

Offshore wind, solar carve out and RPS cost cap model

1. Inputs and key quantities per year

Resources are assumed to be competitively procured under 15 year fixed price PPAs in periodic resource - Annual costs in excess of annual RPS cost cap show up in red in row 51.

input assumptions	2019	3 yrs % change,	10y % change /y
2019 retail sales/y, \$MM	10309	0.0%	0.0%
2019 retail sales/y, TWH	75	0.0%	0.0%
RPS cost cap as % of TR\$	9.0%	7.0%	0.0%
PJM revenue / MWH	45		0.0%
NJ solar LCOE /MWH 2019	145		-1.0%
NJ OSW LCOE /MWH 2024	80		-1.0%
PJM RE LCOE	53		-0.5%
annual solar degradation	1.00%		
solar capacity factor	15%		
OSW capacity factor	45%		
PJM RE REC	\$12		-4.0%
PJM RE capacity factor wind	40%		-1.0%
SREC SACP, Price at %	\$140	0%	
SREC % decline		7.0%	7.0%

FORMULAS POINT >>
SREC reference path
SREC path from inputs

These inputs can be set to be entered directly here or in the optimizer section below. Current set up is to enter values in the optimizer below.

\$M

Converts EY RPS requirements into calendar year requirements in order to calculate the annual budgets required by the new law. For EY 2020, it averages the BPU's proposed EY 2020 target of 0.16029 and the statute's CY 21% mandate. Formulas point >>

For CY 2019, it uses the average of the BPU's EY 2019 & 2020 targets. For CY >2020, it uses the average of the current and next energy years.

(information-only) section contains the sum of in-state Class 1 renewable MWH and the remaining Class 1 RECs needed to meet the RPS, all as assumed or calculated below, as %s of total retail sales.

2. RPS cost cap optimizer

This part of the model finds the maximum fixed annual amount of new solar that can be built, for a given SREC price path on row 19, while preserving enough of the RPS budget after SREC payouts, and preserving enough to buy RECs to meet the balance of the RPS requirement not met by SRECs, new solar and off:

key inputs:

SREC price 2019	140
NJ Solar LCOE 2019	145
SREC price decline/y, '19-22	7%
SREC price decline/y, '23 on	7% same rate as above

2022-on

Notes on headroom analyzer by row (c=column, r=row):

SREC price path set up through blocks B53:56

SREC data

Directly from solar requirement in stat.

Total SREC spend from row 30

From row 158 below

Total RPS req(+/-)SREC requirement - OSW energy, as toggled by \$H\$55

Budget cap based on retail sales (c8) - SREC spend (c61)

BUDGET

Subtracts MWH new solar bought from remaining RPS MWH required

MWH for RPS

Convert annual incr. solar MW (\$H\$63) to MWH (see A40:D40)

same formula

CY incremental solar GWH (c72) * price (c15)

\$ Spent on RPS

total spend in year on prior yr solar PPAs (r71-r69)

Sum of total annual new solar payments, from row 140 below

REC quantities from c65 times REC (c18) or PPA (c17), per \$H\$67**

Note on optimization:

Download and install "solver". Point solver at cell on r74 with lowest

Budget balance

positive or negative value. Solver sets this cell = 0 by changing H:57. Repeat until no c74 < 0.

* c70 payments account for annual degradation per B:15

** PPAs assume price floats w/market, likely low but nonbinding after 2023

Output from optimizer, with place to save scenarios

\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM

These OSW tranches are added manually, based on assumption.

They affect the optimizer, but are not themselves optimized in any way.

3500 <<total MW added by 2030
3500 <<total MW added by 2035



\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM
\$MM

4. Other Class 1 RECs Based on optimizer results r 65





\$MM

\$MM

Results section, summarizes output for charts

if "SURPLUS" then add average SREC value from tab 3 to legacy costs -->

SURPLUS

Charts point here >>>>

Option 1

Not shown

Output values for the LEGEND	New Sol:	3338	MW by 2030,	4729
Output values for the LEGEND	OSW (3500	MW by 2030,	3500

Not shown

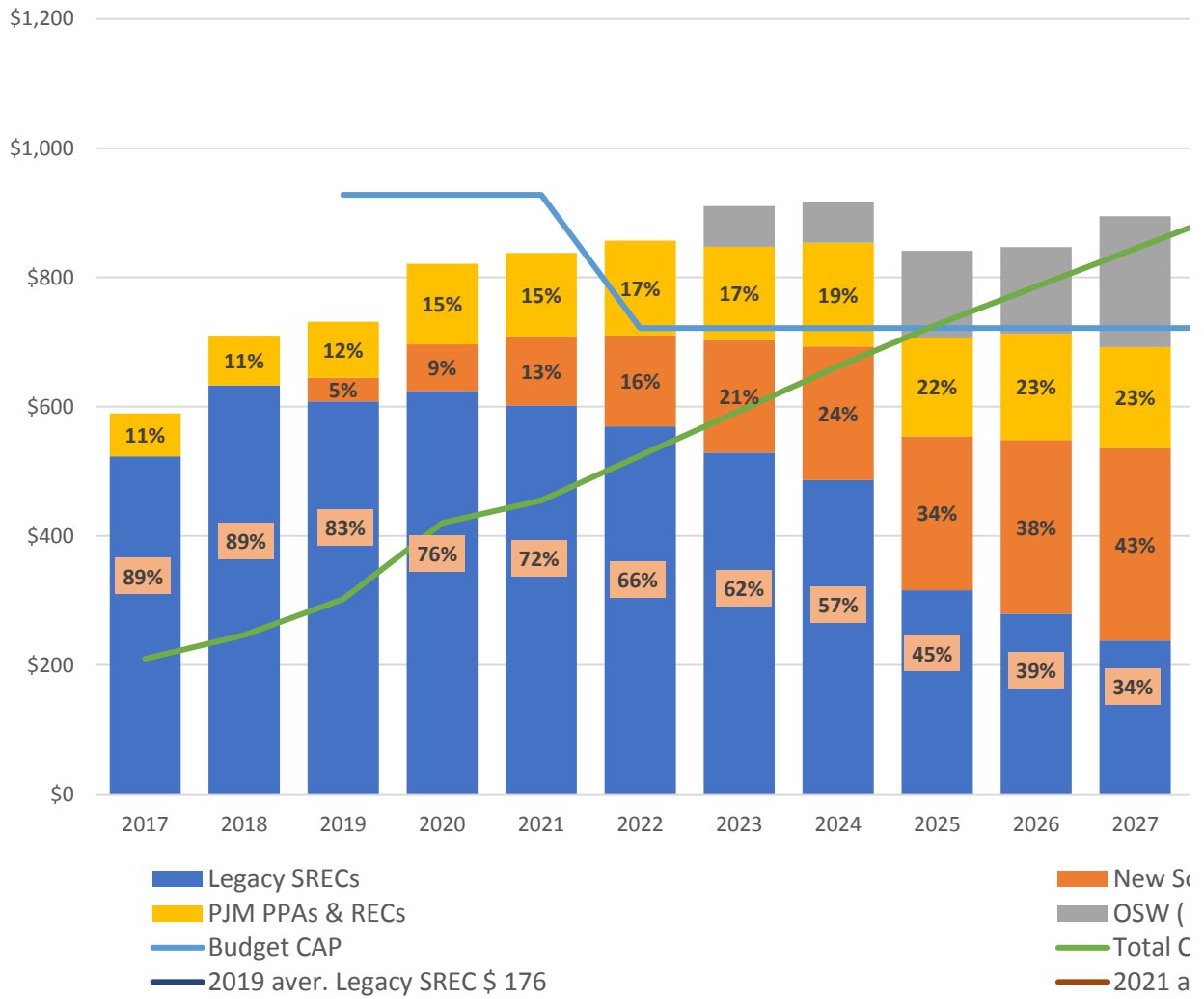
2019 aver. Legacy SREC \$ 176

2021 aver. Legacy SREC \$ 157

copy scenario input here

copy scenario input here

Illustrative RPS scenario Class I cost (\$million)
Resource mix & % of Class I cost cap



specific tranches. Each tranche's fixed price is its first year (LCOE - PJM market revenues). LCOE,

	<i>Year -></i>			
<i>item</i>	2017	2018	2019	2020
total retail sales \$	10,125	10,159	10,309	10,309
total TWH sold	75.0	75.0	75.0	75.0
RPS cap			927.8	927.8
PJM revenue			\$45	\$45
NJ solar cost			\$145	\$144
OSW cost			\$80	\$79
PJM RE cost			\$53	\$53
solar incentive			\$100	\$99
OSW incentive			\$35	\$34
PJM RE incentive			\$8	\$8
PJM REC price	\$12.00	\$12	\$12	\$11
SREC price	\$225	\$225	\$140	\$130
<i>SACP at fixed decline</i>			\$ 268	\$ 258
SREC at % decline rate, 2 rates			\$140	\$130
cf. SACP from statute		308	268	258
Solar Requirement (Stat.)	3.00%	3.20%	4.30%	4.90%
Solar Req. translate to CY	3.10%	3.75%	4.60%	5.00%
Solar req. as MWh	2,325,000	2,812,500	3,450,000	3,750,000
<i>cf SREC data & projection</i>	2,585,940	3,035,533	3,429,745	3,813,116
SREC cost	523,125	632,813	483,000	488,250
% of total billed \$	5.2%	6.2%	4.7%	4.7%
Total installed solar MW	1,590	2,140	2,626	2,854
Incremental solar MW	346	550	485	228
RE % Class I Goal Cal Year	10.49%	12.33%	15.10%	21.00%
RE % Class I for EY	10.49%	12.33%	14.18%	18.51%
RE % Class II Goal	2.5%	2.5%	2.5%	2.5%
OSW, new and legacy solar	3.10%	3.75%	5.09%	5.97%
Remaining RECS for RPS	7.39%	8.58%	10.01%	15.03%

shore wind. Most results, other than charts, are generated here.

