



California ISO

2020 Local Capacity Requirement (LCR) Study Results for LA Basin and San Diego- Imperial Valley Areas

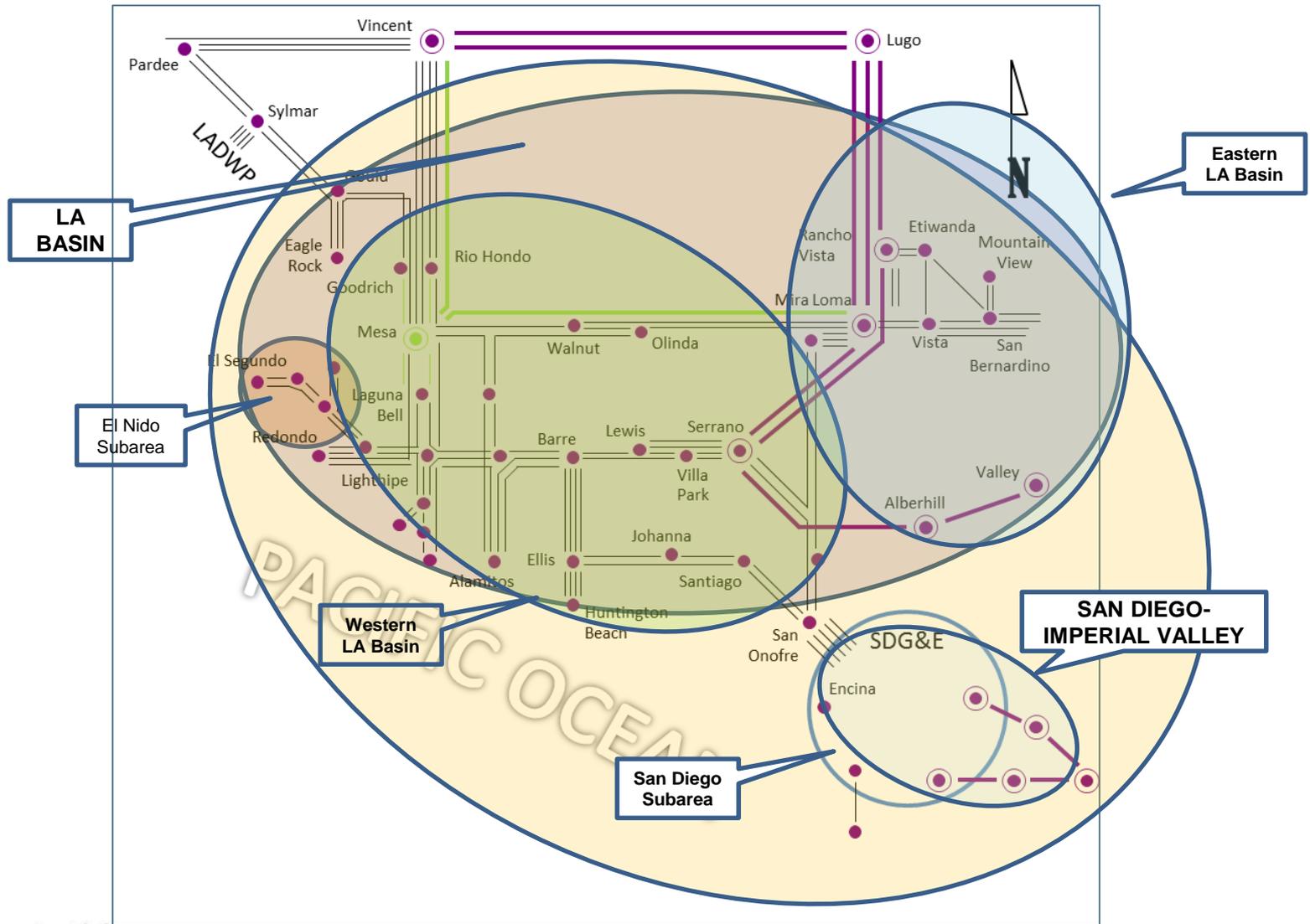
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LA Basin and San Diego-Imperial Valley Areas



