



California Energy Commission

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Infrastructure Assessment: Current Issues

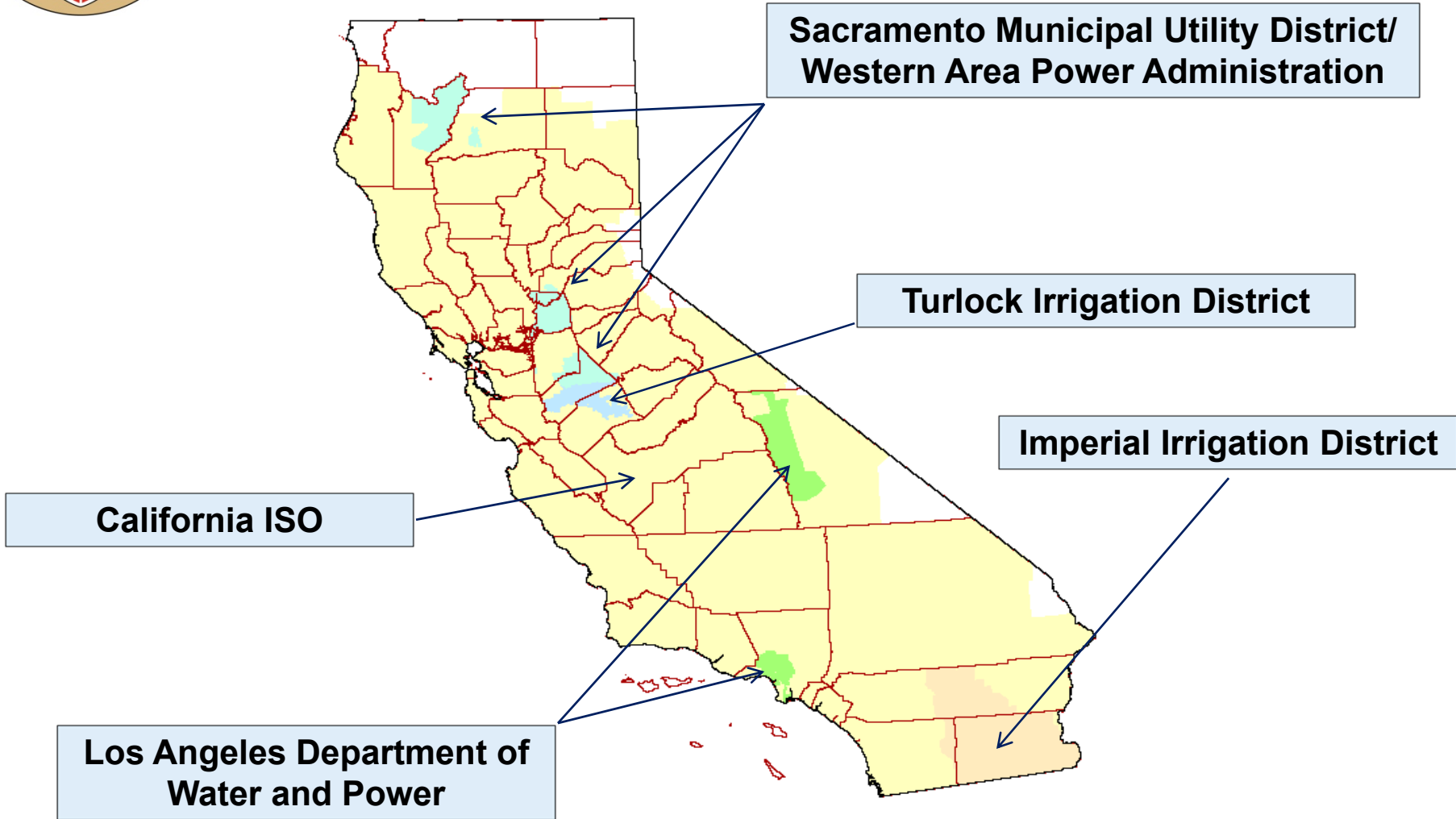
2012 IEPR Update Workshop
Los Angeles, California