RPS required, GWh 7,864 9,244 11,327 15,750

Legacy solar OUT/IN RPS?-> **IN** "OUT" means full RPS must be met in addition to :

MAX new solar / yr MW -> **278** assumes fixed price contract that recovers LCOE v

Year->	2018	2019	2020	
Assumed SREC price path	225	140	130	
CY legacy SRECs purchased	2,813	3,450	3,750	
CY\$ spend on legacy SRECS	632,813	483,000	488,250	
Annual OSW GWH produced		-	-	
RPS req - Legacy SRECs+OSW (GWH)		7,877	12,000	
RPS cap-Legacy SRECs (\$M)		444,810	439,560	
CY PJM wind bought (GWH)	REC	7,511	11,267	
CY new incremental NJ solar bought (GWH)		366	366	
Equivalent PJM wind MW		2,144	3,216	
CY \$ spend on CY incremental new solar		36,556	36,026	
CY \$ spend on cumulative prior new solar contracts		-	36,190	
total CY \$ on new solar (new incr. + new cumulative)		36,556	72,216	
CY \$ spend on wind RECs		86,526	124,606	
total		123,082	196,822	
Surplus (deficit) under cap	total->	1,486,844	321,728	242,738
6 year surplus		806,806		

total spent on OSW	total->	2,786,890	annual->	\$	-
all class I RE spend-cap	total->	1,621,773	annual->	\$	(242,738)

CURRENT RESULT

cases ->

Parameters & output	scenarios ->
2019 SREC price	\$140
2019 SREC price using surplus	\$176
2019 New solar incentive	\$100
Legacy IN or OUT	IN
Wind PPA or REC	REC

new solar incentive cost for one tranche
 new solar incentive cost for one tranche
 new solar incentive cost for one tranche
 new solar incentive cost for one tranche
 new solar incentive cost for one tranche
 new solar incentive cost for one tranche

total cost /y of SI	\$36,556	\$72,216
% of total billed \$	0%	1%

New NJ OSW MWh

energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh
 energy added MWh

total OSWE MWh

% of total energy sold

cost of OSW incentive for one tranche
 cost of OSW incentive for one tranche
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 cost of OSW incentive for one tranche
 cost of OSW incentive for one tranche

total cost of OSW incentives

% of total billed \$

PJM RE from PPAs & RECs

PJM RE % to fill RPS	7.4%	8.6%	10.0%	15.0%
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MWH equivalent	5,538,750	6,431,250	7,510,943	11,267,216
PJM RE PPAs (MW)				0
energy added MWH				-

Added PJM PPAs MWH			-	-
PJM PPA % total energy			0%	0%

Cost of PJM PPA tranches \$ -

total cost of PJM PPAs			\$0	\$0
% of total billed \$			0.0%	0.0%

PJM RECs to fill RPS	5,538,750	6,431,250	7,510,943	11,267,216
% of total energy	7.4%	8.6%	10.0%	15.0%
Total cost of PJM RECS	\$66,465	\$77,175	\$86,526	\$124,606
% of total bill	0.66%	0.76%	0.84%	1.21%

Total cost PJM PPA + RECs	\$66,465	\$77,175	\$86,526	\$124,606
% of total billed \$	0.66%	0.76%	0.84%	1.21%
cost / MWH				

Summary

total costs (\$million /yr)	2017	2018	2019	2020
Legacy SRECs, base	\$523	\$633	\$483	\$488
Legacy SRECs, aver surplus	\$0	\$0	\$125	\$136
Legacy SRECs	\$523	\$633	\$608	\$624
New Solar	\$0	\$0	\$37	\$72
OSW	\$0	\$0	\$0	\$0
PJM PPAs & RECs	\$66	\$77	\$87	\$125

Sum all Class I	\$590	\$710	\$731	\$821
Sum Class I, no OSW	\$590	\$710	\$731	\$821
Budget CAP			\$928	\$928

% Budget CAP, uses inputs			\$928	\$928
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% of total *Class I* Costs

Legacy SRECs	89%	89%	83%	76%
New Solar	0%	0%	5%	9%
OSW (% of total cost)	0%	0%	0%	0%
PJM PPAs & RECs	11%	11%	12%	15%

RPS plus Solar % total energy

Legacy SRECs	3.1%	3.8%	4.6%	5.0%
MW 2035)	0%	0%	0%	1%
MW 2035)	0%	0%	0%	0%
PJM PPAs & RECs	7.4%	8.6%	10.0%	15.0%
Total Class 1 RE %	10.5%	12.3%	15.1%	21.0%
Total RPS (w/ 2.5% Class2)	13.0%	14.8%	17.6%	23.5%

Incentive cost / MWH

	2017	2018	2019	2020
Legacy SRECs	\$225	\$225	\$140	\$130
Legacy SRECs with surplus			\$176	\$166
New Solar	\$0	\$0	\$100	\$99
OSW	\$0	\$0	\$35	\$34
PJM PPAs & RECs	\$12	\$12	\$12	\$11

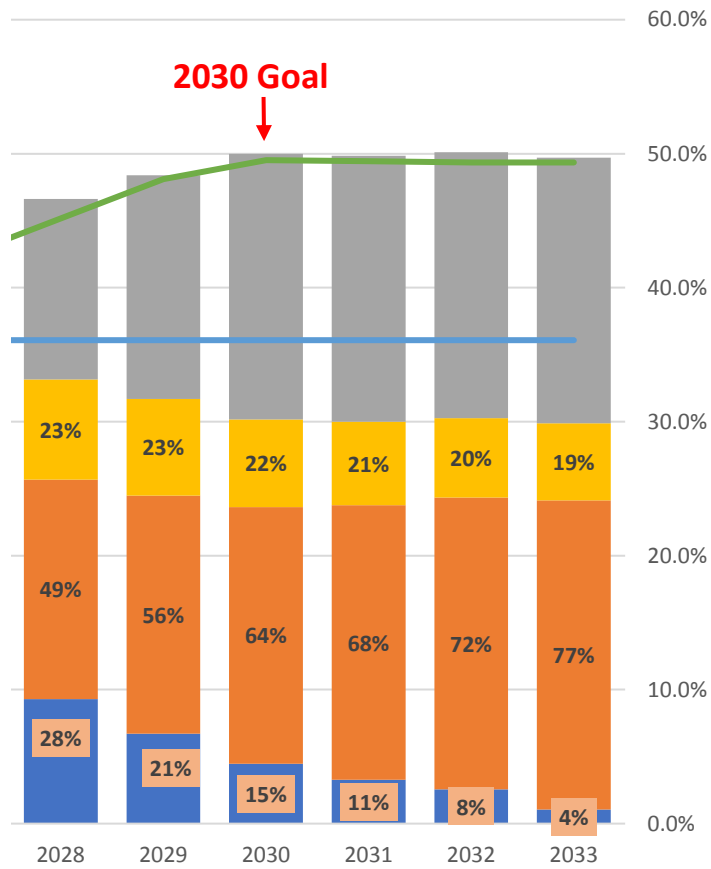
Renewable energy assumptions for scenario

	2017	2018	2019	2020
New Solar (MW)	-	-	278	278
Offshore Wind (MW)	-	-	-	-
PJM RE (million MWH)	5.54	6.43	7.51	11.27
Legacy SRECs (million MWH)	2.33	2.81	3.45	3.75

Composition of RPS

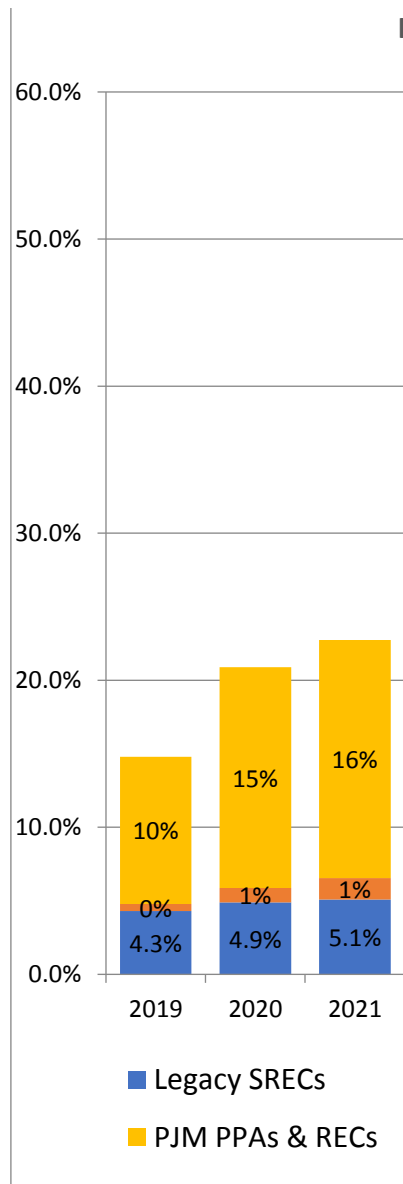
Legacy SRECs	3.0%	3.2%	4.3%	4.9%
New Solar	0%	0%	0%	1%
Offshore Wind	0%	0%	0%	0%
PJM PPAs & RECs	7%	9%	10%	15%
Class II RE	2.5%	2.5%	2.5%	2.5%
cost of new + legacy solar	\$523.13	\$632.81	\$519.56	\$560.47

1/ year),



olar (3338 MW by 2030, 4729 MW 2035)
 3500 MW by 2030, 3500 MW 2035)
 Class 1 RE %
 iver. Legacy SREC \$ 157

II



new LCOE reduction per year and tranche sizes can be modified in the dark yellow cells.

