Draft 2023 Flexible Capacity Needs and Availability Assessment Hours Technical Study

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What's the purpose of this call?

To discuss the assumptions, methodology, and draft results of the monthly flexible capacity requirement and Availability Assessment Hours Technical Study.

Specifically

Calculating monthly flexible capacity requirements for all LRAs within the ISO footprint for RA compliance year 2023 and advisory requirements for compliance years 2024 and 2025

Agenda / Overview

- Background
- Process review
  - Expected build out from all LSEs (CPUC jurisdictional and non-jurisdictional)
  - Load, wind and solar profiles
  - Calculate 3-hour net load upward ramps
  - Add the larger of either the spinning reserve portion of contingency reserves or the most severe contingency
  - Calculate monthly Flexible Capacity requirement
- Overview of methodology used for system/local availability assessment hours
  - 2023 availability assessment hours
  - 2024-2025 draft availability assessment hours

Each LSE Scheduling Coordinator shall make a year-ahead and month-ahead showing of flexible capacity for each month of the compliance year

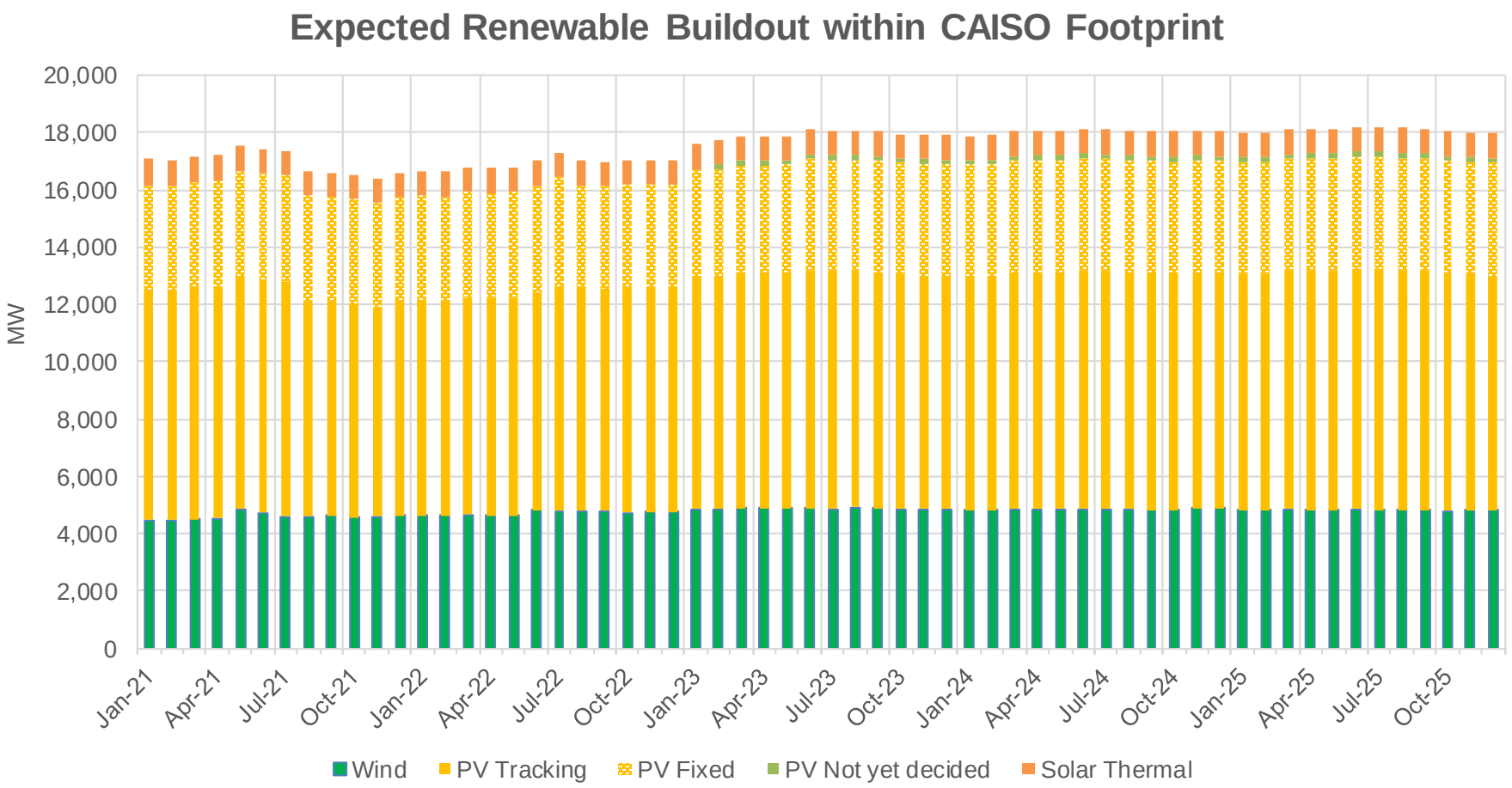
Resource Adequacy (RA)

- Ensure LSEs contract for adequate capacity to meet expected flexible capacity needs
- Year ahead: LSEs need to secure a minimum of 90% of the next years monthly needs
- Month ahead: LSEs need to secure adequate net qualified capacity to serve their peak load including a planning reserve margin and flexible capacity to address largest 3-hour net load ramps plus contingency reserves
- All resources participating in the ISO markets under an RA contract will have an RA must-offer-obligation
- Required to submit economic bids into the ISO's real-time market consistent with the category of flexible capacity

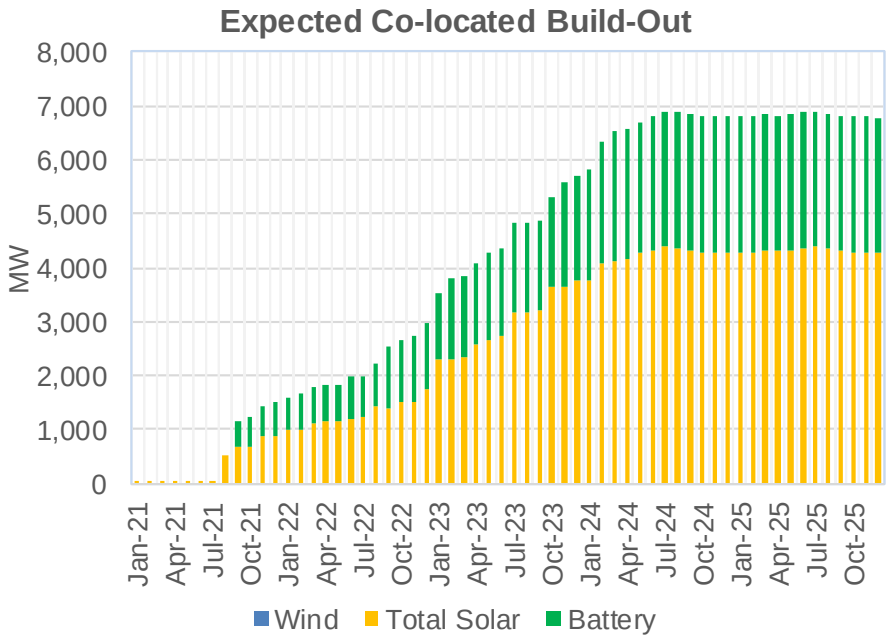
The ISO used the following data to determine the flexible capacity needs

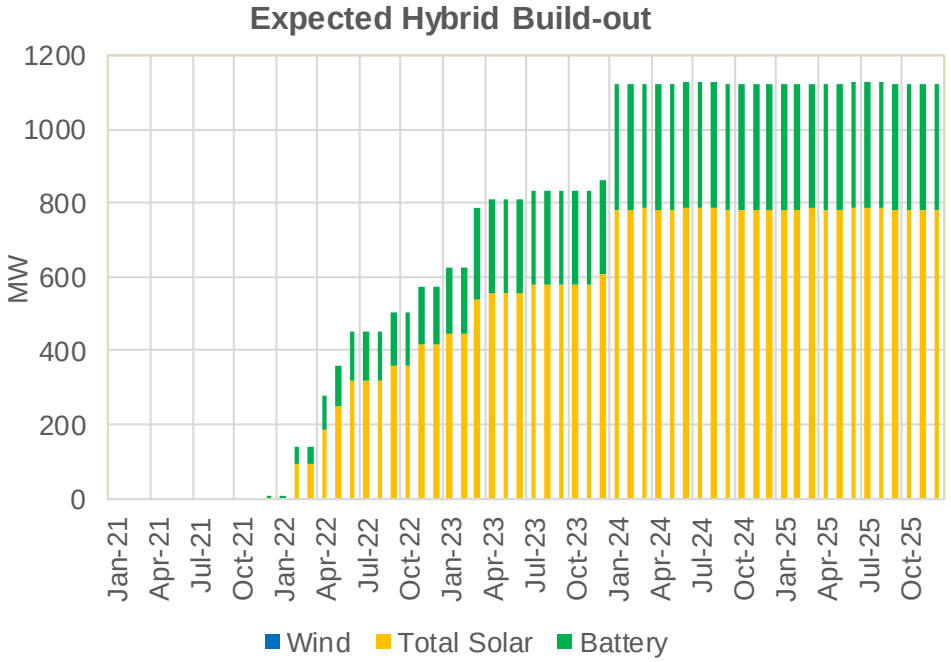
- CEC's IEPR demand forecast for 2023 through 2025
- LSE SCs updated renewable build-out for 2021 through 2025
- The Analysis of Flex Capacity Needs included:
  - Existing VERs capacity
  - Expected installed capacity by technology and expected operating date (e.g. Solar thermal, solar PV tracking, solar PV non-tracking, estimate of behind-the-meter solar PV, co-located and renewable components of hybrids) for all variable energy resources under contract
  - Operational date or expected on-line date
  - Dynamically scheduled resources located outside ISO's BAA

Expected renewable buildout through December 2026 based on LSE's submittal



Expected co-located and hybrid renewable buildout through December 2025 based on LSE's submittal

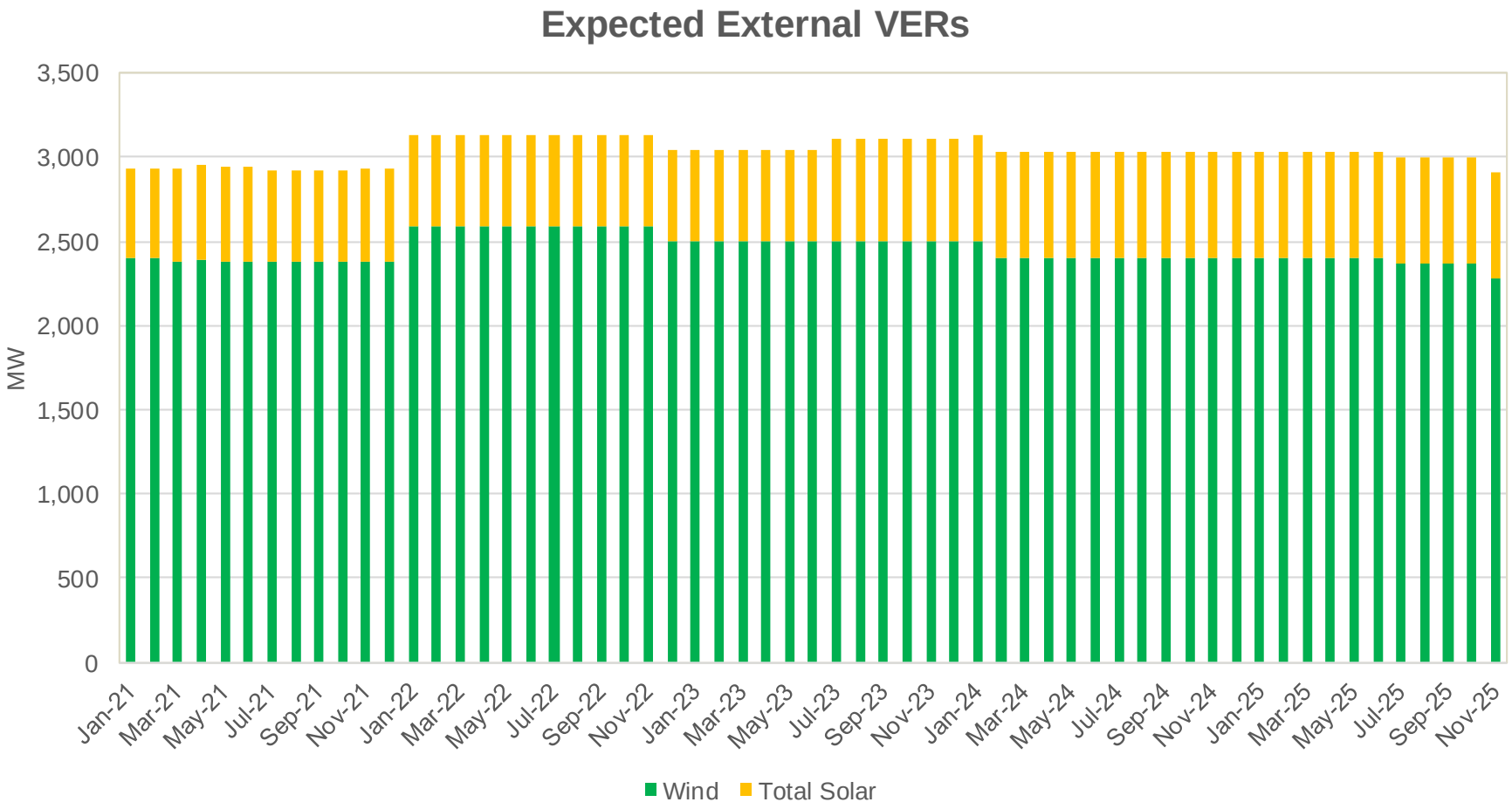




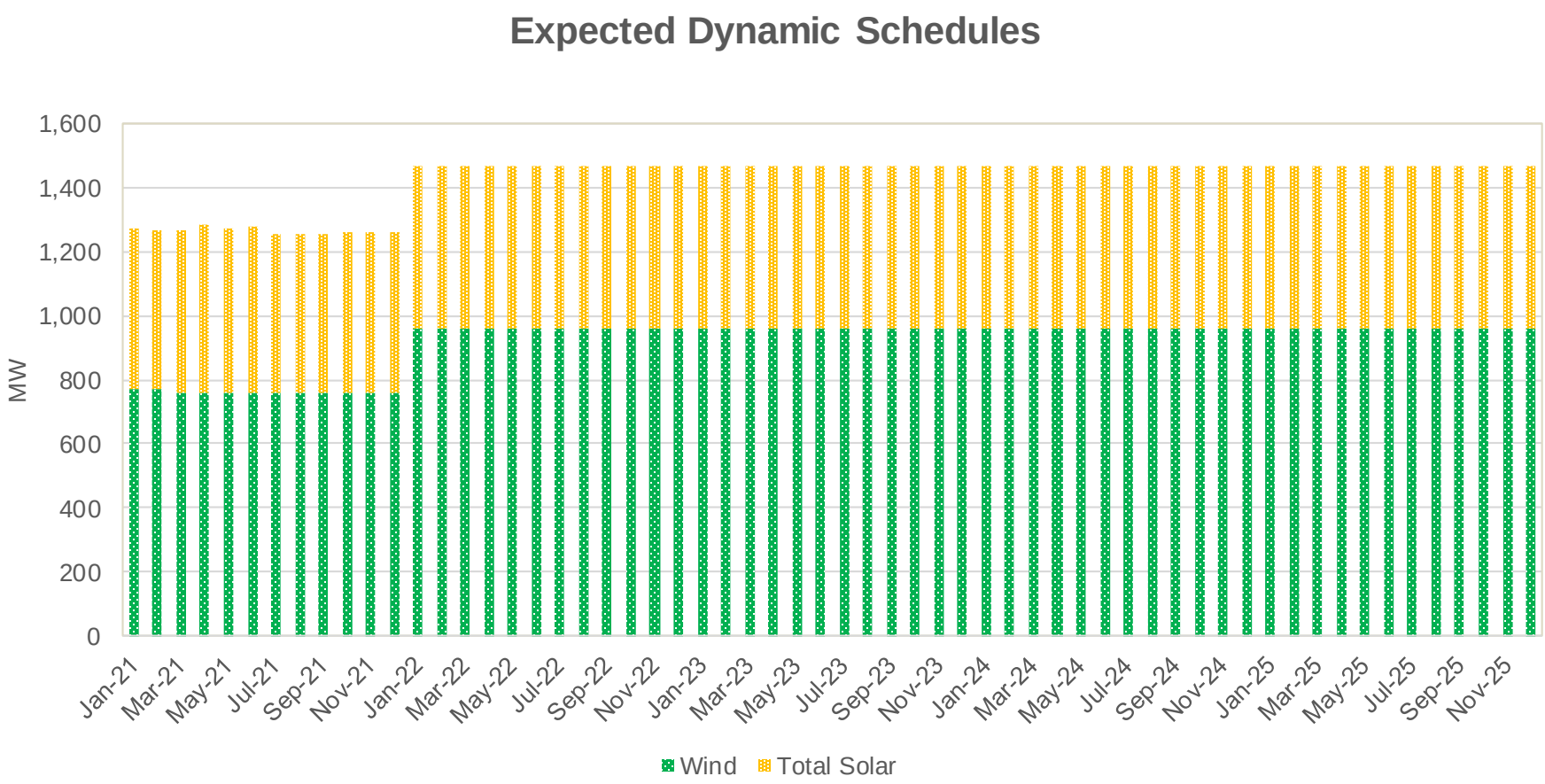
- Co-Located resources and renewable components of hybrid resources were included in the flexible needs assessment