Major Transmission Upgrade Assumptions

2020 LCR study case

- Talega synchronous condensers (2x225 MVAR)
- San Luis Rey synchronous condensers (2x225 MVAR)
- Miguel synchronous condensers (2x225 MVAR)
- San Onofre synchronous condenser (225 MVAR)
- Santiago synchronous condensers (3x81 MVAR)
- Imperial Valley phase shifting transformers (230/230 kV 2x400 MVA)
- Sycamore – Penasquitos 230 kV transmission line
- Bypassing series capacitors on the Imperial Valley-North Gila 500 kV line, as well as the Sunrise and Southwest Powerlink lines

Major Resource Assumptions

2020 LCR study case

- Solar generation production is modeled as in the following based on the time of peak loads
 - Modeled at Net Qualifying Capacity values (33.4% of installed capacity) for SCE peak load study case (the CEC forecast peak load for SCE at 5 p.m. PDT)
 - Modeled at 0 MW values for SDG&E peak load study case (the CEC forecast peak load for SDG&E at 8 p.m. PDT)
- Encina generation retirement (946 MW)
- Carlsbad Energy Center (500 MW) in-service (*CPUC LTPP resource*)
- Natural gas-fired generation retirement (1525 MW) from various once-through cooled generating units at Alamitos, Huntington Beach and Redondo Beach power plants to move emission credits to the new non-OTC units at Alamitos and Huntington Beach
- New non-OTC generating units at Alamitos (640 MW) and Huntington Beach (644 MW)
- Stanton Energy Center (2x49 MW peakers)

Major Resource Assumptions (cont'd)

- Use existing “fast” (20-minute) demand response in SCE’s LA Basin (295 MW) and SDG&E (16 MW) for transmission contingency conditions
- Implementation of long-term procurement plan (LTPP) for preferred resources that were approved by the CPUC for local capacity need in the Western LA Basin (248 MW)
- Battery energy storage projects in San Diego area (113 MW) – these are based on expected 4-hour full capacity resources

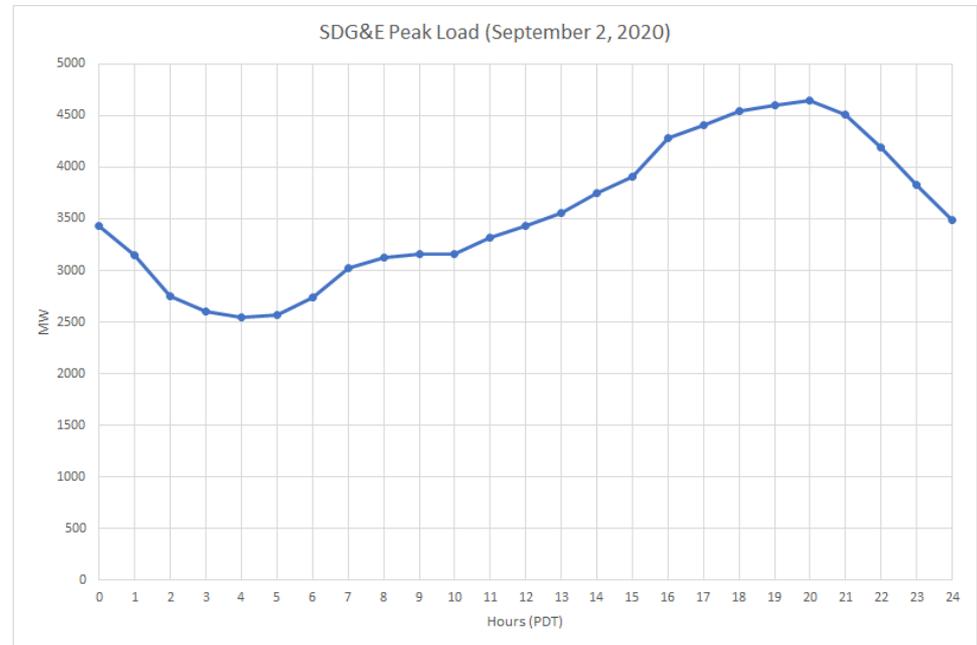
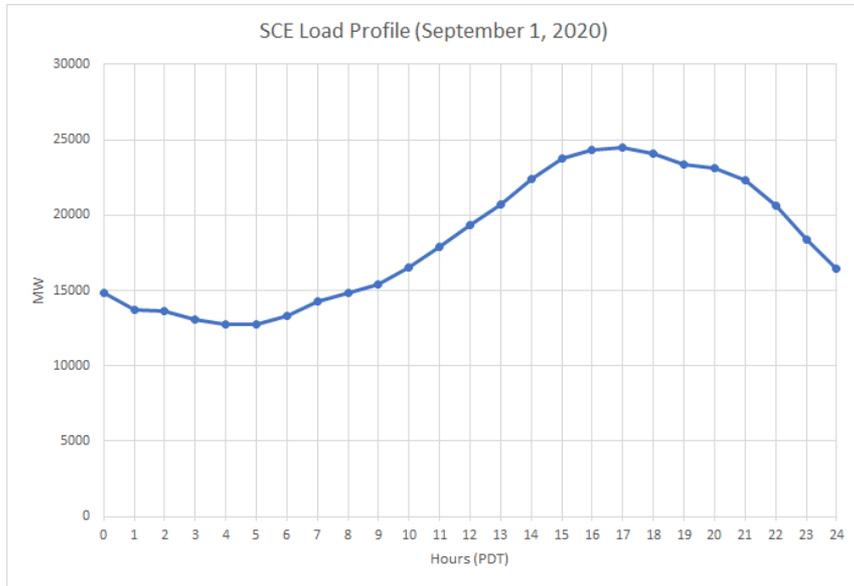
LA Basin Area: Loads and Resources