	2021	2022	2023	2024	2025	2026	2027
	10,309	10,309	10,309	10,309	10,309	10,309	10,309
	75.0	75.0	75.0	75.0	75.0	75.0	75.0
	927.8	927.8	927.8	927.8	927.8	927.8	927.8
	\$45	\$45	\$45	\$45	\$45	\$45	\$45
	\$142	\$141	\$139	\$138	\$137	\$135	\$134
	\$78	\$78	\$77	\$76	\$75	\$75	\$74
	\$52	\$52	\$52	\$52	\$51	\$51	\$51
	\$97	\$96	\$94	\$93	\$92	\$90	\$89
	\$33	\$33	\$32	\$31	\$30	\$30	\$29
	\$7	\$7	\$7	\$7	\$6	\$6	\$6
	\$11	\$10	\$10	\$9	\$9	\$9	\$8
	\$121	\$113	\$105	\$97	\$91	\$84	\$78
\$	248	\$ 238	\$ 228	\$ 218	\$ 208	\$ 198	\$ 188
	\$121	\$113	\$105	\$97	\$91	\$84	\$78
	248	238	228	218	208	198	188
	5.10%	5.10%	5.10%	4.90%	4.80%	4.50%	4.35%
	5.10%	5.10%	5.00%	4.85%	4.65%	4.43%	4.05%
	3,825,000	3,825,000	3,750,000	3,637,500	3,487,500	3,318,750	3,033,750
	3,757,030	3,705,416	3,640,765	3,547,810	3,393,782	2,921,698	2,566,119
	463,154	430,733	392,727	354,279	315,893	279,565	237,668
	4.5%	4.2%	3.8%	3.4%	3.1%	2.7%	2.3%
	2,911	2,911	2,854	2,768	2,654	2,526	2,309
	57	0	-57	-86	-114	-128	-217
	22.75%	26.25%	29.75%	33.25%	36.50%	39.50%	42.50%
	21.00%	24.50%	28.00%	31.50%	35.00%	38.00%	41.00%
	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
	6.55%	7.02%	10.02%	10.33%	13.74%	13.97%	17.20%
	16.20%	19.23%	19.73%	22.92%	22.76%	25.53%	25.30%

17,063 19,688 22,313 24,938 27,375 29,625 31,875

solar mandate, "IN" counts solar mandate SRECs towards RPS

v/ 15+ year tenor

	2021	2022	2023	2024	2025	2026	2027
	121	113	105	97	91	84	78
	3,825	3,825	3,750	3,638	3,488	3,319	3,034
	463,154	430,733	392,727	354,279	315,893	279,565	237,668
	-	-	1,972	1,971	4,337	4,336	6,702
	13,238	15,863	16,591	19,329	19,551	21,970	22,139
	464,656	290,897	328,903	367,351	405,737	442,065	483,962
	12,136	14,390	14,740	17,104	16,949	18,990	18,779
	366	366	366	366	366	366	366
	3,463	4,107	4,207	4,881	4,837	5,420	5,359
	35,501	34,981	34,467	33,958	33,454	32,955	32,461
	71,494	105,925	140,011	172,734	204,625	235,698	265,966
	106,995	140,906	174,478	206,692	238,078	268,653	298,427
	128,843	146,665	144,228	160,659	152,837	164,390	156,057
	235,838	287,572	318,706	367,351	390,915	433,043	454,484
	228,818	3,325	10,196	0	14,822	9,022	29,478
\$	-	\$ -	\$ 62,772	\$ 62,772	\$ 134,481	\$ 134,481	\$ 202,645
\$	(228,818)	\$ (3,325)	\$ 52,575	\$ 62,772	\$ 119,659	\$ 125,459	\$ 173,167

278	278	278	278	278	278	278
358,283	354,700	351,153	347,641	344,165	340,723	337,316
361,902	358,283	354,700	351,153	347,641	344,165	340,723
365,557	361,902	358,283	354,700	351,153	347,641	344,165
	365,557	361,902	358,283	354,700	351,153	347,641
		365,557	361,902	358,283	354,700	351,153
			365,557	361,902	358,283	354,700
				365,557	361,902	358,283
					365,557	361,902
						365,557

1,085,742	1,440,442	1,791,595	2,139,236	2,483,401	2,824,125	3,161,441
1.4%	1.9%	2.4%	2.9%	3.3%	3.8%	4.2%
6.5%	7.0%	7.5%	7.8%	8.1%	8.3%	8.6%
\$35,828	\$35,470	\$35,115	\$34,764	\$34,416	\$34,072	\$33,732
\$35,665	\$35,309	\$34,956	\$34,606	\$34,260	\$33,917	\$33,578
\$35,501	\$35,146	\$34,794	\$34,447	\$34,102	\$33,761	\$33,423
	\$34,981	\$35,146	\$34,794	\$34,447	\$34,102	\$33,761
		\$34,467	\$34,122	\$33,781	\$33,443	\$33,109
			\$33,958	\$33,618	\$33,282	\$32,949
				\$33,454	\$33,119	\$32,788
					\$32,955	\$32,625
						\$32,461

\$106,995	\$140,906	\$174,478	\$206,692	\$238,078	\$268,653	\$298,427
1%	1%	2%	2%	2%	3%	3%

0	500	600	600			
-	-	-	-	-	-	-
		1,971,000	1,971,000	1,971,000	1,971,000	1,971,000
				2,365,200	2,365,200	2,365,200
						2,365,200

-	-	1,971,500	1,971,000	4,336,800	4,336,200	6,702,000
0.0%	0.0%	2.6%	2.6%	5.8%	5.8%	8.9%

\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772
				\$ 71,709	\$ 71,709	\$ 71,709
						\$ 68,164

\$ -	\$ -	\$ 62,772	\$ 62,772	\$ 134,481	\$ 134,481	\$ 202,645
0%	0%	1%	1%	1%	1%	2%

16.2%	19.2%	19.7%	22.8%	22.6%	25.3%	25.0%
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12,135,763	14,390,025	14,740,485	17,103,963	16,949,165	#####	#####
-	0	-	0	-	0	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

0%	0%	0%	0%	0%	0%	0%
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\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -
				\$ -	\$ -	\$ -

\$0	\$0	\$0	\$0	\$0	\$0	\$0
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

12,135,763	14,390,025	14,740,485	17,103,963	16,949,165	#####	#####
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16.2%	19.2%	19.7%	22.8%	22.6%	25.3%	25.0%
\$128,843	\$146,665	\$144,228	\$160,659	\$152,837	\$164,390	\$156,057
1.25%	1.42%	1.40%	1.56%	1.48%	1.59%	1.51%

\$128,843	\$146,665	\$144,228	\$160,659	\$152,837	\$164,390	\$156,057
1.25%	1.42%	1.40%	1.56%	1.48%	1.59%	1.51%

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2021	2022	2023	2024	2025	2026	2027
\$463	\$431	\$393	\$354	\$316	\$280	\$238
\$139	\$139	\$136	\$132	\$0	\$0	\$0
\$602	\$570	\$529	\$486	\$316	\$280	\$238
\$107	\$141	\$174	\$207	\$238	\$269	\$298
\$0	\$0	\$63	\$63	\$134	\$134	\$203
\$129	\$147	\$144	\$161	\$153	\$164	\$156

\$838	\$857	\$910	\$916	\$841	\$847	\$895
\$838	\$857	\$847	\$854	\$707	\$713	\$692
\$928	\$722	\$722	\$722	\$722	\$722	\$722

\$928	\$722	\$722	\$722	\$722	\$722	\$722
72%	66%	62%	57%	45%	39%	34%
13%	16%	21%	24%	34%	38%	43%
0%	0%	7%	7%	16%	16%	23%
15%	17%	17%	19%	22%	23%	23%

5.1%	5.1%	5.0%	4.9%	4.7%	4.4%	4.0%
1%	2%	2%	3%	3%	4%	4%
0%	0%	3%	3%	6%	6%	9%
16.2%	19.2%	19.7%	22.8%	22.6%	25.3%	25.0%
22.7%	26.2%	29.7%	33.1%	36.3%	39.3%	42.2%
25.2%	28.7%	32.2%	35.6%	38.8%	41.8%	44.7%

