



Supplementary Data

2030 Base Scenario

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	81.5	3628.9	111.4	45.5	184.6
Feb	136.6	3439.0	91.2	36.1	155.5
Mar	261.0	3432.5	66.2	43.7	172.8
Apr	404.9	1379.5	53.9	77.3	228.1
May	401.7	2258.0	48.7	57.8	214.5
Jun	388.5	1578.5	40.4	67.0	222.7
Jul	471.4	1350.5	34.8	74.5	229.9
Aug	322.4	2597.2	41.8	43.9	163.0
Sep	259.5	2178.0	43.8	59.2	200.1
Oct	171.9	3270.7	62.7	42.2	153.2
Nov	76.0	3317.5	97.7	43.0	153.2
Dec	71.2	3493.8	100.5	45.7	174.4
Year	3046.4	31753.8	793.2	636.0	2252.1

VRE Curtailment (%)

2030	Solar	Wind
Jan	10%	4%
Feb	6%	6%
Mar	8%	8%
Apr	2%	0%
May	1%	2%
Jun	1%	1%
Jul	0%	1%
Aug	16%	8%
Sep	8%	5%
Oct	13%	9%
Nov	25%	13%
Dec	7%	9%
Year	6.20%	6.50%

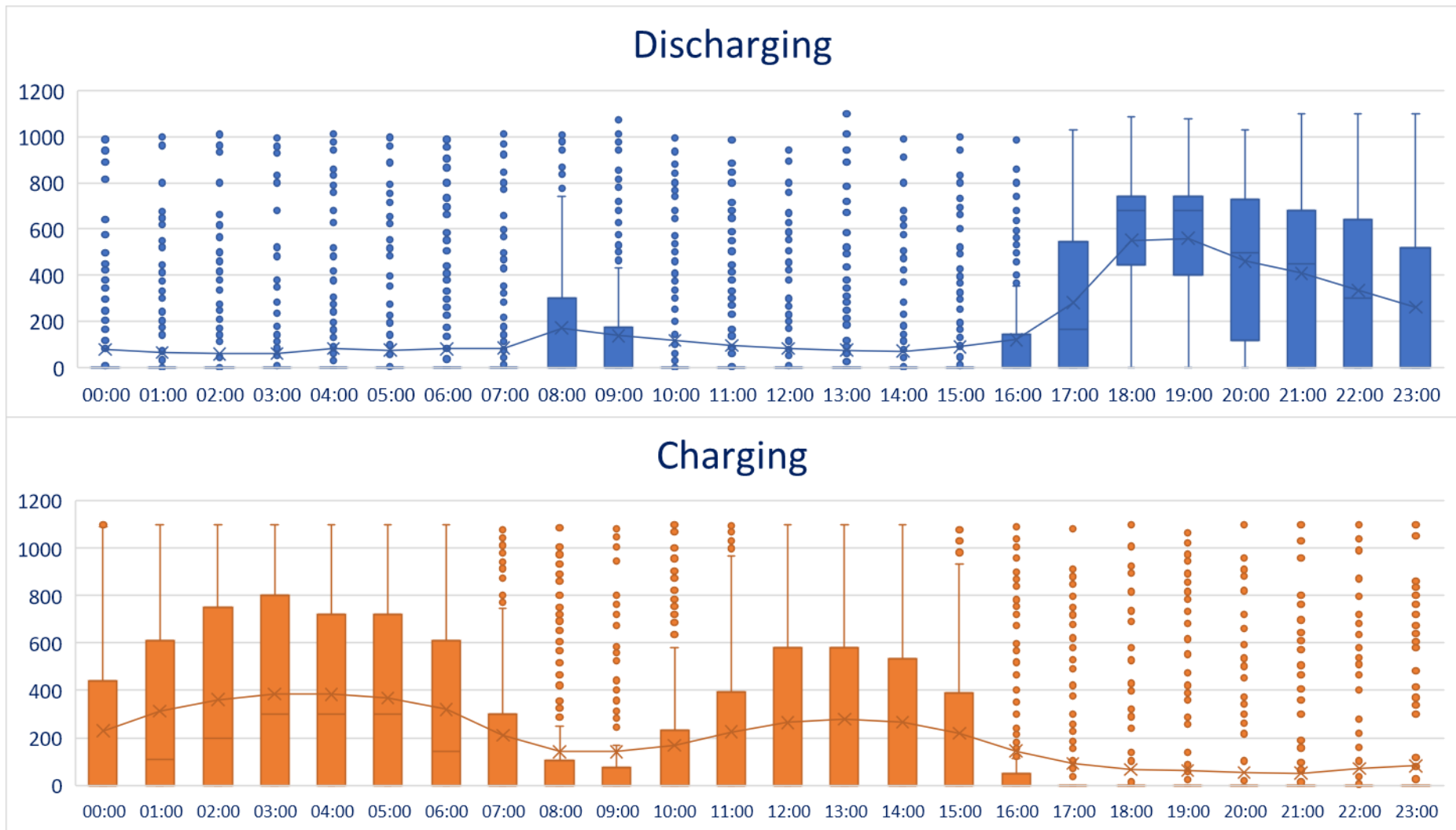
Running Hours and Starts

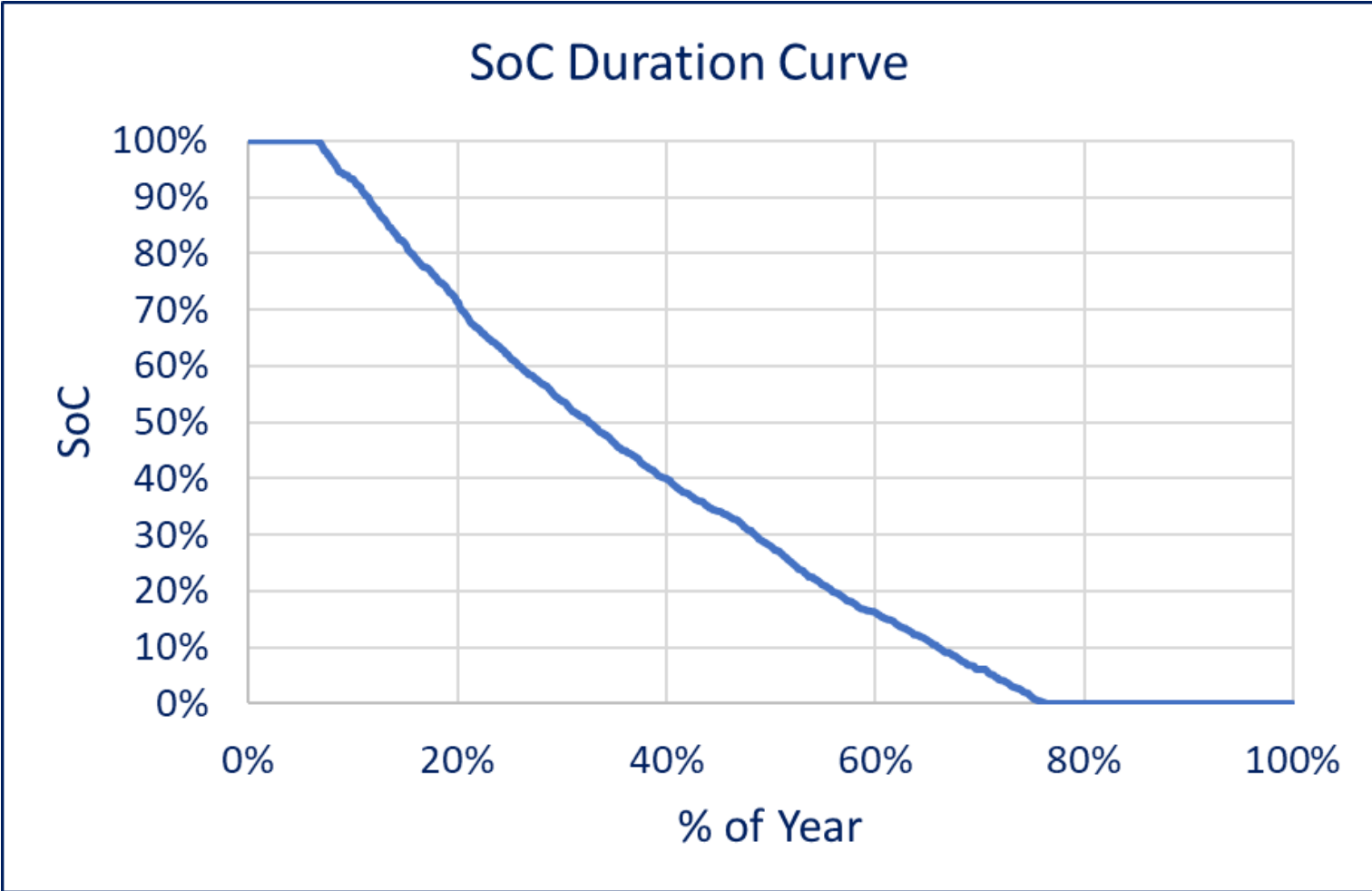
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	13	517	0	429	2	5	0	8
Feb	9	458	0	393	2	5	0	5
Mar	11	508	0	437	3	6	0	7
Apr	8	599	0	682	2	4	0	1
May	3	516	0	520	1	6	0	5
Jun	4	485	0	628	1	5	0	2
Jul	3	492	0	659	1	5	0	3
Aug	4	449	0	430	1	6	0	4
Sep	4	487	0	595	1	6	0	5
Oct	9	478	0	422	2	6	0	8
Nov	7	471	0	425	1	4	0	7
Dec	12	511	0	459	2	6	0	6
Year	87	5971	0	6079	18	66	0	61

Capacity Factors

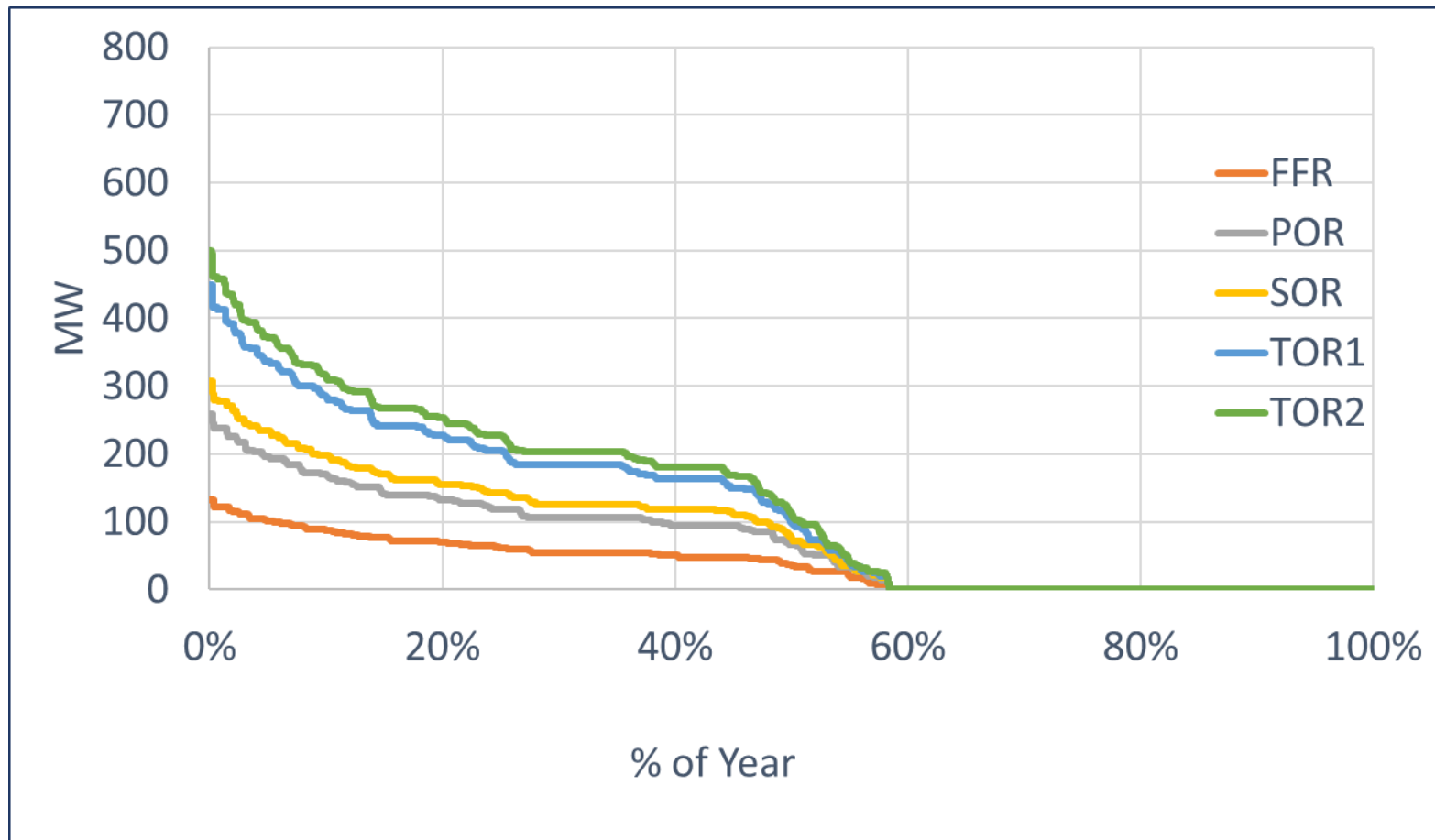
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	1.3%	53%	0%	63%	51%	74%	39%	3%	42%
Feb	0.9%	51%	0%	57%	44%	69%	37%	6%	42%
Mar	1.1%	52%	0%	38%	49%	70%	38%	11%	40%
Apr	1.1%	75%	0%	32%	89%	95%	49%	17%	16%
May	0.4%	61%	0%	28%	64%	86%	47%	16%	26%
Jun	0.3%	61%	0%	24%	77%	93%	47%	16%	19%
Jul	0.3%	58%	0%	20%	83%	93%	48%	19%	16%
Aug	0.3%	45%	0%	24%	49%	66%	40%	13%	30%
Sep	0.3%	53%	0%	26%	68%	83%	44%	11%	26%
Oct	0.9%	48%	0%	36%	47%	62%	38%	7%	38%
Nov	0.6%	51%	0%	57%	49%	73%	36%	3%	40%
Dec	1.2%	54%	0%	57%	51%	62%	37%	3%	40%
Year	0.7%	55%	0%	38%	60%	77%	42%	10%	31%

Battery Usage Profiles

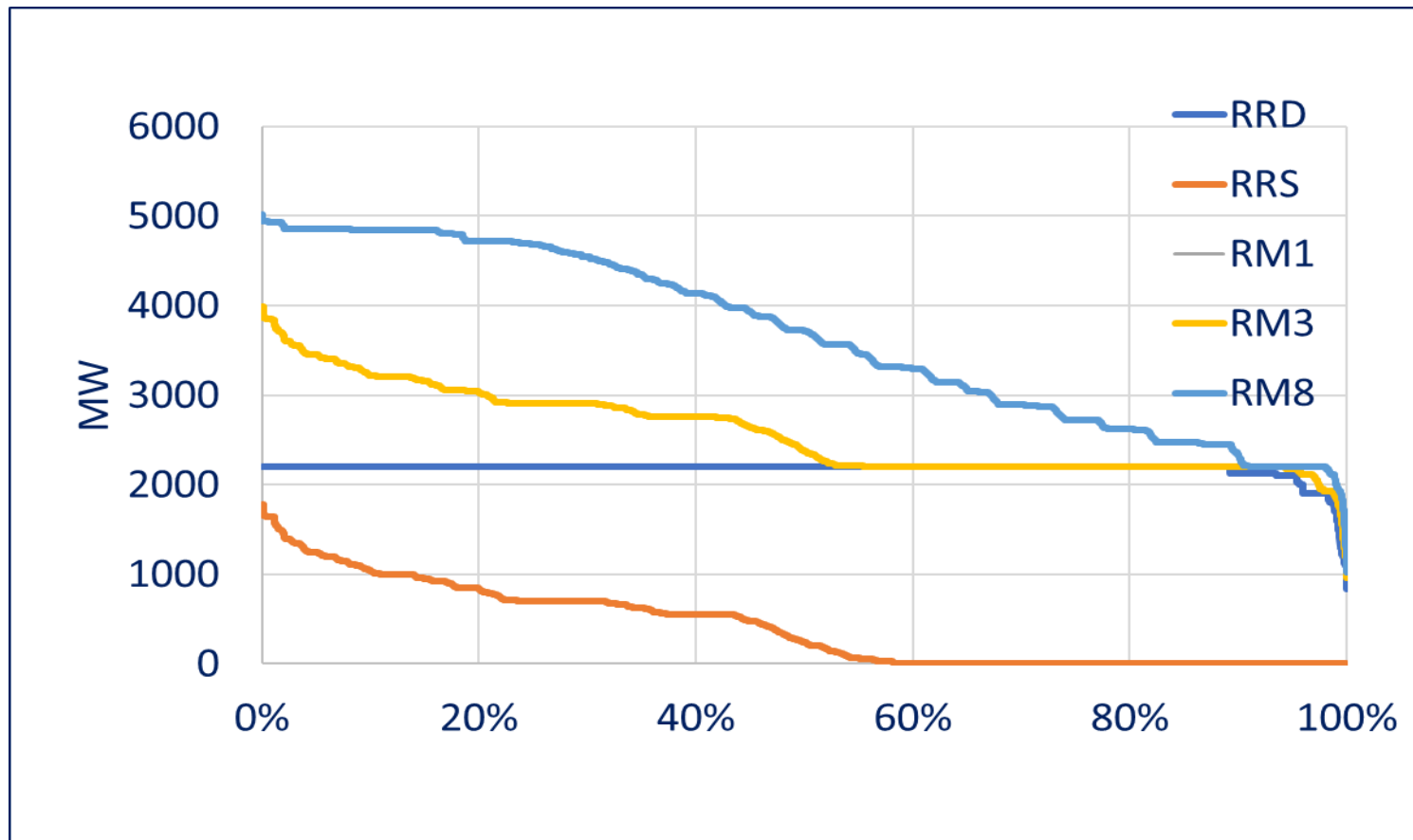




Available operating reserves from conventional generation



Available replacement reserves & ramping margins from conventional generation



Lower Flexibility Scenario

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	80.7	3285.3	111.4	45.5	182.2
Feb	132.3	3065.7	91.2	36.1	154.0
Mar	255.6	3065.0	66.2	43.7	178.6
Apr	403.5	1332.5	53.9	77.8	226.4
May	399.0	2114.2	48.7	57.3	214.5
Jun	386.4	1503.3	40.6	67.1	222.5
Jul	465.7	1289.7	34.8	74.5	230.1
Aug	308.9	2354.4	41.8	43.9	163.1
Sep	255.7	2024.0	43.9	59.2	200.0
Oct	164.2	2921.6	62.7	42.2	153.2
Nov	75.4	2936.5	97.7	43.5	153.2
Dec	68.1	3120.0	100.5	45.2	171.3
Year	2995.4	29012.2	793.4	636.0	2248.9

VRE Curtailment (%)

2030	Solar	Wind
Jan	11%	13%
Feb	9%	16%
Mar	10%	17%
Apr	2%	4%
May	2%	8%
Jun	2%	6%
Jul	2%	5%
Aug	20%	16%
Sep	9%	12%
Oct	17%	19%
Nov	25%	23%
Dec	11%	19%
Year	7.79%	15.00%