For more details on hybrid and co-located resources, visit the stakeholder page: https://stakeholdercenter.caiso.com/StakeholderInitiatives/Hybrid-resources

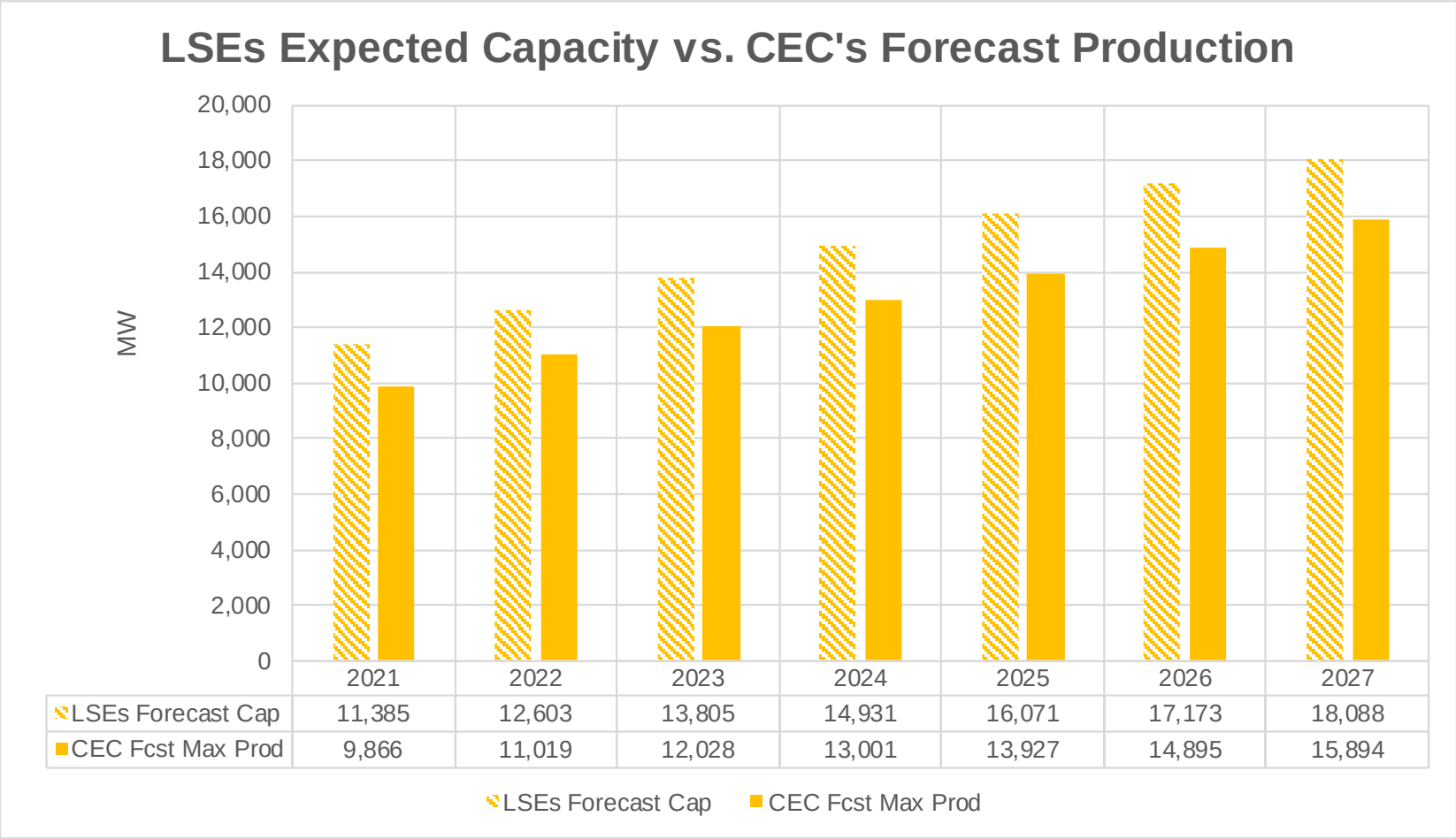
Expected wind/solar resources located outside the ISO which are contracted by LSE within the ISO



Expected dynamically scheduled wind/solar resources from external resources shown in the previous slide



Expected LSEs rooftop solar PV capacity vs. CEC's estimated production



	2021	2022	2023	2024	2025	2026	2027
LSEs Forecast Cap	11,385	12,603	13,805	14,931	16,071	17,173	18,088
CEC Fcst Max Prod	9,866	11,019	12,028	13,001	13,927	14,895	15,894

Summary of LSEs submittal showing the expected capacity at the end of each year

Resource Type	Existing 2021	Expected 2022	Expected 2023
ISO Solar PV	11,261	11,556	12,322
ISO Solar Thermal	860	858	858
ISO Wind	4,523	4,801	4,912
Co-Located Resources (Wind/Solar)	880	1,744	3,769
Hybrid Resources (Wind/Solar)	2	419	608
Total Variable Energy Resource Capacity within the ISO	***17,526***	***19,377***	***22,468***
Incremental Non ISO Wind/Solar Resources that's Dynamically Scheduled into the ISO		204	204
Total Internal and Dynamically Scheduled VERs in Flexible Capacity Needs Assessment	***17,526***	***19,581***	***22,672***
Incremental New VERs Additions Each Year (Included in Flexible Capacity Needs Assessment)		***2,055***	***3,091***
Maximum behind-the-meter Solar PV Production in the CEC's Forecast	9,866	11,019	12,028
Cumulative behind-the-meter Solar PV Capacity reported by LSEs	11,385	12,603	13,805

The ISO flexibility capacity assessment is based on current LSE's RPS build-out data

- Uses the most current data available for renewable build-out obtained from all LSE SCs
  - The SC for each *LSE* in the CAISO BAA [to identify] each *wind and solar resource*… that is owned, in whole or in part, by the LSE, or under contractual commitment to the LSE or the Load-following MSS LSE, for all or a portion of its capacity

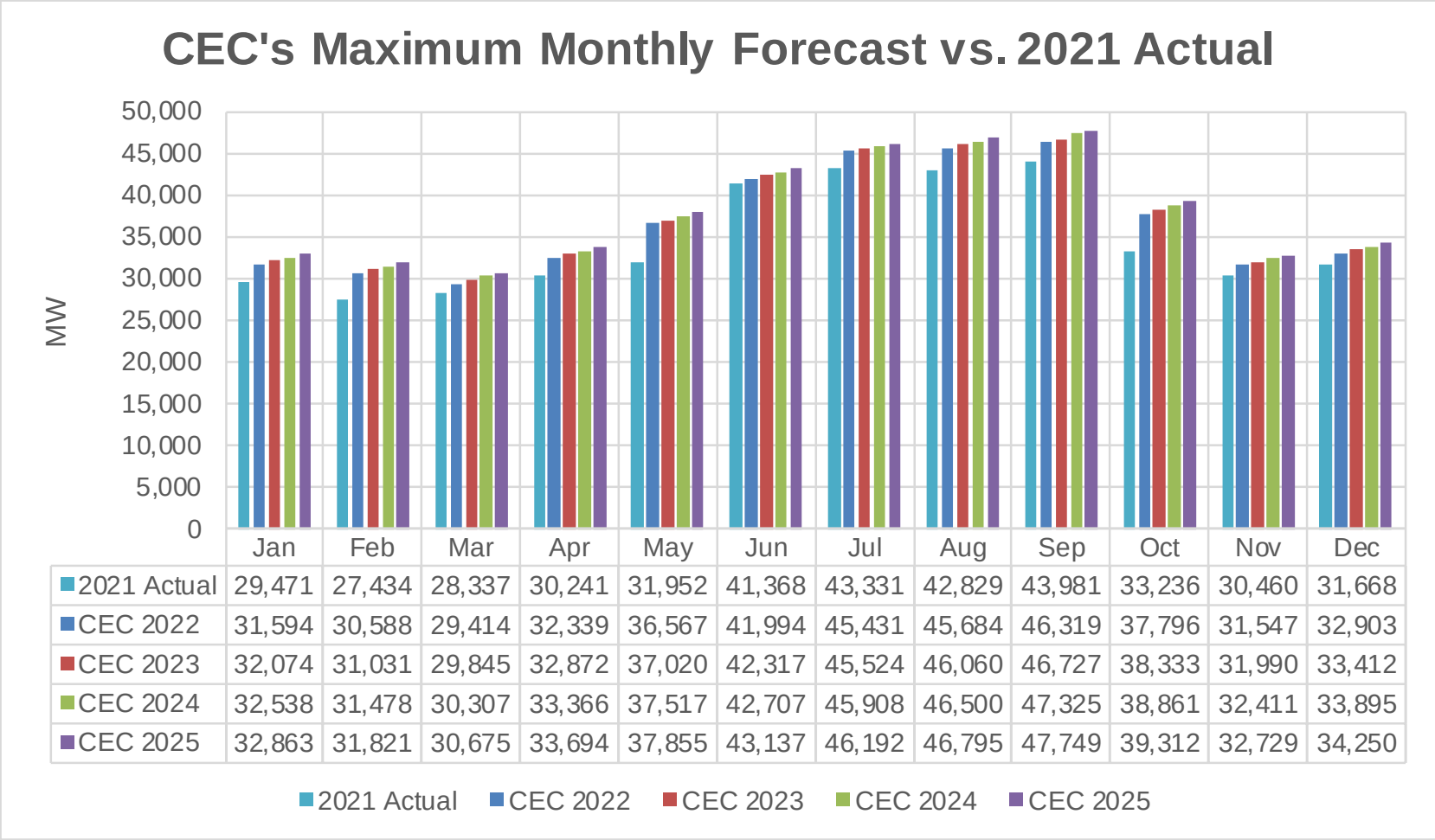
- For new renewable installation, scale 2021 actual production data based on the expected installed capacity in subsequent years

- Generate net-load profiles for 2023 through 2025
  - Generate load profiles for 2023 through 2025
  - Generate solar profiles for 2023 through 2025
  - Generate wind profiles for 2023 through 2025

The ISO will use the CEC's 1-in-2 IEPR forecast to develop the monthly flexible capacity

- CEC IEPR Load Forecast
  - https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2021-integrated-energy-policy-report/2021-1
  - Title of File: "CED 2021 Hourly Forecast - CAISO - Mid Baseline- AAEE Scenario 3 – AAFS Scenario 3"
    - CAISO will be using Managed Net Load (column U) within the spreadsheet
      - **Managed Net Load (col U)** = Baseline Net Load (col T)
        + AAEE (Col R) + AAFS (Col S)
      - Baseline Net Load (col T) = Baseline Consumption (col N)
        - BTM PV (col O)
        - BTM Storage Res (col P)
        - BTM Storage NonRes (col Q)
      - Baseline Consumption (col N) = unadjusted consumption (col E)
        + Pump DWR (col F)
        + Pump MWD (col F)
        + climate change (col I)
        + light duty EV (col J)
        + medium heavy EV (col K)
        + TOU impacts (col L)
        + other adjustments (col M)

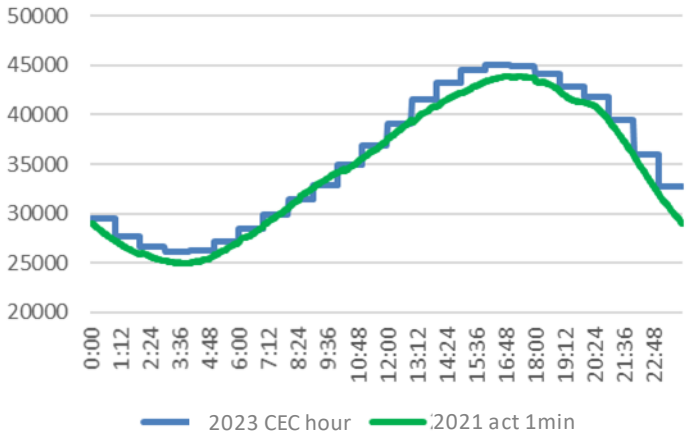
CEC's (1-in-2) ISO monthly coincident peak forecast

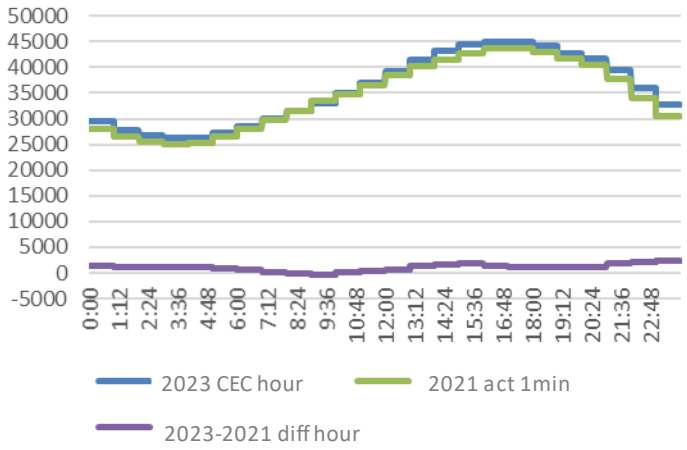


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021 Actual	29,471	27,434	28,337	30,241	31,952	41,368	43,331	42,829	43,981	33,236	30,460	31,668
CEC 2022	31,594	30,588	29,414	32,339	36,567	41,994	45,431	45,684	46,319	37,796	31,547	32,903
CEC 2023	32,074	31,031	29,845	32,872	37,020	42,317	45,524	46,060	46,727	38,333	31,990	33,412
CEC 2024	32,538	31,478	30,307	33,366	37,517	42,707	45,908	46,500	47,325	38,861	32,411	33,895
CEC 2025	32,863	31,821	30,675	33,694	37,855	43,137	46,192	46,795	47,749	39,312	32,729	34,250

Building expected 1-minute load profile requires actual 2021 hourly and 1-minute data and CEC's hourly forecast

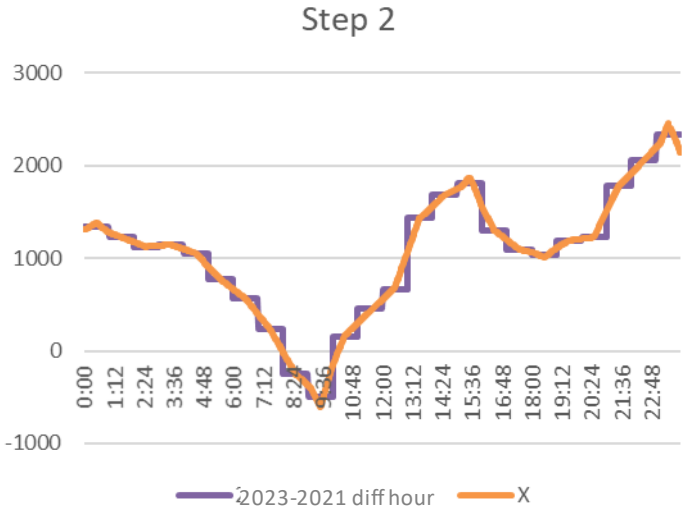
Using the 2023 CEC hourly forecast and the 2021 1-minute actuals, we will create the estimated 2023 1-minute forecast

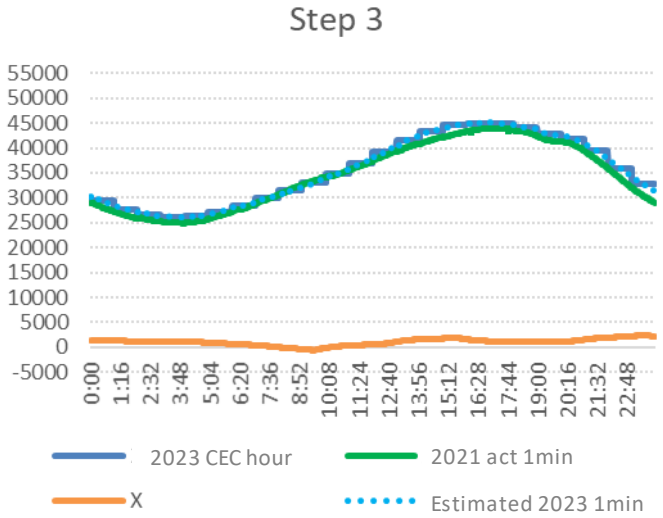




Take the hourly average of the 1-minute data and find the difference between the hourly 2021 actuals and 2023 forecast

Smooth the hourly 2023-2021 difference from Step 1 to a 1-minute granularity





Add the 1-minute data from Step 1 to the 2021 1-minute actuals to get a smoothed 2023 forecast

Hourly load forecast to 1-minute load forecast

- Used 2021 actual 1-minute load data to build 1-minute load profiles for subsequent years
- Scaled the hourly CEC load forecast value of each hour into 1-minute forecast data using a smoothing equation looking at the differences between the forecasted year and the 2021 1-minute actuals.