June 22, 2012

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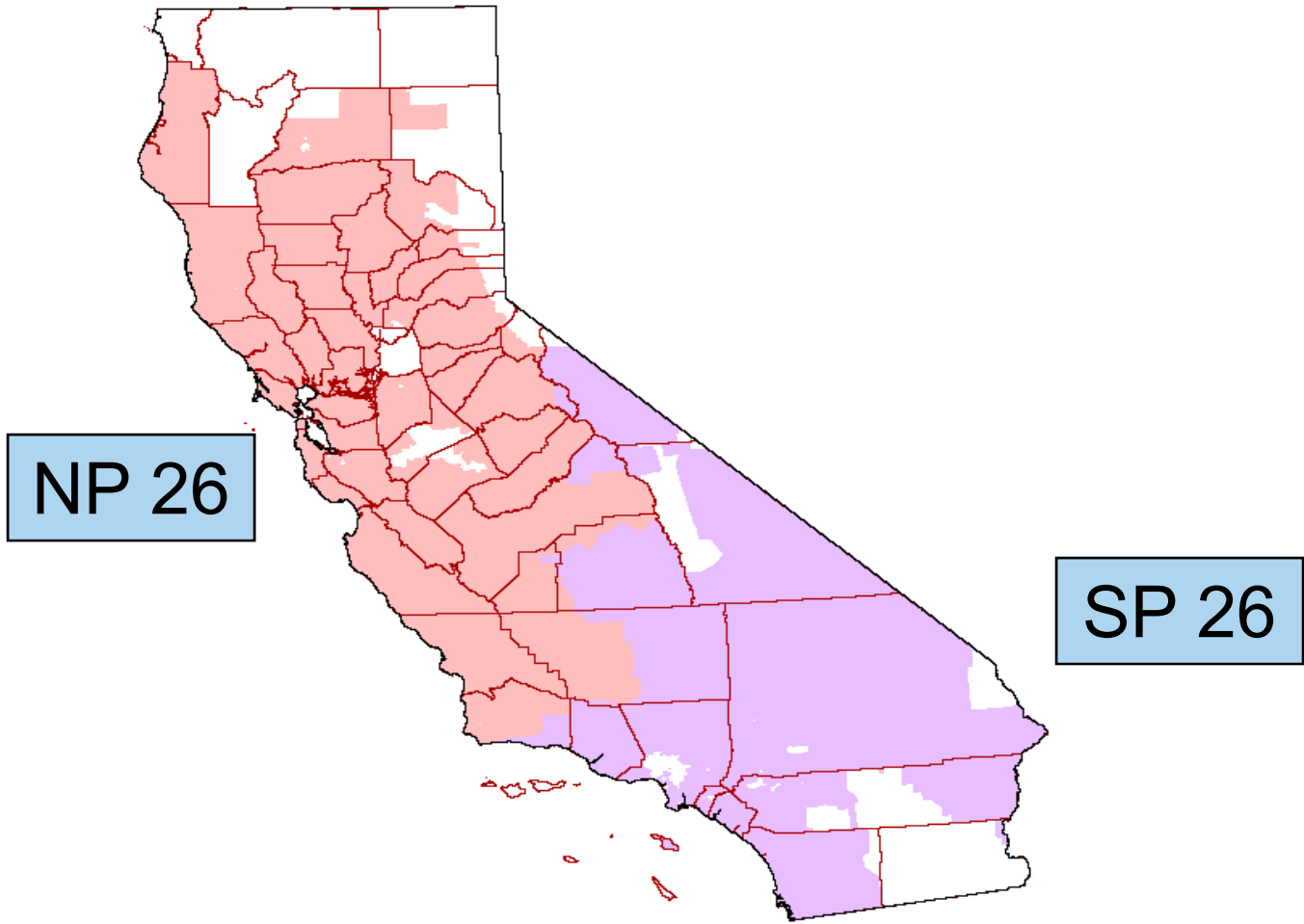


California Balancing Authorities





California ISO Zones





Load - Resource Balance (MW) (illustrative)

Peak Demand	31,200
Less Uncommitted Energy Efficiency	(1,500)
Total Demand	29,700
Existing Supply	27,500
Additions:	
Conventional (e.g. fossil)	2,000
Combined Heat and Power	500
New Renewables	3,000
Less Retirements	(4,000)
Demand Response	800
Net Interchange (Imports)	4,500
Total Supply	34,300
Supply - Demand	4,600
Reserve Margin	15.5%