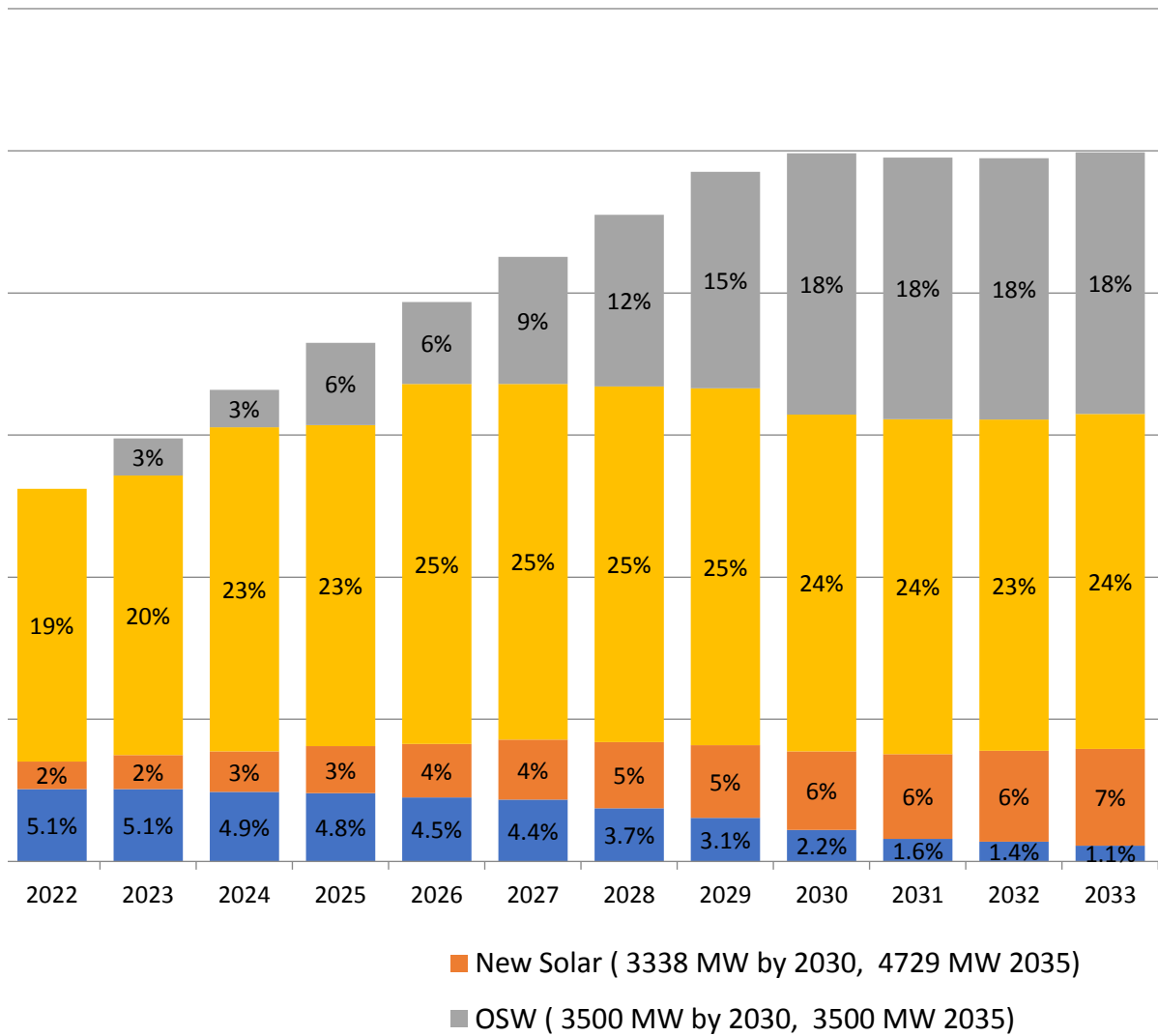
2021	2022	2023	2024	2025	2026	2027
\$121	\$113	\$105	\$97	\$91	\$84	\$78
\$157	\$149	\$141	\$134	\$91	\$84	\$78
\$97	\$96	\$94	\$93	\$92	\$90	\$89
\$33	\$33	\$32	\$31	\$30	\$30	\$29
\$11	\$10	\$10	\$9	\$9	\$9	\$8

2021	2022	2023	2024	2025	2026	2027
278	278	278	278	278	278	278
-	-	500	-	600	-	600
12.14	14.39	14.74	17.10	16.95	18.99	18.78
3.83	3.83	3.75	3.64	3.49	3.32	3.03

5.1%	5.1%	5.1%	4.9%	4.8%	4.5%	4.4%
1%	2%	2%	3%	3%	4%	4%
0%	0%	3%	3%	6%	6%	9%
16%	19%	20%	23%	23%	25%	25%
2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%

\$570.15	\$571.64	\$567.21	\$560.97	\$553.97	\$548.22	\$536.10
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Illustrative RPS scenario Class I resource mix & % of total energy



	2028	2029	2030	2031	2032	2033	2034	2035
	10,309	10,309	10,309	10,309	10,309	10,309	10,309	10,309
	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
	927.8	927.8	927.8	927.8	927.8	927.8	927.8	927.8
	\$45	\$45	\$45	\$45	\$45	\$45	\$45	\$45
	\$132	\$131	\$130	\$129	\$127	\$127	\$127	\$127
	\$73	\$72	\$72	\$71	\$70	\$69	\$69	\$68
	\$51	\$50	\$50	\$50	\$50	\$49	\$49	\$49
	\$87	\$86	\$85	\$84	\$82	\$82	\$82	\$82
	\$28	\$27	\$27	\$26	\$25	\$24	\$24	\$23
	\$6	\$5	\$5	\$5	\$5	\$4	\$4	\$4
	\$8	\$8	\$7	\$7	\$7	\$7	\$6	\$6
	\$73	\$68	\$63	\$59	\$55	\$51		
\$	178	\$ 168	\$ 158	\$ 148	\$ 138	\$ 128		
	\$73	\$68	\$63	\$59	\$55	\$51		
	178	168	158	148	138	128		
	3.74%	3.07%	2.21%	1.58%	1.40%	1.10%	0.00%	0.00%
	3.41%	2.64%	1.90%	1.49%	1.25%	0.55%		
	2,553,750	1,980,000	1,421,250	1,117,500	937,500	412,500	-	-
	1,893,805	1,289,520	700,087	296,827	-	-	-	-
	186,060	134,160	89,559	65,489	51,095	20,908	-	-
	1.8%	1.3%	0.9%	0.6%	0.5%	0.2%	0.0%	0.0%
	1,943	1,507	1,082	850	713	314	-	-
	-365	-437	-425	-231	-137	-400	-314	0
	45.50%	48.50%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	44.00%	47.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
	20.16%	22.98%	25.83%	25.86%	26.04%	25.77%	25.64%	26.05%
	25.34%	25.52%	24.17%	24.14%	23.96%	24.23%	24.36%	23.95%

34,125 36,375 37,500 37,500 37,500 37,500

2028	2029	2030	2031	2032	2033	cumulative sums
73	68	63	59	55	51	
2,554	1,980	1,421	1,118	938	413	
186,060	134,160	89,559	65,489	51,095	20,908	#####
9,067	11,432	13,798	13,797	13,797	13,797	
22,504	22,963	22,281	22,586	22,766	23,291	
535,570	587,470	632,071	656,141	670,535	700,722	#####
18,760	18,834	17,765	17,679	17,467	17,679	
366	366	366	366	366	366	
5,354	5,375	5,070	5,046	4,985	5,046	
31,972	31,487	31,008	30,533	30,064	30,064	
295,442	324,140	352,071	379,248	405,684	431,390	#####
327,414	355,627	383,079	409,782	435,748	461,454	
149,671	144,246	130,617	124,789	118,358	115,006	#####
477,085	499,874	513,697	534,571	554,106	576,459	
58,485	87,596	118,374	121,570	116,429	124,262	

\$ 269,063	\$ 333,753	\$ 396,731	\$ 396,731	\$ 396,731	\$ 396,731
\$ 210,578	\$ 246,156	\$ 278,357	\$ 275,161	\$ 280,302	\$ 272,468

278	278	278	278	278	278	278	278
333,943	330,604	327,297	324,025	320,784	317,576	314,401	311,257
337,316	333,943	330,604	327,297	324,025	320,784	317,576	314,401
340,723	337,316	333,943	330,604	327,297	324,025	320,784	317,576
344,165	340,723	337,316	333,943	330,604	327,297	324,025	320,784
347,641	344,165	340,723	337,316	333,943	330,604	327,297	324,025
351,153	347,641	344,165	340,723	337,316	333,943	330,604	327,297
354,700	351,153	347,641	344,165	340,723	337,316	333,943	330,604
358,283	354,700	351,153	347,641	344,165	340,723	337,316	333,943
361,902	358,283	354,700	351,153	347,641	344,165	340,723	337,316
365,557	361,902	358,283	354,700	351,153	347,641	344,165	340,723
	365,557	361,902	358,283	354,700	351,153	347,641	344,165
		365,557	361,902	358,283	354,700	351,153	347,641
			365,557	361,902	358,283	354,700	351,153
				365,557	361,902	358,283	354,700
					365,557	361,902	358,283
						365,557	361,902
							365,557
3,495,384	3,825,987	4,153,285	4,477,309	4,798,093	5,115,670	5,430,071	5,741,327
4.7%	5.1%	5.5%	6.0%	6.4%	6.8%	7.2%	7.7%
8.4%	8.2%	7.7%	7.5%	7.8%	7.9%	7.2%	7.7%
\$33,394	\$33,060	\$32,730	\$32,402	\$32,078	\$31,758		
\$33,243	\$32,910	\$32,581	\$32,255	\$31,933	\$31,613	\$31,297	
\$33,089	\$32,758	\$32,431	\$32,106	\$31,785	\$31,467	\$31,153	\$30,841
\$33,423	\$33,089	\$32,758	\$32,431	\$32,106	\$31,785	\$31,467	\$31,153
\$32,778	\$32,450	\$32,126	\$31,804	\$31,486	\$31,171	\$30,860	\$30,551
\$32,620	\$32,294	\$31,971	\$31,651	\$31,334	\$31,021	\$30,711	\$30,404
\$32,460	\$32,136	\$31,814	\$31,496	\$31,181	\$30,869	\$30,561	\$30,255
\$32,299	\$31,976	\$31,656	\$31,340	\$31,026	\$30,716	\$30,409	\$30,105
\$32,136	\$31,815	\$31,497	\$31,182	\$30,870	\$30,561	\$30,256	\$29,953
\$31,972	\$31,652	\$31,335	\$31,022	\$30,712	\$30,405	\$30,101	\$29,800
	\$31,487	\$31,173	\$30,861	\$30,552	\$30,247	\$29,944	\$29,645
		\$31,008	\$30,698	\$30,391	\$30,087	\$29,786	\$29,488

\$30,533	\$30,228	\$29,926	\$29,627	\$29,330
	\$30,064	\$29,763	\$29,465	\$29,171
		\$30,064	\$29,763	\$29,465
			\$30,064	\$29,763
				\$30,064

\$327,414	\$355,627	\$383,079	\$409,782	\$435,748	\$461,454	\$455,463	\$449,988
3%	3%	4%	4%	4%	4%	4%	4%

600	600	600		0		0	
-	-	-	-	-	-	-	-
1,971,000	1,971,000	1,971,000	1,971,000	1,971,000	1,971,000	1,971,000	1,971,000
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
		2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
			-	-	-	-	-
				-	-	-	-
					-	-	-
						-	-
							-

9,067,200	#####	#####	#####	13,797,000	13,797,000	#####	13,797,000
12.1%	15.2%	18.4%	18.4%	18.4%	18.4%	18.4%	18.4%