2023 Load 1-Minute Forecast

- **2023 $L_{CECfcst\_1\text{-}min}$ = 2021 $L_{Act\_1\text{-}min}$ + X**
  - **Where X = Interpolated 1min profile from the difference**

    (2023 $L_{CECfcst\_hourly}$ - 2021 L_{actual_hourly})

2024 Load 1-Minute Forecast

- **2024 $L_{CECfcst\_1\text{-}min}$ = 2021 $L_{Act\_1\text{-}min}$ + X**
  - **Where X = Interpolated 1min profile from the difference**

    (2024 $L_{CECfcst\_hourly}$ - 2021 L_{actual_hourly})

*See slide 8 for more graphs showing steps to calculate **X**

Solar growth assumptions through 2025

- Used the actual solar 1-minute solar production data for 2021 to develop the 1-minute solar profiles for 2022 through 2025
- Scaled 1-minute solar data using the forecast monthly solar capacity for the new plants scheduled to be operational in 2021
- Repeated the above steps for 2023, 2024 & 2025

$$2022\ S_{Mth\_Sim\_1min} = 2021\ S_{Act\_1min} * \frac{2022\ S_{Mth\ Capacity}}{2021\ S_{Mth\ Capacity}}$$

$$2023\ S_{Mth\_Sim\_1min} = 2021\ S_{Act\_1min} * \frac{2023\ S_{Mth\ Capacity}}{2021\ S_{Mth\ Capacity}}$$

$$2024\ S_{Mth\_Sim\_1min} = 2021\ S_{Act\_1min} * \frac{2024\ S_{Mth\ Capacity}}{2021\ S_{Mth\ Capacity}}$$

$$2025\ S_{Mth\_Sim\_1min} = 2021\ S_{Act\_1min} * \frac{2025\ S_{Mth\ Capacity}}{2021\ S_{Mth\ Capacity}}$$

Net-load is a NERC accepted metric[1] for evaluating additional flexibility needs to accommodate VERs

- Net load is defined as load minus wind and solar power production
- Net load variability increases as more and more wind and solar resources are integrated into the system
- The monthly 3-hour flexible capacity need equates to the largest upward change in net load when looking across a rolling 3-hour evaluation window
- The ISO dispatches flexible resources (including renewable resources with energy bids) to meet net load

1 NERC Special Report
Flexibility Requirements and Metrics for Variable Generation: Implications for System Planning Studies, August 2010. https://www.nerc.com/files/IVGTF_Task_1_4_Final.pdf

The flexible capacity methodology is expected to provide the ISO with sufficient flexible capacity

Methodology

Flexible Req_{MTHy}= Max[$(3RR_{HRx})_{MTHy}$] + Max(MSSC, 3.5%*$E(PL_{MTHy})$) + ε

Where:

Max[$(3RR_{HRx})_{MTHy}$] = Largest 3-hour contiguous ramp starting in hour x for month y

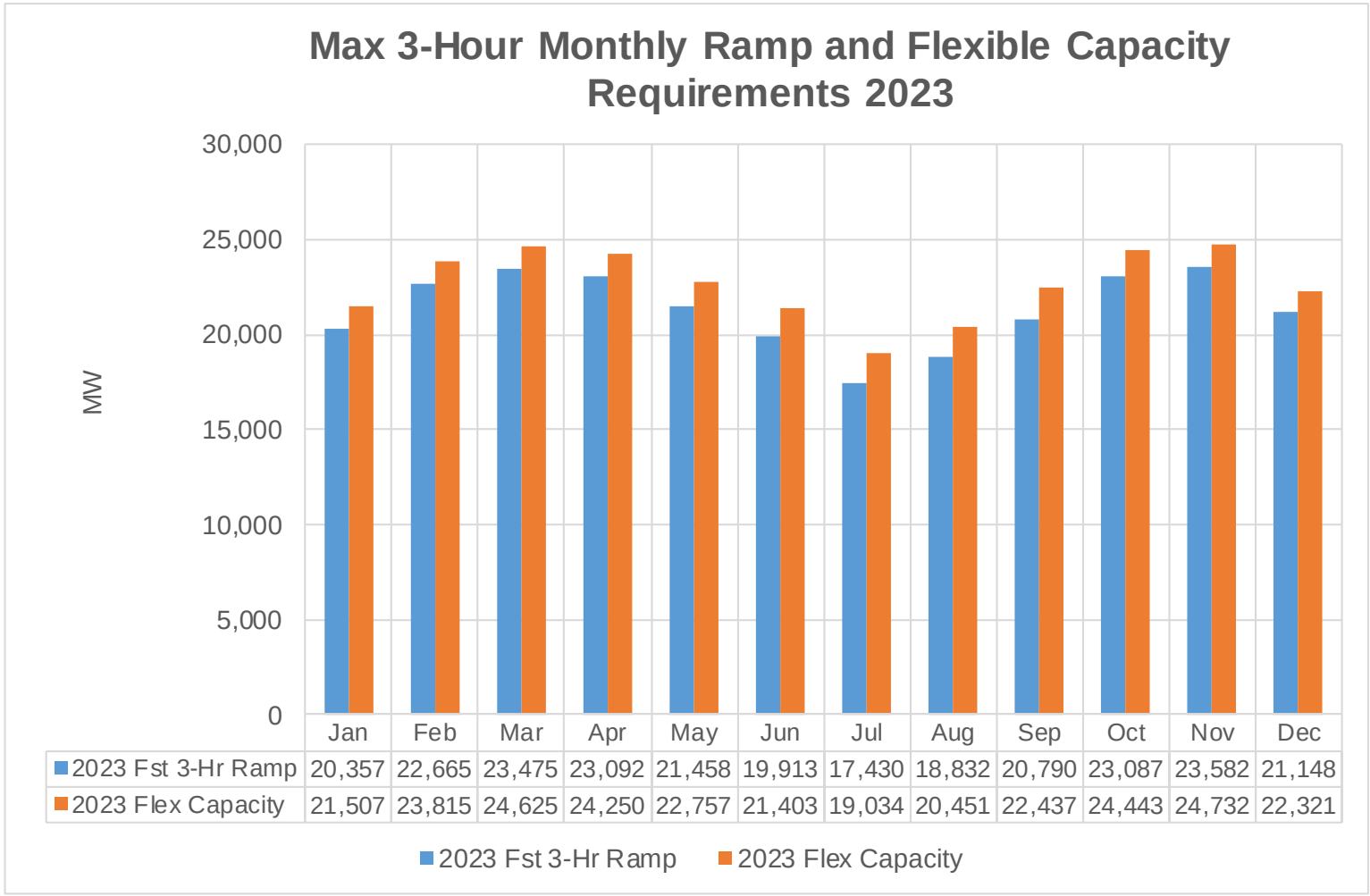
E(PL) = Expected peak load

MTH_y = Month $_y$

MSSC = Most Severe Single Contingency

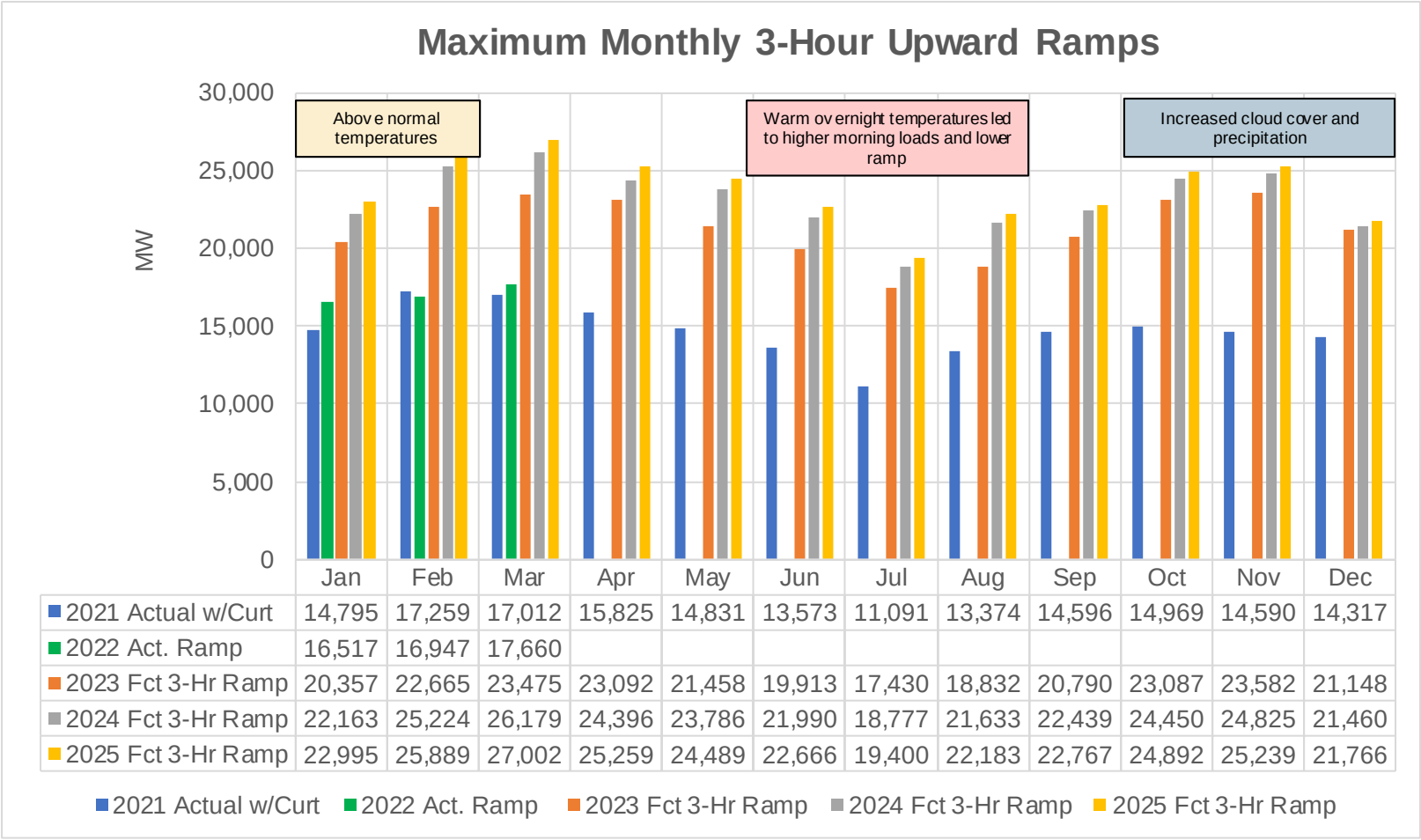
ε = Annually adjustable error term to account for load forecast errors and variability. ε is currently set at zero

Monthly 3-Hour upward ramps and total flexible capacity requirements for 2023



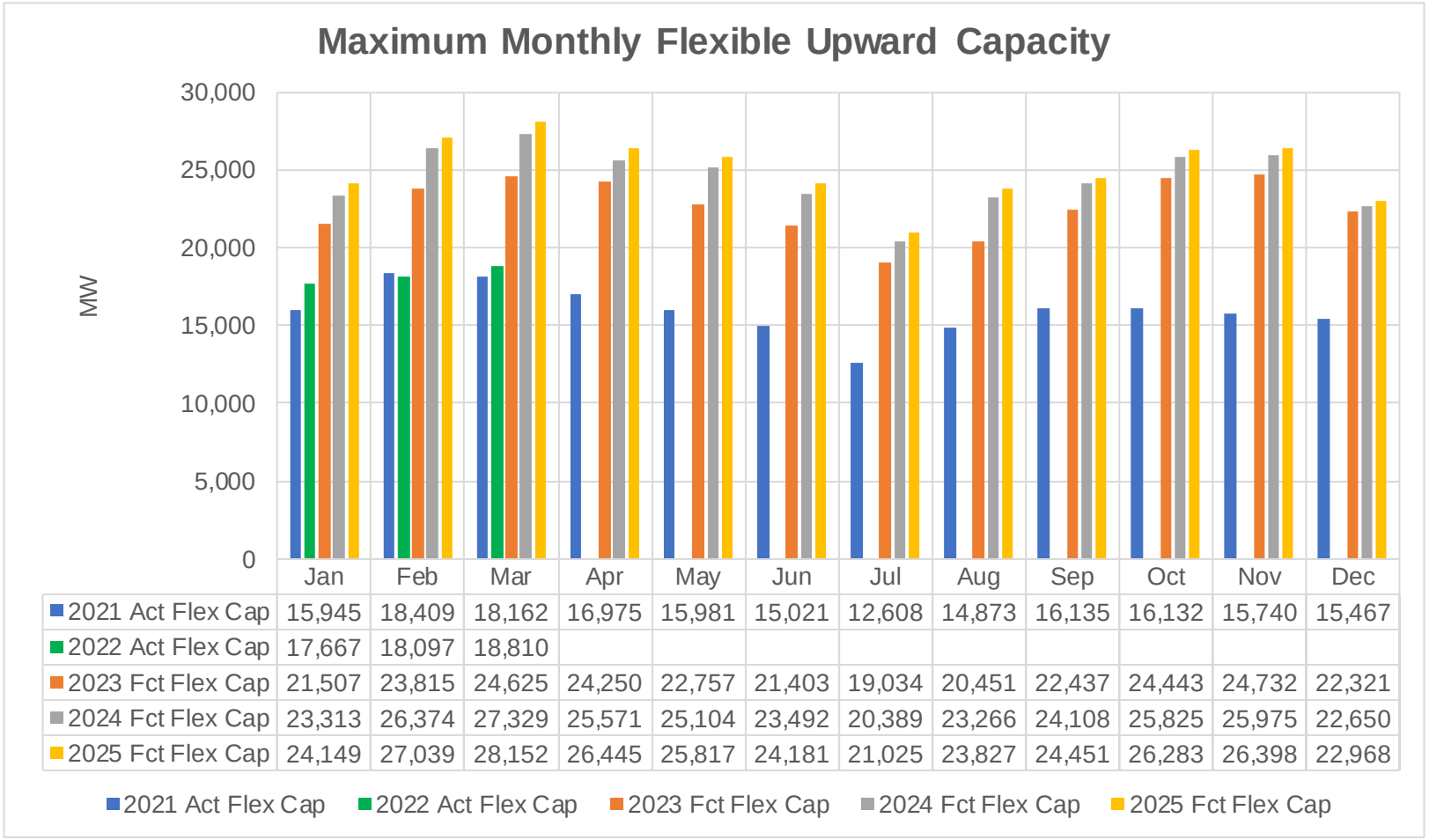
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023 Fst 3-Hr Ramp	20,357	22,665	23,475	23,092	21,458	19,913	17,430	18,832	20,790	23,087	23,582	21,148
2023 Flex Capacity	21,507	23,815	24,625	24,250	22,757	21,403	19,034	20,451	22,437	24,443	24,732	22,321

