



2022 & 2026 Final LCR Study Results for LA Basin and San Diego-Imperial Valley Areas

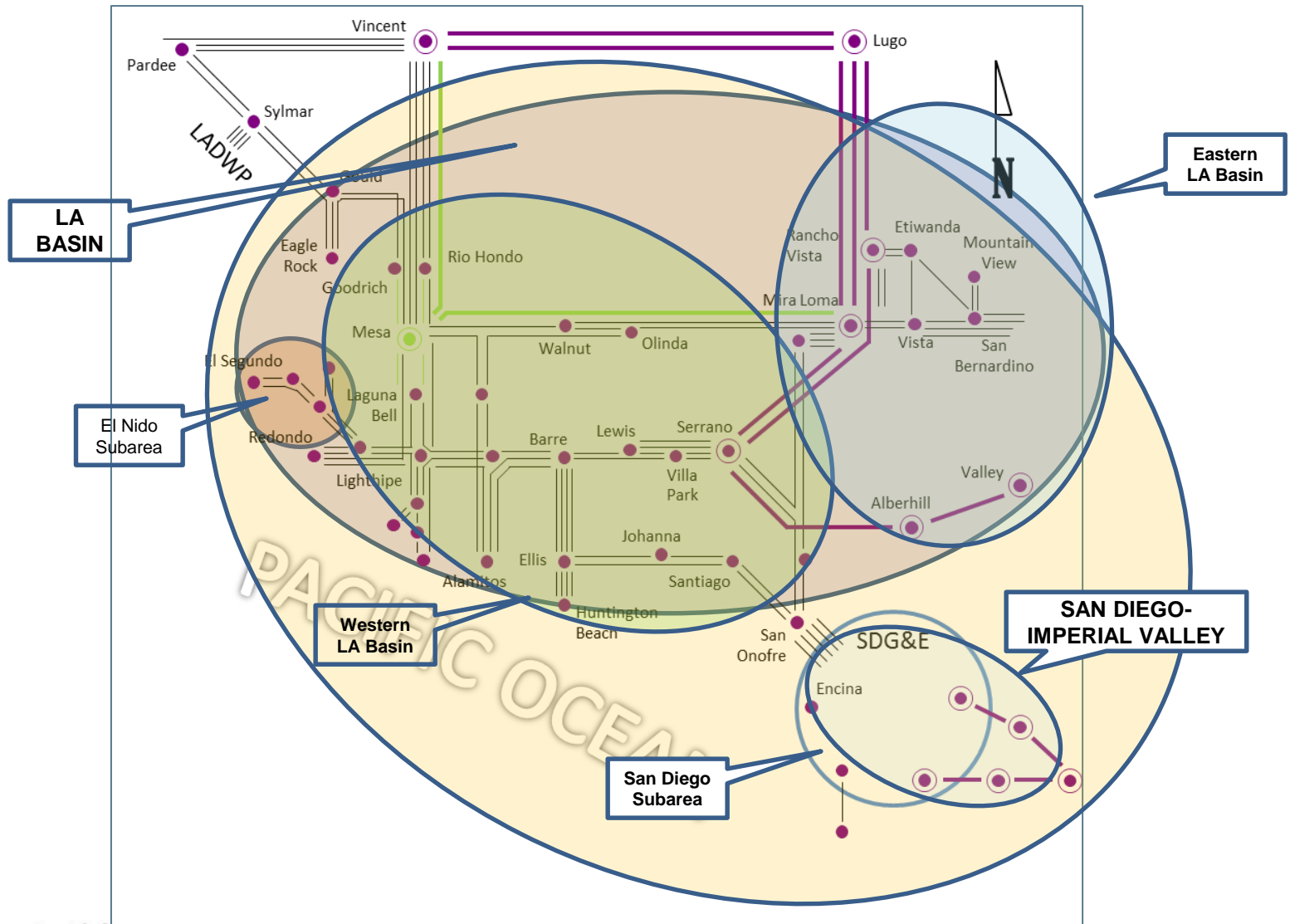
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Stakeholder Call
April 7, 2021

Overview of the Final Results

- Providing final study results for the LA Basin and San Diego-Imperial Valley LCR areas and their bulk sub-areas
- Providing load shapes and estimated charging capability for energy storage for the LCR areas and sub-areas

LA Basin and San Diego-Imperial Valley Areas



Major New Transmission and Resource Assumptions

Project Name	Service Areas	Expected ISD	Modeled in 2022 LCR case	Modeled in 2026 LCR case
New Transmission Projects				
Mesa Loop-In Project (230kV Loop-In)	SCE	6/1/2021	√	√
Mesa Loop-In Project (500kV Loop-In)	SCE	3/2022	√	√
Imperial Valley – El Centro 230 kV (“S” line) upgrades	IID / SDG&E	Q3 2023		√
South Orange County Reliability Enhancement	SDG&E	2023		√
New Resource Projects				
Alamitos Repowering Project	SCE	2/7/2020	√	√
Huntington Beach Repowering Project	SCE	2/4/2020	√	√
Stanton Energy Reliability Center	SCE	6/1/2020	√	√
Alamitos 100 MW Battery Energy Storage System	SCE	1/2021	√	√
Local Capacity Area Preferred Resources in western LA Basin (EE, DR, BTM BESS)	SCE	6/1/2021	√	√
Q1170 250 MW (1-hr.) or 62.5 MW (4-hr.) Battery Energy Storage	SDG&E	8/1/2021	√	√
Additional energy storage projects (total of 389 MW/615 MWh)	SDG&E	12/31/2024		√

LA Basin Area: Loads and Resources

Loads (MW)	2022	2026	Resources NQC* (MW)	2022	2026
Gross Load	20233	21380	Market, Net Seller, Wind, IFM Battery	7169	5789
AAEE	-158	-382	Muni	1039	1038
Behind the meter DG (production)	-1450	-2159	QF	121	121
Net Load	18625	18839	LTPP LCR Preferred Resources (BTM BESS, EE, DR, PV)	183	183
Transmission Losses	284	287	Existing Demand Response	251	251
Pumps	20	20	Solar generation	11	11
Loads + Losses + Pumps	18929	19146	Total Qualifying Capacity	8774	7393

*August NQC for RA accounting purpose

San Diego-Imperial Valley Area: Loads and Resources

Loads (MW)	2022	2026	Resources NQC* (MW)	2022	2026
Gross Load	4514	4642	Market, Net Seller, Battery, Wind	3978	4669
AAEE	-28	-66	Solar (Production is "0" at 20:00 hr. PDT)	369	391
Behind-the-meter DG	0	0	QF	8	8
Net Load	4486	4576	Muni	0	0
Transmission Losses	94	131	LTPP Preferred Resources	0	0
Pumps	0	0	Existing Demand Response	7	7
			Mothballed	0	0
Loads + Losses	4580	4707	Total Qualifying Capacity	4362	5075