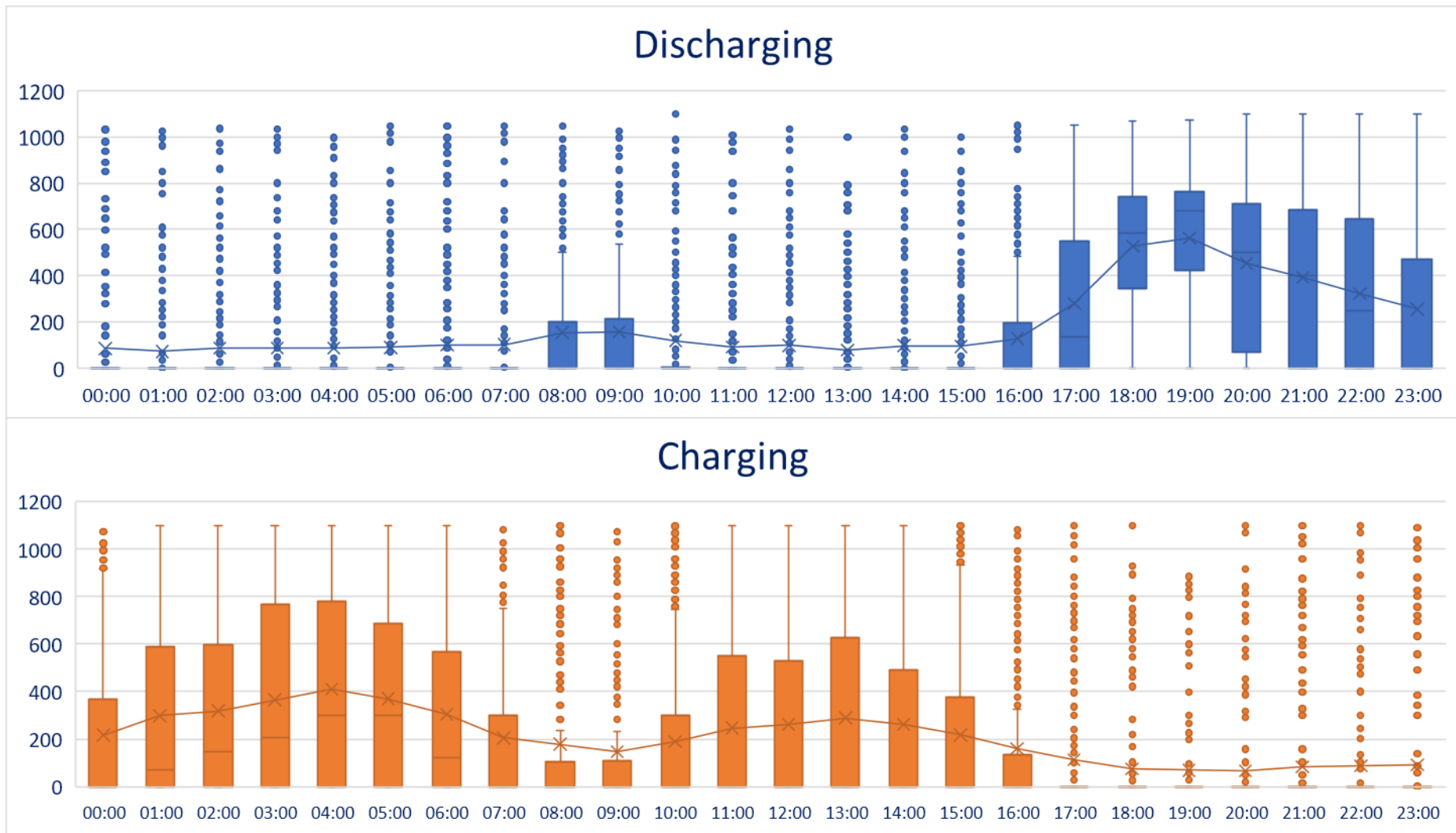
Running Hours and Starts

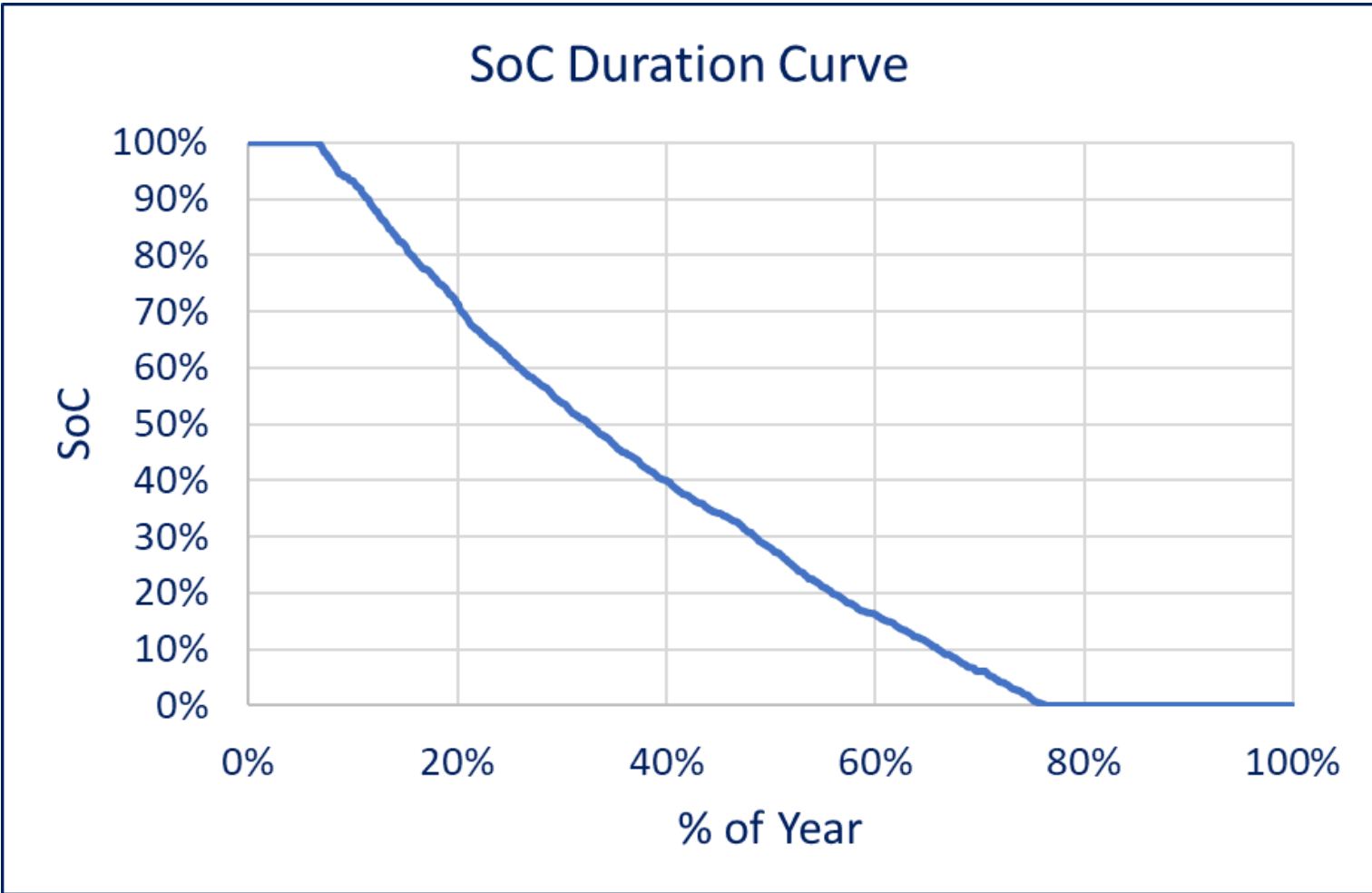
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	15	627	0	494	2	5	0	6
Feb	10	554	0	423	2	4	0	4
Mar	11	620	0	502	3	6	0	4
Apr	10	627	0	696	2	5	0	0
May	3	641	0	535	1	7	0	4
Jun	3	580	0	646	1	6	0	2
Jul	5	611	0	696	1	7	0	1
Aug	9	594	0	430	2	7	0	4
Sep	3	598	0	600	1	6	0	4
Oct	14	604	4	476	4	7	0	7
Nov	4	601	0	478	1	5	0	4
Dec	9	623	0	502	2	6	0	5
Year	96	7279	4	6478	22	70	0	45

Capacity Factors

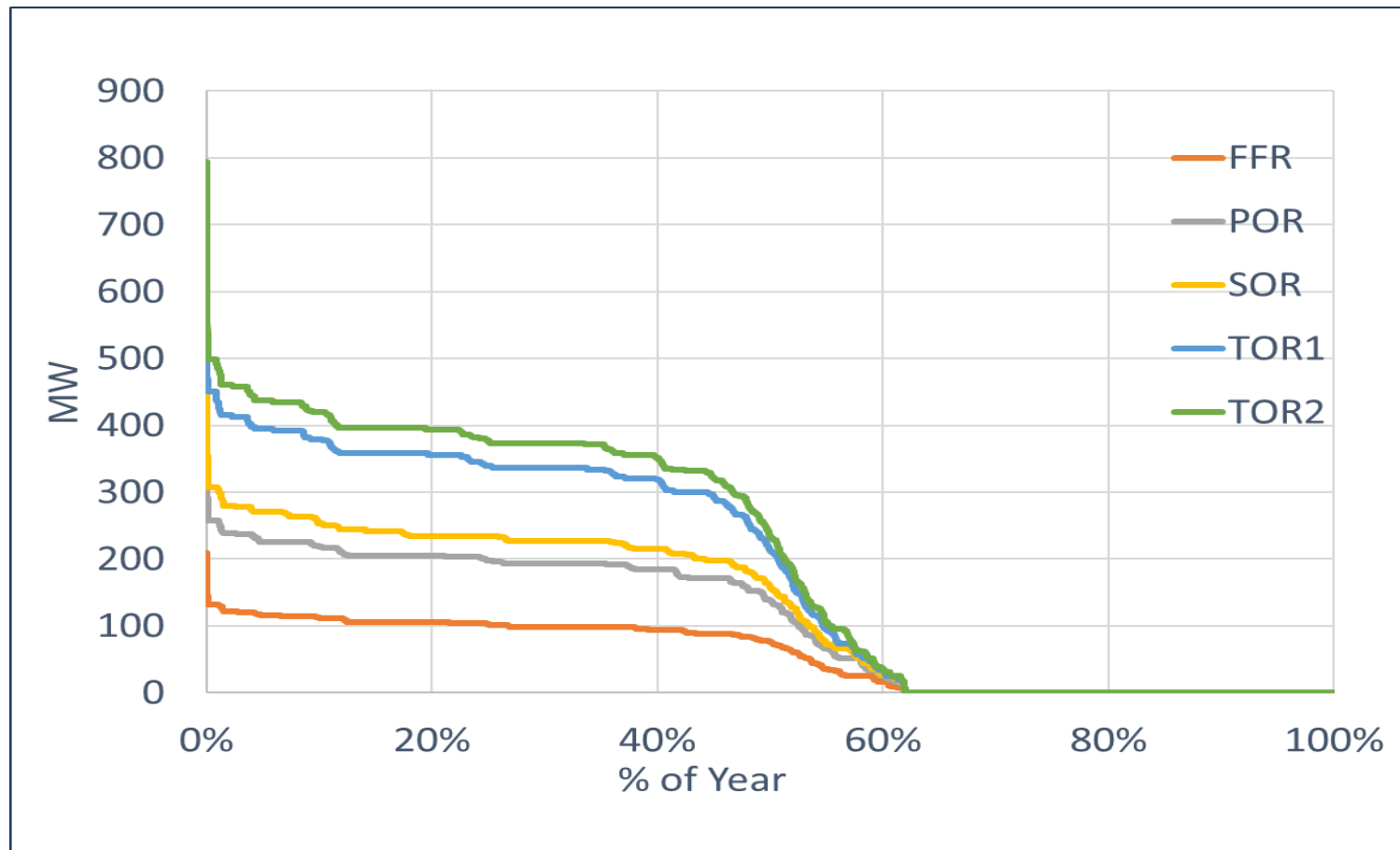
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	1.3%	60%	0%	63%	51%	73%	38%	3%	38%
Feb	1.0%	58%	0%	57%	44%	69%	35%	5%	39%
Mar	1.1%	58%	0%	38%	49%	72%	37%	10%	35%
Apr	1.3%	78%	0%	32%	89%	94%	49%	17%	16%
May	0.4%	68%	0%	28%	64%	86%	45%	16%	24%
Jun	0.4%	68%	0%	24%	77%	93%	47%	16%	18%
Jul	0.4%	70%	0%	20%	83%	93%	47%	19%	15%
Aug	0.5%	53%	0%	24%	49%	66%	38%	13%	27%
Sep	0.3%	63%	0%	26%	68%	83%	44%	11%	24%
Oct	1.0%	57%	0%	36%	47%	62%	35%	7%	34%
Nov	0.5%	59%	0%	57%	50%	71%	34%	3%	35%
Dec	1.1%	61%	0%	57%	50%	62%	34%	3%	36%
Yearly	0.8%	63%	0%	38%	60%	77%	40%	10%	28%

Battery Usage Profiles

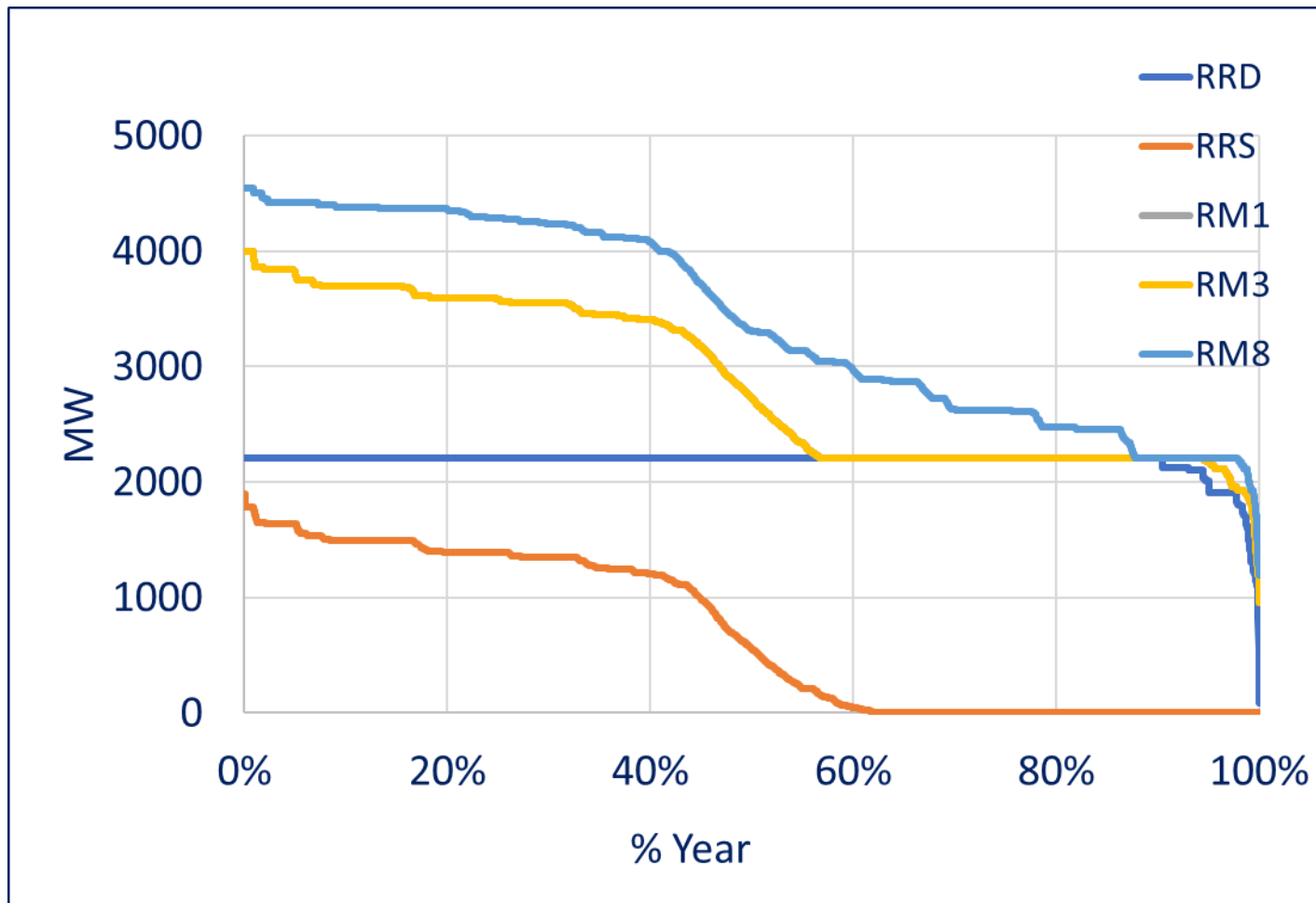




Available operating reserves from conventional generation



Available replacement reserve and ramping margin from conventional generation



Lower Electrification

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	83.0	3595.3	111.4	45.8	179.8
Feb	135.8	3405.6	91.2	35.1	154.5
Mar	254.3	3404.4	66.2	43.1	172.0
Apr	404.3	1379.0	53.9	76.6	226.9
May	398.6	2254.7	48.7	57.8	219.3
Jun	387.6	1576.8	40.4	66.9	221.9
Jul	468.4	1349.4	34.8	74.9	230.1
Aug	324.0	2582.8	41.8	46.2	164.0
Sep	259.5	2167.7	43.8	59.2	201.8
Oct	171.2	3255.7	62.7	42.6	157.3
Nov	77.2	3274.0	97.7	42.4	150.3
Dec	69.7	3462.8	101.0	45.4	173.9
Year	3033.6	31708.2	793.6	636.0	2251.8

VRE Curtailment (%)

2030	Solar	Wind
Jan	9%	5%
Feb	6%	7%
Mar	10%	8%
Apr	2%	1%
May	2%	2%
Jun	2%	1%
Jul	1%	1%
Aug	16%	8%
Sep	8%	5%
Oct	13%	9%
Nov	23%	14%
Dec	9%	10%
Year	6.61%	7.10%