\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772
\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709
\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164
\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418
	\$ 64,690	\$ 64,690	\$ 64,690	\$ 64,690	\$ 64,690	\$ 64,690	\$ 64,690
		\$ 62,978	\$ 62,978	\$ 62,978	\$ 62,978	\$ 62,978	\$ 62,978
			\$ -	\$ -	\$ -	\$ -	\$ -
				\$ -	\$ -	\$ -	\$ -
					\$ -	\$ -	\$ -
						\$ -	\$ -
							\$ -

\$ 269,063	\$ 333,753	\$ 396,731	\$ 396,731	\$ 396,731	\$ 396,731	\$ 396,731	\$ 396,731
3%	3%	4%	4%	4%	4%	4%	4%

25.0%	25.1%	23.7%	23.6%	23.3%	23.6%	0.0%	0.0%
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\$722	\$722	\$722	\$722	\$722	\$722	\$722	\$722
28%	21%	15%	11%	8%	4%	0%	0%
49%	56%	64%	68%	72%	77%	100%	100%
29%	34%	40%	40%	40%	40%	47%	47%
23%	23%	22%	21%	20%	19%	0%	0%

3.4%	2.6%	1.9%	1.5%	1.3%	0.6%	0.0%	0.0%
5%	5%	6%	6%	6%	7%	7%	8%
12%	15%	18%	18%	18%	18%	18%	18%
25.0%	25.1%	23.7%	23.6%	23.3%	23.6%	0.0%	0.0%
45.2%	48.1%	49.5%	49.4%	49.3%	49.3%	25.6%	26.1%
47.7%	50.6%	52.0%	51.9%	51.8%	51.8%	28.1%	28.6%

2028	2029	2030	2031	2032	2033		
\$73	\$68	\$63	\$59	\$55	\$51	\$0	\$0
\$73	\$68	\$63	\$59	\$55	\$51	\$0	\$0
\$87	\$86	\$85	\$84	\$82	\$82	\$82	\$82
\$28	\$27	\$27	\$26	\$25	\$24	\$24	\$23
\$8	\$8	\$7	\$7	\$7	\$7	\$6	\$6

2028	2029	2030	2031	2032	2033	2034	2035
278	278	278	278	278	278	278	278
600	600	600	-	-	-	-	-
18.76	18.83	17.76	17.68	17.47	17.68	-	-
2.55	1.98	1.42	1.12	0.94	0.41	-	-

3.7%	3.1%	2.2%	1.6%	1.4%	1.1%	0.0%	0.0%
5%	5%	6%	6%	6%	7%	7%	8%
12%	15%	18%	18%	18%	18%	18%	18%
25%	25%	24%	24%	23%	24%	0%	0%
2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%

\$513.47	\$489.79	\$472.64	\$475.27	\$486.84	\$482.36	\$455.46	\$449.99
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2036	2037	2038	2039	2040
10,309	10,309	10,309	10,309	10,309
75.0	75.0	75.0	75.0	75.0
927.8	927.8	927.8	927.8	927.8
\$45	\$45	\$45	\$45	\$45
\$127	\$127	\$127	\$127	\$127
\$67	\$67	\$66	\$65	\$65
\$49	\$48	\$48	\$48	\$48
\$82	\$82	\$82	\$82	\$82

314,401					
317,576					
320,784	317,576				
324,025	320,784	317,576			
327,297	324,025	320,784	317,576		
330,604	327,297	324,025	320,784	317,576	
333,943	330,604	327,297	324,025	320,784	317,576
337,316	333,943	330,604	327,297	324,025	320,784
340,723	337,316	333,943	330,604	327,297	324,025
344,165	340,723	337,316	333,943	330,604	327,297
347,641	344,165	340,723	337,316	333,943	330,604
351,153	347,641	344,165	340,723	337,316	333,943
354,700	351,153	347,641	344,165	340,723	337,316
358,283	354,700	351,153	347,641	344,165	340,723
361,902	358,283	354,700	351,153	347,641	344,165

5,064,513	4,388,211	4,029,928	3,675,228	3,324,075
6.8%	5.9%	5.4%	4.9%	4.4%

\$30,841					
\$30,246	\$29,943				
\$30,100	\$29,799	\$29,501			
\$29,953	\$29,653	\$29,356	\$29,063		
\$29,804	\$29,506	\$29,211	\$28,919	\$28,629	
\$29,653	\$29,357	\$29,063	\$28,773	\$28,485	\$28,200
\$29,502	\$29,207	\$28,915	\$28,625	\$28,339	\$28,056
\$29,348	\$29,055	\$28,764	\$28,477	\$28,192	\$27,910
\$29,193	\$28,902	\$28,613	\$28,326	\$28,043	\$27,763

\$29,037	\$28,747	\$28,459	\$28,175	\$27,893	\$27,614
\$28,879	\$28,590	\$28,304	\$28,021	\$27,741	\$27,464
\$29,171	\$28,879	\$28,590	\$28,304	\$28,021	\$27,741
\$29,465	\$29,171	\$28,879	\$28,590	\$28,304	\$28,021
\$29,763	\$29,465	\$29,171	\$28,879	\$28,590	\$28,304

\$414,955	\$380,273	\$346,826	\$314,152	\$282,238	\$251,073
4%	4%	3%	3%	3%	

-	-	-	-	-	-
1,971,000	1,971,000	1,971,000	1,971,000	1,971,000	1,971,000
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
2,365,200	2,365,200	2,365,200	2,365,200	2,365,200	2,365,200
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

13,797,000	13,797,000	13,797,000	13,797,000	13,797,000	13,797,000
18.4%	18.4%	18.4%	18.4%	18.4%	18.4%

\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772	\$ 62,772
\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709	\$ 71,709
\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164	\$ 68,164
\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418	\$ 66,418
\$ 64,690	\$ 64,690	\$ 64,690	\$ 64,690	\$ 64,690	\$ 64,690
\$ 62,978	\$ 62,978	\$ 62,978	\$ 62,978	\$ 62,978	\$ 62,978
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

\$ 396,731	\$ 396,731	\$ 396,731	\$ 396,731	\$ 396,731	\$ 396,731
4%	4%	4%	4%	4%	4%

0.0% 0.0%

-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0%	0%	0%	0%	0%	0%

\$	-	\$	-	\$	-	\$	-
\$	-	\$	-	\$	-	\$	-
\$	-	\$	-	\$	-	\$	-
\$	-	\$	-	\$	-	\$	-
\$	-	\$	-	\$	-	\$	-
\$	-	\$	-	\$	-	\$	-
\$	-	\$	-	\$	-	\$	-
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

-	-	-	-	-	-
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0.0%	0.0%	0.0%	0.0%	0.0%
\$0	\$0	\$0	\$0	\$0
0.00%	0.00%	0.00%	0.00%	0.00%

\$0	\$0	\$0	\$0
0.00%	0.00%	0.00%	0.00%

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2036	2037	2038	2039	2040
\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0
\$415	\$380	\$347	\$314	\$282
\$397	\$397	\$397	\$397	\$397
\$0	\$0	\$0	\$0	\$0

\$812	\$777	\$744	\$711	\$679
\$415	\$380	\$347	\$314	\$282
\$722	\$722	\$722	\$722	\$722

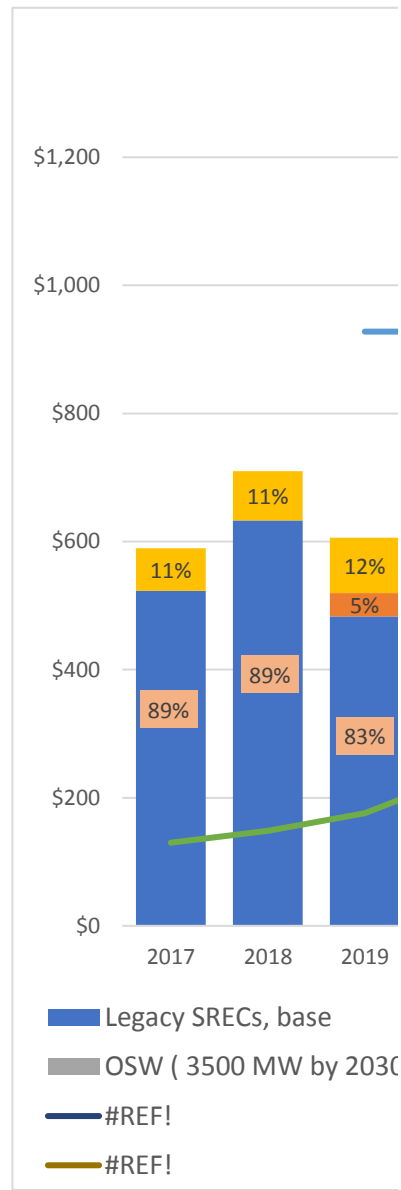
\$722

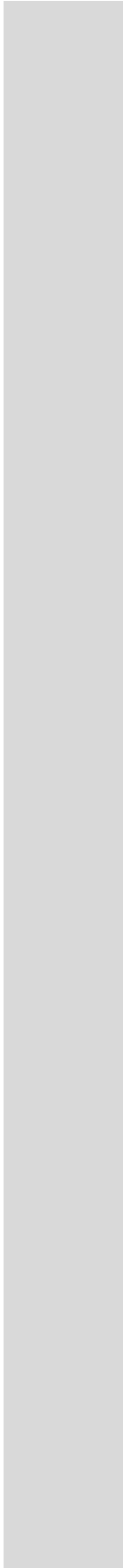
\$722

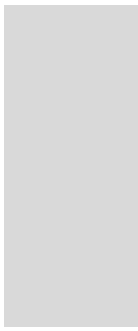
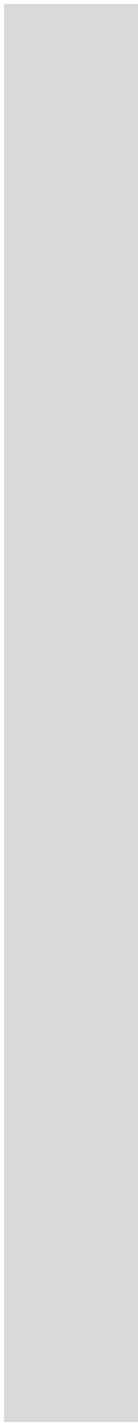
\$722