*August NQC for RA accounting purpose

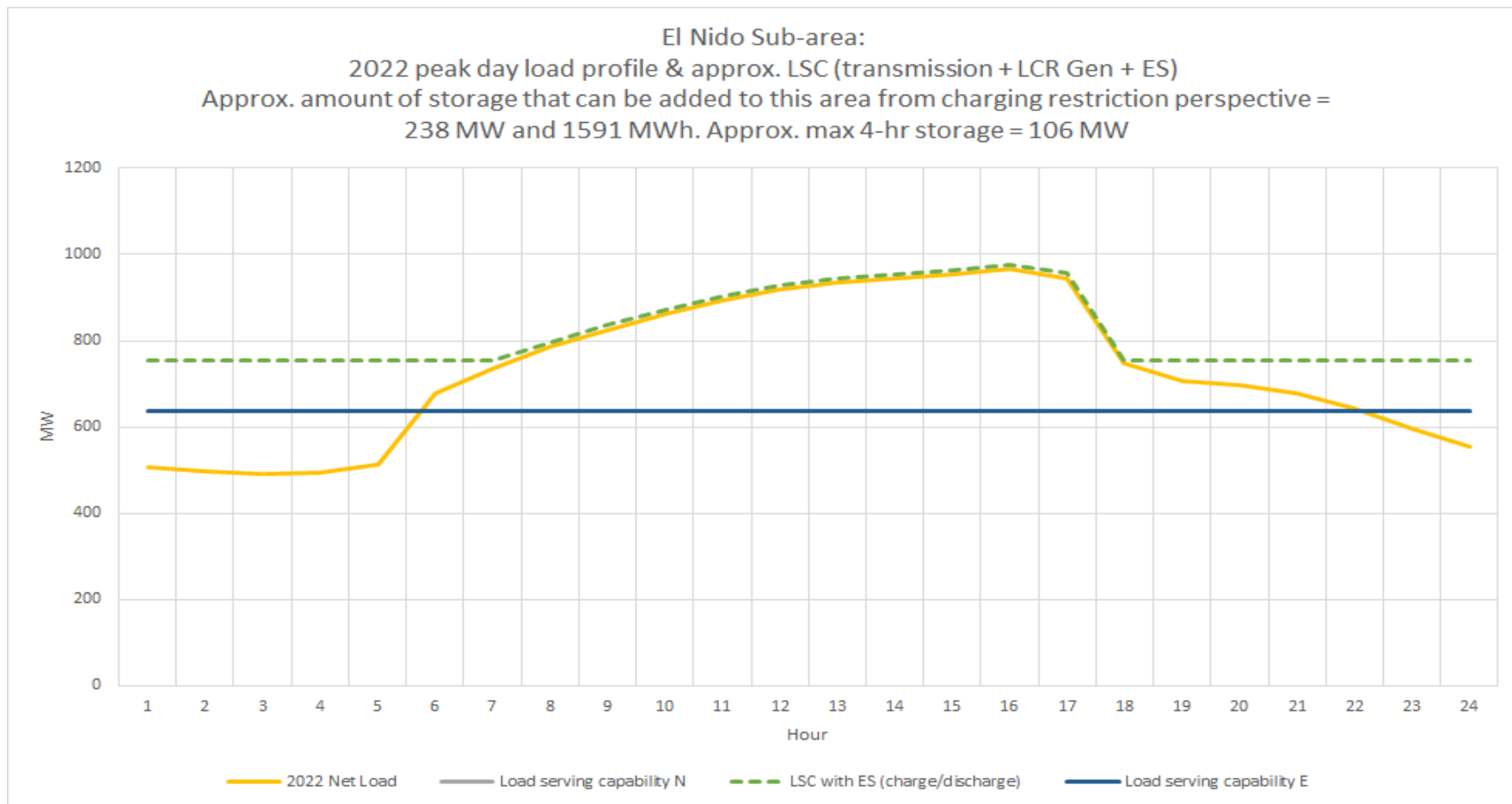
El Nido Sub-area LCR (LA Basin)

Year	Category	Limiting Facility	Contingency	LCR (MW)	2021 and 2025 LCR (MW)
2022	P7	La Fresa-La Cienega 230 kV	La Fresa – El Nido #3 & 4 230 kV lines	356	394
2026	P7	La Fresa-La Cienega 230 kV	La Fresa – El Nido #3 & 4 230 kV lines	361	409

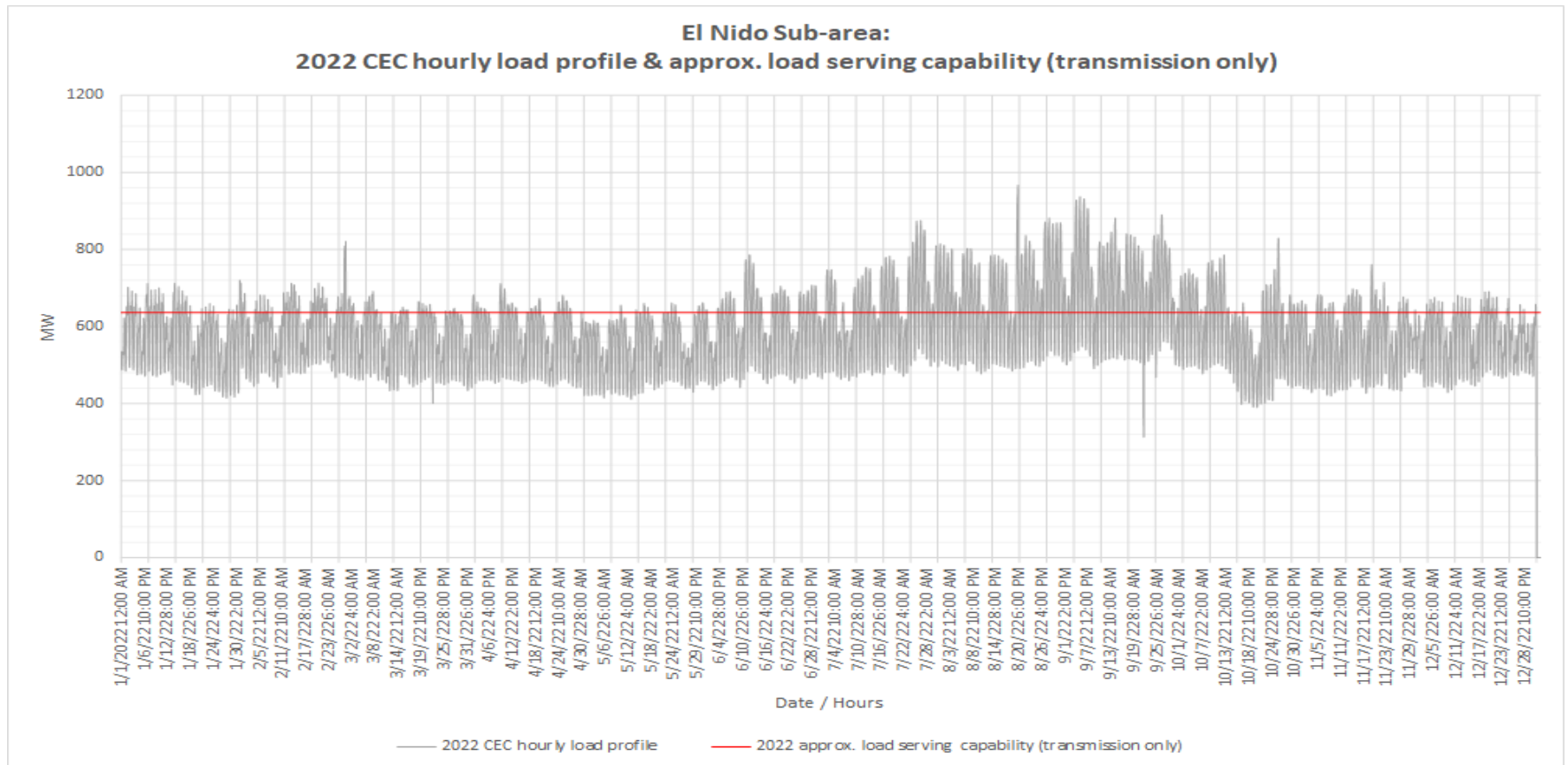
Reasons for the changes in the LCR needs:

- LCR need decreases due to lower demand forecast for the El Nido sub-area.