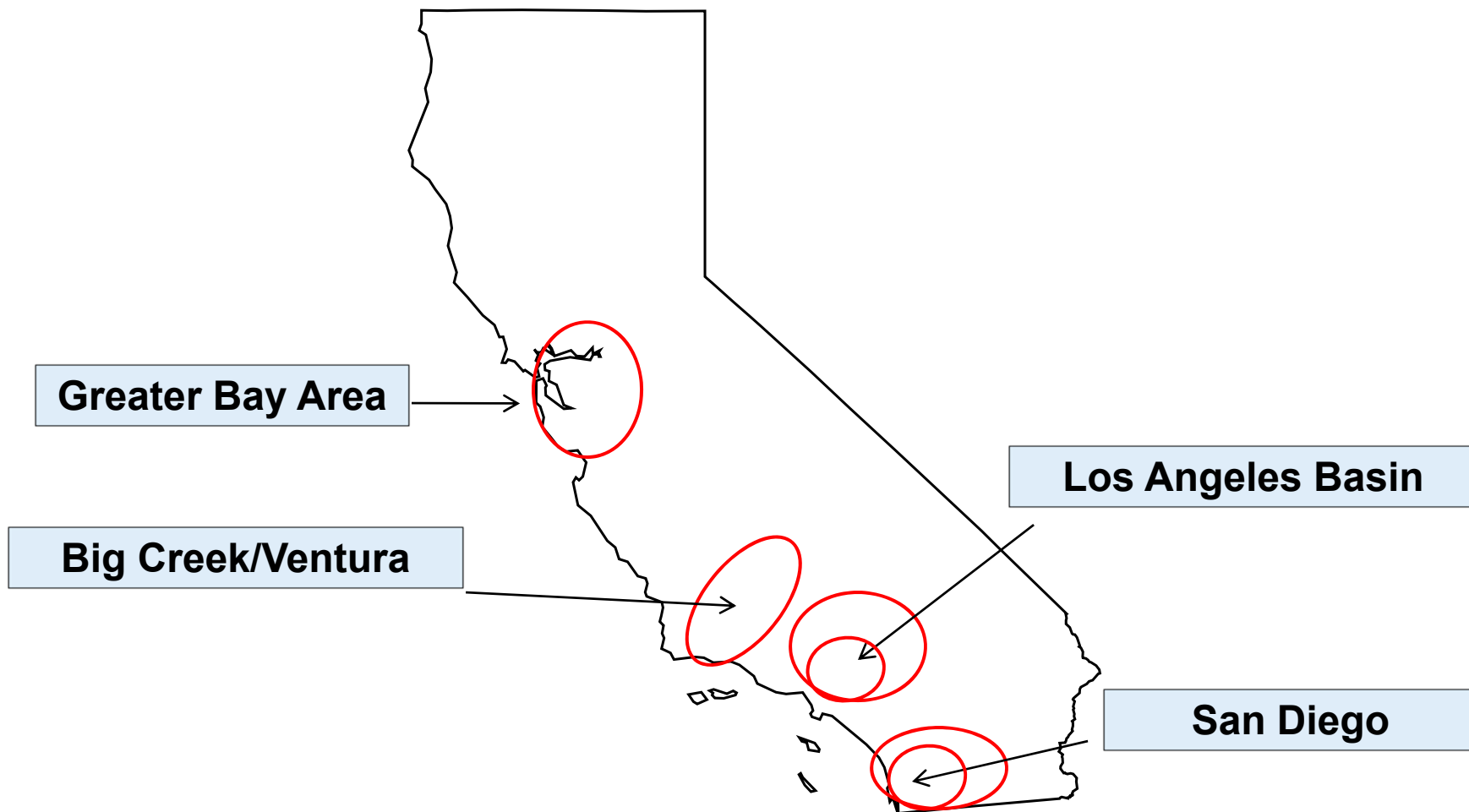
Caveat

Adequate planning reserve margins at the system and zonal levels are necessary but not sufficient for reliability. Other requirements are:

- Local capacity requirements
- Stability requirements (e.g., inertia)
- Flexibility requirements (quick-starting, fast ramping, wide range of output)
- Capacity of generation resources must be appropriately valued; 15-17% reserve margin may be insufficient if this is not the case