Loads (MW)	2020	Resources NQC (MW)	2020
Gross Load	20684	Market, Net Seller, Wind, Battery, Solar	8216
AAEE + AAPV	-277	Muni	1110
Behind the meter DG (production)	-1450	QF	234
Net Load	18957	LTPP Preferred Resources (BESS, EE, DR, PV)	248
Transmission Losses	284	Existing 20-minute Demand Response	295
Pumps	20	Mothballed gas-fired generation	335
Loads + Losses + Pumps	19261	Total Qualifying Capacity	10439

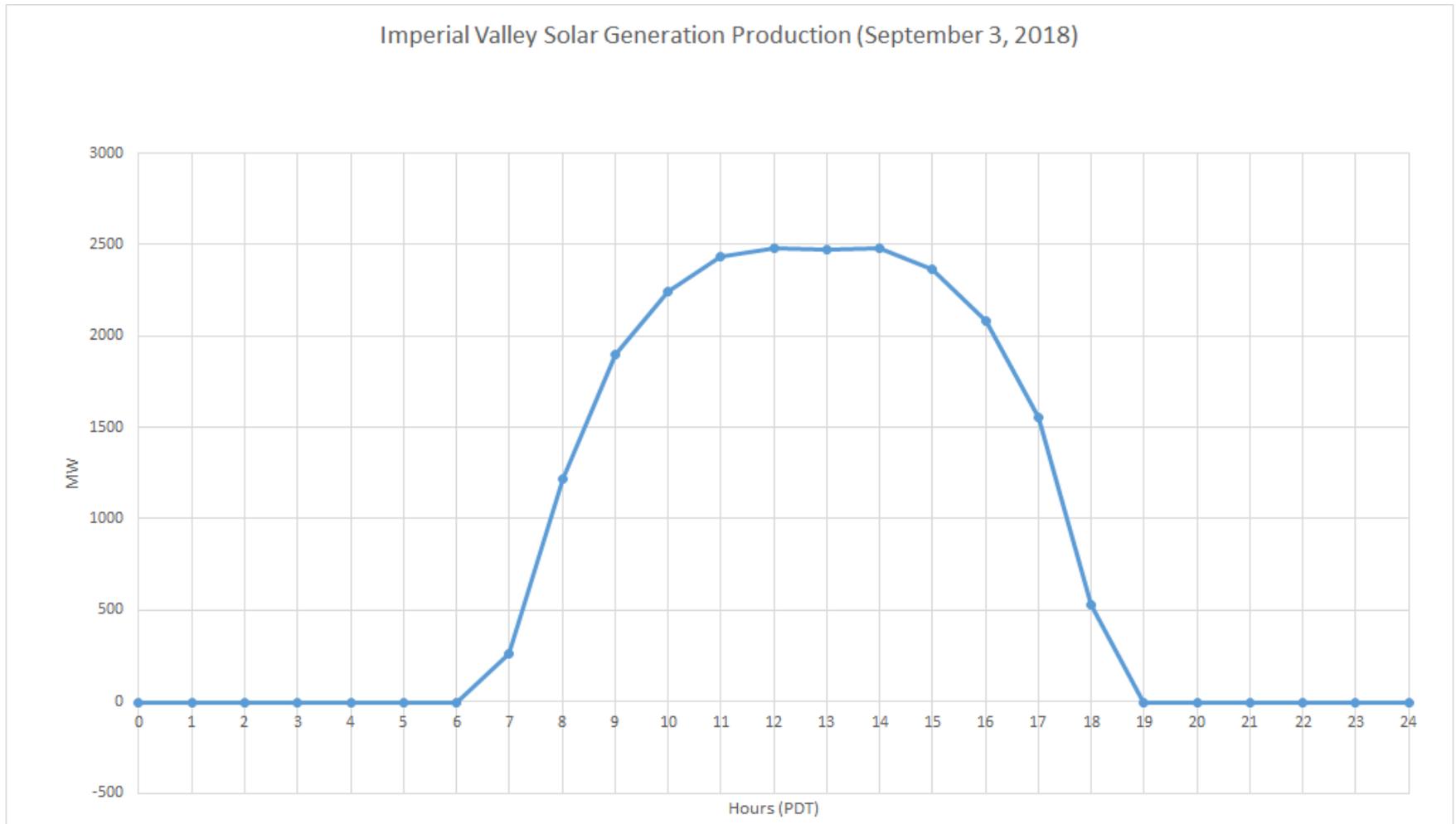
San Diego-Imperial Valley Area: Loads and Resources