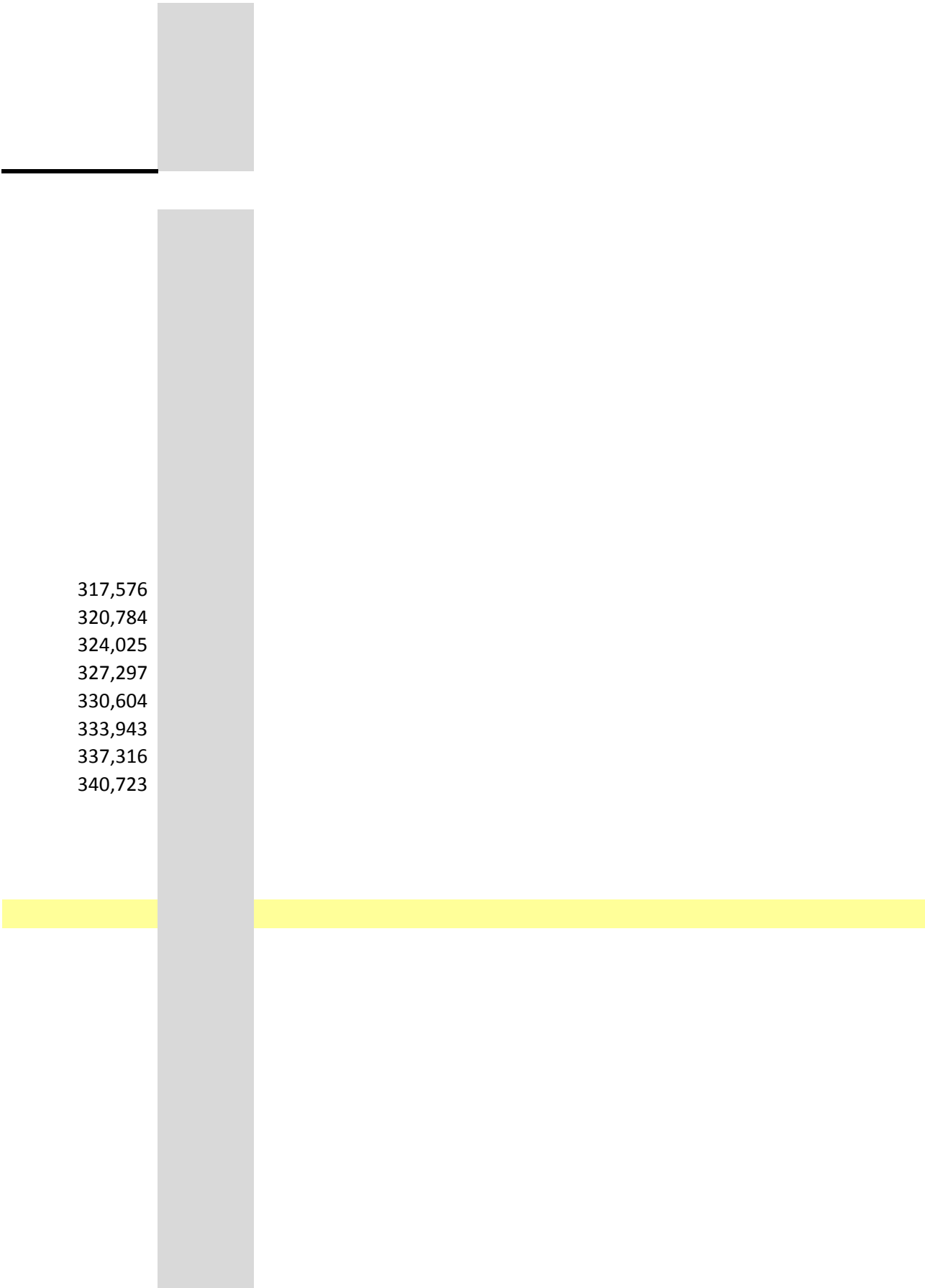
\$722

\$722

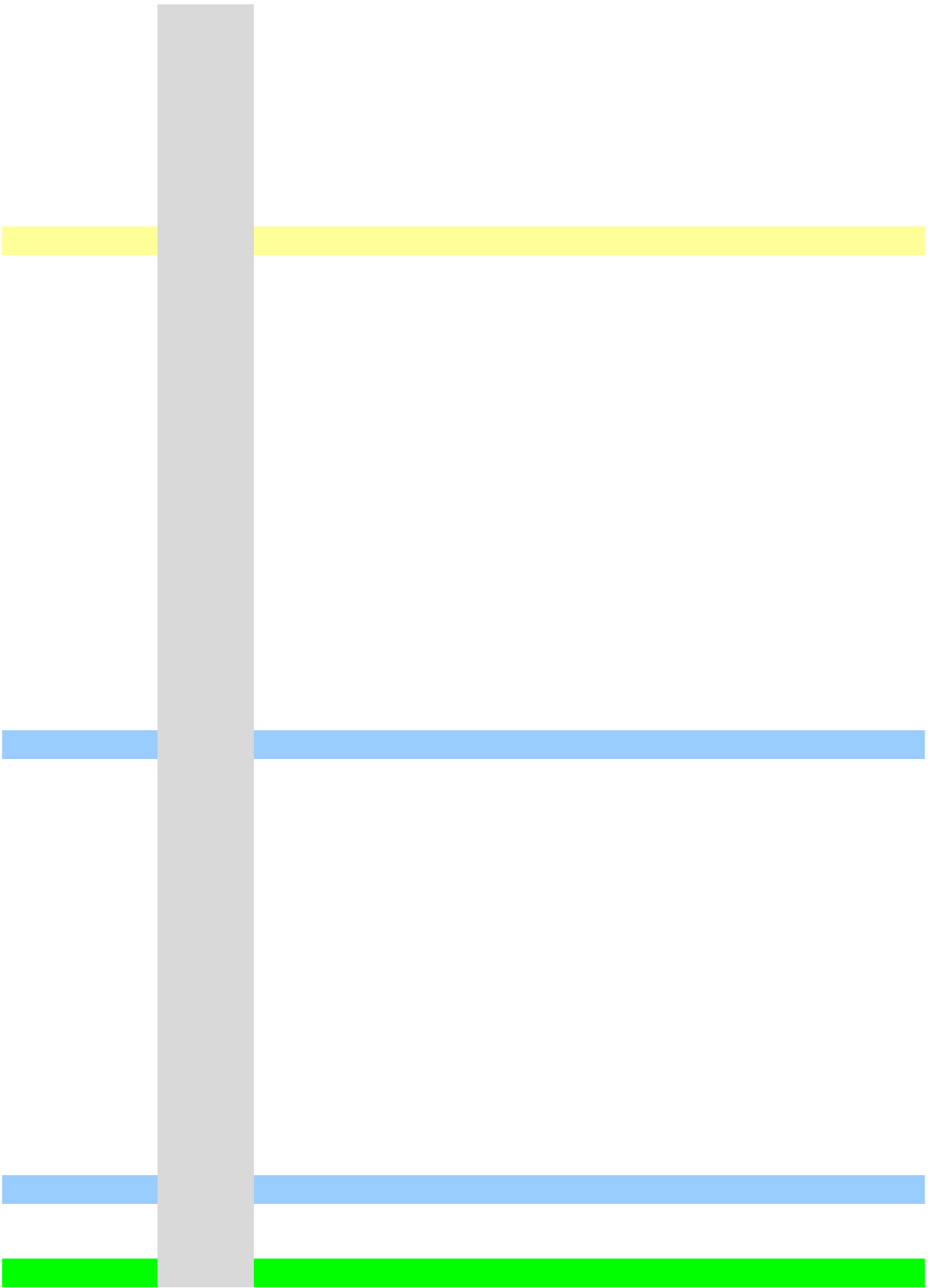


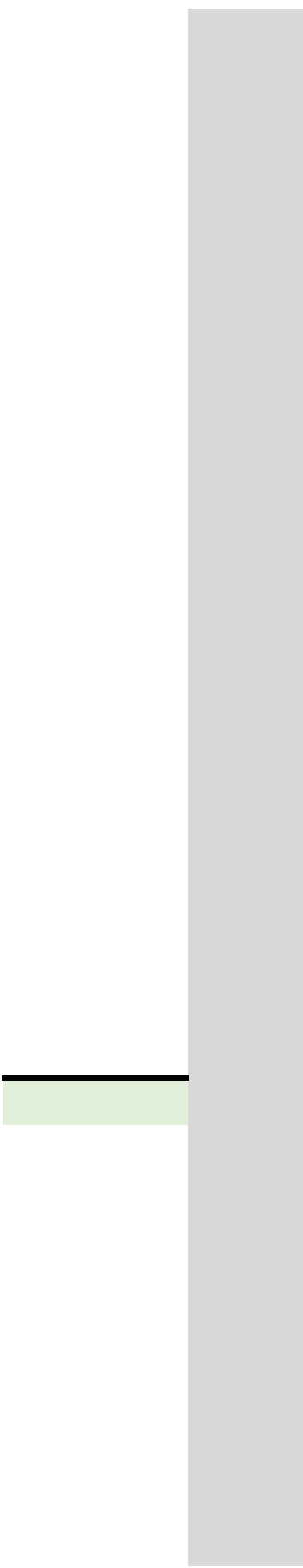






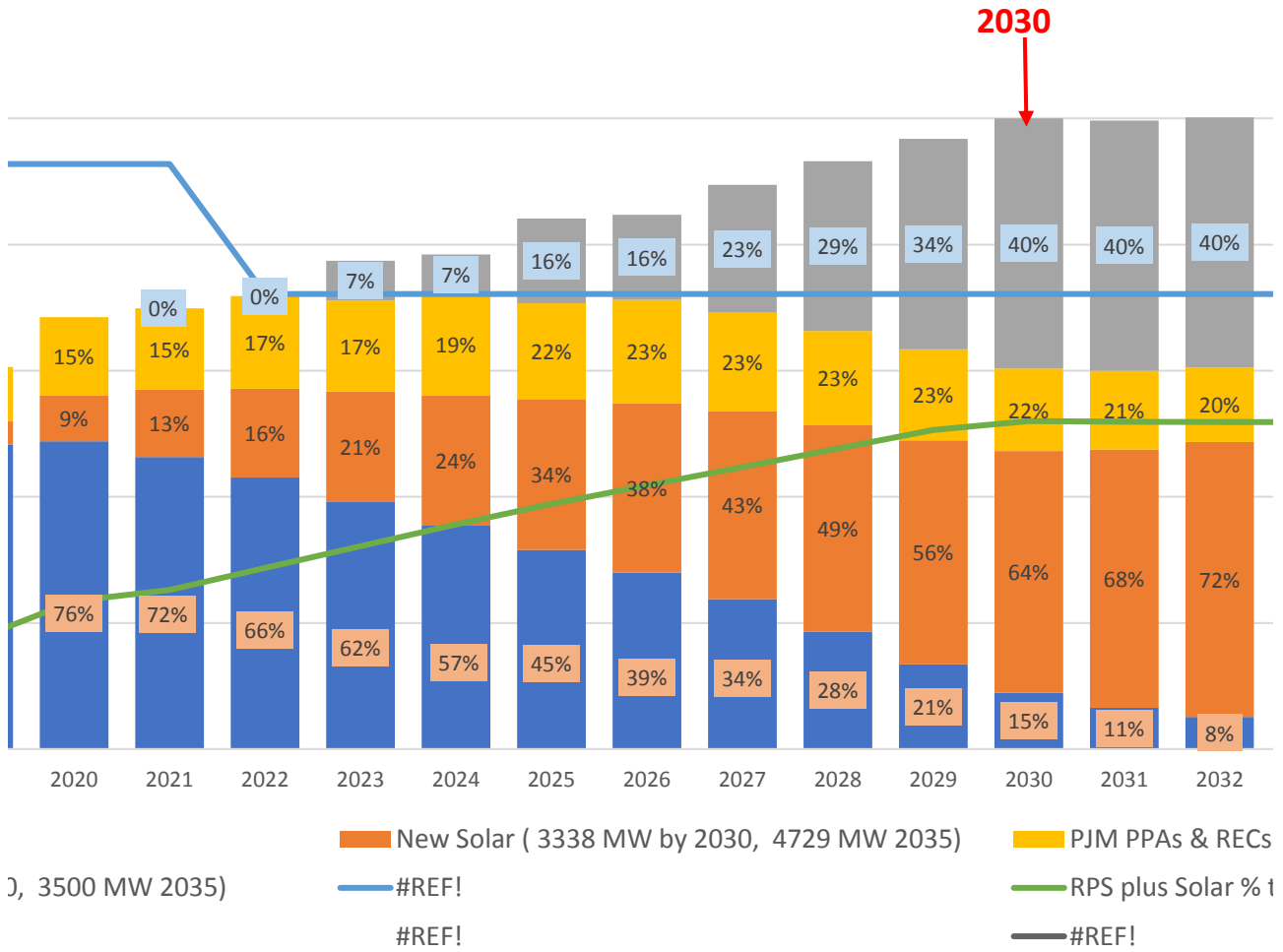
317,576
320,784
324,025
327,297
330,604
333,943
337,316
340,723