El Nido Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency



El Nido Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency (cont'd)



Western LA Basin Sub-area LCR

Year	Category	Limiting Facility	Contingency	LCR (MW)	2021 and 2025 LCR (MW)
2022	P6	Mesa-Laguna Bell 230 kV	Mesa-Redondo 230 kV, followed by Mesa-Lighthipe 230 kV line, or vice versa	4443	3303
2026	P6	Mesa-Laguna Bell 230 kV	Mesa-Redondo 230 kV, followed by Mesa-Lighthipe 230 kV line, or vice versa	3865	3943

Reasons for the changes in the LCR needs:

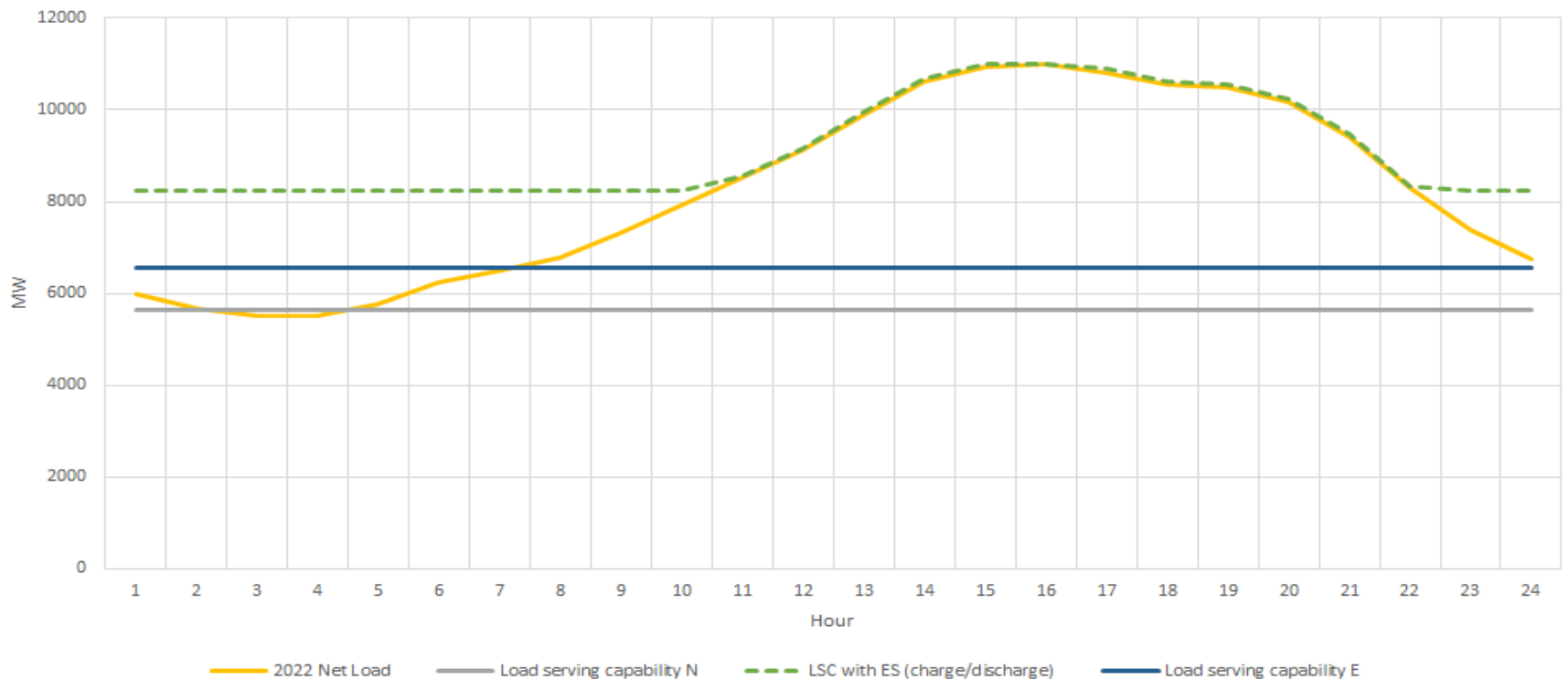
- 2022 - the 2022 LCR need is higher than 2021 LCR need due the following:
 - The 230 kV bus tie breaker at Mesa Substation is operated in the open position to help mitigate short-circuit duty concern for the final completed 500kV loop-in project.
- 2026 - the LCR need is slightly lower than the 2025 LCR need due to the following:
 - Higher flows from east of Serrano substation into western LA Basin due to retirement of OTC generation. This rebalances the flows into western LA Basin between flows from north of Mesa substation and flows from east of Serrano substation.

Western LA Basin Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

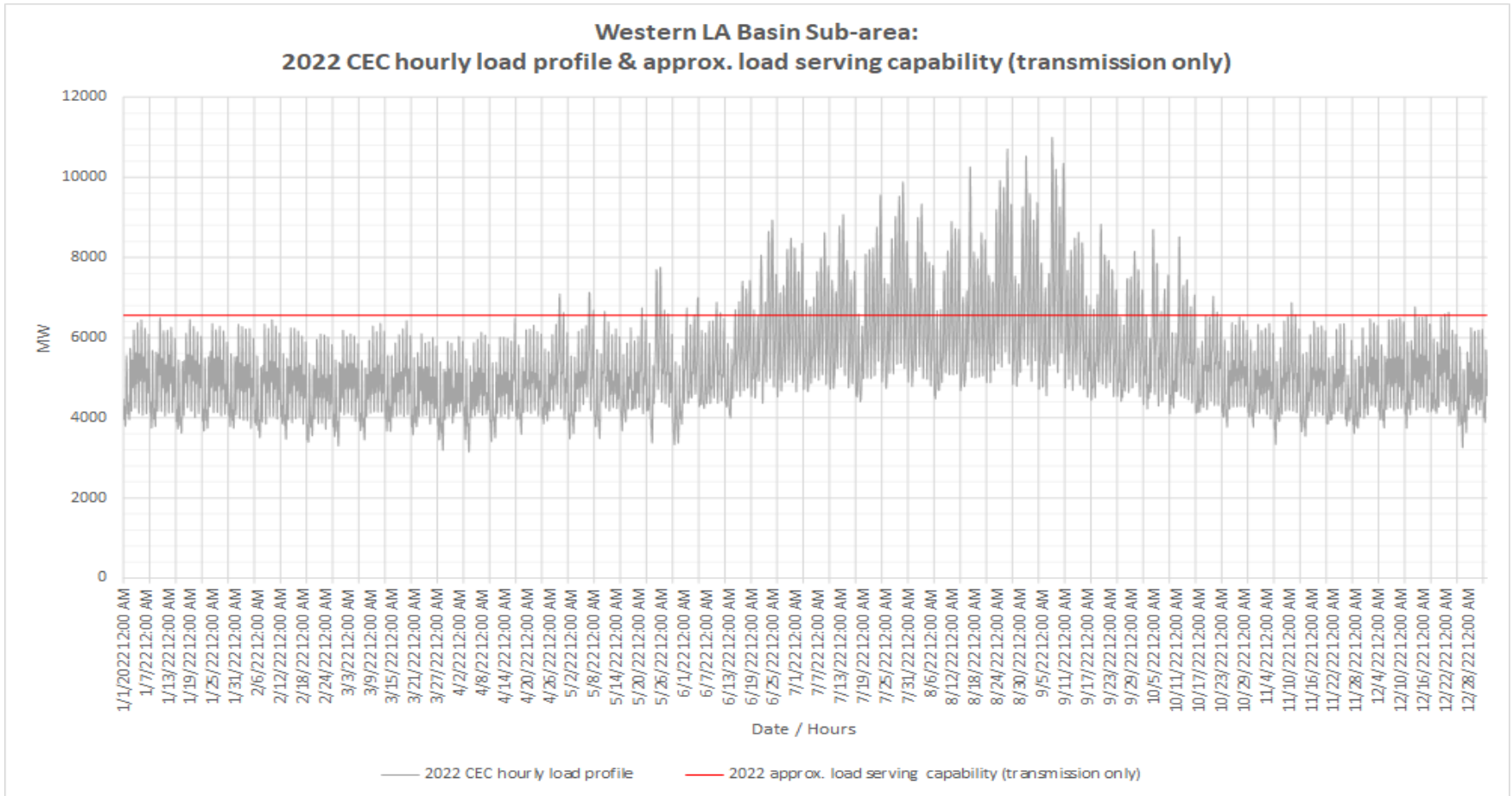
Western LA Basin Sub-area:

2022 peak day load profile & approx. LSC (transmission + LCR Gen + ES)

Approx. amount of storage that can be added to this area from charging restriction perspective = 1840 MW and 15148 MWh. Approx. max 4-hr storage = 580 MW



Western LA Basin Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency (cont'd)



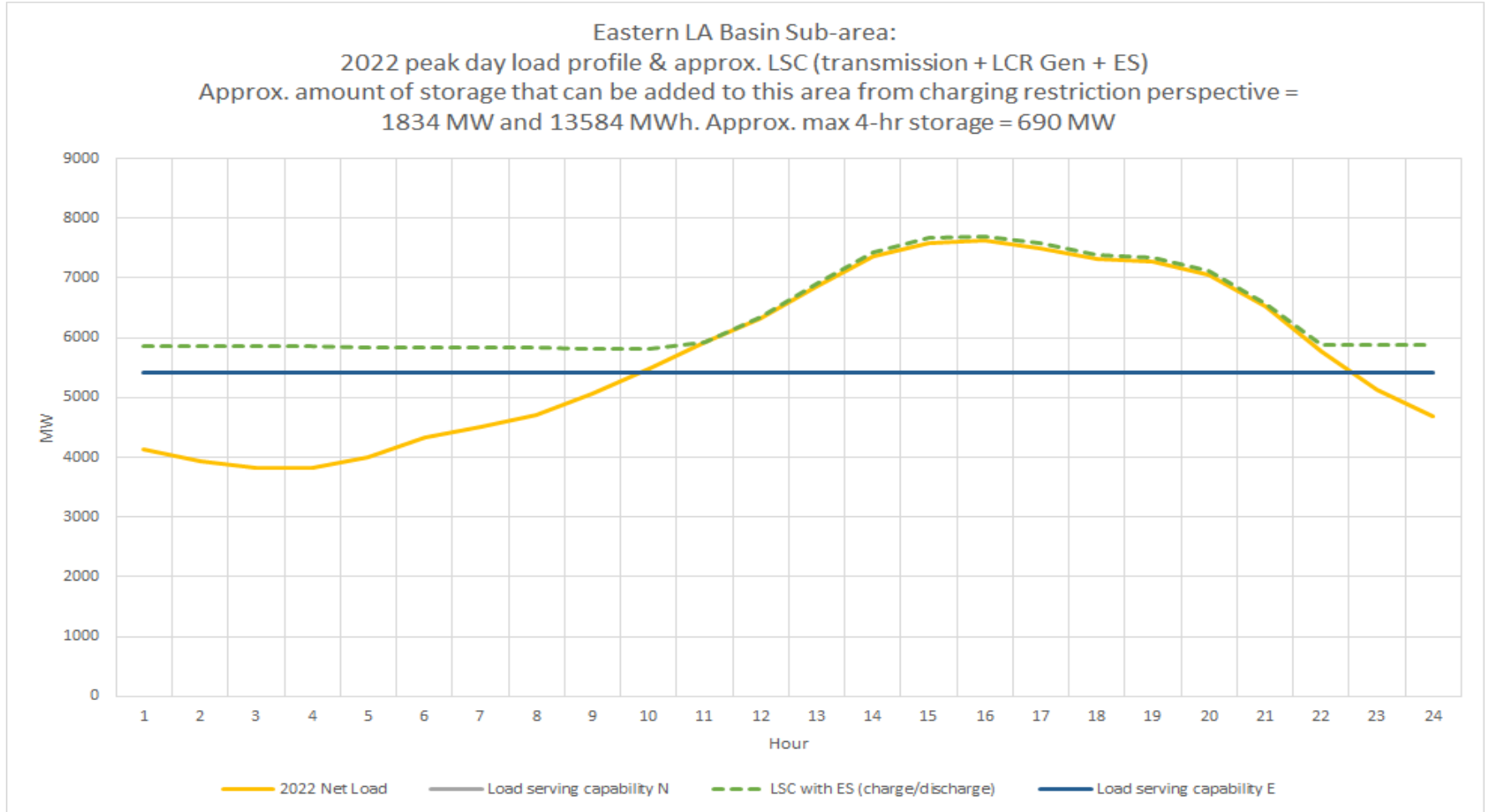
Eastern LA Basin Sub-area LCR

Year	Category	Limiting Facility	Contingency	LCR (MW)	2021 and 2025 LCR (MW)
2022	Extreme (P1+P7)	Post-transient voltage stability	Serrano-Valley 500 kV line, followed by Devers – Red Bluff 500 kV #1 and 2 lines	2203	2867
2026	Extreme (P1+P7)	Post-transient voltage stability	Serrano-Alberhill 500 kV line, followed by Devers – Red Bluff 500 kV #1 and 2 lines	2494	2366

Reasons for the changes in the LCR needs:

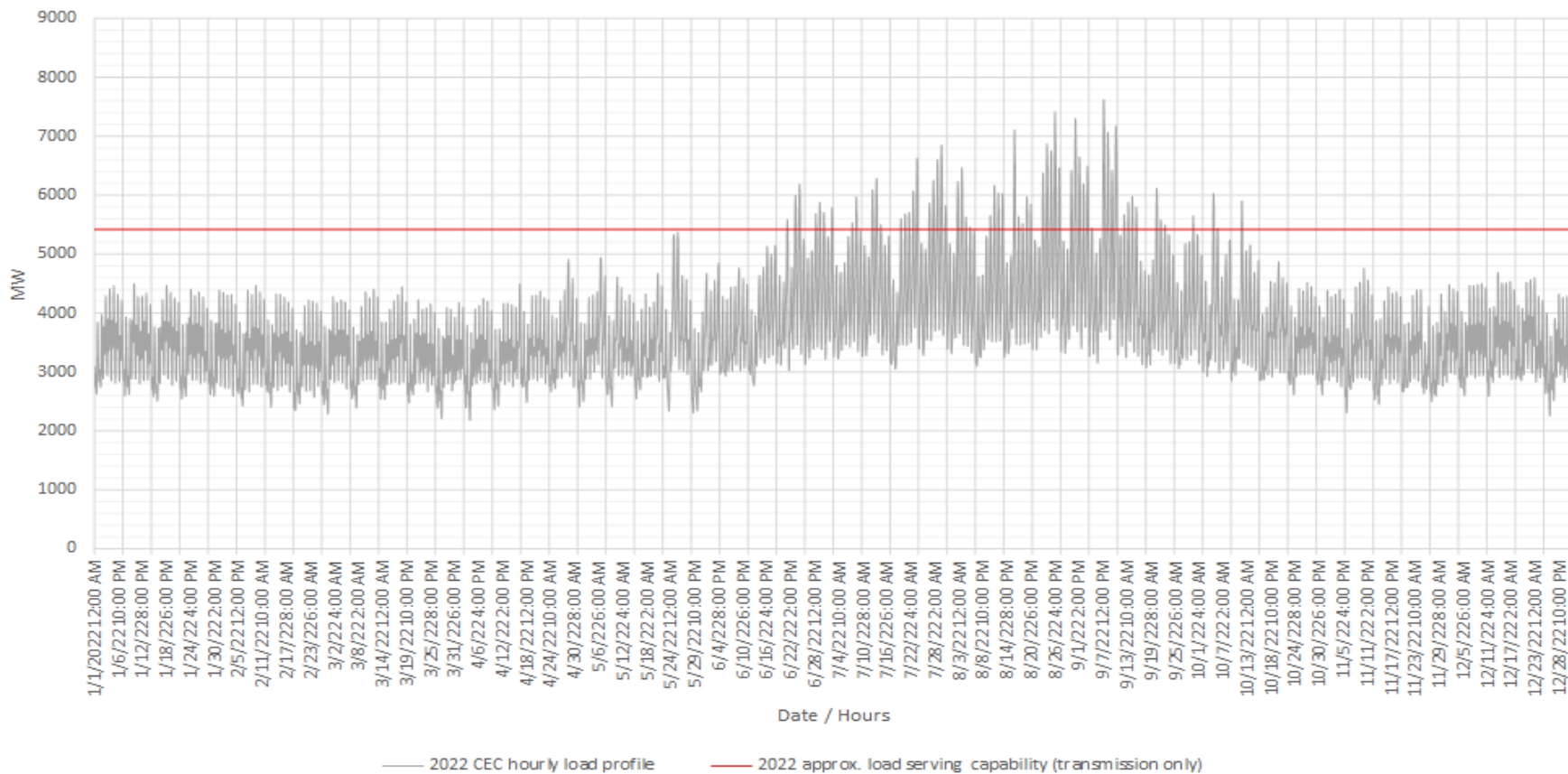
- 2022 - the LCR need for the Eastern LA Basin is lower than the 2021 LCR due to the following:
 - Implementation of the Mesa Loop-In Project brings additional source of power into the western LA Basin subarea. This helps reduce power flows from eastern to western LA Basin, thus reducing the LCR need in the eastern LA Basin.
- 2026 - the LCR need for the Eastern LA Basin is higher due to the following reasons:
 - Higher demand forecast from the CEC

Eastern LA Basin Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency



Eastern LA Basin Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency (cont'd)

Eastern LA Basin Sub-area:
2022 CEC hourly load profile & approx. load serving capability (transmission only)