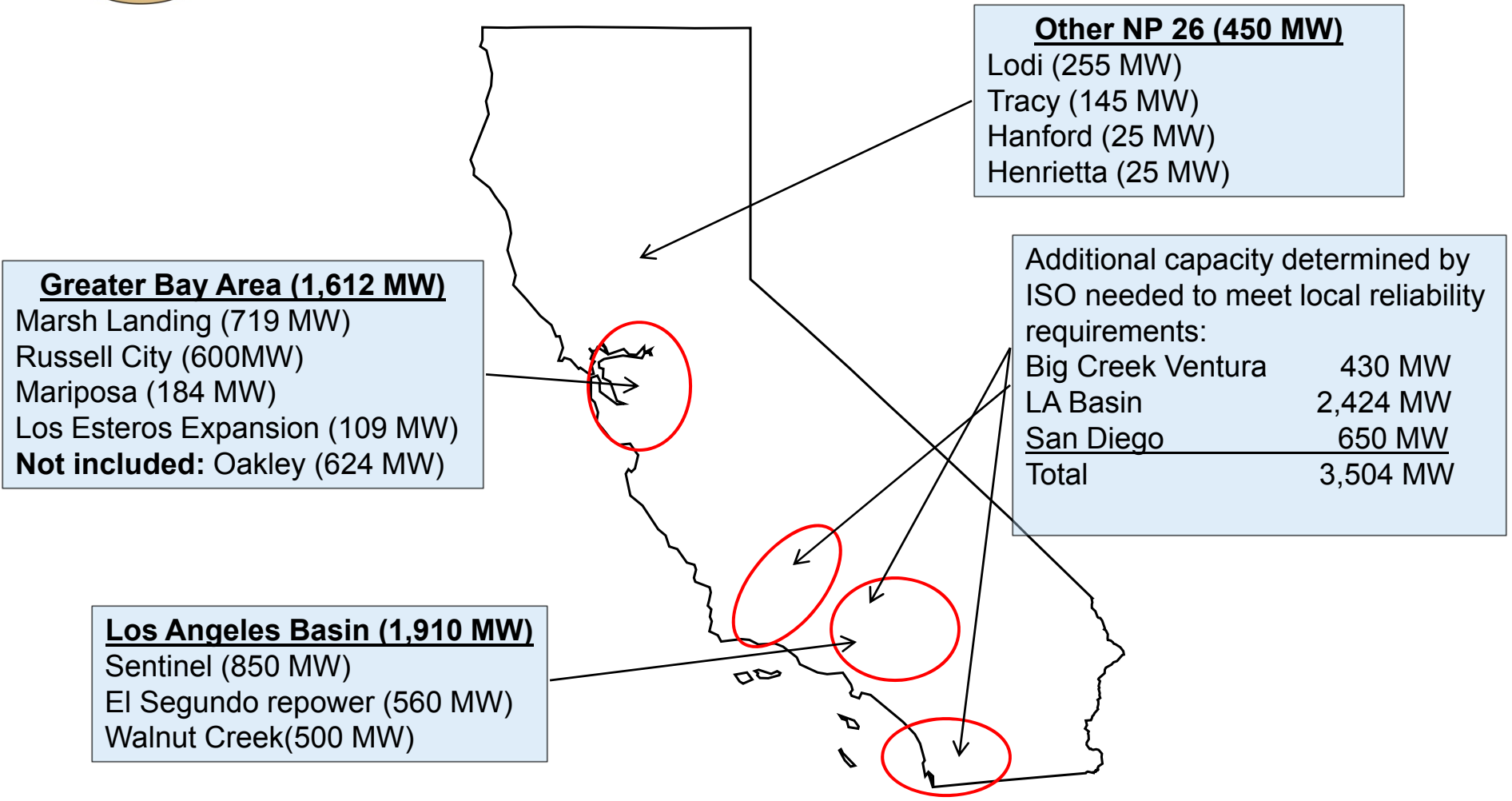


Major California ISO Local Reliability Areas and Subareas





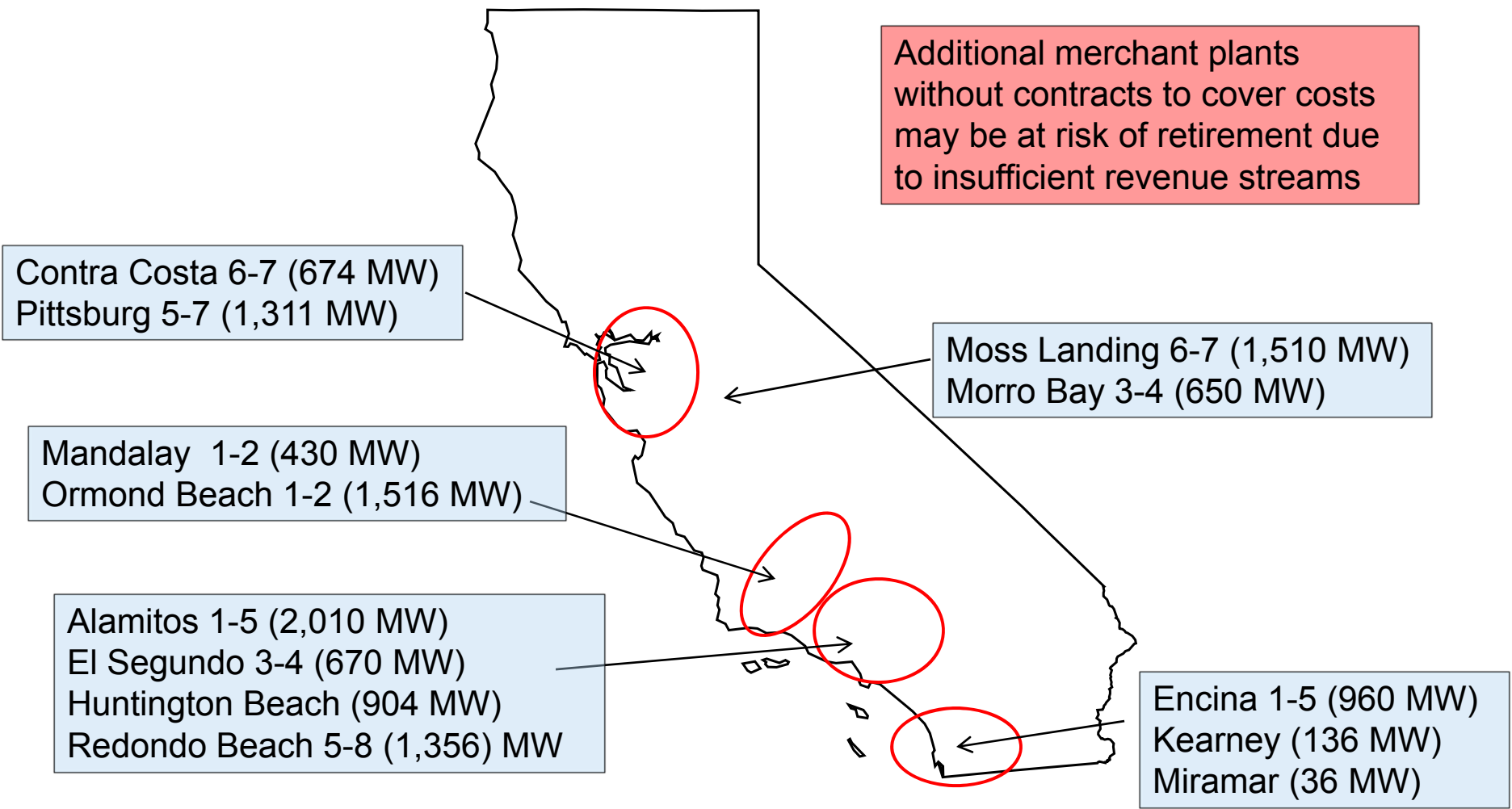
Conventional Resource Additions





Retirements through 2020

12,163 MW





Impact of Uncommitted Energy Efficiency Programs is Uncertain

- Impact of yet-to-be funded, designed and implemented energy efficiency programs not included in load forecast
- 2020 assumptions used in 2010 LTPP proceeding based on 2009 IEPR study:
 - NP26: 2,496 MW
 - SP26: 3,192 MW
- Updated estimates for 2012 IEPR Update are being prepared and will be available shortly



Combined Heat and Power is Uncertain

- Targets for development set by ARB (4,000 MW by 2020 in AB 32 Scoping Plan), Governor's Office (6,500 MW by 2030)
- QF settlement at CPUC set target of 3,000 MW of new CHP
- 2010 CPUC Long-Term Procurement Planning proceeding assumptions (for 2020):

Area	MW Added	Demand-Side ¹	Supply-Side
PG&E/NP 26	782	401	409
SCE	641	360	307
SDG&E	82	58	28
Total SP 26	723	418	335
Total	1,505	819	744

¹ Increased to account for 7.7% transmission losses



Combined Heat and Power (cont'd)

- 2012 ICF study funded by Energy Commission
- Comparison of base case to LTPP assumptions (2020 values):

Area	ICF Study ¹	LTPP
PG&E/NP 26	636	782
SCE	347	641
SDG&E	141	82
Total SP 26	488	723
Total	1,123	1,505

¹ Also projects CHP development for LADWP (224 MW), SMUD (47 MW) and other areas in Northern (44 MW) and Southern California (60 MW), for a total of 1,498 MW.