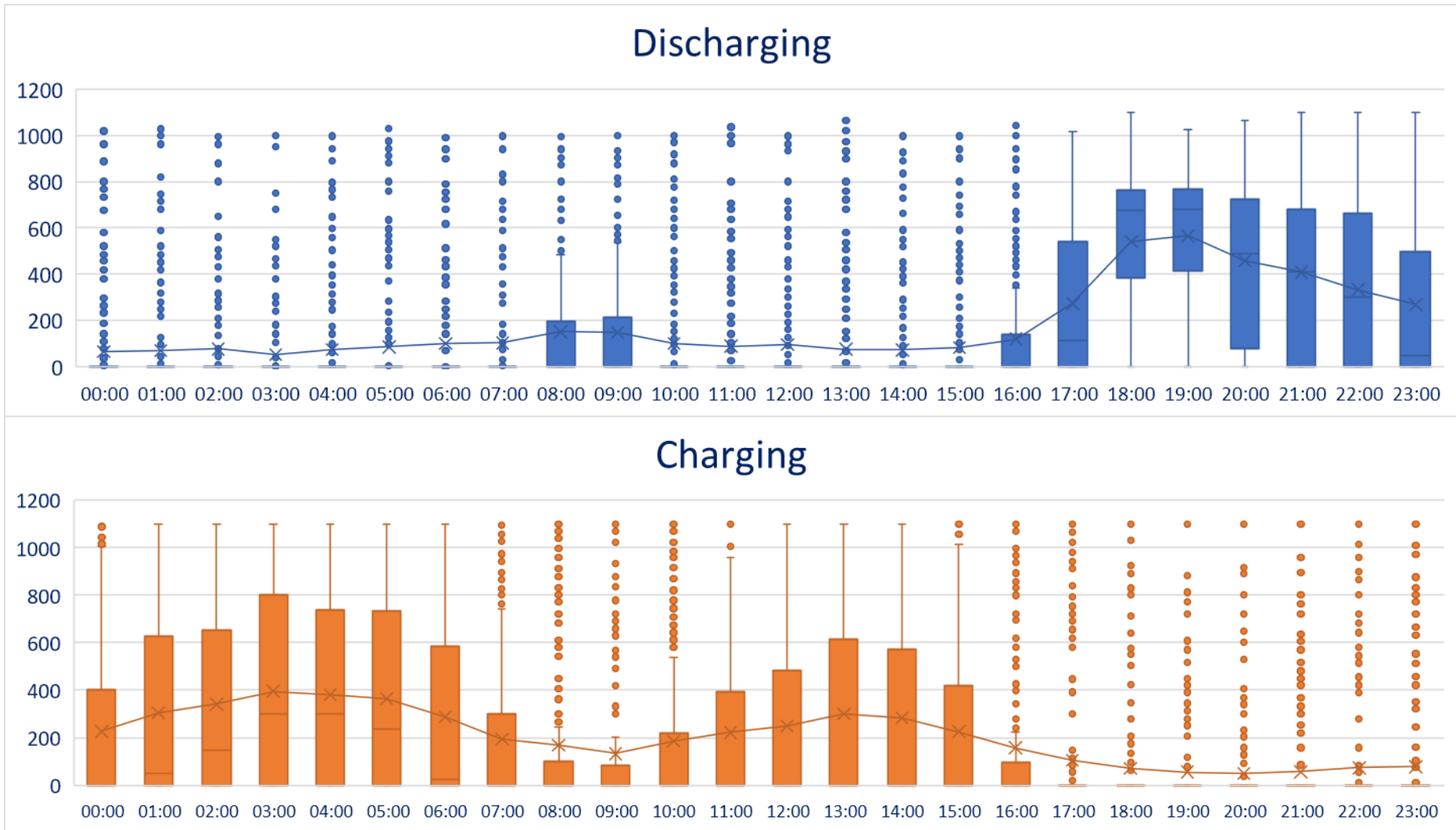
Running Hours and Starts

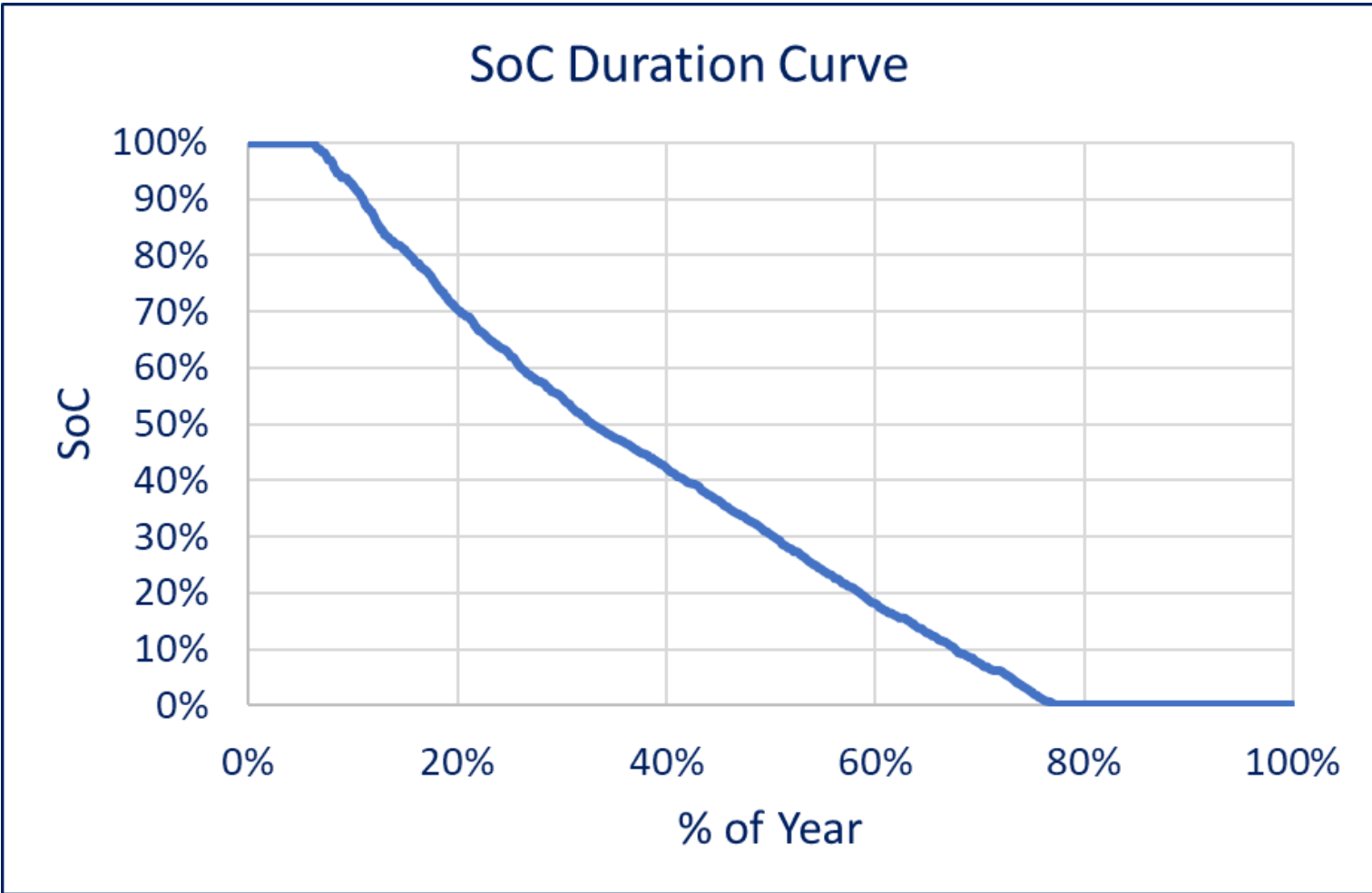
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	9	511	0	432	2	5	0	8
Feb	7	447	0	368	2	5	0	7
Mar	9	492	0	433	2	5	0	3
Apr	6	578	0	672	2	4	0	1
May	3	515	0	541	1	6	0	3
Jun	3	472	0	645	1	5	0	2
Jul	3	496	0	661	1	6	0	4
Aug	4	441	0	453	1	6	0	5
Sep	3	465	0	563	1	6	0	6
Oct	7	447	0	413	1	7	0	9
Nov	4	462	0	441	1	4	0	6
Dec	12	500	0	456	2	6	0	6
Year	70	5825	0	6078	15	65	0	60

Capacity Factors

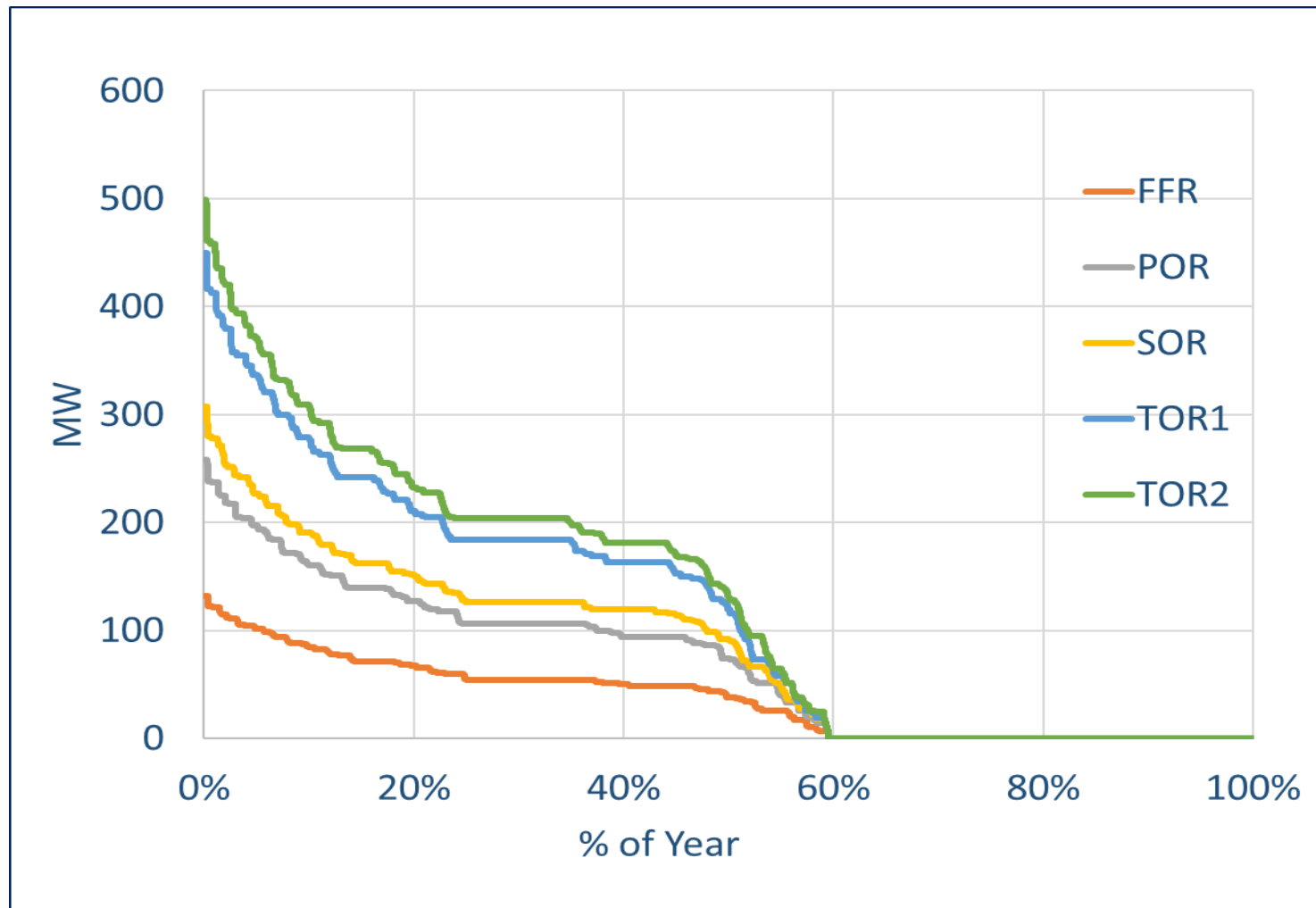
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	1.0%	51%	0%	63%	51%	72%	38%	3%	0%
Feb	0.7%	49%	0%	57%	43%	69%	36%	6%	0%
Mar	0.8%	49%	0%	38%	48%	69%	38%	10%	0%
Apr	1.1%	73%	0%	32%	88%	94%	49%	17%	0%
May	0.4%	58%	0%	28%	64%	88%	47%	16%	0%
Jun	0.4%	60%	0%	24%	77%	92%	47%	16%	0%
Jul	0.3%	60%	0%	20%	83%	93%	47%	19%	0%
Aug	0.2%	46%	0%	24%	51%	66%	39%	13%	0%
Sep	0.2%	51%	0%	26%	68%	84%	44%	11%	0%
Oct	0.5%	46%	0%	36%	47%	63%	36%	7%	0%
Nov	0.4%	49%	0%	57%	49%	72%	36%	3%	0%
Dec	1.0%	52%	0%	57%	50%	60%	35%	3%	0%
Yearly	0.6%	54%	0%	38%	60%	77%	41%	10%	0%

Battery Usage Profiles

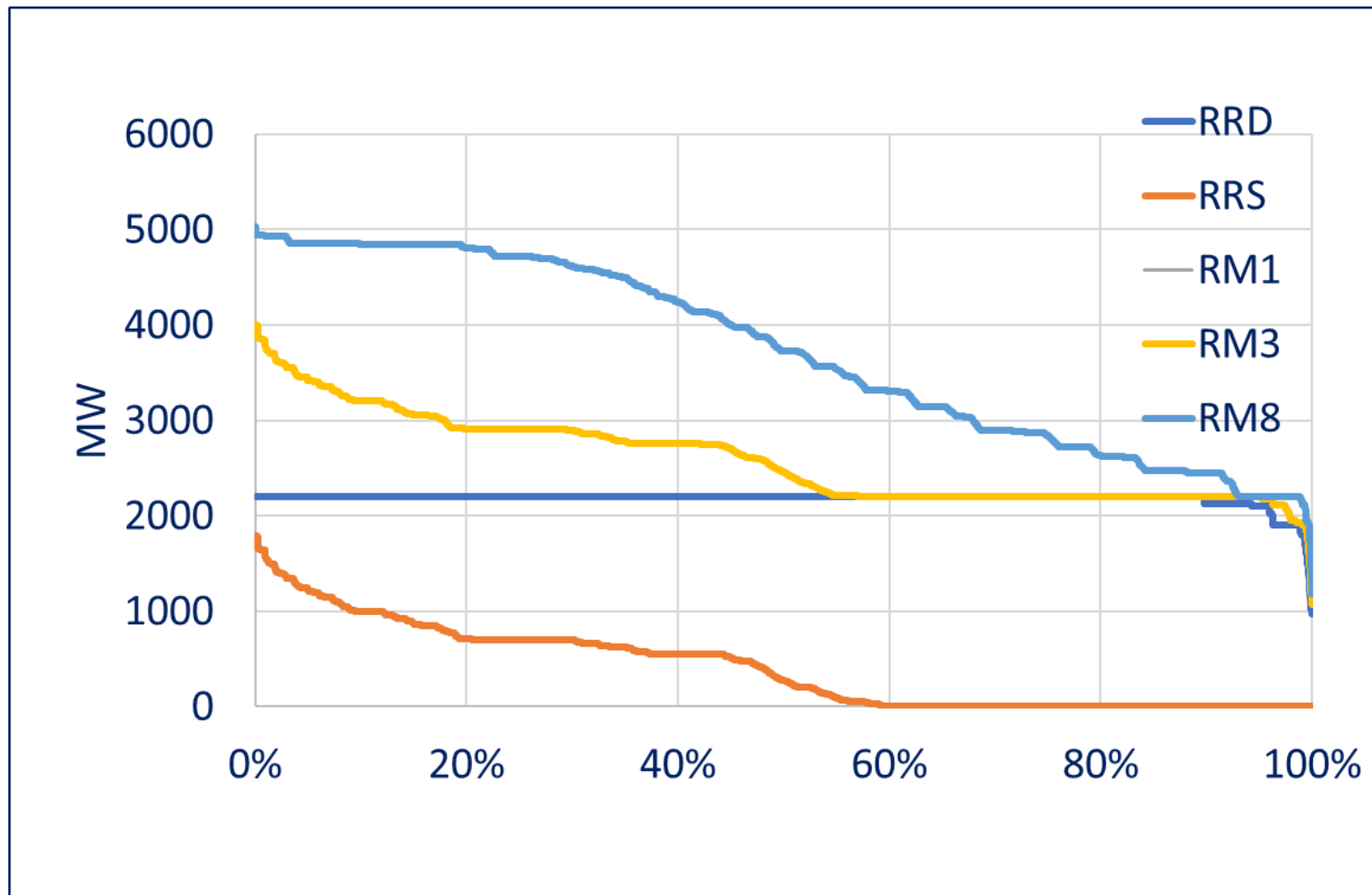




Available operating reserves from conventional generation



Available replacement reserves and ramping margins from conventional generation



Weather Years Scenario

This scenario covered 30 weather years. The results presented are for the Mean of all samples.

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	94.7	3565.4	102.8	43.3	151.3
Feb	146.0	2992.1	87.4	48.0	163.7
Mar	252.3	3003.3	65.7	55.9	191.3
Apr	344.8	2263.8	53.8	56.2	203.5
May	410.3	2167.9	48.7	56.7	205.1
Jun	423.3	1793.0	40.4	54.9	196.4
Jul	427.7	1716.4	34.8	56.3	201.4
Aug	380.8	1788.4	41.7	55.0	197.1
Sep	281.9	2129.5	43.8	54.2	187.2
Oct	183.0	2754.6	62.3	52.8	182.6
Nov	102.4	2897.3	94.9	50.6	178.4
Dec	71.5	3284.0	99.6	51.4	180.7
Year	3118.5	30355.8	775.8	635.2	2238.7

VRE Curtailment (%)

2030	Curtailment	
	Solar	Wind
Jan	8%	7%
Feb	8%	6%
Mar	8%	6%
Apr	4%	4%
May	4%	4%
Jun	3%	3%
Jul	2%	3%
Aug	4%	4%
Sep	7%	6%
Oct	9%	8%
Nov	8%	7%
Dec	7%	6%
Year	4.9%	5.6%