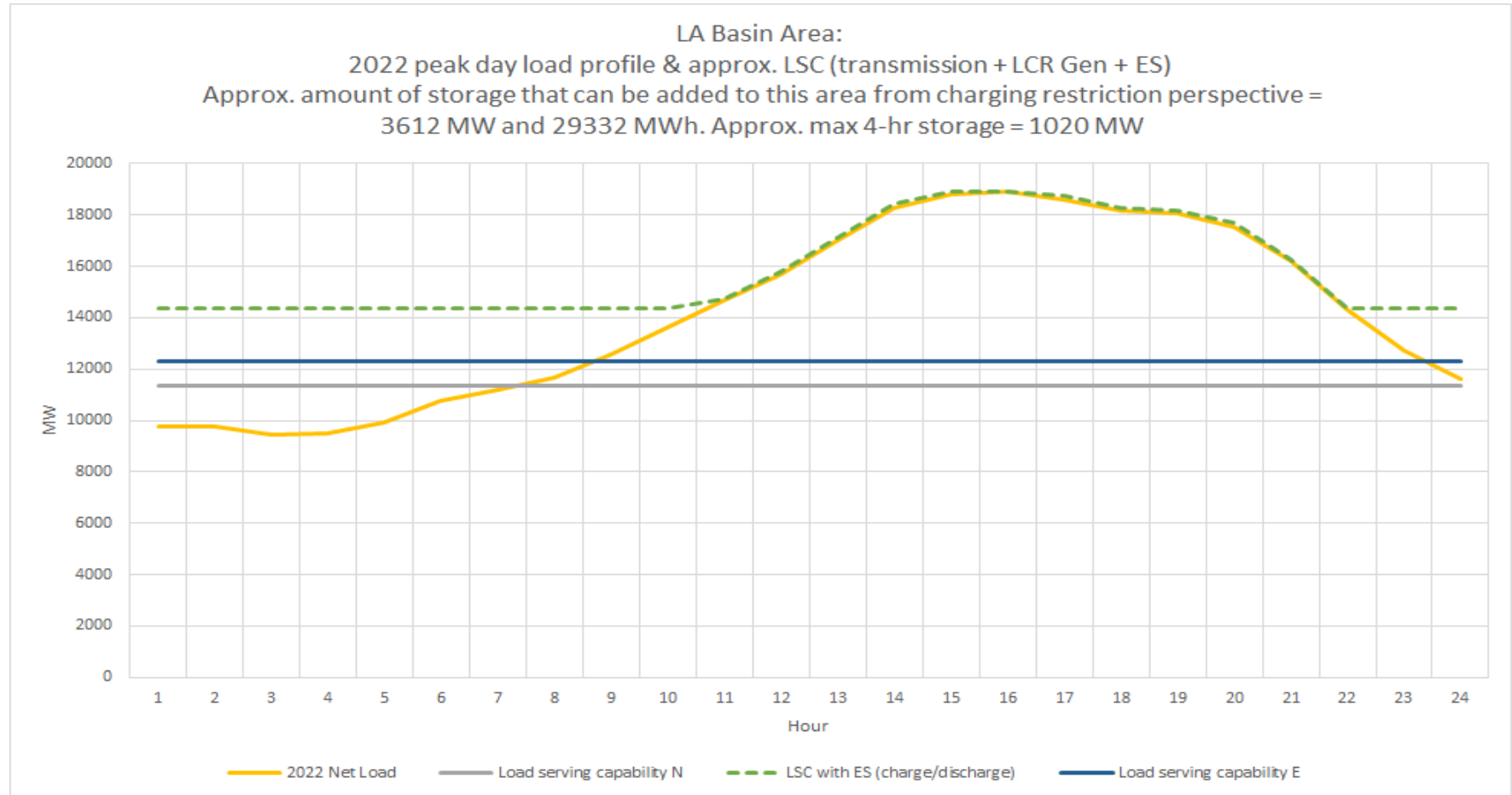


Overall LA Basin LCR Need

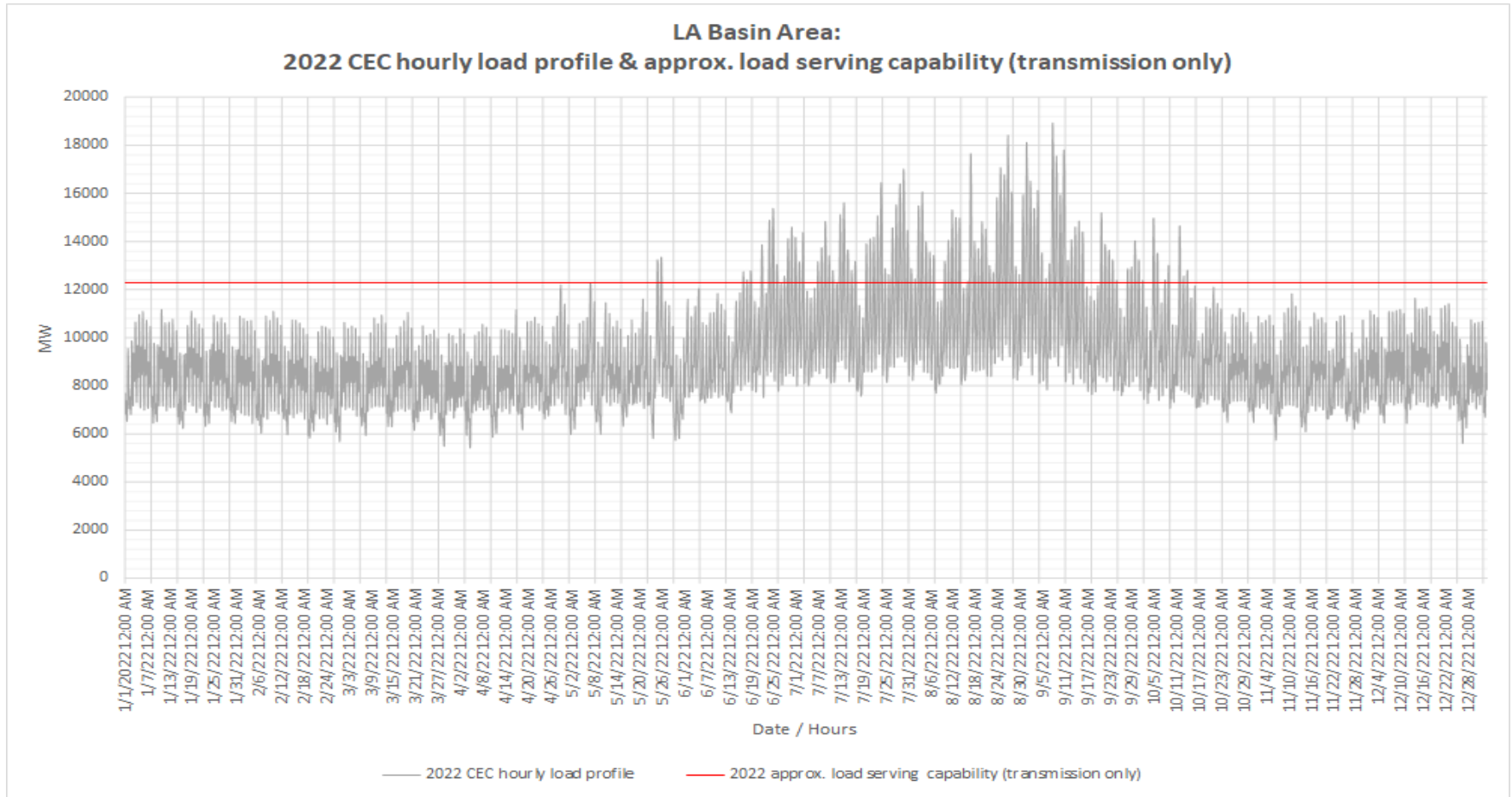
Year	Limiting Facility	Limiting Facility	Contingency	LCR (MW)	2021 and 2025 LCR (MW)
2022	Sum of Western and Eastern LA Basin LCR needs	See Western and Eastern LA Basin LCR results	See Western and Eastern LA Basin LCR results	<u>6646</u>	6170
2022	P3	Imperial Valley – El Centro 230 kV Line (S-Line)	TDM generation (G-1), system readjustment, followed by Imperial Valley-North Gila 500 kV line (N-1)	6198	6127
2026	Sum of Western and Eastern LA Basin LCR needs	See Western and Eastern LA Basin LCR results	See Western and Eastern LA Basin LCR results	<u>6359</u>	6309
2026	P3	El Centro 230/161 kV Transformer	TDM generation (G-1), system readjustment, followed by Imperial Valley-North Gila 500 kV line (N-1)	6315	6281

- The underlined values indicate the final LCR needs for the LA Basin for 2022 and 2026.
- 2022 – higher overall LA Basin LCR need is driven by higher western LA Basin LCR need; for further details please see western LA Basin slide.
- 2026 – higher overall LA Basin LCR need is driven by higher eastern LA Basin LCR need; for further details please see eastern LA Basin slide.

Overall LA Basin Area Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency



Overall LA Basin Area Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency (cont'd)



San Diego Bulk Sub-area LCR

Year	Category	Limiting Facility	Contingency	LCR (MW)	2021 and 2025 LCR (MW)
2022	P6	Remaining Sycamore-Suncrest 230 kV	ECO-Miguel 500 kV line, system readjustment, followed by one of the Sycamore-Suncrest 230 kV	2097	2270
2026	P6	Remaining Sycamore-Suncrest 230 kV	ECO-Miguel 500 kV line, system readjustment, followed by one of the Sycamore-Suncrest 230 kV	2790	2791

Reasons for the changes in the LCR needs:

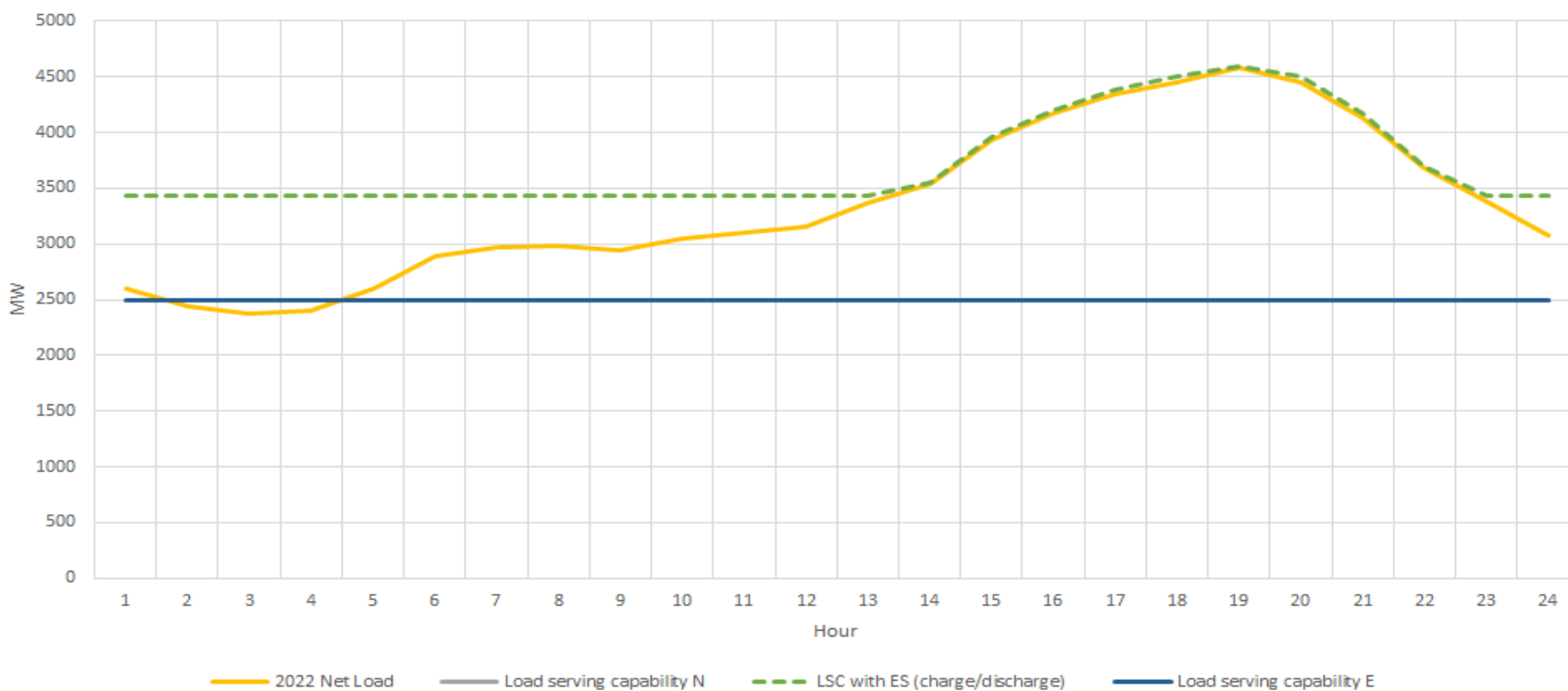
- 2022 - the LCR need is lower due to lower demand forecast from the CEC for the San Diego area. Implementation of the Mesa Loop-In Project provides additional source of power into the western LA Basin. This also helps with additional southbound flow into San Diego area.
- 2026 – the LCR needs are virtually the same as the 2025 LCR needs because the demand forecast is technically the same between the 2026 (IEPR 2020) and the 2025 (IEPR 2019) with the difference of less than 1%.