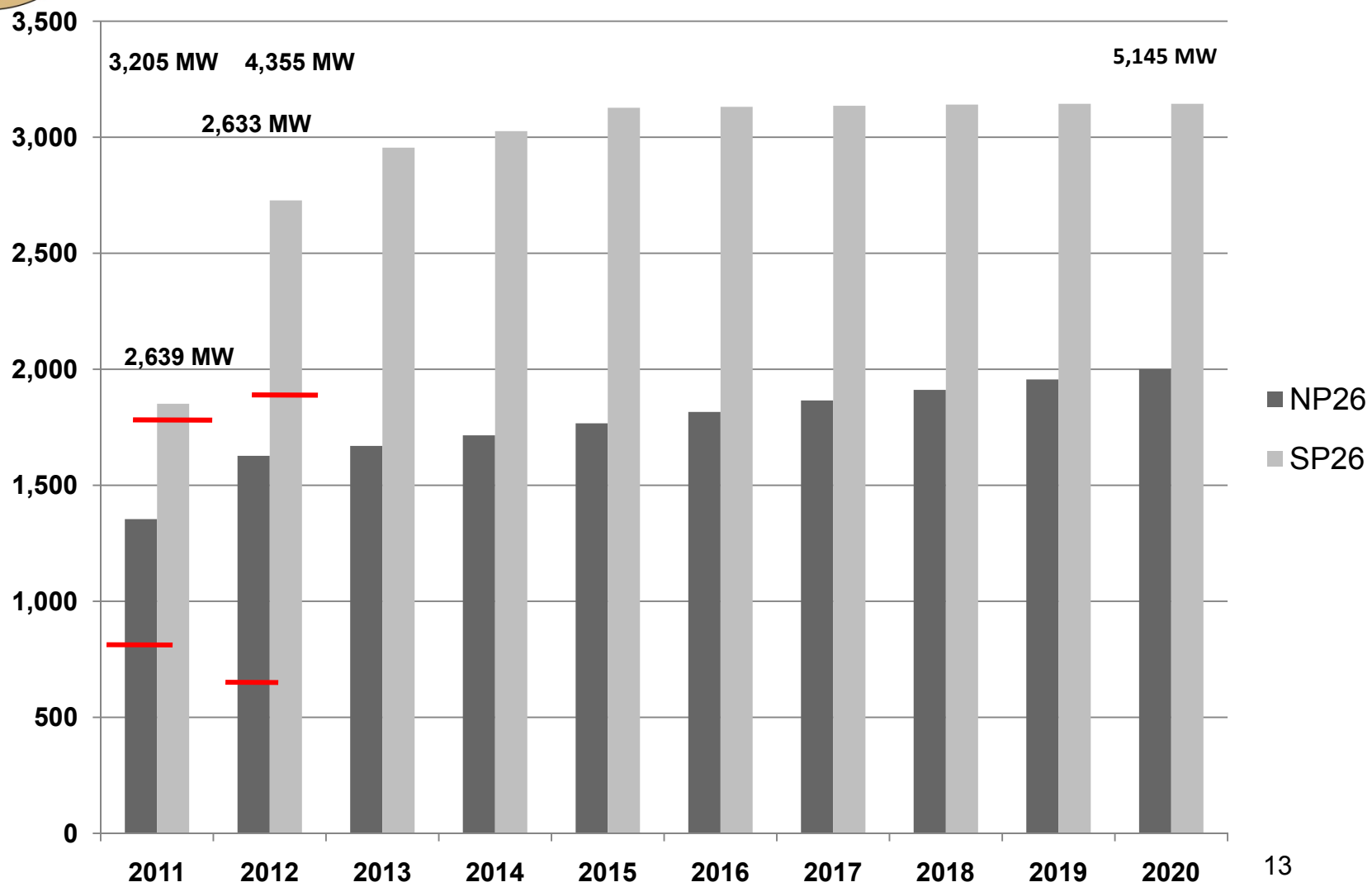


Combined Heat and Power (cont'd)

- While higher rates and lower gas prices provide incentives for CHP, parties at February 2012 IEPR workshop questioned whether Settlement targets and/or ICF projections would be realized
 - Extension of contracts with existing QFs counts toward settlement target
 - Existing CHP has advantage in ongoing IOU RFOs
 - CHP must ultimately compete on least-cost, best-fit basis
 - POUs cite limited opportunities for CHP development
- 2011 IEPR filings by IOUs (for 2020):
 - PG&E - 488 MW
 - SCE - 253 MW



