



## MONTHLY RENEWABLE ENERGY REPORT - OCT 2021

OCTOBER 2021

- In September, the House Energy and Commerce Committee advanced the Clean Electricity Performance Program (CEPP) as part of a larger \$3.5 trillion budget reconciliation bill, awarding incentives to utilities for increasing their clean electricity supplied year-over-year and penalizing those that do not. Congress is working on getting the reconciliation bill as well as the \$1.2 trillion bi-partisan infrastructure bill across the finish line.

## Capacity and generation by fuel type

Capacity (GW)	Monthly Data			MoM Change (GW)	YoY Change (GW)	Net Additions YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	56.1	54.9	43.0	1.2	13.1	8.5	5.7
Wind	127.8	126.7	109.1	1.1	18.7	9.8	5.3
Battery	4.3	3.6	1.4	0.7	3.0	2.9	0.4
Hydro	102.7	102.7	102.6	0.0	0.1	0.1	0.1
Other Renewables	7.7	7.7	7.9	0.0	-0.1	-0.1	0.0
Nuclear	95.5	95.5	97.1	0.0	-1.6	-1.0	-1.0
Fossil	711.0	710.6	715.0	0.5	-4.0	0.5	-3.4
<b>Total</b>	<b>1,105.1</b>	<b>1,101.6</b>	<b>1,076.1</b>	<b>3.5</b>	<b>25.6</b>	<b>20.5</b>	<b>7.0</b>

- There is some talk of boosting the carbon capture tax credits in the budget reconciliation bill from \$50 to \$85 per metric ton for heavy industries to solidify support for the bill. However, this proposal is yet to cover emissions from coal and natural gas power plants.

Generation (TWh)	Monthly Data			MoM Change (TWh)	YoY Change (TWh)	YTD Ending	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	10.8	11.5	7.8	-0.7	3.1	90.5	71.3
Wind	28.4	26.1	22.9	2.2	5.4	267.0	241.4
Battery	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1
Hydro	18.0	20.7	18.5	-2.7	-0.5	194.0	221.4
Other Renewables	3.5	4.0	3.4	-0.5	0.0	32.2	31.9
Nuclear	64.6	69.7	65.7	-5.1	-1.1	586.9	598.9
Fossil	208.1	265.4	202.4	-57.3	5.7	1,843.5	1,755.0
<b>Total</b>	<b>333.4</b>	<b>397.3</b>	<b>320.7</b>	<b>-64.0</b>	<b>12.7</b>	<b>3,014.0</b>	<b>2,919.8</b>

- As of September 2021, there were 128 GW of wind and 56 GW of solar operating in the U.S. Onshore wind and utility-scale solar is expected to headline the steady growth of renewables in the ensuing years, ramping up to 146 GW of onshore wind and 121 GW of solar by 2023. The possible long-term extension of the production tax credits and investment tax credits (through 2033) introduced in the budget bill would pave the way for more renewables.

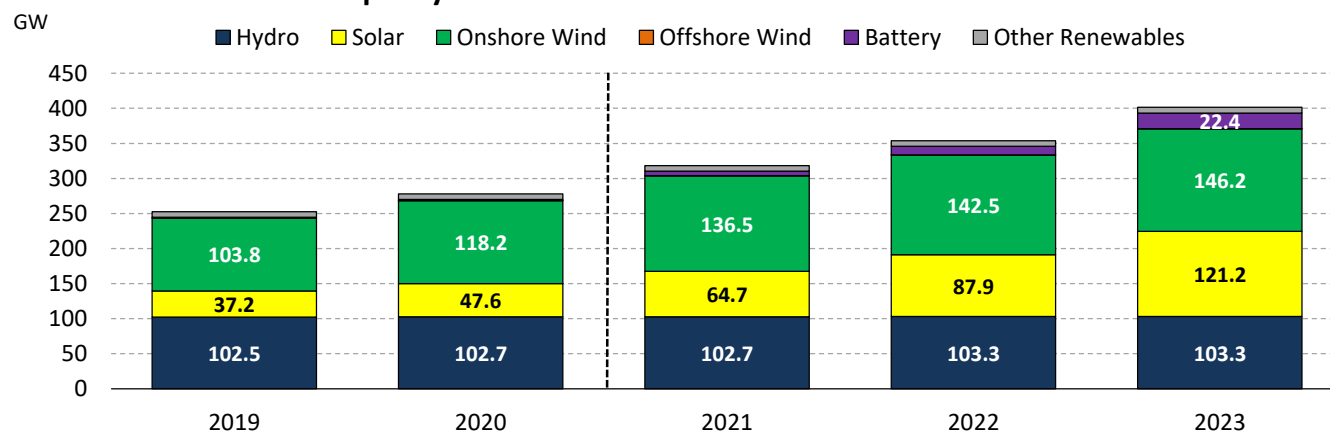
Capacity Factor	Monthly Data			MoM Change (%)	YoY Change (%)	YTD Ending	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	27%	28%	25%	-1%	2%	26%	27%
Wind	31%	28%	29%	3%	2%	33%	34%
Battery	0%	0%	-1%	0%	1%	0%	-1%
Hydro	24%	27%	25%	-3%	-1%	29%	33%
Other Renewables	62%	69%	61%	-6%	2%	63%	62%
Nuclear	94%	98%	94%	-4%	0%	94%	93%
Fossil	41%	50%	39%	-10%	1%	40%	37%

- The nation's offshore wind industry is on the cusp of a boom, with the upward trend driven by federal and state support as well as falling costs. The enthusiasm is rapidly spreading to the West coast as well - California's governor passed a landmark bill requiring the state's energy commission to set concrete 2030 and 2045 offshore wind production targets by mid-2022.

## Annual renewable capacity additions

(GW)	2019	2020	2021	2022	2023
Solar	5.5	10.4	17.1	23.2	33.3
Onshore Wind	9.3	14.4	18.3	6.0	3.6
Offshore Wind	0.0	0.0	0.0	0.0	0.0
Battery	0.1	0.5	4.8	5.7	10.4
Other Renewables	0.2	0.1	0.0	0.1	0.0
<b>U.S. Total</b>	<b>15.1</b>	<b>25.4</b>	<b>40.2</b>	<b>35.0</b>	<b>47.4</b>

## Cumulative renewable capacity forecast



RENEWABLE ENERGY

## U.S. RENEWABLE CAPACITY OUTLOOK SENSITIVITY

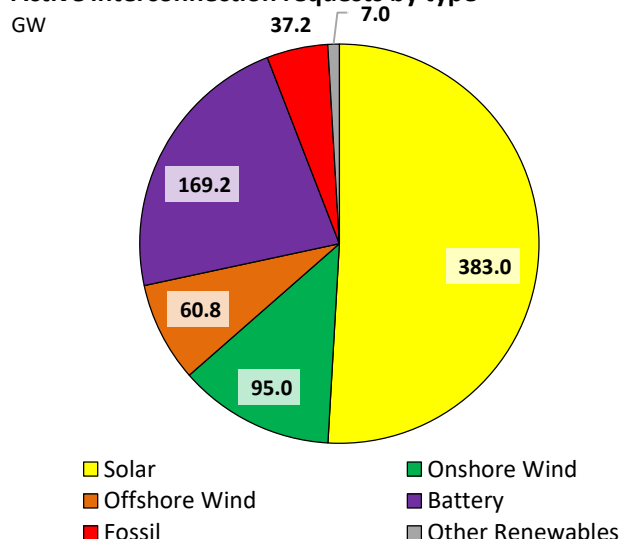
## Renewable capacity by region and type (GW)

	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
<b>U.S. Total</b>												
Solar	31.70	37.20	47.58	64.44	87.61	120.90	62.70	80.47	101.92	66.38	97.24	145.94
Onshore Wind	94.70	103.84	118.01	136.32	142.36	146.00	135.19	140.00	142.14	137.65	145.19	150.99
Offshore Wind	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.52
Battery	0.84	0.98	1.46	6.23	11.95	22.39	5.96	9.65	15.33	6.52	15.32	32.04
Other Renewables	8.20	8.03	7.99	7.86	7.93	7.96	7.85	7.88	7.89	7.86	8.01	8.07
<b>ISONE</b>												
Solar	1.05	1.29	1.50	2.07	2.32	2.50	2.02	2.09	2.21	2.12	2.61	2.90
Onshore Wind	1.35	1.41	1.49	1.52	1.53	1.56	1.52	1.53	1.55	1.52	1.53	1.58
Offshore Wind	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.37
Battery	0.03	0.07	0.12	0.21	0.26	0.78	0.21	0.21	0.41	0.22	0.34	1.31
Other Renewables	1.07	1.01	1.02	1.03	1.03	1.04	1.03	1.03	1.03	1.03	1.04	1.05
<b>NYISO</b>												
Solar	0.29	0.52	0.65	0.90	1.37	2.63	0.86	1.08	1.70	0.95	1.71	3.77
Onshore Wind	1.98	1.98	1.98	2.36	2.66	2.97	2.35	2.53	2.72	2.36	2.79	3.25
Offshore Wind	-	-	-	-	-	-	-	-	-	-	-	0.13
Battery	0.01	0.03	0.04	0.14	0.61	1.22	0.10	0.26	0.53	0.20	1.05	2.11
Other Renewables	0.30	0.28	0.29	0.29	0.30	0.30	0.29	0.29	0.30	0.29	0.30	0.30
<b>PJM</b>												
Solar	2.23	2.79	3.90	6.60	10.06	14.70	5.98	7.81	10.20	7.26	12.51	19.99
Onshore Wind	8.58	9.25	10.09	10.66	10.74	10.80	10.62	10.65	10.68	10.71	10.84	10.94
Offshore Wind	-	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Battery	0.28	0.30	0.29	0.37	0.95	2.72	0.33	0.55	1.32	0.40	1.44	4.58
Other Renewables	0.95	0.86	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
<b>Southeast</b>												
Solar	6.69	8.47	11.55	14.93	15.79	15.92	14.85	15.90	16.05	15.00	16.42	16.66
Onshore Wind	0.29	0.29	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
Battery	0.02	0.04	0.05	0.58	0.61	0.61	0.56	0.59	0.59	0.59	0.63	0.63
Other Renewables	1.44	1.42	1.41	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27
<b>MISO</b>												
Solar	1.15	1.37	1.99	3.75	7.06	12.67	3.46	5.45	8.03	4.04	8.73	18.55
Onshore Wind	18.91	21.13	25.16	27.08	27.78	28.53	27.04	27.47	27.77	27.11	28.12	29.49
Battery	0.04	0.04	0.06	0.09	0.38	0.82	0.07	0.14	0.36	0.10	0.70	1.41
Other Renewables	0.80	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
<b>SPP</b>												
Solar	0.38	0.40	0.43	0.90	1.55	3.69	0.45	0.57	1.31	1.58	3.02	7.24
Onshore Wind	22.33	24.55	28.80	33.78	35.08	36.12	32.99	33.97	34.45	34.86	36.57	38.44
Battery	0.00	0.00	0.01	0.11	0.22	0.74	0.02	0.03	0.21	0.23	0.50	1.53
Other Renewables	0.04	0.04	0.04	0.04	0.08	0.08	0.04	0.04	0.04	0.04	0.14	0.14
<b>ERCOT</b>												
Solar	1.89	2.39	4.86	9.19	19.99	34.03	9.12	18.59	28.91	9.19	21.33	39.12
Onshore Wind	19.70	23.09	25.19	32.53	35.87	37.17	32.31	35.20	36.18	32.54	36.34	37.96
Battery	0.09	0.11	0.22	1.56	5.17	9.87	1.53	4.11	6.86	1.56	6.28	13.11
Other Renewables	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
<b>WECC</b>												
Solar	6.38	7.19	8.26	10.85	11.56	12.86	10.80	11.69	12.93	10.92	12.36	14.37
Onshore Wind	15.08	15.56	18.36	21.00	21.10	21.20	20.98	21.11	21.21	21.13	21.34	21.61
Battery	0.09	0.10	0.10	0.33	0.47	0.88	0.34	0.61	1.00	0.35	0.95	1.65
Other Renewables	1.53	1.55	1.55	1.55	1.56	1.56	1.55	1.56	1.56	1.55	1.57	1.57
<b>CAISO</b>												
Solar	11.50	12.51	14.14	14.95	17.62	21.62	14.87	17.00	20.28	15.03	18.27	23.06
Onshore Wind	6.22	6.31	6.11	6.58	6.78	6.83	6.55	6.72	6.75	6.60	6.84	6.90
Battery	0.18	0.18	0.46	2.72	3.17	4.63	2.68	3.04	3.93	2.76	3.30	5.58
Other Renewables	1.90	1.91	1.91	1.91	1.92	1.95	1.91	1.92	1.93	1.91	1.93	1.97

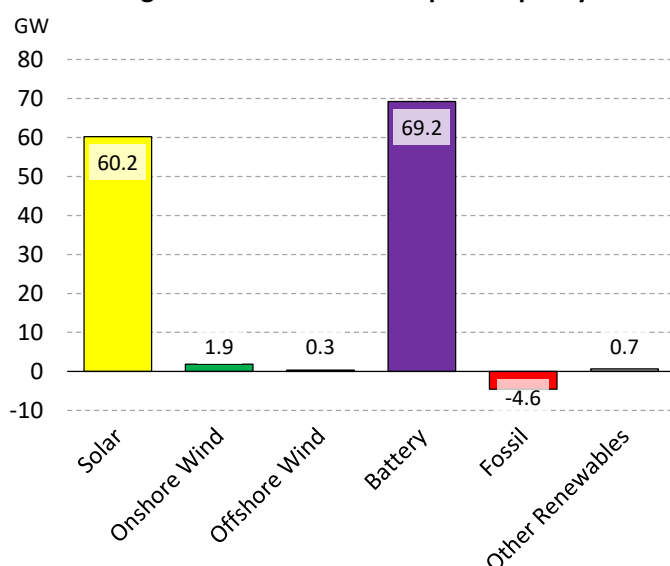
## U.S. INTERCONNECTION QUEUE UPDATE

- Renewable projects in the combined interconnection queue (IQ) for the seven U.S. ISOs swelled from 624 to 752 GW over the past month. Solar or solar+storage projects and standalone battery projects contribute to a majority of this increase.
- Of the 752 GW, 383 GW or 51% are solar and solar+storage projects added to the interconnection roster. 156 GW or 21% are onshore and offshore wind projects, while 169 GW or 22% are battery and other energy storage projects (excluding hybrid).
- With 142 GW of active projects in the IQ, MISO's footprint grew rapidly in the last month, surpassing ERCOT for the maximum capacity submitted for requests. Solar and battery storage projects comprise a significant chunk of the new project influx.

Active interconnection requests by type



MoM change in interconnection request capacity



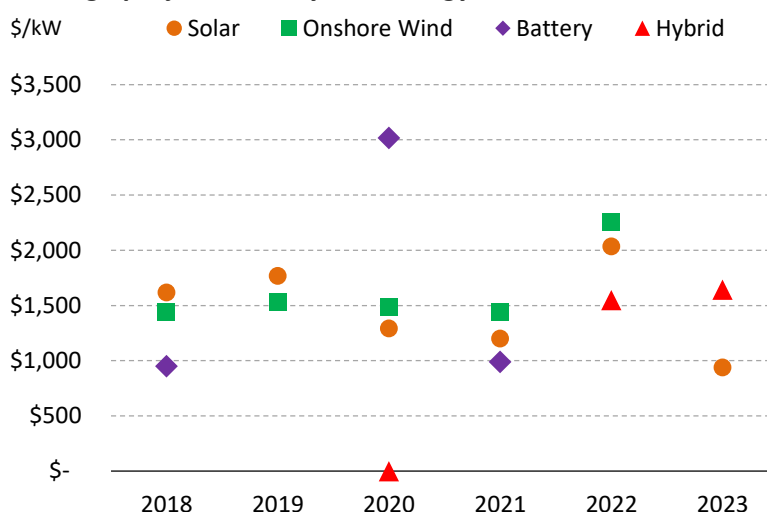
## Interconnection requests by ISO, type and year

Capacity (MW)	2021	2022	2023
<b>ISONE</b>			
Solar	638	1,809	816
Onshore Wind	-	40	126
Offshore Wind	-	-	3,297
Battery	62	480	3,174
Fossil	271	1,356	-
Other Renewables	20	35	17
<b>NYISO</b>			
Solar	548	2,576	6,368
Onshore Wind	178	1,325	1,331
Offshore Wind	-	138	-
Battery	435	3,090	3,354
Fossil	-	788	179
Other Renewables	-	19	14
<b>PJM</b>			
Solar	6,465	16,708	22,623
Onshore Wind	439	489	296
Offshore Wind	2	84	315
Battery	338	3,701	10,041
Fossil	1,456	5,678	2,935
Other Renewables	-	-	-
<b>MISO</b>			
Solar	3,726	14,504	31,039
Onshore Wind	390	3,135	4,428
Battery	120	2,295	2,167
Fossil	1,057	829	2,190
Other Renewables	-	-	-
<b>SPP</b>			
Solar	4,506	5,499	14,000
Onshore Wind	10,217	5,014	6,085
Battery	829	1,079	3,444
Fossil	-	-	3,506
Other Renewables	-	400	-
<b>ERCOT</b>			
Solar	1,413	19,306	41,974
Onshore Wind	4,262	6,520	4,104
Battery	680	11,626	19,596
Fossil	647	1,459	1,564
Other Renewables	-	-	-
<b>CAISO</b>			
Solar	1,321	8,121	11,461
Onshore Wind	428	562	182
Battery	744	1,346	6,691
Fossil	-	63	656
Other Renewables	-	44	163

## RENEWABLE PORTFOLIO STANDARD &amp; REC MARKET UPDATE

- North Carolina House provided the green light to impose its sweeping clean energy plan HB 951, mandating a 70% emission cut to Duke's fleet by 2030 and carbon neutrality by 2050. The compromise bill removed the guidance for replacing coal provided in the previous bill text and gives regulators the flexibility to determine its 'least cost' generation mix for achieving the stated carbon goals.
- Illinois' clean energy legislature enacted last month re-established the state's lucrative solar renewable energy credit (sRECs) incentives for distributed and community solar projects. As part of the 40% renewables by 2030 target, the Illinois Power Agency is directed to procure \$350 million worth of RECs annually from utility-scale renewable projects.

## Average project costs by technology



## Notable recently completed facilities

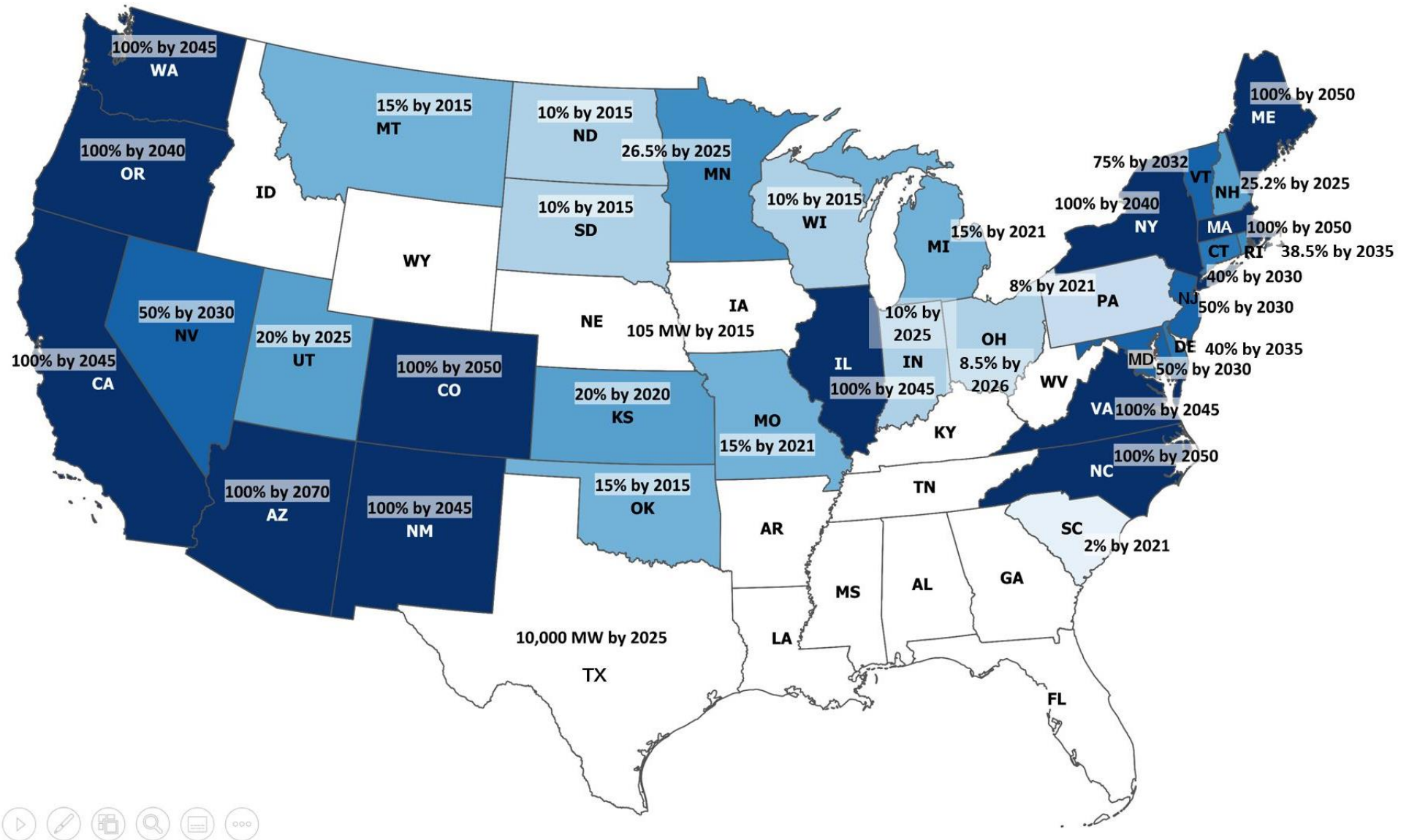
No.	Project Name	Developer	State	County	Fuel Type	Size (MW)	Online Date
1	Aviator Wind	Aviator Wind, LLC	TX	Coke	Wind	525.0	Jun-21
2	High Lonesome Wind Power, LLC	High Lonesome Wind Power, LLC	TX	Upton	Wind	449.5	Jul-21
3	Isabella Wind Park	DTE Electric Company	MI	Isabella	Wind	383.5	Jun-21
4	Frontier Windpower II	Frontier Windpower II, LLC	OK	Kay	Wind	351.8	Feb-21
5	Neosho Ridge Wind Energy Center	Empire District Electric Co	KS	Neosho	Wind	301.0	May-21
6	Dynegy Moss Landing Power Plant	Dynegy -Moss Landing LLC	CA	Monterey	Battery	300.0	May-21
7	Deuel Harvest Wind Energy LLC	Invenergy Services LLC	SD	Deuel	Wind	300.0	Feb-21
8	Las Majadas Wind Farm	Las Majadas Wind Farm, LLC	TX	Willacy	Wind	272.6	Mar-21
9	Taygete Energy Project LLC	7X Energy, Inc.	TX	Pecos	Solar	255.0	Mar-21
10	Greasewood	Concho Bluff LLC	TX	Pecos	Solar	255.0	Feb-21