Expected maximum monthly 3-hour upward ramps vs. 2021 and 2022 actuals



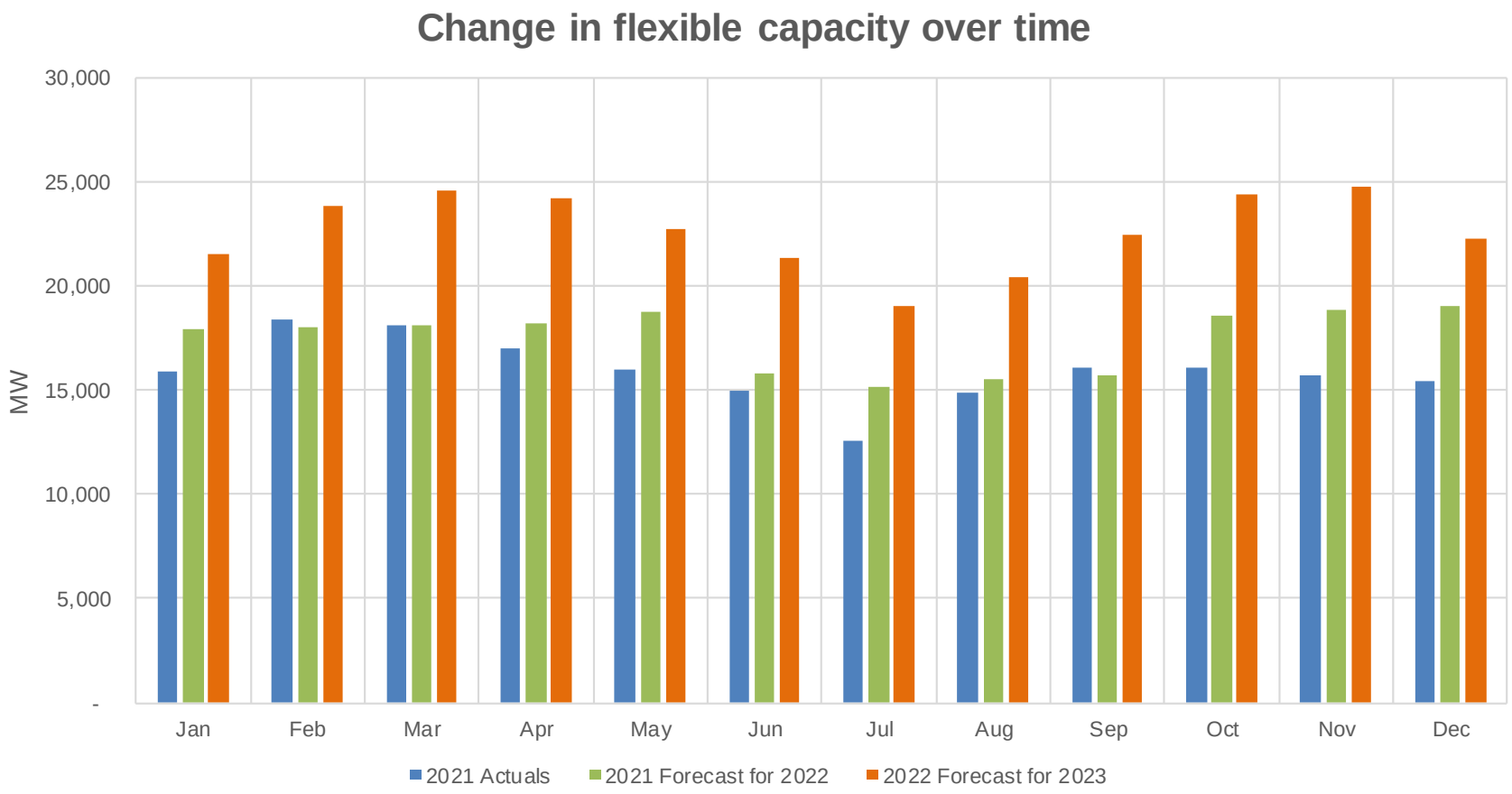
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021 Actual w/Curt	14,795	17,259	17,012	15,825	14,831	13,573	11,091	13,374	14,596	14,969	14,590	14,317
2022 Act. Ramp	16,517	16,947	17,660									
2023 Fct 3-Hr Ramp	20,357	22,665	23,475	23,092	21,458	19,913	17,430	18,832	20,790	23,087	23,582	21,148
2024 Fct 3-Hr Ramp	22,163	25,224	26,179	24,396	23,786	21,990	18,777	21,633	22,439	24,450	24,825	21,460
2025 Fct 3-Hr Ramp	22,995	25,889	27,002	25,259	24,489	22,666	19,400	22,183	22,767	24,892	25,239	21,766

Actual maximum monthly flexible capacity for 2021 and 2022 vs. forecast flexible capacity for 2023 through 2025

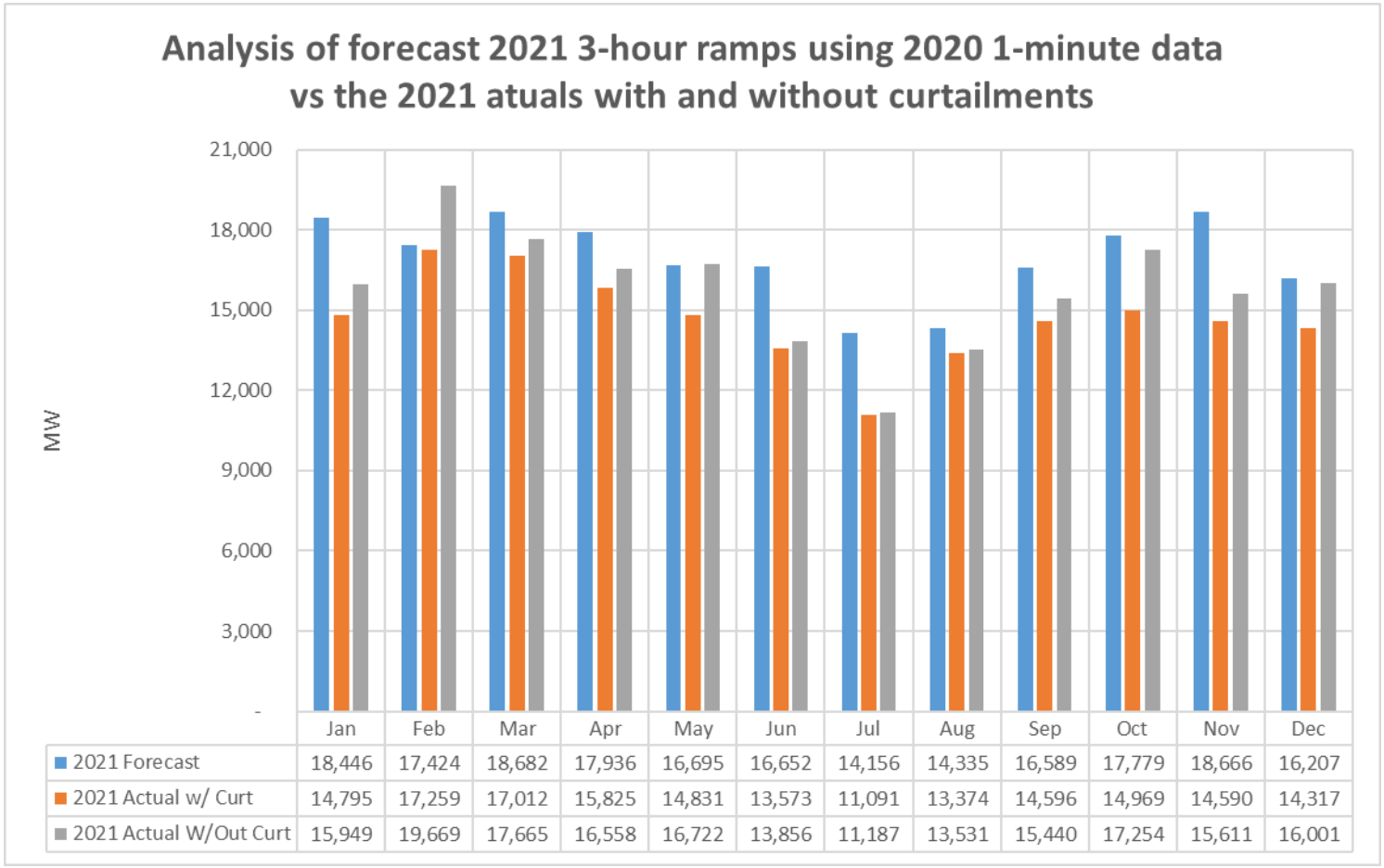


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021 Act Flex Cap	15,945	18,409	18,162	16,975	15,981	15,021	12,608	14,873	16,135	16,132	15,740	15,467
2022 Act Flex Cap	17,667	18,097	18,810									
2023 Fct Flex Cap	21,507	23,815	24,625	24,250	22,757	21,403	19,034	20,451	22,437	24,443	24,732	22,321
2024 Fct Flex Cap	23,313	26,374	27,329	25,571	25,104	23,492	20,389	23,266	24,108	25,825	25,975	22,650
2025 Fct Flex Cap	24,149	27,039	28,152	26,445	25,817	24,181	21,025	23,827	24,451	26,283	26,398	22,968

Change in flexible capacity

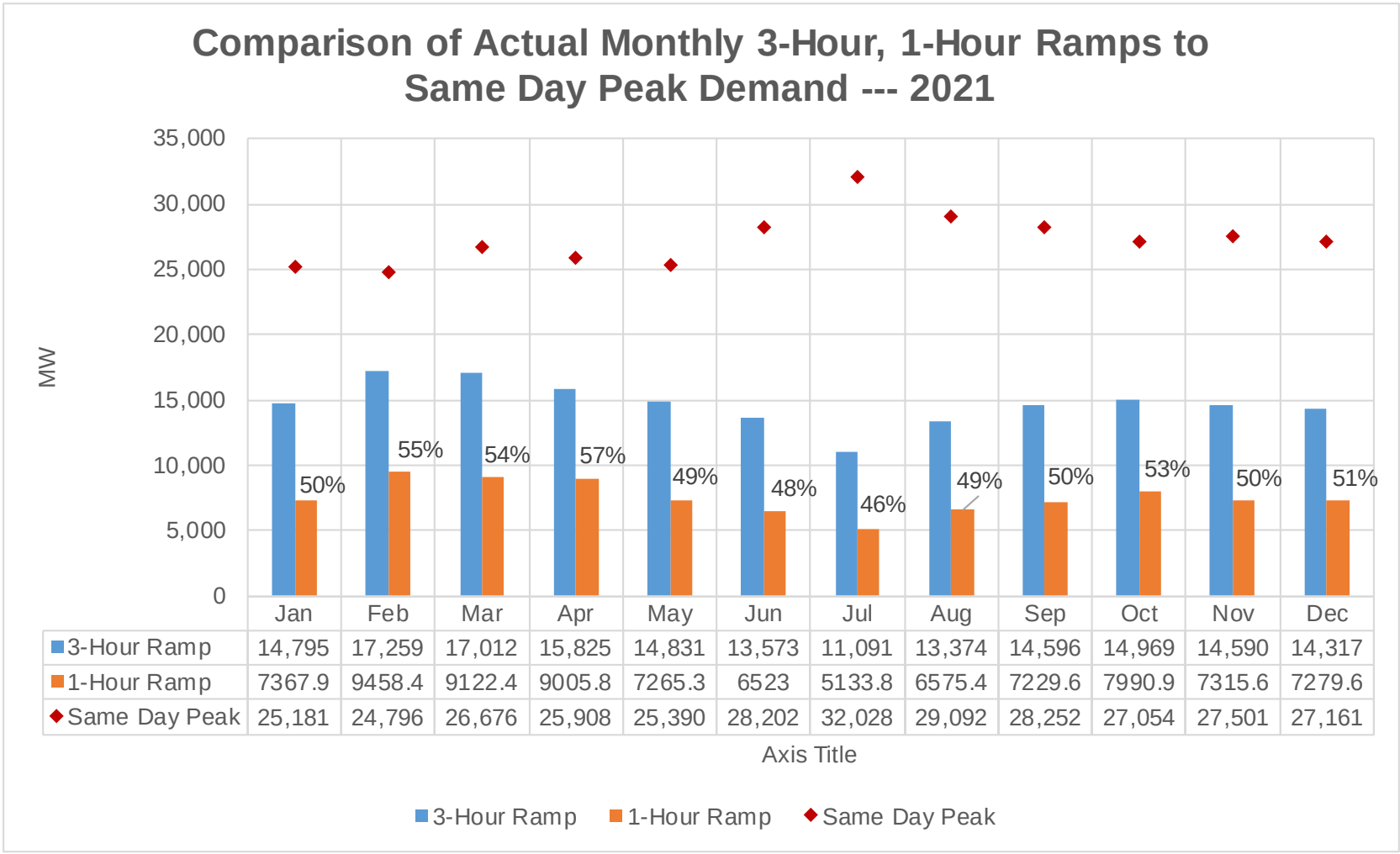


2020 forecast of 2021 3-hour ramps are higher than actual ramps with/without curtailments most months

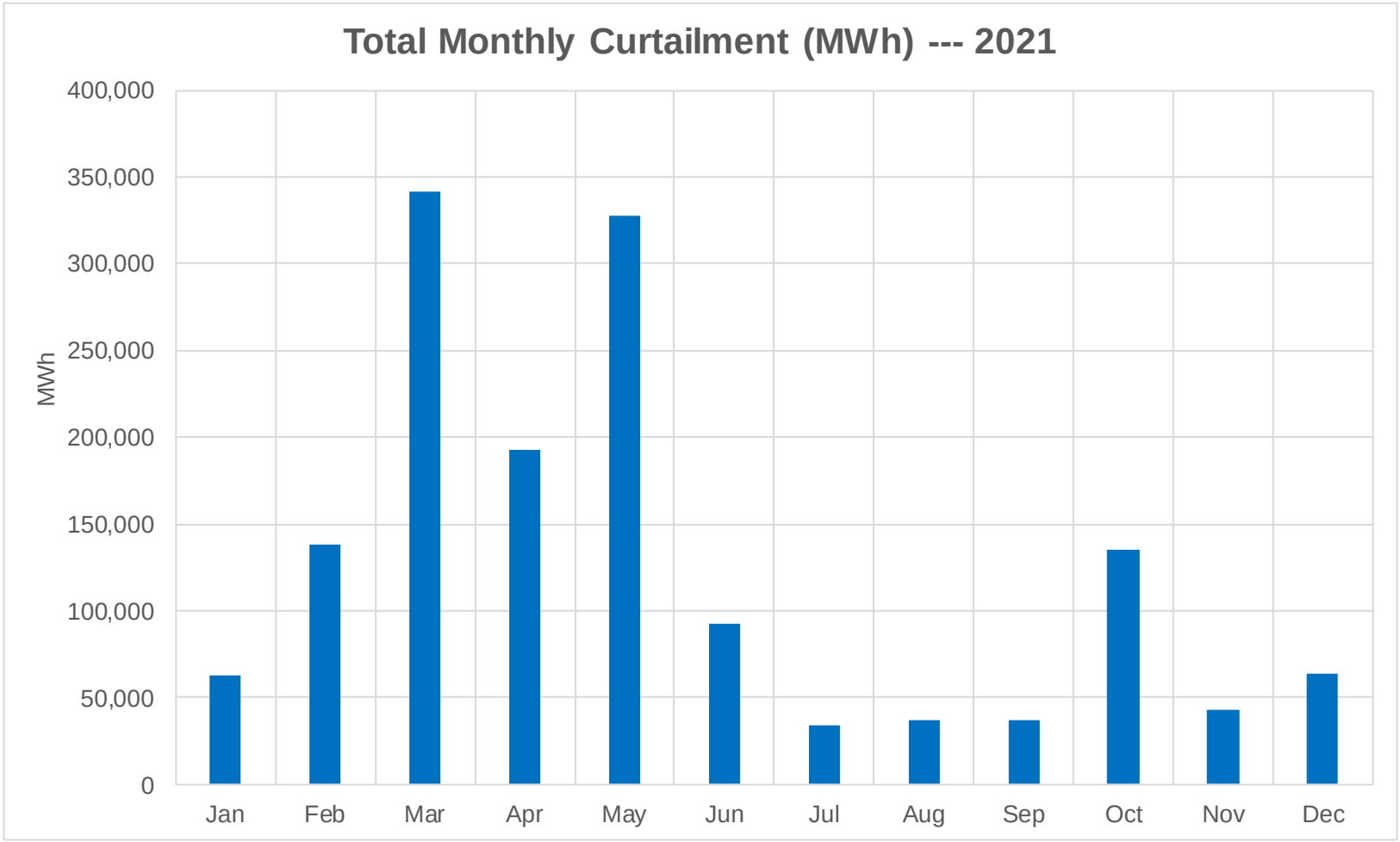


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021 Forecast	18,446	17,424	18,682	17,936	16,695	16,652	14,156	14,335	16,589	17,779	18,666	16,207
2021 Actual w/ Curt	14,795	17,259	17,012	15,825	14,831	13,573	11,091	13,374	14,596	14,969	14,590	14,317
2021 Actual W/Out Curt	15,949	19,669	17,665	16,558	16,722	13,856	11,187	13,531	15,440	17,254	15,611	16,001