Loads (MW)	2020	Resources NQC (MW)	2020
Gross Load	4648	Market, Net Seller, Battery, Wind	3875
AAEE	-159	Solar	439
Behind-the-meter DG	0	QF	4
Net Load	4489	Muni	0
Transmission Losses	124	LTPP Preferred Resources	0
Pumps	0	Existing 20-Minute Demand Response	16
		Mothballed	0
Loads + Losses	4613	Total Qualifying Capacity	4334
		Total Qualifying Capacity at Peak (8 p.m. PDT)	3895

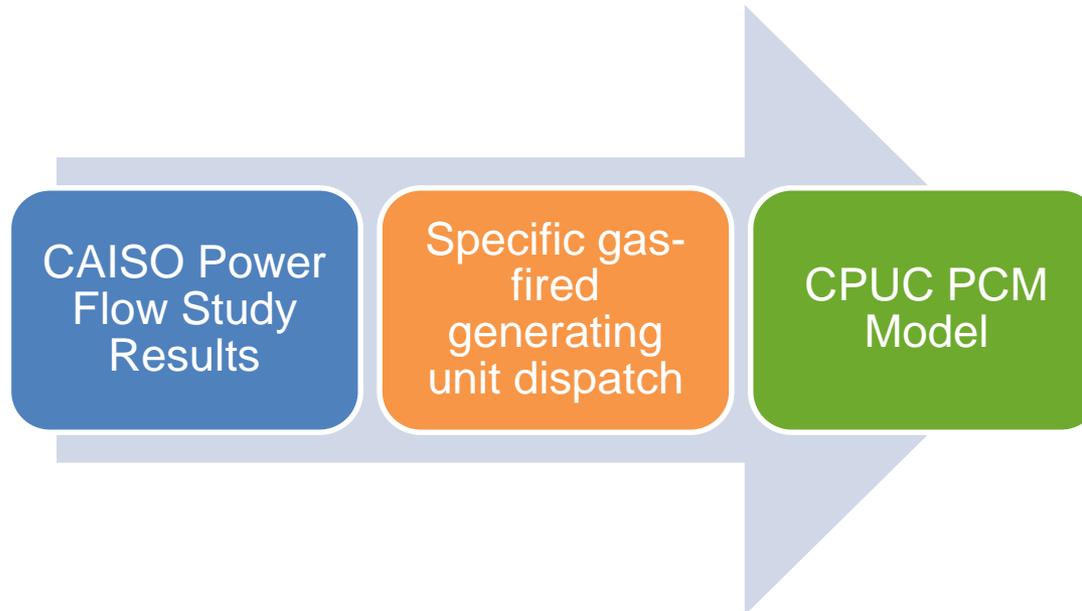
Hourly demand forecast profile for SCE and SDG&E service areas (2020) (source: CEC)