San Diego Bulk Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

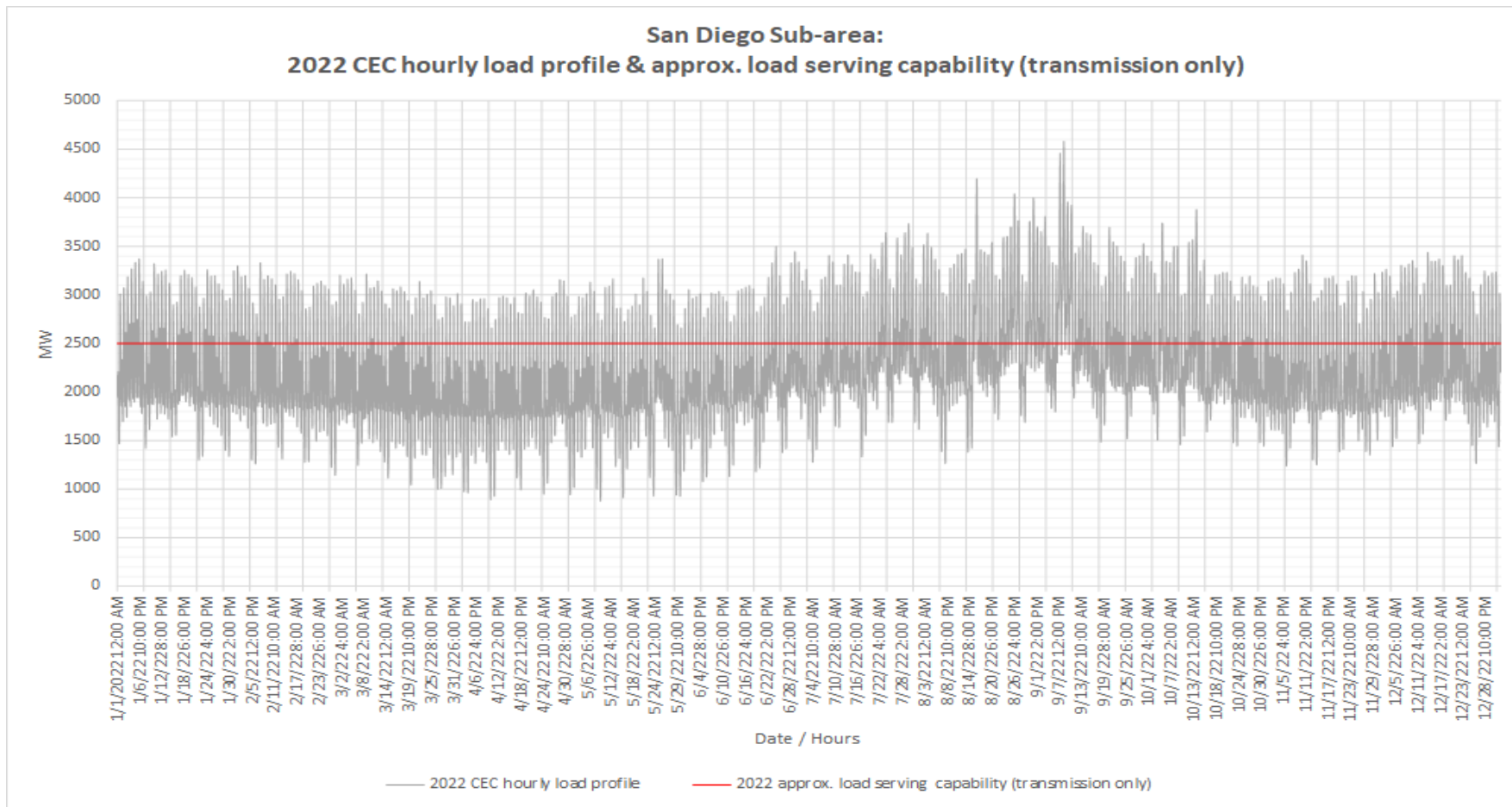
San Diego Sub-area:

2022 peak day load profile & approx. LSC (transmission + LCR Gen + ES)

Approx. amount of storage that can be added to this area from charging restriction perspective = 1165 MW and 6697 MWh. Approx. max 4-hr storage = 670 MW



San Diego Bulk Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency (cont'd)