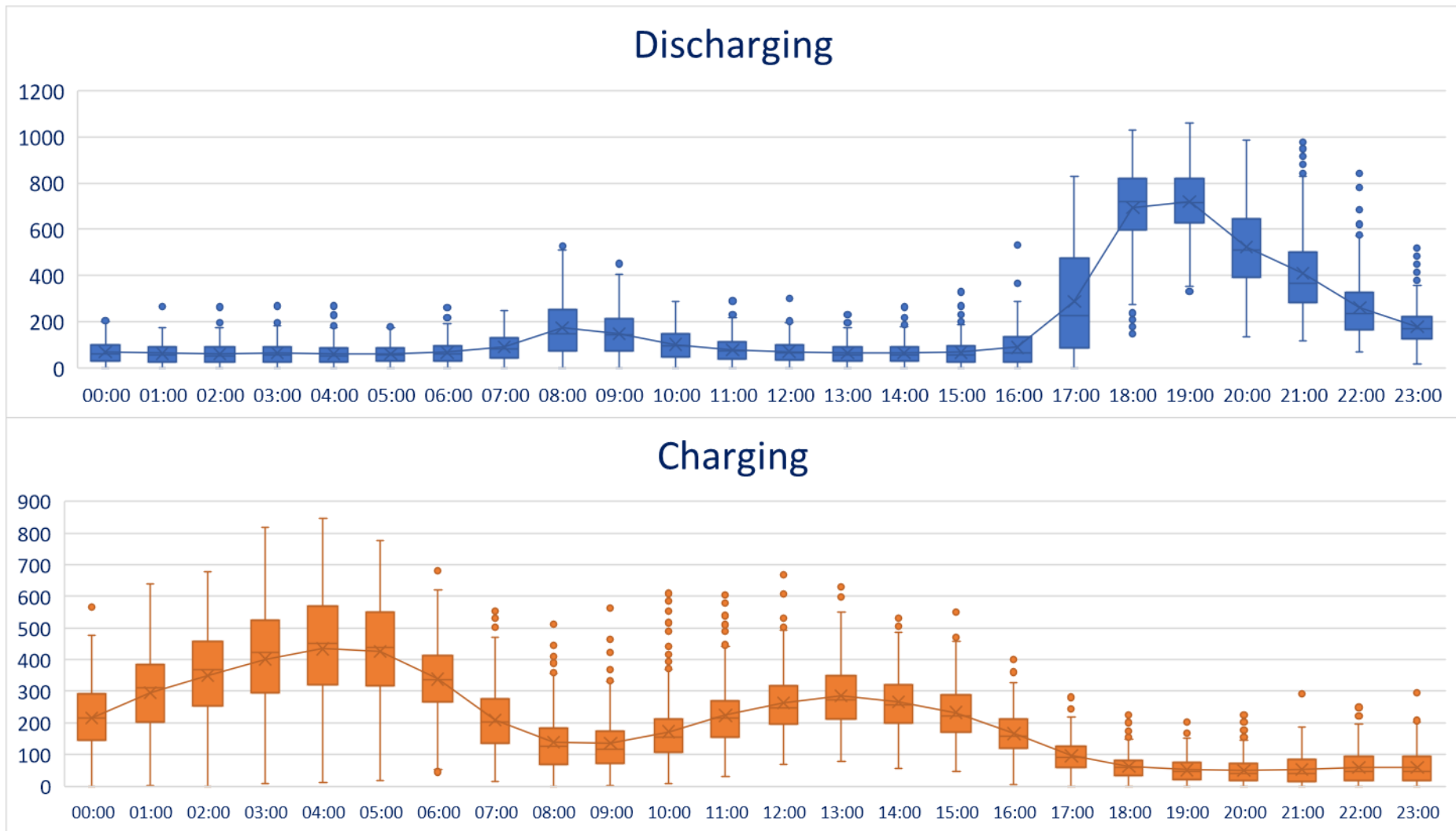
Running Hours and Starts

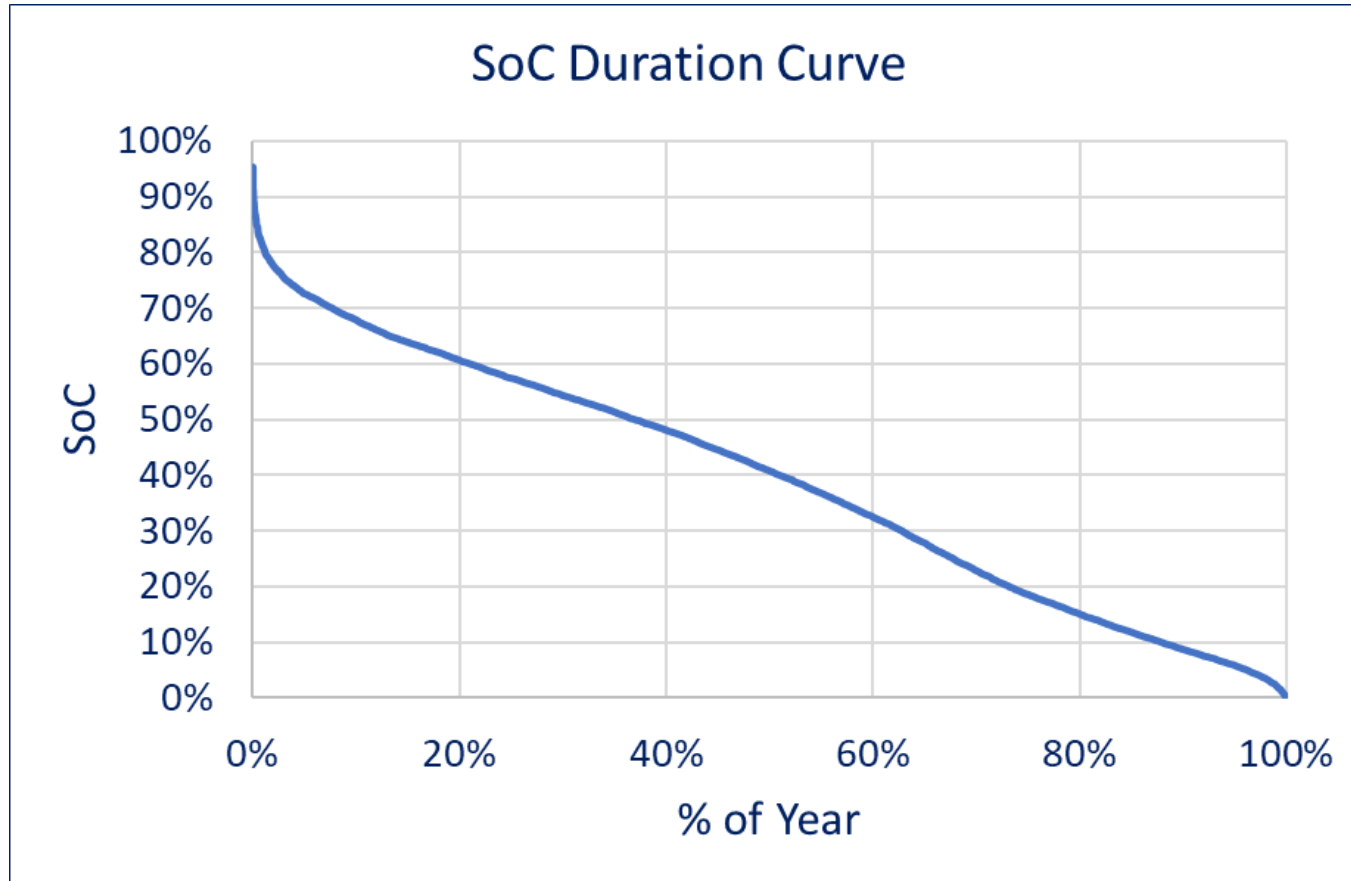
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	25	503	0	531	2	4	0	6
Feb	15	462	0	538	2	5	0	4
Mar	9	515	0	621	1	5	0	3
Apr	5	511	0	656	1	5	0	3
May	2	502	0	687	1	6	0	2
Jun	2	464	0	689	0	5	0	1
Jul	3	465	0	716	0	5	0	1
Aug	2	471	0	707	0	6	0	2
Sep	3	473	0	637	0	5	0	2
Oct	5	470	0	613	1	6	0	5
Nov	9	484	0	592	1	5	0	4
Dec	13	497	0	599	1	6	0	4
Year	93	5819	0	7584	11	64	0	37

Capacity Factors

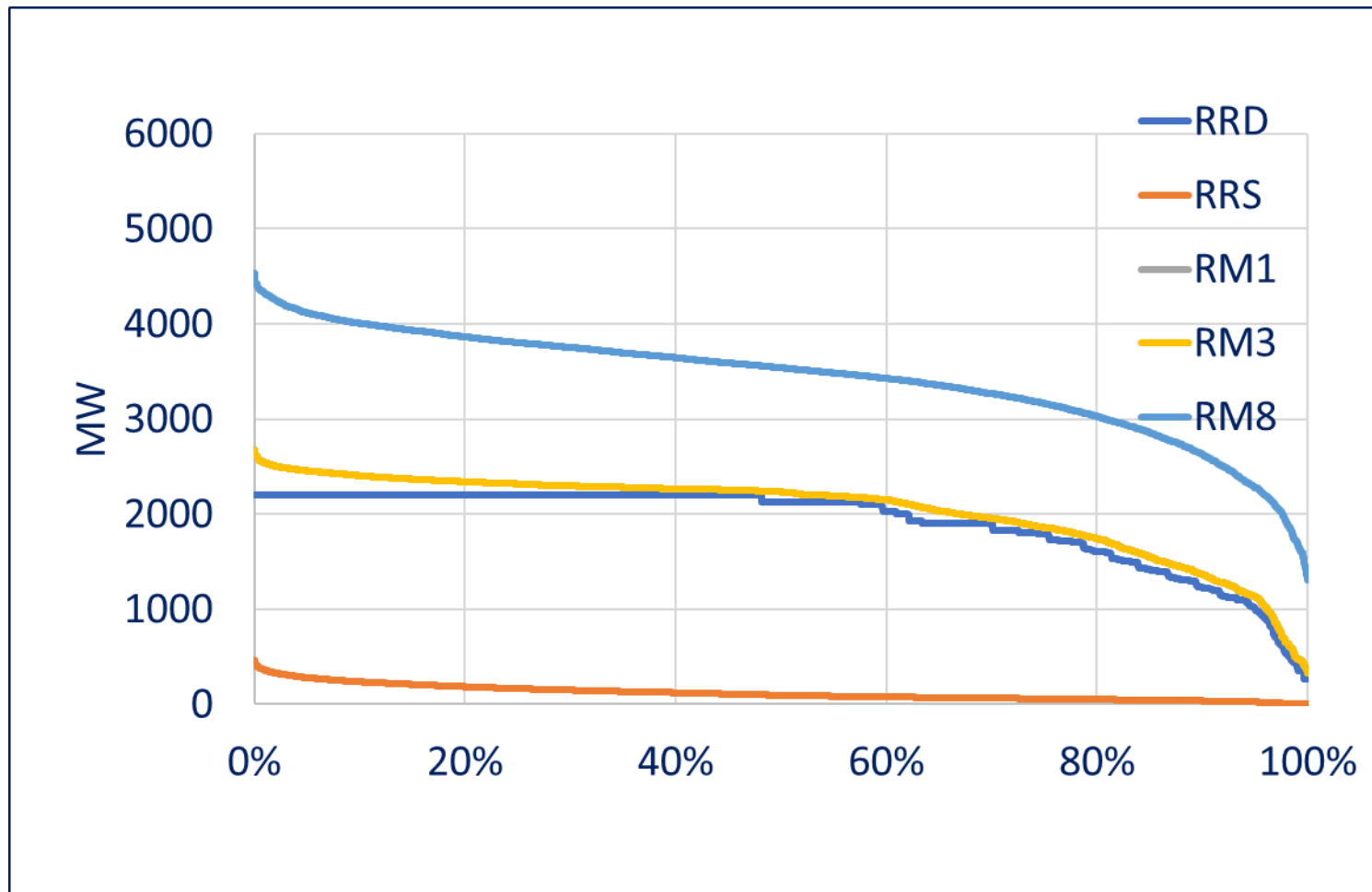
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	2.8%	51%	0%	58%	48%	61%	37%	4%	41%
Feb	1.8%	54%	0%	55%	59%	73%	39%	6%	38%
Mar	1.1%	55%	0%	37%	62%	77%	40%	10%	35%
Apr	0.6%	60%	0%	32%	65%	85%	45%	14%	27%
May	0.2%	58%	0%	28%	63%	83%	45%	17%	25%
Jun	0.1%	56%	0%	24%	63%	82%	47%	18%	21%
Jul	0.2%	53%	0%	20%	63%	81%	47%	17%	20%
Aug	0.2%	53%	0%	24%	61%	79%	46%	15%	21%
Sep	0.2%	53%	0%	26%	62%	78%	43%	12%	25%
Oct	0.4%	50%	0%	35%	59%	73%	41%	7%	32%
Nov	1.0%	53%	0%	56%	58%	75%	40%	4%	35%
Dec	1.5%	52%	0%	56%	57%	72%	40%	3%	38%
Yearly	0.8%	54%	0%	38%	60%	77%	42%	11%	30%

Battery Usage Profiles





Available replacement Reserve and Ramping Margin from conventional generation



Sensitivity 1 – Removal of Min Units Constraint

Annual Production from RES-E Generation (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	87.8	3665.1	111.4	45.5	184.6
Feb	138.7	3477.9	91.2	36.1	155.8
Mar	266.9	3462.0	66.2	43.7	174.3
Apr	409.7	1377.4	53.9	77.8	226.4
May	403.0	2267.8	48.7	57.3	214.5
Jun	391.1	1583.0	40.4	67.1	222.7
Jul	473.4	1355.6	34.8	74.5	229.9
Aug	331.3	2623.9	41.8	43.9	163.1
Sep	266.3	2190.4	43.8	59.2	200.0
Oct	179.9	3314.5	62.7	42.2	153.2
Nov	80.1	3351.6	97.7	43.0	153.2
Dec	71.9	3540.5	100.7	45.7	174.9
Year	3099.9	32209.9	793.4	636.0	2252.6

VRE Curtailment (%)

2030	Solar	Wind
Jan	4%	3%
Feb	4%	5%
Mar	6%	7%
Apr	1%	1%
May	1%	2%
Jun	1%	1%
Jul	0%	0%
Aug	14%	7%
Sep	5%	4%
Oct	9%	8%
Nov	21%	12%
Dec	6%	8%
Year	4.6%	5.6%

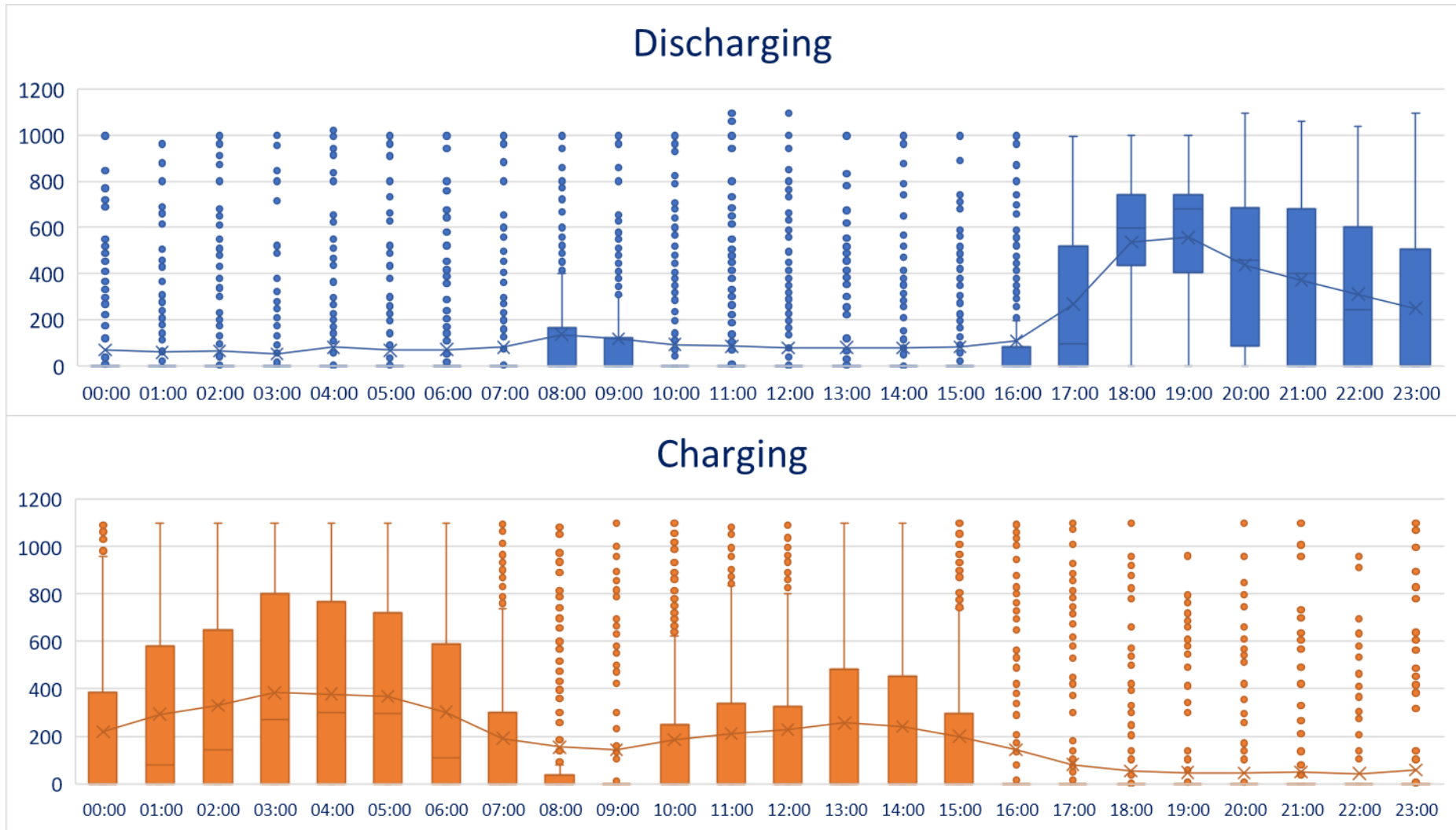
Running Hours and Starts

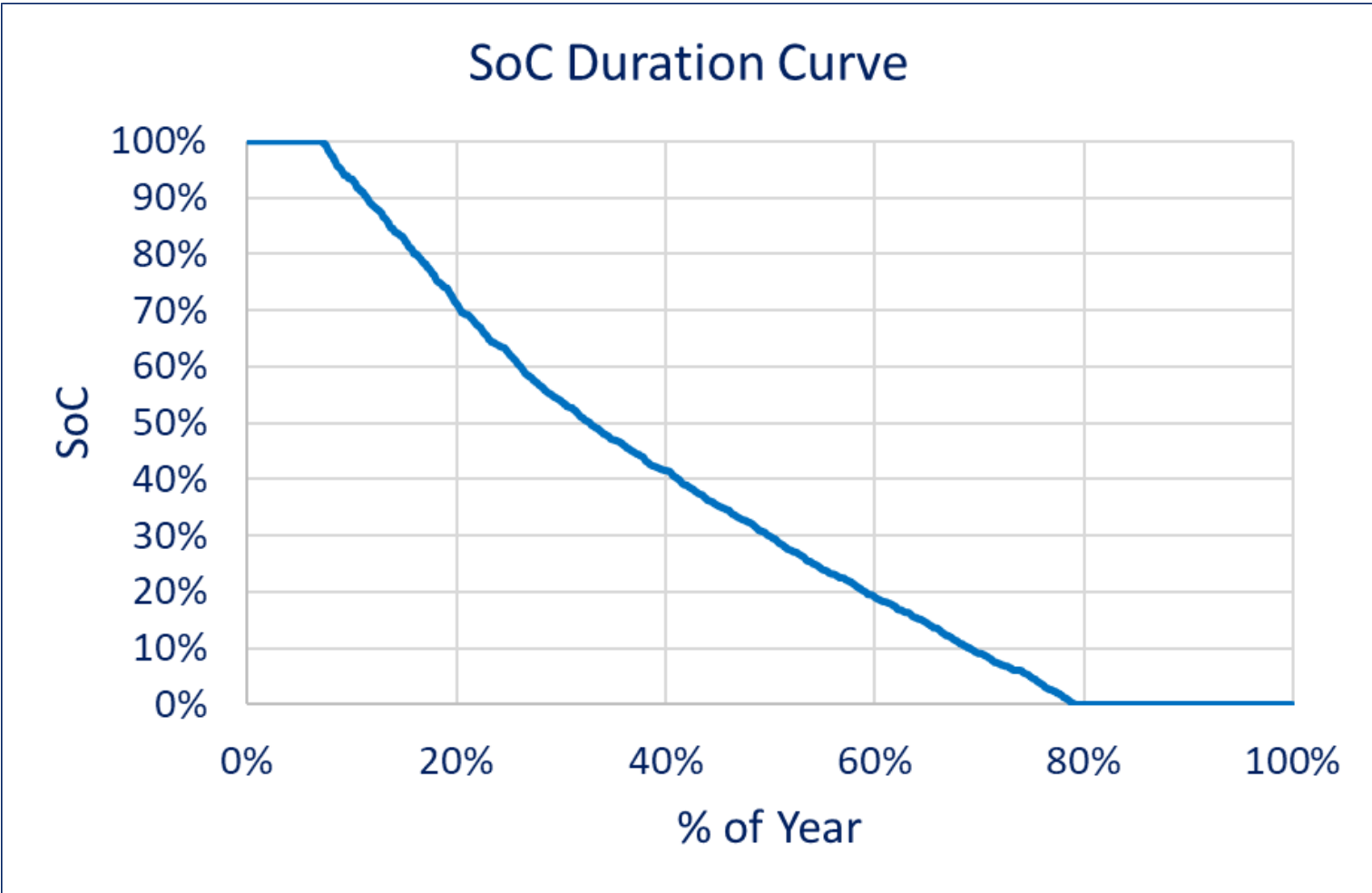
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	14	344	0	434	2	6	0	8
Feb	6	321	0	389	2	5	0	6
Mar	9	379	0	453	2	6	0	5
Apr	9	536	0	692	2	4	0	1
May	2	394	0	519	1	5	0	4
Jun	1	378	0	640	0	4	0	2
Jul	1	376	0	694	0	5	0	1
Aug	1	270	0	427	0	5	0	4
Sep	2	334	0	592	1	6	0	9
Oct	5	300	0	422	1	7	0	8
Nov	4	347	0	429	1	5	0	6
Dec	7	361	0	461	2	7	0	7
Year	59	4339	0	6152	15	66	0	61