Demand Response is Uncertain



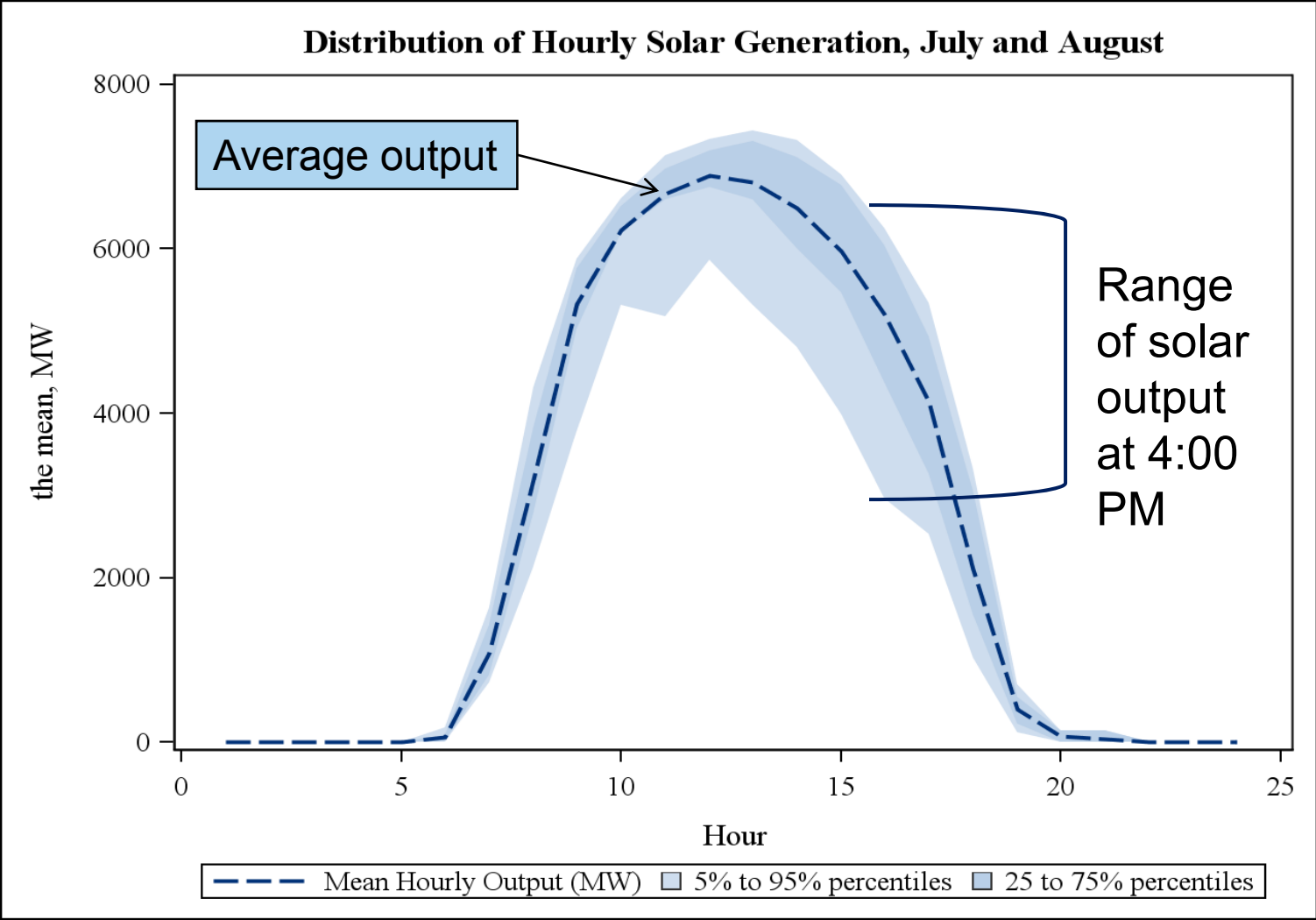


Renewable Resource Development

- Two scenarios developed by CPUC for 2010 LTPP are being evaluated
 - Cost-constrained case
 - Environmentally-constrained case
- Latter is high distributed generation case, accordingly with more capacity in NP26, local reliability areas
 - 33% build-out is all but complete by 2018
- Capacity of resource is based upon dispatch value in ISO transmission planning studies
 - Solar: 55%
 - Solar Thermal: 69-72%
 - Wind: 25-52%