## Renewable energy certificate (REC) price update (\$/MWh)

		Monthly Data							MoM Change	YoY Change
State	RPS Goal/ Solar Carveout	Sep-21	Aug-21	Jul-21	Jun-21	May-21	Apr-21	Sep-20	\$/MWh	\$/MWh
<b>Tier 1 RECs</b>										
CT	40% by 2030	\$37.69	\$38.25	\$38.55	\$36.88	\$39.88	\$46.20	\$44.19	(\$0.56)	(\$6.50)
MD	50% by 2030	\$16.44	\$16.81	\$14.90	\$13.94	\$14.06	\$16.15	\$9.81	(\$0.38)	\$6.63
MA	40% by 2030	\$38.00	\$38.75	\$39.55	\$37.94	\$40.13	\$46.30	\$44.50	(\$0.75)	(\$6.50)
NJ	50% by 2030	\$16.50	\$16.63	\$14.90	\$13.81	\$14.11	\$16.20	\$10.13	(\$0.13)	\$6.38
OH	8.5% by 2026	\$10.19	\$9.19	\$7.90	\$6.69	\$6.63	\$10.85	\$8.94	\$1.00	\$1.25
PA	8% by 2021	\$16.38	\$16.75	\$14.65	\$13.69	\$13.63	\$15.95	\$10.06	(\$0.38)	\$6.31
TX	10,000 MW by 2025	\$4.83	\$5.36	\$4.01	\$3.73	\$3.30	\$2.90	\$1.25	(\$0.53)	\$3.58
<b>Solar RECs</b>										
MD	14.5% solar by 2030	\$79.50	\$79.00	\$78.50	\$78.88	\$78.25	\$78.45	\$84.13	\$0.50	(\$4.63)
MA	1600 MW solar by 2020	\$325.00	\$324.94	\$325.95	\$315.00	\$316.25	\$346.05	\$350.88	\$0.06	(\$25.88)
NJ	5.1% solar by 2021	\$235.44	\$234.94	\$233.60	\$233.13	\$234.38	\$234.60	\$232.19	\$0.50	\$3.25
OH	carveout eliminated in 2020	\$8.13	\$7.75	\$7.25	\$7.25	\$7.25	\$8.65	\$8.00	\$0.38	\$0.13
PA	0.5% solar by 2020-2021	\$41.75	\$41.56	\$40.60	\$38.50	\$37.00	\$32.45	\$23.50	\$0.19	\$18.25
<b>California RECs</b>										
CA	Bundled REC (Bucket 1)	\$12.44	\$11.50	\$11.50	\$12.25	\$13.31	\$14.25	\$15.25	\$0.94	(\$2.81)
CA	Bundled REC (Bucket 2)	\$8.63	\$7.50	\$7.50	\$8.00	\$8.50	\$8.50	\$8.50	\$1.13	\$0.13
CA	Tradable REC (Bucket 3)	\$5.25	\$5.25	\$5.25	\$4.94	\$4.35	\$3.50	\$2.65	\$0.00	\$2.60

all prices are in nominal\$

## RENEWABLE PORTFOLIO TARGETS BY STATE



*Note:*

*100% RPS category represents states that have required that all retail sales be supplied by renewable or clean resources by that set date.*



## ISONE - RENEWABLE CAPACITY OUTLOOK

- Vineyard Wind recently unveiled two Requests for Proposals (RFPs) for offshore wind development in Massachusetts. The projects dubbed 'Commonwealth Wind' offering options of 800 and 1,200 MW add to the developer's existing expansive portfolio (1,604 MW). Following the spate of recent milestones, the company's 800-MW phase Vineyard Wind 1 became the first commercial offshore wind farm in the U.S. to achieve financial close.
- In the hopes of kickstarting Maine's offshore wind industry, Gov. Janet Mills applied for a federal lease for a University of Maine project siting 12 turbines on innovative floating hulls. This research array is considered a significant step in advancing deep-water offshore wind technology that doesn't negatively impact the state's fishing industry.
- EVA expects ISONE's renewable footprint to grow from the current 4.6 GW to 5.9 GW by 2023. As highlighted by FERC recently, transmission will play a challenging but critical role in growing offshore wind and decarbonizing New England.

## Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
CT	40% by 2030	2 GW by 2030	1 GW by 2030
MA	100% by 2050	5.6 GW by 2035	1 GWh by 2025
ME	100% by 2050	5 GW by 2030	0.4 GW by 2030
NH	25.2% by 2025	--	--
RI	38.5% by 2035	--	--
VT	75% by 2032	--	--

## ISONE capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change (MW)	YoY Change (MW)	Net Additions YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	1,807	1,643	1,349	165	459	304	63
Wind	1,516	1,516	1,444	0	73	0	0
Battery	205	180	90	25	116	82	22
Hydro	3,719	3,719	3,723	0	-4	-4	-5
Other Renewables	1,027	1,027	1,020	0	7	7	14
Nuclear	3,321	3,321	3,321	0	0	0	0
Fossil	22,963	22,963	23,335	0	-372	-372	-1
<b>Total</b>	<b>34,560</b>	<b>34,370</b>	<b>34,281</b>	<b>190</b>	<b>89</b>	<b>18</b>	<b>93</b>

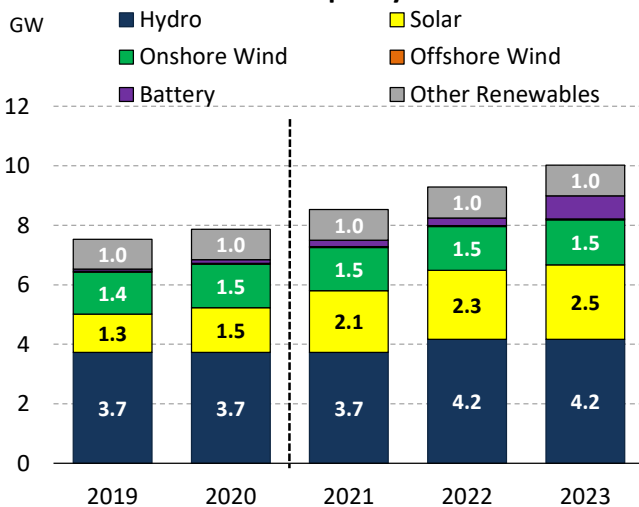
## Generation (GWh)

	Monthly Data			MoM Change (GWh)	YoY Change (GWh)	Generation YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	308	328	190	-20	118	2,318	1,765
Wind	269	151	289	118	-20	2,764	2,744
Battery	0	0	-1	0	1	1	-3
Hydro	488	547	515	-58	-27	5,101	5,711
Other Renewables	436	473	406	-38	30	4,076	4,086
Nuclear	2,378	2,452	2,389	-74	-12	21,438	19,512
Fossil	4,571	6,196	4,217	-1,625	354	39,974	37,404
<b>Total</b>	<b>8,450</b>	<b>10,147</b>	<b>8,005</b>	<b>-1,697</b>	<b>445</b>	<b>75,672</b>	<b>71,219</b>

## Capacity Factor

	Monthly Data			MoM Change (%)	YoY Change (%)	Capacity Factor YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	24%	27%	20%	-3%	7%	22%	20%
Wind	25%	13%	28%	11%	-14%	28%	29%
Battery	0%	0%	-1%	0%	1%	0%	-1%
Hydro	18%	20%	19%	-2%	1%	21%	23%
Other Renewables	59%	62%	55%	-3%	7%	61%	61%
Nuclear	99%	99%	100%	0%	-1%	99%	89%
Fossil	28%	36%	25%	-9%	11%	26%	24%

## Cumulative renewable capacity forecast



## ISONE renewable capacity by type (MW)

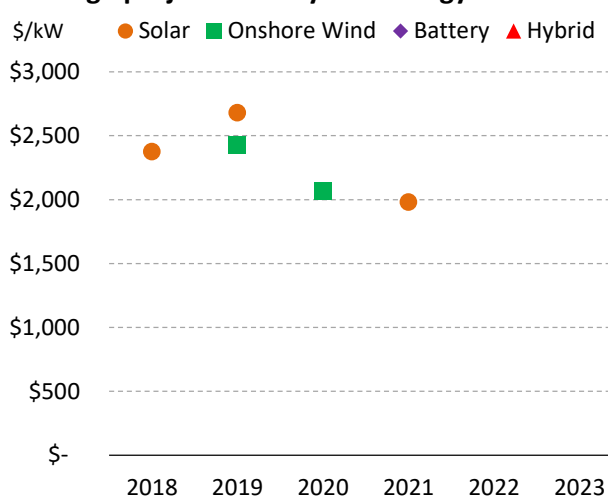
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	1,053	1,285	1,503	2,070	2,315	2,505	2,020	2,090	2,210	2,124	2,615	2,899
Onshore Wind	1,355	1,414	1,487	1,516	1,532	1,564	1,516	1,530	1,549	1,516	1,534	1,579
Offshore Wind	30	30	30	30	30	30	30	30	30	30	30	374
Battery	27	68	123	212	260	779	206	206	407	221	341	1,314
Other Renewables	1,072	1,006	1,020	1,029	1,035	1,037	1,027	1,029	1,030	1,032	1,042	1,047
<b>Total</b>	<b>3,536</b>	<b>3,803</b>	<b>4,163</b>	<b>4,857</b>	<b>5,172</b>	<b>5,914</b>	<b>4,799</b>	<b>4,886</b>	<b>5,227</b>	<b>4,924</b>	<b>5,562</b>	<b>7,213</b>

## ISONE - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	State	Fuel Type	Size (MW)	Online Date
1	Milo PV - BD Solar 1 LLC	ME	Solar	20.0	Jun-21
2	Oxford PV - BD Solar Oxford LLC	ME	Solar	9.2	Jun-21
3	Augusta PV - BD Solar Augusta LLC	ME	Solar	7.2	Jun-21
4	10 Briggs Solar NG, LLC (East)	RI	Solar	5.0	Jun-21
5	Syncarpha Puddon I Hybrid CSG	MA	Solar	5.0	Mar-21
6	Syncarpha Puddon II Hybrid CSG	MA	Solar	5.0	Mar-21
7	Syncarpha Northbridge II Hybrid CSG	MA	Solar	5.0	Apr-21
8	Randall Solar Project Hybrid	MA	Solar	5.0	Jul-21
9	Fairfield PV - BD Solar Fairfield LLC	ME	Solar	5.0	Jun-21
10	East Brookfield Adams Road Solar LLC CSG	MA	Solar	5.0	Jun-21
11	ZPD-PT Solar Project 2017-038 Hybrid LLC	MA	Solar	5.0	Apr-21
12	Rumford ESS	ME	Battery	4.9	Jun-21
13	Amaterasu LLC	MA	Solar	4.6	Jun-21
14	Dunstable Solar 1, LLC	MA	Solar	4.5	Apr-21
15	BWC Lake Lashaway, LLC Hybrid	MA	Solar	4.2	May-21

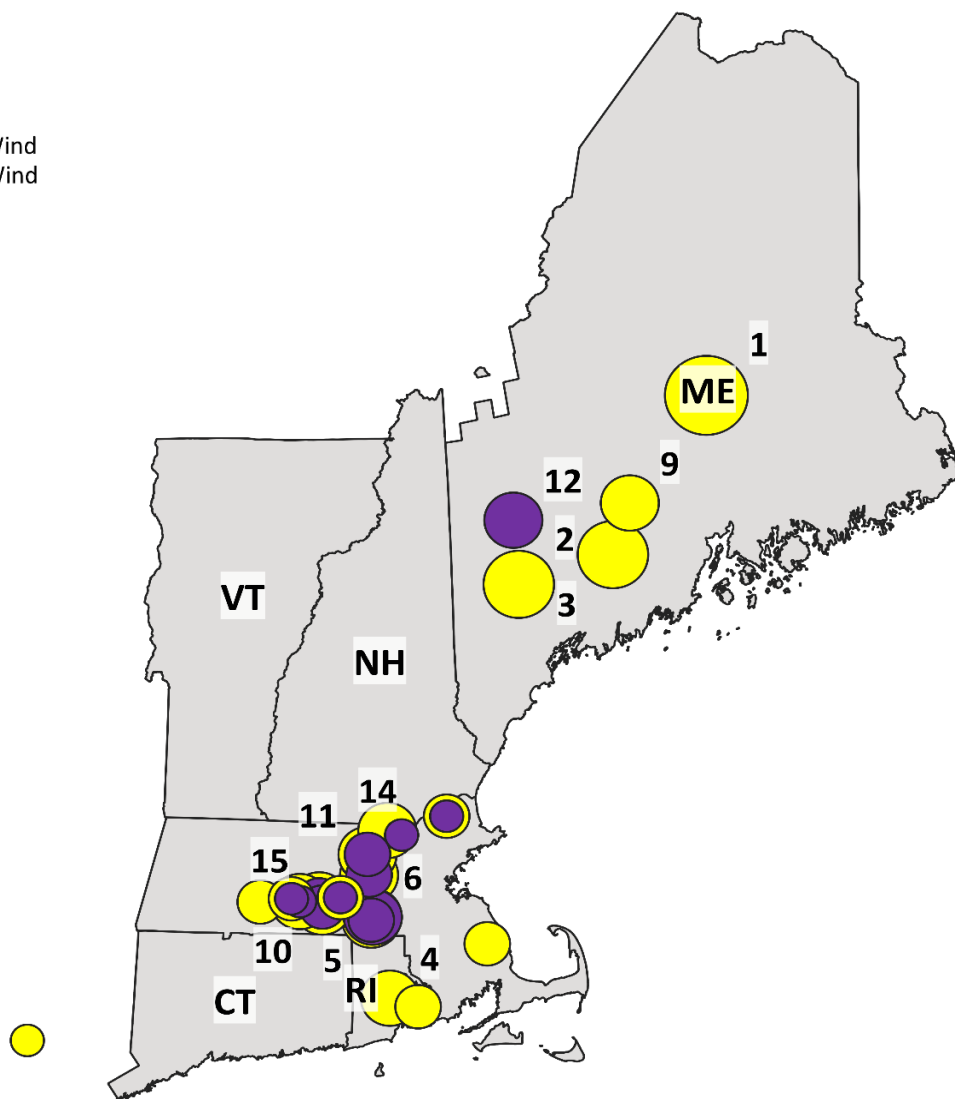
## Average project costs by technology



## ISONE map with notable recently completed projects

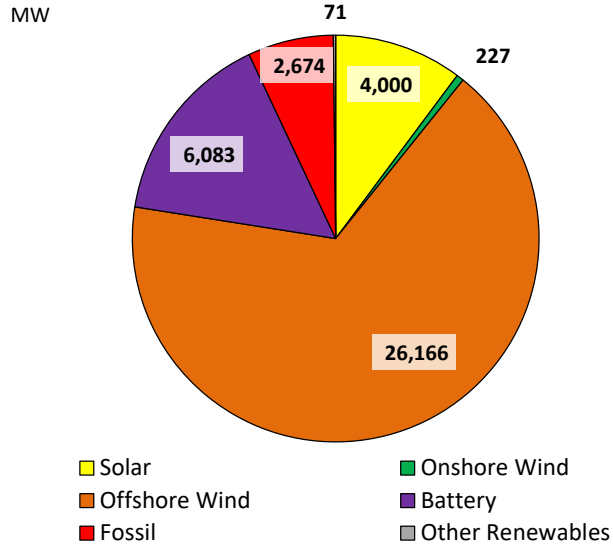
## Legend

- Solar
- Battery
- Onshore Wind
- Offshore Wind

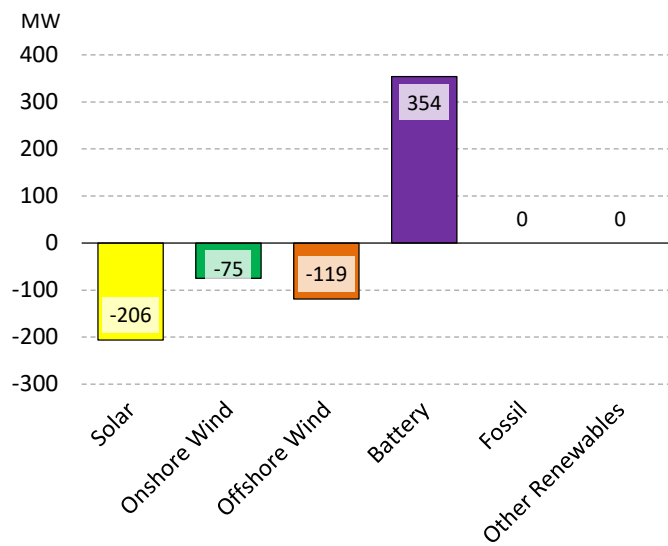


## ISONE - INTERCONNECTION QUEUE UPDATE

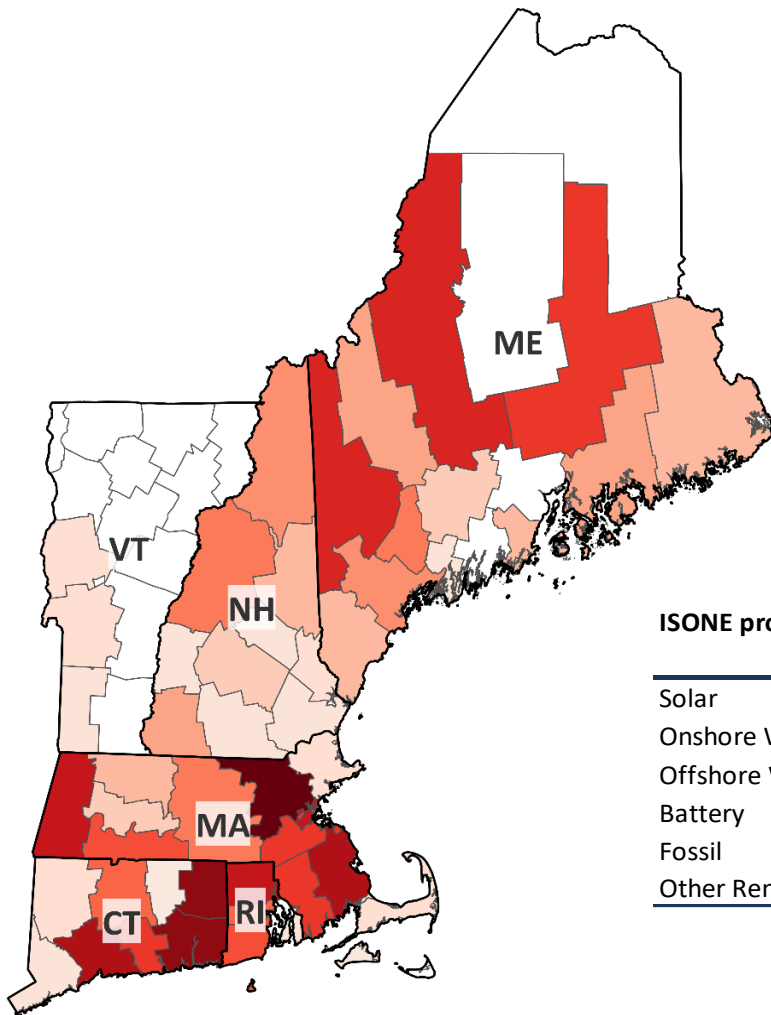
ISONE active interconnection requests by type



MoM change in interconnection request capacity



ISONE interconnection queue heatmap by county



ISONE proposed capacity by year by type (MW)

	2021	2022	2023
Solar	638	1,809	816
Onshore Wind	-	40	126
Offshore Wind	-	-	3,297
Battery	62	480	3,174
Fossil	271	1,356	-
Other Renewables	20	35	17



## NYISO - RENEWABLE CAPACITY OUTLOOK

- As featured in last month's report, New York regulators are chalking plans to address transmission hurdles in achieving the state's goal of 70% renewable energy by 2030. Gov. Hochul approved two large transmission projects to decarbonize the highly congested New York City - the 1,250 MW Champlain Hudson Power Express (CHPE) proposed to supply hydropower from Quebec, Canada, and the 1,300 MW Clean Path to transport wind, solar and hydro electricity from upstate New York. Both projects will be able to avail New York's newly-created Tier 4 RECs. Prior to the creation of the Tier 4 system, large-scale hydropower did not qualify for RECs. In other news, the governor announced plans of expanding in-state solar energy use to at least 10 GW by 2030.
- The state also passed a law requiring all new cars to be zero-emission by 2035, marking New York as the second state after California to phase out greenhouse gas emissions in automobiles.

### Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
NY	100% by 2040	9 GW by 2035	3 GW by 2030

### NYISO capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change (MW)	YoY Change (MW)	Net Additions YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	755	708	576	47	179	101	60
Wind	2,184	2,184	1,980	0	204	204	0
Battery	84	47	36	37	48	40	4
Hydro	5,943	5,943	5,943	0	0	0	0
Other Renewables	293	293	283	0	10	0	6
Nuclear	3,203	3,203	4,239	0	-1,036	-1,036	-1,012
Fossil	27,805	27,805	27,934	0	-129	-80	282
<b>Total</b>	<b>40,267</b>	<b>40,183</b>	<b>40,992</b>	<b>84</b>	<b>-809</b>	<b>-771</b>	<b>-659</b>

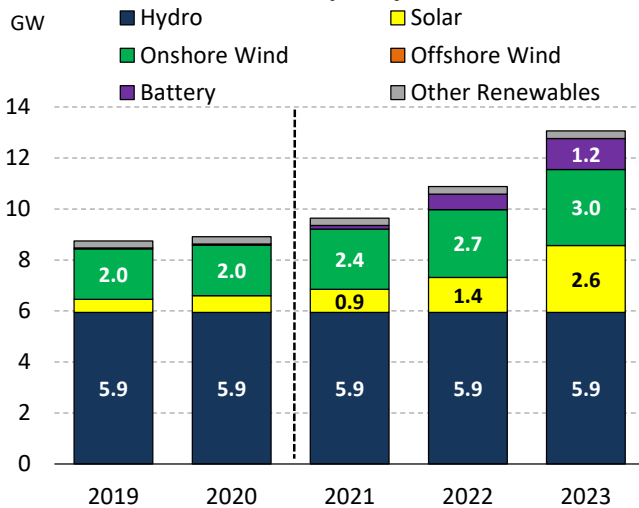
### Generation (GWh)

				Generation YTD			
Solar	129	141	94	-13	34	1,094	881
Wind	440	261	343	179	97	3,384	3,523
Battery	0	0	0	0	0	0	0
Hydro	2,236	2,517	2,447	-281	-211	21,572	23,548
Other Renewables	137	142	135	-4	3	1,235	1,261
Nuclear	2,353	2,433	2,711	-80	-358	24,211	28,903
Fossil	5,238	7,934	5,392	-2,696	-154	47,871	45,560
<b>Total</b>	<b>10,533</b>	<b>13,428</b>	<b>11,122</b>	<b>-2,896</b>	<b>-589</b>	<b>99,367</b>	<b>103,676</b>

### Capacity Factor

				Capacity Factor YTD			
Solar	24%	27%	23%	-3%	4%	24%	24%
Wind	28%	16%	24%	12%	-8%	25%	27%
Battery	0%	0%	0%	0%	0%	0%	0%
Hydro	52%	57%	57%	-5%	0%	55%	60%
Other Renewables	65%	65%	66%	0%	-1%	64%	69%
Nuclear	102%	102%	89%	0%	13%	104%	96%
Fossil	26%	38%	27%	-12%	12%	26%	25%

### Cumulative renewable capacity forecast



### NYISO renewable capacity by type (MW)

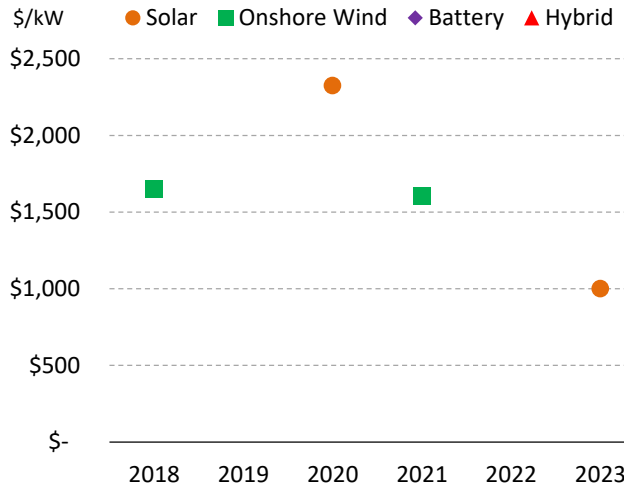
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	293	515	654	903	1,369	2,628	860	1,082	1,704	950	1,711	3,774
Onshore Wind	1,980	1,980	1,980	2,362	2,658	2,971	2,353	2,532	2,724	2,362	2,791	3,253
Offshore Wind	0	0	0	0	0	0	0	0	0	0	0	132
Battery	7	32	44	140	609	1,218	96	256	530	199	1,052	2,111
Other Renewables	296	277	293	293	297	300	293	295	297	293	298	303
<b>Total</b>	<b>2,577</b>	<b>2,805</b>	<b>2,971</b>	<b>3,698</b>	<b>4,932</b>	<b>7,117</b>	<b>3,602</b>	<b>4,165</b>	<b>5,255</b>	<b>3,803</b>	<b>5,852</b>	<b>9,573</b>

## NYISO - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	County	Fuel Type	Size (MW)	Online Date
1	Cassadaga Wind Farm	Chautauqua	Wind	124.0	Jul-21
2	Gloversville Landfill Solar	Fulton	Solar	6.9	May-21
3	Podunque Road CSG	Allegany	Solar	5.0	Apr-21
4	Clay Solar CSG	Onondaga	Solar	5.0	Jun-21
5	Bellisario Solar 1	Cortland	Solar	5.0	Mar-21
6	Amazon JFK8 Solar Project	Richmond	Solar	4.9	Mar-21
7	CES Marbletown Solar	Ulster	Solar	3.0	Mar-21
8	Big Tree Community Solar Farm	Erie	Solar	2.0	Feb-21
9	Fogarty CSG	Orange	Solar	2.0	Mar-21
10	98th Street Battery Storage Station	Queens	Battery	1.8	Jun-21
11	Volney II	Oswego	Battery	1.5	Feb-21
12	Volney II	Oswego	Solar	1.5	Feb-21

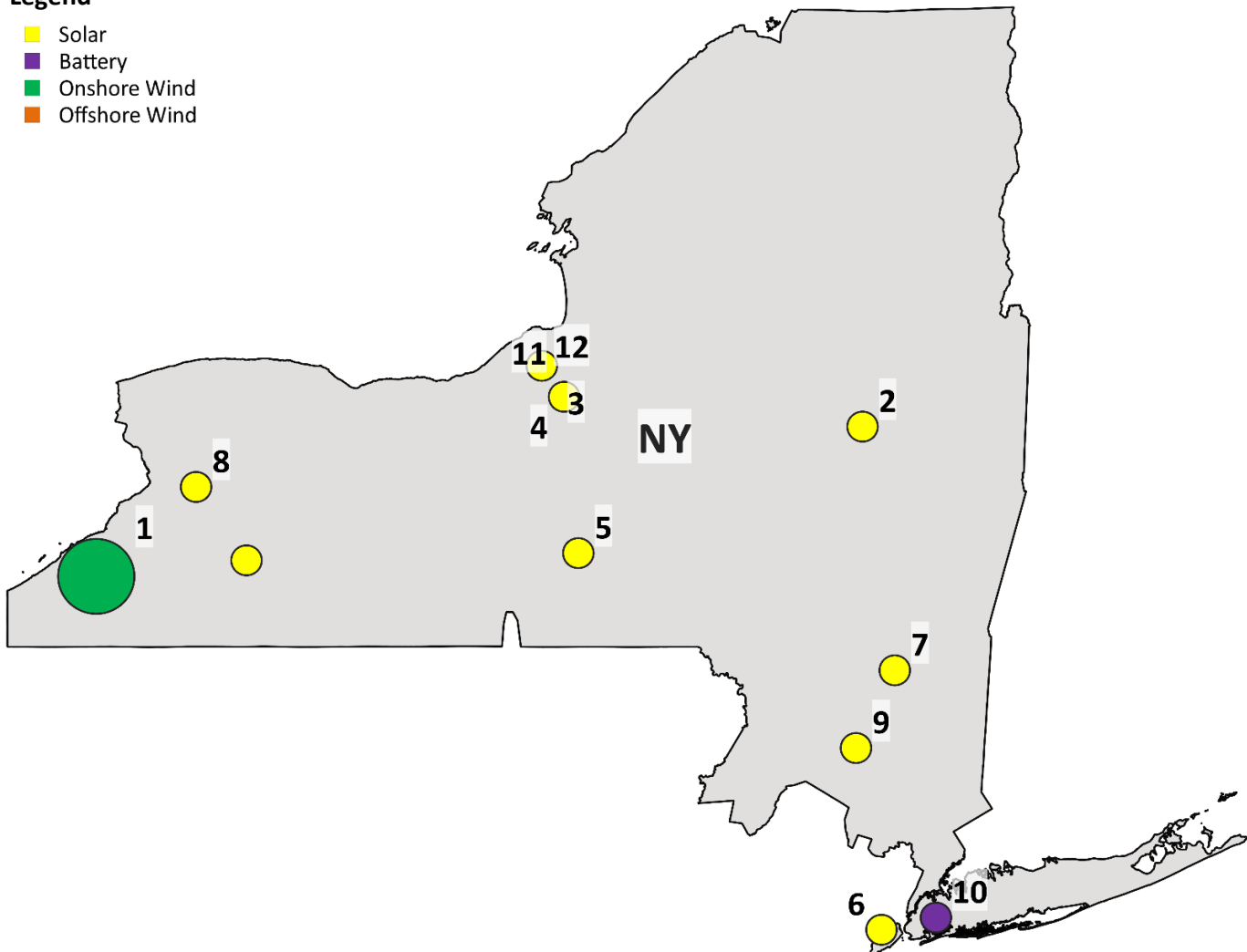
## Average project costs by technology



## NYISO map with notable recently completed projects

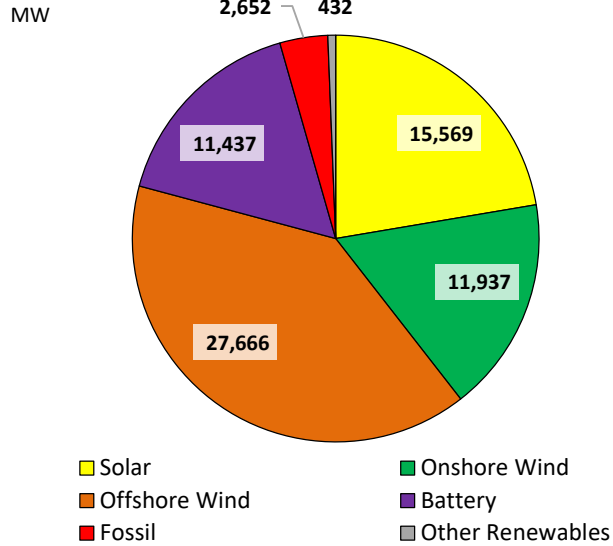
## Legend

- Solar
- Battery
- Onshore Wind
- Offshore Wind

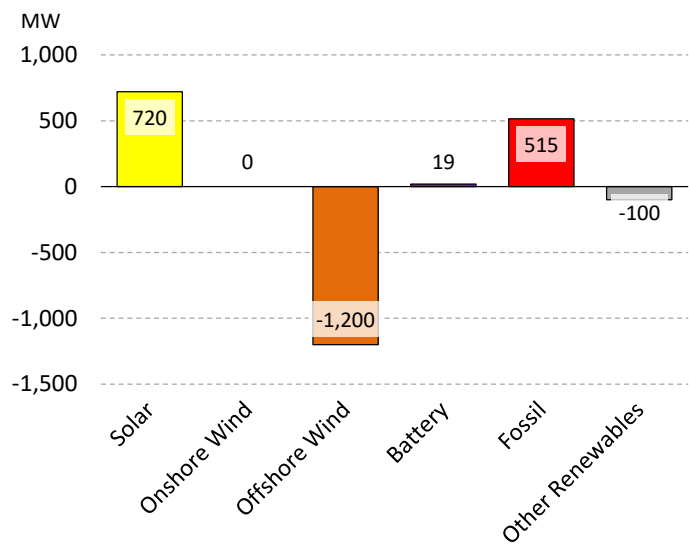


## NYISO - INTERCONNECTION QUEUE UPDATE

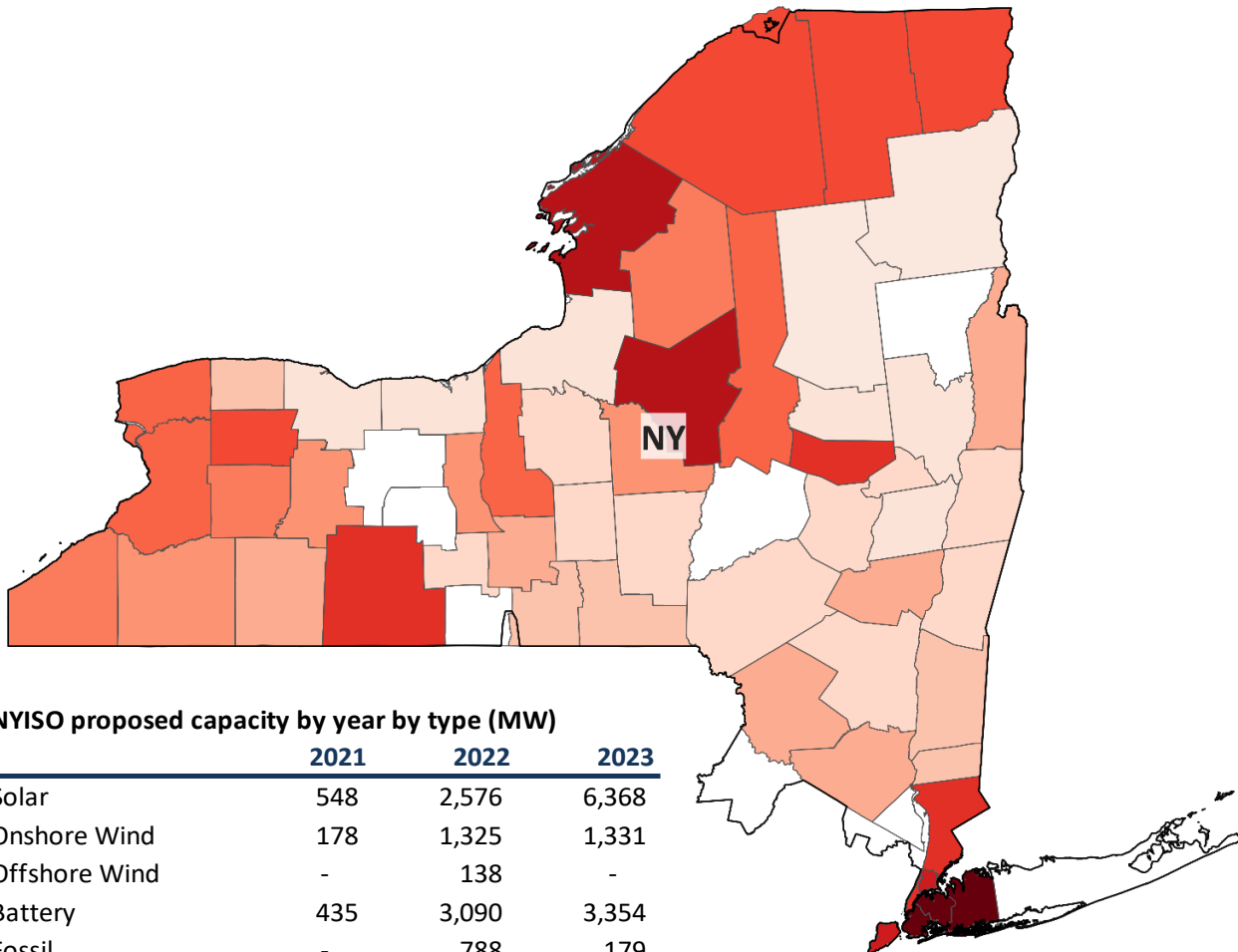
NYISO active interconnection requests by type



MoM change in interconnection request capacity



NYISO interconnection queue heatmap by county



NYISO proposed capacity by year by type (MW)

	2021	2022	2023
Solar	548	2,576	6,368
Onshore Wind	178	1,325	1,331
Offshore Wind	-	138	-
Battery	435	3,090	3,354
Fossil	-	788	179
Other Renewables	-	19	14

## PJM - RENEWABLE CAPACITY OUTLOOK

- PJM, with its diverse member states, saw a churn of energy and policy updates this past month.
- Pennsylvania lawmakers introduced the Pennsylvania Climate Action Plan 2021, charting potential pathways and tools to achieve an 80% GHG emission reduction by 2050. Notable measures included expanding the state's alternative energy portfolio standard, joining RGGI, increasing EV adoption, and setting higher building and energy efficiency standards.
- The Biden administration opened an environmental review process for New Jersey's Atlantic Shores 1.5 GW and 2.3 GW offshore wind projects.
- Virginia's largest utility, Dominion Energy, announced plans for more than 1,000 MW of new solar and battery storage capacity in-state, slated for completion by 2023. PJM's revised 'focused' MOPR took effect recently, reversing FERC's earlier efforts to stymy state-subsidized renewables. PJM is also exploring options to delay the May 2022 retirement of the 401-MW Indian River coal-fired plant in Delaware due to grid reliability concerns.

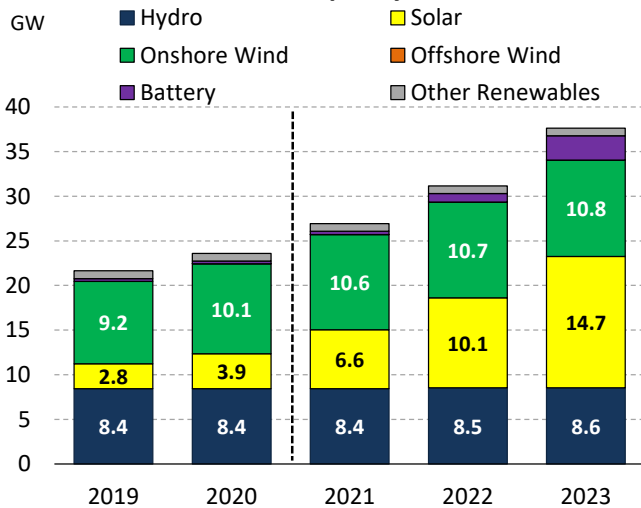
## Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
DC	100% by 2032	--	--
DE	40% by 2035	--	--
MD	50% by 2030	1.2 GW by 2030	--
NJ	50% by 2030	7.5 GW by 2035	2 GW by 2030
OH	8.5% by 2026	--	--
PA	8% by 2021	--	--
VA	100% by 2045	5.2 GW by 2035	3.1 GW by 2035
WV	--	--	--

## PJM capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change (MW)	YoY Change (MW)	Net Additions YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	5,112	4,994	3,245	118	1,868	1,210	454
Wind	10,567	10,567	9,776	0	791	462	526
Battery	304	304	293	0	11	11	-2
Hydro	8,435	8,433	8,433	3	3	3	0
Other Renewables	805	805	805	0	0	0	-60
Nuclear	32,672	32,672	32,672	0	0	0	0
Fossil	142,152	141,828	141,962	325	190	975	-1,477
<b>Total</b>	<b>200,047</b>	<b>199,602</b>	<b>197,185</b>	<b>445</b>	<b>2,417</b>	<b>2,660</b>	<b>-559</b>

## Cumulative renewable capacity forecast



Generation (GWh)	Monthly Data			MoM Change (GWh)	YoY Change (GWh)	Generation YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	765	813	434	-48	331	6,160	3,983
Wind	2,232	1,186	1,686	1,046	546	18,426	18,201
Battery	0	0	-4	0	4	-29	-36
Hydro	600	581	491	19	109	6,448	7,043
Other Renewables	287	411	376	-124	-90	3,571	3,624
Nuclear	22,757	24,166	22,630	-1,409	128	203,459	206,817
Fossil	39,101	53,543	37,228	-14,442	1,874	377,743	354,795
<b>Total</b>	<b>65,743</b>	<b>80,700</b>	<b>62,841</b>	<b>-14,957</b>	<b>2,902</b>	<b>615,777</b>	<b>594,429</b>

Capacity Factor	Monthly Data			MoM Change (%)	YoY Change (%)	Capacity Factor YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	21%	22%	19%	-1%	3%	21%	20%
Wind	29%	15%	24%	14%	-9%	27%	29%
Battery	0%	0%	-2%	0%	2%	-1%	-2%
Hydro	10%	9%	8%	1%	1%	12%	13%
Other Renewables	49%	69%	65%	-19%	4%	68%	66%
Nuclear	97%	99%	96%	-3%	3%	95%	96%
Fossil	38%	51%	36%	-13%	14%	41%	38%

## PJM renewable capacity by type (MW)

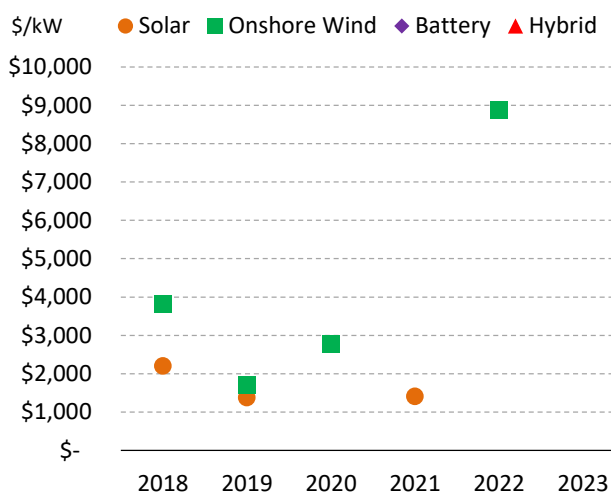
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	2,231	2,790	3,902	6,604	10,064	14,699	5,977	7,807	10,201	7,258	12,509	19,992
Onshore Wind	8,575	9,250	10,093	10,659	10,742	10,799	10,616	10,650	10,677	10,705	10,845	10,939
Offshore Wind	0	0	12	12	12	12	12	12	12	12	12	12
Battery	276	295	293	366	950	2,722	332	547	1,315	403	1,436	4,581
Other Renewables	952	865	805	805	805	805	805	805	805	805	805	805
<b>Total</b>	<b>12,034</b>	<b>13,200</b>	<b>15,106</b>	<b>18,446</b>	<b>22,573</b>	<b>29,036</b>	<b>17,742</b>	<b>19,821</b>	<b>23,010</b>	<b>19,183</b>	<b>25,606</b>	<b>36,330</b>