Overall San Diego – Imperial Valley Area LCR

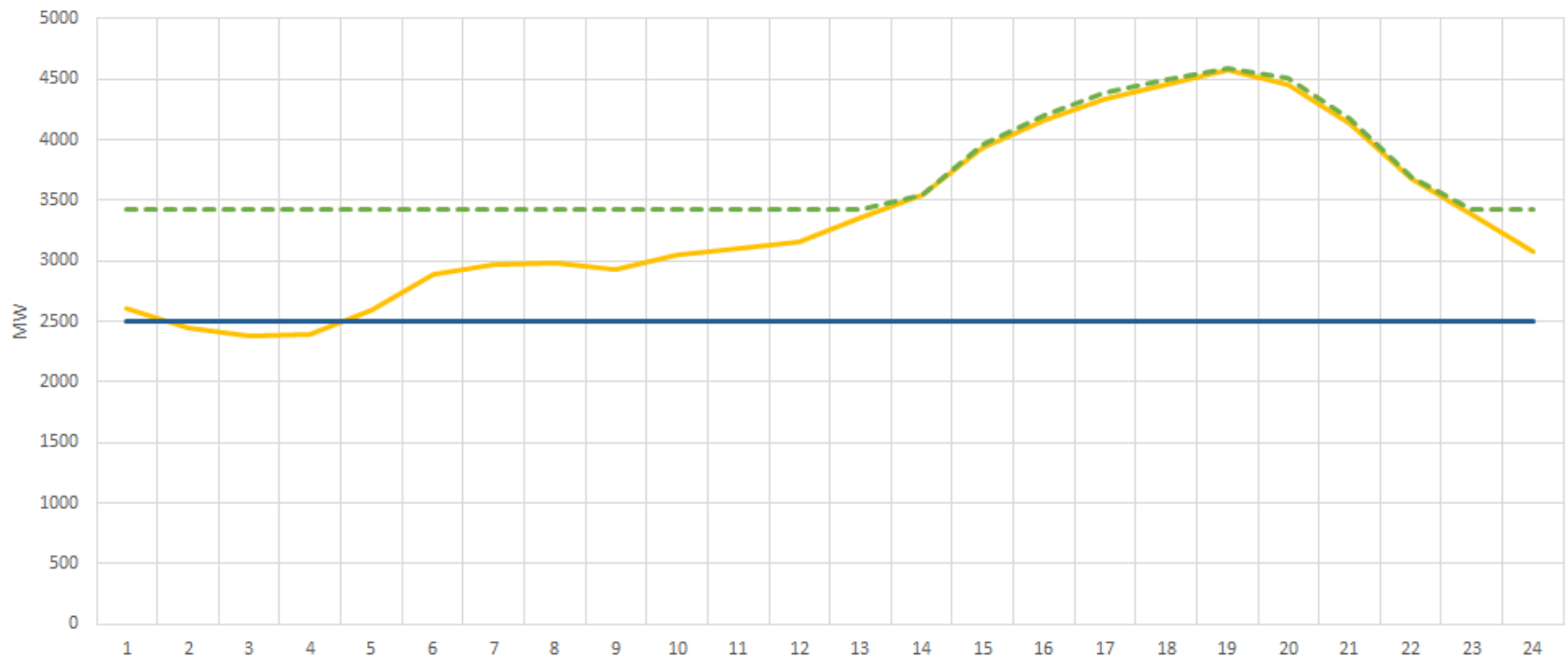
Year	Category	Limiting Facility	Contingency	LCR (MW)	2021 and 2025 LCR (MW)
2022	P3	Imperial Valley – El Centro 230 kV Line (S-Line)	G-1 of TDM generation, system readjustment, followed by Imperial Valley-North Gila 500 kV line (N-1)	3993	3888
2026	P3	El Centro 230/161 kV Transformer	TDM generation, system readjustment, followed by Imperial Valley-North Gila 500 kV line (N-1)	3394	3557

Reasons for the changes in the LCR needs:

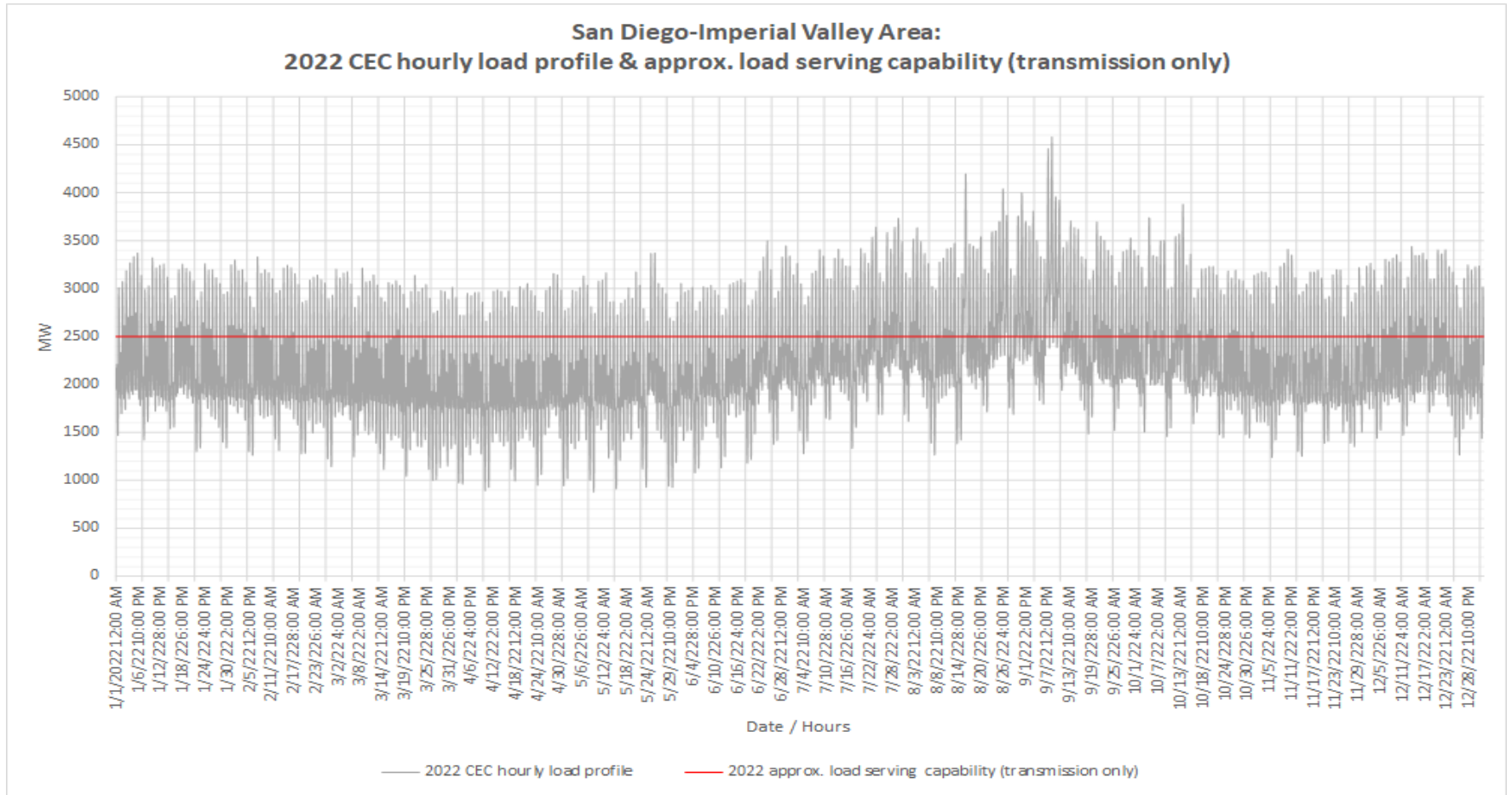
- 2022 – slightly higher LCR needs due to higher Maximum Import Capability (MIC) calculated and modeled between IID and CAISO (<http://www.caiso.com/Documents/AdvisoryestimatesoffutureResourceAdequacyImportCapabilityforyears2021-2030.pdf>).
- 2026 – lower LCR need for 2026 when compared to the 2025 LCR study results due to network modeling updates for the S-line upgrades.

Overall San Diego-Imperial Valley Area Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

San Diego-Imperial Valley Area:
2022 peak day load profile & approx. LSC (transmission + LCR Gen + ES)
Approx. amount of storage that can be added to this area from charging restriction perspective =
1165 MW and 6690 MWh. Approx. max 4-hr storage = 670



Overall San Diego-Imperial Valley Area Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency (cont'd)



Changes Compared to Previous LCR Requirements

Subarea	2021		2022		2025		2026	
	Load	LCR	Load	LCR	Load	LCR	Load	LCR
El Nido	1005	394	969	356	1020	409	978	361
Western LA Basin	11420	3303	11166	4443	11291	3943	11130	3865
Eastern LA Basin	7502	2867	7758	2203	7510	2366	8016	2494
Overall LA Basin	18930	6170	18924	6646	18801	6309	19146	6359
San Diego Subarea	4523	2270	4580	2097	4675	2791	4707	2790
Overall San Diego – Imperial Valley Area	4523	3888	4580	3993	4675	3557	4707	3394

- Please see the sub-areas and LCR area study result slides for further discussion on the reasons for the changes in LCR needs.