Capacity Factors

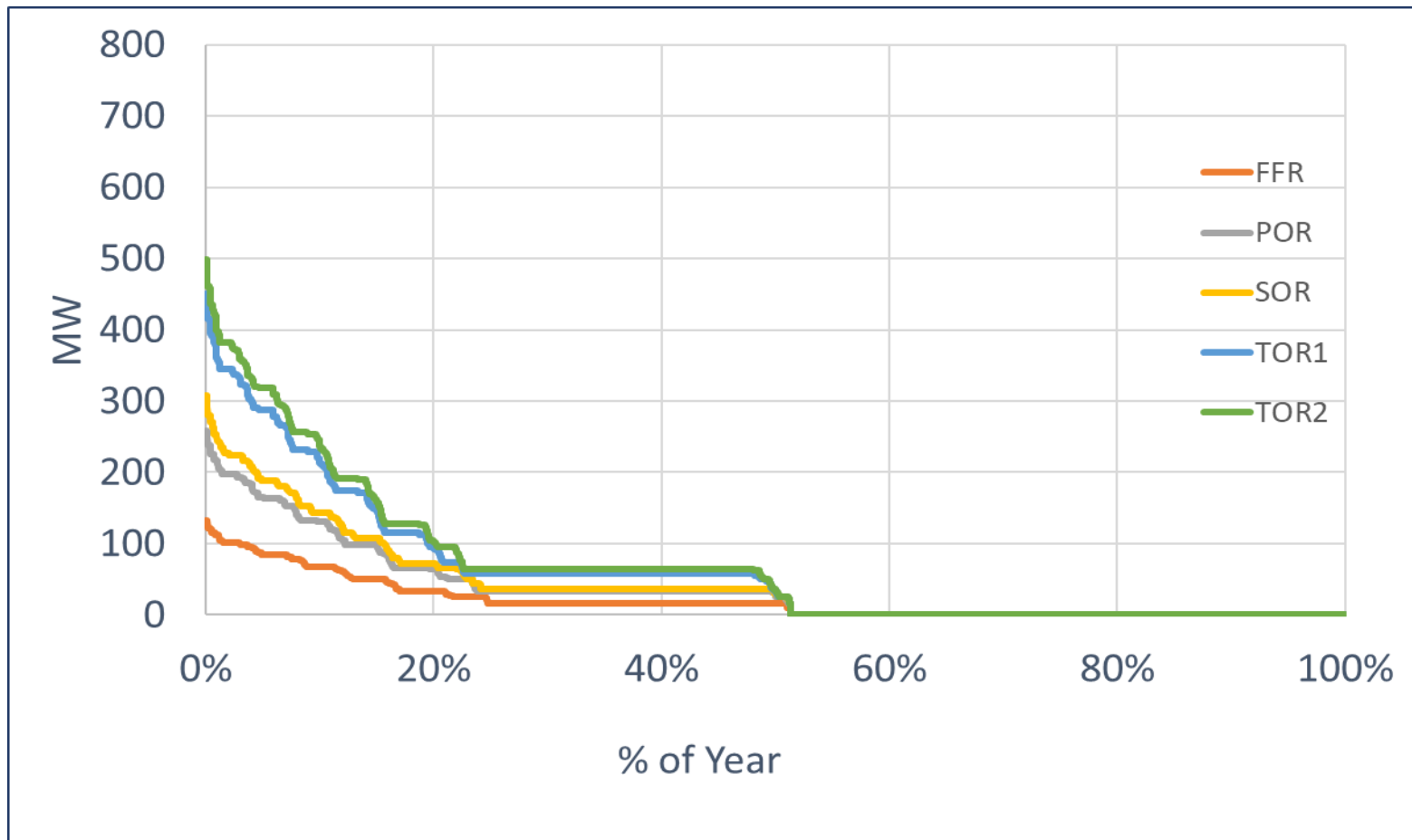
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	1.5%	44%	0%	63%	51%	74%	41%	4%	42%
Feb	0.8%	44%	0%	57%	44%	69%	38%	6%	44%
Mar	1.1%	44%	0%	38%	49%	70%	40%	11%	40%
Apr	1.3%	71%	0%	32%	89%	94%	49%	17%	16%
May	0.4%	51%	0%	28%	64%	86%	47%	16%	26%
Jun	0.2%	55%	0%	24%	77%	93%	48%	16%	19%
Jul	0.2%	53%	0%	20%	83%	93%	49%	19%	16%
Aug	0.1%	36%	0%	24%	49%	66%	42%	13%	30%
Sep	0.4%	45%	0%	26%	68%	83%	45%	11%	26%
Oct	0.7%	39%	0%	36%	47%	62%	38%	7%	38%
Nov	0.5%	44%	0%	57%	49%	73%	36%	3%	40%
Dec	1.1%	46%	0%	57%	51%	62%	39%	3%	41%
Yearly	0.7%	48%	0%	38%	60%	77%	43%	11%	32%

Battery Usage Profiles

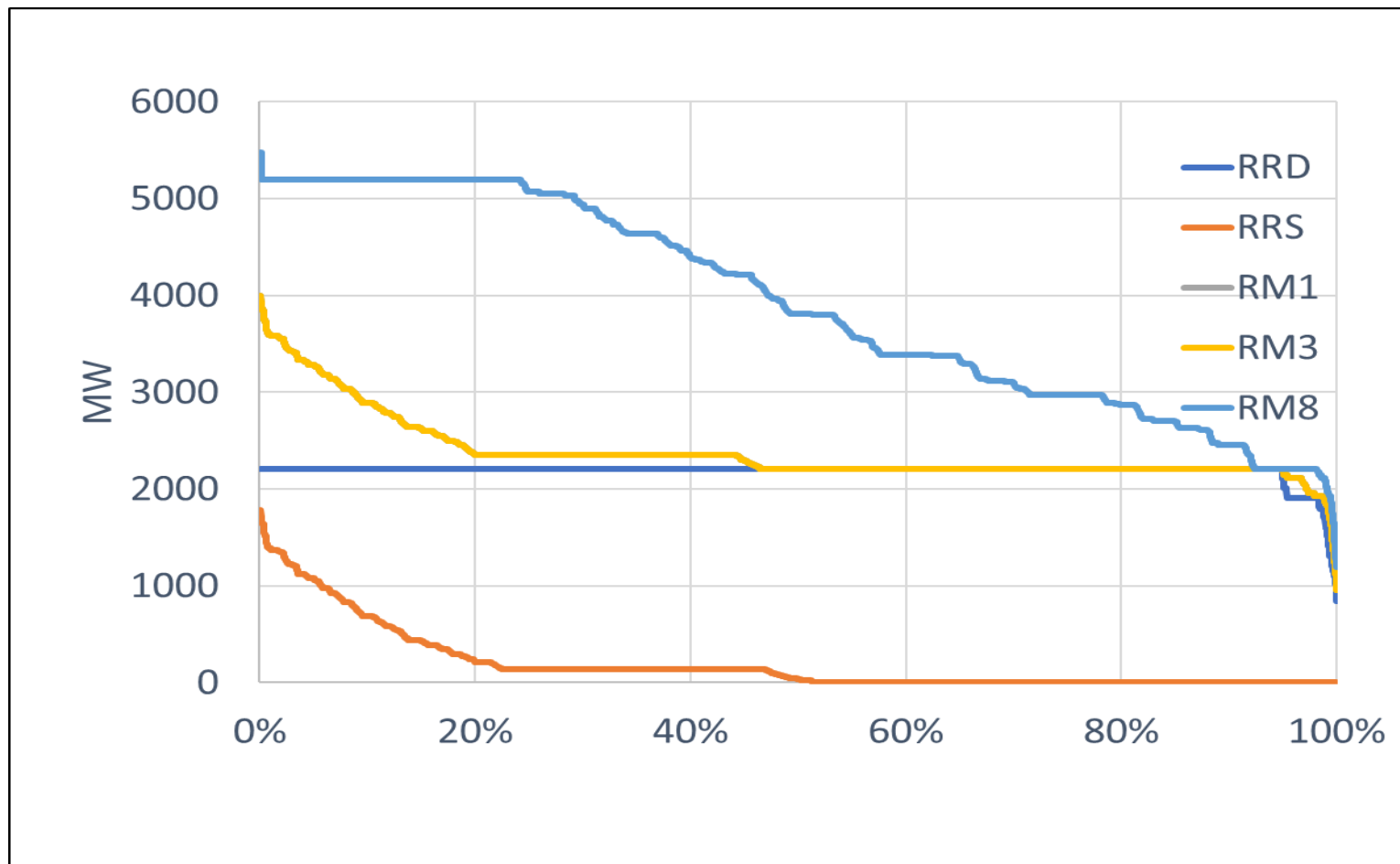




Available operating reserves from conventional generation



Available replacement reserve and ramping margin from conventional generation



Sensitivity 2 - Increased Wind Capacity

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	88.9	5180.0	110.4	44.2	185.9
Feb	138.4	4838.5	90.3	38.6	154.8
Mar	265.0	4817.9	66.2	45.7	177.8
Apr	410.7	1941.8	53.9	75.8	227.0
May	402.7	3179.8	48.7	61.3	223.7
Jun	394.3	2257.9	40.4	67.3	221.7
Jul	473.3	2205.9	34.8	73.3	228.9
Aug	342.9	3609.5	41.8	45.4	159.5
Sep	268.2	3117.4	43.8	58.0	198.4
Oct	176.3	4680.2	62.7	40.4	145.4
Nov	82.5	4721.5	97.7	40.4	146.6
Dec	73.1	4846.4	101.0	45.7	180.2
Year	3116.2	45396.9	791.8	636.0	2249.7

VRE Curtailment (%)

2030	Solar	Wind
Jan	2%	2%
Feb	4%	4%
Mar	7%	7%
Apr	0%	0%
May	1%	2%
Jun	0%	0%
Jul	0%	1%
Aug	11%	6%
Sep	5%	3%
Oct	11%	7%
Nov	18%	12%
Dec	5%	8%
Year	4.1%	5.3%

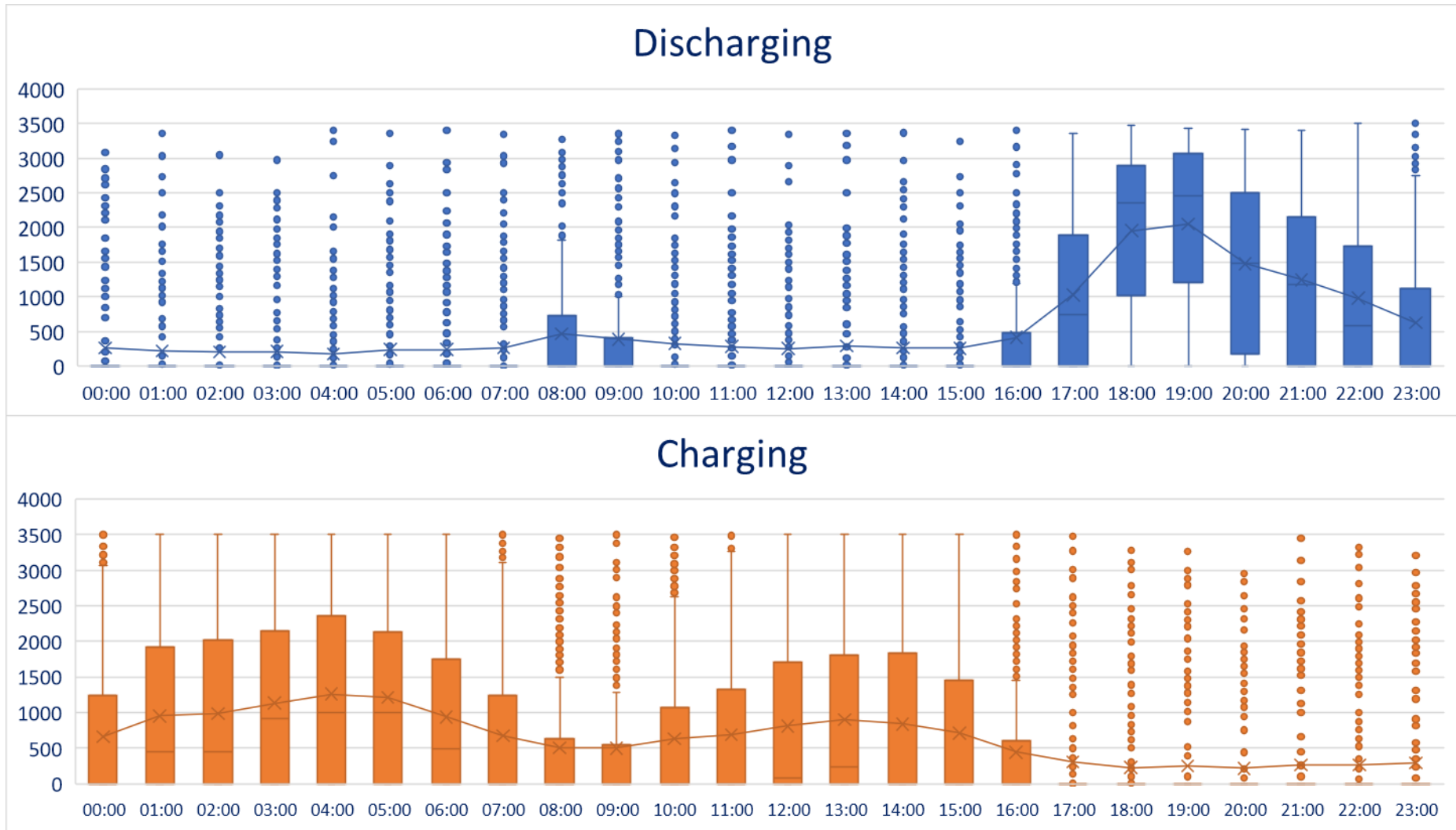
Running Hours and Starts

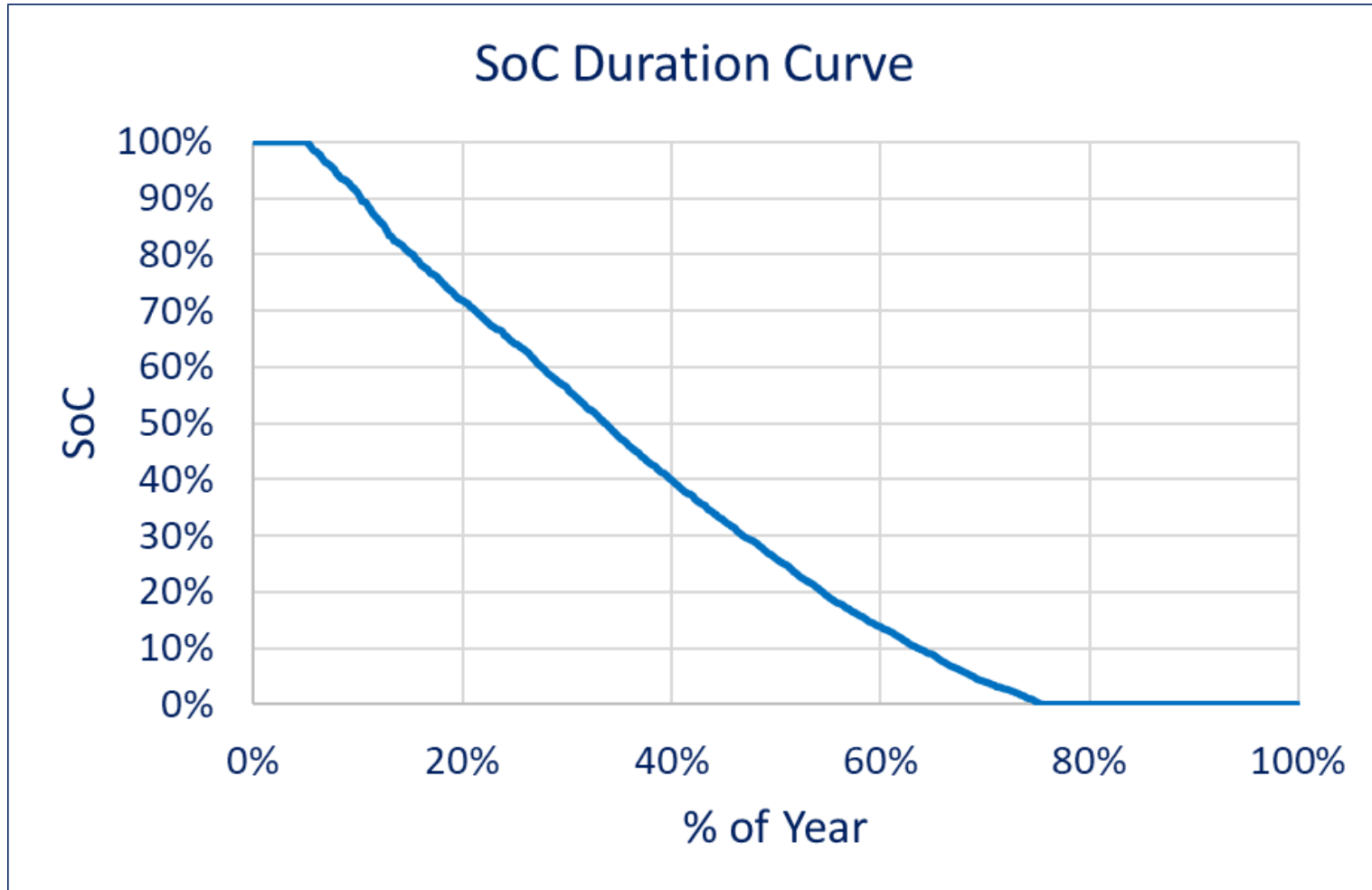
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	2	456	0	452	0	5	0	10
Feb	4	395	0	392	1	4	0	8
Mar	3	435	0	479	1	4	0	5
Apr	1	500	0	661	0	4	0	2
May	1	451	0	614	0	5	0	4
Jun	2	441	0	623	0	5	0	2
Jul	2	407	0	692	0	5	0	3
Aug	4	398	0	450	0	5	0	4
Sep	3	395	0	614	0	4	0	4
Oct	4	409	0	423	1	5	0	10
Nov	3	385	0	408	0	4	0	4
Dec	7	434	0	457	1	5	0	8
Year	35	5105	0	6265	6	54	0	64