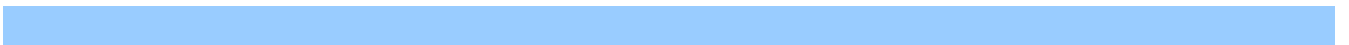


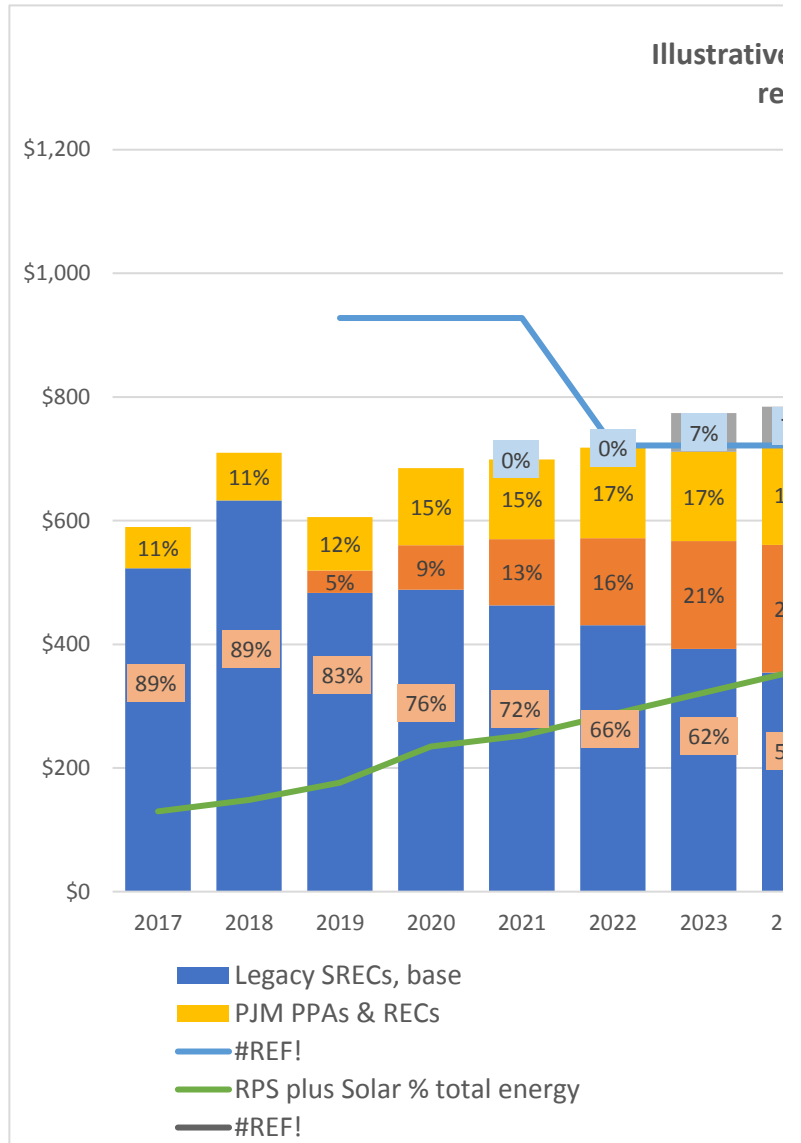
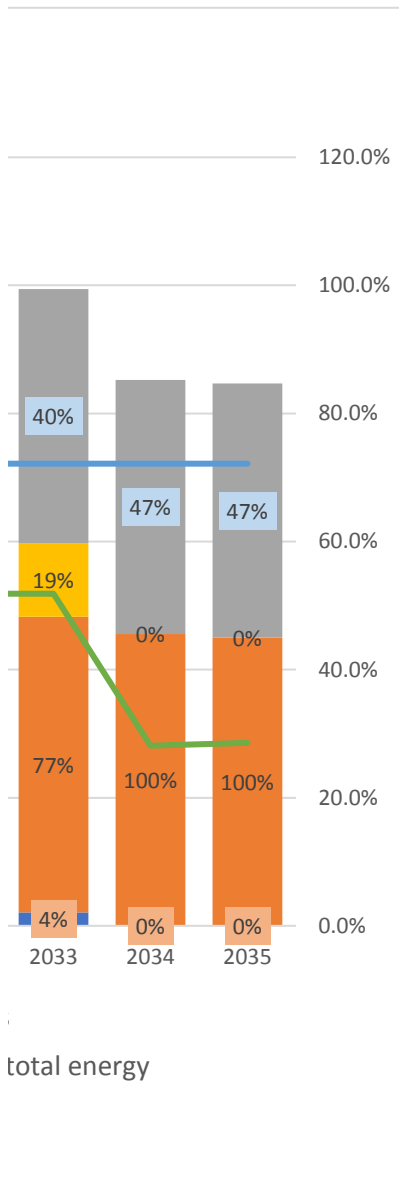


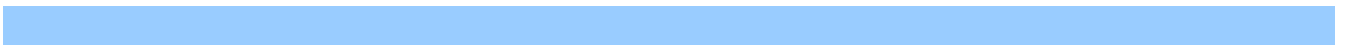


Illustrative RPS scenario Class I cost (\$million / year),
resource mix & % of Class I total cost