## PJM - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	State	Fuel Type	Size (MW)	Online Date
1	Scioto Ridge Wind Farm	OH	Wind	249.8	May-21
2	Hillcrest Solar	OH	Solar	200.0	Jul-21
3	Headwaters Wind Farm II LLC	IN	Wind	200.0	Jun-21
4	Hardin Solar Energy LLC	OH	Solar	150.0	Feb-21
5	Desper Solar	VA	Solar	88.2	Jun-21
6	Water Strider Solar	VA	Solar	80.0	Mar-21
7	Altavista Solar	VA	Solar	80.0	Jun-21
8	Bluestone Solar	VA	Solar	49.9	May-21
9	EDF Ph1 Toms River	NJ	Solar	21.3	Jun-21
10	St. Joseph Solar	IN	Solar	20.0	Mar-21
11	Energix Buckingham, LLC	VA	Solar	20.0	Jul-21
12	Todd Solar	MD	Solar	20.0	Jul-21
13	Mt. Jackson Solar	VA	Solar	15.7	Jun-21
14	Energix Hollyfield, LLC	VA	Solar	13.0	Jul-21
15	Grissom Solar, LLC	NC	Battery	10.0	May-21

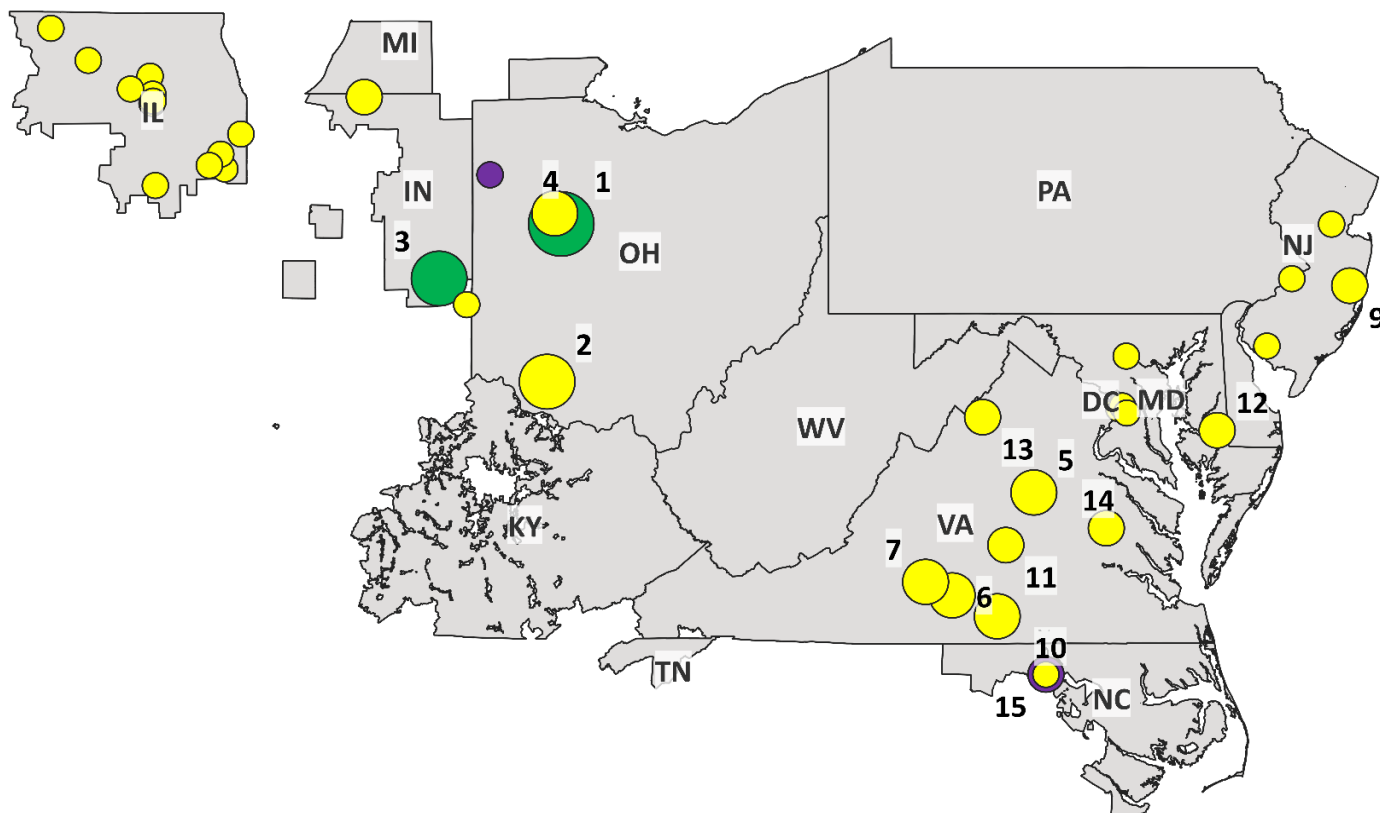
## Average project costs by technology



## PJM map with notable recently completed projects

## Legend

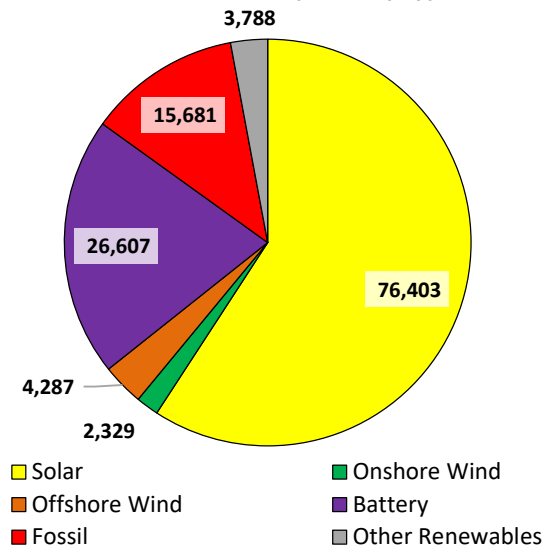
- Solar
- Battery
- Onshore Wind
- Offshore Wind



## PJM - INTERCONNECTION QUEUE UPDATE

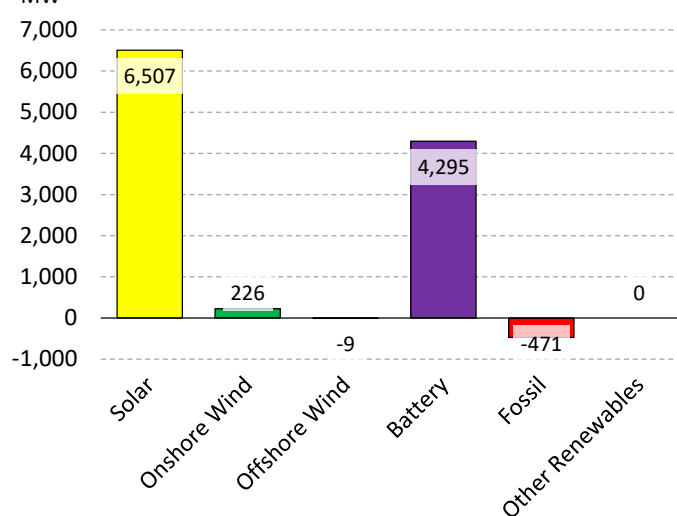
PJM active interconnection requests by type

MW

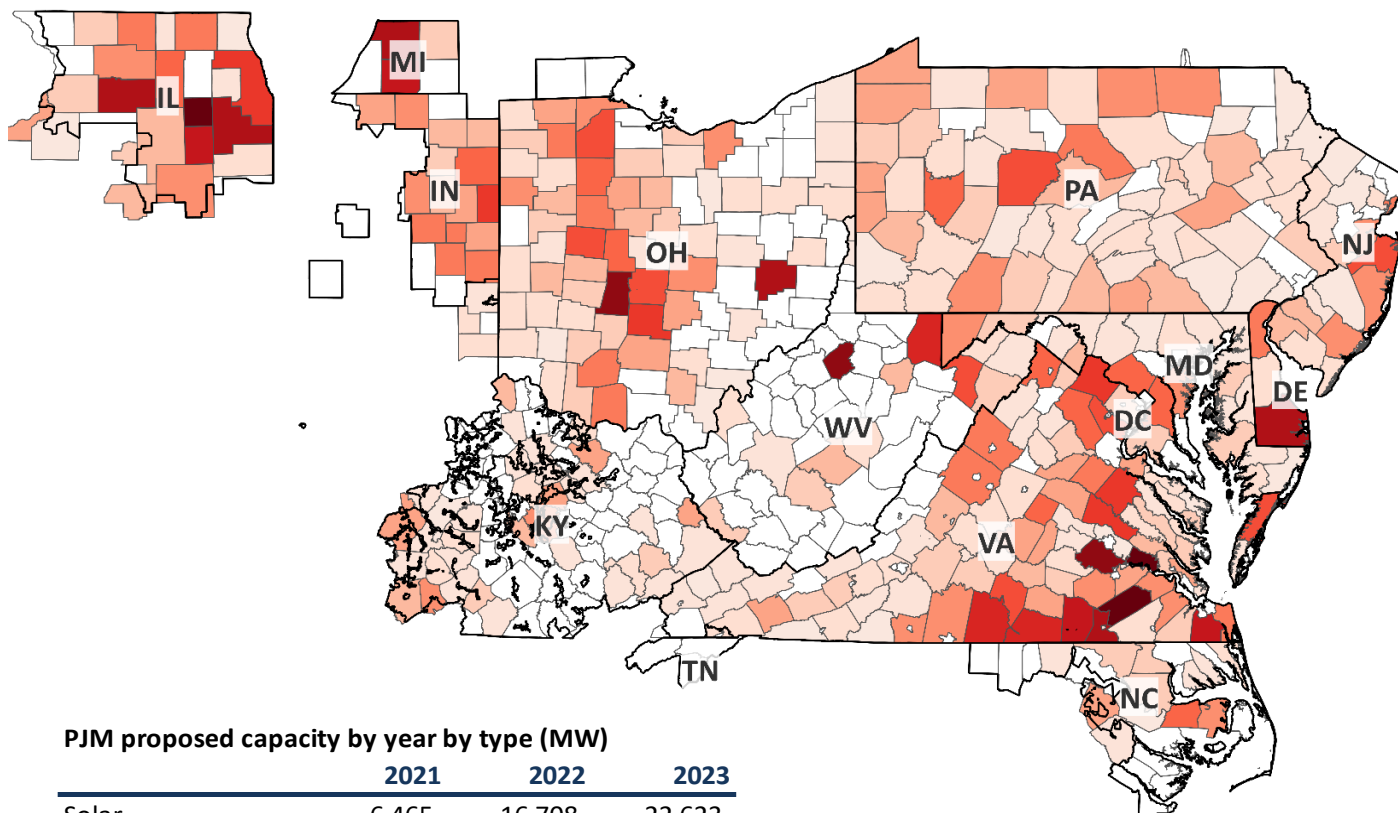


MoM change in interconnection request capacity

MW



PJM interconnection queue heatmap by county



PJM proposed capacity by year by type (MW)

	2021	2022	2023
Solar	6,465	16,708	22,623
Onshore Wind	439	489	296
Offshore Wind	2	84	315
Battery	338	3,701	10,041
Fossil	1,456	5,678	2,935
Other Renewables	-	-	-



## SOUTHEAST - RENEWABLE CAPACITY OUTLOOK

- North Carolina legislators passed significant energy reform legislation. House Bill 951, "Energy Solutions for North Carolina", is a compromise between N.C. Governor Cooper and Democratic and Republican lawmakers. Under the bill, N.C. utilities have until the end of 2022 to present a long-term resource plan that ensures meeting the decarbonization goals of 70% below 2005 levels by 2030 and carbon neutral by 2050 as suggested in Cooper's 2019 Clean Energy Plan. The final bill also eliminates language that would have banned Cooper's executive branch from considering other greenhouse gas rules. Therefore, N.C. can move forward with rulemaking that possibly joins N.C. with the Regional Greenhouse Gas Initiative (RGGI).
- Orsted recently completed the largest solar facility in the state of Alabama. The 227 MW project is located in the TVA service area and signed a long-term power purchase agreement with Facebook to supply its data center in Huntsville, Alabama, with 100% renewable energy.

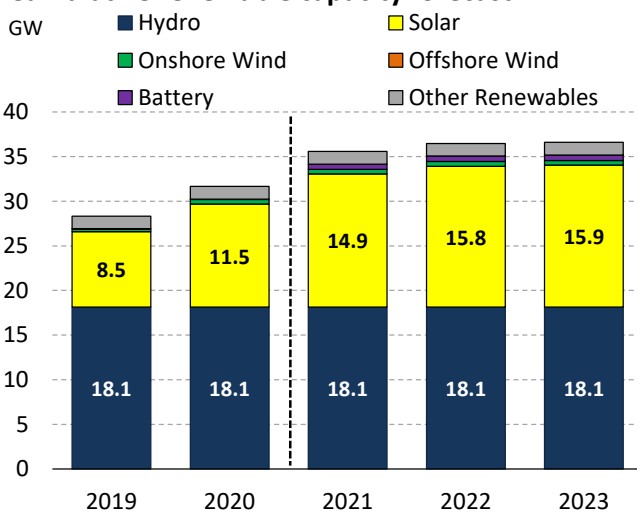
## Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
AL	--	--	--
FL	--	--	--
GA	--	--	--
KY	--	--	--
MS	--	--	--
NC	100% by 2050	8 GW by 2040	--
SC	2% by 2021	--	--
TN	--	--	--

## Southeast capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change (MW)	YoY Change (MW)	Net Additions YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	13,189	13,113	10,687	76	2,502	1,640	2,216
Wind	528	528	528	0	0	0	242
Battery	67	62	44	5	24	22	9
Hydro	18,124	18,124	18,124	0	0	0	0
Other Renewables	1,266	1,266	1,409	0	-143	-143	-14
Nuclear	29,538	29,538	29,538	0	0	0	0
Fossil	166,756	166,756	168,285	0	-1,530	-599	-1,860
<b>Total</b>	<b>229,467</b>	<b>229,386</b>	<b>228,614</b>	<b>81</b>	<b>772</b>	<b>921</b>	<b>593</b>

## Cumulative renewable capacity forecast



Generation (GWh)						Generation YTD	
Solar	2,473	2,488	1,770	-15	703	13,320	16,453
Wind	0	0	155	0	-155	1,471	1,257
Battery	0	0	0	0	0	-1	-2
Hydro	3,549	3,091	2,456	458	1,093	17,894	28,725
Other Renewables	550	612	524	-62	26	3,348	5,019
Nuclear	18,799	21,240	20,129	-2,441	-1,330	119,762	180,080
Fossil	51,358	64,393	51,408	-13,035	-50	280,257	446,626
<b>Total</b>	<b>76,729</b>	<b>91,825</b>	<b>76,442</b>	<b>-15,096</b>	<b>287</b>	<b>436,052</b>	<b>678,156</b>

Capacity Factor						Capacity Factor YTD	
Solar	26%	26%	23%	1%	3%	16%	25%
Wind	0%	0%	41%	0%	-41%	43%	45%
Battery	0%	0%	-1%	0%	1%	0%	-1%
Hydro	27%	23%	19%	4%	4%	15%	24%
Other Renewables	60%	65%	52%	-5%	13%	39%	54%
Nuclear	88%	97%	95%	-8%	2%	62%	93%
Fossil	43%	52%	42%	-9%	9%	26%	40%

## Southeast renewable capacity by type (MW)

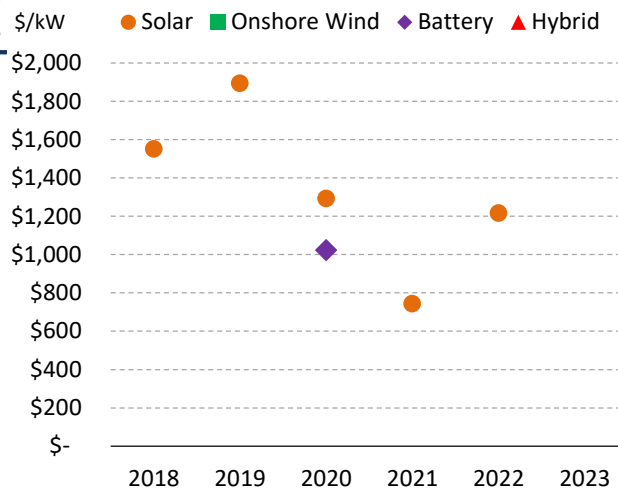
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	6,687	8,471	11,549	14,930	15,792	15,921	14,853	15,903	16,051	14,998	16,418	16,655
Onshore Wind	286	286	528	528	528	528	528	528	528	528	528	528
Battery	20	35	45	583	610	610	559	595	595	585	633	633
Other Renewables	1,441	1,422	1,409	1,266	1,266	1,266	1,266	1,266	1,266	1,266	1,266	1,266
<b>Total</b>	<b>8,434</b>	<b>10,214</b>	<b>13,531</b>	<b>17,307</b>	<b>18,196</b>	<b>18,326</b>	<b>17,206</b>	<b>18,292</b>	<b>18,439</b>	<b>17,377</b>	<b>18,845</b>	<b>19,082</b>

## SOUTHEAST - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	State	Fuel Type	Size (MW)	Online Date
1	Robins Air Force Base Solar	GA	Solar	128.0	Apr-21
2	Trent River Solar, LLC	NC	Solar	78.7	Jul-21
3	Santa Fe Solar Power Plant	FL	Solar	74.9	Mar-21
4	Twin Rivers Solar Power Plant	FL	Solar	74.9	Mar-21
5	Magnolia Springs Solar Center	FL	Solar	74.5	Mar-21
6	Rodeo Solar Center	FL	Solar	74.5	Mar-21
7	Orange Blossom Solar Center	FL	Solar	74.5	May-21
8	Palm Bay Solar	FL	Solar	74.5	Mar-21
9	Pelican Solar Center	FL	Solar	74.5	Mar-21
10	Discovery Solar Center	FL	Solar	74.5	May-21
11	Sabal Palm Solar Center	FL	Solar	74.5	Apr-21
12	Fort Drum Energy Center	FL	Solar	74.5	Jun-21
13	Willow Solar Energy Center	FL	Solar	74.5	May-21
14	Solar Lee, LLC	NC	Solar	6.7	Apr-21
15	Acme Solar, LLC	NC	Solar	6.6	Apr-21

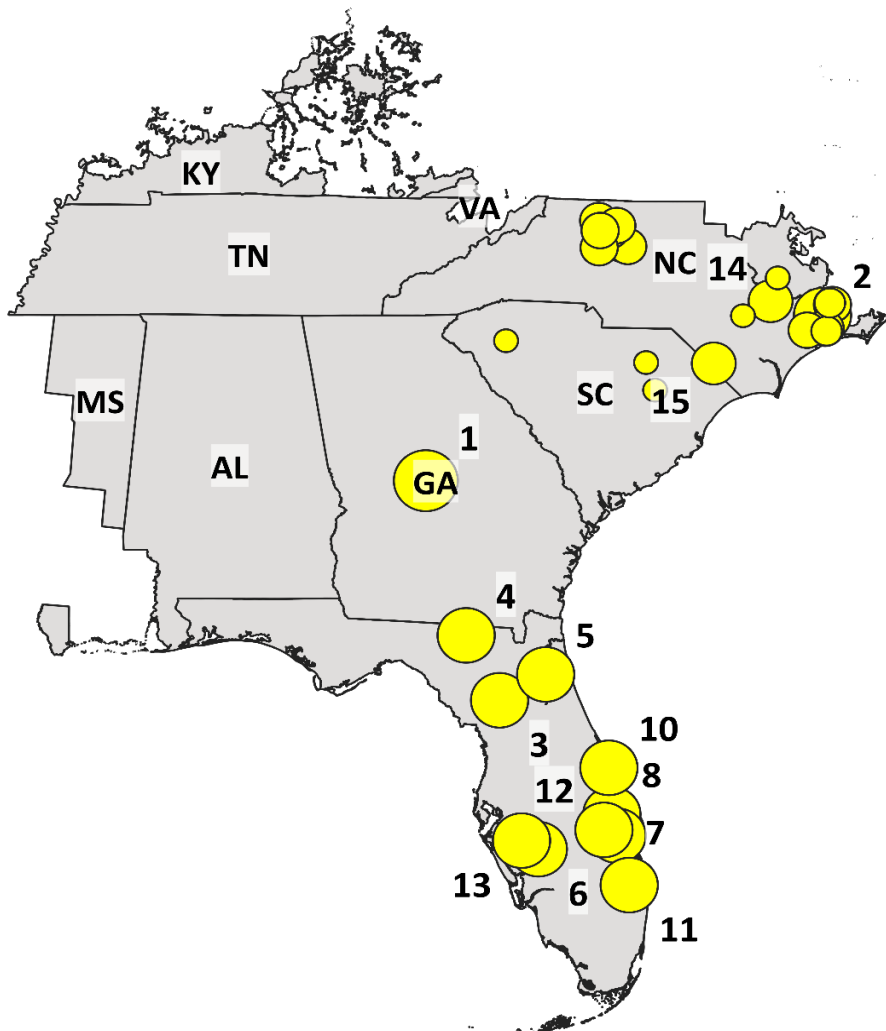
## Average project costs by technology



## Southeast map with notable recently completed projects

## Legend

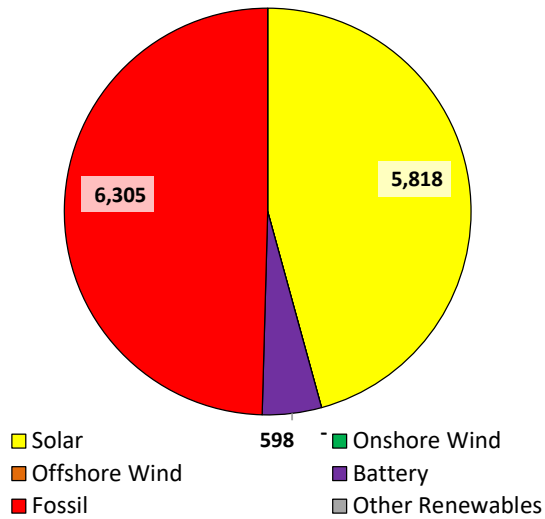
- Solar
- Battery
- Onshore Wind
- Offshore Wind