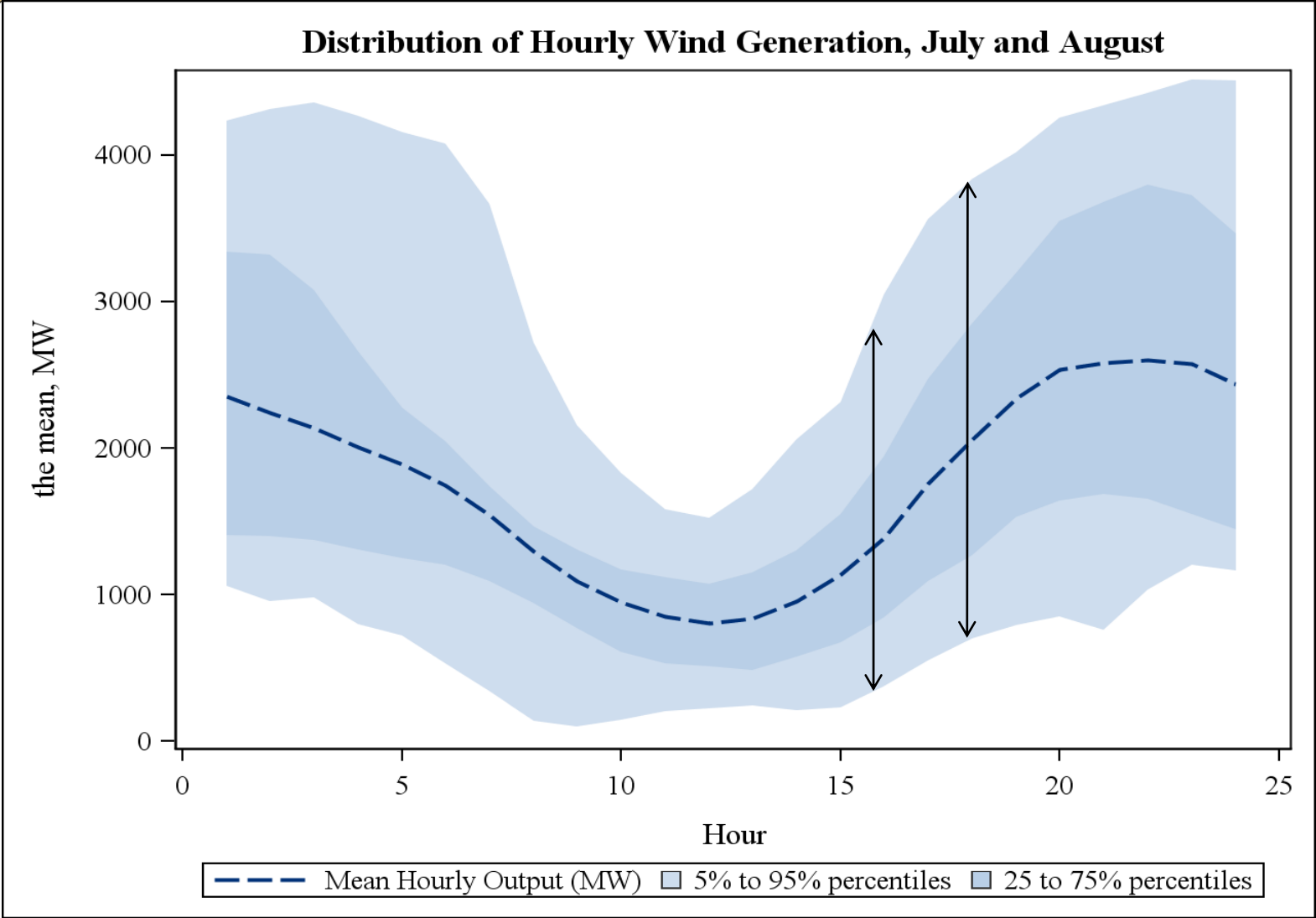


Solar Output Varies



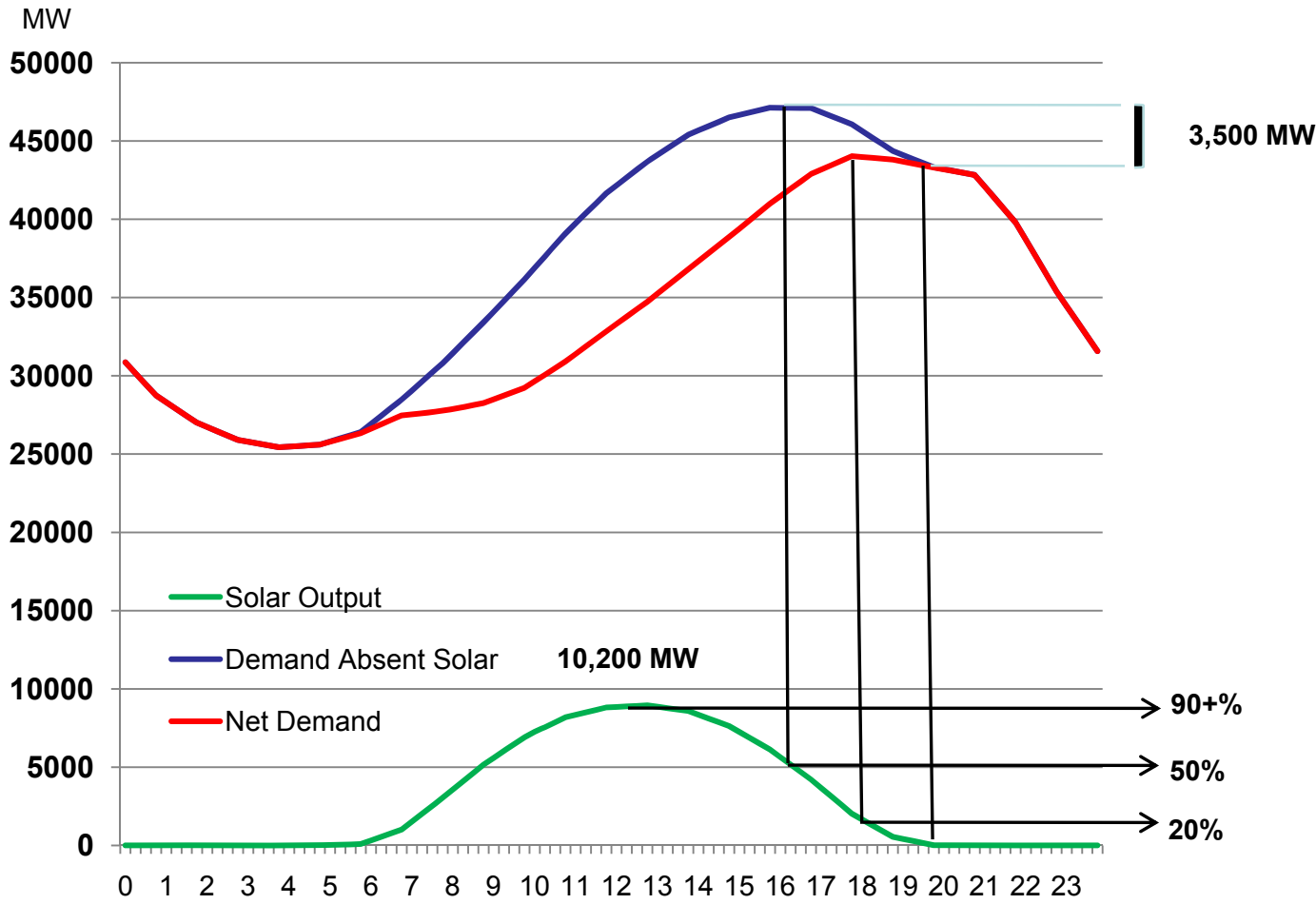


Wind Output Varies





Limits on Solar Capacity Value (illustrative values)





Imports are Uncertain

- Basing available imports (net interchange) for planning purposes on historically observed average values is problematic
 - Most high load days don't reflect stressed conditions
 - High reserve margins can reduce need for imports
 - Net interchange will change as California procures resources out-of-state, NP 26 utilities contract with SP 26 renewable projects
- Studies for 2021/2022 use 2012 Maximum Import Capability as determined for consideration in resource adequacy settings
 - ISO 11,225 MW
 - SP26 10,132 MW
 - NP26 4,843 MW
- Long run values need to consider California contracts with out-of-state resources, available energy and capacity surpluses in neighboring states



NP 26 Reserve Margins without Preferred Resource Targets

	2018	2021
Peak Demand	23,408	24,323
Less Uncommitted Energy Efficiency	0	0
Total Demand	23,408	24,323
Existing Supply	25,750	25,750
Additions:		
Conventional (e.g. fossil)	2,074	2,074
Combined Heat and Power	0	0
Renewable (Cost constrained case)	1,612	1,612
Less Retirements	(4,145)	(4,145)
Demand Response (2012 levels)	682	682
Net Interchange (Imports)	4,843	4,843
Total Supply	30,816	30,816
Supply - Demand	7,408	6,493
Reserve Margin	31.6%	26.7%



SP 26 Reserve Margins without Preferred Resource Targets

	2018	2021
Peak Demand	30,349	31,602
Less Uncommitted Energy Efficiency	0	0
Total Demand	30,349	31,602
Existing Supply	24,677	24,677
Additions:		
Conventional (e.g., fossil)	1,910	1,910
Combined Heat and Power	0	0
Renewable (Cost constrained case)	4,446	4,446
Additional Capacity for Local Reqs.	650	3,504
Less Retirements	(2,244)	(8,008)
Demand Response (2012 levels)	1,944	1,944