Capacity Factors

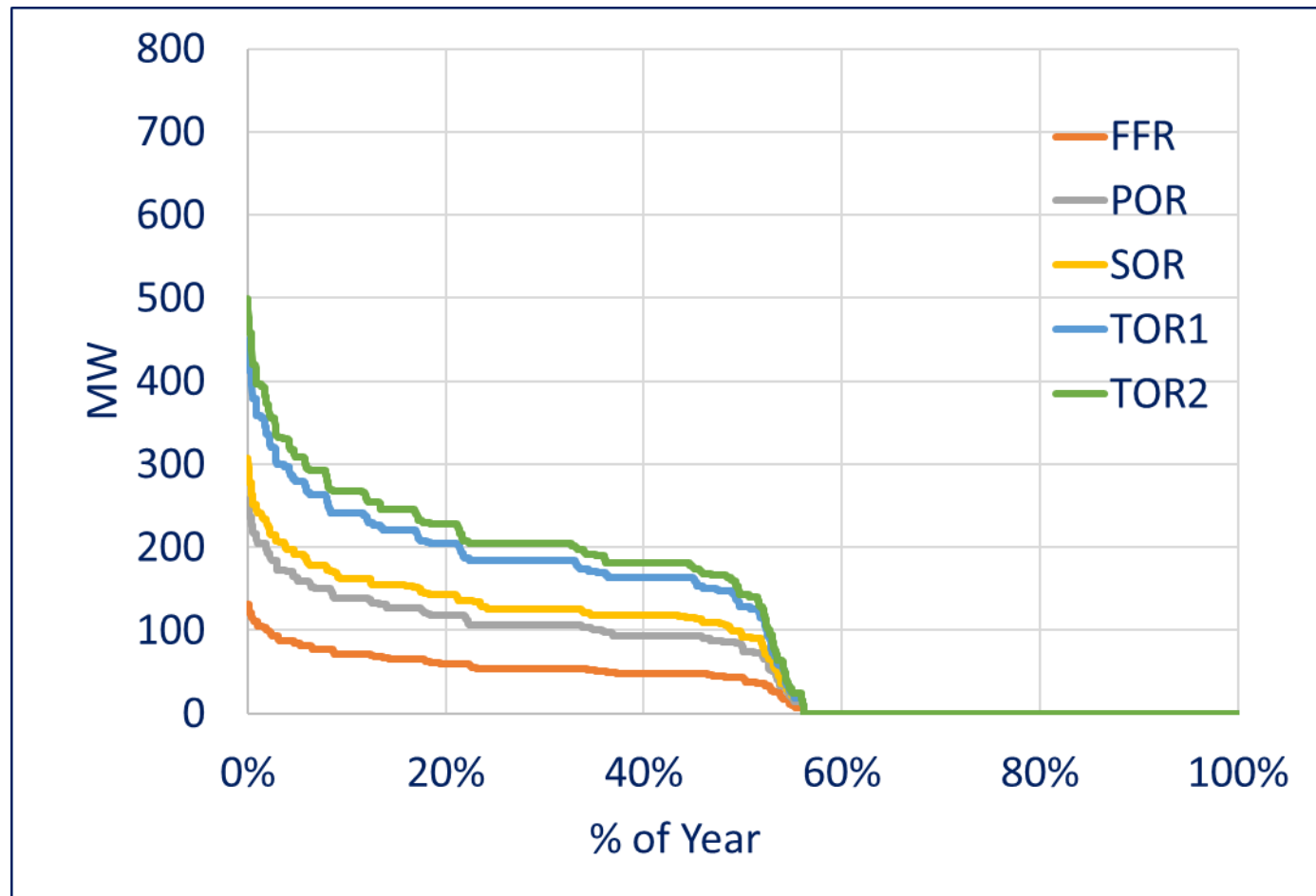
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	0.1%	42%	0%	63%	49%	75%	38%	4%	45%
Feb	0.4%	42%	0%	57%	47%	69%	35%	6%	46%
Mar	0.2%	41%	0%	38%	51%	72%	38%	11%	42%
Apr	0.1%	61%	0%	32%	87%	94%	49%	17%	17%
May	0.0%	51%	0%	28%	68%	90%	46%	16%	27%
Jun	0.1%	52%	0%	24%	77%	92%	48%	17%	20%
Jul	0.1%	46%	0%	20%	81%	92%	48%	19%	19%
Aug	0.2%	39%	0%	24%	50%	64%	42%	14%	31%
Sep	0.1%	41%	0%	26%	67%	82%	45%	11%	28%
Oct	0.1%	38%	0%	36%	45%	58%	36%	7%	40%
Nov	0.2%	36%	0%	57%	46%	75%	35%	3%	42%
Dec	0.3%	44%	0%	57%	51%	59%	36%	3%	42%
Yearly	0.2%	44%	0%	38%	60%	77%	41%	11%	33%

Battery Usage Profiles

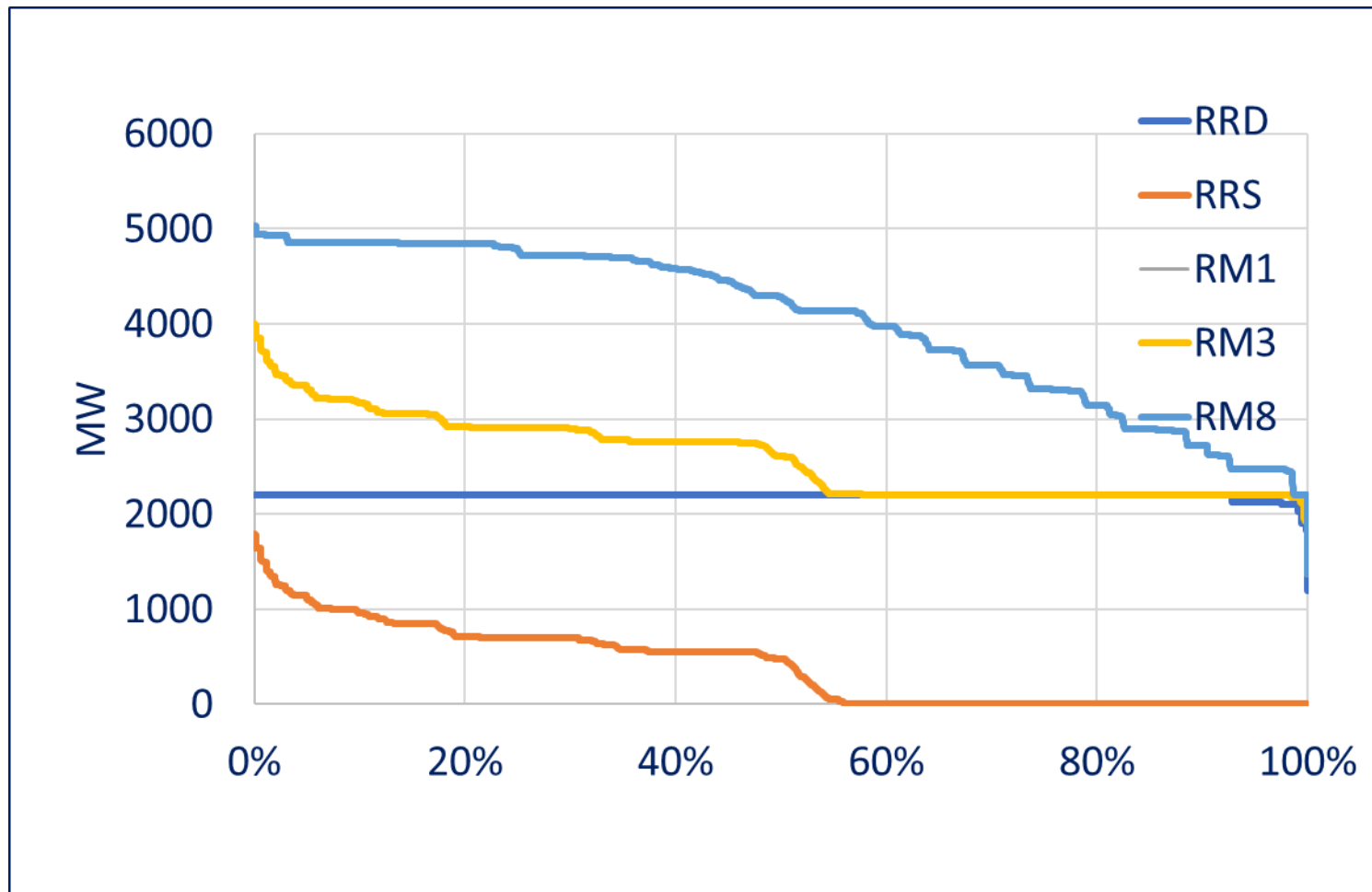




Available operating reserves from conventional generation



Available replacement reserves and ramping margins from conventional generation



Sensitivity 3 - Increased 'Smartness'

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	84.5	3641.1	111.4	45.6	181.7
Feb	135.6	3470.1	91.2	35.7	153.2
Mar	260.6	3449.0	66.2	46.6	171.1
Apr	407.1	1381.4	53.9	77.3	225.9
May	401.1	2263.5	48.7	57.2	217.8
Jun	389.7	1583.4	40.4	65.0	222.9
Jul	470.9	1352.5	34.8	75.1	228.8
Aug	328.1	2596.2	41.8	43.8	162.8
Sep	262.4	2183.9	43.8	57.7	200.9
Oct	172.0	3291.5	62.7	41.4	157.7
Nov	78.5	3324.4	97.7	43.8	151.0
Dec	71.0	3515.8	100.5	46.7	178.4
Year	3061.3	32052.7	793.2	636.0	2252.1

VRE Curtailment (%)

2030	Solar	Wind
Jan	7%	4%
Feb	6%	5%
Mar	8%	7%
Apr	1%	0%
May	1%	2%
Jun	1%	1%
Jul	1%	1%
Aug	15%	8%
Sep	7%	5%
Oct	13%	8%
Nov	22%	13%
Dec	8%	8%
Year	5.8%	6.1%

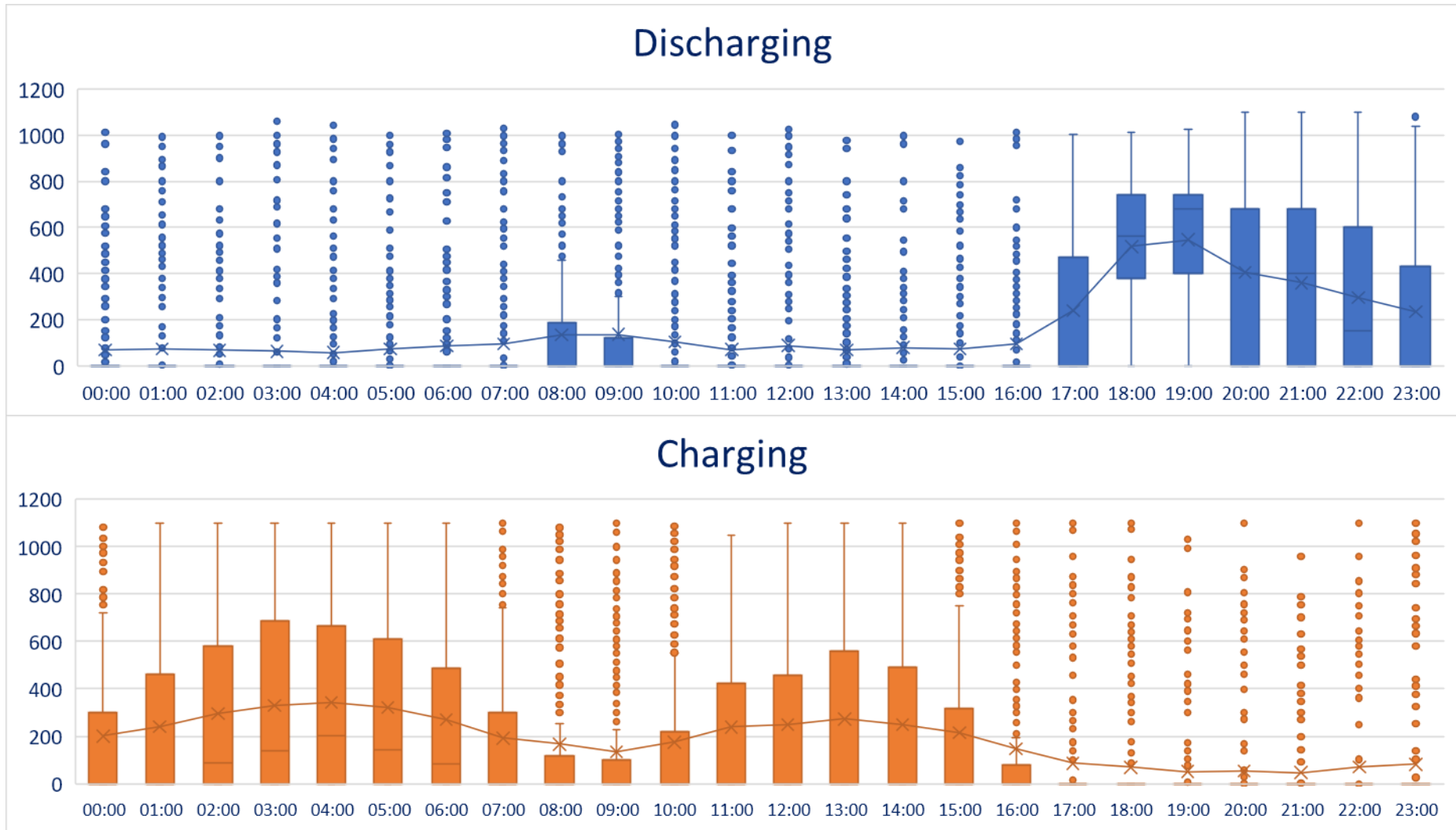
Running Hours and Starts

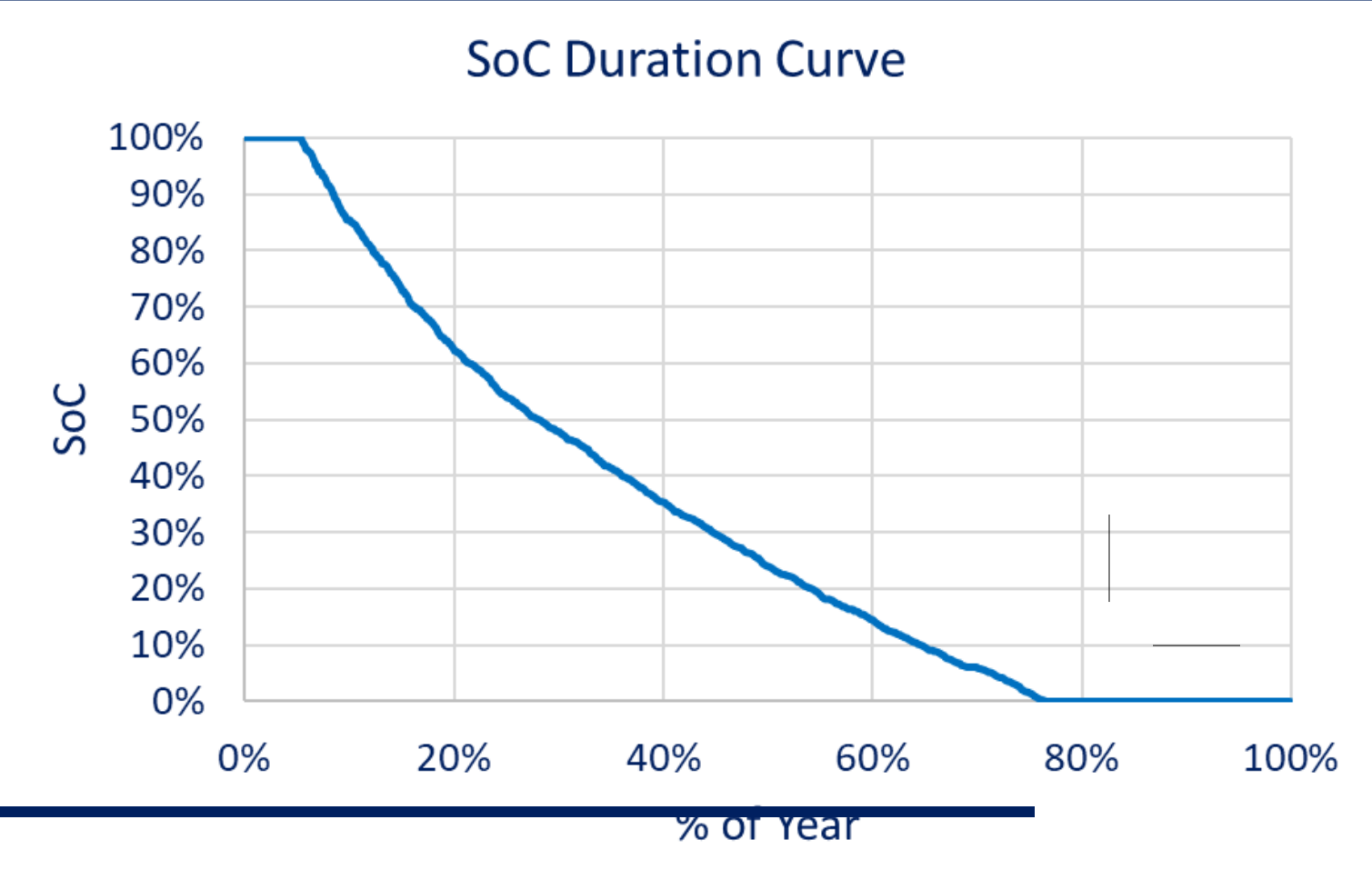
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	8	520	0	438	2	5	0	8
Feb	7	450	0	352	2	5	0	7
Mar	9	484	0	485	2	5	0	5
Apr	5	570	0	670	2	4	0	1
May	2	510	0	517	1	6	0	4
Jun	4	484	0	624	1	5	0	2
Jul	3	502	0	663	1	5	0	4
Aug	4	448	0	430	0	6	0	4
Sep	3	476	0	566	1	6	0	6
Oct	7	454	0	428	1	6	0	9
Nov	4	462	0	434	1	4	0	5
Dec	12	501	0	461	2	6	0	6
Year	67	5861	0	6068	14	66	0	61

Capacity Factors

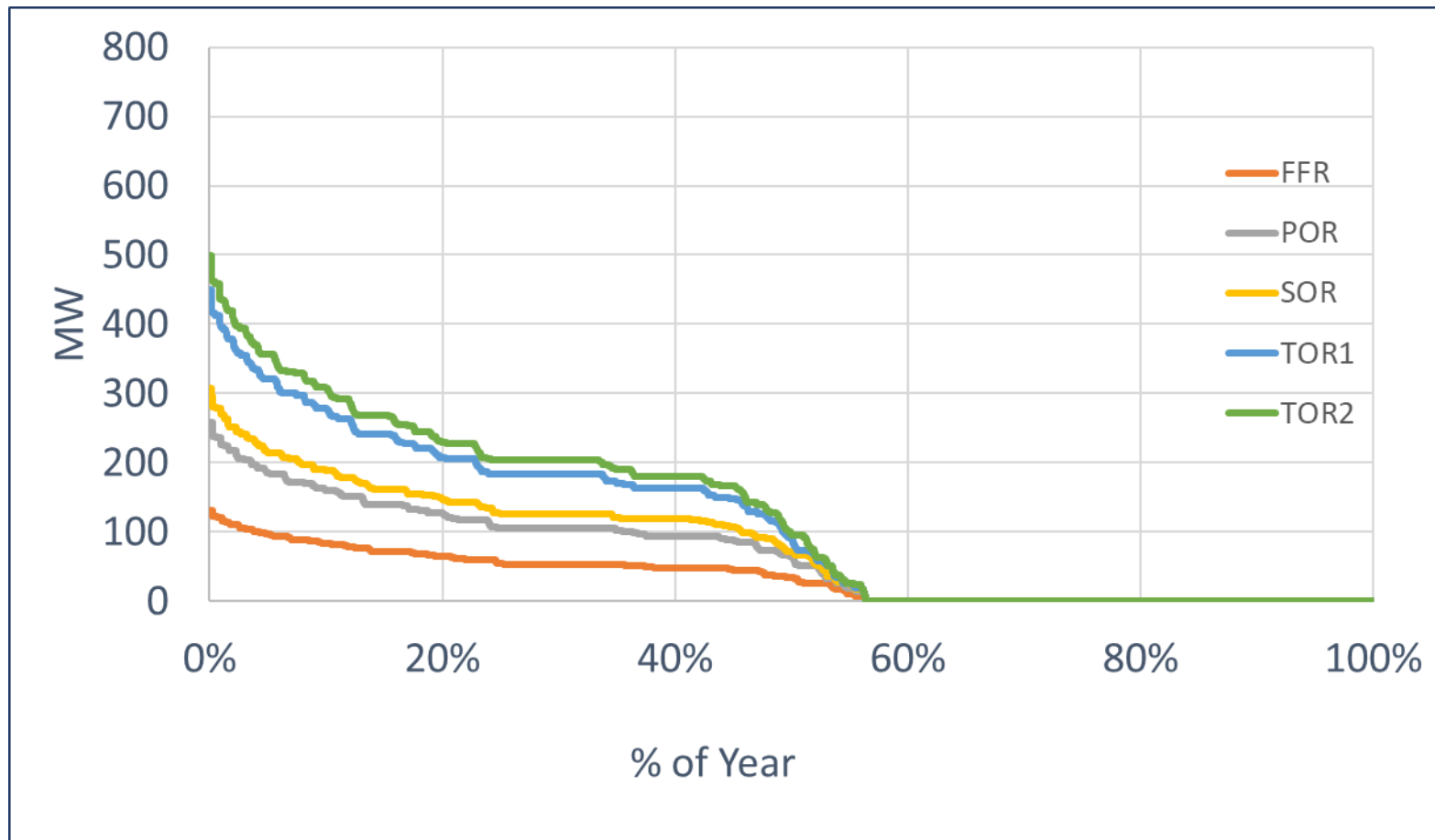
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	0.9%	53%	0%	63%	51%	73%	40%	3%	42%
Feb	0.7%	50%	0%	57%	44%	68%	37%	5%	44%
Mar	0.9%	49%	0%	38%	52%	69%	39%	11%	40%
Apr	0.9%	73%	0%	32%	89%	94%	49%	17%	16%
May	0.3%	58%	0%	28%	64%	88%	47%	16%	26%
Jun	0.4%	61%	0%	24%	75%	93%	47%	16%	19%
Jul	0.2%	60%	0%	20%	83%	92%	48%	19%	16%
Aug	0.2%	46%	0%	24%	49%	66%	40%	13%	30%
Sep	0.3%	53%	0%	26%	66%	84%	44%	11%	26%
Oct	0.5%	47%	0%	36%	46%	63%	37%	7%	38%
Nov	0.3%	49%	0%	57%	50%	74%	36%	3%	40%
Dec	0.9%	53%	0%	57%	52%	61%	38%	3%	41%
Yearly	0.5%	54%	0%	38%	60%	77%	42%	11%	31%