## SOUTHEAST - PROPOSED PROJECTS UPDATE

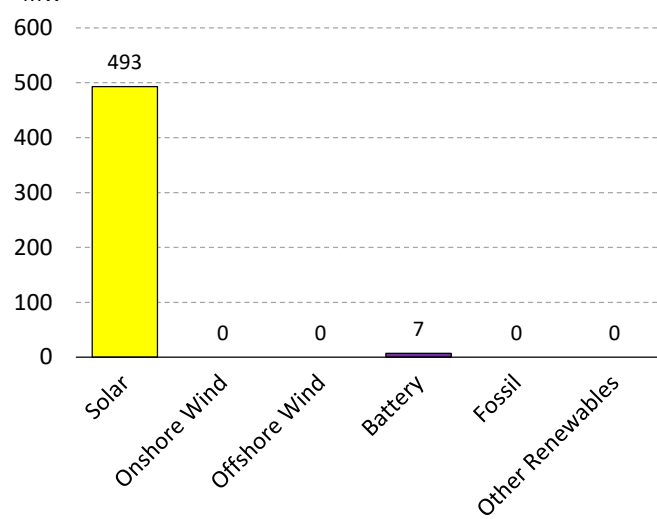
Southeast proposed capacity by type

MW

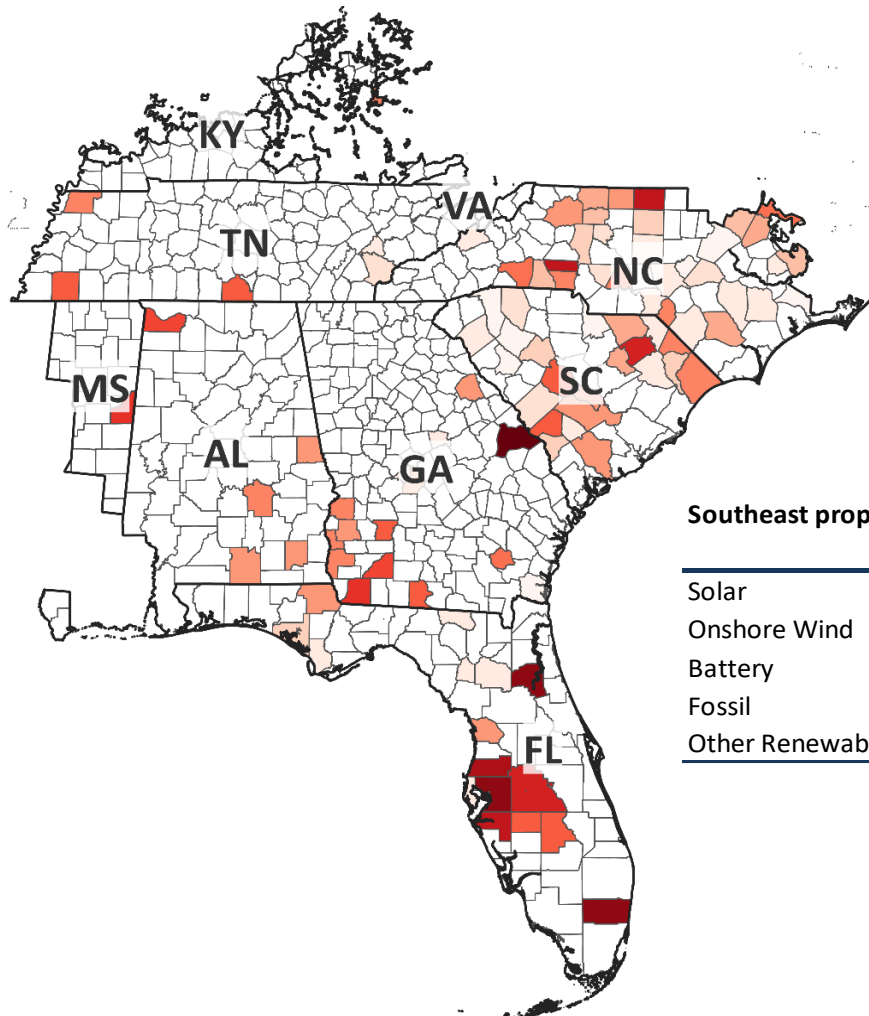


MoM change in interconnection request capacity

MW



Southeast proposed projects heatmap by county



Southeast proposed capacity by year by type (MW)

	2021	2022	2023
Solar	1,869	2,273	489
Onshore Wind	-	-	-
Battery	519	79	-
Fossil	720	2,283	1,650
Other Renewables	-	-	-

## MISO - RENEWABLE CAPACITY OUTLOOK

- The recently passed Illinois Clean Energy bill provides funding for communities in which coal plants have or are projected to close in the near future by incentivizing energy storage and solar projects built at the site of retired coal plants. In some communities, property taxes from the local coal plant is the biggest single source of tax revenue supporting local library, park, and school boards. The new law provides financial grants for energy storage projects built at five coal-fired power plant locations and also establishes \$30/MWh solar RECs for up to 300 MW of solar projects at similar sites.

## Relevant State Targets

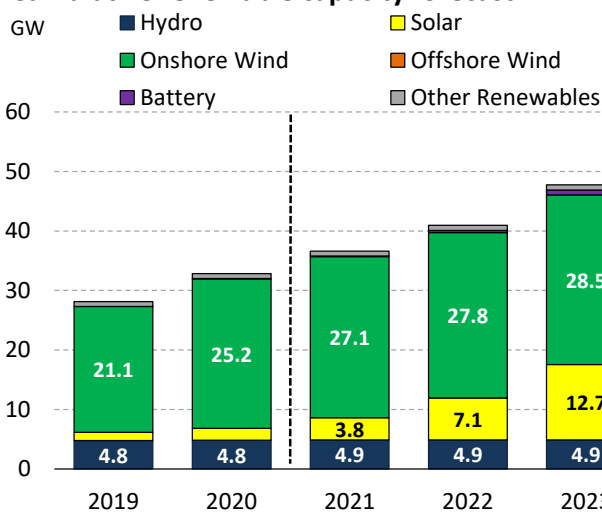
State	RPS/CES	Offshore Wind	Energy Storage
AR	--	--	--
IA	105 MW by 2015	--	--
IL	100% by 2045	--	--
IN	10% by 2025	--	--
LA	--	--	--
MI	15% by 2021	--	--
MN	26.5% by 2025	--	--
WI	10% by 2015	--	--

- Some Minnesota solar developers have to wait 15 years for Xcel Energy to connect their rooftop solar system to its distribution network. The number of Minnesota solar projects stalled due to delays by Xcel Energy has ballooned to more than 300, with a backlog of applications that solar industry leaders say will take decades to clear at the utility's current pace. Most of those projects waiting to be connected are community solar projects in suburbs outside the Twin Cities.

## MISO capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change (MW)	YoY Change (MW)	Net Additions YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	2,671	2,436	1,637	235	1,034	681	263
Wind	26,965	26,799	22,780	166	4,185	1,807	1,649
Battery	58	58	45	0	13	3	0
Hydro	4,861	4,861	4,808	0	54	54	20
Other Renewables	742	742	742	0	0	0	0
Nuclear	12,427	12,427	13,029	0	-601	0	0
Fossil	121,718	121,718	122,148	0	-429	-176	399
<b>Total</b>	<b>169,442</b>	<b>169,041</b>	<b>165,188</b>	<b>401</b>	<b>3,854</b>	<b>2,369</b>	<b>2,331</b>

## Cumulative renewable capacity forecast



## Generation (GWh)

	Monthly Data			MoM Change (GWh)	YoY Change (GWh)	Generation YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	475	518	249	-44	226	3,560	2,294
Wind	6,828	5,319	5,534	1,509	1,294	57,602	49,161
Battery	0	0	0	0	0	-3	-1
Hydro	503	651	609	-149	-106	6,990	7,859
Other Renewables	282	311	285	-29	-3	2,667	2,160
Nuclear	8,100	8,886	7,715	-786	386	71,352	73,866
Fossil	36,170	48,039	31,621	-11,869	4,549	335,820	300,561
<b>Total</b>	<b>52,358</b>	<b>63,725</b>	<b>46,013</b>	<b>-11,367</b>	<b>6,345</b>	<b>477,988</b>	<b>435,900</b>

## Capacity Factor

	Monthly Data			MoM Change (%)	YoY Change (%)	Capacity Factor YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	25%	29%	21%	-4%	7%	24%	24%
Wind	35%	27%	34%	8%	-7%	33%	34%
Battery	0%	0%	0%	0%	0%	-1%	0%
Hydro	14%	18%	18%	-4%	0%	22%	25%
Other Renewables	53%	56%	53%	-4%	3%	55%	46%
Nuclear	91%	96%	82%	-6%	14%	88%	86%
Fossil	41%	53%	36%	-12%	17%	42%	37%

## MISO renewable capacity by type (MW)

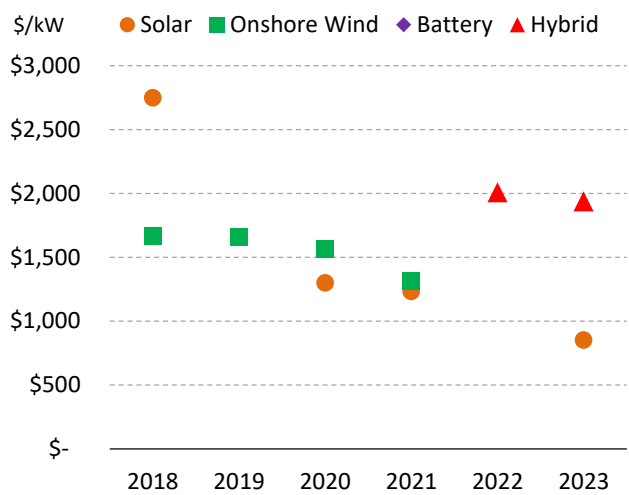
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	1,146	1,374	1,990	3,752	7,061	12,666	3,464	5,453	8,035	4,041	8,727	18,553
Onshore Wind	18,910	21,131	25,157	27,076	27,778	28,527	27,045	27,465	27,772	27,107	28,116	29,487
Battery	39	45	55	86	381	819	75	141	365	97	704	1,412
Other Renewables	801	792	792	792	792	792	792	792	792	792	792	792
<b>Total</b>	<b>20,896</b>	<b>23,342</b>	<b>27,995</b>	<b>31,706</b>	<b>36,012</b>	<b>42,804</b>	<b>31,376</b>	<b>33,852</b>	<b>36,963</b>	<b>32,037</b>	<b>38,339</b>	<b>50,244</b>

## MISO - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	State	Fuel Type	Size (MW)	Online Date
1	Isabella Wind Park	MI	Wind	383.5	Jun-21
2	Deuel Harvest Wind Energy LLC	SD	Wind	300.0	Feb-21
3	Southern Hills Wind Farm	IA	Wind	254.1	Mar-21
4	Freeborn Wind Farm	MN	Wind	200.0	May-21
5	Crescent Wind Park	MI	Wind	150.0	Feb-21
6	Wapello Solar LLC	IA	Solar	100.0	Mar-21
7	Prairie State Solar Project	IL	Solar	99.0	Jul-21
8	Troy Solar	IN	Solar	50.4	Apr-21
9	Peru 2	IN	Solar	9.5	Apr-21
10	O'Brien Solar Fields	WI	Solar	7.5	May-21
11	O'Brien Solar Fields	WI	Solar	7.5	May-21
12	Pickford Solar	MI	Solar	6.9	Feb-21
13	O'Brien Solar Fields	WI	Solar	5.0	May-21
14	West Riverside Energy Center	WI	Solar	4.4	Apr-21
15	Columbia City Solar Park	IN	Solar	4.3	Apr-21

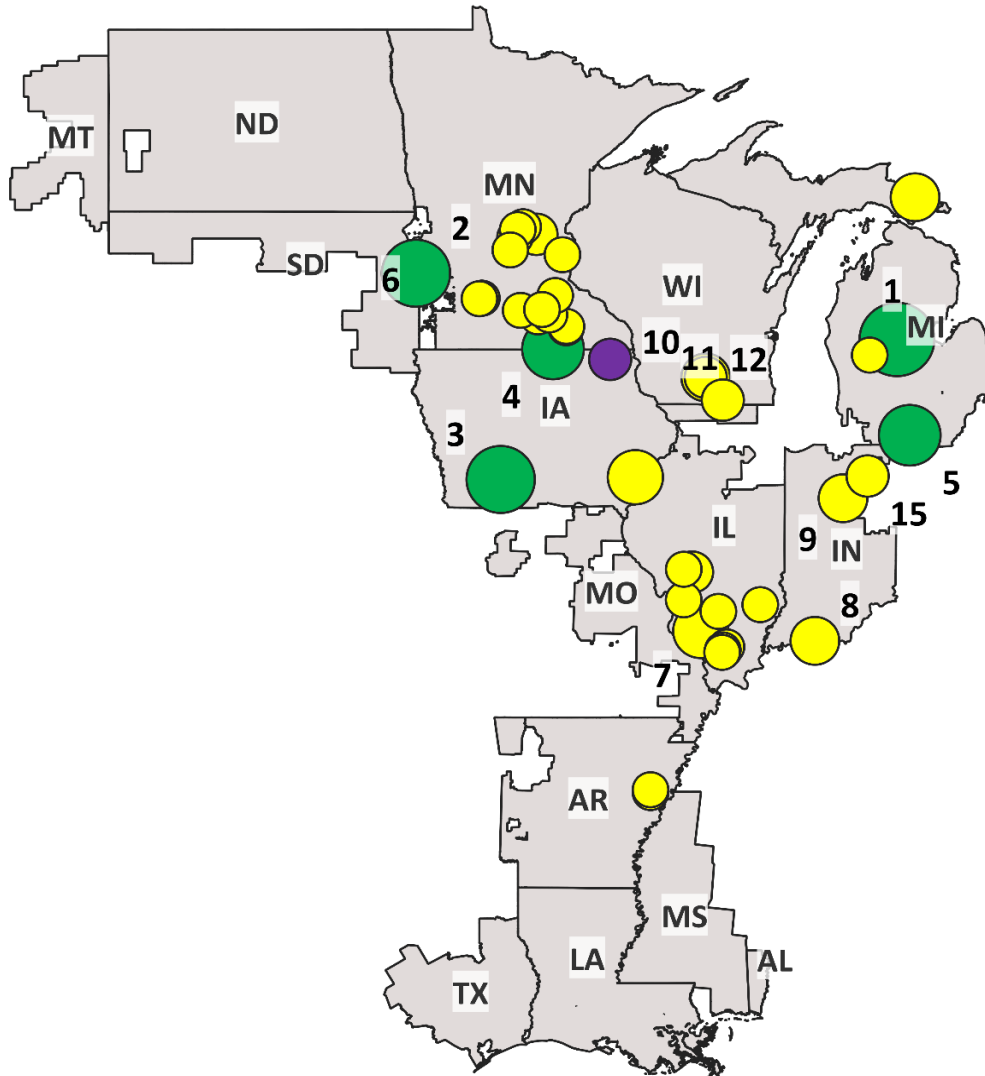
## Average project costs by technology



## MISO map with notable recently completed projects

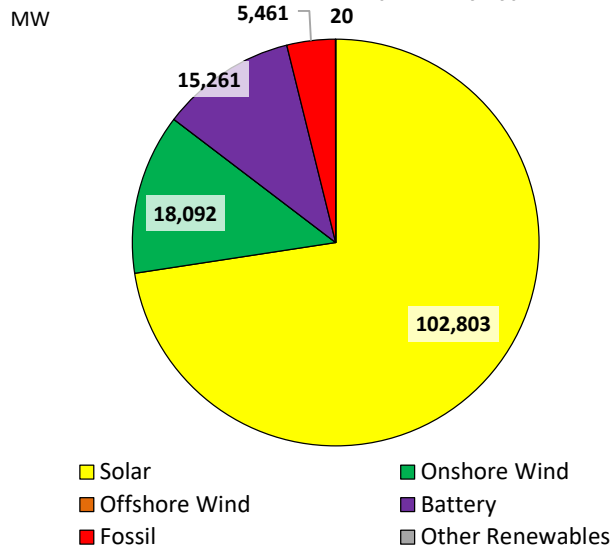
## Legend

- Solar
- Battery
- Onshore Wind
- Offshore Wind

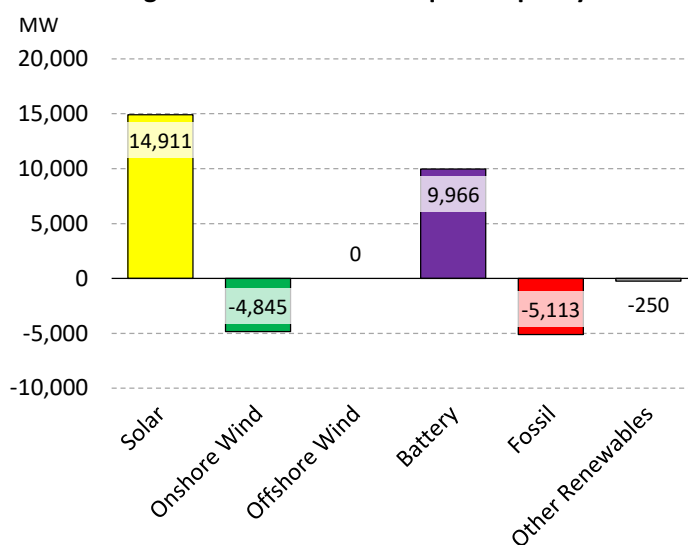


## MISO - INTERCONNECTION QUEUE UPDATE

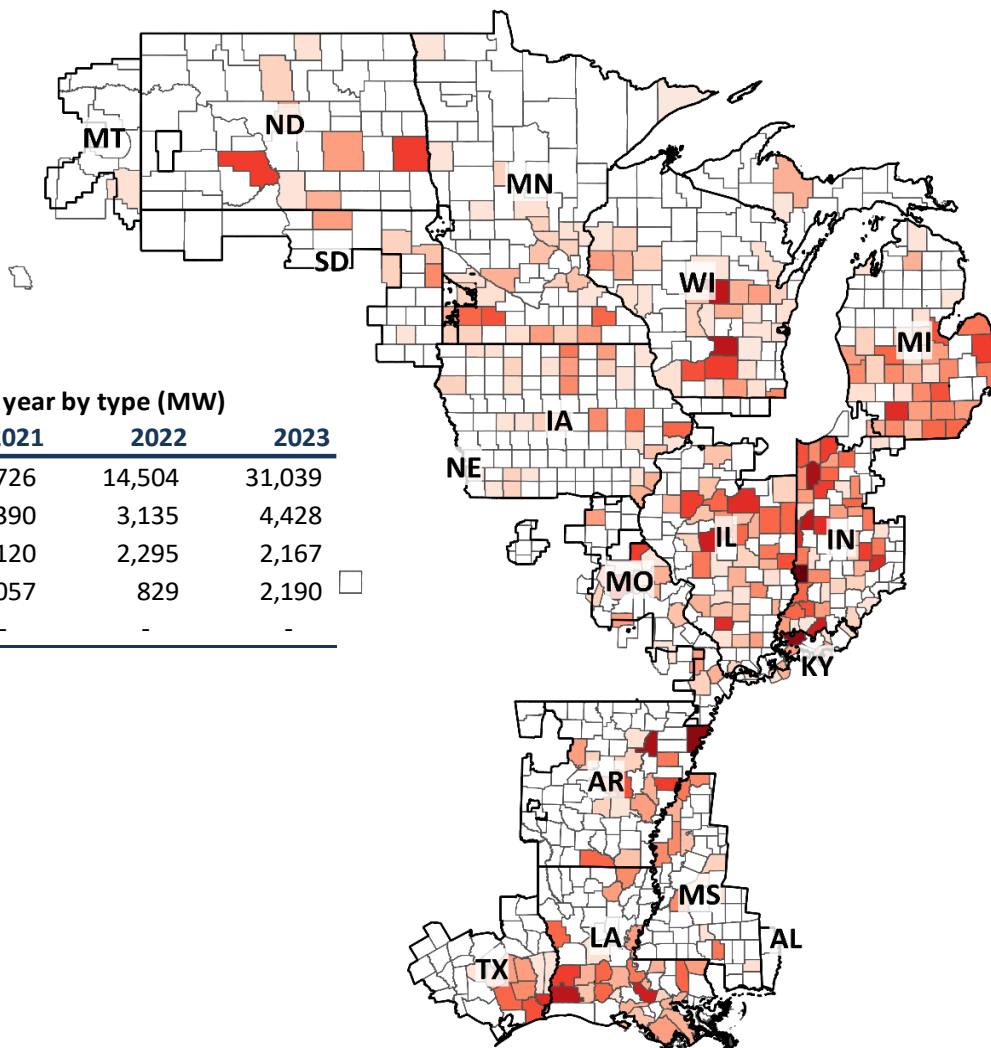
MISO active interconnection requests by type



MoM change in interconnection request capacity



MISO interconnection queue heatmap by county



MISO proposed capacity by year by type (MW)

	2021	2022	2023
Solar	3,726	14,504	31,039
Onshore Wind	390	3,135	4,428
Battery	120	2,295	2,167
Fossil	1,057	829	2,190
Other Renewables	-	-	-



## SPP - RENEWABLE CAPACITY OUTLOOK

- In North Dakota, local wind developers continue to clash with the Minot Air Force Base about proposed lighting systems installed on top of the wind turbines. While the Air Force prefers its "Aircraft Detection Lighting System", a system that uses radar technology to turn the lights on only when an aircraft is nearby, local developers such as Ruso Wind proposed to equip their turbines with the normal blinking red light system. The commission needs to approve all waiver requests before a project can move forward.
- The rapid buildout of renewable energy projects in the Upper Midwest sparks the need for more transmission lines. Recently, Xcel Energy announced it would reduce the size of a proposed wind farm in South Dakota by one-third because of a lack of transmission capability to carry the full capacity of the original project. The lack of available transmission capacity and slow-moving expansion of the same results in more and more project delays in the region.