Total Imperial Valley Area Solar Generation Production (source: ISO EMS Data)



California ISO power flow study results are provided as inputs to the CPUC for use in the Production Cost Model



- Specific gas-fired generating unit dispatch from CAISO power flow studies is provided to the CPUC staff for use in the Production Cost Model.
- Specific gas-fired generating unit dispatch is considered Critical Energy Infrastructure Information (CEII) and is covered by a Non-Disclosure Agreement (NDA).
- The local capacity requirement study was evaluated for both the LA Basin and the San Diego-Imperial Valley due to strong power flow interaction between these two areas after the retirement of SONGS and other local gas-fired generation in these areas.

El Nido Subarea LCR (LA Basin)

Year	Category	Limiting Facility	Contingency	Total LCR Need (MW)	Natural Gas-Fired Generation (MW)
2020	C	La Fresa-La Cienega 230 kV	N-1-1: La Fresa – El Nido #3 & 4 230 kV lines	365	331
2020	B	None	Various contingencies	N/A	N/A

- The LCR need for the El Nido subarea is included in the LCR need for the Western LA Basin (see slide #13) as it is a subarea within the Western LA Basin (see diagram on slide #2)

Western LA Basin Subarea LCR

Year	Category	Limiting Facility	Contingency	Total LCR Need (MW)	Natural Gas-Fired Generation (MW)
2020	C	Barre-Lewis 230 kV line	N-1 of Barre-Villa Park 230 kV line, followed by G-1 of Huntington Beach new combined cycle plant	3706	3239
2020	B	Barre-Lewis 230 kV line	G-1 of Huntington Beach new combined cycle plant, followed by N-1 of Barre-Villa Park 230 kV line	3706	3239

- The LCR need for the Western LA Basin subarea is included in the LCR need for the overall LA Basin (see slide #19) as it is a subarea within the overall area (see diagram on slide #2)

Eastern LA Basin Subarea LCR

Year	Category	Limiting Facility	Contingency	Total LCR Need (MW)	Natural Gas-Fired Generation (MW)
2020	C	Post-transient voltage stability	Serrano-Valley 500 kV line, followed by Devers – Red Bluff 500 kV #1 and 2 lines	2537	2011
2020	B	Non-binding	Multiple combinations possible	N/A	N/A

- The LCR need for the Eastern LA Basin subarea is included in the LCR need for the overall LA Basin (see slide #19) as it is a subarea within the overall area (see diagram on slide #2)

Combined Overall LA Basin and San Diego-Imperial Valley LCR Assessment

San Diego Bulk Subarea LCR

Year	Category	Limiting Facility	Contingency	Total LCR (MW)	Natural Gas-Fired Generation (MW)
2020	C	Remaining Sycamore-Suncrest 230 kV	ECO-Miguel 500 kV line, system readjustment, followed by one of the Sycamore-Suncrest 230 kV	2642	2612
2020	B	None-binding	Multiple combinations possible	N/A	N/A