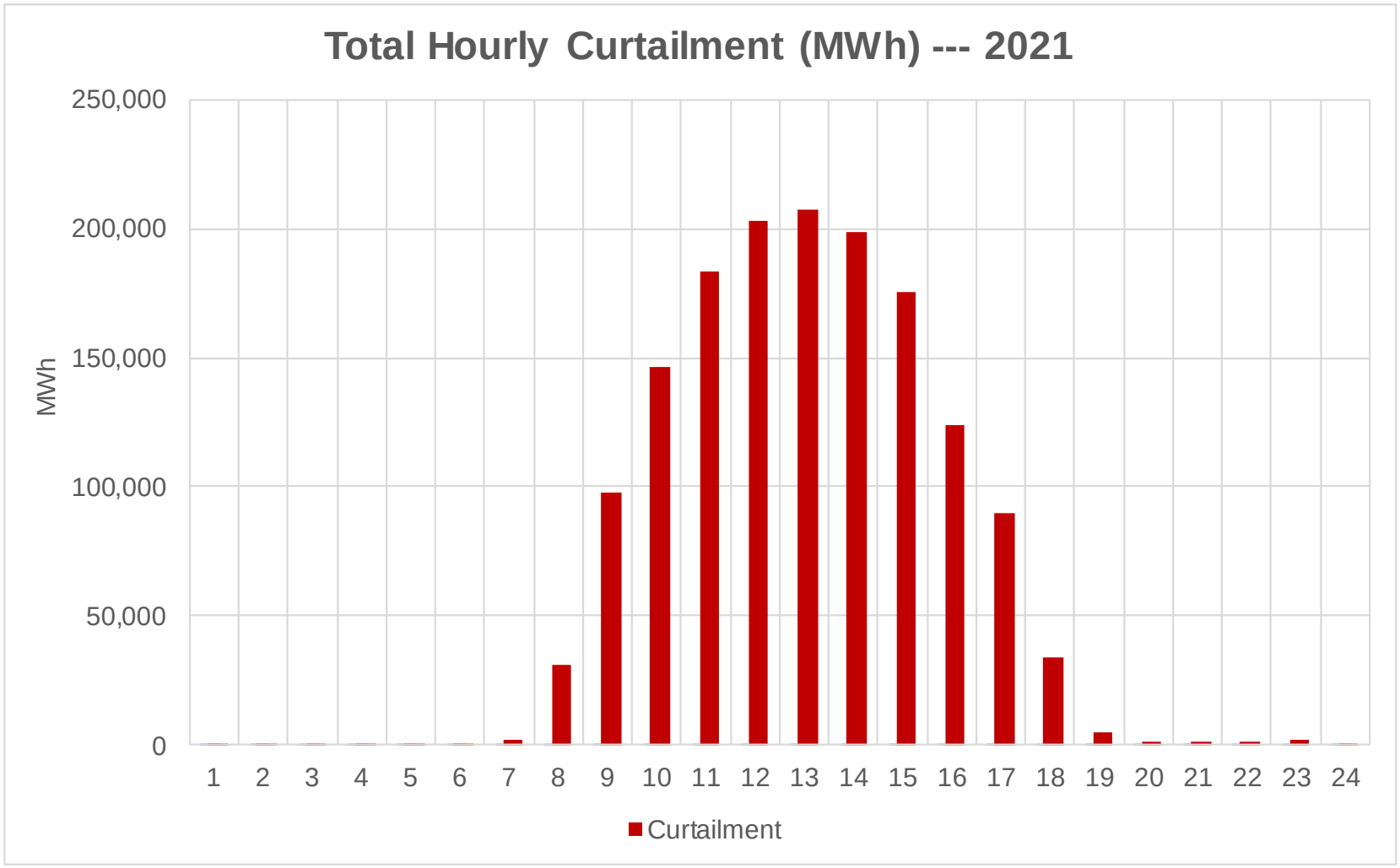
3-hour upward ramps can be more than 50% of the daily peak demand, indicating the need for faster ramping resources



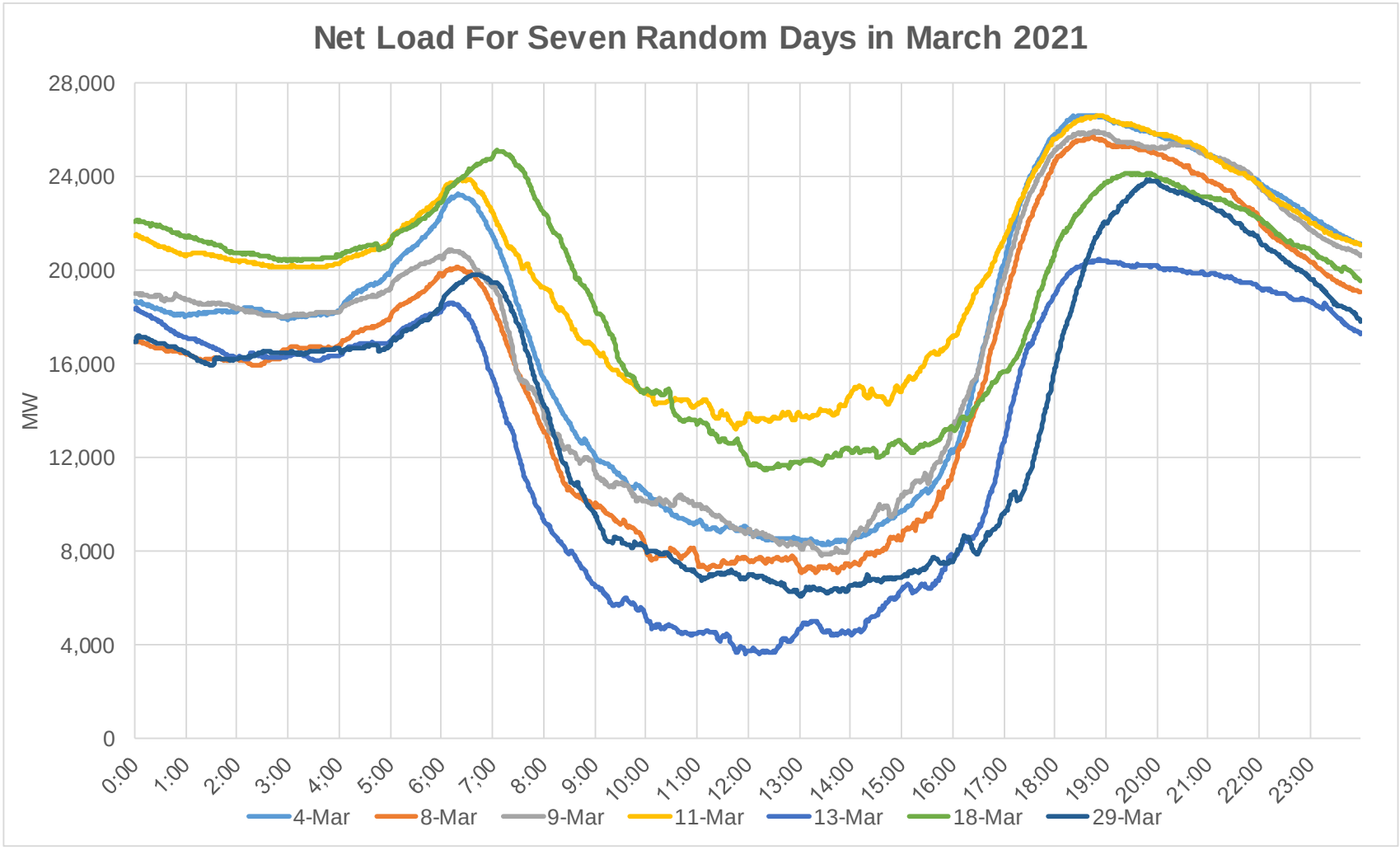
Total monthly wind/solar curtailment for 2021 (MWh)



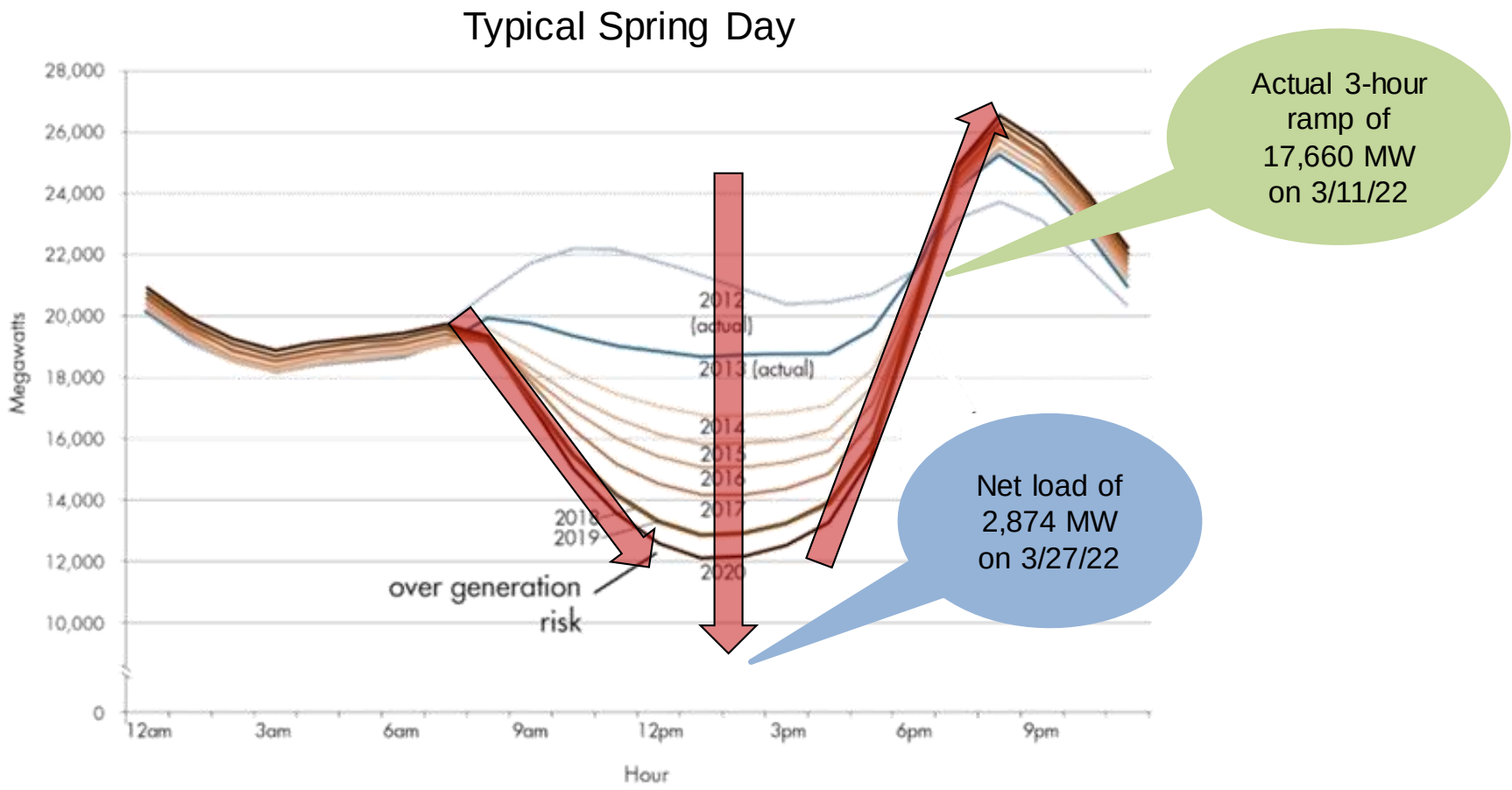
Total hourly curtailment for 2021 (MWh)



Example of net-load variability for one week in March 2021



The actual net load and 3-hour ramps are years ahead of the ISO's original estimate primarily due to under forecasting rooftop solar PV installation



California ISO

Preliminary Results

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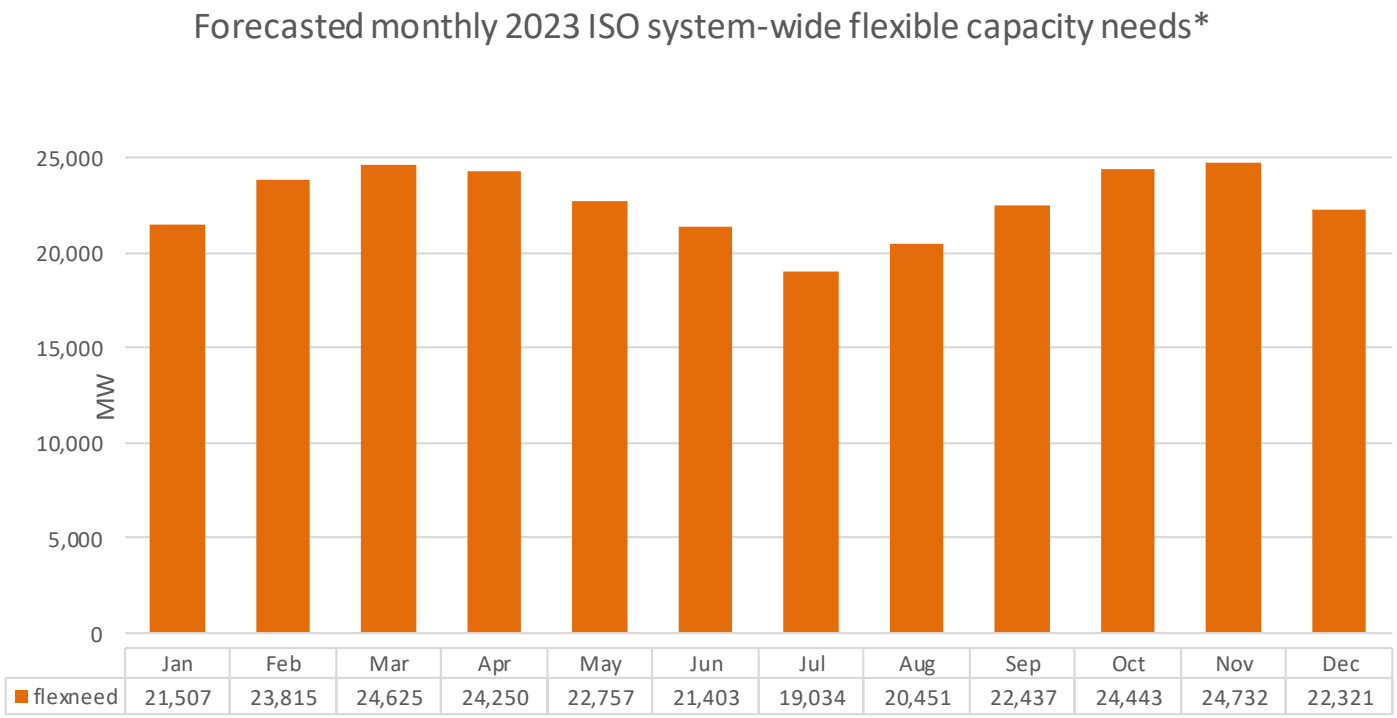
Forecasted monthly 2023 ISO system-wide flexible capacity needs*