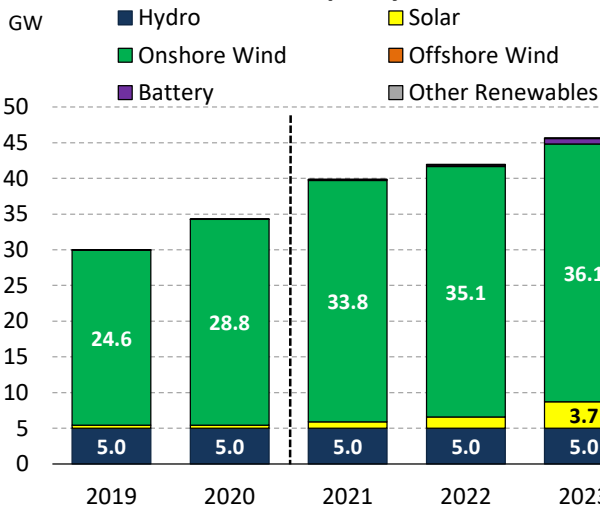
## Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
KS	20% by 2020	--	--
MO	15% by 2021	--	--
ND	10% by 2015	--	--
NE	--	--	--
OK	15% by 2015	--	--
SD	10% by 2015	--	--

## SPP capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change	YoY Change	Net Additions YTD	
	Sep-21	Aug-21	Sep-20	(MW)	(MW)	Sep-21	Sep-20
Solar	451	446	434	5	18	18	36
Wind	31,443	31,027	25,742	416	5,701	2,638	1,189
Battery	14	14	13	0	1	1	10
Hydro	5,013	5,013	5,013	0	0	0	0
Other Renewables	0	0	0	0	0	0	0
Nuclear	1,995	1,995	1,995	0	0	0	0
Fossil	55,924	55,924	56,112	0	-189	39	-980
<b>Total</b>	<b>94,841</b>	<b>94,420</b>	<b>89,309</b>	<b>421</b>	<b>5,110</b>	<b>2,696</b>	<b>256</b>

## Cumulative renewable capacity forecast



## Generation (GWh)

	Monthly Data			MoM Change	YoY Change	Generation YTD	
	Sep-21	Aug-21	Sep-20	(GWh)	(GWh)	Sep-21	Sep-20
Solar	123	131	102	-8	21	1,051	885
Wind	8,520	7,596	6,448	924	2,072	73,487	67,251
Battery	0	0	0	0	0	0	0
Hydro	1,051	1,510	1,406	-459	-354	14,917	17,253
Other Renewables	0	0	0	0	0	0	0
Nuclear	1,435	1,388	1,287	47	148	11,211	12,938
Fossil	14,567	19,075	14,090	-4,508	477	128,770	127,426
<b>Total</b>	<b>25,697</b>	<b>29,701</b>	<b>23,333</b>	<b>-4,004</b>	<b>2,365</b>	<b>229,436</b>	<b>225,754</b>

## Capacity Factor

	Monthly Data			MoM Change	YoY Change	Capacity Factor YTD	
	Sep-21	Aug-21	Sep-20	(%)	(%)	Sep-21	Sep-20
Solar	38%	39%	33%	-1%	7%	36%	32%
Wind	38%	33%	35%	5%	-2%	37%	40%
Battery	0%	0%	0%	0%	0%	0%	0%
Hydro	29%	40%	39%	-11%	2%	45%	52%
Other Renewables	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Nuclear	100%	94%	90%	6%	4%	86%	99%
Fossil	36%	46%	35%	-10%	11%	35%	34%

## SPP renewable capacity by type (MW)

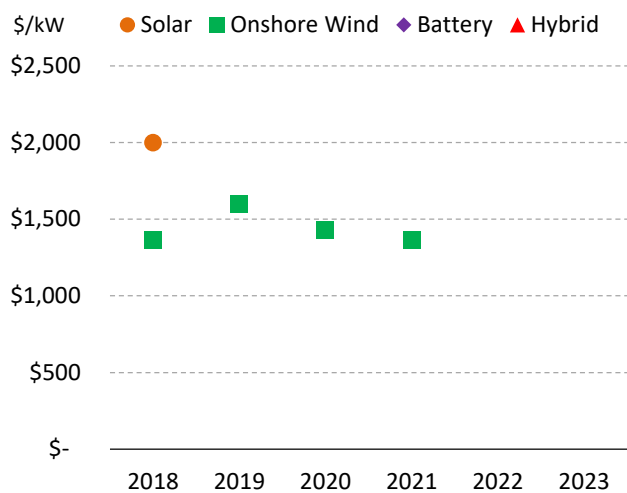
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	383	398	434	902	1,551	3,689	451	567	1,313	1,578	3,019	7,242
Onshore Wind	22,331	24,553	28,805	33,785	35,080	36,122	32,990	33,966	34,445	34,863	36,569	38,440
Battery	3	3	13	107	219	741	24	28	207	227	498	1,535
Other Renewables	40	40	40	40	80	80	40	40	40	40	140	140
<b>Total</b>	<b>22,757</b>	<b>24,993</b>	<b>29,291</b>	<b>34,834</b>	<b>36,930</b>	<b>40,632</b>	<b>33,506</b>	<b>34,601</b>	<b>36,005</b>	<b>36,708</b>	<b>40,226</b>	<b>47,356</b>

## SPP - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	State	Fuel Type	Size (MW)	Online Date
1	Frontier Windpower II	OK	Wind	351.8	Feb-21
2	Neosho Ridge Wind Energy Center	KS	Wind	301.0	May-21
3	Sundance Wind Project, LLC	OK	Wind	199.0	Apr-21
4	Dakota Range III Wind Project	SD	Wind	153.6	May-21
5	Kings Point Wind Energy Center	MO	Wind	149.4	Apr-21
6	Milligan 1 Wind Farm	NE	Wind	135.0	Mar-21
7	Outlaw Wind Project LLC	MO	Wind	96.2	Mar-21
8	Prosperity Solar Farm CSG	MO	Solar	2.3	Mar-21
9	SoCore Clovis 1	NM	Solar	2.0	Apr-21
10	Hot Springs 2020	AR	Solar	1.0	Mar-21
11	Burt County Solar Hybrid	NE	Solar	0.7	Jun-21
12	Burt County Solar Hybrid	NE	Battery	0.7	Jun-21
13	Dodge County Solar Hybrid	NE	Solar	0.7	Jun-21
14	Dodge County Solar Hybrid	NE	Battery	0.7	Jun-21

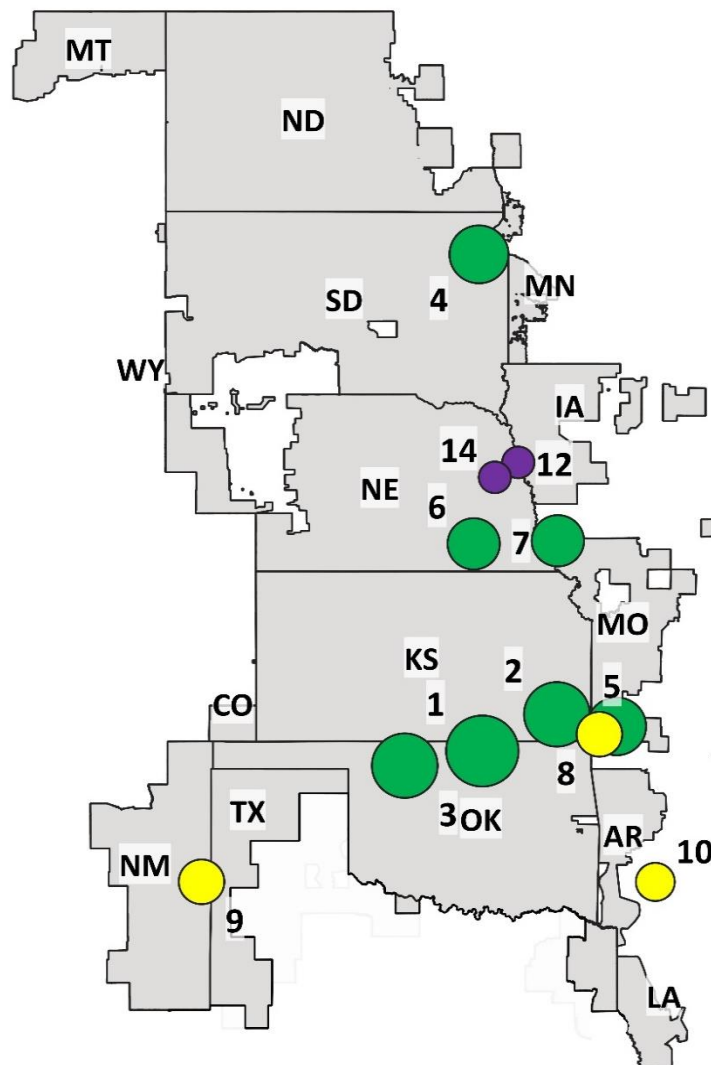
## Average project costs by technology



## SPP map with notable recently completed projects

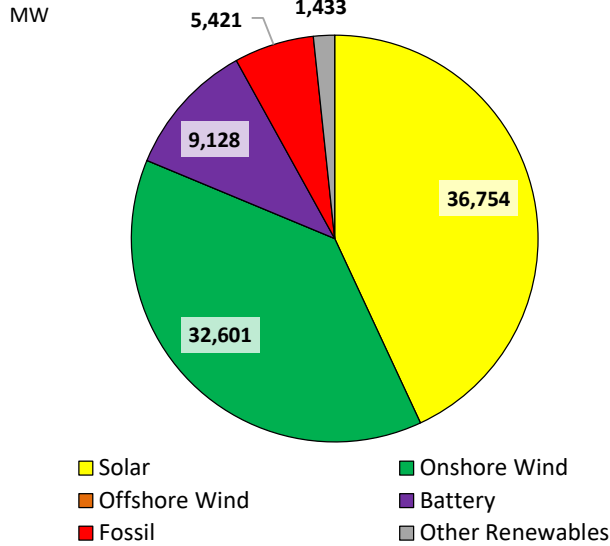
## Legend

- Solar
- Battery
- Onshore Wind
- Offshore Wind

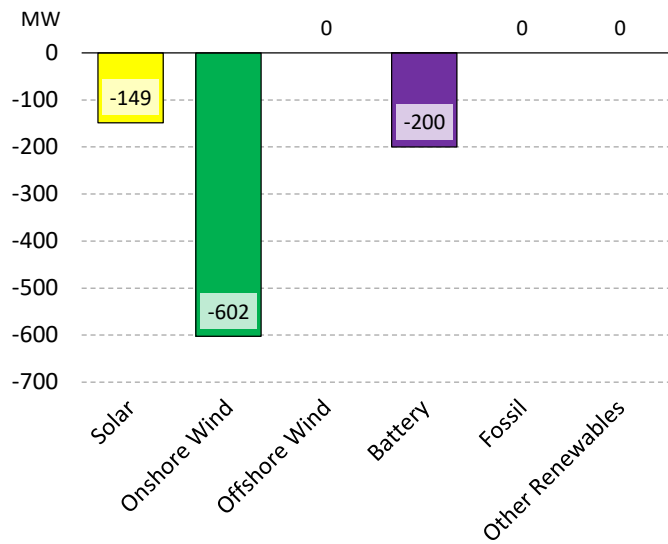


## SPP - INTERCONNECTION QUEUE UPDATE

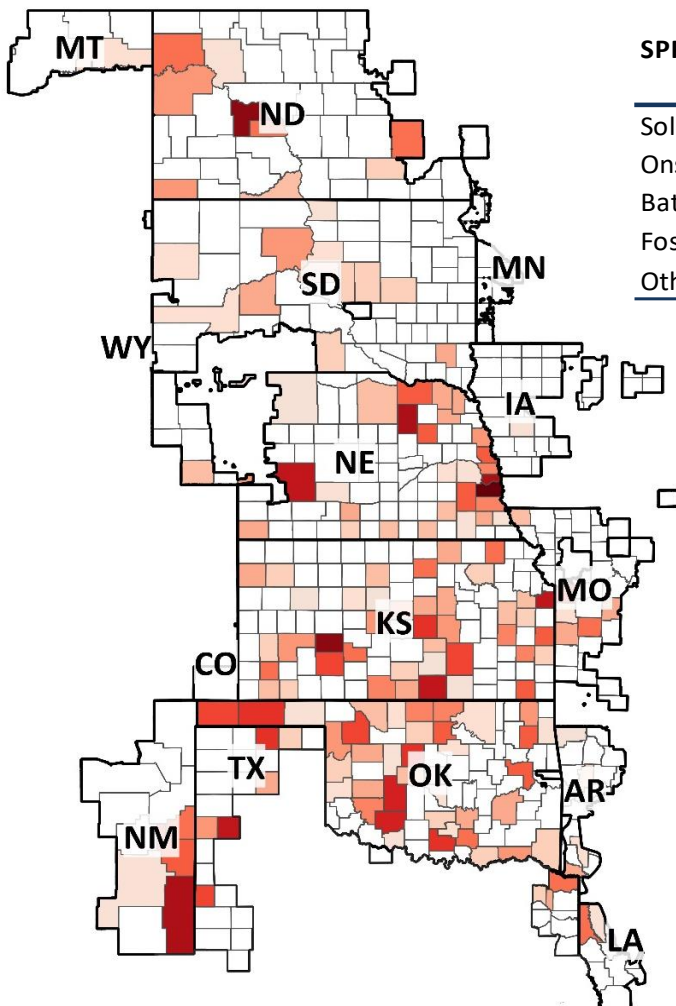
SPP active interconnection requests by type



MoM change in interconnection request capacity



SPP interconnection queue heatmap by county



SPP proposed capacity by year by type (MW)

	2021	2022	2023
Solar	4,506	5,499	14,000
Onshore Wind	10,217	5,014	6,085
Battery	829	1,079	3,444
Fossil	-	-	3,506
Other Renewables	-	400	-

## ERCOT - RENEWABLE CAPACITY OUTLOOK

- The Federal Energy Regulatory Commission (FERC) released a preliminary report on the cause of the Texas blackout in February 2021. The report points to freezing of generator components and fuel issues as the top two significant causes of generator outages, derates, or failures to start across all fuel types. Some of the policy recommendations presented by FERC/NERC include weatherization of cold-weather critical plant components, strengthening the reliability of natural gas infrastructure, and possibly increasing the linkage between ERCOT and surrounding power markets. Historically, Texas has operated its own independent grid to avoid federal regulation.
- The city of Austin, Texas, moves up the target date for its net-zero carbon emissions goal. The recently adopted Climate Equity Plan moves up the target date by ten years to 2040. The two largest CO<sub>2</sub>-emitting sectors are electric power and transportation. Austin Energy, the city's public utility, aims to be 100% carbon-free by 2035. In 2020, that number was 66%.

## Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
TX	10,000 MW by 2025	--	--

## ERCOT capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change		YoY Change		Net Additions YTD	
	Sep-21	Aug-21	Sep-20	(MW)	(MW)	(MW)	(MW)	Sep-21	Sep-20
Solar	7,782	7,522	4,198	260	3,584			2,917	1,807
Wind	28,387	27,927	24,055	460	4,333			3,196	961
Battery	879	779	164	100	716			656	50
Hydro	539	539	539	0	0			0	0
Other Renewables	105	105	105	0	0			0	0
Nuclear	4,980	4,980	4,980	0	0			0	0
Fossil	68,267	68,133	67,858	134	409			798	86
<b>Total</b>	<b>110,938</b>	<b>109,985</b>	<b>101,897</b>	<b>953</b>	<b>8,087</b>			<b>7,567</b>	<b>2,904</b>

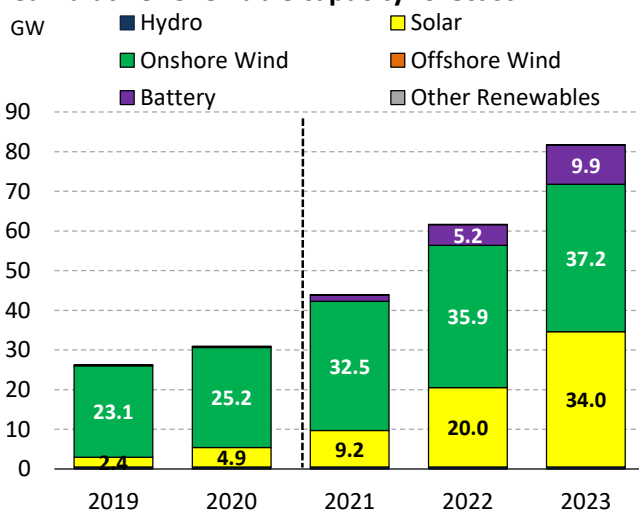
## Generation (GWh)

Generation (GWh)	Monthly Data			MoM Change		YoY Change		Generation YTD	
	Sep-21	Aug-21	Sep-20	(GWh)	(GWh)	(GWh)	(GWh)	Sep-21	Sep-20
Solar	1,423	1,386	833	37	590			10,212	6,040
Wind	6,118	6,659	4,580	-541	1,538			59,806	55,409
Battery	0	0	-2	0	2			-14	-17
Hydro	67	96	70	-29	-3			781	784
Other Renewables	63	59	7	3	55			194	114
Nuclear	3,560	3,659	3,603	-99	-43			31,205	31,135
Fossil	23,674	27,785	23,629	-4,112	44			187,148	188,102
<b>Total</b>	<b>34,905</b>	<b>39,645</b>	<b>32,721</b>	<b>-4,740</b>	<b>2,184</b>			<b>289,332</b>	<b>281,568</b>

## Capacity Factor

Capacity Factor	Monthly Data			MoM Change		YoY Change		Capacity Factor YTD	
	Sep-21	Aug-21	Sep-20	(%)	(%)	(%)	(%)	Sep-21	Sep-20
Solar	25%	25%	28%	1%	-3%			26%	29%
Wind	30%	32%	26%	-2%	6%			34%	35%
Battery	0%	0%	-1%	0%	1%			-1%	-2%
Hydro	17%	24%	18%	-7%	6%			22%	22%
Other Renewables	83%	76%	10%	7%	66%			28%	17%
Nuclear	99%	99%	100%	1%	-2%			96%	95%
Fossil	48%	55%	48%	-7%	6%			42%	42%

## Cumulative renewable capacity forecast



## ERCOT renewable capacity by type (MW)

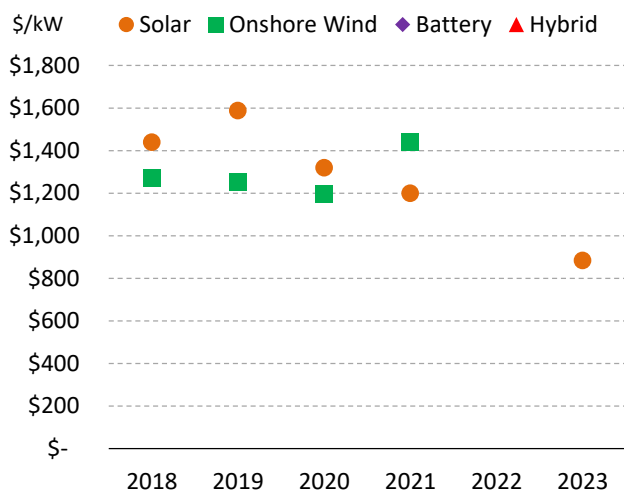
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	1,894	2,391	4,864	9,195	19,994	34,034	9,124	18,591	28,911	9,195	21,327	39,120
Onshore Wind	19,701	23,093	25,192	32,530	35,874	37,174	32,309	35,201	36,181	32,545	36,341	37,960
Battery	94	114	223	1,560	5,170	9,866	1,526	4,111	6,863	1,560	6,283	13,105
Other Renewables	119	119	119	119	119	119	119	119	119	119	119	119
<b>Total</b>	<b>21,808</b>	<b>25,718</b>	<b>30,398</b>	<b>43,403</b>	<b>61,156</b>	<b>81,192</b>	<b>43,077</b>	<b>58,022</b>	<b>72,075</b>	<b>43,418</b>	<b>64,070</b>	<b>90,304</b>

## ERCOT - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	County	Fuel Type	Size (MW)	Online Date
1	Aviator Wind	Coke	Wind	525.0	Jun-21
2	High Lonesome Wind Power, LI	Upton	Wind	449.5	Jul-21
3	Las Majadas Wind Farm	Willacy	Wind	272.6	Mar-21
4	Taygete Energy Project LLC	Pecos	Solar	255.0	Mar-21
5	Greasewood	Pecos	Solar	255.0	Feb-21
6	Griffin Trail Wind	Knox	Wind	225.6	Jul-21
7	Azure Sky Solar	Haskell	Solar	225.0	Jul-21
8	Reloj del Sol Wind Farm	Zapata	Wind	209.4	May-21
9	Raymond Wind Farm, LLC	Willacy	Wind	200.2	Jun-21
10	ANSON Solar Center, LLC	Jones	Solar	200.0	Mar-21
11	La Chalupa, LLC	Cameron	Wind	198.5	Jun-21
12	Maryneal Windpower	Nolan	Wind	182.4	Jul-21
13	Wildcat Creek Wind Farm LLC	Cooke	Wind	180.1	Jul-21
14	Juno Solar Project	Borden	Solar	159.0	Jun-21
15	Gambit Energy Storage - Anglet	Brazoria	Battery	100.0	Jun-21

