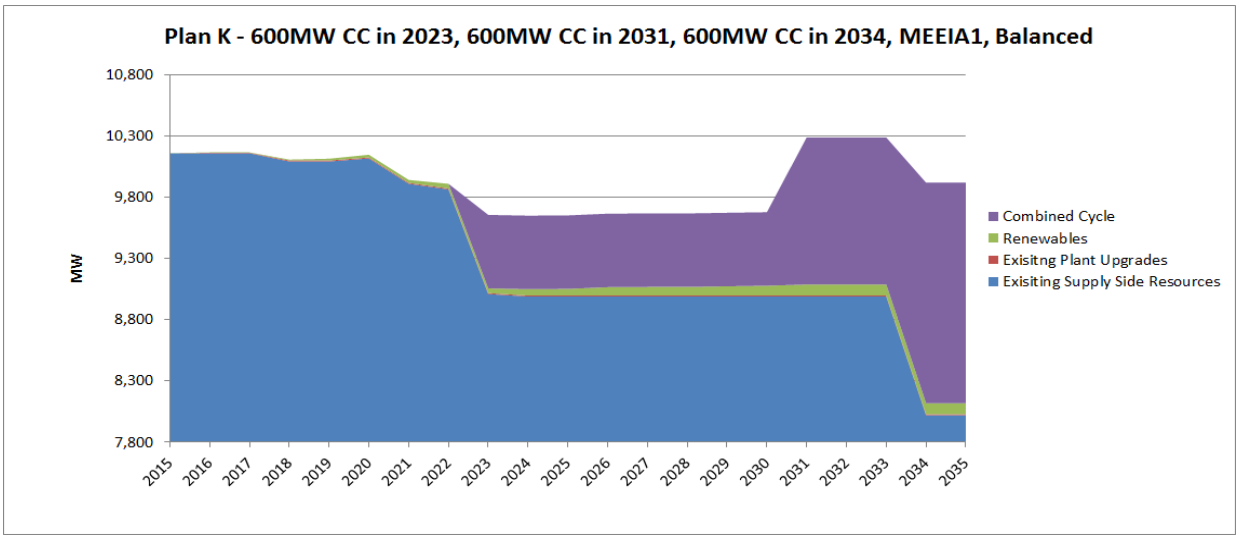

Plan F - 1200MW CC in 2034, RAP EE Only, RES Compliance
MW
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

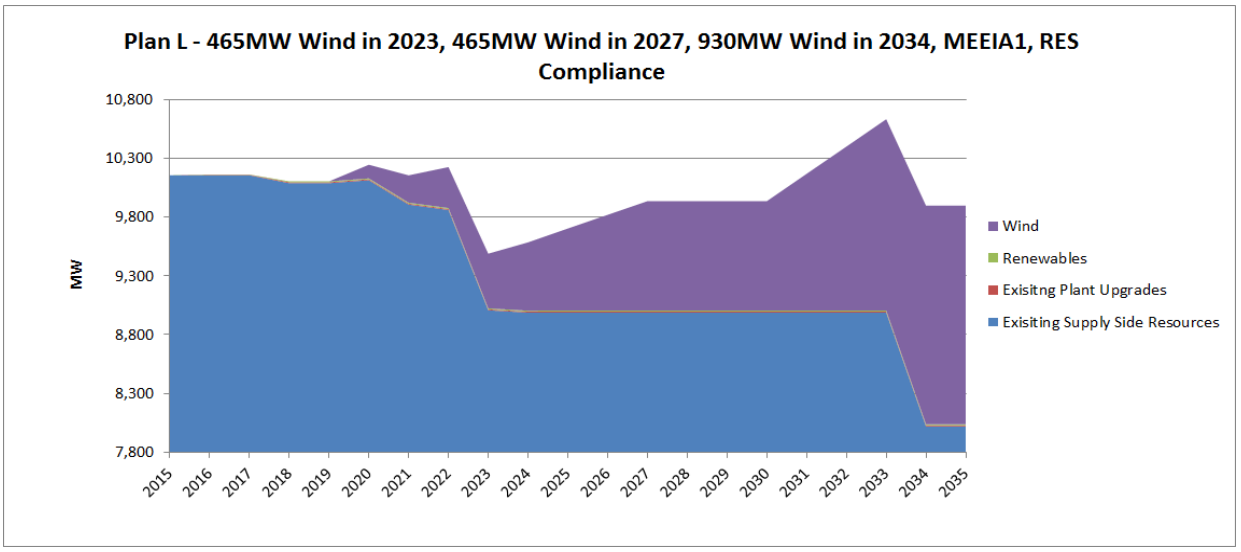

Plan G - 600MW CC in 2034, MAP, RES Complinace
MW
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

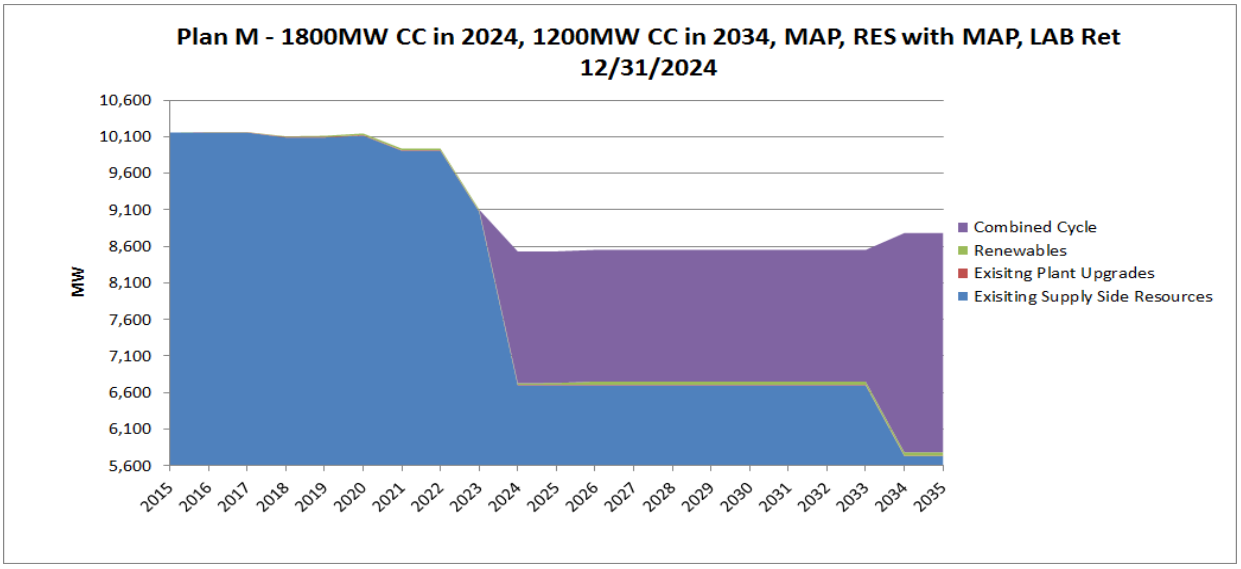

Plan H - 169MW Nuke in 2034, 600MW CC in 2034, RAP, Balanced
MW
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Nuclear
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

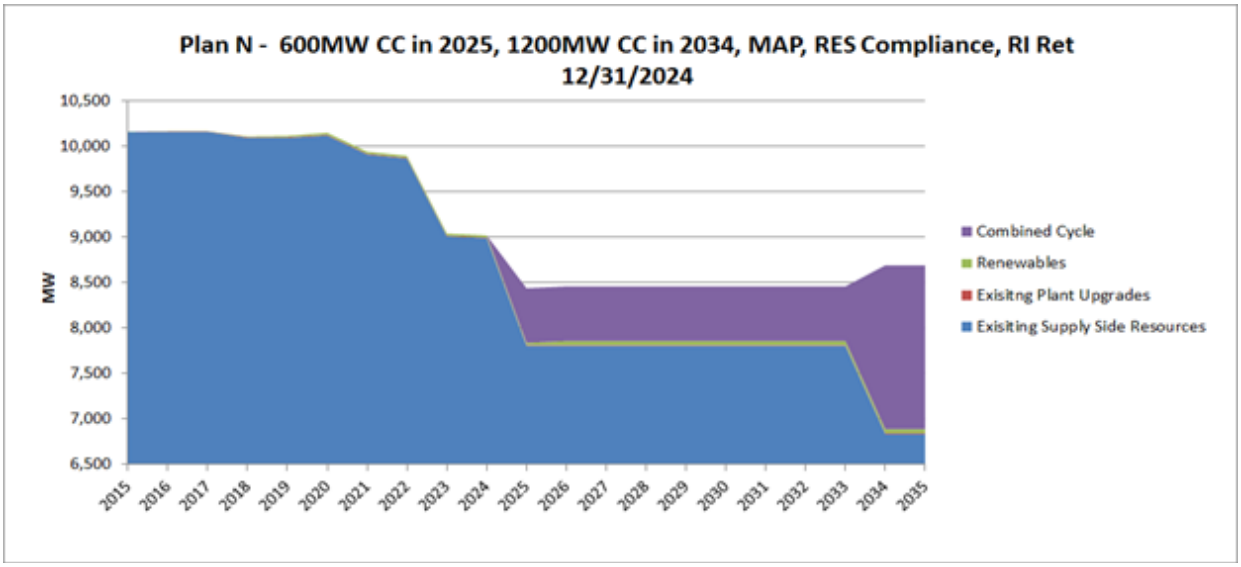

Plan I - 600MW CC in 2034, RAP, Balanced
MW
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

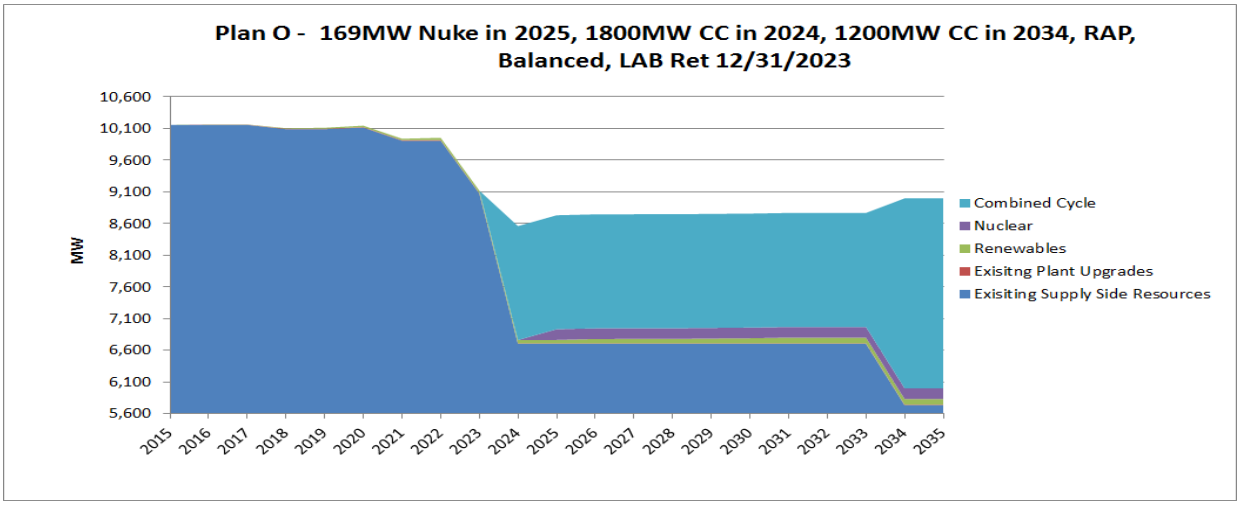

Plan J - 169MW Nuke in 2031, 600MW CC in 2023, 1200MW CC in 2034, MEEIA1, Balanced
MW
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Nuclear
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

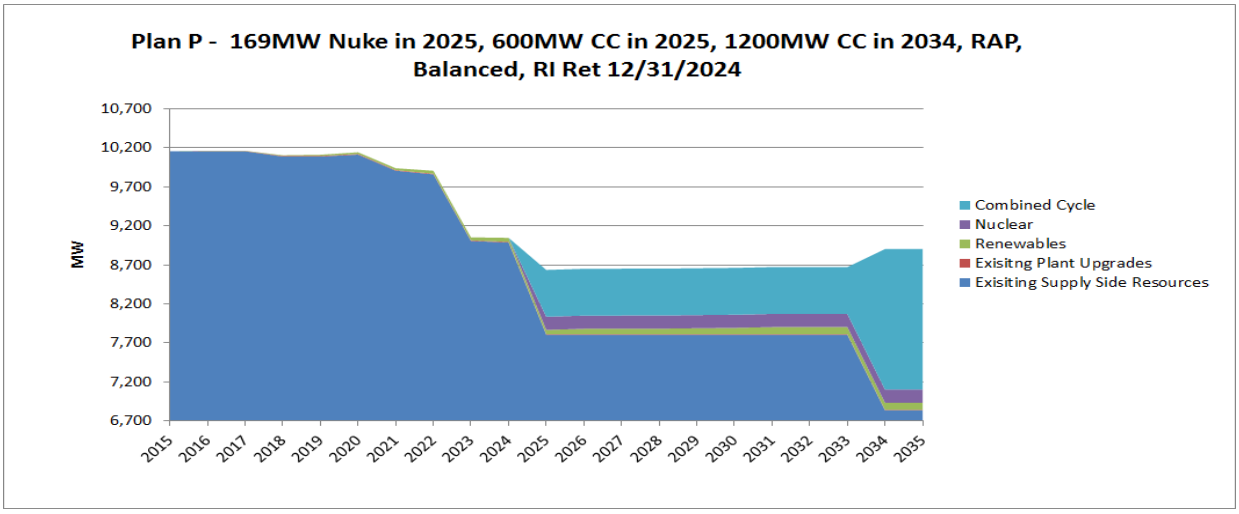

Plan K - 600MW CC in 2023, 600MW CC in 2031, 600MW CC in 2034, MEEIA1, Balanced
MW
10,800
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

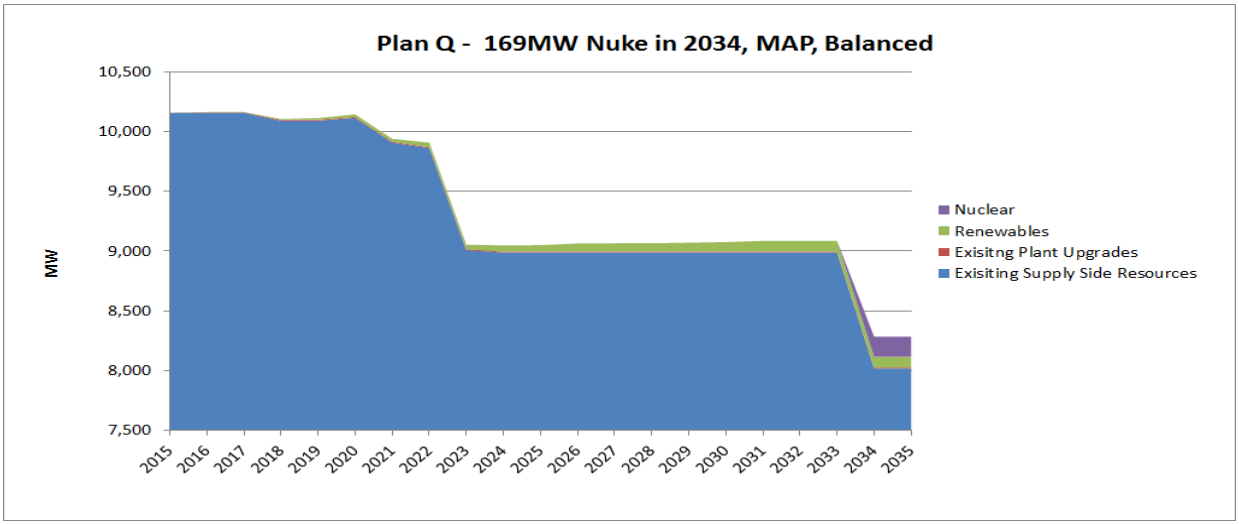

Plan L - 465MW Wind in 2023, 465MW Wind in 2027, 930MW Wind in 2034, MEEIA1, RES Compliance
MW
10,800
10,300
9,800
9,300
8,800
8,300
7,800
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Wind
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

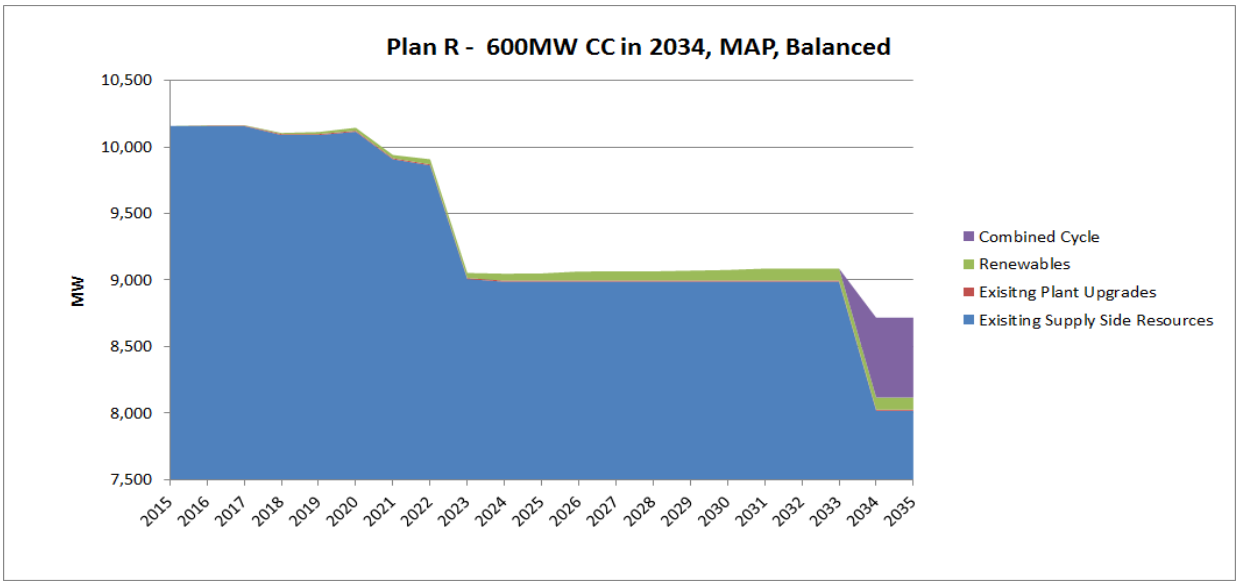

Plan M - 1800MW CC in 2024, 1200MW CC in 2034, MAP, RES with MAP, LAB Ret 12/31/2024
MW
10,600
10,100
9,600
9,100
8,600
8,100
7,600
7,100
6,600
6,100
5,600
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources


Plan N - 600MW CC in 2025, 1200MW CC in 2034, MAP, RES Compliance, RI Ret 12/31/2024
MW
10,500
10,000
9,500
9,000
8,500
8,000
7,500
7,000
6,500
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources


Plan O - 169MW Nuke in 2025, 1800MW CC in 2024, 1200MW CC in 2034, RAP, Balanced, LAB Ret 12/31/2023
MW
10,600
10,100
9,600
9,100
8,600
8,100
7,600
7,100
6,600
6,100
5,600
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Nuclear
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources


Plan P - 169MW Nuke in 2025, 600MW CC in 2025, 1200MW CC in 2034, RAP, Balanced, RI Ret 12/31/2024
MW
10,700
10,200
9,700
9,200
8,700
8,200
7,700
7,200
6,700
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Nuclear
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources


Plan Q - 169MW Nuke in 2034, MAP, Balanced
MW
10,500
10,000
9,500
9,000
8,500
8,000
7,500
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Nuclear
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources


Plan R - 600MW CC in 2034, MAP, Balanced
MW
10,500
10,000
9,500
9,000
8,500
8,000
7,500
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

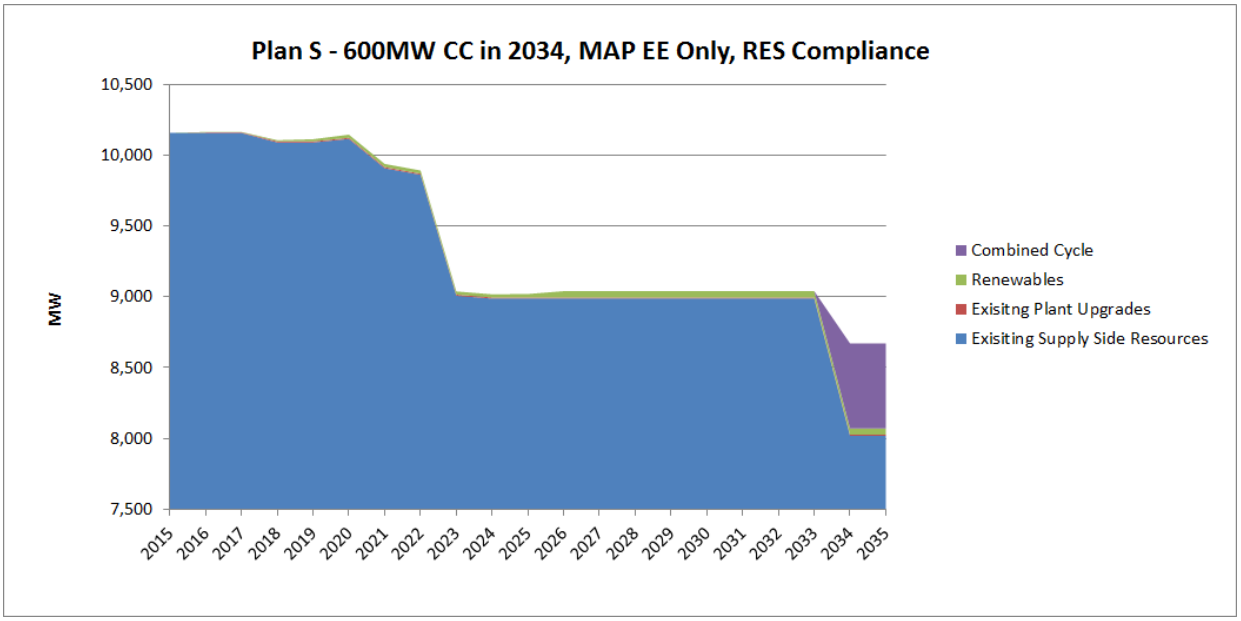

Plan S - 600MW CC in 2034, MAP EE Only, RES Compliance
MW
10,500
10,000
9,500
9,000
8,500
8,000
7,500
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
Combined Cycle
Renewables
Exisitng Plant Upgrades
Exisiting Supply Side Resources

Figure 9A.7 Combined Impact of DSM Resources on Energy[18]

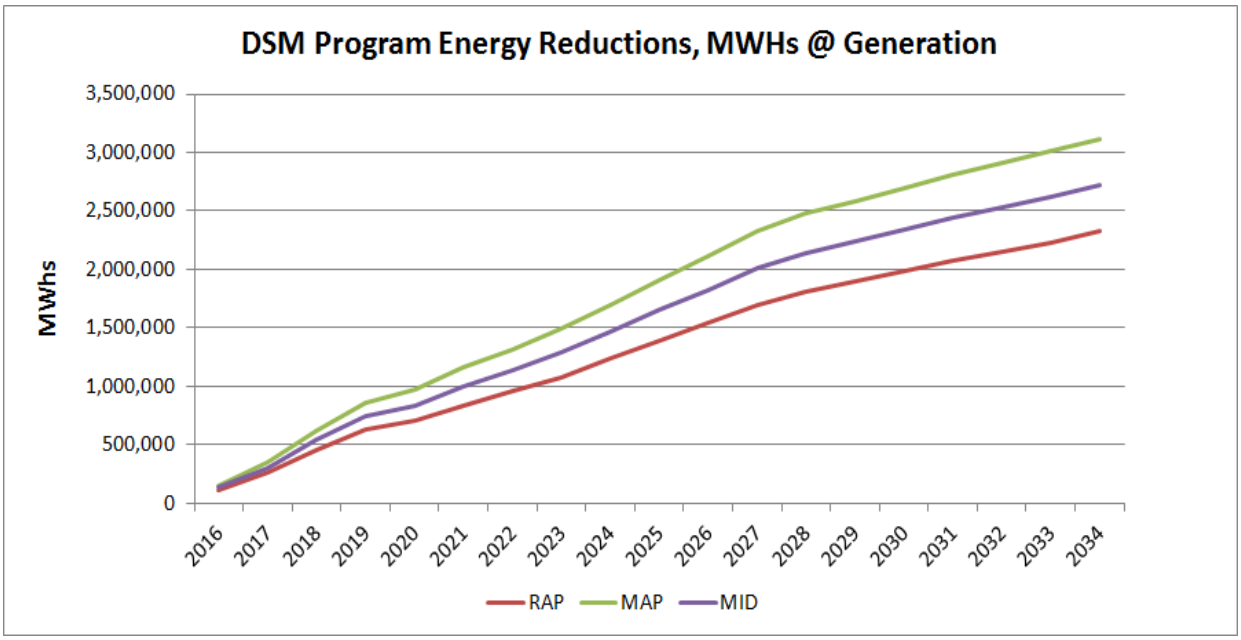
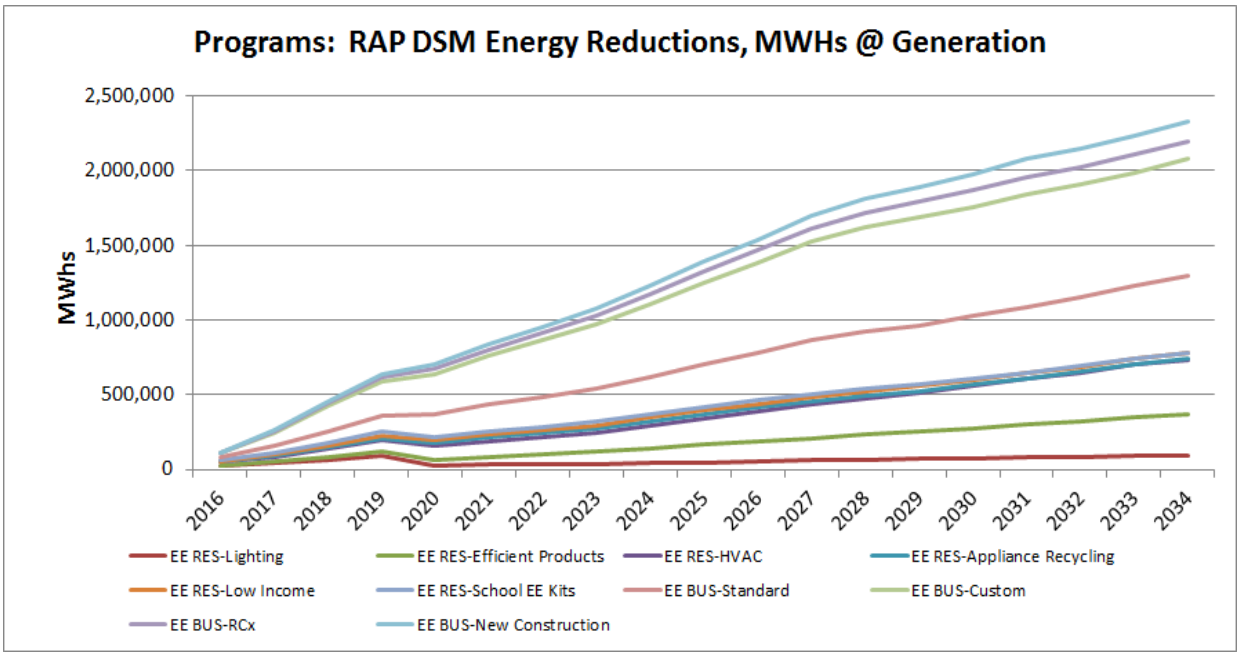


Figure 9A.8 Programs for RAP DSM Energy[19]



[18] 4 CSR 240-22.060(4)(B)4
[19] 4 CSR 240-22.060(4)(B)5

Figure 9A.9 Programs for MAP DSM Energy[20]