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
flexneed	21,507	23,815	24,625	24,250	22,757	21,403	19,034	20,451	22,437	24,443	24,732	22,321

*Flexibility Requirement$_{MTHy}$= Max[(3RR$_{HRx}$)$_{MTHy}$] + Max(MSSC, 3.5%*E(PL$_{MTHy}$)) + ε

Components of the flexible capacity needs

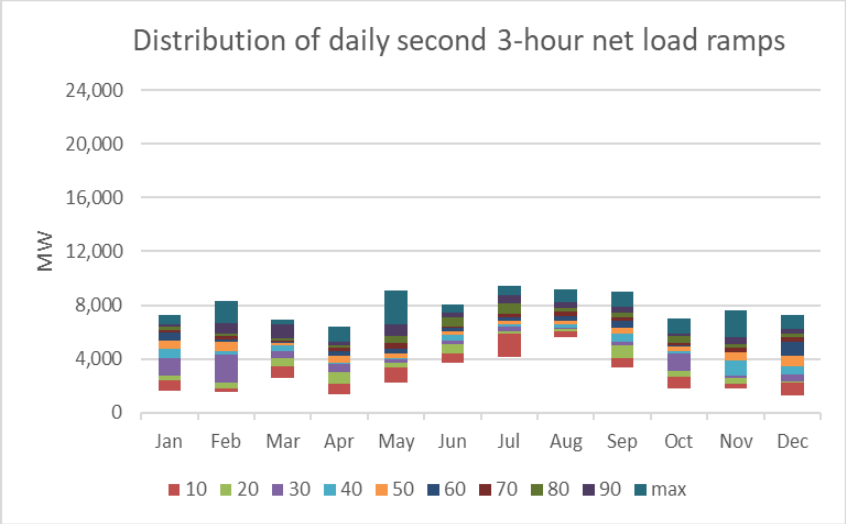
Month	Load contribution 2023	Wind contribution 2023	Solar contribution 2023	Total percent 2023
January	45.31%	-1.79%	-52.90%	100%
February	35.55%	-1.16%	-63.29%	100%
March	36.41%	-1.40%	-62.19%	100%
April	37.00%	-2.13%	-60.87%	100%
May	32.42%	-4.25%	-63.33%	100%
June	29.58%	-1.41%	-69.01%	100%
July	25.16%	3.01%	-77.85%	100%
August	29.41%	2.70%	-73.28%	100%
September	30.98%	-0.85%	-68.17%	100%
October	32.54%	-0.64%	-66.82%	100%
November	38.46%	-1.87%	-59.67%	100%
December	42.57%	-0.12%	-57.31%	100%

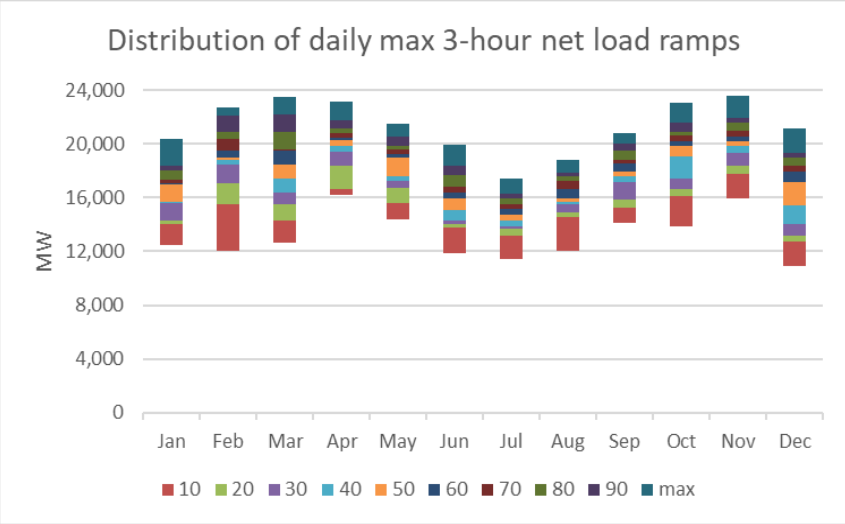
Δ Load $-\Delta$ Wind $-\Delta$ Solar = 100

Flexible capacity categories allow a wide variety of resources to provide flexible capacity

- Category 1 (Base Flexibility): Operational needs determined by the magnitude of the largest 3-hour secondary net load ramp
- Category 2 (Peak Flexibility): Operational need determined by the difference between 95 percent of the maximum 3-hour net load ramp and the largest 3-hour secondary net load ramp
- Category 3 (Super-Peak Flexibility): Operational need determined by five percent of the maximum 3-hour net load ramp of the month

The 2023 forecasted distribution range of daily maximum and secondary 3-hour net load ramps





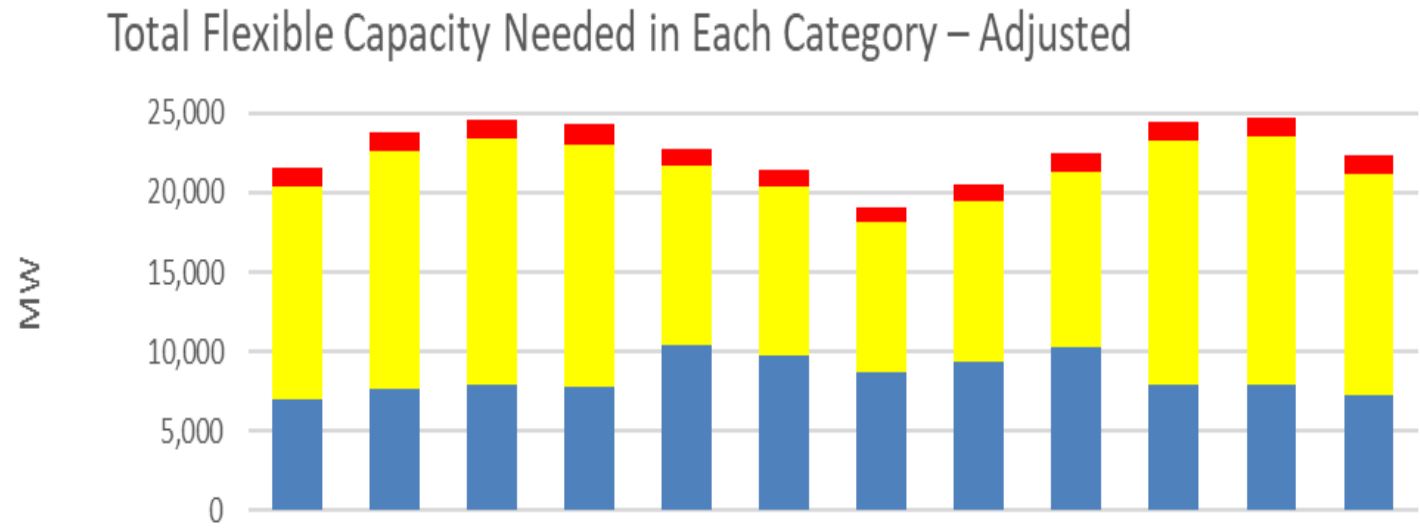
Seasonal breakout of flexible capacity needs

	Actual Contributions			Seasonal Contribution		
	Unadjusted			Adjusted		
Month	Base Flexibility	Peak Flexibility	Super-Peak Flexibility	Base Flexibility	Peak Flexibility	Super-Peak Flexibility
January	36%	59%	5%	32%	63%	5%
February	37%	58%	5%	32%	63%	5%
March	29%	66%	5%	32%	63%	5%
April	28%	67%	5%	32%	63%	5%
May	42%	53%	5%	46%	49%	5%
June	40%	55%	5%	46%	49%	5%
July	54%	41%	5%	46%	49%	5%
August	49%	46%	5%	46%	49%	5%
September	43%	52%	5%	46%	49%	5%
October	30%	65%	5%	32%	63%	5%
November	32%	63%	5%	32%	63%	5%
December	34%	61%	5%	32%	63%	5%

Increased weighting observed in Peak Category

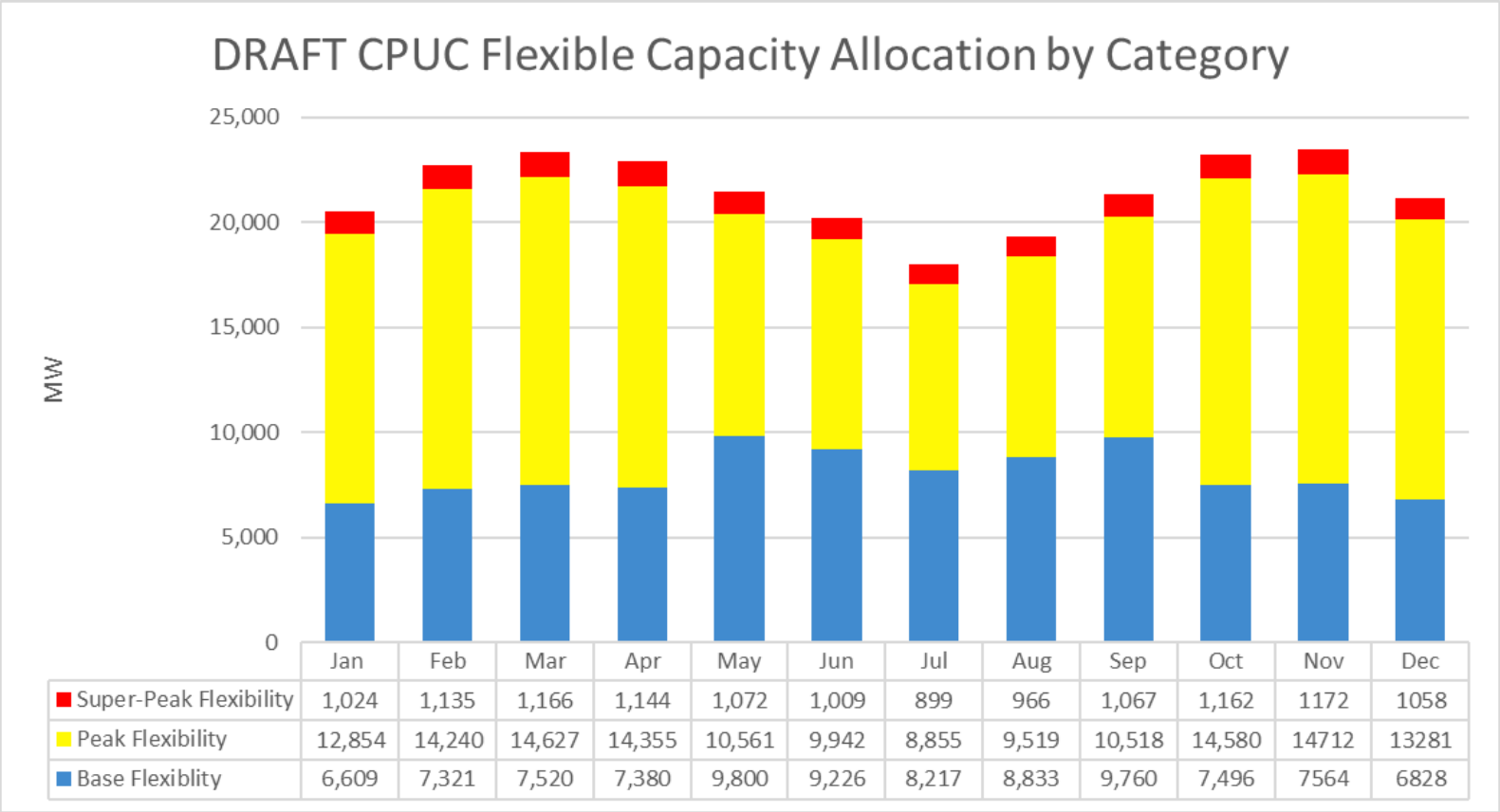
Month	2021	2022	2023
January	57.30%	55.06%	62.74%
February	57.30%	55.06%	62.74%
March	57.30%	55.06%	62.74%
April	57.30%	55.06%	62.74%
May	45.62%	45.39%	49.28%
June	45.62%	45.39%	49.28%
July	45.62%	45.39%	49.28%
August	45.62%	45.39%	49.28%
September	45.62%	45.39%	49.28%
October	57.30%	55.06%	62.74%
November	57.30%	55.06%	62.74%
December	57.30%	55.06%	62.74%

Total flexible capacity needed in each category – seasonally adjusted



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Super-Peak Flexibility	1,075	1,191	1,231	1,213	1,138	1,070	952	1,023	1,122	1,222	1,237	1,116
Peak Flexibility	13,494	14,942	15,450	15,215	11,214	10,546	9,379	10,078	11,056	15,336	15,517	14,005
Base Flexibility	6,938	7,682	7,944	7,823	10,405	9,786	8,703	9,351	10,259	7,885	7,978	7,201

CPUC jurisdictional flexible capacity allocation - by flexible capacity category



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Super-Peak Flexibility	1,024	1,135	1,166	1,144	1,072	1,009	899	966	1,067	1,162	1172	1058
Peak Flexibility	12,854	14,240	14,627	14,355	10,561	9,942	8,855	9,519	10,518	14,580	14712	13281
Base Flexiblity	6,609	7,321	7,520	7,380	9,800	9,226	8,217	8,833	9,760	7,496	7564	6828

Start time of 3-Hour net load ramp to evaluate seasonal must offer obligations

	Three Hour Net Load Ramp Start Hour (Hour Ending)					
Month	13:00	14:00	15:00	16:00	17:00	18:00
January			31			
February			17	11		
March			6	5	20	
April				1	29	
May					26	5
June			1	1	28	
July				3	28	
August	1			14	16	
September				28	2	
October			7	24		
November		4	22	4		
December		2	29			

Seasonal must-offer obligations for peak and super-peak flexible capacity

- Recommended Must-offer obligation hours in Hour Ending

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HE15-HE19	v	v									v	v
HE16-HE20									v	v		
HE17-HE21			v	v	v	v	v	v				

Review of preliminary assessment results

- Flexible Capacity need is largest in the off-peak months
  - Flexible capacity makes up a greater percentage of resource adequacy needs during the off-peak months
  - Increase almost exclusively caused by 3-hour ramp, not increase in peak load
- Peak category has heavier weight this year
- Growth of behind-the-meter solar PV and utility scale PV contributes to the larger flexible capacity requirements
- Using the ISO flexible capacity contribution calculation majority of 3-hour net load ramps are attributable to CPUC jurisdictional LSEs
- The Peak and Super-Peak MOO hours have not changed from the 2022 study (information below is in Hour Ending)
  - November through February: HE 15- HE 19 (2:00 p.m. to 7:00 p.m.)
  - March through August: HE 17 – HE 21 (4:00 p.m. to 9:00 p.m.)
  - September through October: HE 16- HE 20 (3:00 p.m. to 8:00 p.m.)