- The LCR need for the San Diego bulk transmission subarea is included in the LCR need for the overall San Diego-Imperial Valley (see slide #18) as it is a subarea within the overall area (see diagram on slide #2)

Overall San Diego – Imperial Valley Area LCR (2020)

- The following three scenario studies were performed to determine the potential minimum LCR need for the overall San Diego-Imperial Valley area:
 - Scenario 1: Assess LCR need for the San Diego – Imperial Valley area without increasing LA Basin local capacity. Identified the amount of deficient local capacity by assuming the additional capacity is located in the most effective location.
 - Scenario 2: Assess LCR need for the San Diego – Imperial Valley area based on available resources in San Diego. Increase local capacity in the LA Basin to help offset local capacity deficiency in the San Diego – Imperial Valley area.
 - Scenario 3: same as Scenario 2 but implementing operational actions to curtail imports to SDG&E via southern 500 kV and 230 kV lines as well utilization of the existing Remedial Action Scheme to mitigate transmission loading concern. ***The study results for Scenario 3 are presented here.***

Summary of Overall San Diego – Imperial Valley Total LCR Need

Year	Category	Limiting Facility	Contingency	Total LCR Need (MW)	Natural Gas-Fired Generation (MW)
2020	B	Imperial Valley – El Centro 230 kV Line (S-Line)	G-1 of TDM generation, system readjustment, followed by N-1 of Imperial Valley-North Gila 500 kV line	3895	3526
2020	C	Imperial Valley – El Centro 230 kV Line (S-Line)	N-1 of Imperial Valley-North Gila 500 kV line, system readjustment, followed by G-1 of TDM generation	3895	3526

- The LCR need for the overall San Diego-Imperial Valley area is met by dispatch of available resources in the San Diego-Imperial Valley area, as well as dispatch of additional available resources in the Western LA Basin to mitigate identified reliability concern.
- Resources in the San Diego-Imperial Valley area are insufficient due to unavailability of solar resources as peak net load is shifted to early evening timeframe (i.e., 8 p.m. PDT).

Summary of Overall LA Basin LCR Need

Year	Category	Limiting Facility	Contingency	Total LCR Need (MW)	Natural Gas-Fired Generation (MW)
2020	B	Imperial Valley – El Centro 230 kV Line (S-Line)	G-1 of TDM generation, system readjustment, followed by N-1 of Imperial Valley-North Gila 500 kV line	7364	5910
2020	C	Imperial Valley – El Centro 230 kV Line (S-Line)	N-1 of Imperial Valley-North Gila 500 kV line, system readjustment, followed by G-1 of TDM generation	7364	5910

- The LCR need for the overall LA Basin is driven by the constraint identified above.
- Additional resources in the Western LA Basin are needed to “cure” the potential local capacity resource deficiency in the overall San Diego-Imperial Valley with the peak load in San Diego being shifted to early evening when solar generation resources are unavailable.

Summary list of California ISO power flow study cases

Season	Year	Brief Description of Starting “Seed” Study Case	Tentative Planned Completion Date
Summer	2020	The 2020 LCR study case from the 2019 annual LCR study cycle	Completed. Submitted specific gas-fired generating units to the CPUC under an NDA. Information is considered CEII.
Winter	2020	WECC 2019-20 Heavy Winter 3-OP Operating Case (20HW3a1)	WECC posted the study case on April 22, 2019. The ISO will update the study case as needed and provide results to the CPUC by the end of July 2019.
Summer	2025	Modified from ISO's 2024 long-term LCR study (part of the 2019 LCR study cycle)	August 26 – 30, 2019
Winter	2025	Modified from WECC's 2023-2024 Heavy Winter 2 case (posted 10-29-2018)	August 26 – 30, 2019
Summer	2030	Modified from ISO's 2028 long-term LCR study case (available from 2018-19 TPP)	September 24 – 30, 2019
Winter	2030	Modified from WECC's 2028-2029 Heavy Winter 1 case (posted 10/31/2018)	September 24 – 30, 2019