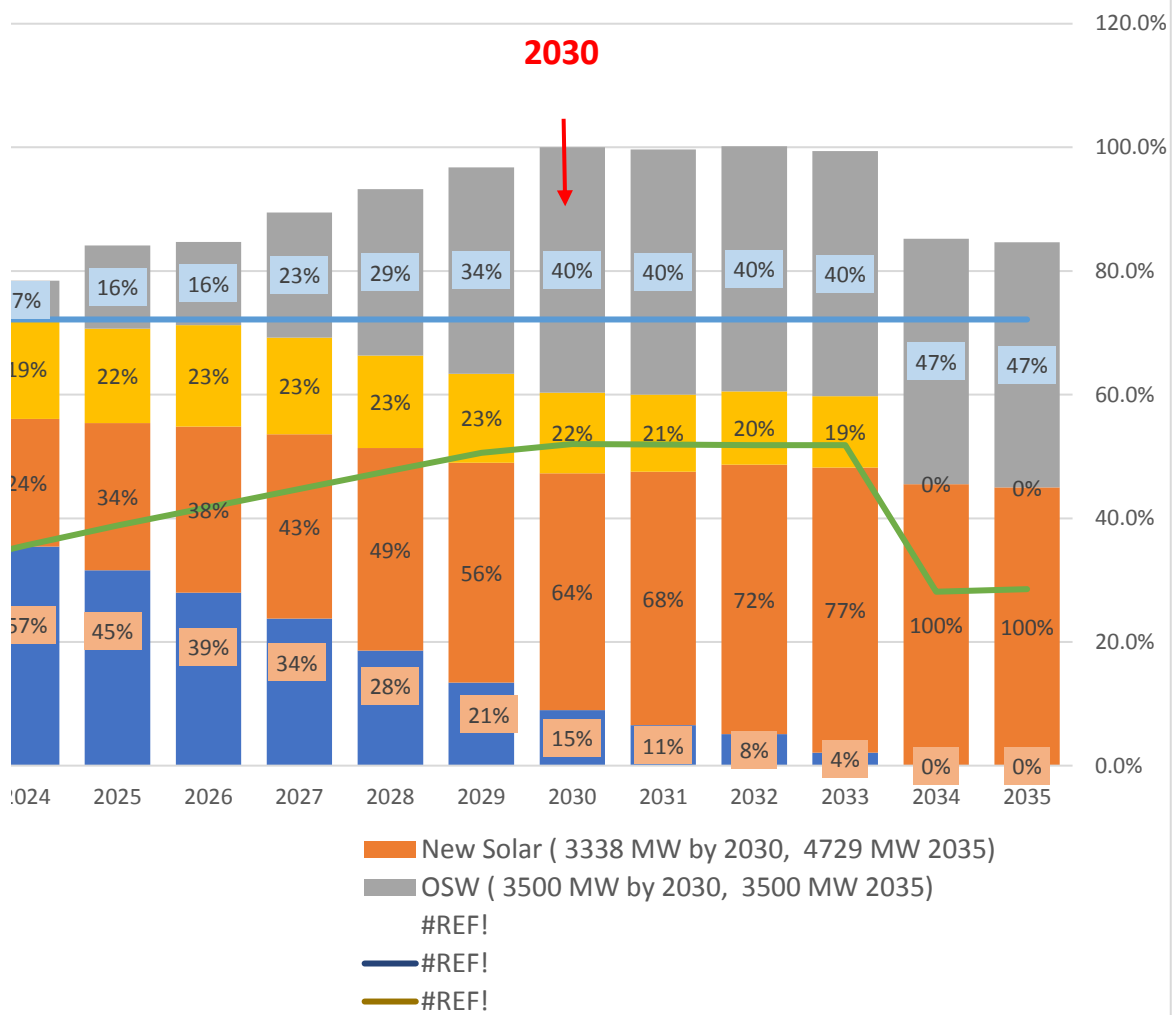


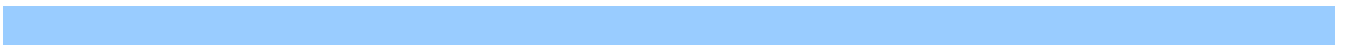
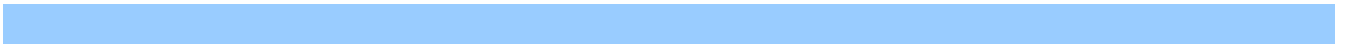




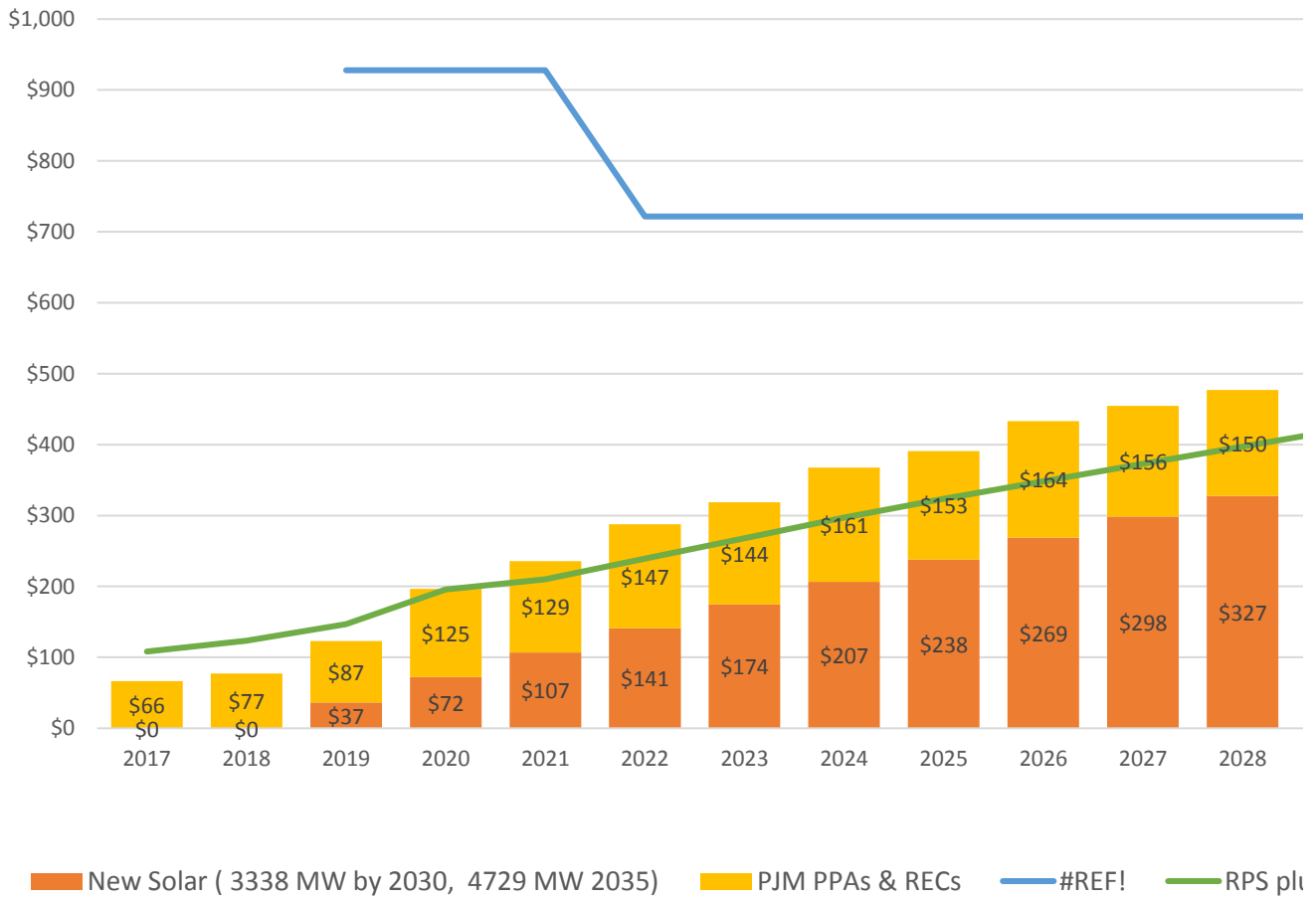


e RPS scenario Class I cost (\$million / year),
 source mix & % of Class I total cost

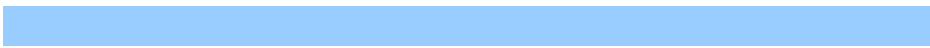




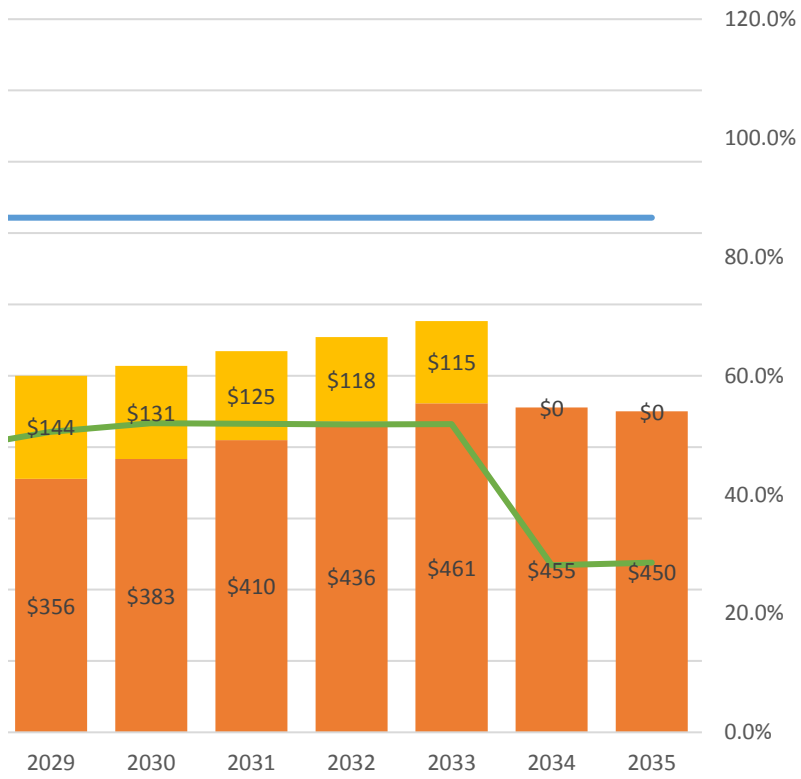
Illustrative RPS scenario Class I cost (\$million / Excludes Legacy SREC costs and OREC cost



■ New Solar (3338 MW by 2030, 4729 MW 2035)
 ■ PJM PPAs & RECs
 — #REF!
 — RPS pl



year),
s



us Solar % total energy #REF! #REF! #REF!