AVAILABILITY ASSESSMENT HOURS

Availability assessment hours: Background and purpose

- Concept originally developed as part of the ISO standard capacity product (SCP)
  - Maintained as part of Reliability Service Initiative – Phase 1 (i.e. RA Availability Incentive Mechanism, or RAAIM)
- Determine the hours of greatest need to maximize the effectiveness of the availability incentive structure
  - Resources are rewarded for availability during hours of greatest need
  - Hours determined annually by ISO and published in the BPM
    - See section 40.9 of the ISO Tariff

Methodology overview of system/local availability assessment hours

- Used CEC IEPR data described in previous slides to obtain:
  - Hourly Average Load
    - By Hour
    - By Month
    - Years 2021-2025
- Calculated:
  - Top 5% of Load Hours within each month using an hourly load distribution
  - Years 2023 - 2025

Proposed Change to AAH Seasons

Previous years

Month	Season
Jan	winter
Feb	winter
Mar	winter
Apr	summer
May	summer
Jun	summer
Jul	summer
Aug	summer
Sep	summer
Oct	summer
Nov	winter
Dec	winter

2023-2025

Month	Season
Jan	winter
Feb	winter
Mar	spring
Apr	spring
May	summer
Jun	summer
Jul	summer
Aug	summer
Sep	summer
Oct	summer
Nov	winter
Dec	winter

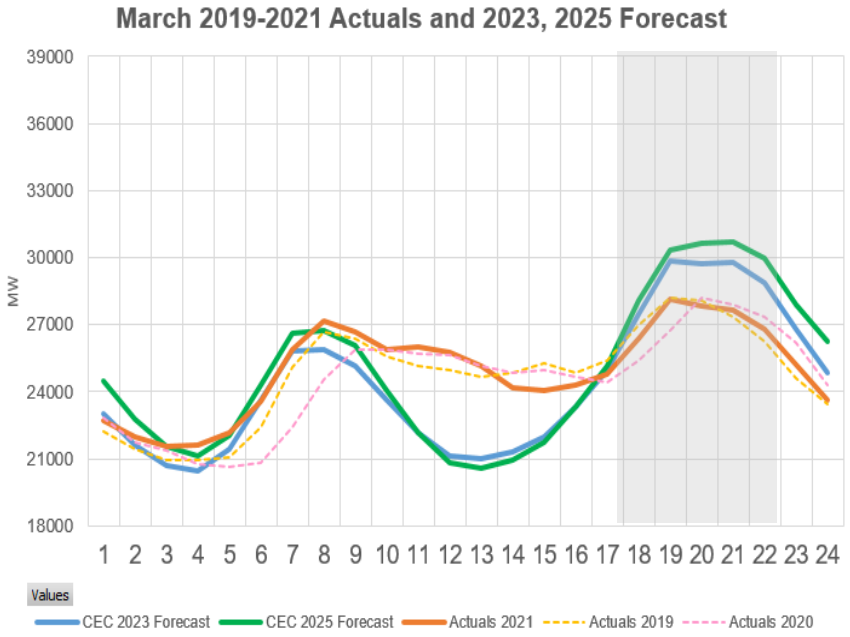
Forecast and actual data supports change in top 5% of load hours for March and April

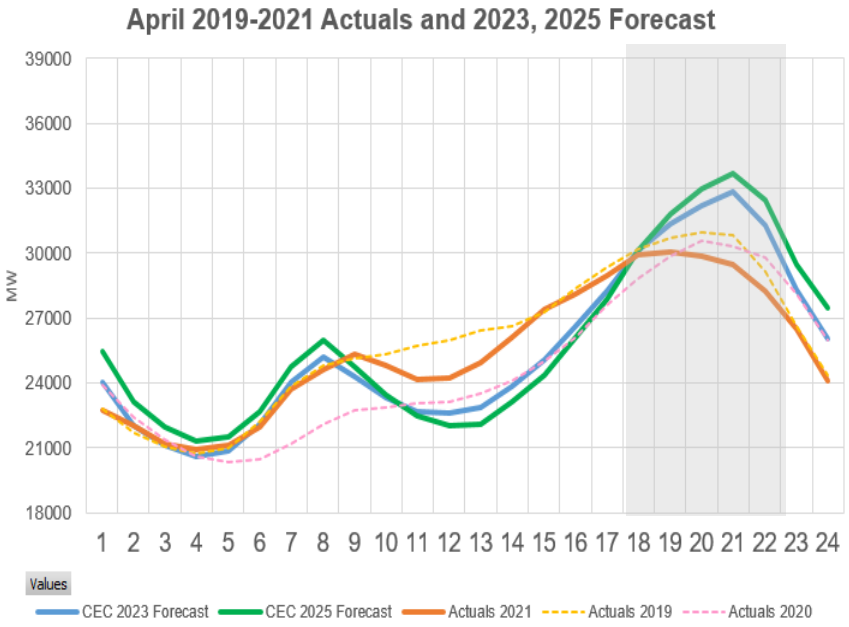
- CEC Forecast for 2023-2025 and load actuals from 2019-2021 show for March and April the top load hours have shifted to HE 18-22
  - Historically these months had HE 17-21 as their AAH
- CAISO proposes addition of Spring season to better align with actual and forecast data, which are consistent in their trends

Number of times each hour was in the top 5%of load hours for each month – 2021 Actual

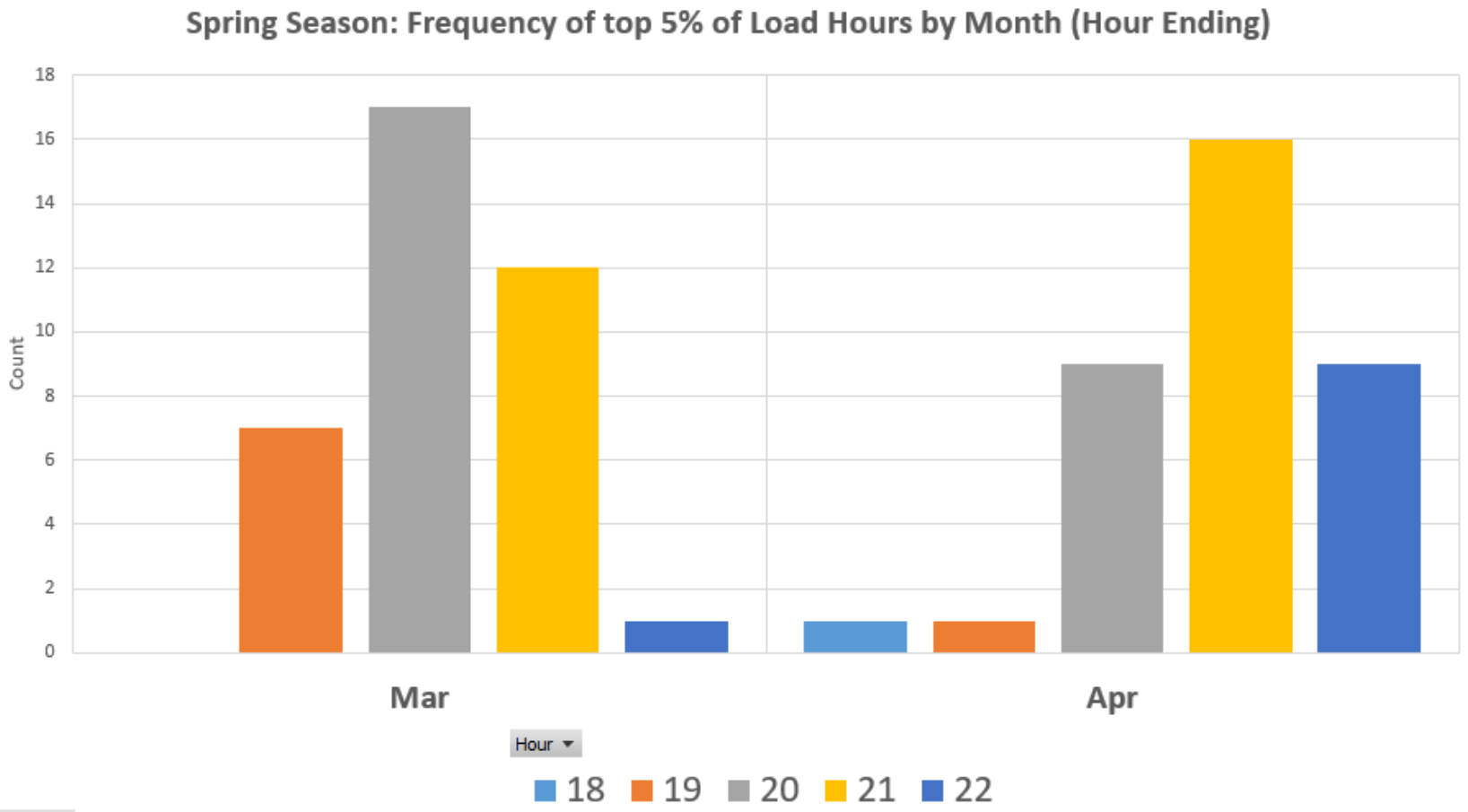
	Row Labels	8	9	14	15	16	17	18	19	20	21	22	23
MONTH	Jan	1						10	***17***	7	2		
	Feb							2	***19***	12			
	Mar	2	2						11	***14***	7	1	
	Apr				1	1	2	3	4	8	***13***	3	1
	May						2	5	9	9	***11***	1	
	Jun				2	3	6	7	***8***	5	4	1	
	Jul				1	3	8	***10***	9	6			
	Aug				1	4	7	***11***	9	5			
	Sep				2	6	7	***8***	***8***	3	2		
	Oct			1	1	5	5	6	***7***	***7***	5		
	Nov				1	1	3	13	***15***	3			
	Dec						1	***14***	13	6	3		
	Grand Total	**3**	**2**	**1**	**9**	**23**	**41**	**89**	**129**	**85**	**47**	**6**	**1**

CEC forecast and previous 3 years of actuals indicate a shift in top load hours for March and April

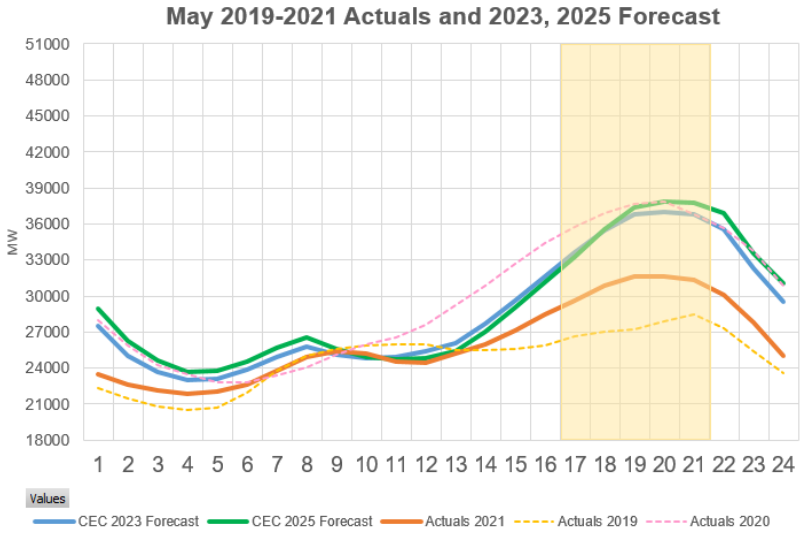


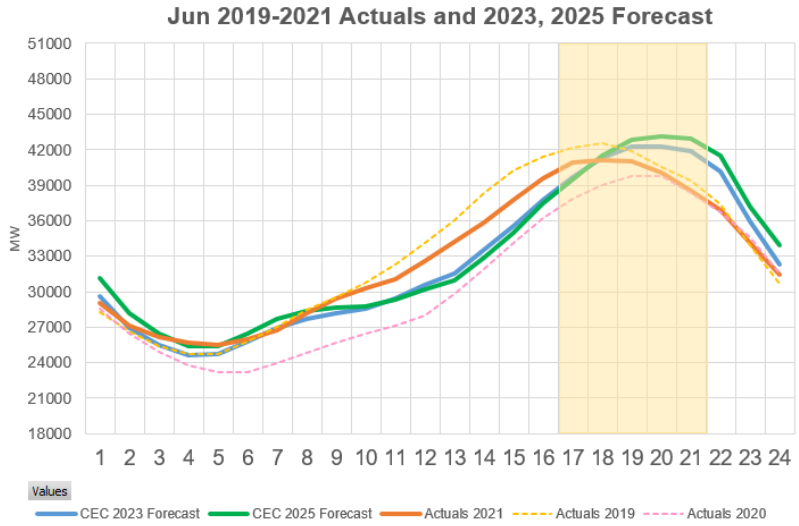


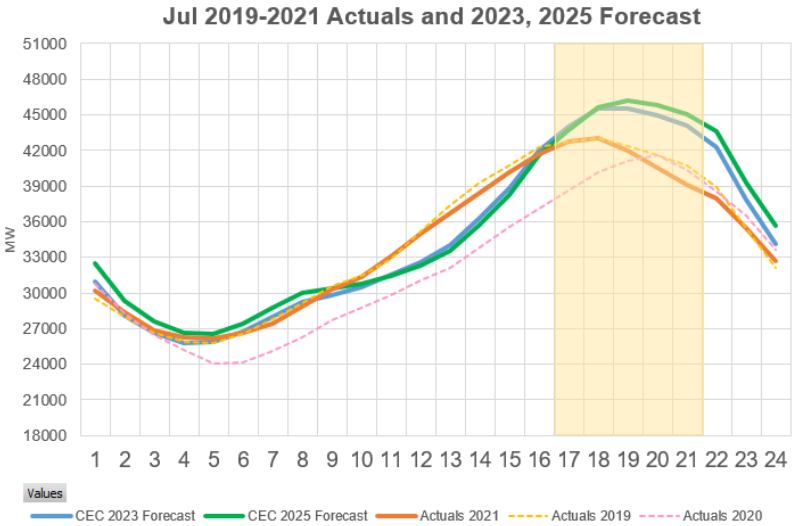
Spring Season
2023 top 5% of load hours (HE)



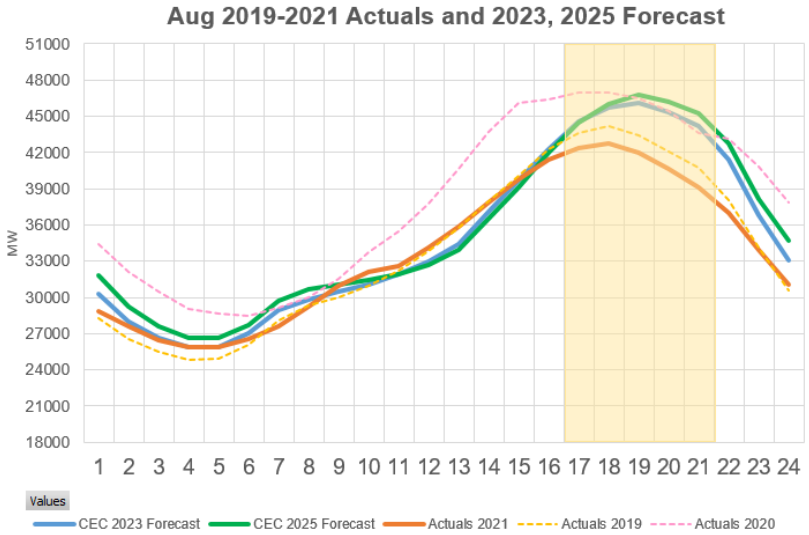
Expected load shape evolution: Summer season