Battery Usage Profiles

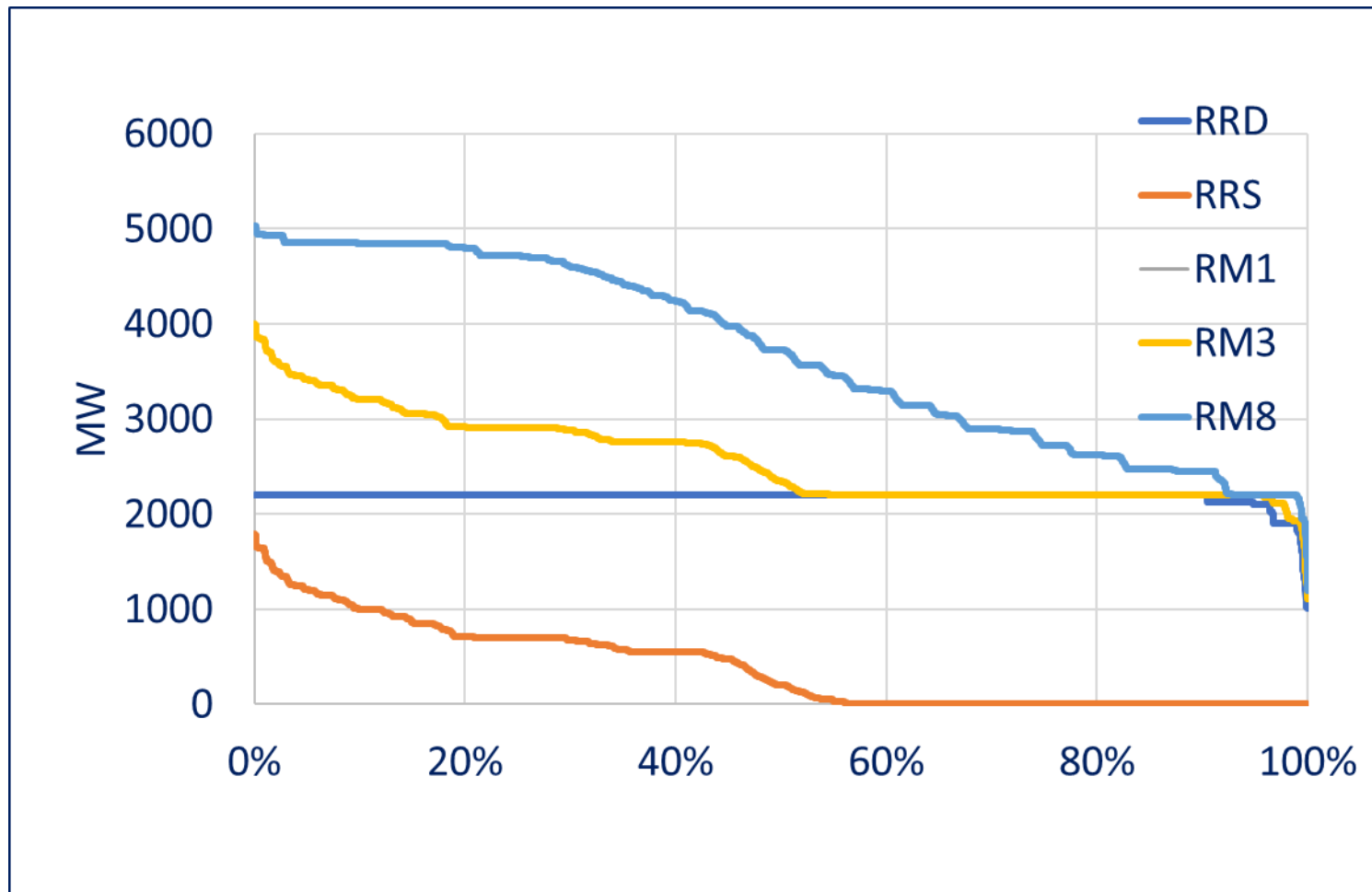




Available operating reserves from conventional generation



Available replacement reserves and ramping margin from conventional generation



Sensitivity 4 – CCS

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	81.5	3628.9	111.4	45.5	184.6
Feb	136.6	3439.0	91.2	36.1	155.5
Mar	261.0	3432.5	66.2	43.7	172.8
Apr	404.9	1379.5	53.9	77.3	228.1
May	401.7	2258.0	48.7	57.8	214.5
Jun	388.5	1578.5	40.4	67.0	222.7
Jul	471.4	1350.5	34.8	74.5	229.9
Aug	322.4	2597.2	41.8	43.9	163.0
Sep	259.5	2178.0	43.8	59.2	200.1
Oct	171.9	3270.7	62.7	42.2	153.2
Nov	76.0	3317.5	97.7	43.0	153.2
Dec	71.2	3493.8	100.5	45.7	174.4
Year	3046.4	31924.2	793.2	636.0	2252.1

VRE Curtailment (%)

2030	Solar	Wind
Jan	7%	4%
Feb	6%	6%
Mar	9%	8%
Apr	1%	1%
May	1%	2%
Jun	2%	1%
Jul	1%	1%
Aug	16%	8%
Sep	5%	5%
Oct	12%	9%
Nov	24%	13%
Dec	7%	8%
Year	5.8%	6.4%

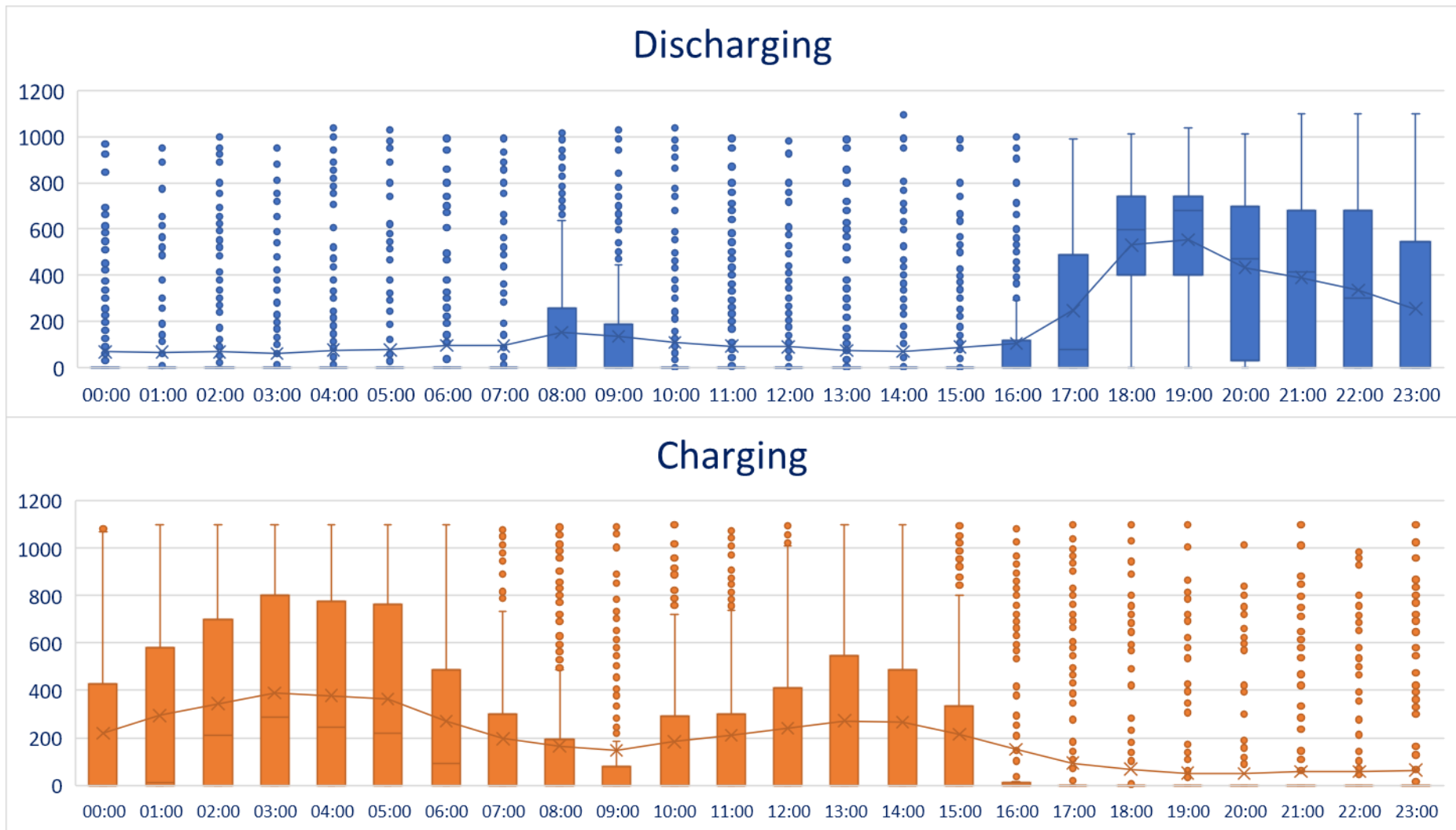
Running Hours and Starts

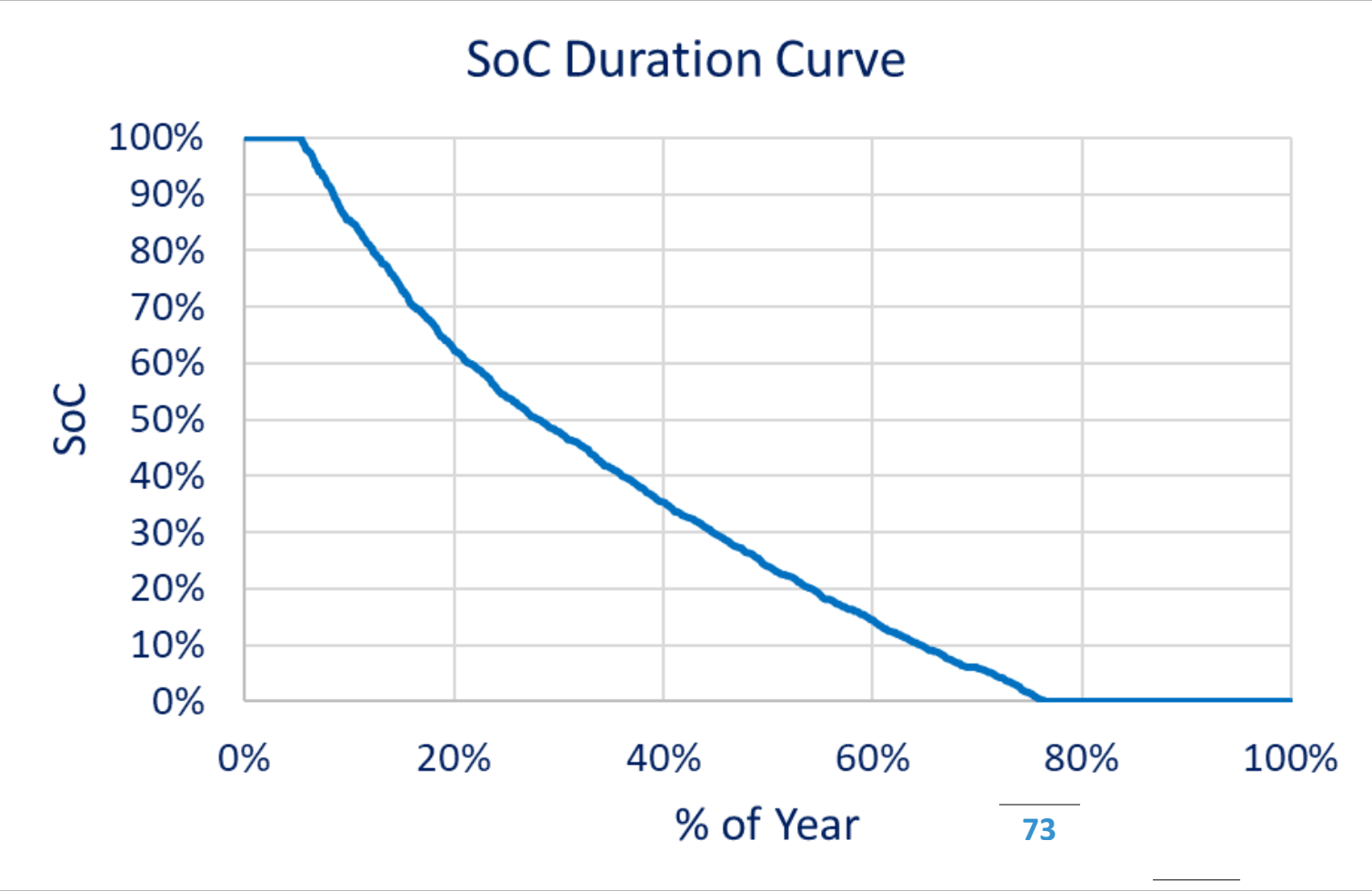
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	13	502	0	431	2	5	0	8
Feb	8	450	0	364	2	5	0	6
Mar	12	502	0	410	2	5	0	4
Apr	7	592	0	693	2	4	0	1
May	6	520	0	549	1	5	0	3
Jun	2	494	0	605	1	5	0	4
Jul	5	505	0	667	1	5	0	5
Aug	4	440	0	451	1	5	0	5
Sep	3	472	0	560	1	5	0	6
Oct	9	451	0	419	2	6	0	9
Nov	6	469	0	430	1	4	0	6
Dec	13	493	0	456	2	6	0	6
Year	87	5890	0	6035	17	60	0	63

Capacity Factors

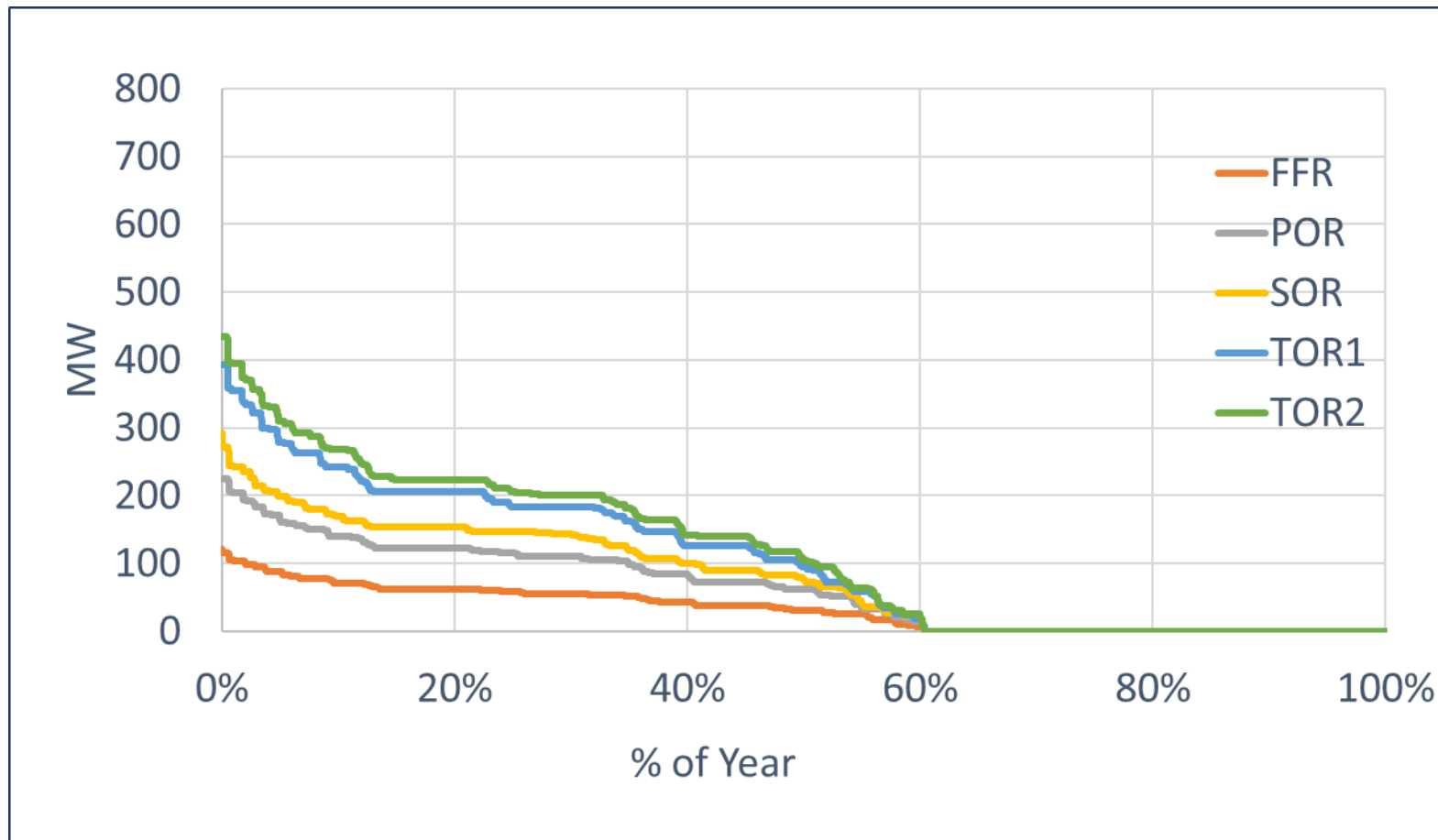
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	1.0%	44%	0%	63%	51%	73%	38%	3%	41%
Feb	0.7%	44%	0%	57%	42%	68%	36%	5%	43%
Mar	0.9%	44%	0%	38%	49%	72%	38%	11%	38%
Apr	0.8%	69%	0%	32%	88%	94%	49%	17%	16%
May	0.3%	53%	0%	28%	64%	89%	47%	16%	25%
Jun	0.3%	54%	0%	24%	77%	92%	48%	16%	19%
Jul	0.2%	54%	0%	20%	84%	92%	47%	19%	15%
Aug	0.3%	40%	0%	24%	50%	66%	39%	13%	29%
Sep	0.2%	48%	0%	26%	68%	82%	44%	11%	26%
Oct	0.6%	40%	0%	36%	47%	62%	37%	7%	37%
Nov	0.5%	44%	0%	57%	48%	72%	36%	3%	38%
Dec	1.0%	46%	0%	57%	51%	61%	36%	3%	40%
Yearly	0.6%	48%	0%	38%	60%	77%	41%	10%	31%