Net Interchange (Imports)	10,132	10,132
Total Supply	41,515	38,605
Supply - Demand	11,166	7,003
Reserve Margin	36.8%	22.2%



NP 26 Reserve Margins and Uncertainties

	2021	Δ	
Peak Demand	24,323		
Less Uncommitted Energy Efficiency	0	(2,496)	LTPP target
Total Demand	24,323		
Existing Supply	25,750	?	
Additions:			
Conventional (e.g., fossil)	2,074	624	Oakley
Combined Heat and Power	0	636	ICF study
Renewable (Cost constrained case)	1,612	?	
Less Retirements	(4,145)	(1,010)	Moss Landing 1-2
Demand Response (2012 levels)	682	1,319	LTPP target
Net Interchange (Imports)	4,843	?	
Total Supply	30,816		
Supply - Demand	6,493		
Reserve Margin	26.7%		



SP 26 Reserve Margins and Uncertainties

	2021	Δ	
Peak Demand	31,602		
Less Uncommitted Energy Efficiency	0	(3,192)	LTPP target
Total Demand	31,602		
Existing Supply	24,677	(2,246)	San Onofre
Additions:			
Conventional (e.g., fossil)	1,910		
Combined Heat and Power	0	488	ICF study
Renewable (Cost constrained case)	4,446	?	
Additional Capacity for Local Reqs.	3,504		
Less Retirements	(8,008)		
Demand Response (2012 levels)	1,944	1,248	LTPP target
Net Interchange (Imports)	10,132	?	
Total Supply	38,605		
Supply - Demand	7,003		
Reserve Margin	22.2%		



Power Plant Outage Assumptions Matter

- At any point in time, some share of the generation fleet will be “out for maintenance.”
- Assumptions regarding the size of this share do not appear in load-resource balance tables (slides 19-22), but influence MW of generation needed to meet system reliability.



Power Plant Outages Happening More Frequently?

- Historical averages may be poor indicators of true values
 - Amount of planned outages can be influenced by balancing authority (ISO) fiat
 - The higher the daily load (thus price), the more likely generators are to be available

Average Daily MW out at hour of peak, Summer Weekdays, California ISO