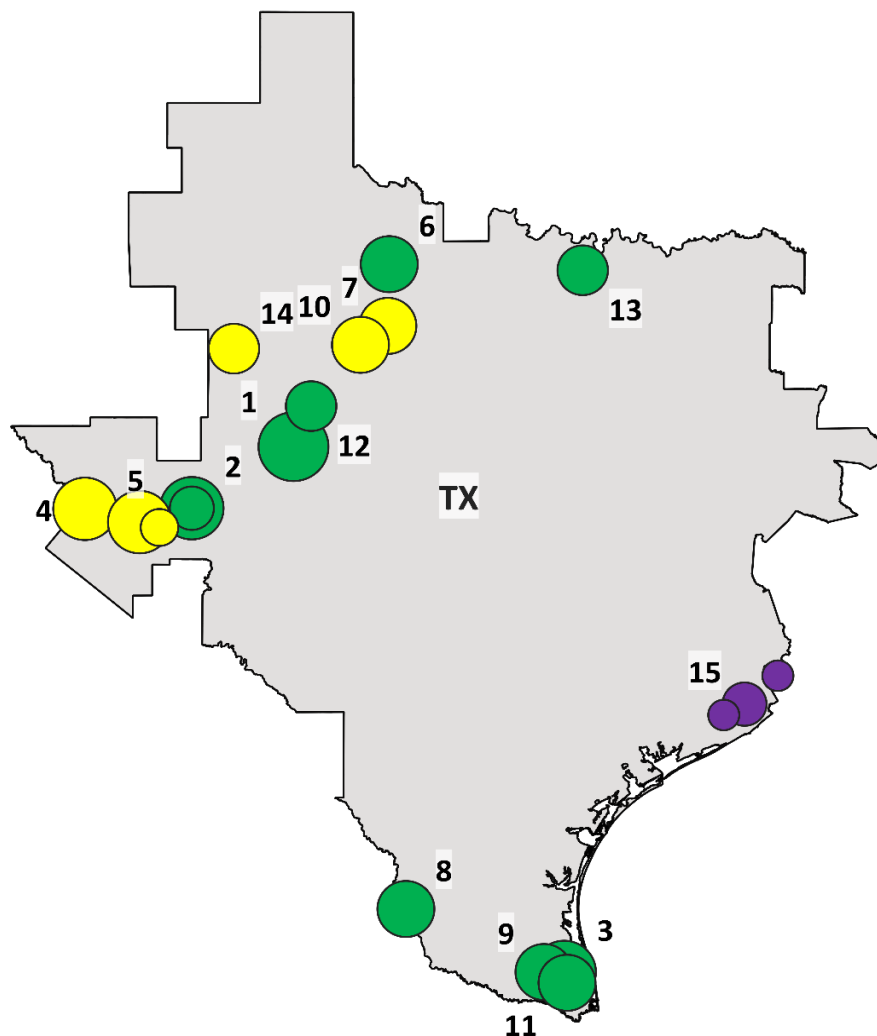
## Average project costs by technology



## ERCOT map with notable recently completed projects

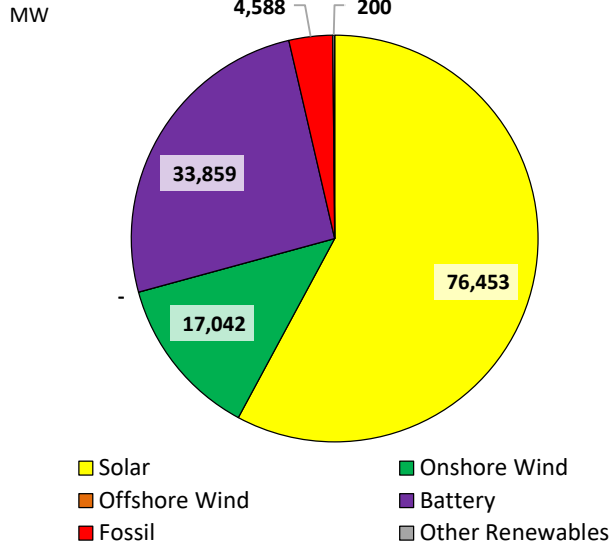
## Legend

- Solar
- Battery
- Onshore Wind
- Offshore Wind

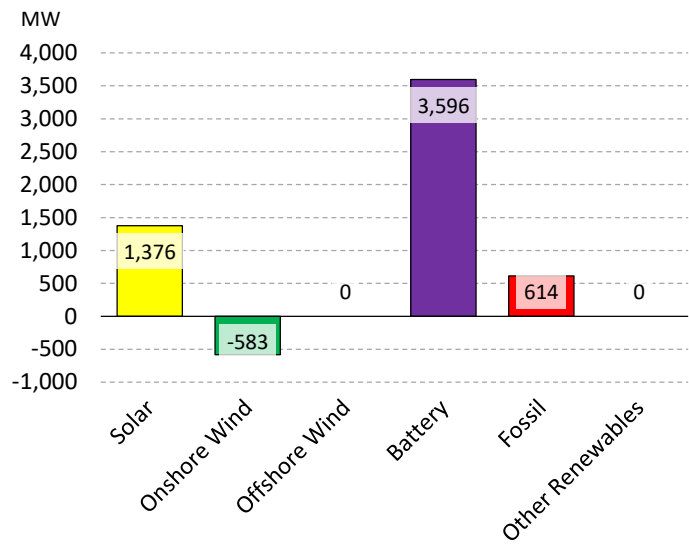


## ERCOT - INTERCONNECTION QUEUE UPDATE

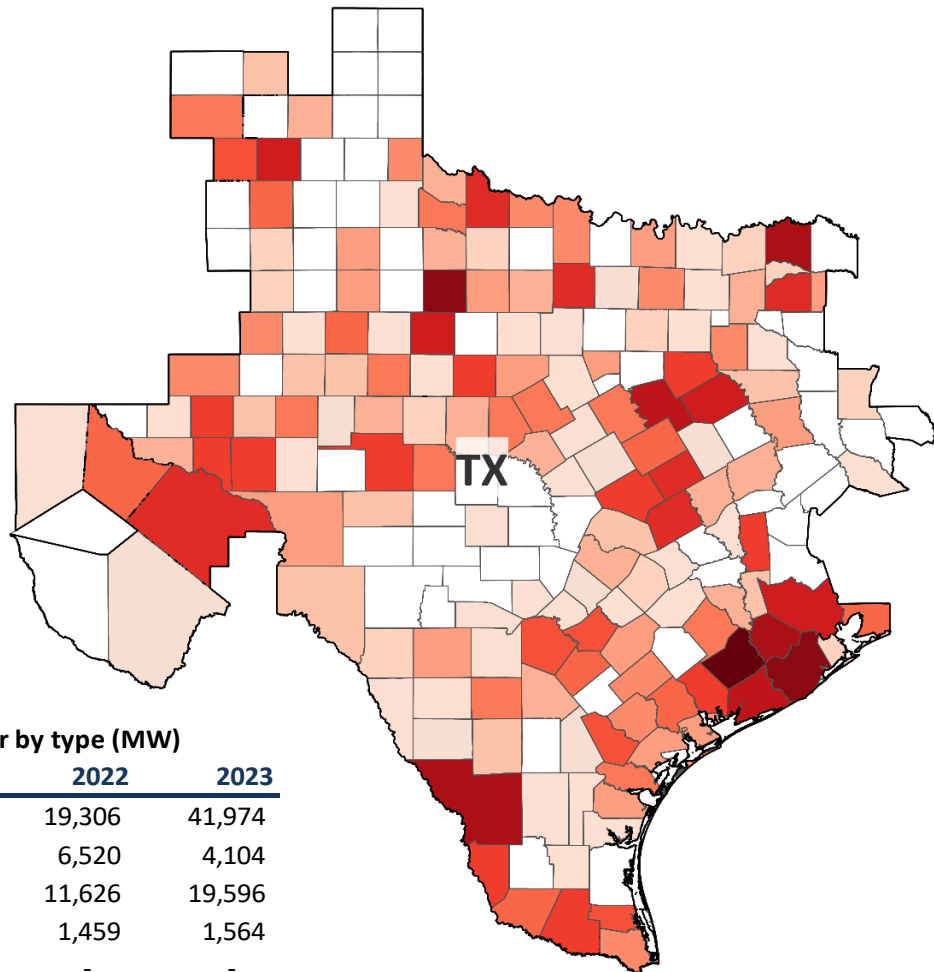
ERCOT active interconnection requests by type



MoM change in interconnection request capacity



ERCOT interconnection queue heatmap by county



ERCOT proposed capacity by year by type (MW)

	2021	2022	2023
Solar	1,413	19,306	41,974
Onshore Wind	4,262	6,520	4,104
Battery	680	11,626	19,596
Fossil	647	1,459	1,564
Other Renewables	-	-	-



## WECC - RENEWABLE CAPACITY OUTLOOK

- German utility RWE is exploring potential sites for an offshore wind farm off the south coast of Oregon. The wind turbines would be located 20 miles off the coast. A task force from the BOEM will discuss the idea on October 21. That same group has given the Port of Coos Bay money to study offshore wind development.
- On October 1, Avista filed the first Clean Energy Implementation Plan (CEIP), which is a roadmap of specific actions Avista plans to take over the next four years to show that progress is being made toward the clean energy goals established by the Clean Energy Transformation Act (CETA). CETA requires Washington utilities to procure 100% of their electricity from clean energy resources by 2045.
- Xcel Energy explores the option to install a molten salt energy storage facility at its retiring Hayden coal plant. The project would use excess energy from the grid to heat the molten salt, which would later be used to power a steam turbine.

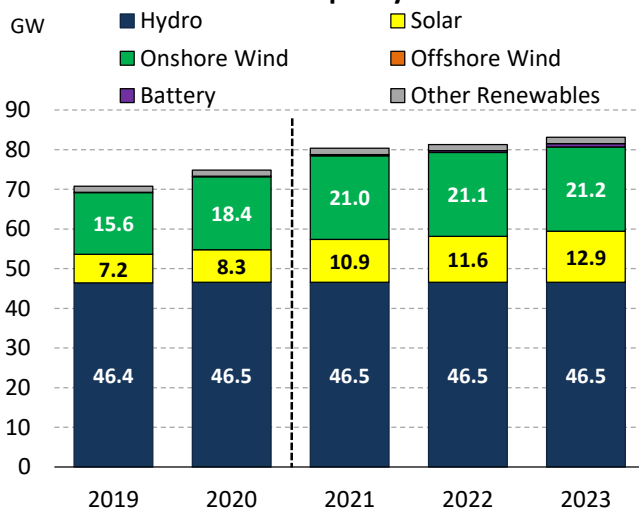
## Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
AZ	100% by 2070	--	--
CO	100% by 2050	--	--
ID	--	--	--
MT	15% by 2015	--	--
NM	100% by 2045	--	--
NV	50% by 2030	--	1 GW by 2030
OR	100% by 2040	--	0.01 GWh by 2020
UT	20% by 2025	--	--
WA	100% by 2045	--	--
WY	--	--	--

## WECC capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change (MW)	YoY Change (MW)	Net Additions YTD	
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	9,529	9,523	7,649	6	1,879	1,271	455
Wind	19,526	19,526	16,384	0	3,142	1,163	824
Battery	163	157	102	6	61	62	0
Hydro	46,531	46,531	46,526	0	5	2	125
Other Renewables	1,536	1,536	1,536	0	0	0	7
Nuclear	5,088	5,088	5,088	0	0	0	0
Fossil	69,934	69,934	71,841	0	-1,907	-2	-535
<b>Total</b>	<b>152,307</b>	<b>152,295</b>	<b>149,126</b>	<b>12</b>	<b>3,169</b>	<b>2,497</b>	<b>876</b>

## Cumulative renewable capacity forecast



Generation (GWh)				Generation YTD			
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	2,222	2,497	1,757	-274	465	19,223	16,348
Wind	3,312	3,794	3,065	-483	247	39,242	33,615
Battery	0	0	-1	0	1	-6	-6
Hydro	8,636	10,733	9,375	-2,096	-738	103,931	118,744
Other Renewables	525	585	539	-60	-15	4,889	5,032
Nuclear	3,599	3,737	3,663	-138	-64	30,261	31,495
Fossil	25,100	28,851	26,770	-3,750	-1,670	207,956	203,148
<b>Total</b>	<b>43,394</b>	<b>50,196</b>	<b>45,169</b>	<b>-6,802</b>	<b>-1,775</b>	<b>405,496</b>	<b>408,376</b>

Capacity Factor				Capacity Factor YTD			
	Sep-21	Aug-21	Sep-20			Sep-21	Sep-20
Solar	32%	35%	32%	-3%	3%	32%	33%
Wind	24%	26%	26%	-3%	0%	32%	33%
Battery	0%	0%	-1%	0%	1%	-1%	-1%
Hydro	26%	31%	28%	-5%	3%	34%	39%
Other Renewables	47%	51%	49%	-4%	2%	49%	50%
Nuclear	98%	99%	100%	0%	-1%	91%	94%
Fossil	50%	55%	52%	-6%	4%	45%	43%

## WECC renewable capacity by type (MW)

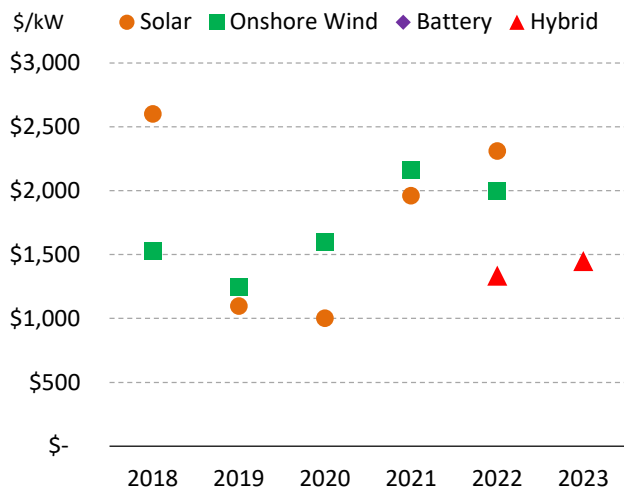
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	6,384	7,195	8,258	10,855	11,564	12,856	10,799	11,694	12,934	10,924	12,362	14,368
Onshore Wind	15,080	15,560	18,363	20,995	21,098	21,200	20,983	21,112	21,214	21,126	21,340	21,612
Battery	93	102	101	335	467	879	340	605	1,003	354	952	1,645
Other Renewables	1,534	1,547	1,554	1,554	1,559	1,559	1,554	1,562	1,562	1,554	1,567	1,567
<b>Total</b>	<b>23,091</b>	<b>24,404</b>	<b>28,276</b>	<b>33,739</b>	<b>34,688</b>	<b>36,493</b>	<b>33,675</b>	<b>34,972</b>	<b>36,712</b>	<b>33,958</b>	<b>36,221</b>	<b>39,191</b>

## WECC - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	State	Fuel Type	Size (MW)	Online Date
1	Copper Mountain Solar 5, LLC	NV	Solar	250.0	Mar-21
2	Oso Grande Wind Farm	NM	Wind	216.0	May-21
3	La Joya NM	NM	Wind	165.0	Feb-21
4	Sun Streams 2	AZ	Solar	150.0	Jun-21
5	La Joya NM	NM	Wind	141.2	Jun-21
6	Wilmot Energy Center LLC	AZ	Solar	130.0	Apr-21
7	Crossing Trails Wind Power Project LLC.	CO	Wind	104.0	Apr-21
8	Battle Mountain Solar Project	NV	Solar	101.0	May-21
9	Hunter Solar LLC	UT	Solar	100.0	Mar-21
10	Harry Allen Solar Energy LLC	NV	Solar	100.0	May-21
11	Pioneer Solar (CO), LLC	CO	Solar	80.0	Jun-21
12	Sigurd Solar LLC	UT	Solar	80.0	May-21
13	Millican Solar Energy LLC	OR	Solar	71.4	Mar-21
14	Prineville Solar Energy LLC	OR	Solar	46.2	Feb-21
15	Oso Grande Wind Farm	NM	Wind	33.8	May-21

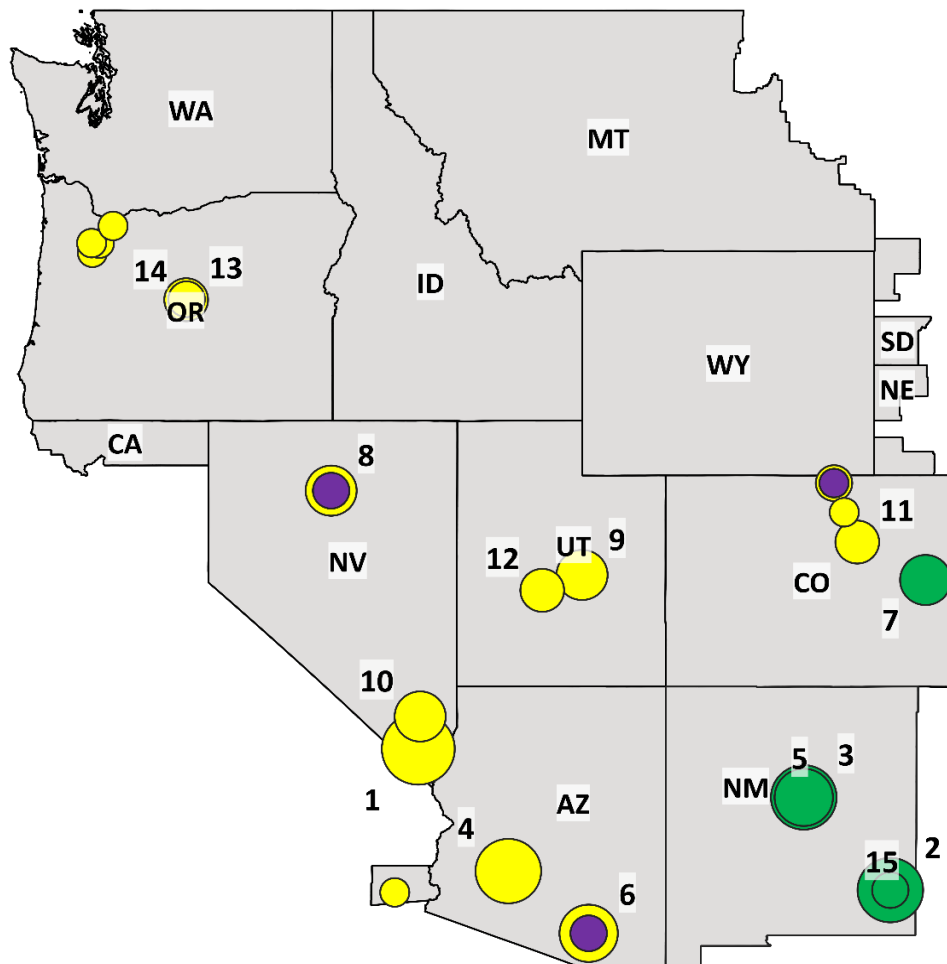
## Average project costs by technology



## WECC map with notable recently completed projects

## Legend

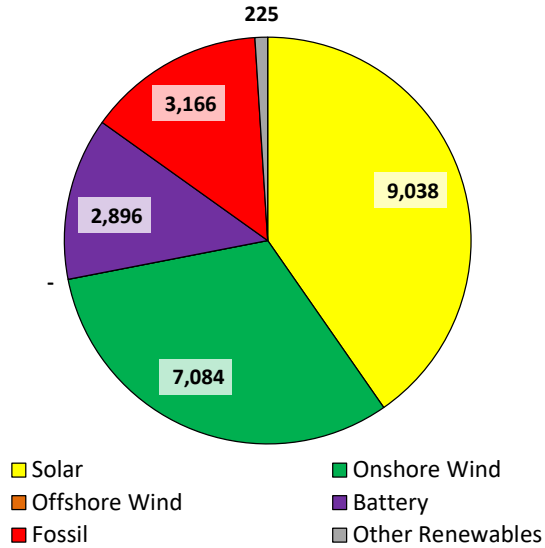
- Solar
- Battery
- Onshore Wind
- Offshore Wind