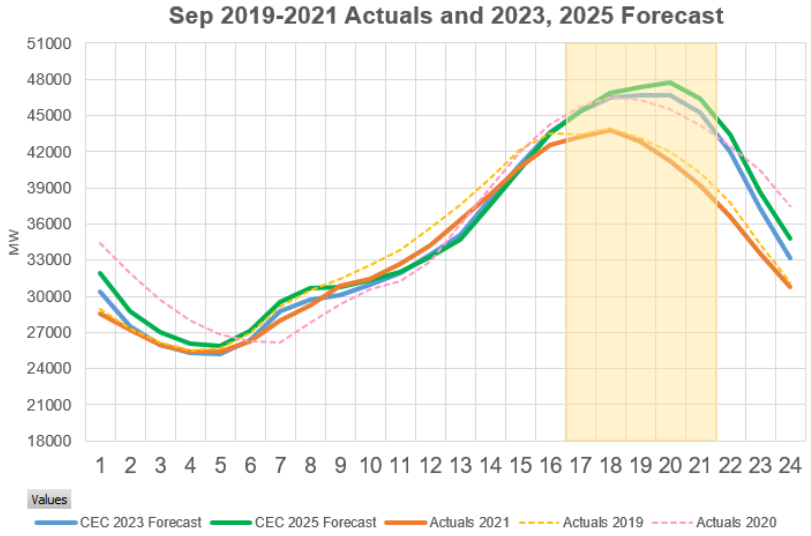


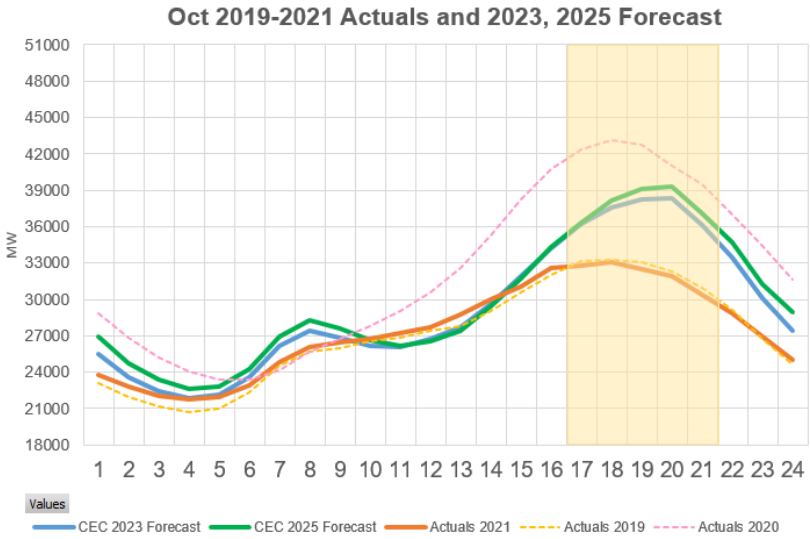




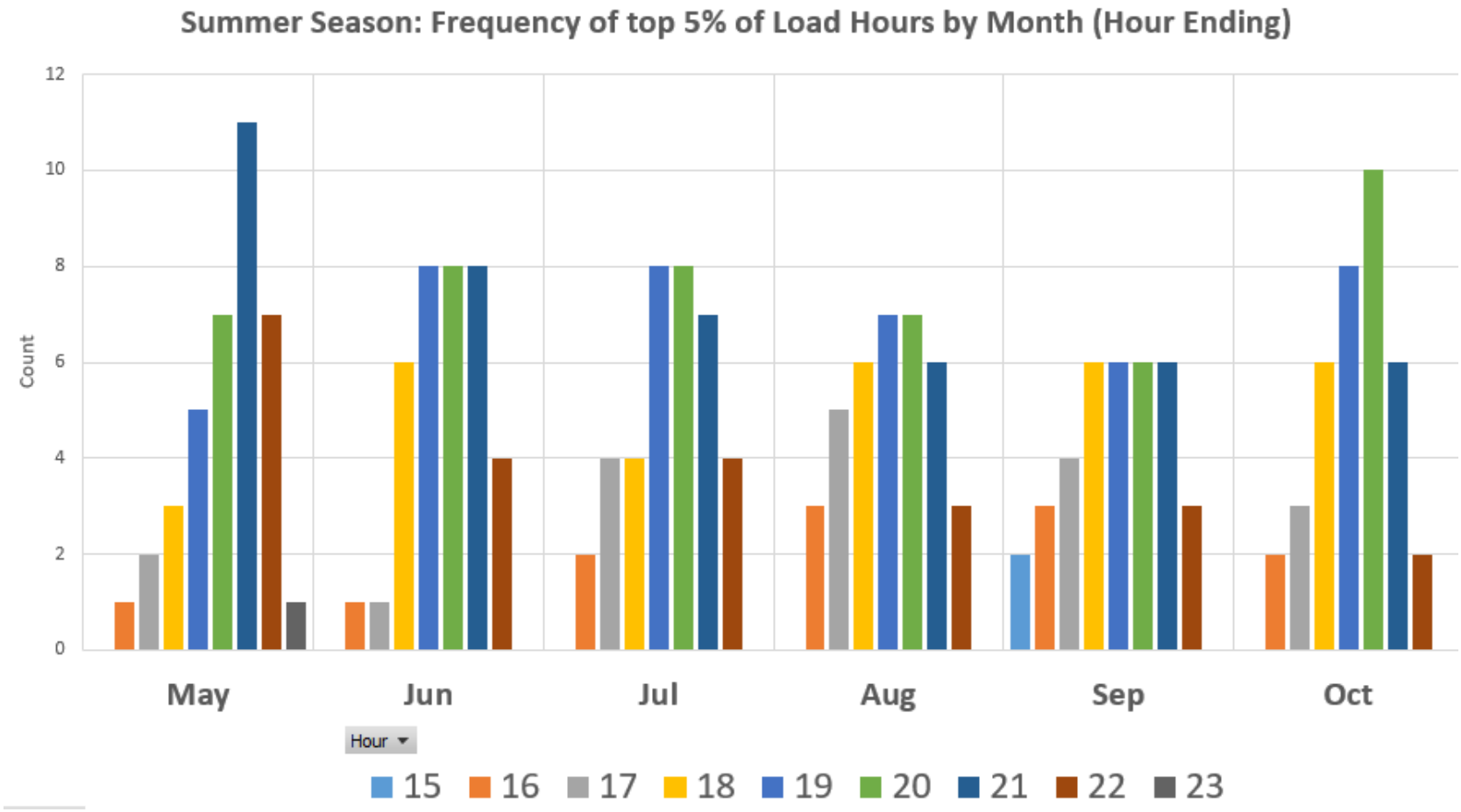
Expected load shape evolution: Summer season



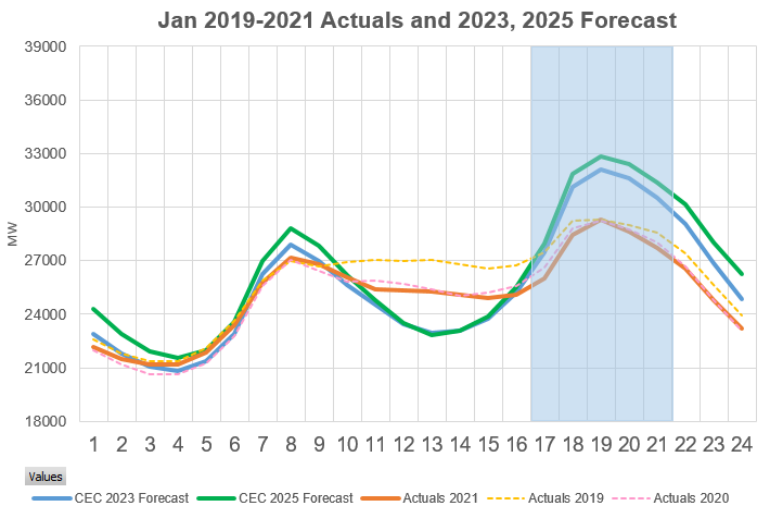


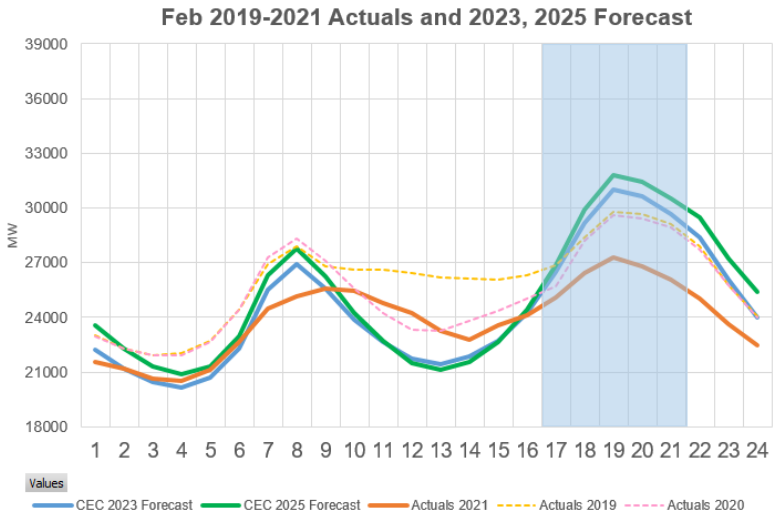


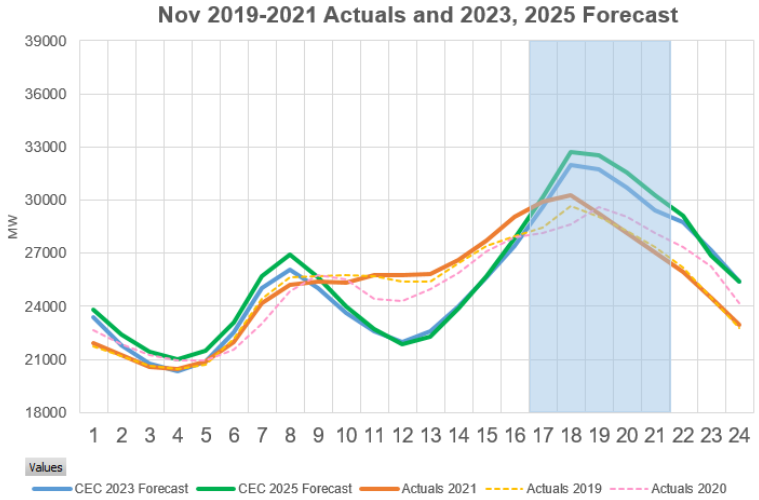
Summer Season
2023 top 5% of load hours (in HE)

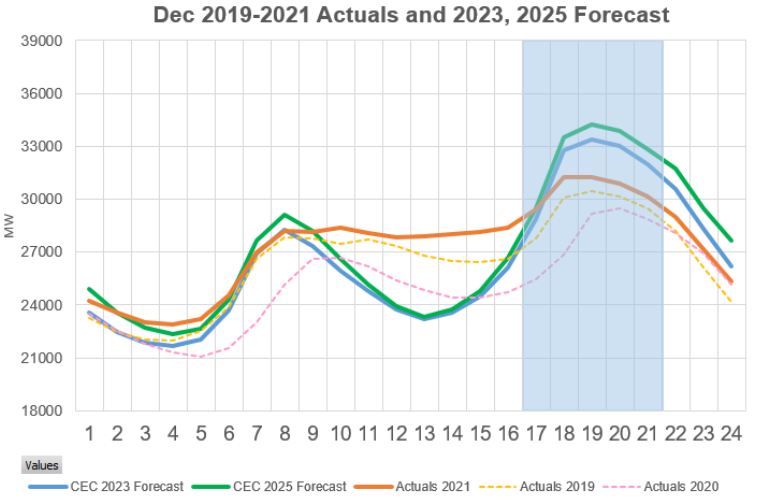


Expected load shape evolution: Winter season

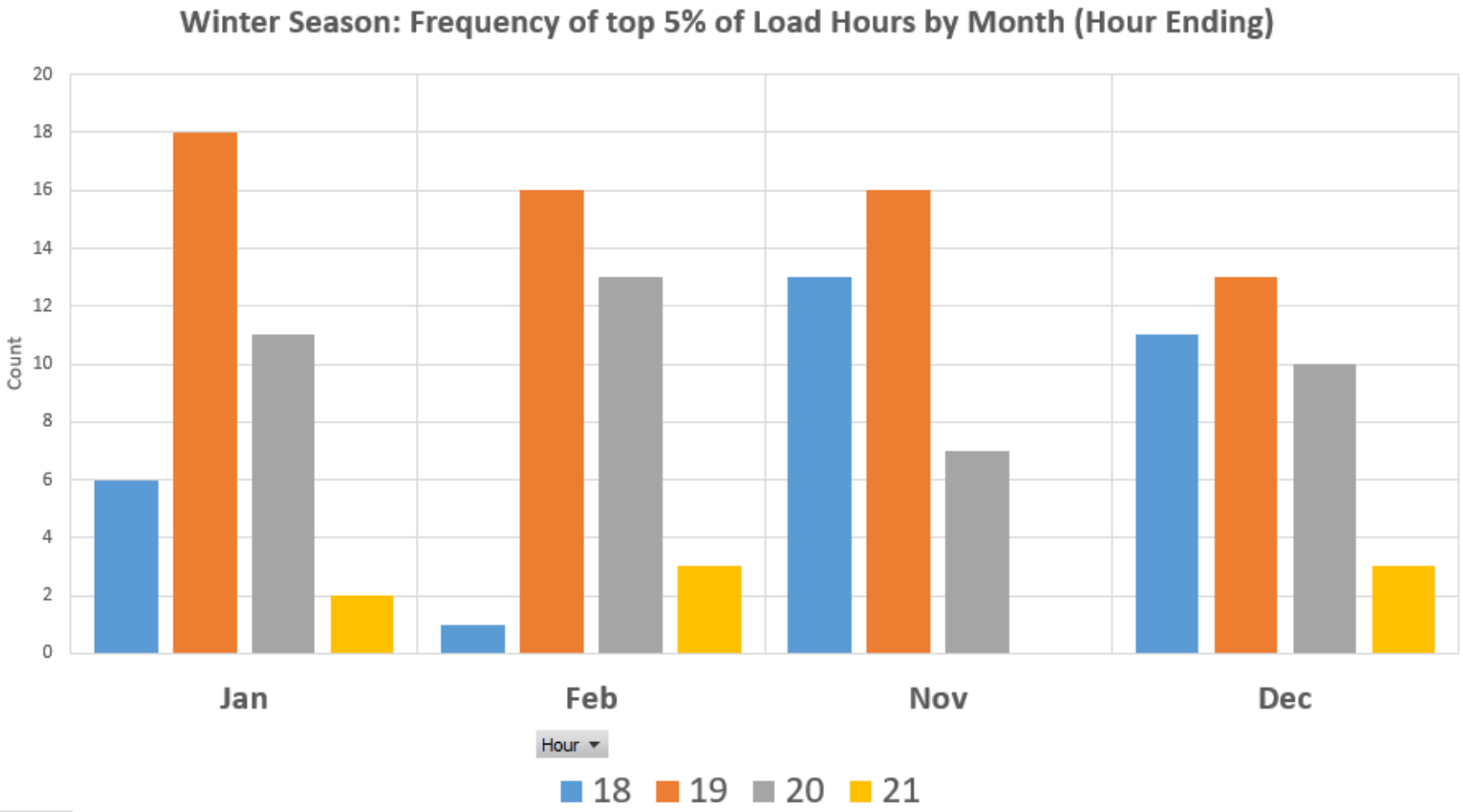








Winter Season
2023 top 5% of load hours (HE)



Availability assessment hours draft recommendation

Winter and Summer Season Draft Recommendation

Jan-Feb, Nov-Dec; May-Oct

Year	Start	End
2022 (Final)	HE 17	HE 21
2023 (Draft)	HE 17	HE 21
2024 (Estimate)*	HE 17	HE 21
2025 (Estimate)*	HE 17	HE 21

* Monitoring May for potential shift to Spring season for 2024-2025

Spring Season Draft Recommendation

Mar-Apr

Year	Start	End
2022 (Final)	HE 17	HE 21
2023 (Draft)	HE 18	HE 22
2024 (Estimate)	HE 18	HE 22
2025 (Estimate)	HE 18	HE 22

Reliability Requirements; Section 7 – BPM Updates Needed

2023 System and Local Resource Adequacy Availability Assessment Hours
Analysis employed: Top 5% of load hours using average hourly load

Spring: March 1 – April 30
Availability Assessment Hours: 5pm – 10pm (HE18 – HE22)

Summer: May 1 - October 31
Availability Assessment Hours: 4pm – 9pm (HE17 – HE21)

Winter: November 1 - February 28
Availability Assessment Hours: 4pm – 9pm (HE17 – HE21)

2023 Flexible Resource Adequacy Availability Assessment Hours and must offer obligation hours

Flexible RA Capacity Type	Category Designation	Required Bidding Hours	Required Bidding Days
January – February November – December			
Base Ramping	Category 1	5:00am to 10:00pm (HE6-HE22)	All days
Peak Ramping	Category 2	2:00pm to 7:00pm (HE15-HE19)	All days
Super-Peak Ramping	Category 3	2:00pm to 7:00pm (HE15-HE19)	Non-Holiday Weekdays*
March – August			
Base Ramping	Category 1	5:00am to 10:00pm (HE6-HE22)	All days
Peak Ramping	Category 2	4:00pm to 9:00pm (HE17-HE21)	All days
Super-Peak Ramping	Category 3	4:00pm to 9:00pm (HE17-HE21)	Non-Holiday Weekdays*
September – October			
Base Ramping	Category 1	5:00am to 10:00pm (HE6-HE22)	All days
Peak Ramping	Category 2	3:00pm to 8:00pm (HE16-HE20)	All days
Super-Peak Ramping	Category 3	3:00pm to 8:00pm (HE16-HE20)	Non-Holiday Weekdays*

Next steps

- Published Draft Flexible Capacity Needs Assessment for 2023 on April 12, 2022

  Comments due April 28, 2022

  Please submit comments to

  initiativecomments@caiso.com

- Publish Final Flexible Capacity Needs Assessment for 2023

  May 17th, 2022

Questions

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