Battery Usage Profiles

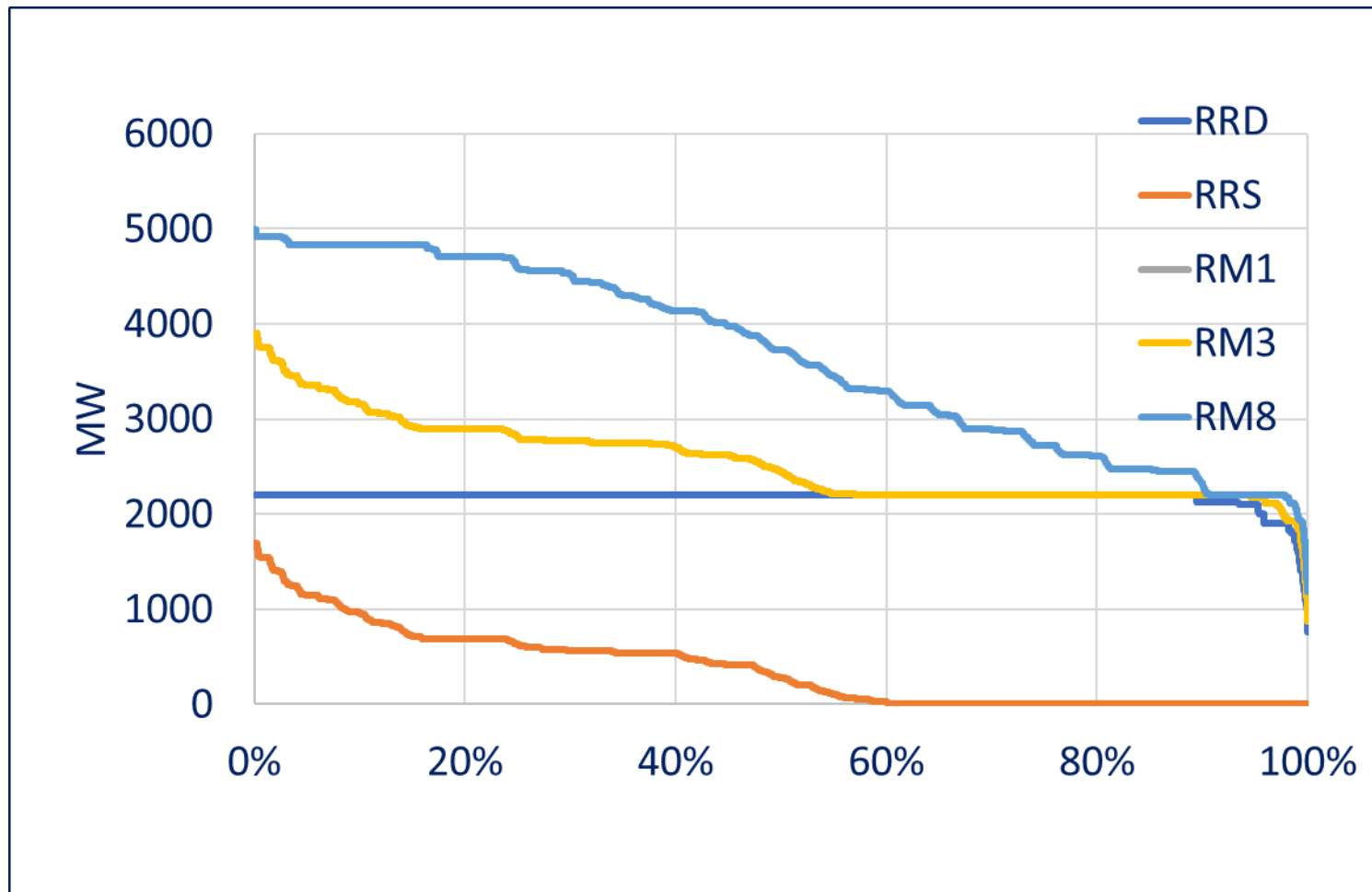




Available operating reserves from conventional generation



Available replacement reserves and ramping margin from conventional generation



Sensitivity 5 – Varying portfolios in France and GB

Annual Production for each type of RES-E (GWh)

2030	GWh Volumes				
	Solar	Wind	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES
Jan	94.0	3543.7	100.3	29.6	120.1
Feb	144.5	2968.8	87.3	36.7	136.5
Mar	249.3	2979.6	65.3	45.8	172.6
Apr	343.2	2248.4	53.7	69.9	214.5
May	409.4	2162.0	48.6	70.8	223.1
Jun	421.7	1786.9	40.4	68.1	221.9
Jul	427.3	1712.3	34.7	69.9	233.8
Aug	379.1	1782.5	41.7	64.7	222.8
Sep	280.5	2115.7	43.7	52.3	197.1
Oct	181.7	2732.5	62.2	47.1	177.2
Nov	101.4	2879.3	94.9	38.3	167.5
Dec	71.4	3268.0	100.2	42.7	160.9
Year	3103.3	30179.6	773.1	635.8	2248.1

VRE Curtailment (%)

2030	Solar	Wind
Jan	9%	7%
Feb	9%	7%
Mar	9%	7%
Apr	4%	4%
May	4%	4%
Jun	3%	3%
Jul	2%	3%
Aug	4%	4%
Sep	8%	7%
Oct	10%	8%
Nov	9%	7%
Dec	7%	7%
Year	5.4%	6.2%

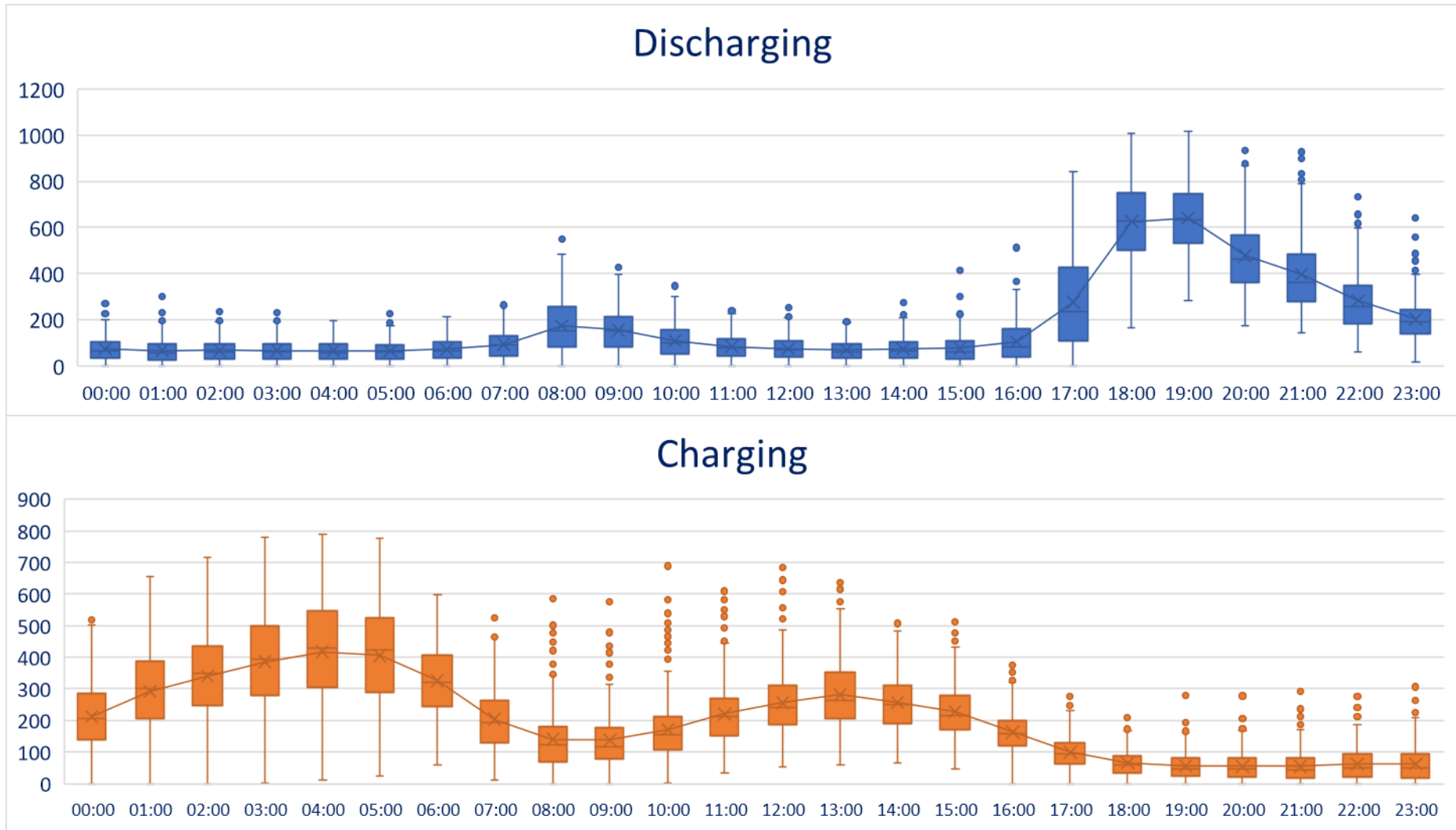
Running Hours and Starts

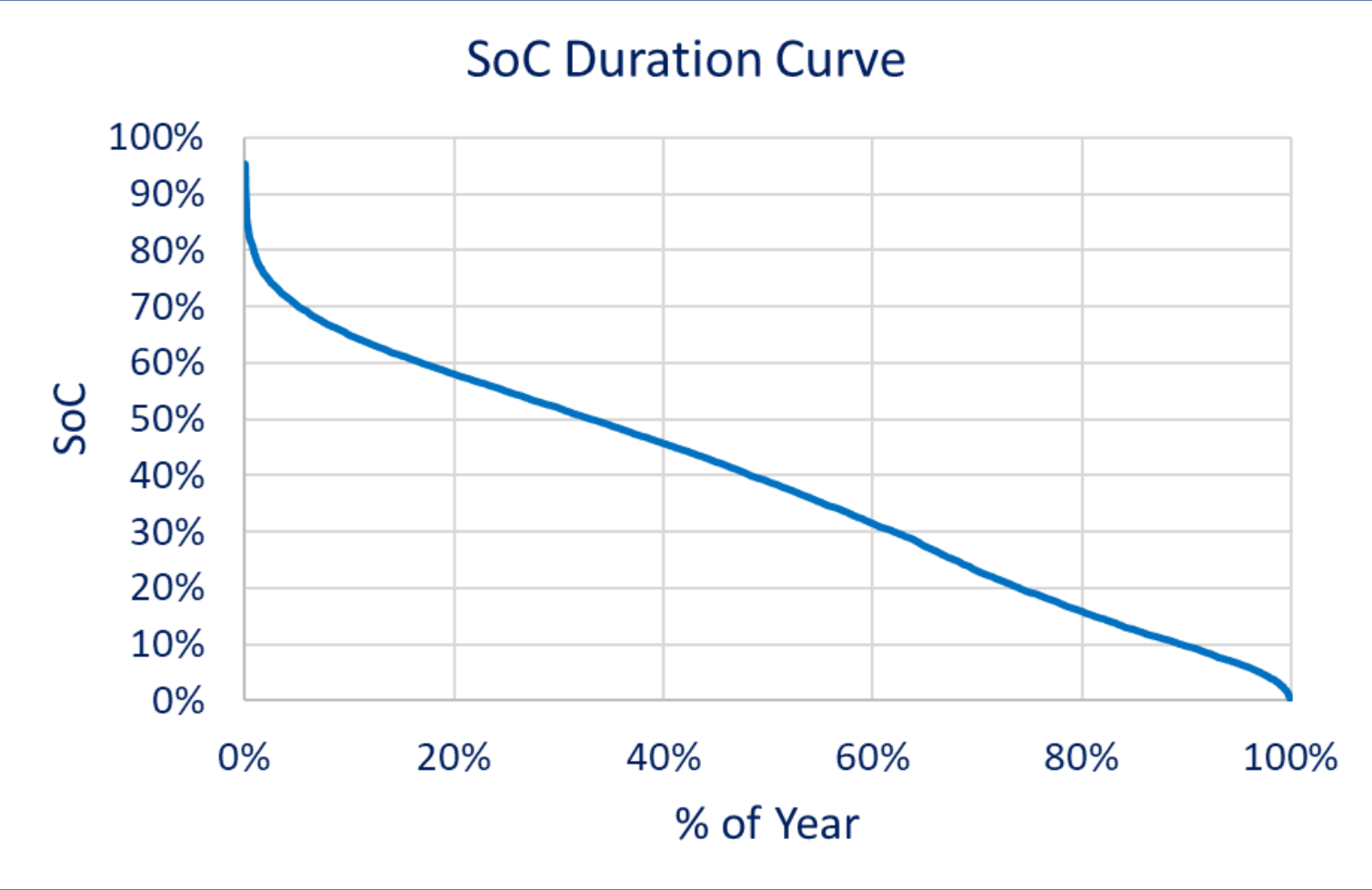
2030	Average Running Hours				Average Number of Starts			
	OCGT	CCGT	DO	Large Biomass	OCGT	CCGT	DO	Large Biomass
Jan	34	516	3	428	4	4	0	8
Feb	21	473	0	462	3	5	0	6
Mar	17	521	0	562	4	5	0	6
Apr	9	514	0	653	2	5	0	2
May	6	500	0	688	2	6	0	2
Jun	6	464	0	664	1	5	0	2
Jul	5	468	0	714	1	6	0	1
Aug	4	470	0	682	1	6	0	3
Sep	6	476	0	601	1	5	0	3
Oct	9	475	0	532	2	6	0	6
Nov	14	493	0	486	2	5	0	6
Dec	18	505	0	502	3	6	0	6
Year	151	5875	3	6973	27	63	0	52

Capacity Factors

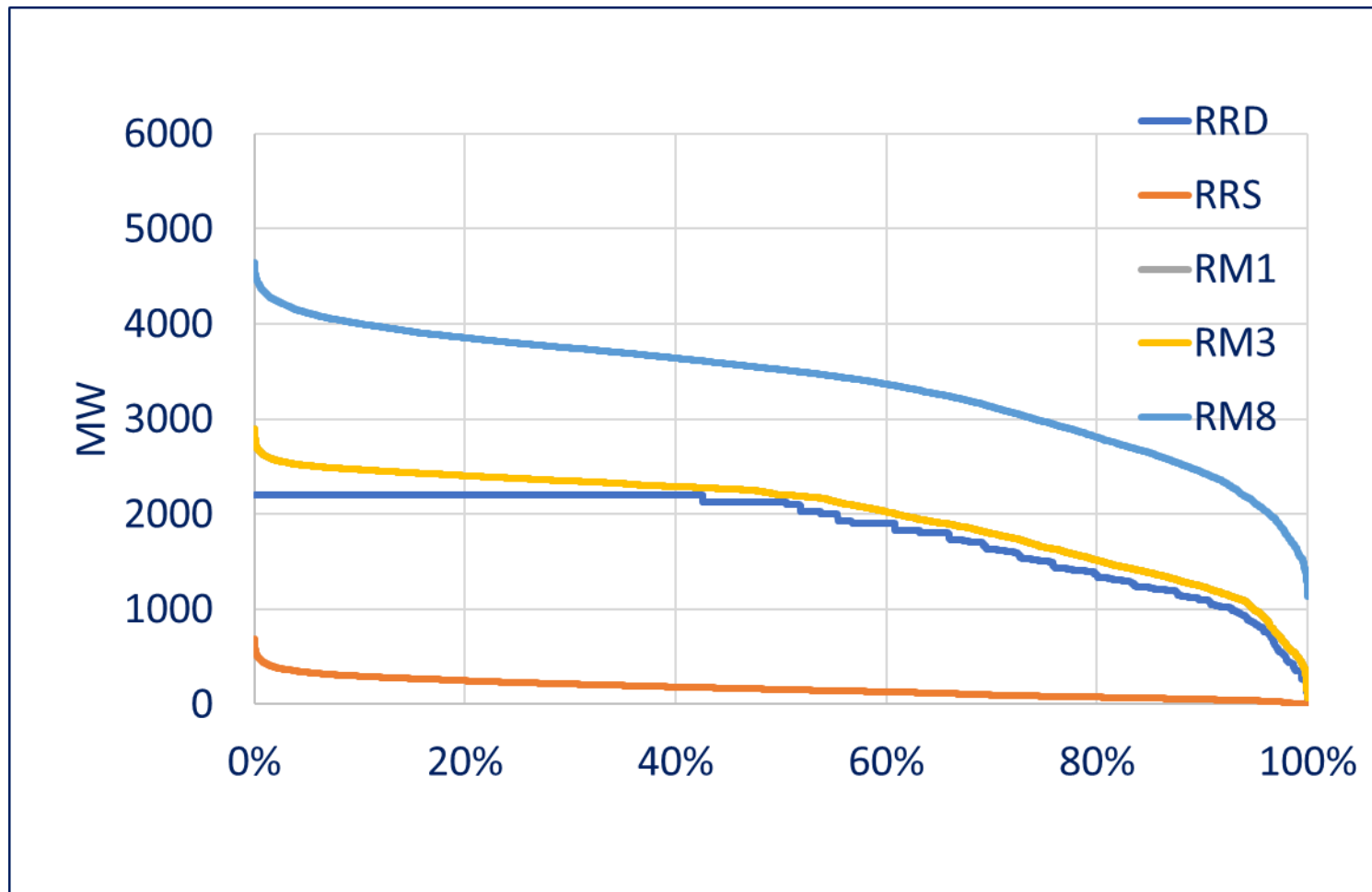
2030	OCGT	CCGT	DO	Hydro	Large Biomass	Small Biomass, Biomass CHP & Other RES	Other Non-RES	Solar	Wind
Jan	3.1%	52%	0%	57%	33%	48%	37%	4%	41%
Feb	1.9%	54%	0%	55%	45%	61%	39%	6%	38%
Mar	1.3%	55%	0%	37%	51%	69%	40%	10%	34%
Apr	0.8%	59%	0%	31%	80%	89%	45%	14%	27%
May	0.5%	56%	0%	28%	79%	90%	45%	17%	25%
Jun	0.4%	54%	0%	24%	78%	92%	46%	18%	21%
Jul	0.3%	53%	0%	20%	78%	94%	47%	17%	20%
Aug	0.3%	51%	0%	24%	72%	90%	46%	15%	21%
Sep	0.5%	53%	0%	26%	60%	82%	43%	12%	25%
Oct	0.6%	49%	0%	35%	52%	71%	40%	7%	32%
Nov	1.2%	53%	0%	56%	44%	67%	40%	4%	34%
Dec	1.6%	52%	0%	57%	47%	67%	39%	3%	38%
Yearly	1.0%	53%	0%	38%	60%	77%	42%	11%	30%

Battery Usage Profiles





Available replacement reserve and ramping margin from conventional generation



Inertia available from generation