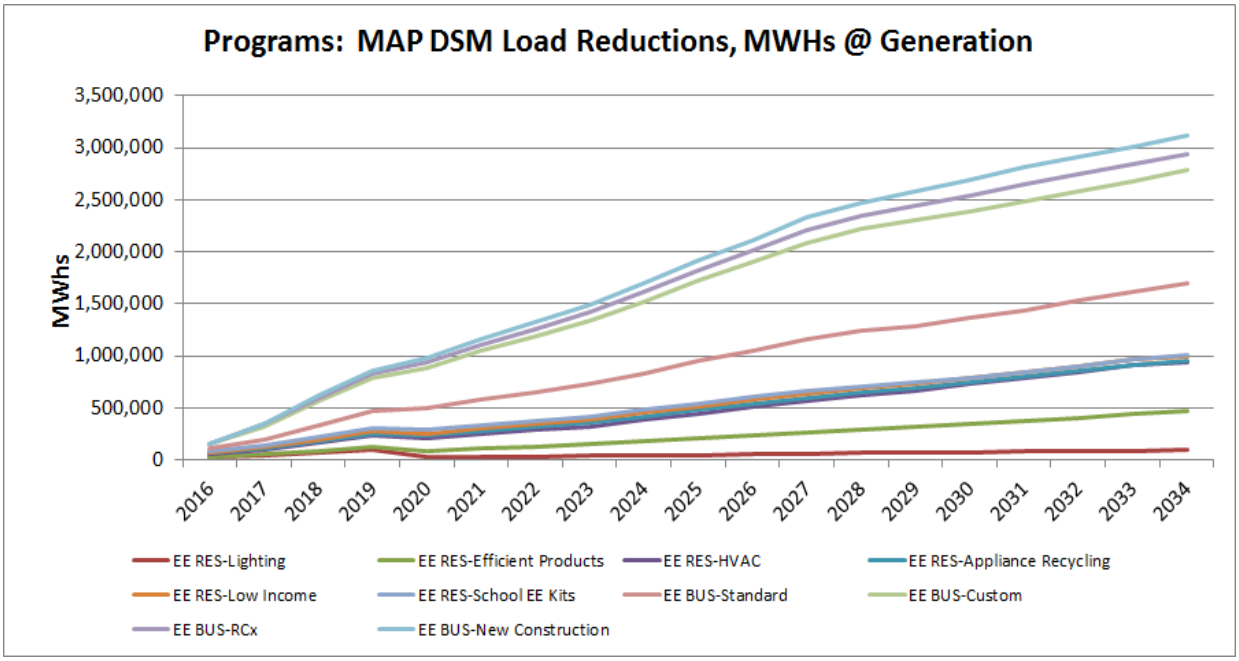
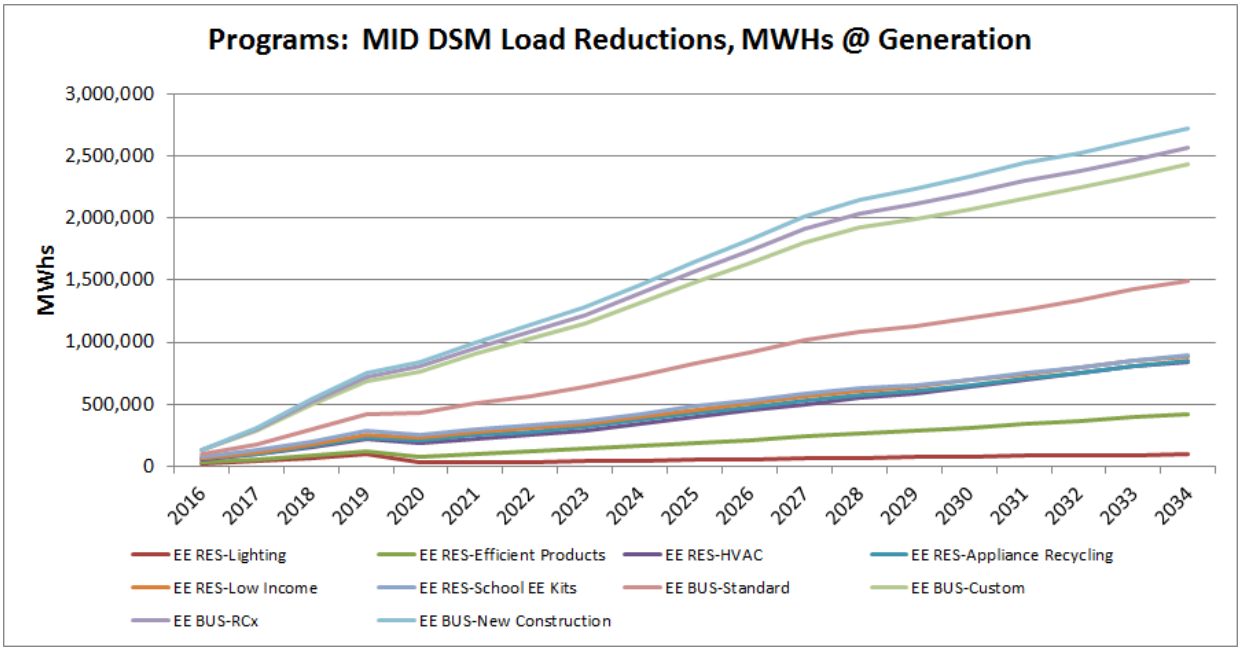
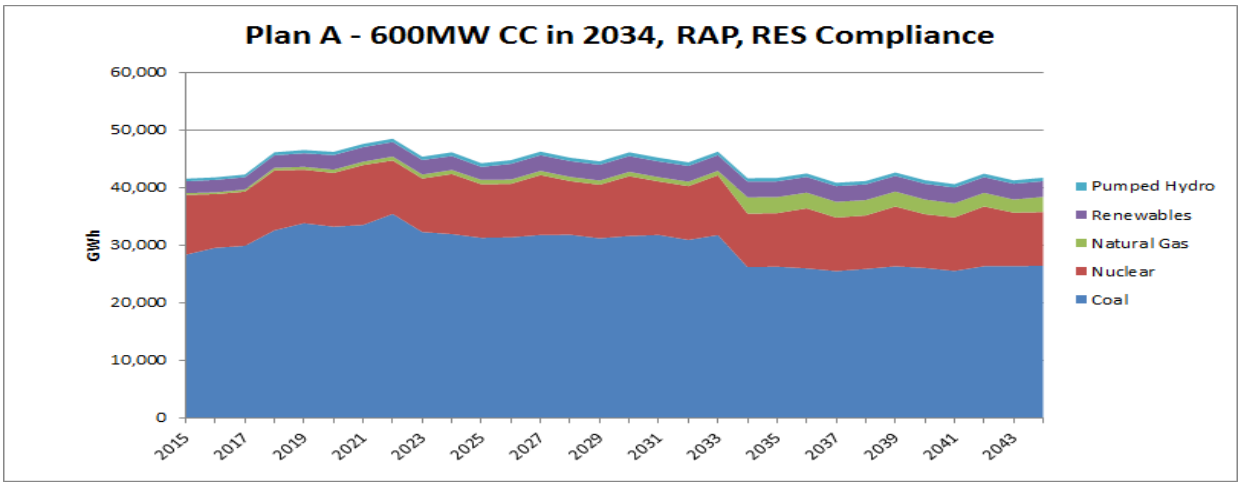


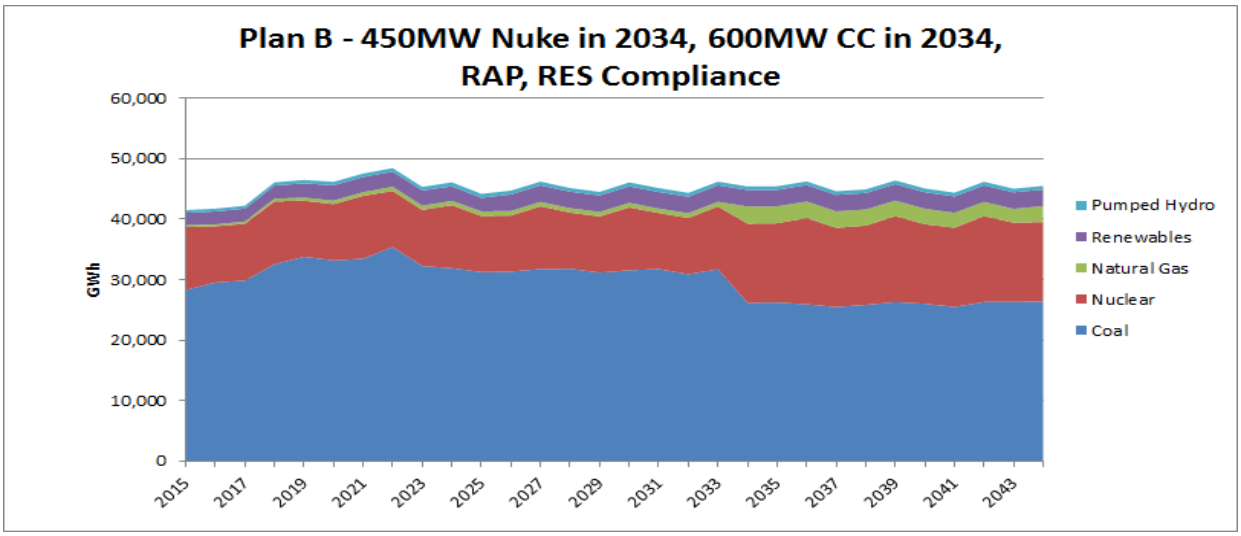
Figure 9A.10 Programs for MID DSM Energy[21]

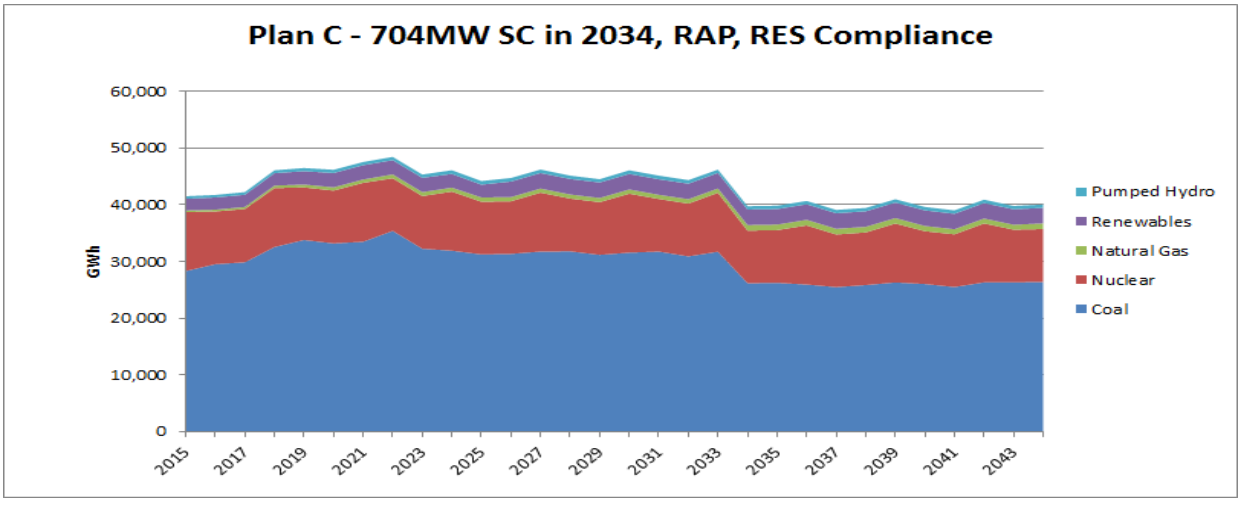


[20] 4 CSR 240-22.060(4)(B)5
[21] 4 CSR 240-22.060(4)(B)5

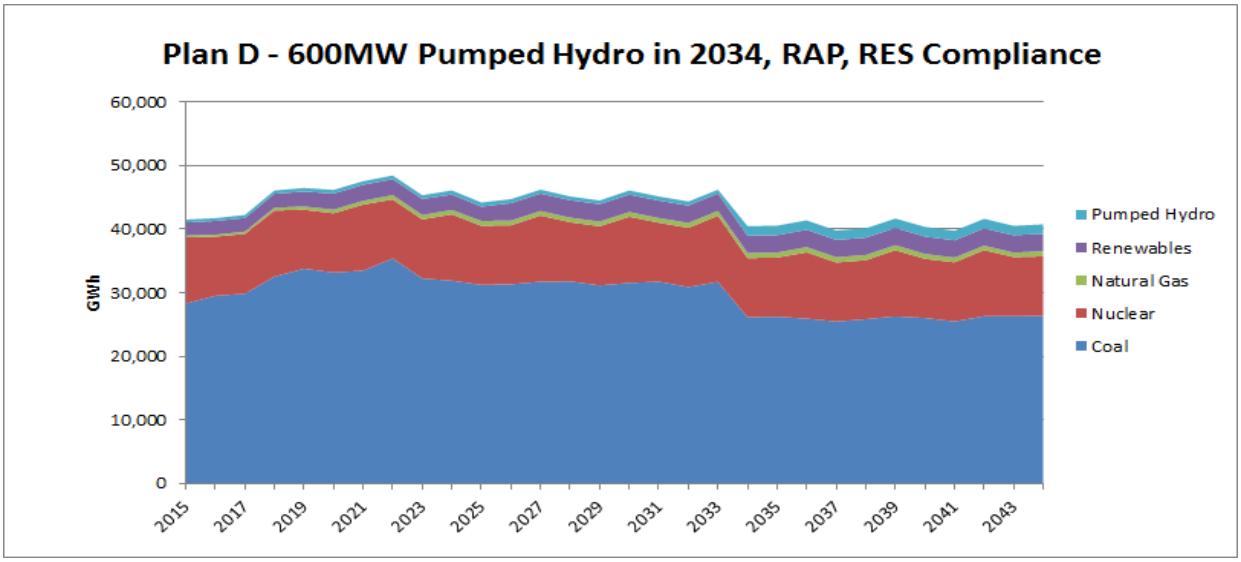
Figure 9A.11 Composition of Energy[22]

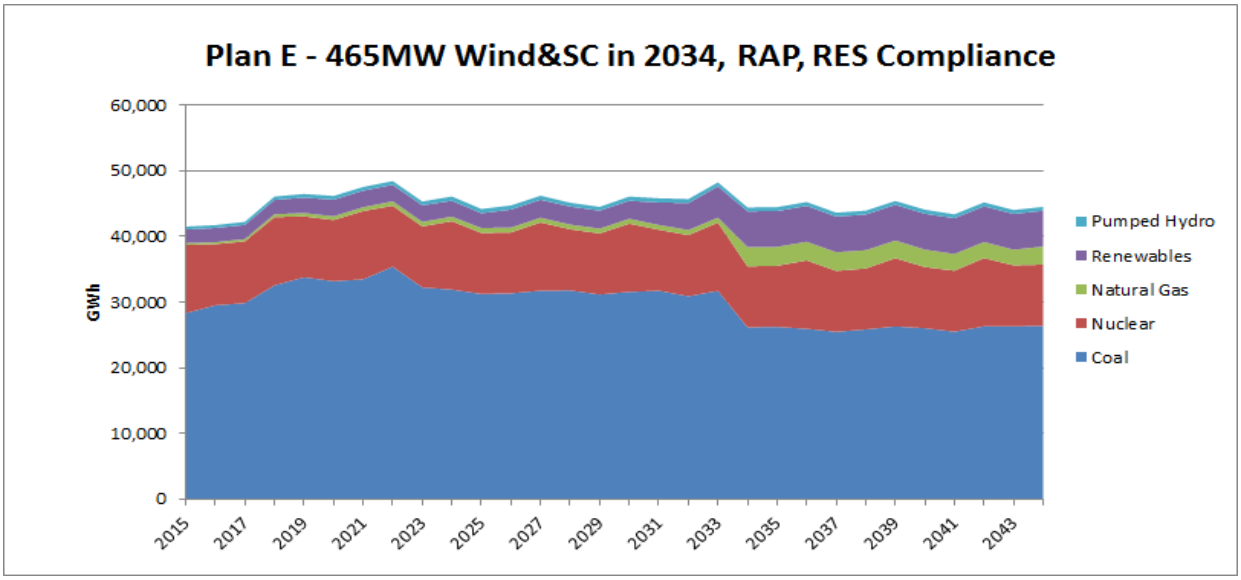


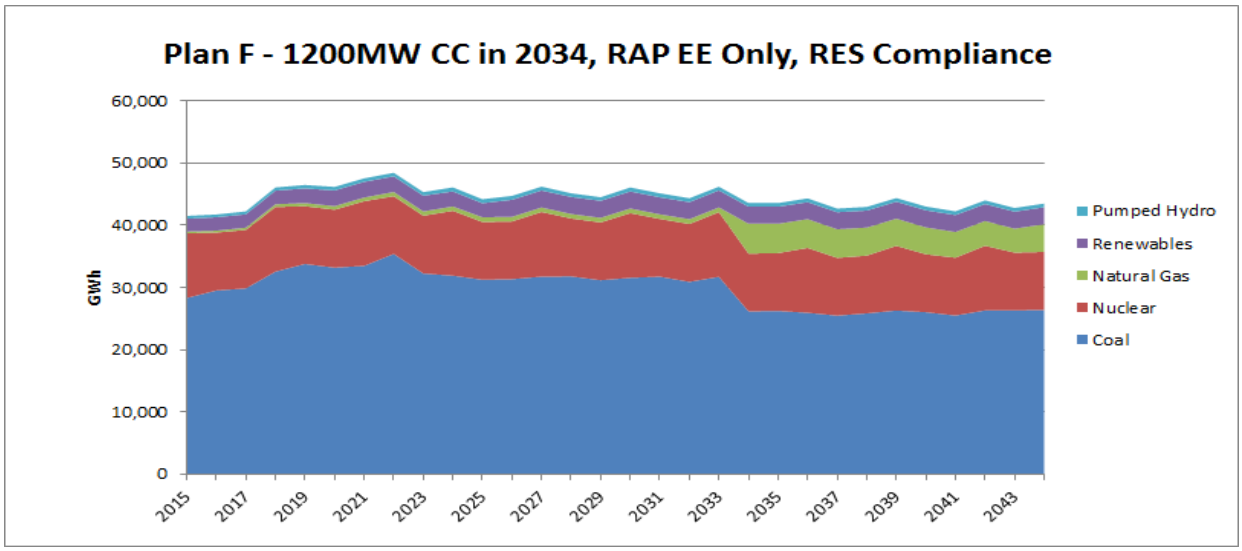


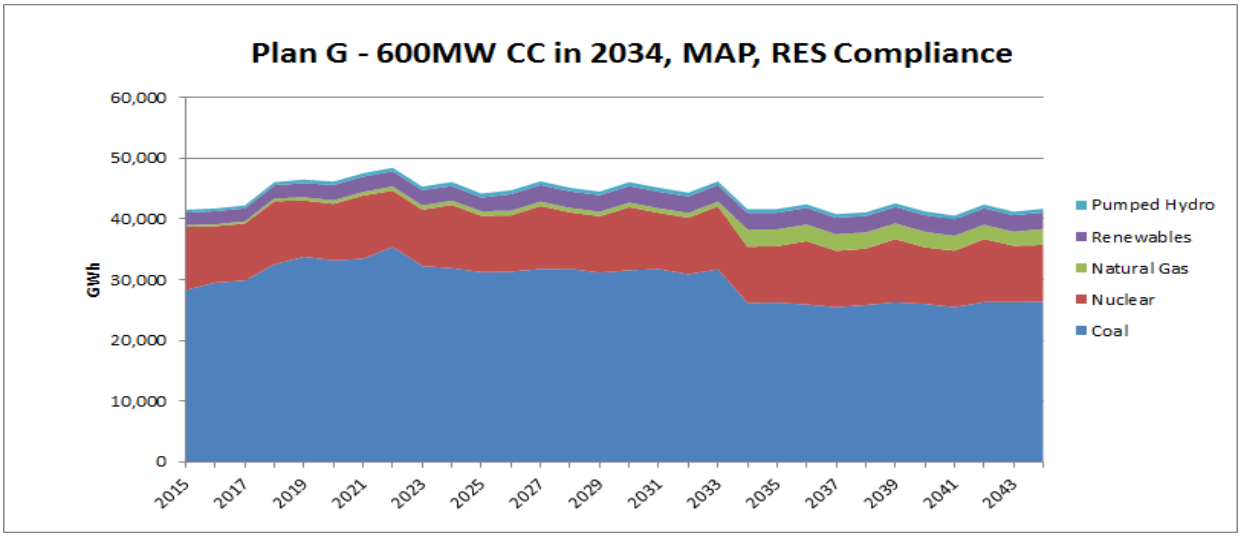


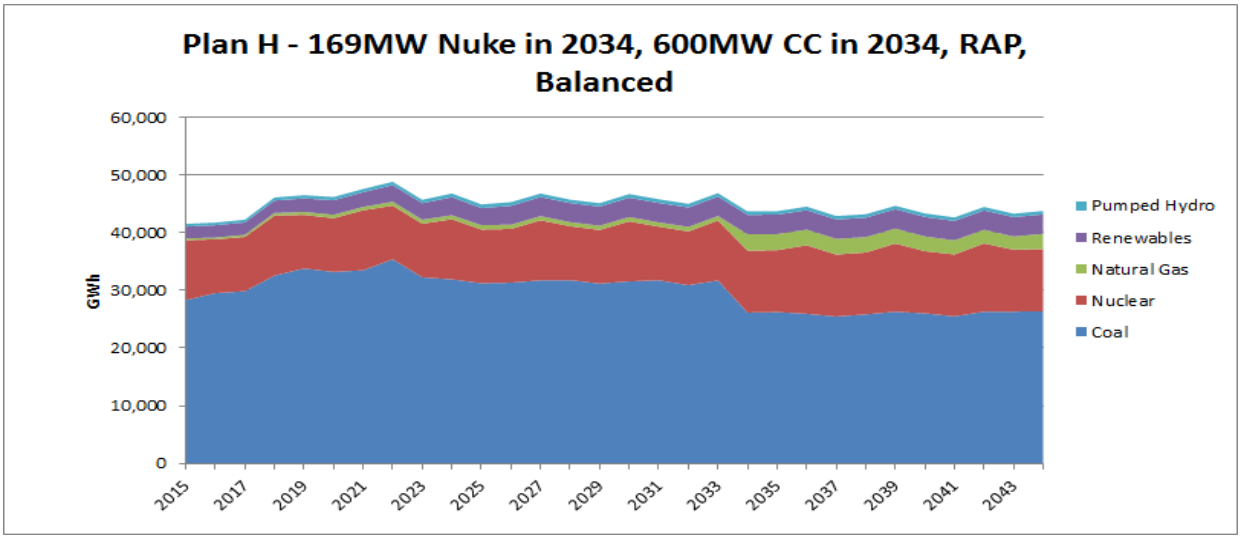
[22] 4 CSR 240-22.060(4)(B)6

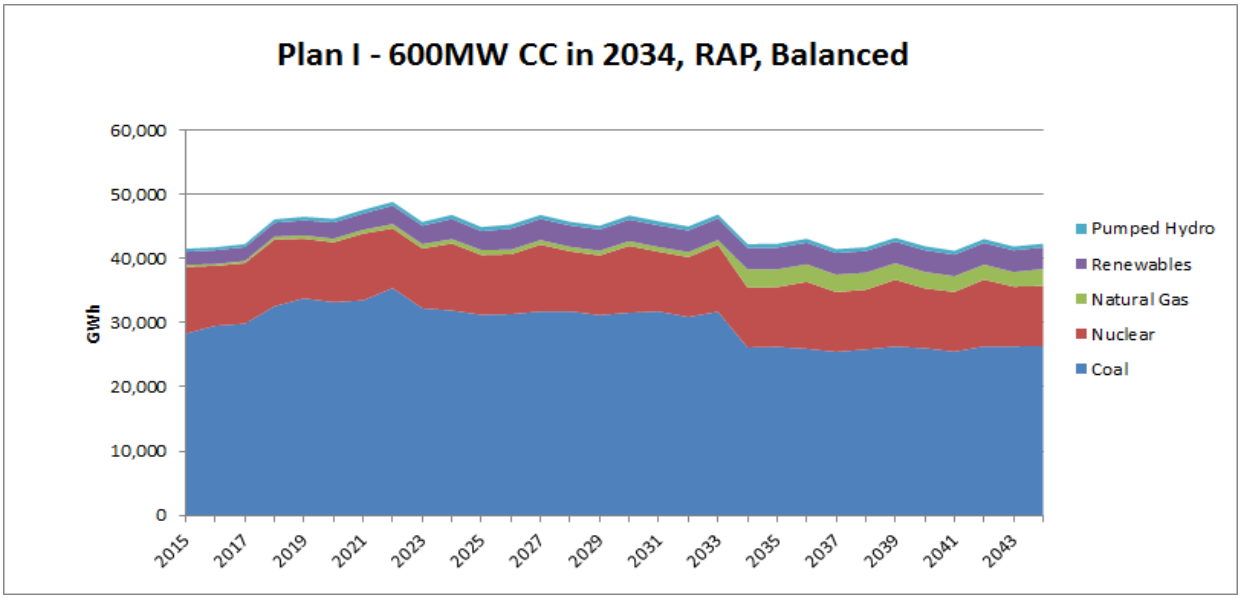

Plan D - 600MW Pumped Hydro in 2034, RAP, RES Compliance
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

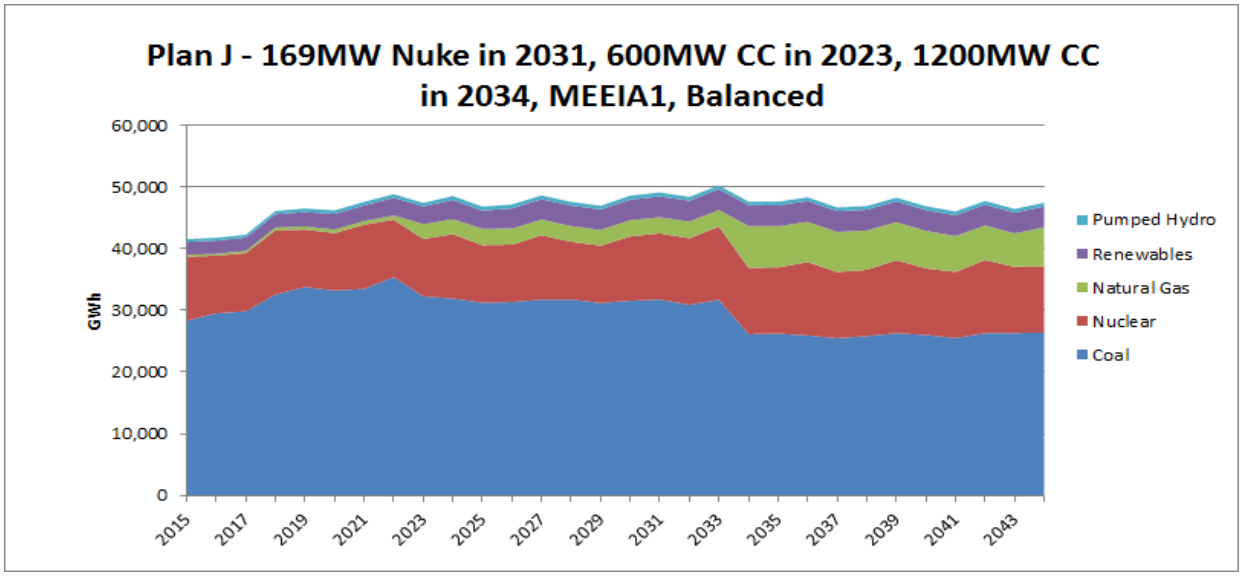

Plan E - 465MW Wind&SC in 2034, RAP, RES Compliance
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

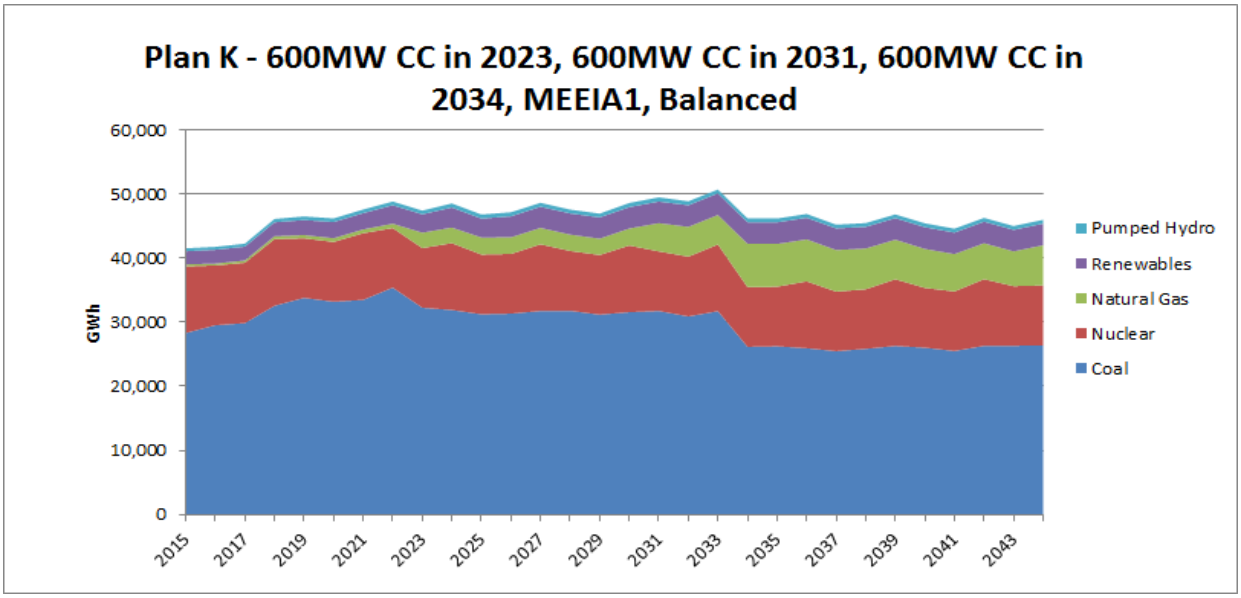

Plan F - 1200MW CC in 2034, RAP EE Only, RES Compliance
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

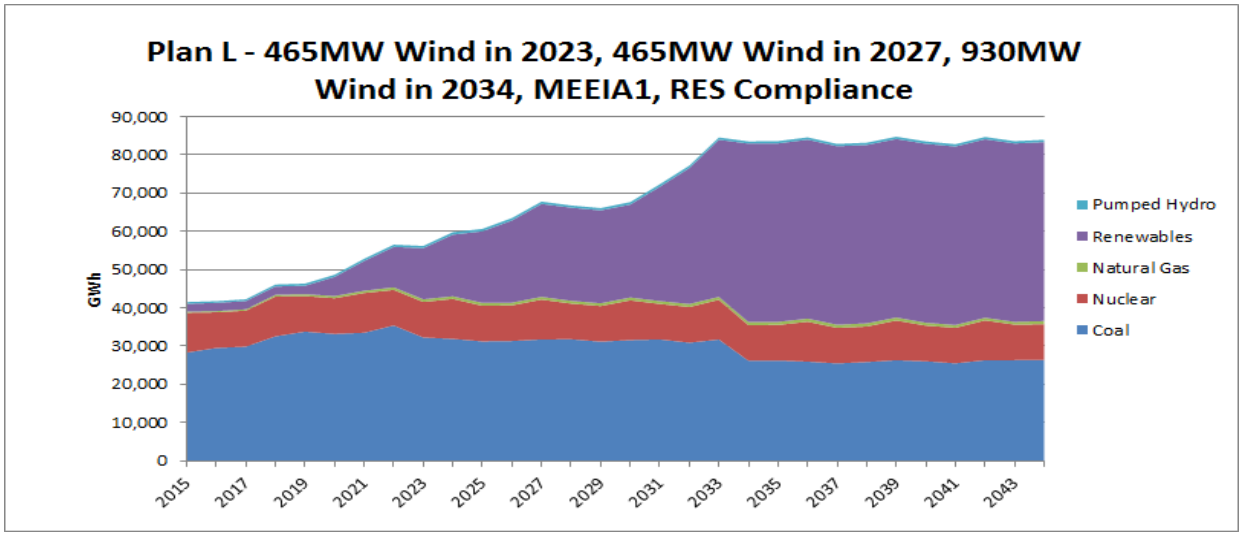

Plan G - 600MW CC in 2034, MAP, RES Compliance
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

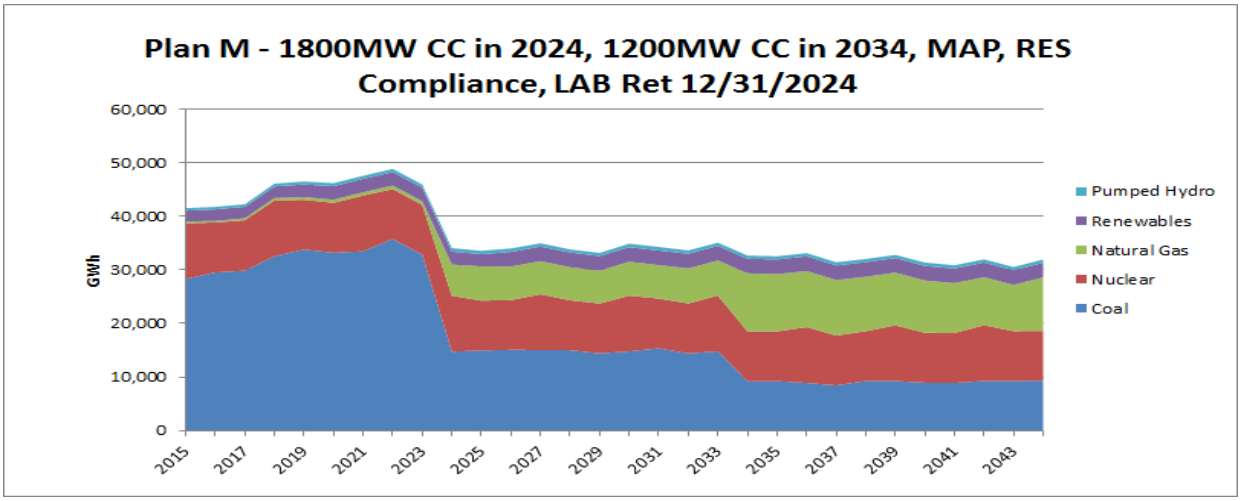

Plan H - 169MW Nuke in 2034, 600MW CC in 2034, RAP, Balanced
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

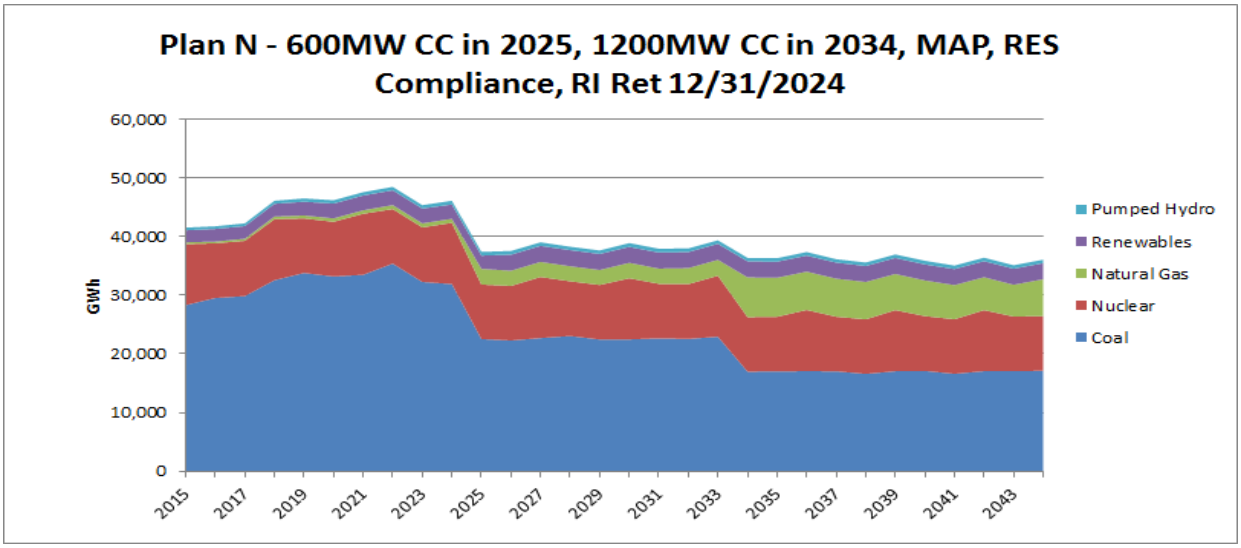

Plan I - 600MW CC in 2034, RAP, Balanced
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

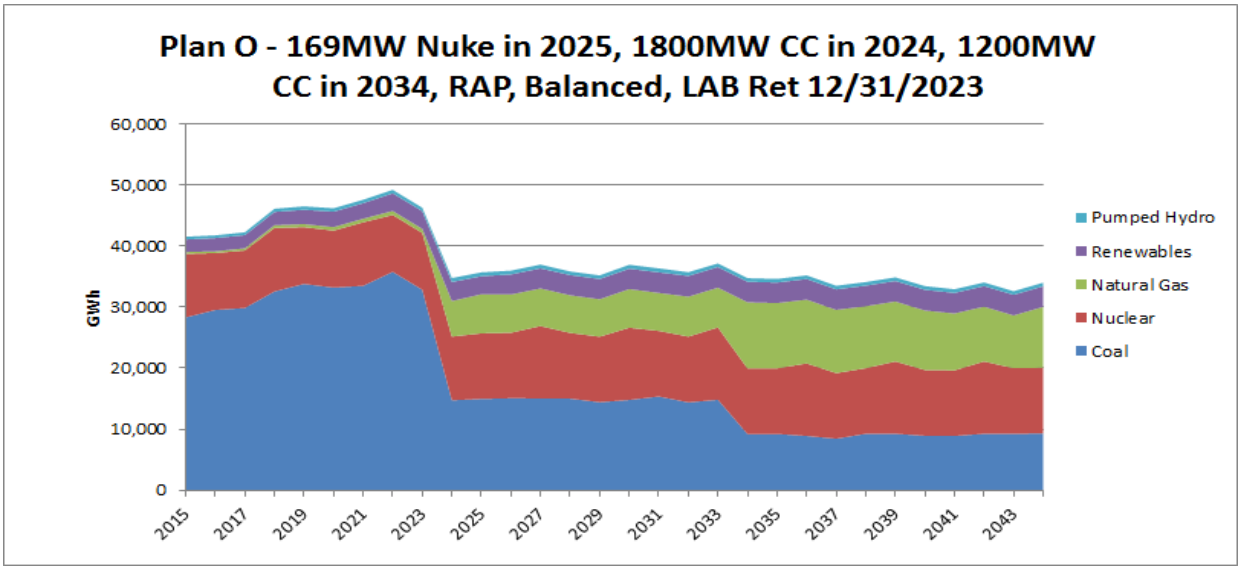

Plan J - 169MW Nuke in 2031, 600MW CC in 2023, 1200MW CC in 2034, MEEIA1, Balanced
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

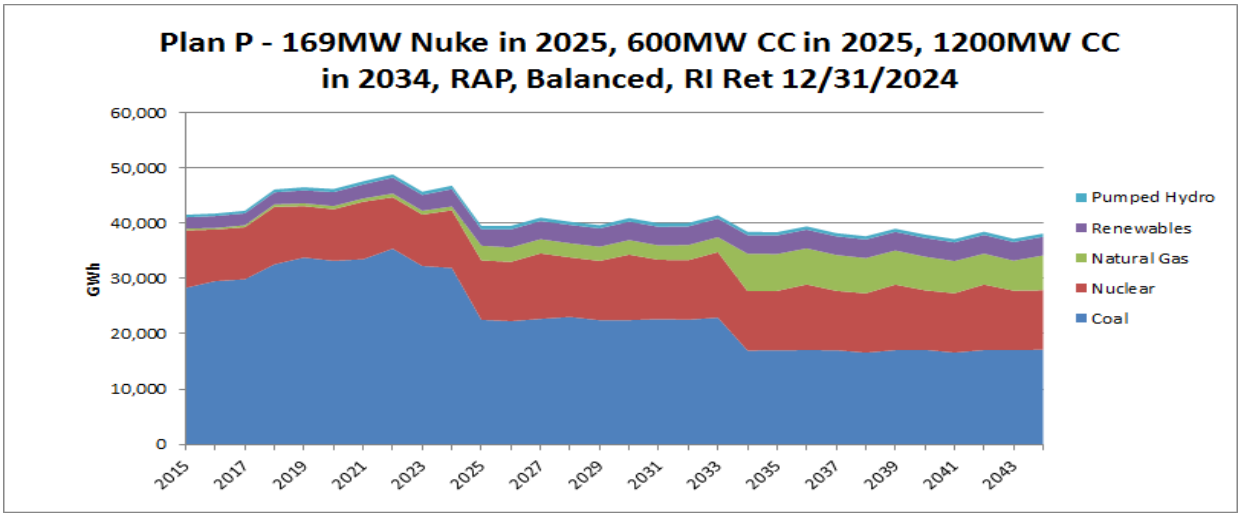

Plan K - 600MW CC in 2023, 600MW CC in 2031, 600MW CC in 2034, MEEIA1, Balanced
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

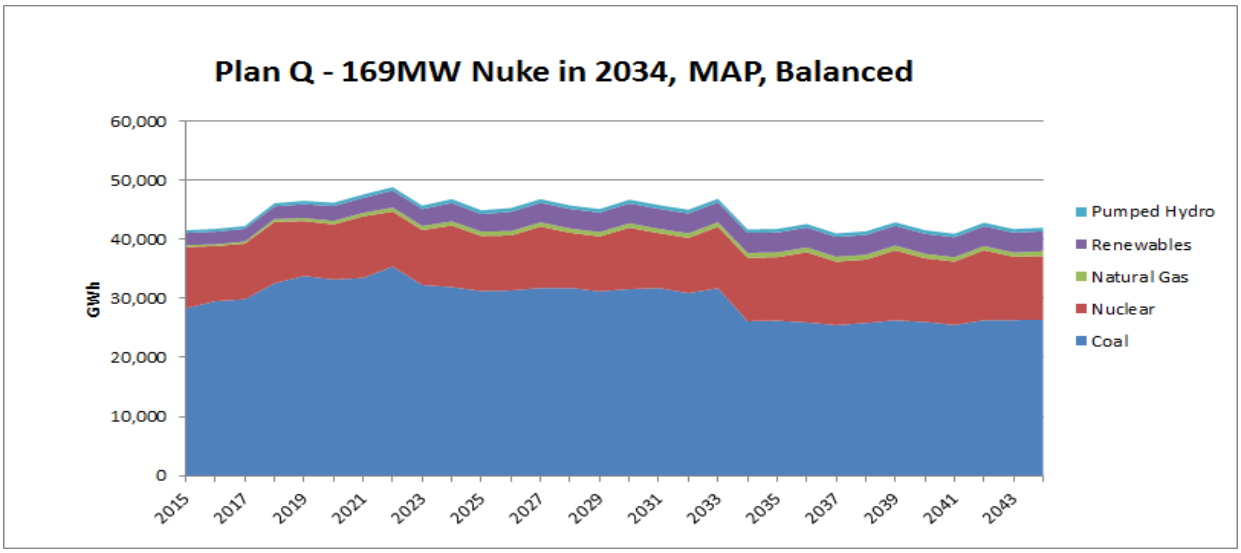

Plan L - 465MW Wind in 2023, 465MW Wind in 2027, 930MW Wind in 2034, MEEIA1, RES Compliance
GWh
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

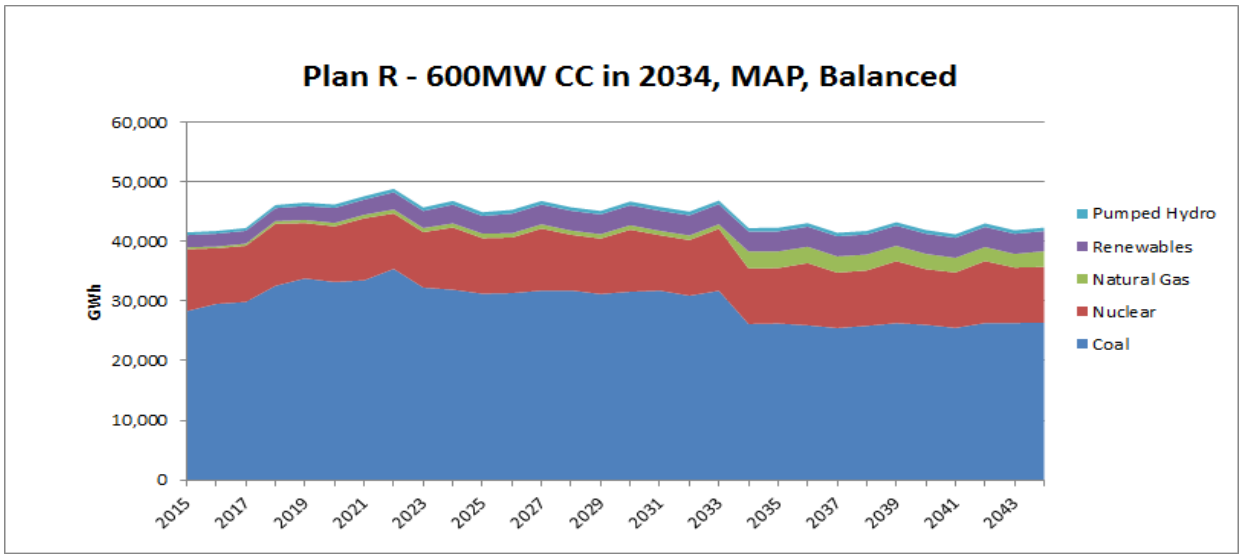

Plan M - 1800MW CC in 2024, 1200MW CC in 2034, MAP, RES Compliance, LAB Ret 12/31/2024
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal


Plan N - 600MW CC in 2025, 1200MW CC in 2034, MAP, RES Compliance, RI Ret 12/31/2024
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal


Plan O - 169MW Nuke in 2025, 1800MW CC in 2024, 1200MW CC in 2034, RAP, Balanced, LAB Ret 12/31/2023
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal


Plan P - 169MW Nuke in 2025, 600MW CC in 2025, 1200MW CC in 2034, RAP, Balanced, RI Ret 12/31/2024
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal


Plan Q - 169MW Nuke in 2034, MAP, Balanced
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal


Plan R - 600MW CC in 2034, MAP, Balanced
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

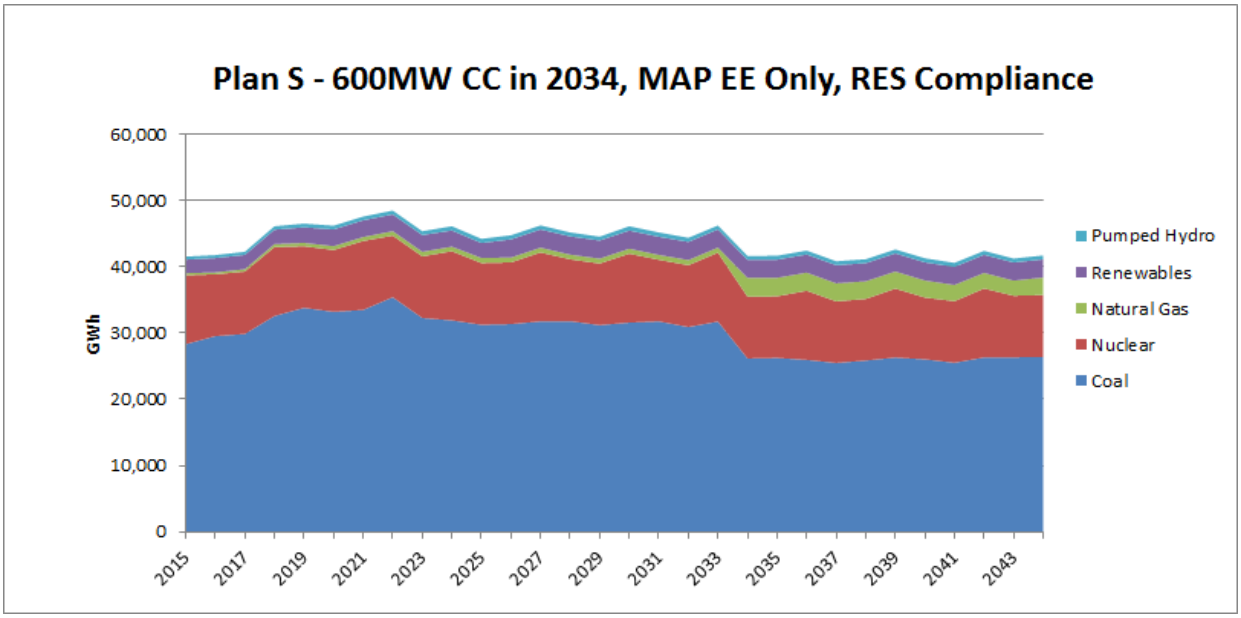
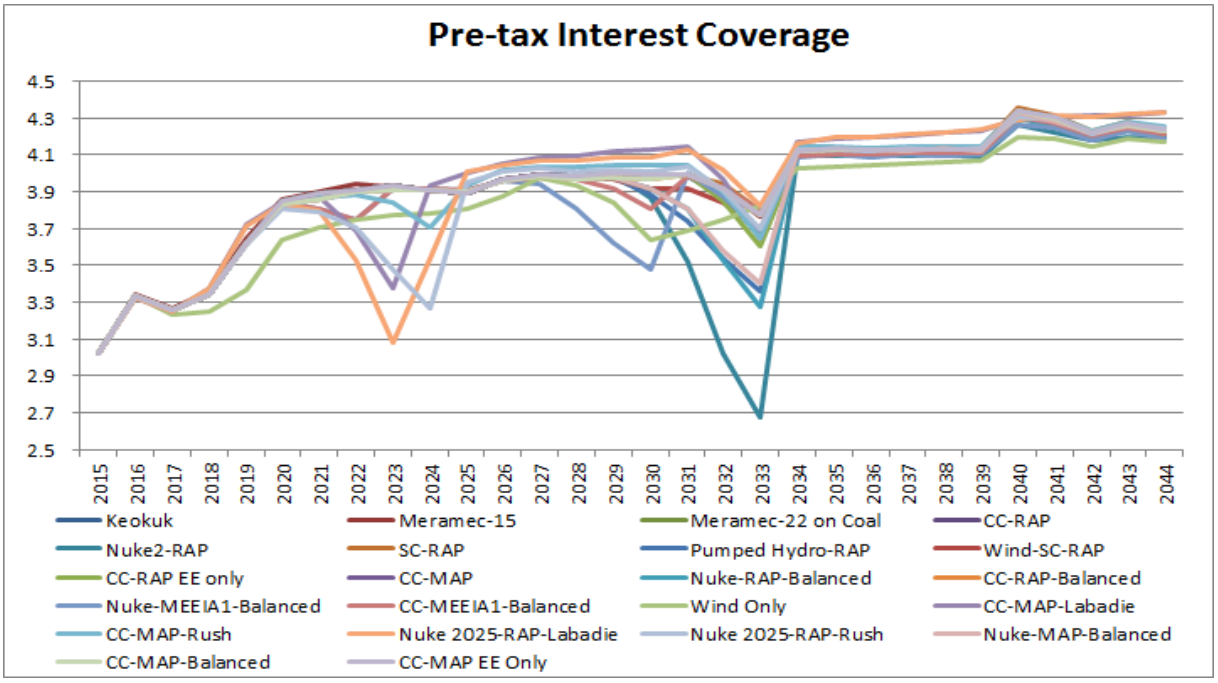

Plan S - 600MW CC in 2034, MAP EE Only, RES Compliance
GWh
60,000
50,000
40,000
30,000
20,000
10,000
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
Pumped Hydro
Renewables
Natural Gas
Nuclear
Coal

Figure 9A.12 Financial Measures[23] **HC**



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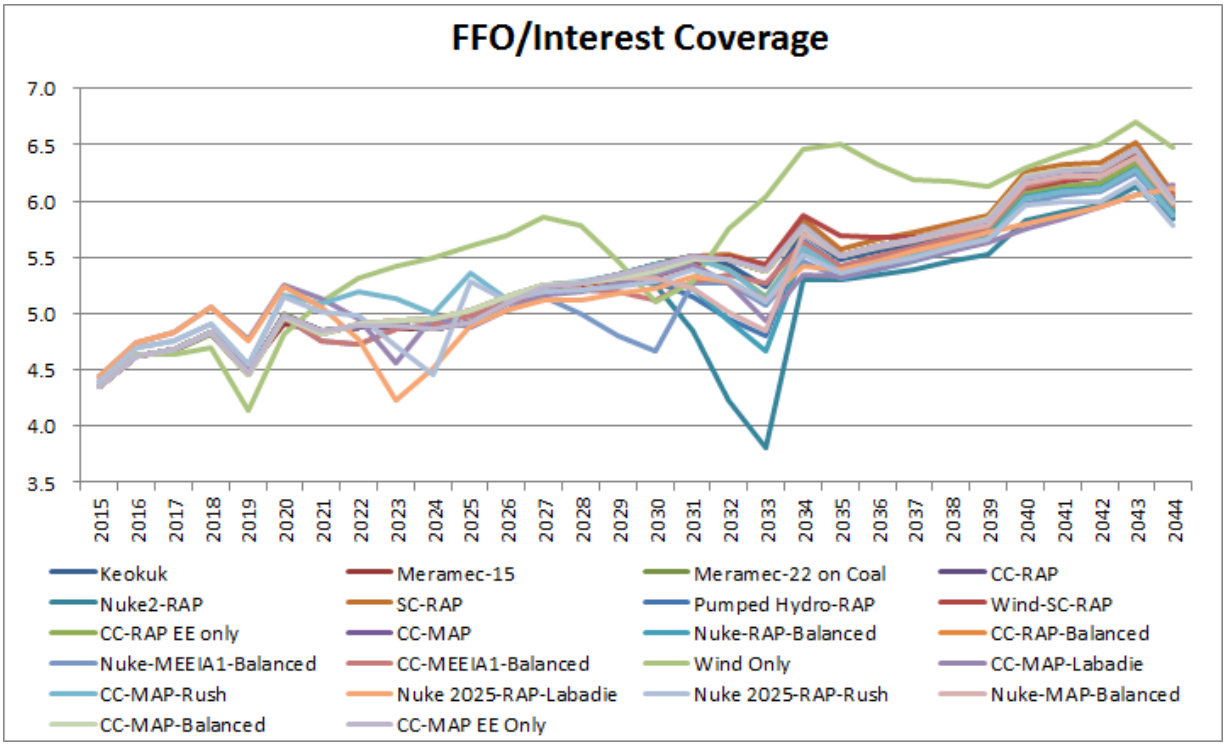
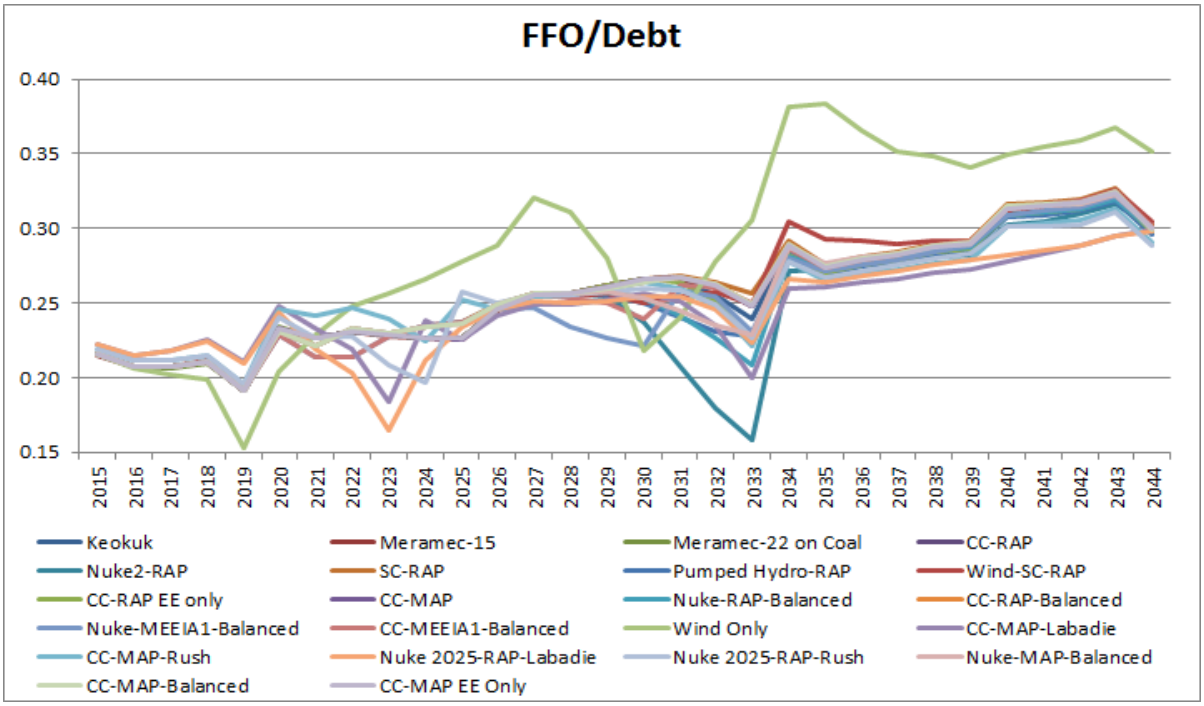
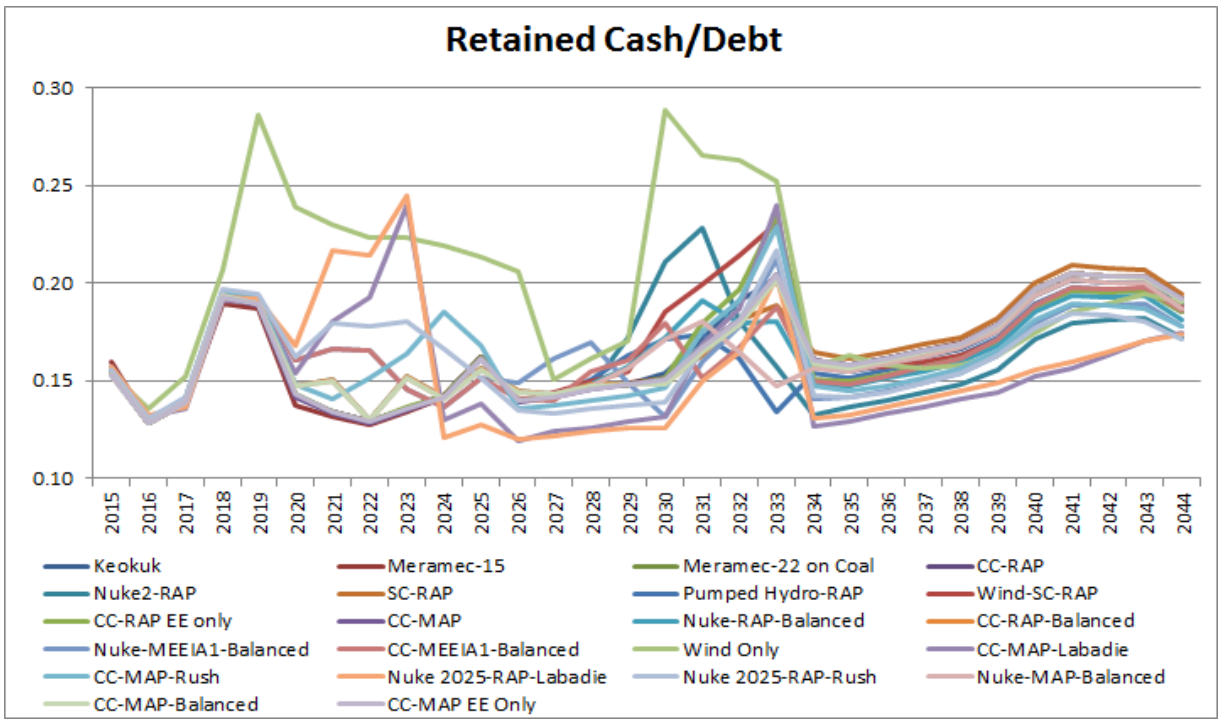


[23] 4 CSR 240-22.060(2)(A)6

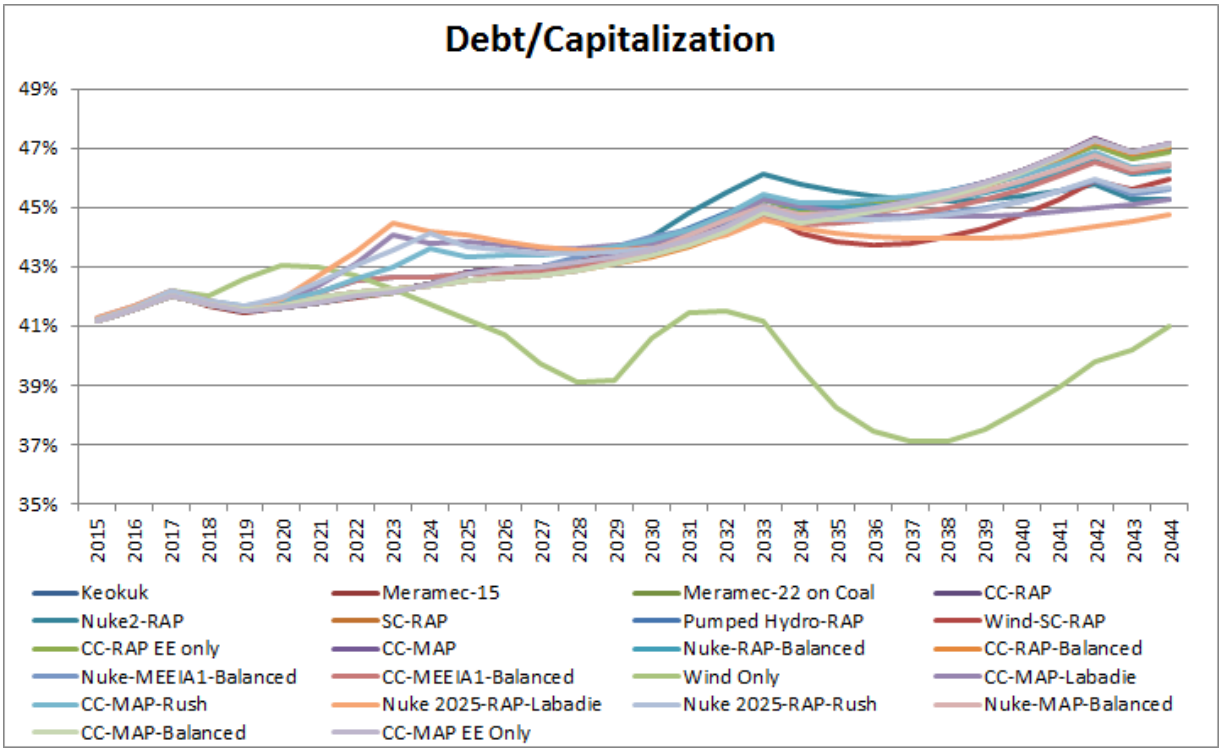
****HC****


FFO/Debt
0.40
0.35
0.30
0.25
0.20
0.15
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

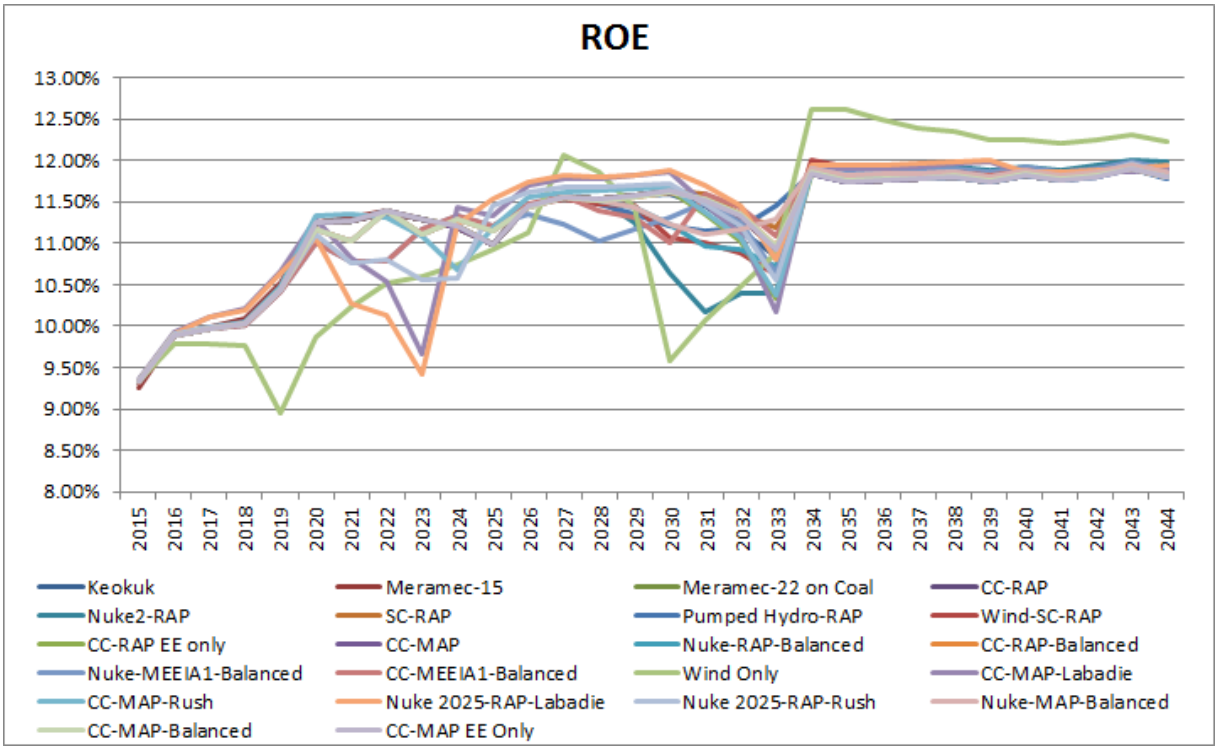
****HC****


Retained Cash/Debt
0.30
0.25
0.20
0.15
0.10
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

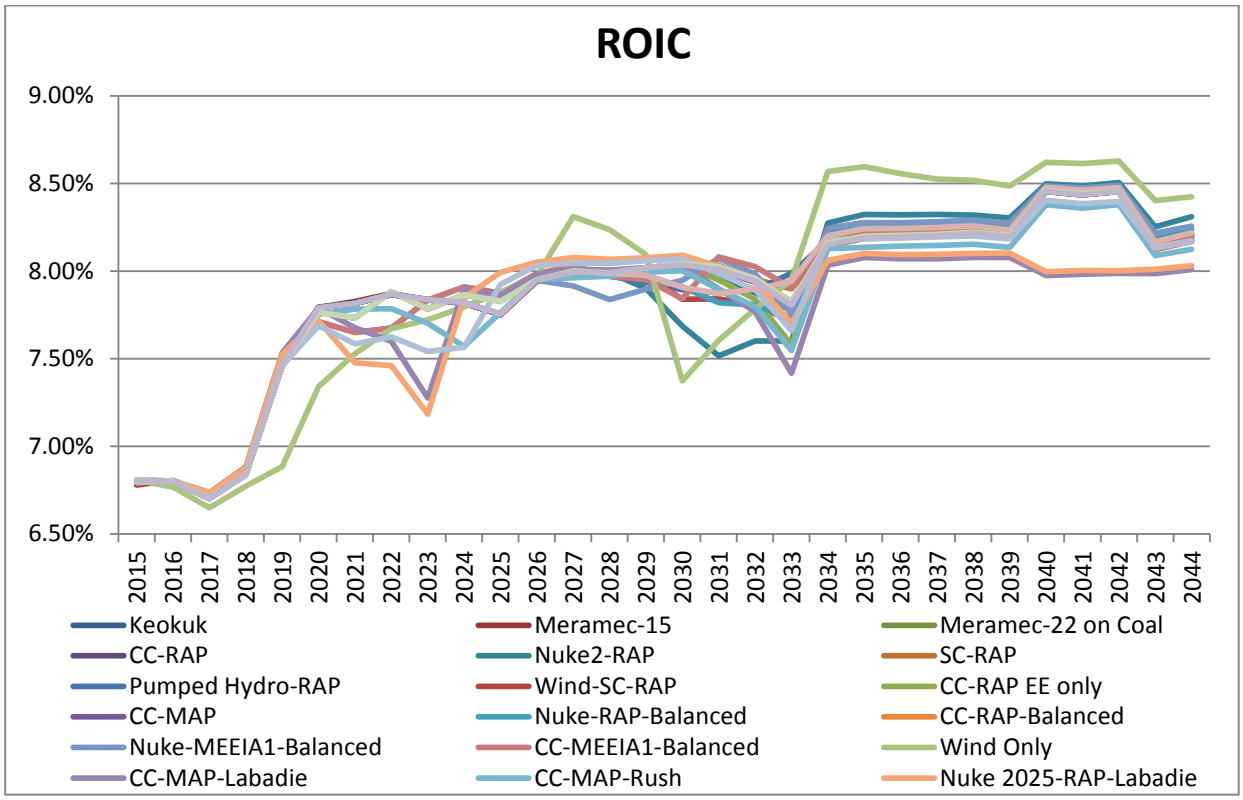
HC


Debt/Capitalization
49%
47%
45%
43%
41%
39%
37%
35%
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

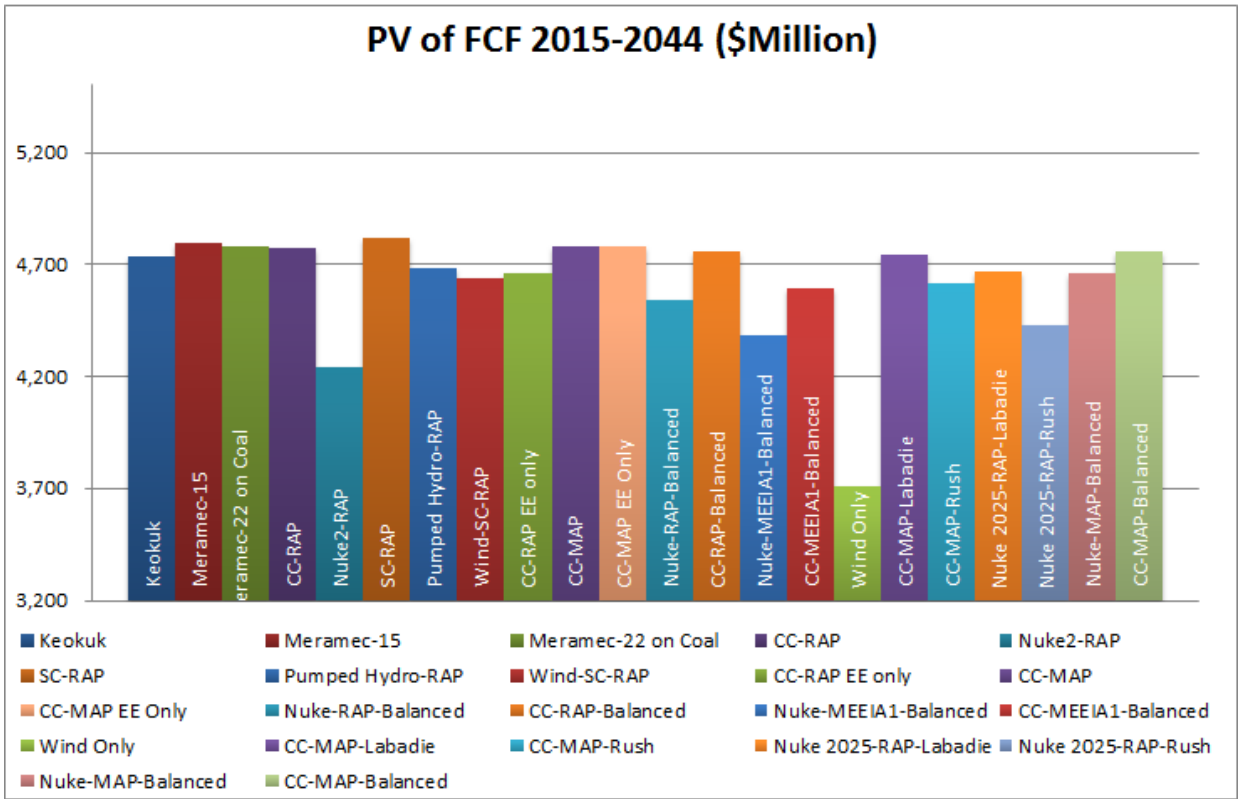
HC


ROE
13.00%
12.50%
12.00%
11.50%
11.00%
10.50%
10.00%
9.50%
9.00%
8.50%
8.00%
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

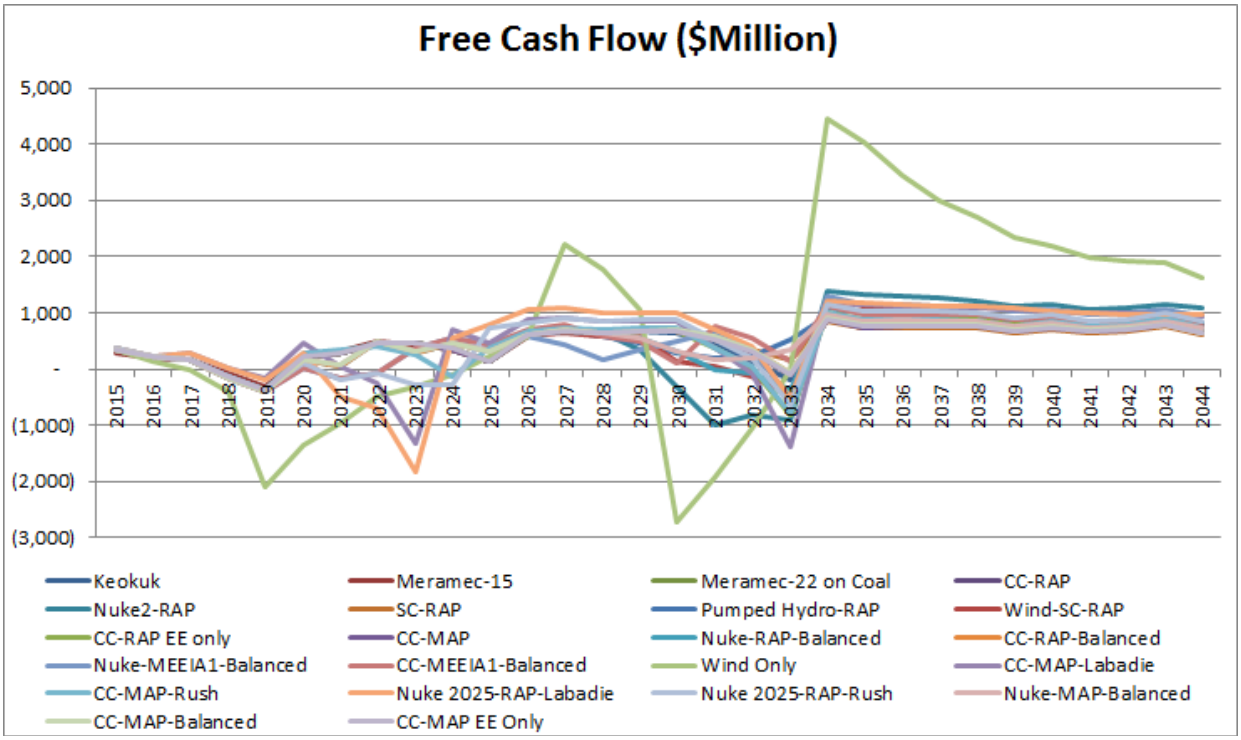
HC


ROIC
9.00%
8.50%
8.00%
7.50%
7.00%
6.50%
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie

**


PV of FCF 2015-2044 ($Million)
5,200
4,700
4,200
3,700
3,200
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
CC-MAP EE Only
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced

HC


Free Cash Flow ($Million)
5,000
4,000
3,000
2,000
1,000
-
(1,000)
(2,000)
(3,000)
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

HC

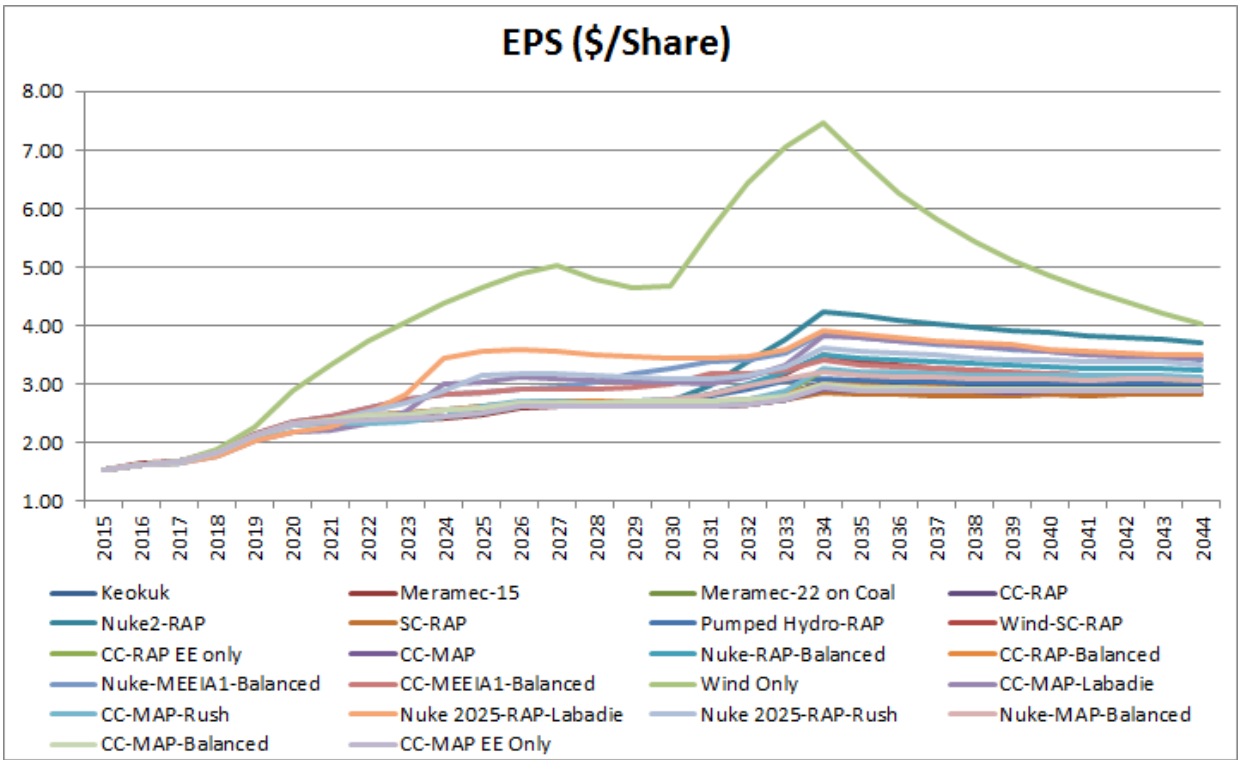
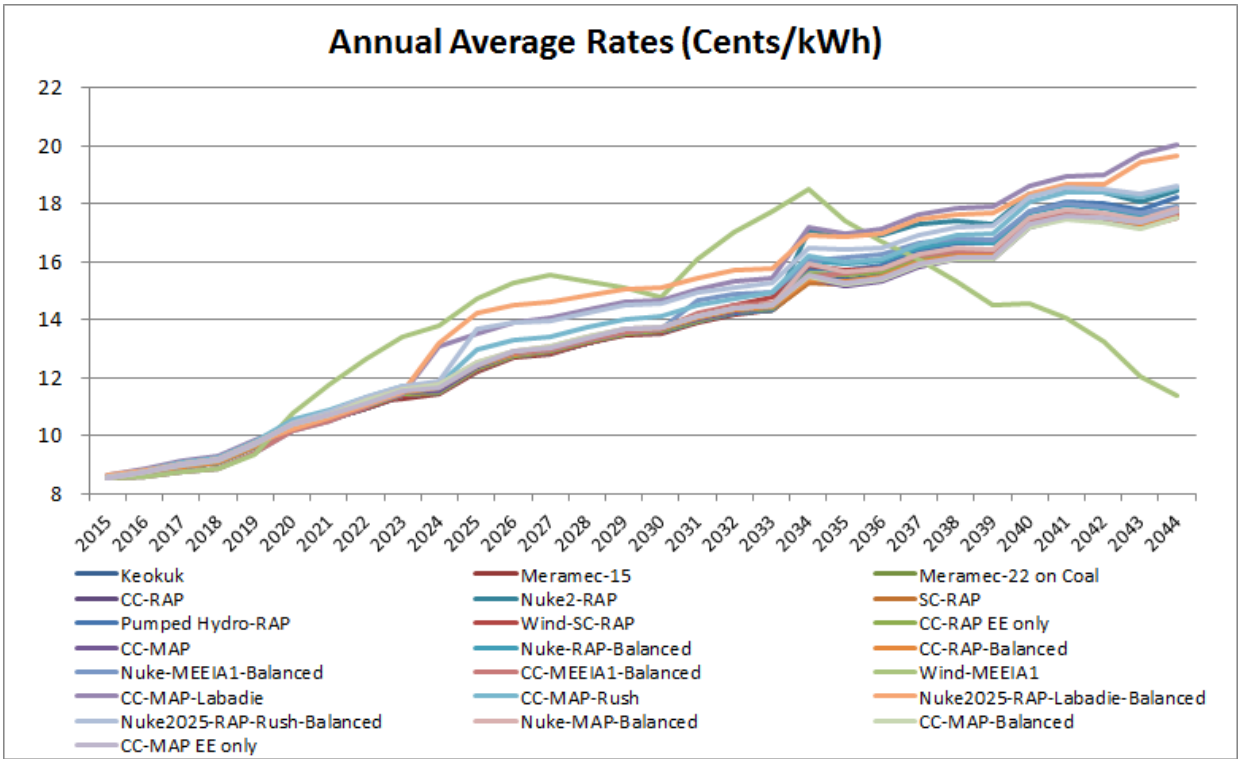

EPS ($/Share)
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

Figure 9A.13 Rates[24] **HC**



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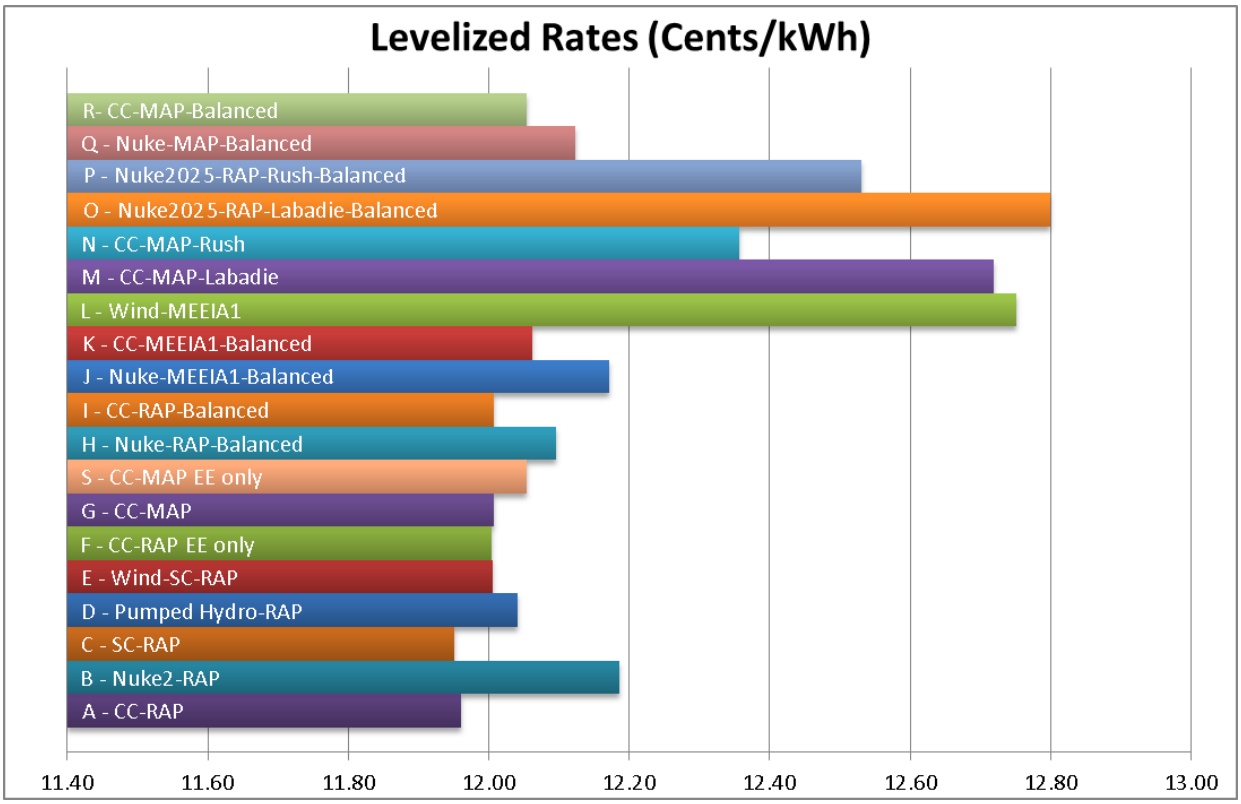


[24] 4 CSR 240-22.060(2)(A)4; 4 CSR 240-22.060(2)(A)5

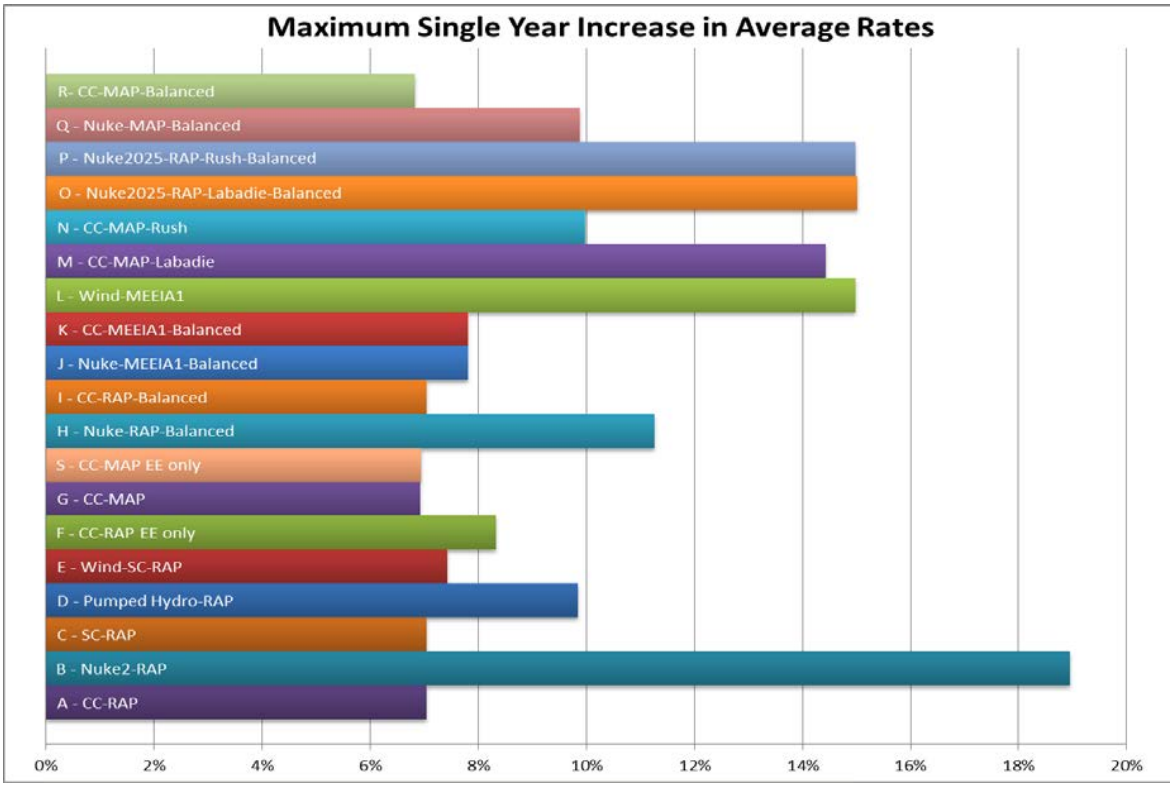
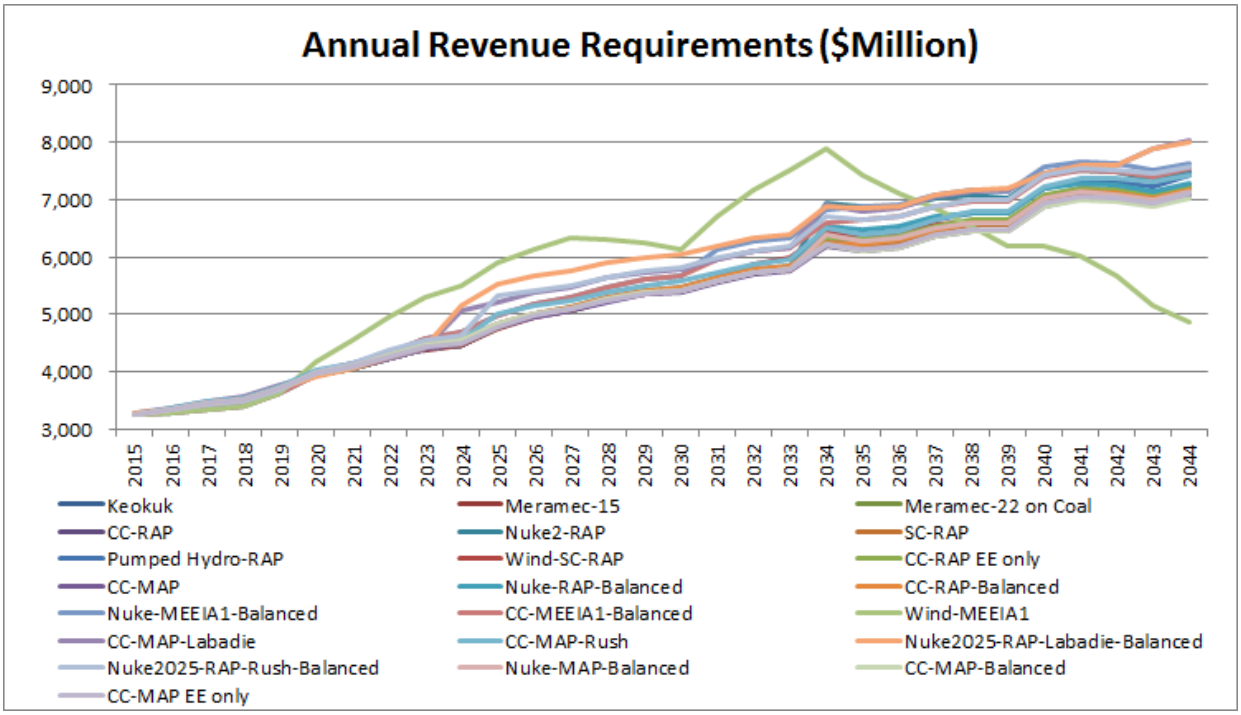
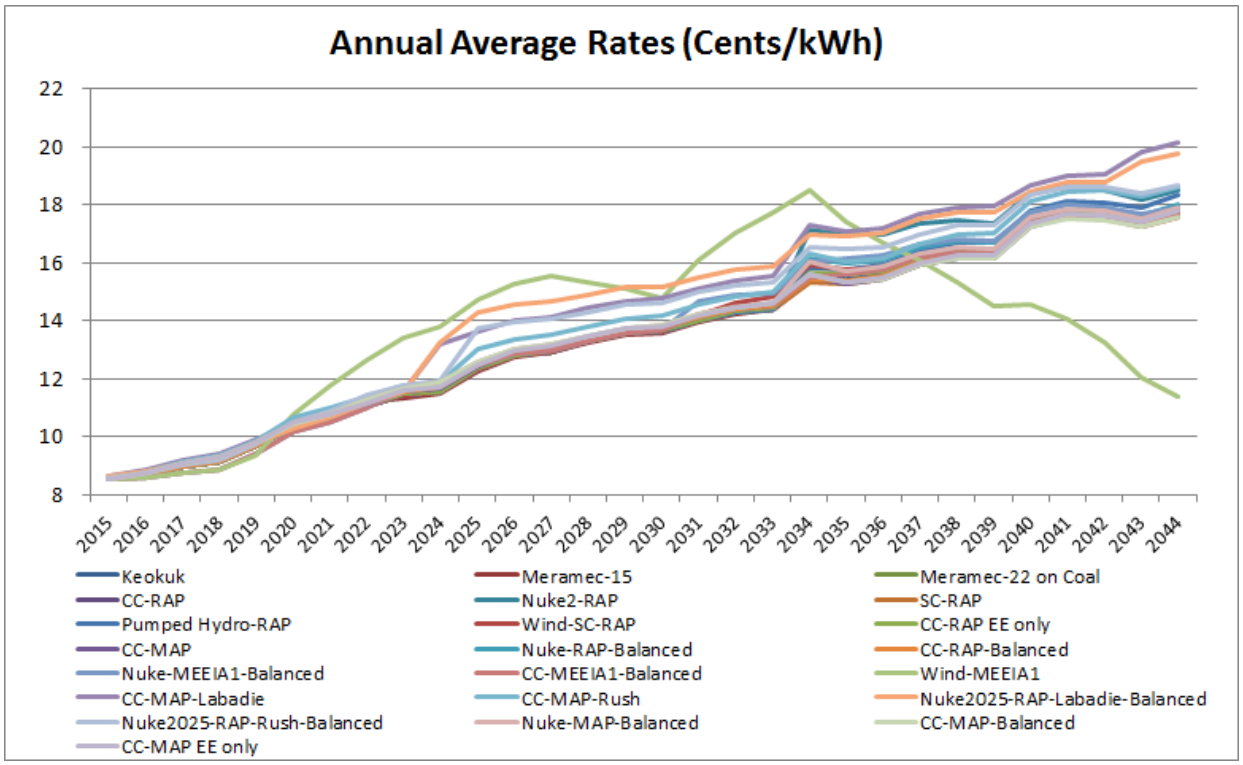


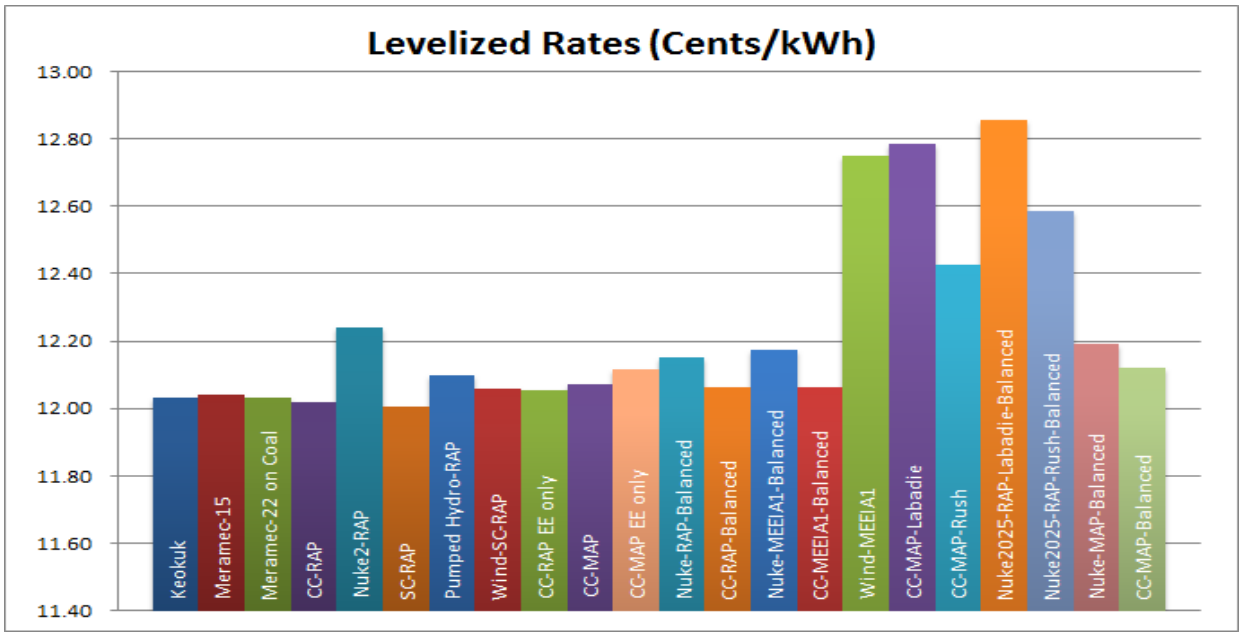
Figure 9A.14 Results with Financial Incentives for DSM[25] **HC**
Annual Revenue Requirements[26]



[25] 4 CSR 240-22.060(4)(C)
[26] 4 CSR 240-22.060(4)(C)1A

Annual Average Rates[27] **HC**

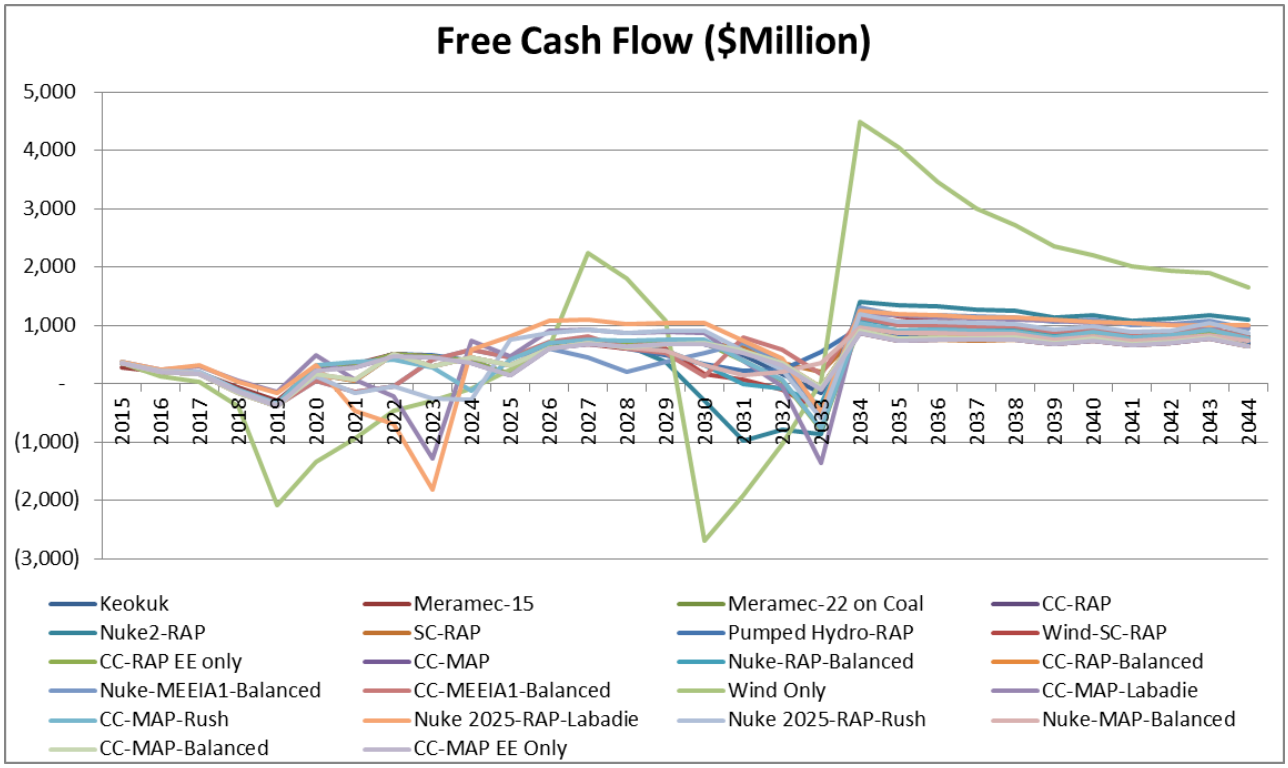




Tabulation for annual % increases in rates with and without financial incentives is provided in the workpapers.

[27] 4 CSR 240-22.060(4)(C)1B; 4 CSR 240-22.060(4)(C)1C

Free Cash Flows **HC**



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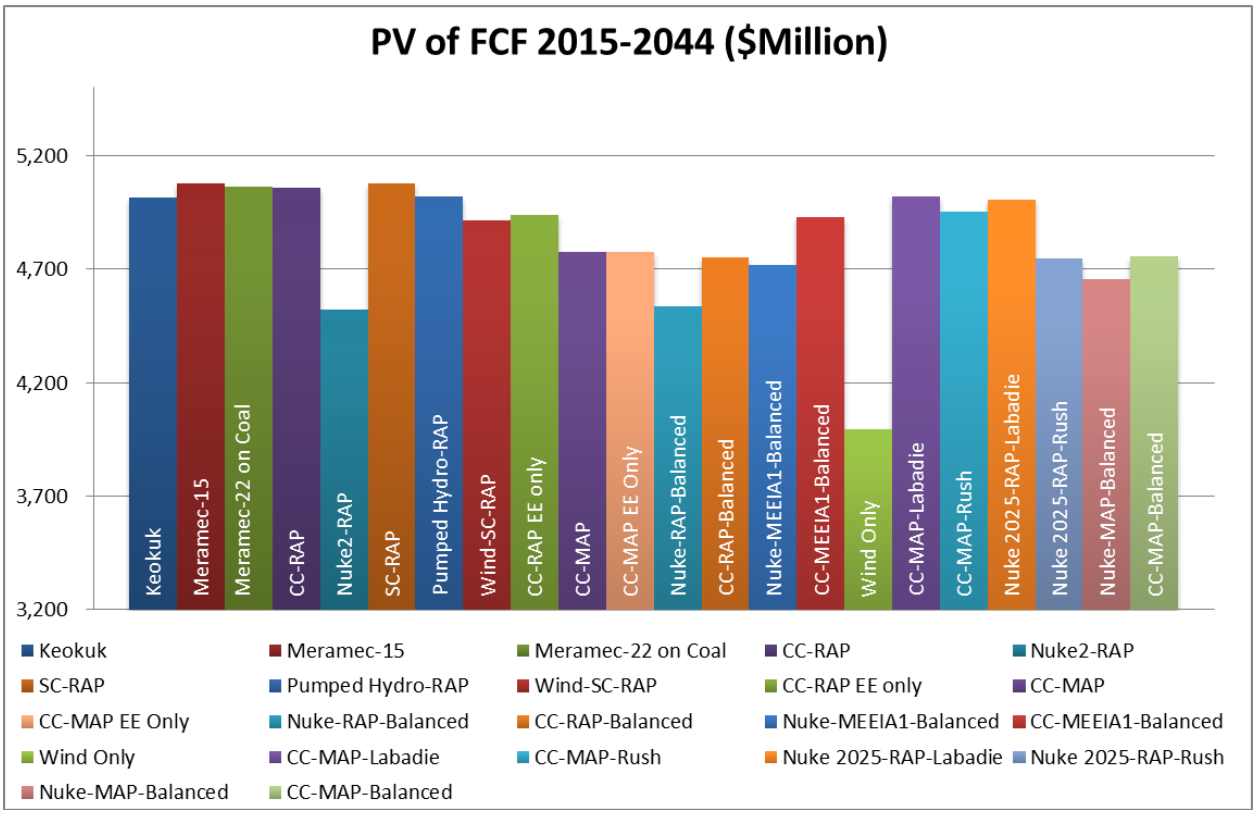
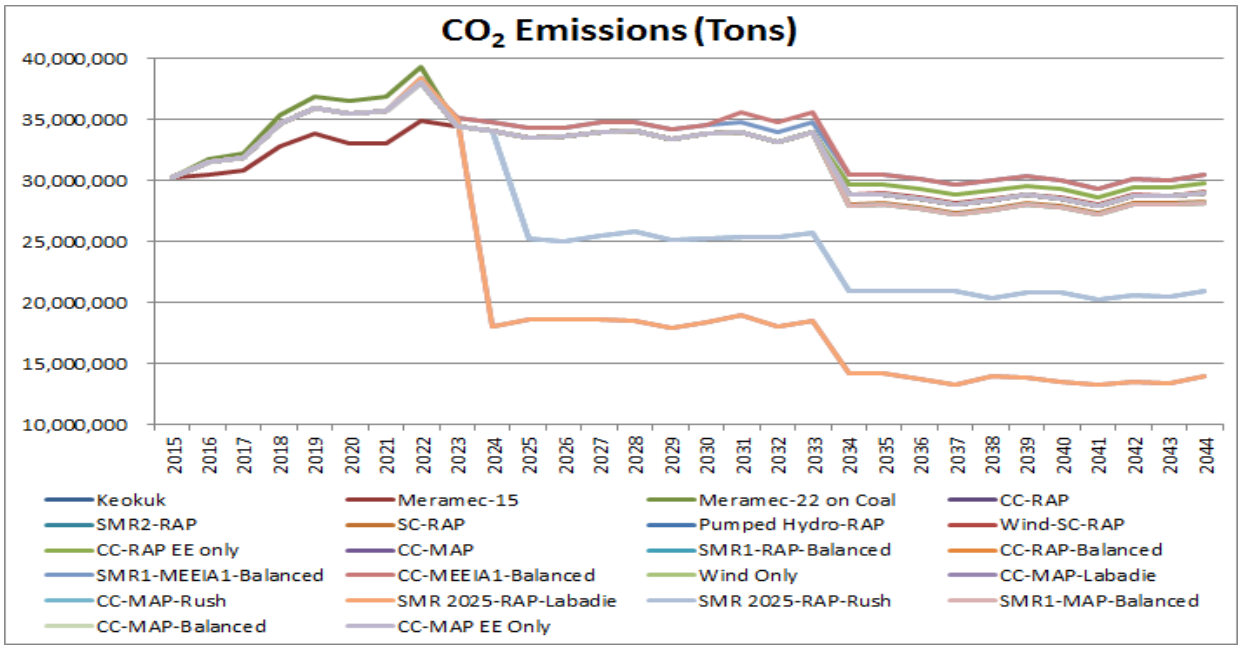
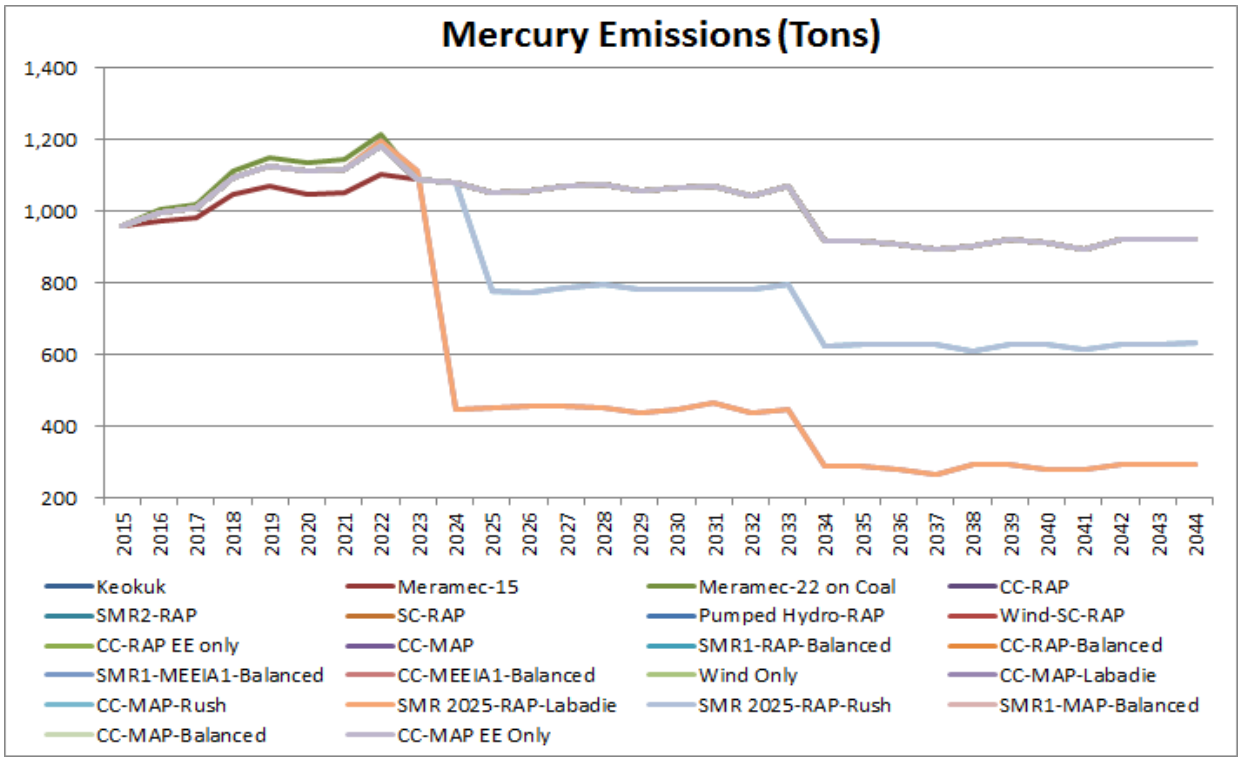
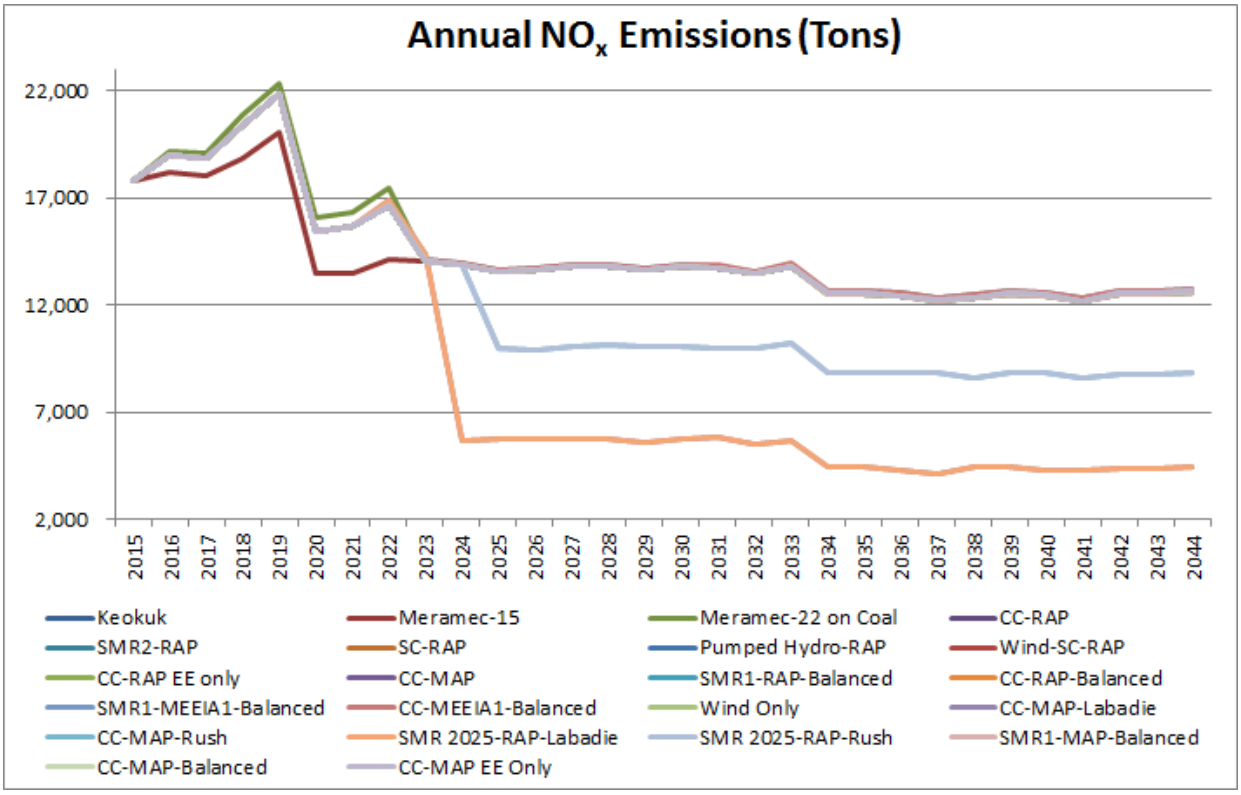


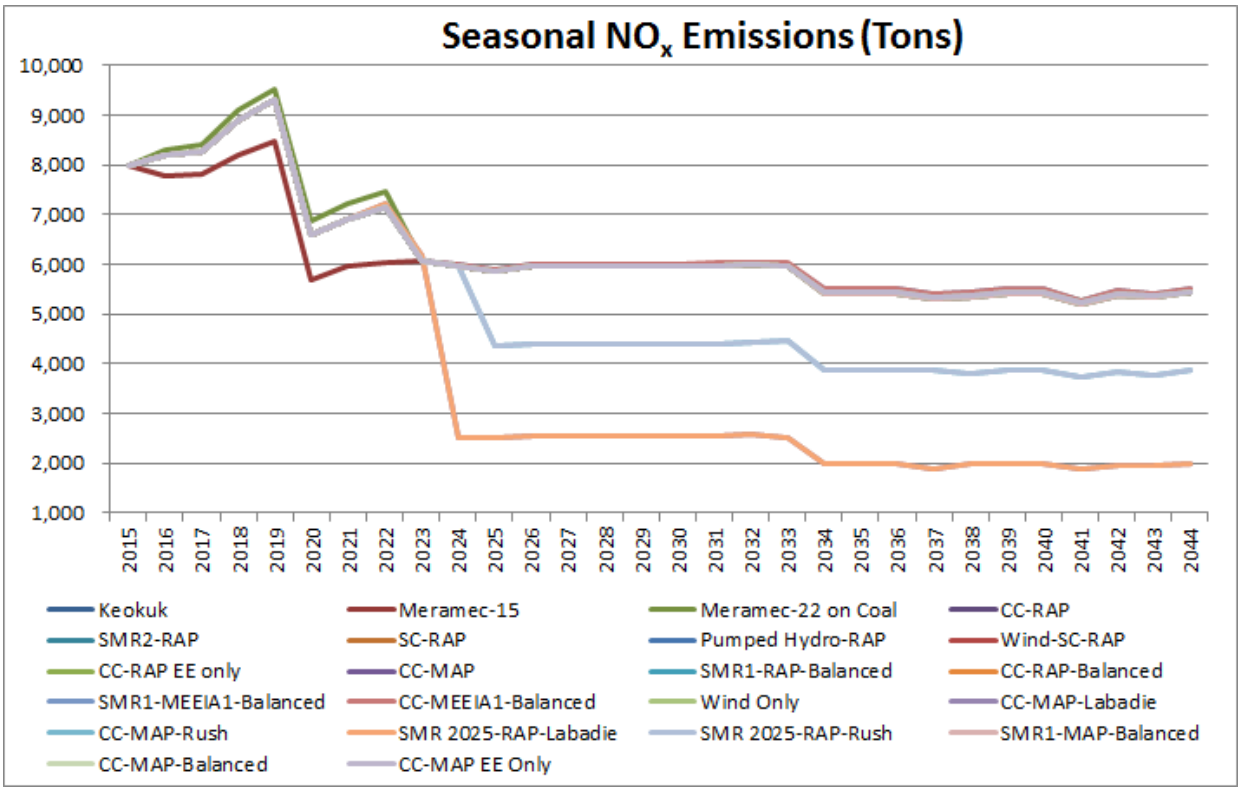
Figure 9A.15 Annual Emissions[28]





[28] 4 CSR 240-22.060(4)(B)7


Annual NOx Emissions (Tons)
22,000
17,000
12,000
7,000
2,000
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
SMR2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
SMR1-RAP-Balanced
CC-RAP-Balanced
SMR1-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
SMR 2025-RAP-Labadie
SMR 2025-RAP-Rush
SMR1-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only


Seasonal NOx Emissions (Tons)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
SMR2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
SMR1-RAP-Balanced
CC-RAP-Balanced
SMR1-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
SMR 2025-RAP-Labadie
SMR 2025-RAP-Rush
SMR1-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

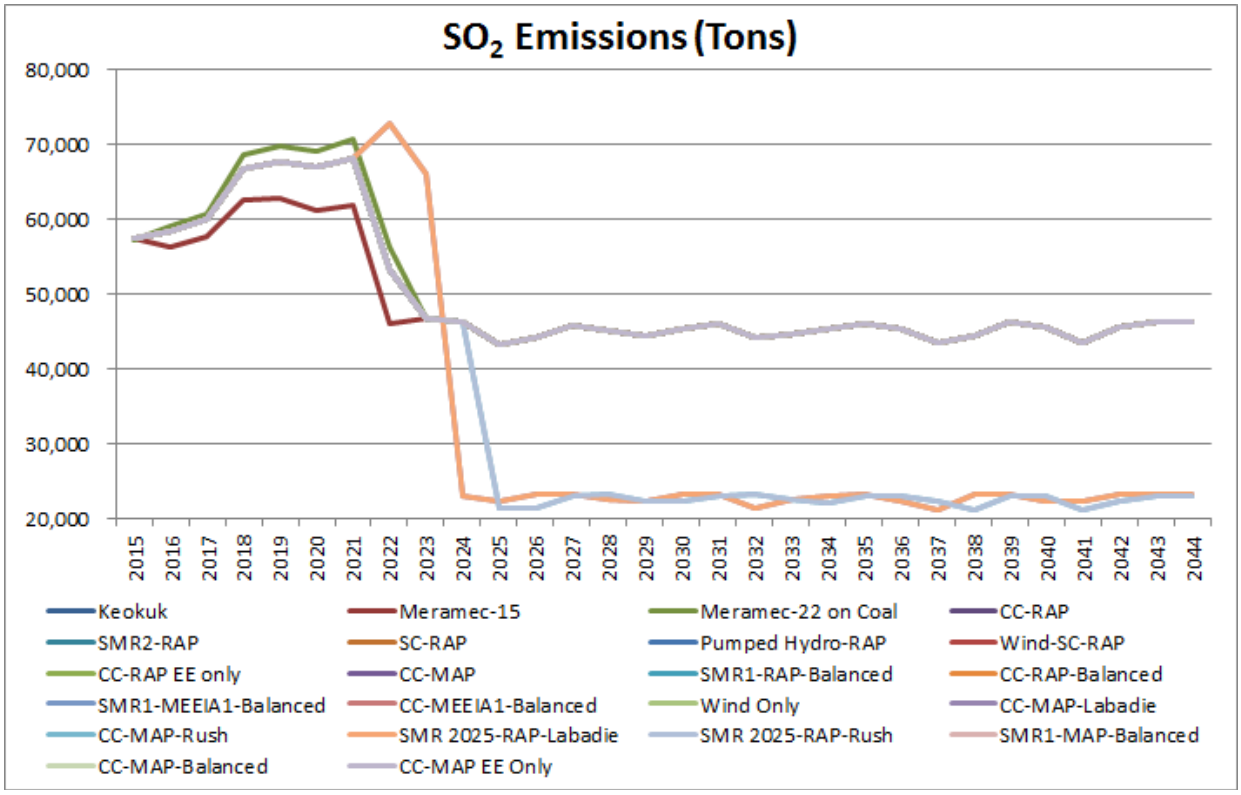
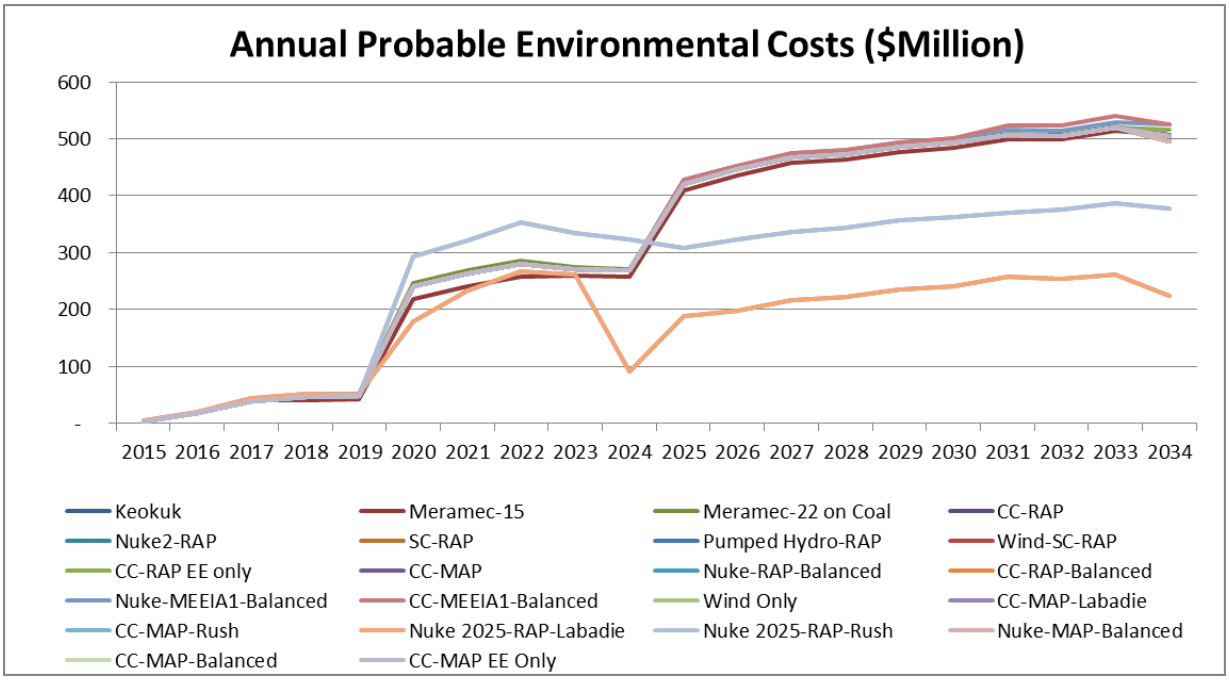

SO_2 Emissions (Tons)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
SMR2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
SMR1-RAP-Balanced
CC-RAP-Balanced
SMR1-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
SMR 2025-RAP-Labadie
SMR 2025-RAP-Rush
SMR1-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

Figure 9A.16 Probable Environmental Costs[29] **HC**



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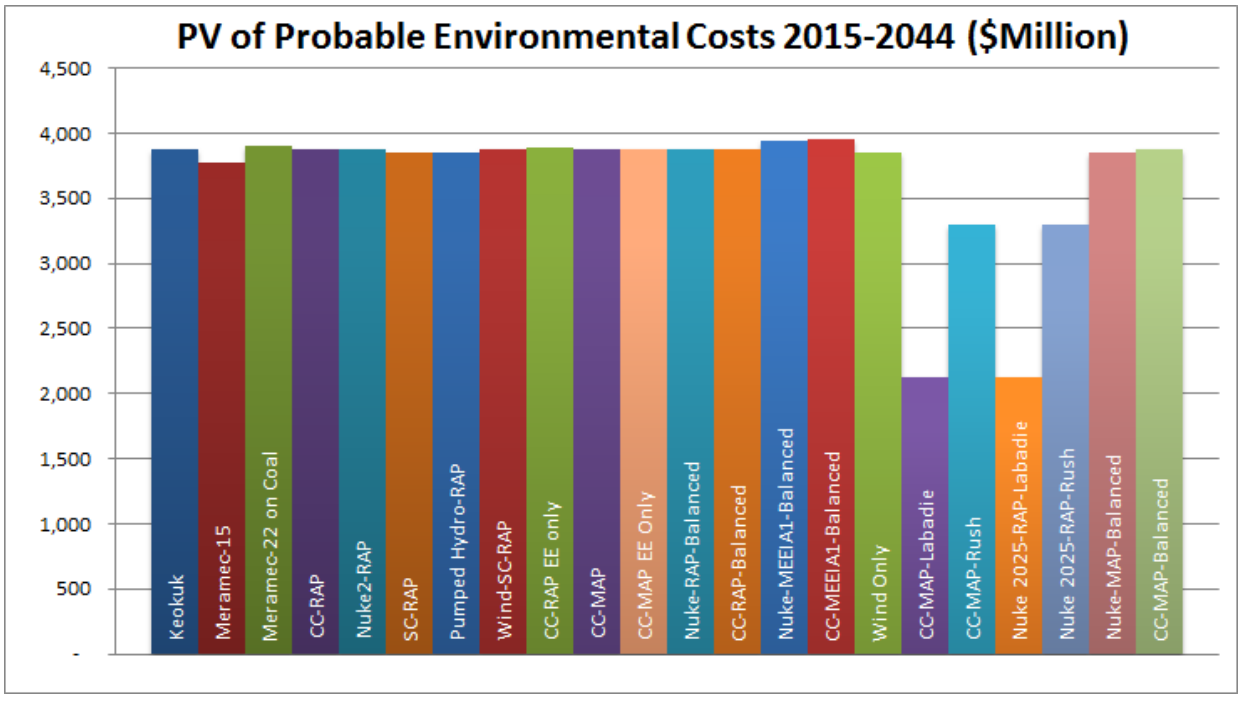
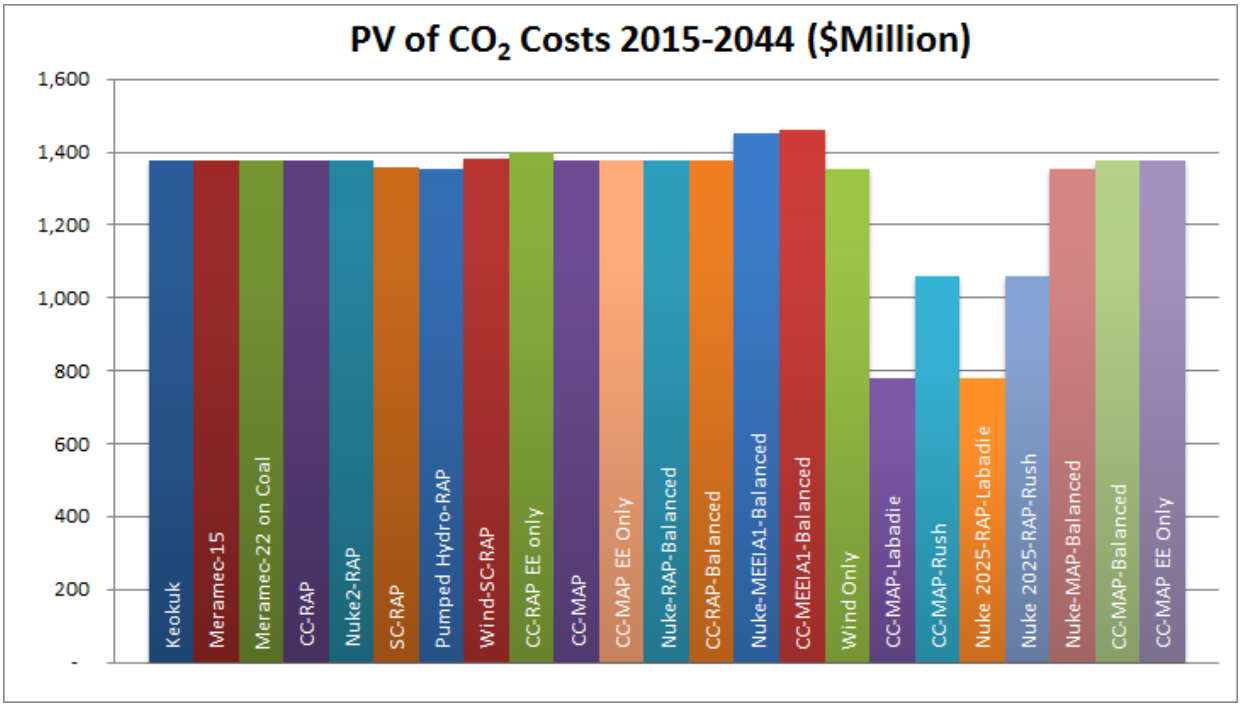
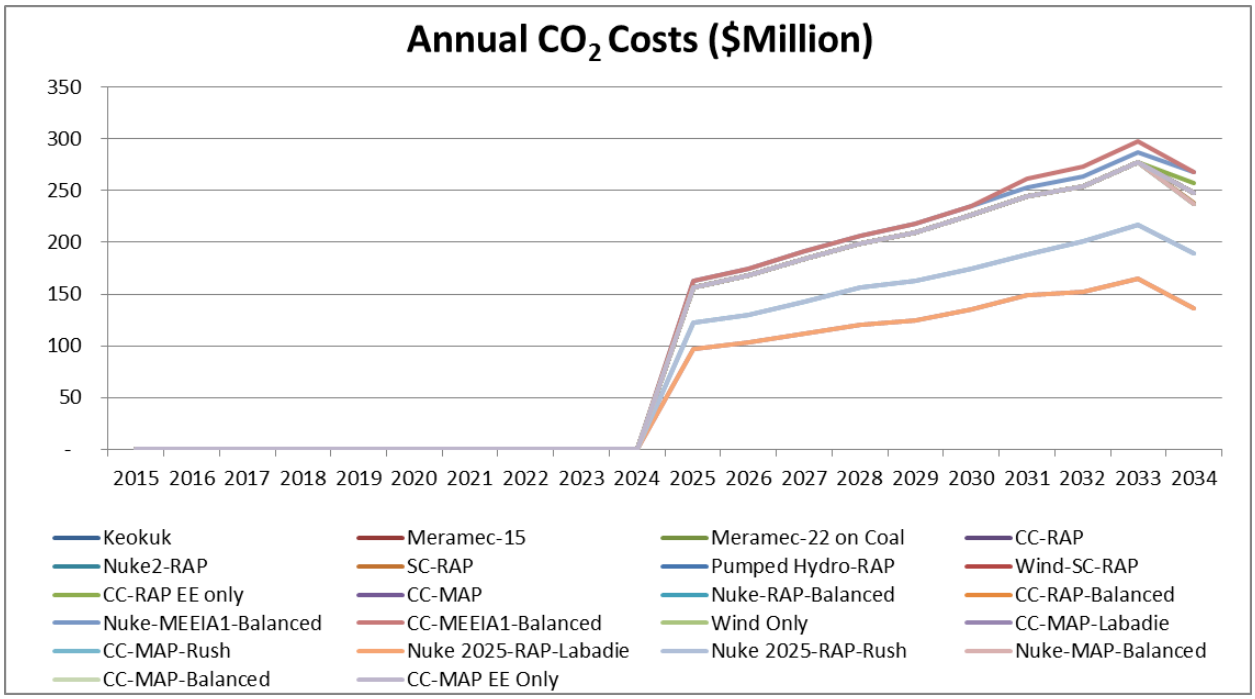


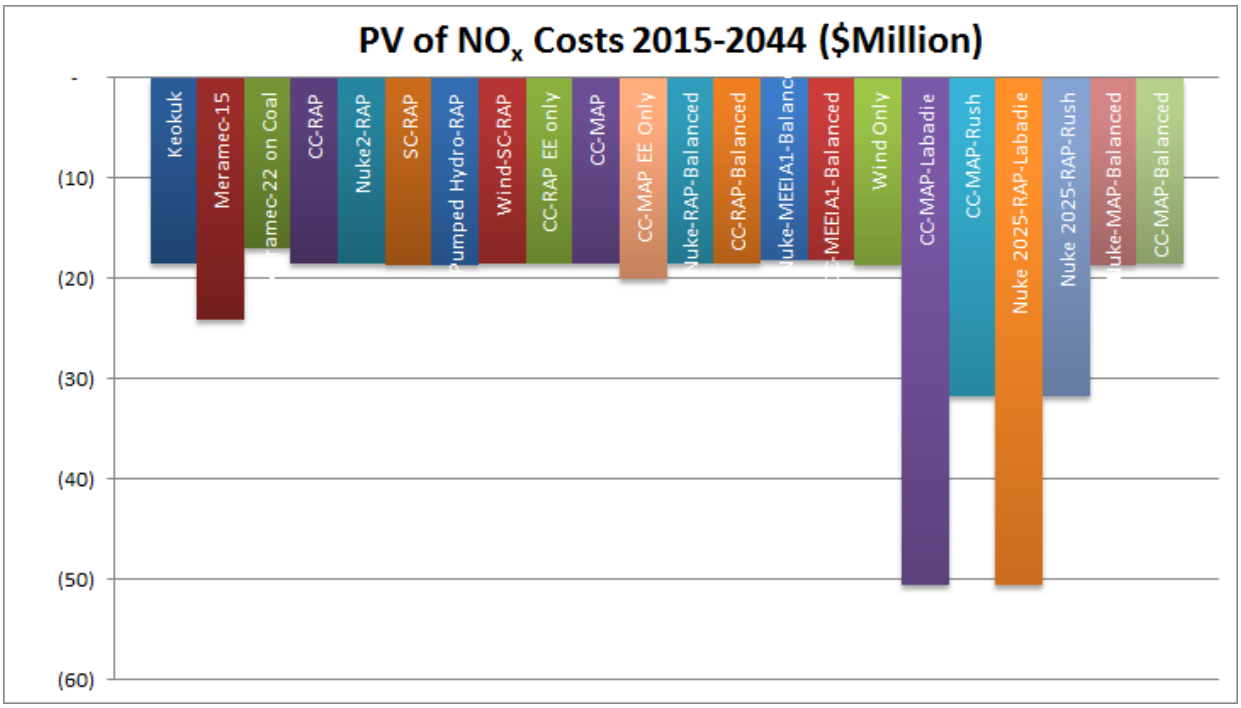
[29] 4 CSR 240-22.060(2)(A)2; 4 CSR 240-22.060(4)(B)8


PV of CO_2 Costs 2015-2044 ($Million)
1,600
1,400
1,200
1,000
800
600
400
200
-
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
CC-MAP EE Only
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

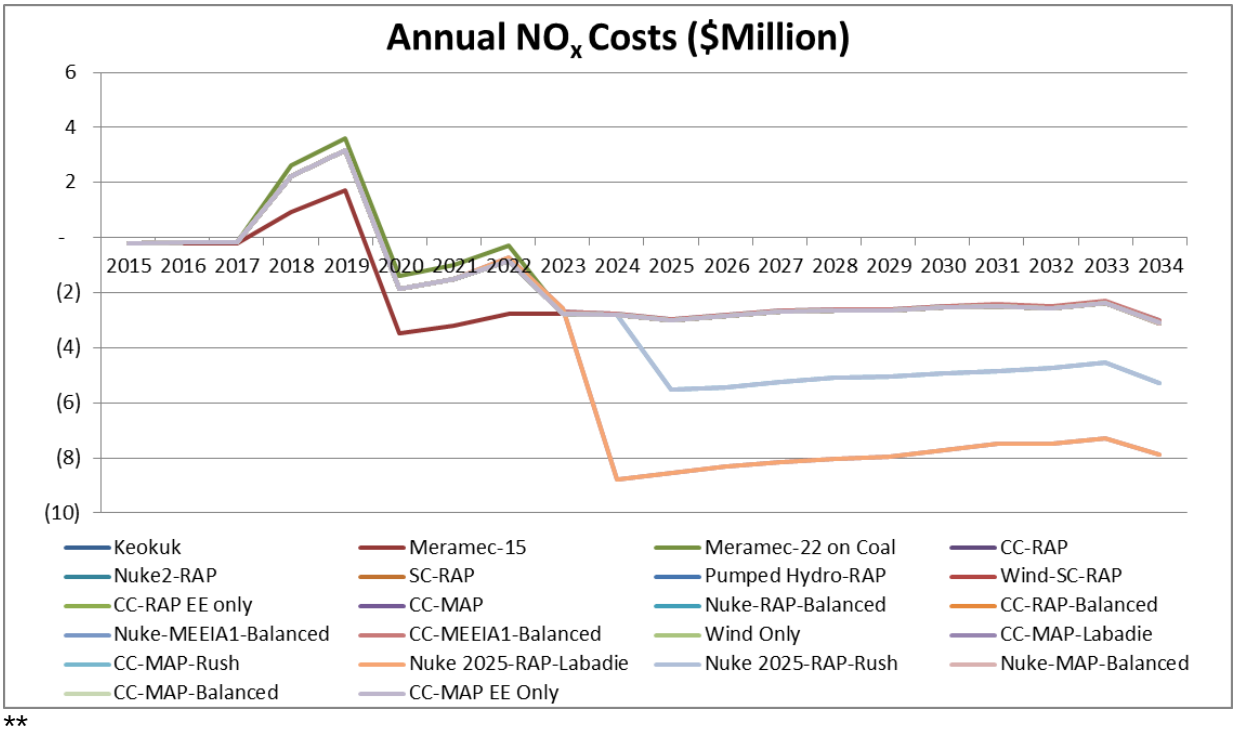
****HC****


Annual CO_2 Costs ($Million)
350
300
250
200
150
100
50
-
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

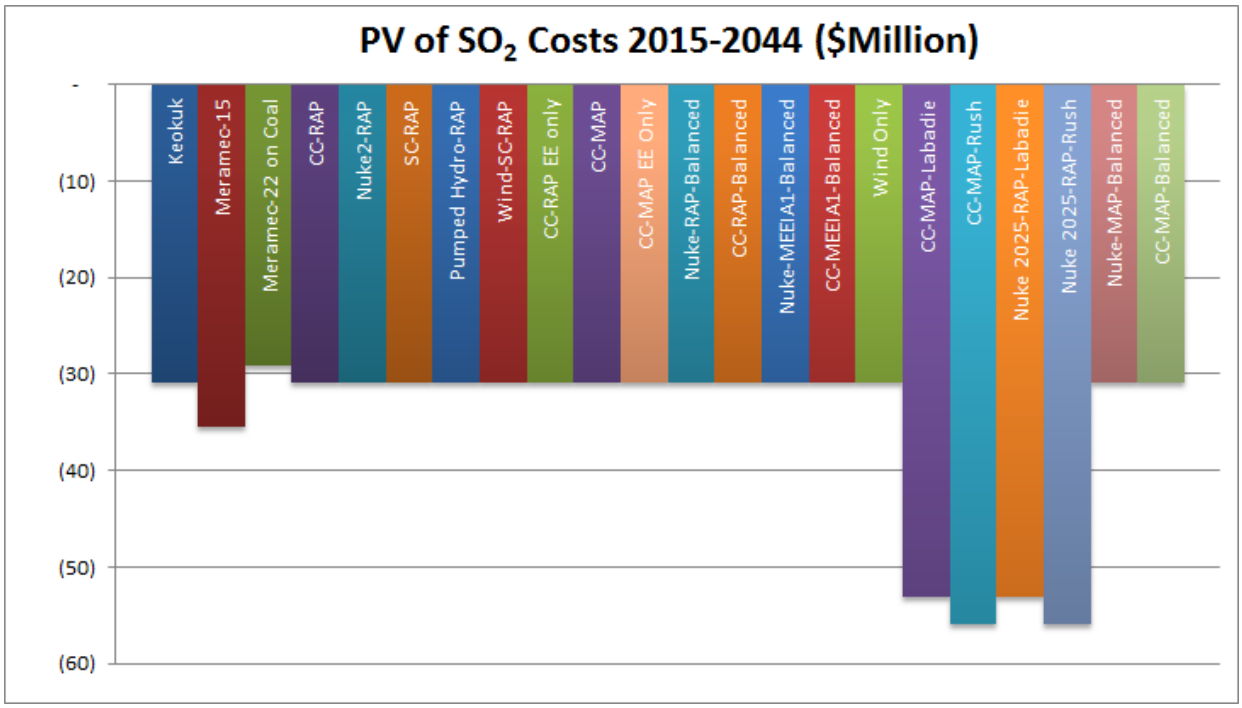
**


PV of NOx Costs 2015-2044 ($Million)
-
(10)
(20)
(30)
(40)
(50)
(60)
Keokuk
Meramec-15
amec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
CC-MAP EE Only
Nuke-RAP-Balanced
CC-RAP-Balanced
uke-MEEIA1-Balanc
-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
uke-MAP-Balanced
CC-MAP-Balanced

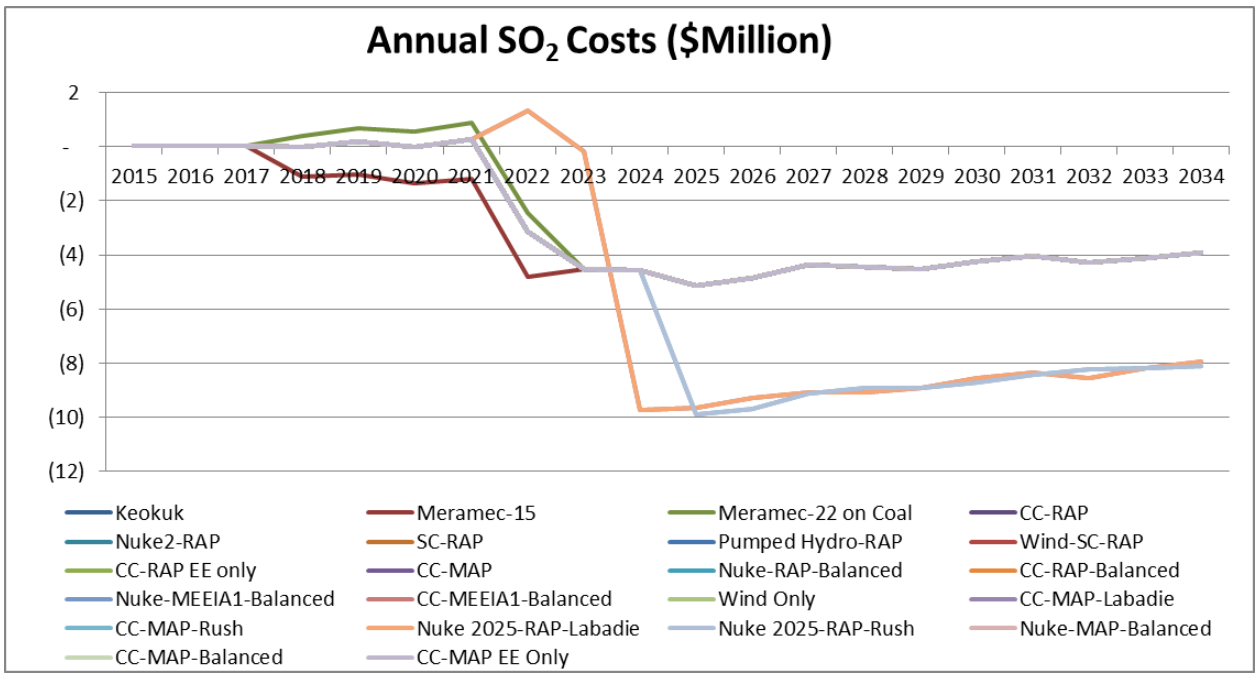
HC


Annual NOx Costs ($Million)
6
4
2
-
(2)
(4)
(6)
(8)
(10)
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

**


PV of SO_2 Costs 2015-2044 ($Million)
-
(10)
(20)
(30)
(40)
(50)
(60)
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
CC-MAP EE Only
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced

HC


Annual SO_2 Costs ($Million)
2
-
(2)
(4)
(6)
(8)
(10)
(12)
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034
Keokuk
Meramec-15
Meramec-22 on Coal
CC-RAP
Nuke2-RAP
SC-RAP
Pumped Hydro-RAP
Wind-SC-RAP
CC-RAP EE only
CC-MAP
Nuke-RAP-Balanced
CC-RAP-Balanced
Nuke-MEEIA1-Balanced
CC-MEEIA1-Balanced
Wind Only
CC-MAP-Labadie
CC-MAP-Rush
Nuke 2025-RAP-Labadie
Nuke 2025-RAP-Rush
Nuke-MAP-Balanced
CC-MAP-Balanced
CC-MAP EE Only

**

Expected Values, Rankings and Cumulative Probability Distributions for Selected Performance Measures[30]

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.[31]

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.[32]

[30] 4 CSR 240-22.060(7)
[31] 4 CSR 240-22.060(2)
[32] 4 CSR 240-22.060(7)(C)4

Table 9A.7 Expected Values for Selected Performance Measures[33]

		EXPECTED VALUE														
Plan	Description	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	CC-RAP	61,113	61,396	11.96	7%	576	3,870	32	3.92	5.35	26%	44%	11%	4,776	2.54	12,492
B	Nuke2-RAP	62,262	62,544	12.19	19%	576	3,870	32	3.82	5.11	25%	44%	11%	4,243	3.00	19,265
C	SC-RAP	61,060	61,343	11.95	7%	576	3,850	32	3.93	5.37	26%	44%	11%	4,819	2.51	11,280
D	Pumped Hydro-RAP	61,522	61,804	12.04	10%	576	3,847	32	3.88	5.25	25%	44%	11%	4,684	2.62	14,439
E	Wind-SC-RAP	61,338	61,621	12.01	7%	576	3,873	32	3.90	5.34	26%	43%	11%	4,635	2.70	14,782
F	CC-RAP EE only	61,335	61,598	12.01	8%	576	3,894	32	3.91	5.29	26%	44%	11%	4,658	2.64	14,385
G	CC-MAP	60,842	61,181	12.01	7%	752	3,870	32	3.92	5.35	26%	44%	11%	4,780	2.54	18,568
H	Nuke-RAP-Balanced	61,800	62,083	12.10	11%	576	3,870	32	3.87	5.25	25%	44%	11%	4,539	2.77	17,884
I	CC-RAP-Balanced	61,352	61,635	12.01	7%	576	3,870	32	3.92	5.35	26%	44%	11%	4,755	2.59	15,344
J	Nuke-MEEIA1-Balanced	63,935	63,935	12.17	8%	0	3,946	33	3.86	5.19	25%	44%	11%	4,381	3.00	13,128
K	CC-MEEIA1-Balanced	63,357	63,357	12.06	8%	0	3,955	33	3.90	5.28	26%	44%	11%	4,593	2.81	10,831
L	Wind-MEEIA1	66,973	66,973	12.75	15%	0	3,847	32	3.81	5.65	29%	40%	11%	3,712	4.47	34,921
M	CC-MAP-Labadie	64,452	64,790	12.72	14%	752	2,131	21	3.95	5.26	25%	44%	11%	4,742	2.95	24,619
N	CC-MAP-Rush	62,617	62,956	12.36	10%	752	3,296	27	3.92	5.34	26%	44%	11%	4,618	2.66	21,451
O	Nuke2025-RAP-Labadie-Balanced	65,397	65,680	12.80	15%	576	2,131	21	3.92	5.23	25%	44%	11%	4,668	3.13	25,527
P	Nuke2025-RAP-Rush-Balanced	64,018	64,301	12.53	15%	576	3,296	27	3.88	5.26	25%	44%	11%	4,427	2.93	21,390
Q	Nuke-MAP-Balanced	61,431	61,769	12.12	10%	752	3,847	32	3.88	5.29	26%	44%	11%	4,660	2.67	22,067
R	CC-MAP-Balanced	61,081	61,420	12.05	7%	752	3,870	32	3.92	5.35	26%	44%	11%	4,758	2.58	21,420
S	CC-MAP EE only	61,078	61,398	12.05	7%	752	3,870	32	3.92	5.35	26%	44%	11%	4,778	2.54	18,568

Table 9A.8 Rankings for Selected Performance Measures

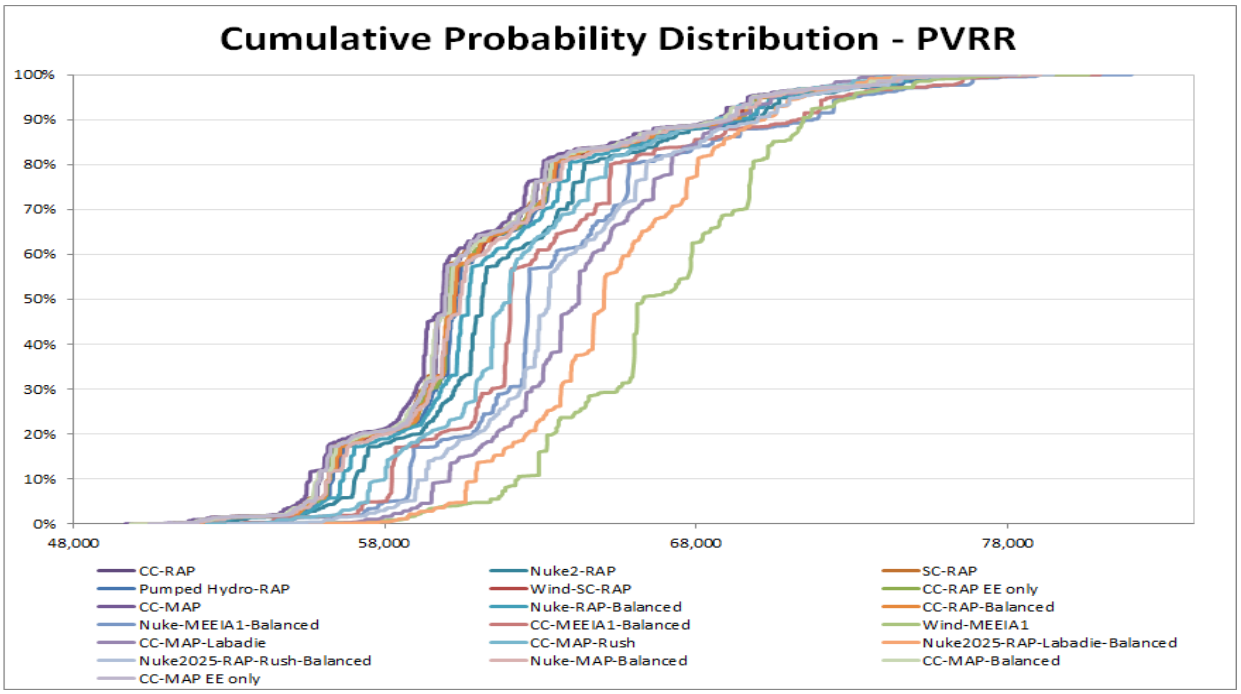
		RANKING														
Plan	Description	PVRR $MM	PVRR w/ Incentives $MM	Levelized Rates Cents/kWh	Max Single Yr Rate Increase	PV of Participant Cost $MM	PV of Probable Environmental Cost $MM	Avg CO2 Emissions (MM Tons)	PreTax Interest Coverage	FFO-Interest Coverage	FFO/Debt	Debt/ Capitalization	ROE	FCF $MM	EPS	Jobs
A	CC-RAP	5	3	2	4	4	9	9	5	5	6	14	4	16	16	17
B	Nuke2-RAP	12	12	14	19	4	9	9	18	19	19	10	18	2	4	8
C	SC-RAP	2	2	1	4	4	8	8	2	2	2	12	1	19	19	18
D	Pumped Hydro-RAP	10	10	7	11	4	5	5	14	15	15	18	10	12	13	14
E	Wind-SC-RAP	7	7	4	7	4	16	16	11	8	3	2	13	8	9	13
F	CC-RAP EE only	6	6	3	10	4	17	17	10	11	12	16	12	9	12	15
G	CC-MAP	1	1	5	2	14	9	9	3	7	8	17	2	18	18	9
H	Nuke-RAP-Balanced	11	11	11	14	4	9	9	16	16	13	7	15	5	8	11
I	CC-RAP-Balanced	8	8	6	4	4	9	9	9	3	4	8	6	14	14	12
J	Nuke-MEEIA1-Balanced	15	15	13	8	1	18	18	17	18	16	4	17	3	3	16
K	CC-MEEIA1-Balanced	14	14	10	8	1	19	19	12	12	9	5	14	6	7	19
L	Wind-MEEIA1	19	19	18	16	1	5	5	19	1	1	1	19	1	1	1
M	CC-MAP-Labadie	17	17	17	15	14	1	1	1	13	18	11	9	13	5	3
N	CC-MAP-Rush	13	13	15	13	14	3	3	6	9	11	19	11	7	11	5
O	Nuke2025-RAP-Labadie-Balanced	18	18	19	18	4	1	1	7	17	17	3	7	11	2	2
P	Nuke2025-RAP-Rush-Balanced	16	16	16	17	4	3	3	15	14	14	13	16	4	6	7
Q	Nuke-MAP-Balanced	9	9	12	12	14	5	5	13	10	10	6	8	10	10	4
R	CC-MAP-Balanced	4	5	9	1	14	9	9	8	4	5	9	5	15	15	6
S	CC-MAP EE only	3	4	8	3	14	9	9	4	6	7	15	3	17	17	9

[33] 4 CSR 240-22.060(4)(A); 4 CSR 240-22.060(7)(A); 4 CSR 240-22.060(7)(C)3

The expected values for one of the selected performance measures, PVRR with utility incentives for DSM, had essentially the same rank order as the PVRR rank order, so no cumulative distribution function (CDF) was produced for this measure. Additionally, there were only two sets of possible values for DSM costs; therefore, a CDF would not be useful for this measure. CDF's for the remaining performance measures are shown in Figures 9A.17 – 28.[34]

To create the CDF's, Ameren Missouri looked at the unique outcomes for the performance measures for each of the 1215 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 1215 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.[35]

Figure 9A.17 Cumulative Probability Distribution of PVRR



[34] 4 CSR 240-22.060(7)(C)2
[35] 4 CSR 240-22.060(7)(C)1

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

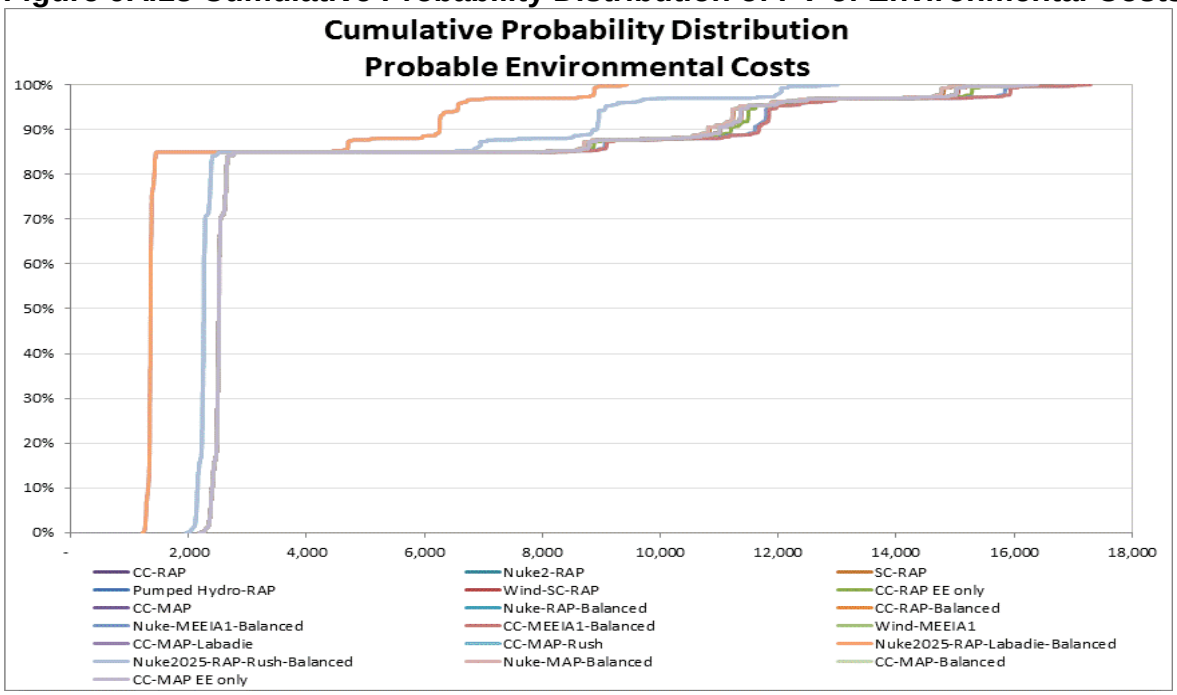
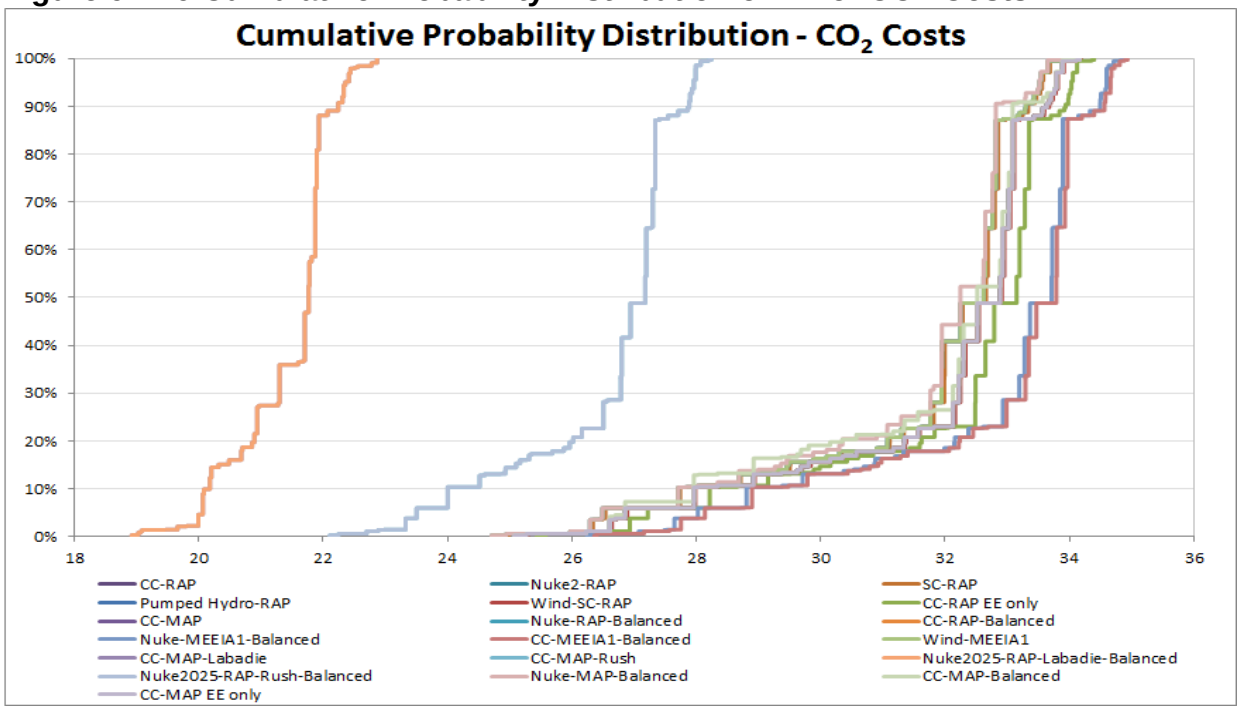


Figure 9A.19 Cumulative Probability Distribution of PV of CO2 Costs



Cumulative Probability Distribution of Financial Measures

Figure 9A.20 Cumulative Probability Distribution of Pre-Tax Interest Coverage

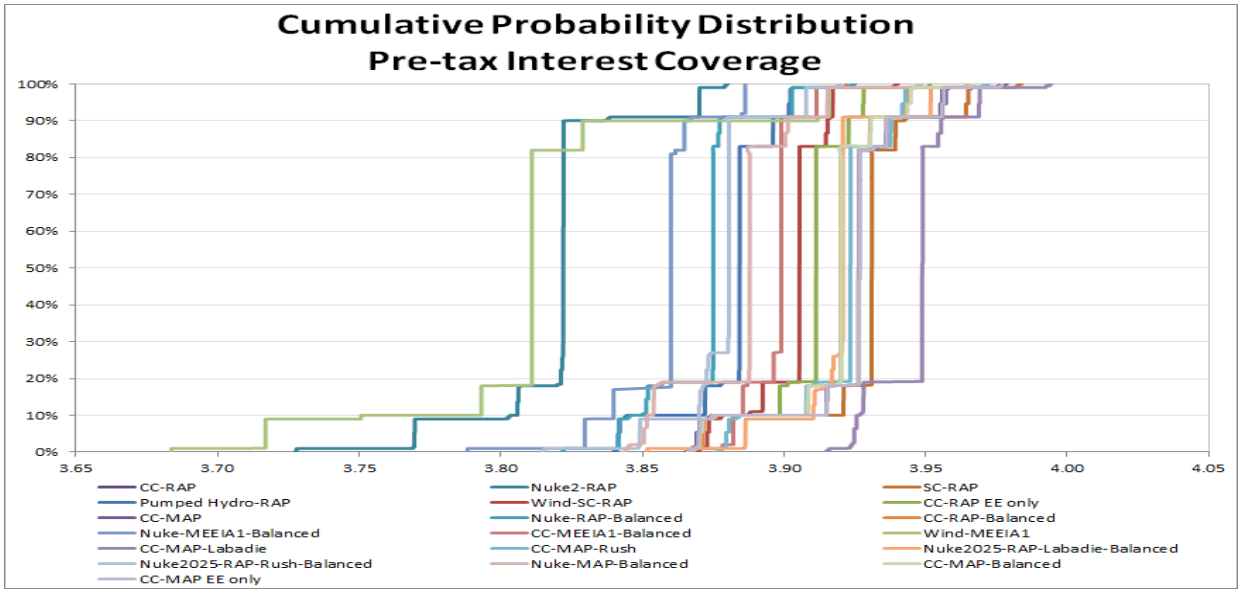


Figure 9A.21 Cumulative Probability Distribution of FFO/Interest Coverage

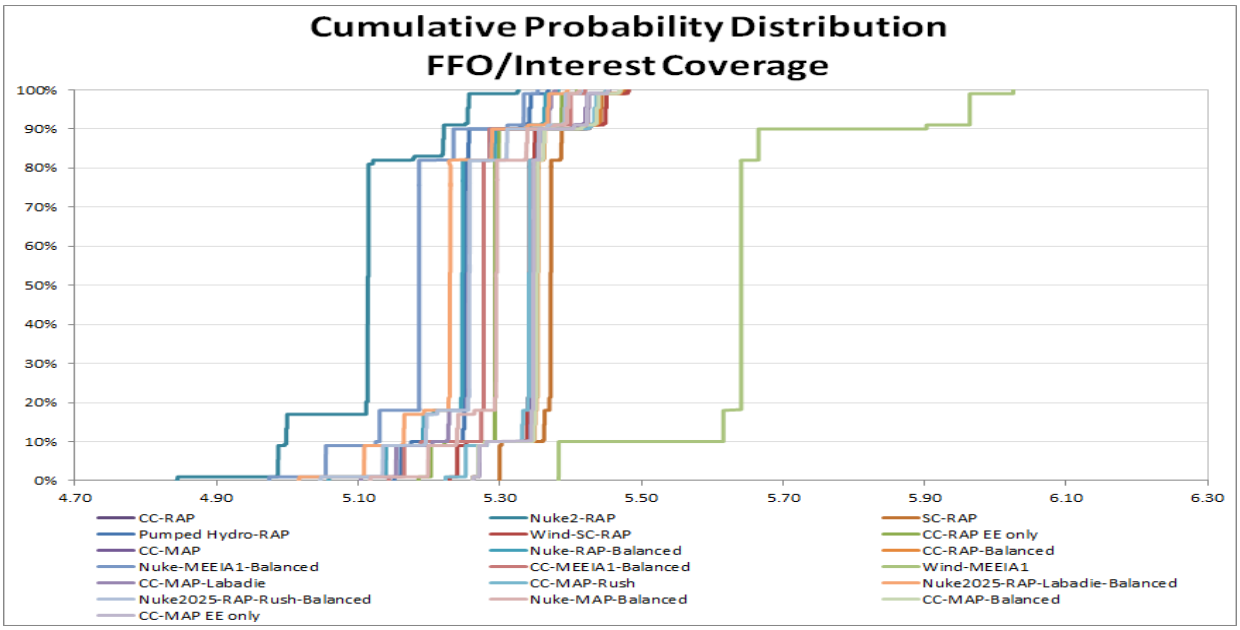


Figure 9A.22 Cumulative Probability Distribution of FFO/Debt

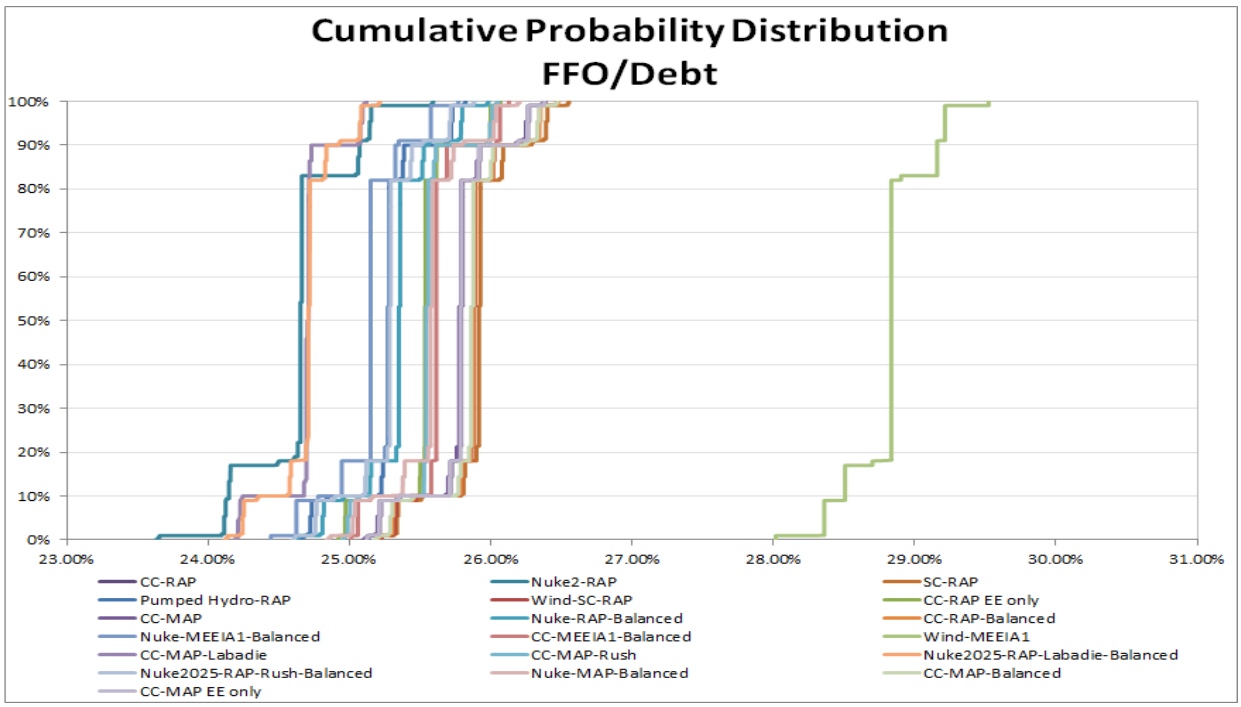


Figure 9A.23 Cumulative Probability Distribution of Debt/Capitalization

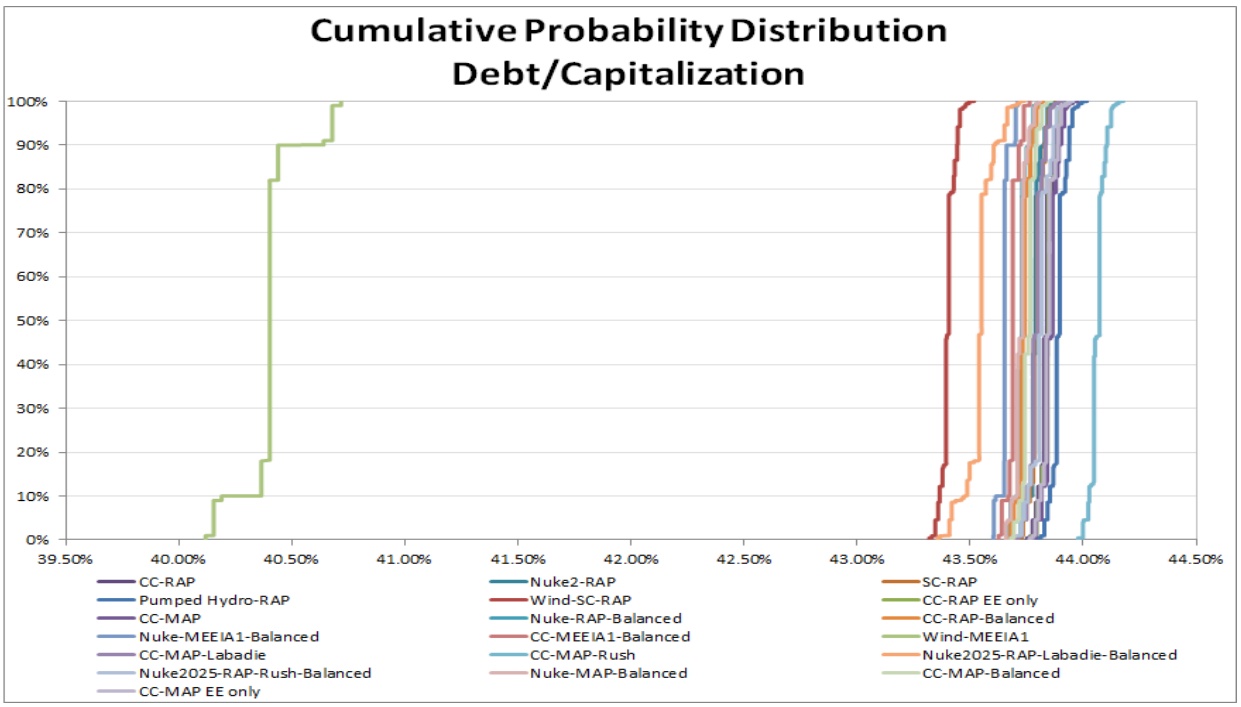


Figure 9A.24 Cumulative Probability Distribution of ROE

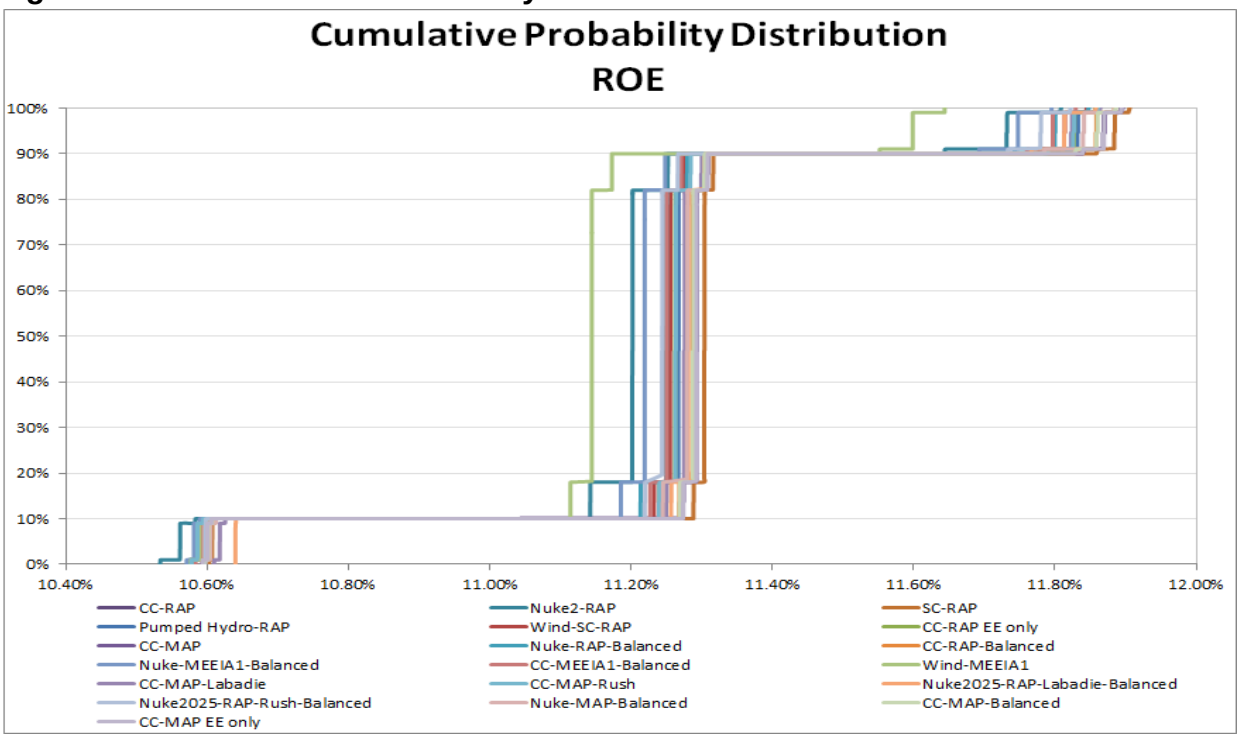


Figure 9A.25 Cumulative Probability Distribution of PV of FCF

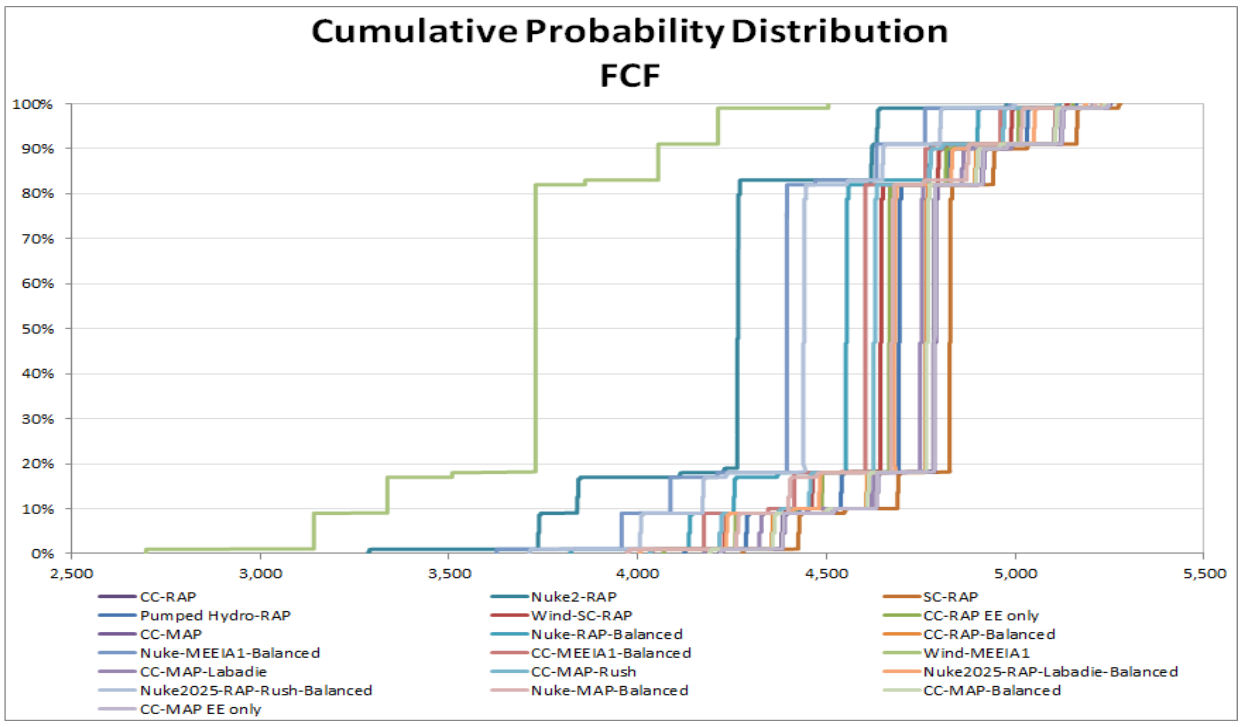


Figure 9A.26 Cumulative Probability Distribution of EPS

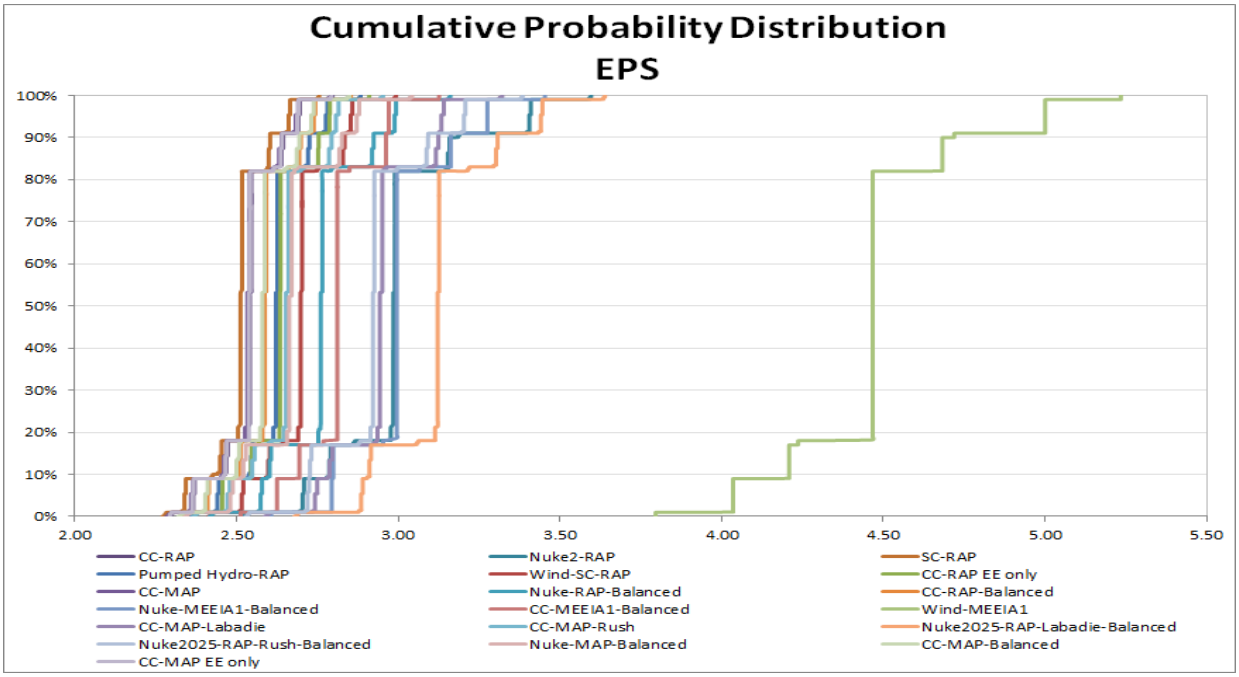


Figure 9A.27 Cumulative Probability Distribution of Levelized Rates

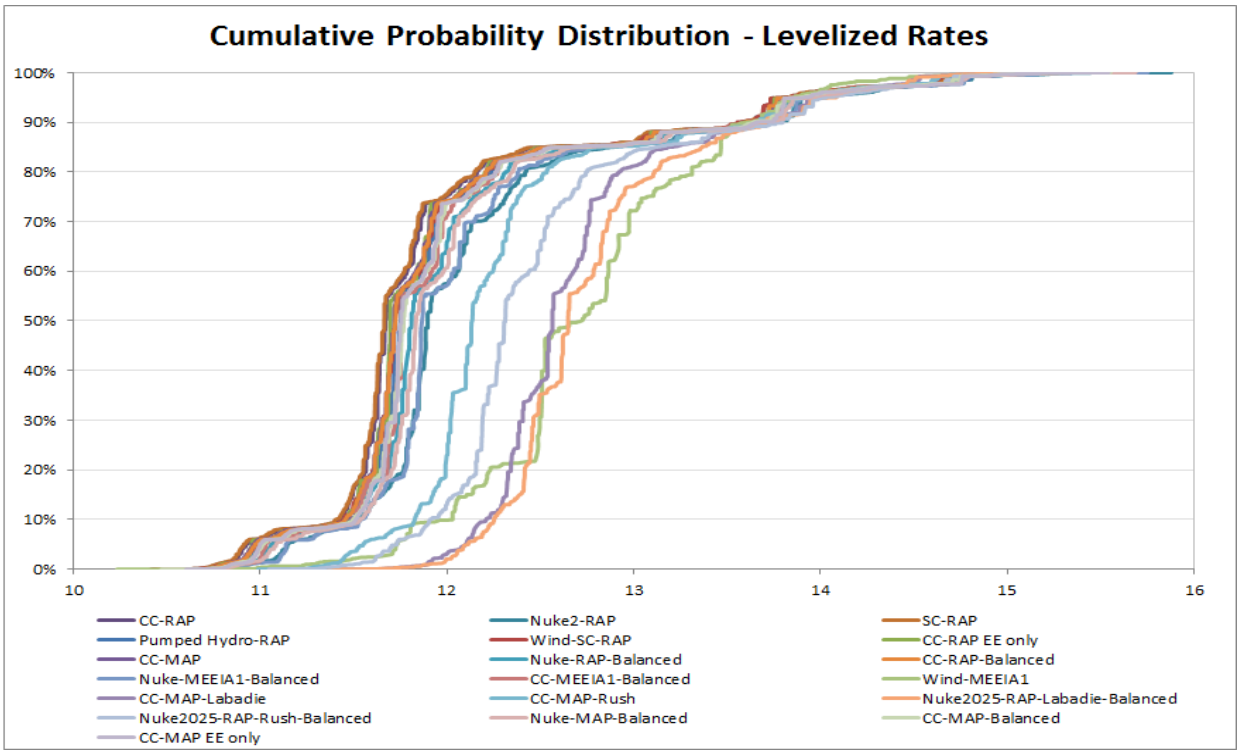
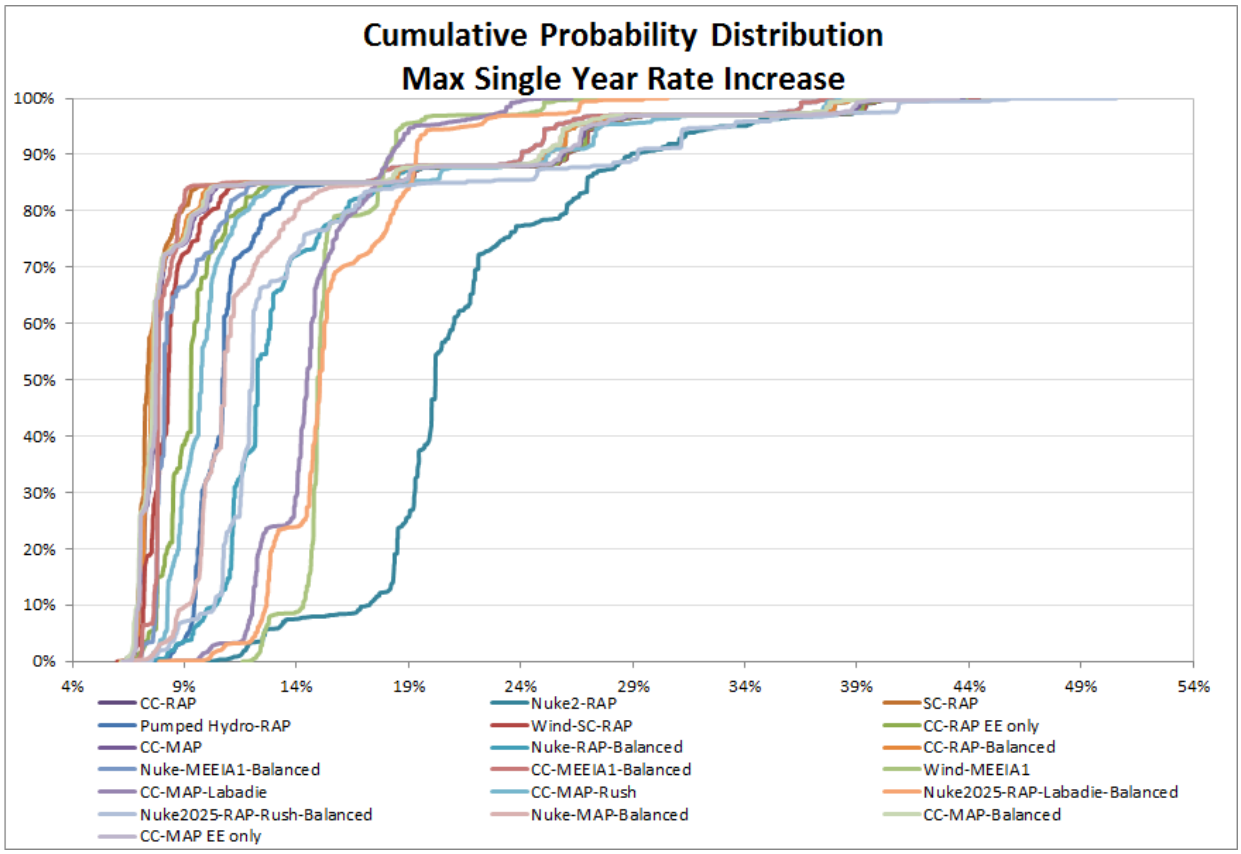


Figure 9A.28 Cumulative Probability Distribution of Maximum Single Year Rate Increase



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 Measures[36]

		STANDARD DEVIATION														
Plan	Description	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	CC-RAP	6,028	6,028	1.17	10%	44	4,545	2.62	0.04	0.06	0%	0%	1%	324	0.15	N/A
B	Nuke2-RAP	6,057	6,057	1.17	8%	44	4,545	2.62	0.04	0.14	1%	0%	0%	489	0.33	N/A
C	SC-RAP	6,046	6,046	1.17	10%	44	4,477	2.63	0.04	0.06	0%	0%	1%	319	0.15	N/A
D	Pumped Hydro-RAP	6,074	6,074	1.18	9%	44	4,467	2.63	0.03	0.08	0%	0%	1%	326	0.15	N/A
E	Wind-SC-RAP	5,929	5,929	1.15	10%	44	4,552	2.62	0.02	0.09	0%	0%	1%	340	0.17	N/A
F	CC-RAP EE only	6,006	6,006	1.17	10%	44	4,623	2.61	0.03	0.08	0%	0%	1%	336	0.16	N/A
G	CC-MAP	5,982	5,982	1.17	10%	70	4,545	2.62	0.04	0.06	0%	0%	1%	324	0.15	N/A
H	Nuke-RAP-Balanced	5,989	5,989	1.16	8%	44	4,545	2.62	0.03	0.10	0%	0%	0%	379	0.21	N/A
I	CC-RAP-Balanced	5,988	5,988	1.16	10%	44	4,545	2.62	0.03	0.07	0%	0%	1%	329	0.15	N/A
J	Nuke-MEEIA1-Balanced	6,124	6,124	1.16	9%	0	4,793	2.55	0.03	0.12	0%	0%	0%	400	0.25	N/A
K	CC-MEEIA1-Balanced	6,105	6,105	1.15	9%	0	4,822	2.55	0.02	0.10	0%	0%	0%	352	0.18	N/A
L	Wind-MEEIA1	5,645	5,645	1.05	3%	0	4,467	2.63	0.08	0.24	0%	0%	0%	532	0.44	N/A
M	CC-MAP-Labadie	4,268	4,268	0.80	4%	70	2,597	1.09	0.02	0.09	0%	0%	0%	335	0.21	N/A
N	CC-MAP-Rush	5,054	5,054	0.97	10%	70	3,482	1.75	0.03	0.08	0%	0%	1%	334	0.17	N/A
O	Nuke2025-RAP-Labadie-Balanced	4,377	4,377	0.82	5%	44	2,597	1.09	0.03	0.12	0%	0%	0%	365	0.28	N/A
P	Nuke2025-RAP-Rush-Balanced	5,115	5,115	0.98	11%	44	3,482	1.75	0.03	0.12	0%	0%	0%	381	0.25	N/A
Q	Nuke-MAP-Balanced	5,952	5,952	1.16	9%	70	4,467	2.51	0.03	0.09	0%	0%	1%	365	0.20	N/A
R	CC-MAP-Balanced	5,944	5,944	1.16	10%	70	4,545	2.64	0.03	0.07	0%	0%	1%	328	0.15	N/A
S	CC-MAP EE only	5,971	5,971	1.17	10%	70	4,545	2.62	0.04	0.06	0%	0%	1%	324	0.15	N/A

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

Charts 9A.29-31 display the expected value and standard deviation for each plan's PVRR. Also, in chart 9A.32, the 5th and 95th percentiles along with the expected PVRR are shown. [37]

[36] 4 CSR 240-22.060(7)(C)3
[37] 4 CSR 240-22.060(7)(B)

Figure 9A.29 PVRR – Expected Value and Standard Deviation

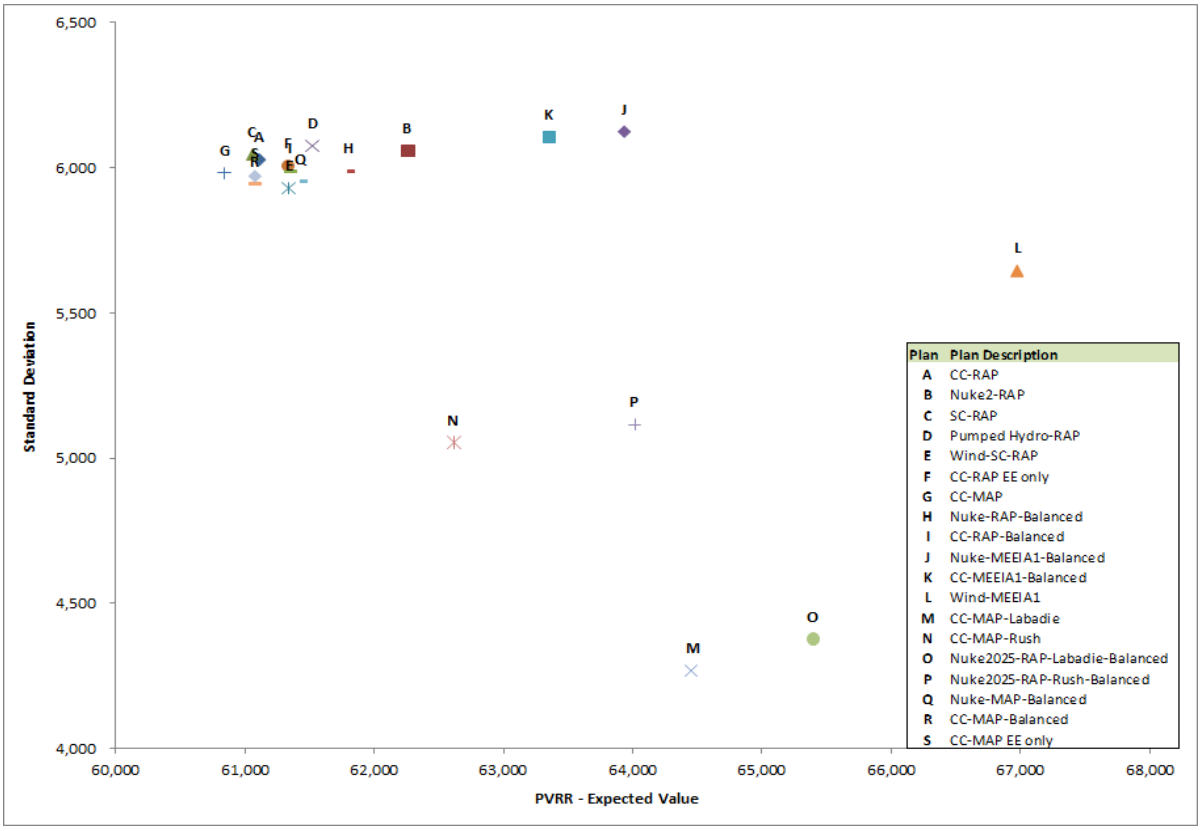


Figure 9A.30 PVRR – Expected Value and Standard Deviation

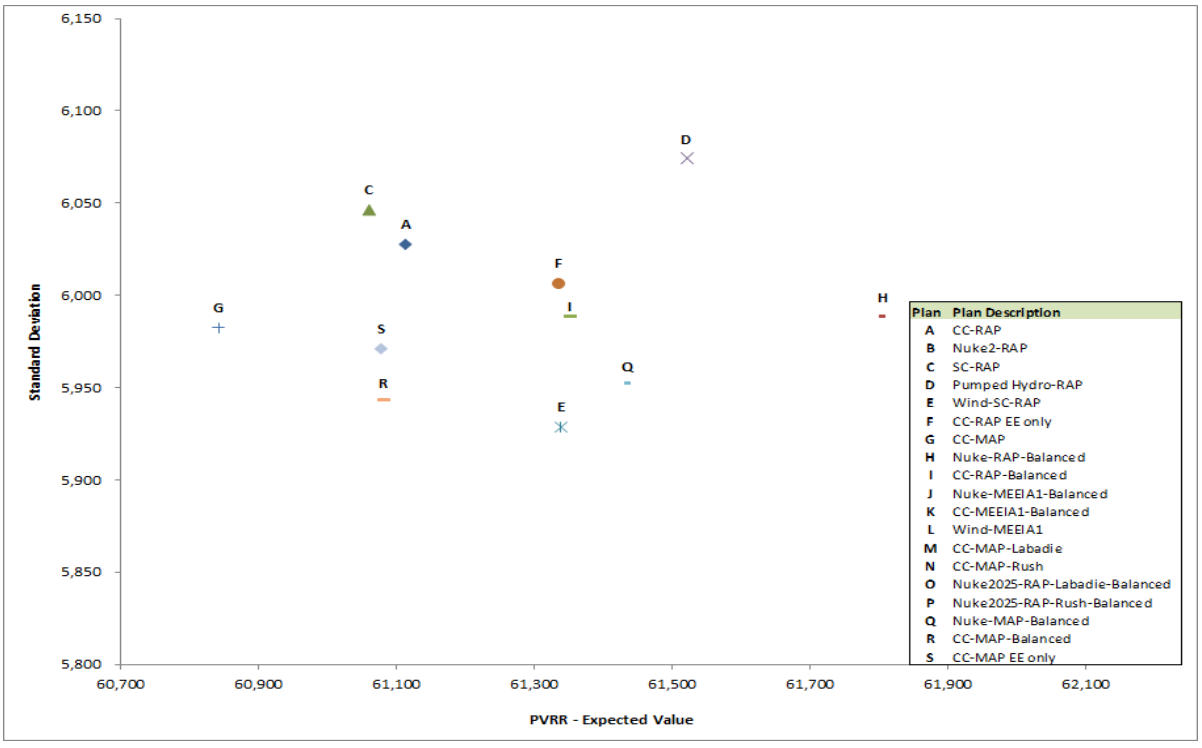


Figure 9A.31 PVRR – Expected Value and Standard Deviation

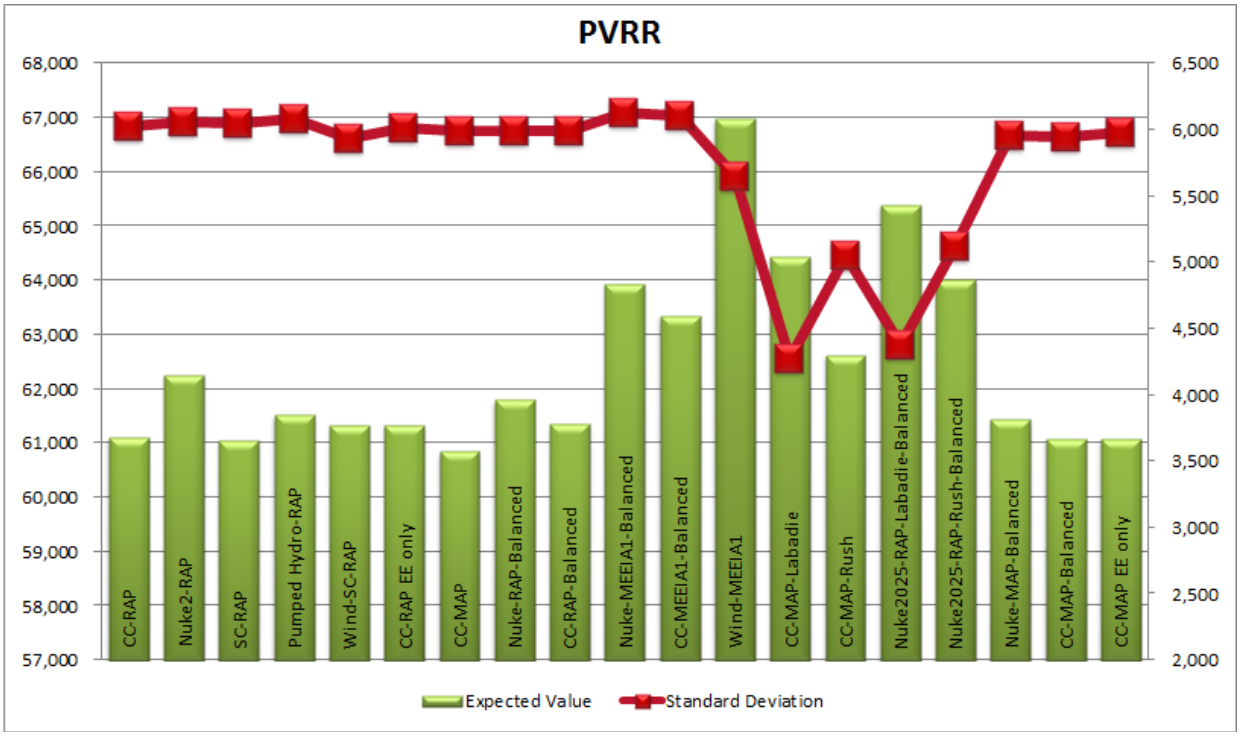
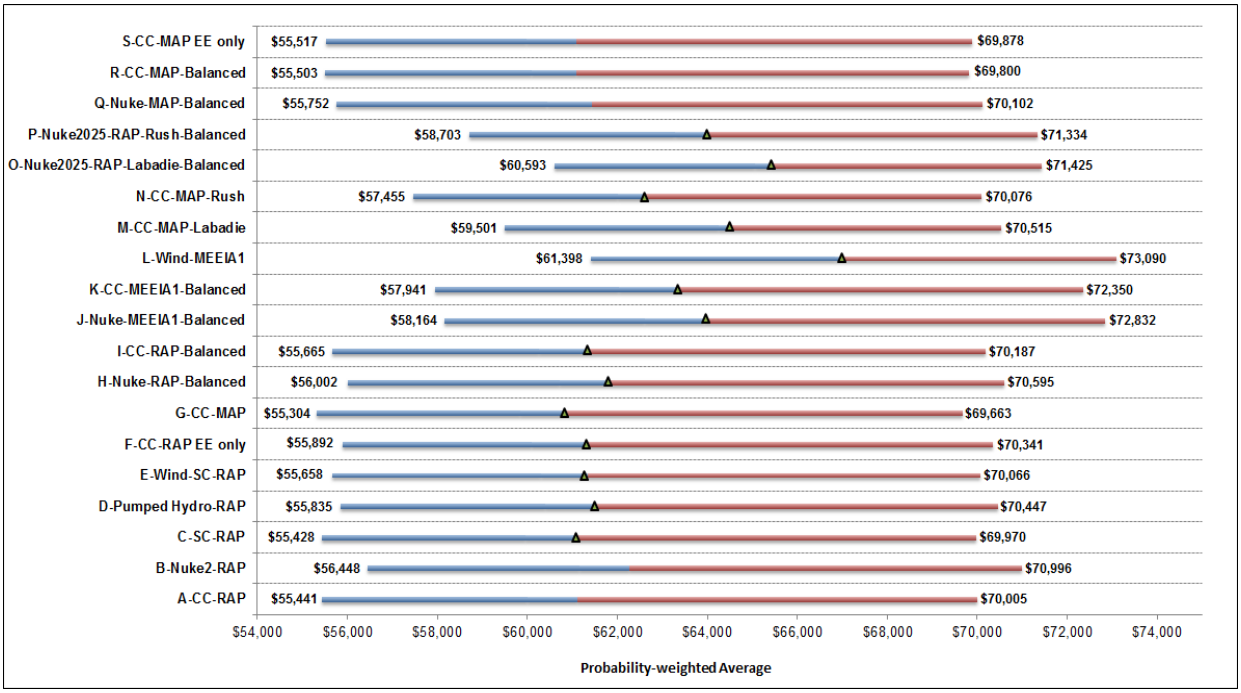


Figure 9A.32 PVRR – Expected Value, 5th and 95th Percentiles



Compliance References