## WECC - PROPOSED UNIT UPDATE

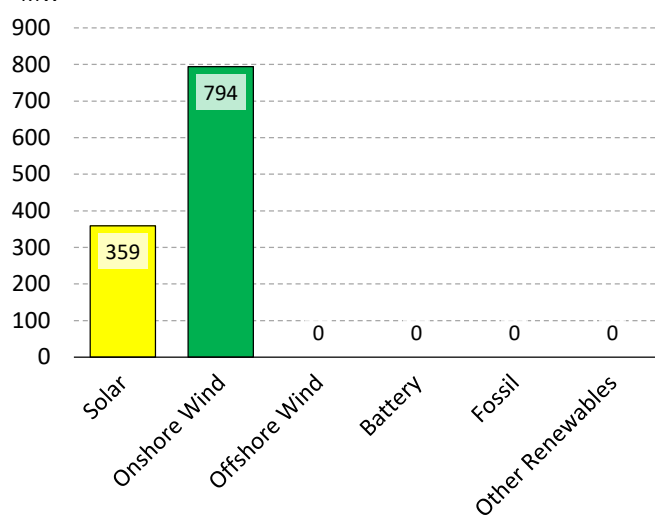
WECC proposed capacity by type

MW

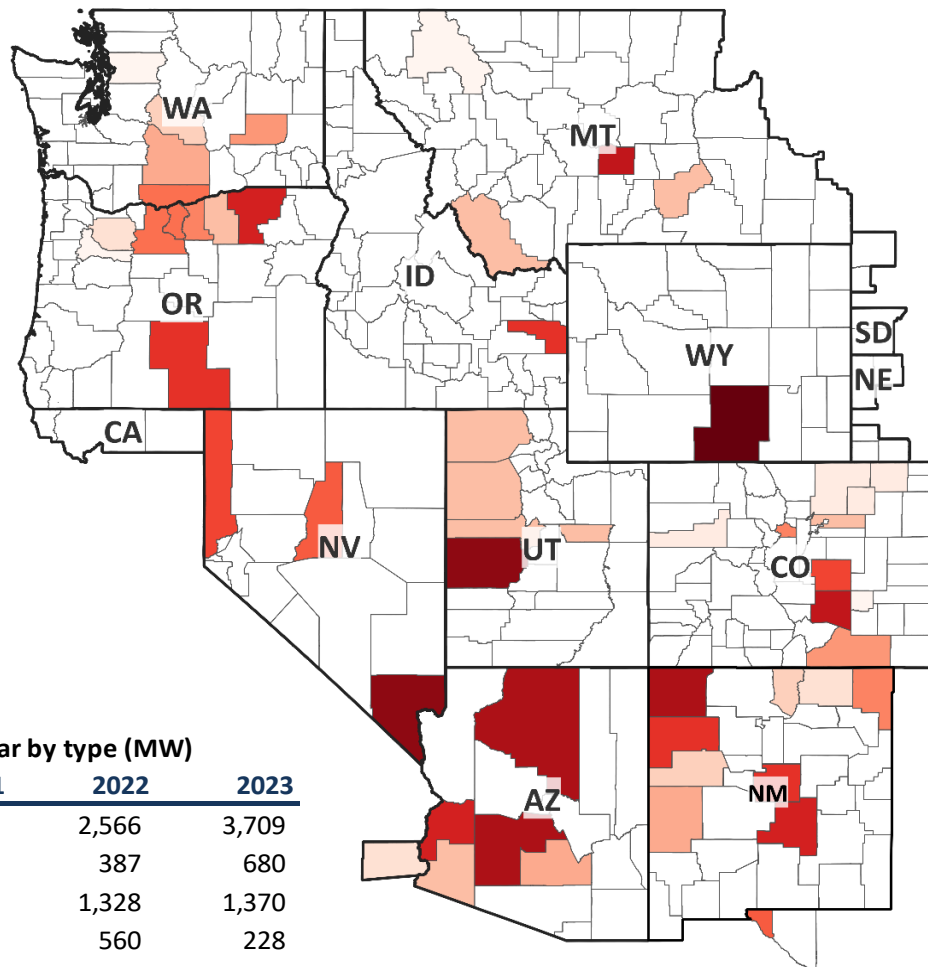


MoM change in proposed capacity

MW



WECC proposed project heatmap by county



WECC proposed capacity by year by type (MW)

	2021	2022	2023
Solar	1,434	2,566	3,709
Onshore Wind	1,643	387	680
Battery	198	1,328	1,370
Fossil	-	560	228
Other Renewables	-	25	-

## CAISO - RENEWABLE CAPACITY OUTLOOK

- Governor Newsom recently signed a bill into law mandating that the California Energy Commission (CEC) create a plan for offshore wind development in federal waters. The new law, which goes into effect next year, gives the commission three deadlines: First, the CEC must figure out and establish what the maximum feasible capacity is for floating wind turbines off the coast of California in federal waters by June 1, 2022. The bill then requires the CEC to submit an economic benefits assessment of offshore wind by Dec. 31, 2022. And finally, the CEC must identify and plan for how much offshore wind power would be developed by the target years of 2030 and 2045.
- The city of San Diego issued a request for proposals on the development of a 500-MW pumped storage system at its San Vicente Reservoir. Local authorities hope to have the project online by 2030. Additional energy storage projects such as this will be vital for California to achieve its decarbonization goals over the next two decades.

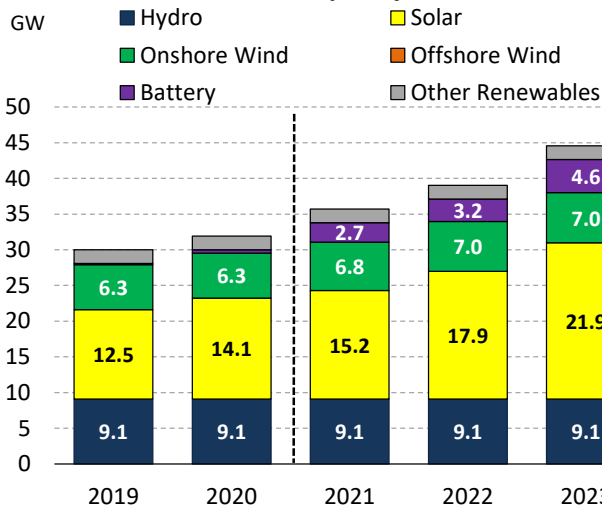
## Relevant State Targets

State	RPS/CES	Offshore Wind	Energy Storage
CA	100% by 2045	--	1.325 GW by 2020

## CAISO capacity and generation by fuel type

Capacity (MW)	Monthly Data			MoM Change		YoY Change		Net Additions YTD	
	Sep-21	Aug-21	Sep-20	(MW)	(MW)	(MW)	(MW)	Sep-21	Sep-20
Solar	14,478	14,206	12,902	272	1,577			336	395
Wind	6,418	6,358	6,192	60	226			303	-115
Battery	2,424	1,861	458	563	1,966			1,965	279
Hydro	9,096	9,096	9,096	0	0			0	0
Other Renewables	1,905	1,905	1,906	0	-1			0	0
Nuclear	2,240	2,240	2,240	0	0			0	0
Fossil	31,217	31,217	31,274	0	-57			-53	658
<b>Total</b>	<b>67,779</b>	<b>66,883</b>	<b>64,068</b>	<b>896</b>	<b>2,815</b>			<b>2,551</b>	<b>1,217</b>

## Cumulative renewable capacity forecast



## Generation (GWh)

	Monthly Data			MoM Change		YoY Change		Generation YTD	
	Sep-21	Aug-21	Sep-20	(GWh)	(GWh)	(GWh)	(GWh)	Sep-21	Sep-20
Solar	2,884	3,240	2,342	-356	542			25,959	22,586
Wind	859	1,068	819	-209	39			10,773	10,236
Battery	0	0	-3	0	3			-49	-11
Hydro	1,186	1,117	1,082	69	104			7,567	11,774
Other Renewables	1,474	1,442	1,168	32	306			10,901	10,565
Nuclear	1,627	1,670	1,600	-43	27			12,139	14,179
Fossil	7,544	8,960	8,026	-1,416	-482			58,781	51,333
<b>Total</b>	<b>15,574</b>	<b>17,497</b>	<b>15,034</b>	<b>-1,923</b>	<b>539</b>			<b>126,071</b>	<b>120,661</b>

## Capacity Factor

	Monthly Data			MoM Change		YoY Change		Capacity Factor YTD	
	Sep-21	Aug-21	Sep-20	(%)	(%)	(%)	(%)	Sep-21	Sep-20
Solar	28%	31%	25%	-3%	5%			28%	27%
Wind	19%	23%	18%	-4%	4%			26%	25%
Battery	0%	0%	-1%	0%	1%			-1%	-1%
Hydro	18%	17%	17%	2%	0%			13%	20%
Other Renewables	107%	102%	85%	6%	17%			87%	84%
Nuclear	101%	100%	99%	1%	1%			83%	96%
Fossil	34%	39%	36%	-5%	3%			29%	25%

## CAISO renewable capacity by type (MW)

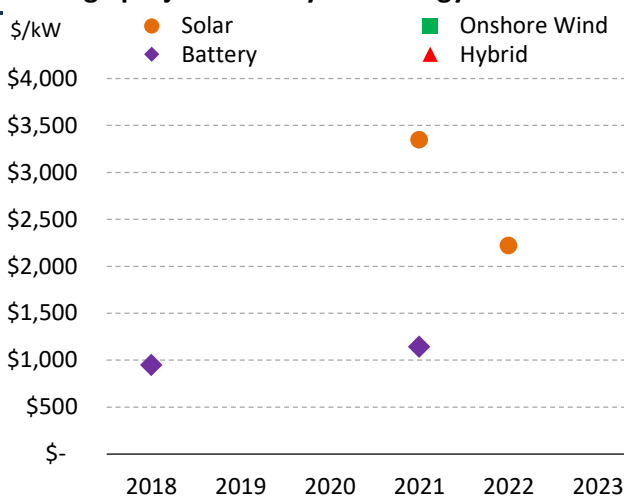
	Actual			Base			Low			High		
	2018	2019	2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
Solar	11,498	12,507	14,142	14,948	17,615	21,618	14,868	17,002	20,280	15,029	18,267	23,057
Onshore Wind	6,220	6,306	6,115	6,576	6,779	6,826	6,552	6,721	6,754	6,601	6,837	6,904
Battery	178	180	460	2,718	3,165	4,635	2,680	3,043	3,926	2,756	3,299	5,581
Other Renewables	1,896	1,906	1,905	1,905	1,923	1,947	1,905	1,921	1,929	1,905	1,925	1,974
<b>Total</b>	<b>19,792</b>	<b>20,899</b>	<b>22,622</b>	<b>26,148</b>	<b>29,482</b>	<b>35,026</b>	<b>26,004</b>	<b>28,687</b>	<b>32,889</b>	<b>26,291</b>	<b>30,328</b>	<b>37,516</b>

## CAISO - RECENT PROJECTS UPDATE

## Notable recently completed projects

No.	Project Name	County	Fuel Type	Size (MW)	Online Date
1	Dynegy Moss Landing Power P	Monterey	Battery	300.0	May-21
2	McCoy Solar Energy Project Hy	Riverside	Battery	230.0	Jul-21
3	Rancho Seco Solar II, LLC	Sacramento	Solar	160.0	Feb-21
4	Blythe Solar II, LLC	Riverside	Battery	115.0	Mar-21
5	Blythe Solar III, LLC Hybrid	Riverside	Battery	115.0	May-21
6	Saticoy	Ventura	Battery	100.0	Apr-21
7	Point Wind	Kern	Wind	64.5	Mar-21
8	Blythe Solar 110, LLC	Riverside	Battery	63.0	Jun-21
9	Coachella Hills Wind	Riverside	Wind	61.2	Mar-21
10	Painted Hills Wind Park	Riverside	Wind	46.8	Apr-21
11	Summit Winds	Alameda	Wind	46.2	Jul-21
12	Central 40	Stanislaus	Solar	40.0	Feb-21
13	Top Gun Energy Storage	San Diego	Battery	30.0	Jun-21
14	Johanna Energy Center, LLC	Orange	Battery	20.0	Jun-21
15	Antelope Expansion 3A	Los Angeles	Solar	15.0	Jun-21

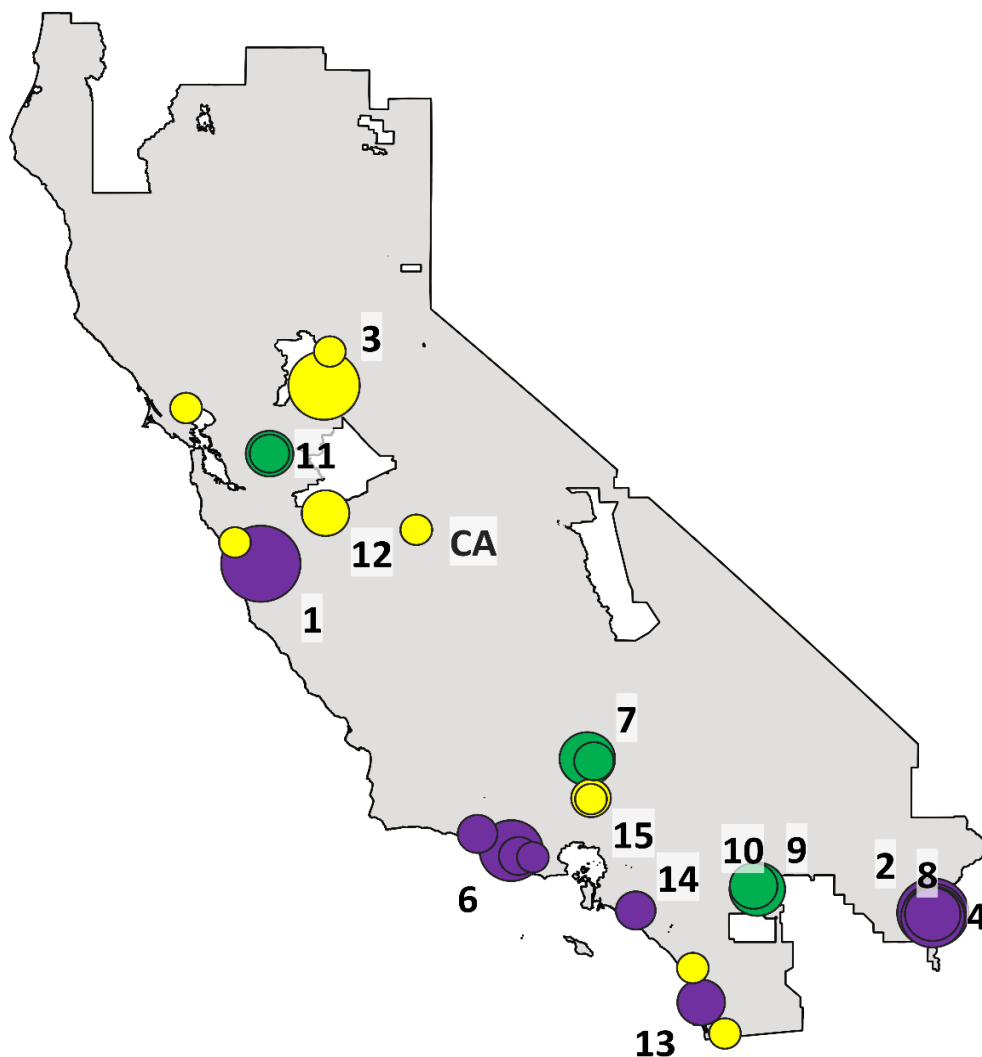
## Average project costs by technology



## CAISO map with notable recently completed projects

## Legend

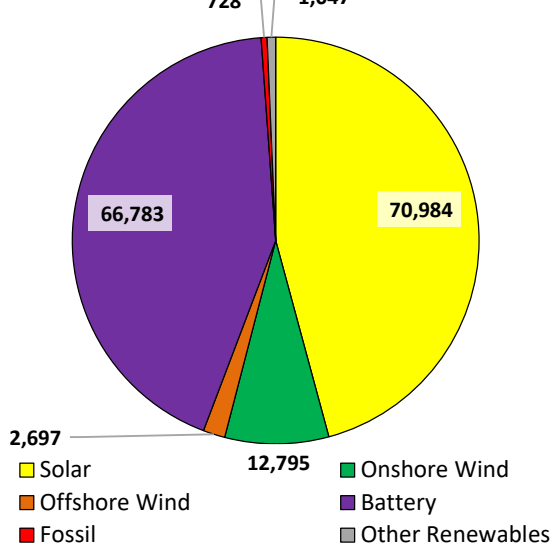
- Solar
- Battery
- Onshore Wind
- Offshore Wind



## CAISO - INTERCONNECTION QUEUE UPDATE

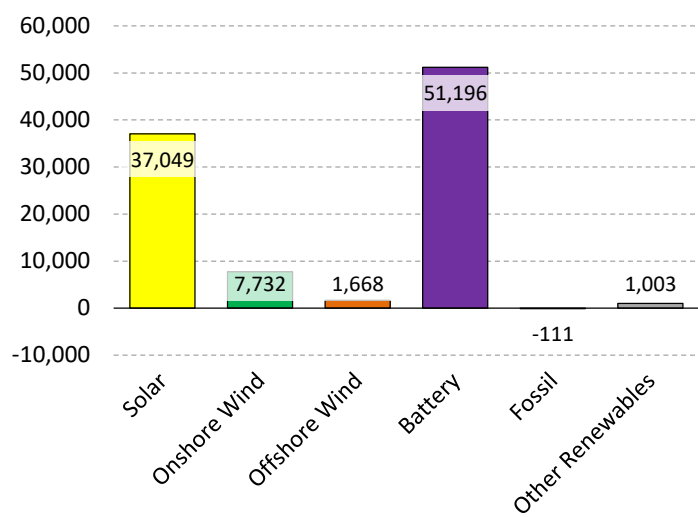
CAISO active interconnection requests by type

MW

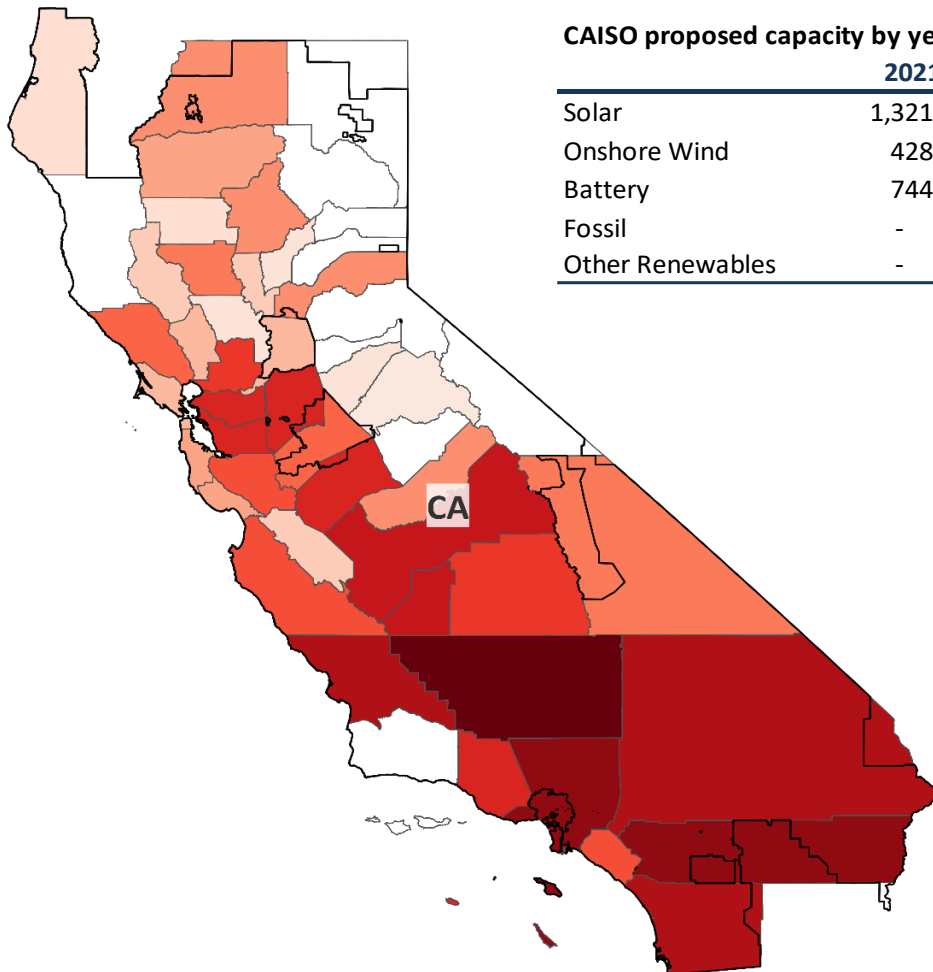


MoM change in interconnection request capacity

MW



CAISO interconnection queue heatmap by county



CAISO proposed capacity by year by type (MW)

	2021	2022	2023
Solar	1,321	8,121	11,461
Onshore Wind	428	562	182
Battery	744	1,346	6,691
Fossil	-	63	656
Other Renewables	-	44	163



## METHODOLOGY & GLOSSARY

- All capacity shown in the report is net summer installed capacity (ICAP) according to EIA's 860 data or the submitted data to the respective ISO interconnection queues. Unforced capacity (UCAP) for each resource, which can vary by location and technology, is not provided. UCAP determines compliance with reserve requirements.
- Other Renewables include biomass, geothermal, and renewable natural gas.
- Wind and solar includes so-called hybrid projects (i.e., wind and solar projects with co-located battery projects) unless specified.
- Any capacity forecast is based on EVA's assessment of the likelihood of success for individual projects included in EIA's 860 data, ISO interconnection queues, and EVA's proprietary Power Plant Tracking System (PPTS). The current probabilities by project status category and year for the base case are shown below:

Scenario	Status	Cat	2021	2022	2023	2024	2025
Base	(TS) Construction complete, but not yet in commercial operation	1	1.00	1.00	1.00	1.00	1.00
Base	(V) Under construction, more than 50 percent complete	1	1.00	0.95	0.90	0.90	0.90
Base	(U) Under construction, less than or equal to 50 percent complete	2	1.00	0.90	0.85	0.85	0.80
Base	(T) Regulatory approvals received. Not under construction	3	0.40	0.40	0.40	0.35	0.30
Base	(L) Regulatory approvals pending. Not under construction	4	0.20	0.20	0.25	0.20	0.20
Base	(P) Planned for installation, but regulatory approvals not initiated	5	0.10	0.10	0.15	0.10	0.10
Base	(OT) Other	6	0.00	0.00	0.00	0.00	0.00

- Capacity values shown on the interconnection summary pages (pages 3, 8, 11, 14, 17, 20, 23, 26, 29, 32) are not probability-adjusted and instead show the full capacity value of the proposed project included in the respective interconnection queue.
- Average project costs by technology charts include data for projects where the overall project costs have been disclosed in public filings or news releases. The data is tracked in EVA's proprietary PPTS. When there are no data points for certain years, EVA does not have cost data for projects completed or expected to be completed during that year.
- The notable recently completed projects tables and maps include renewable projects that have come online within the last six months of actual EIA 860 data. For example, The July 2021 report includes EIA 860 completed project data from November 2020 to April 2021.
- A map of the regions covered report is shown below:

