

## DOCKETED

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# Analysis of Peak Shift

2016 Integrated Energy Policy Report Update

Sacramento, CA

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# Background

- CEC utility/system peak demand based on outputs from sector forecasting models serving as inputs into HELM peak forecasting model
- Underlying assumption is that utility peak in forecast period will occur in similar period as in history
- If load modifiers affect shape of load curve, then the underlying methodology is not capturing potential changes to peak demand



# What are the Consequences?

- The IEPR load forecast is used by CPUC and CAISO as inputs for their respective needs supporting procurement and transmission planning
- Not addressing issues related to shift in peak injects bias which then carries over into analyses using IEPR forecast
- This bias implies a higher impact from BTM PV which then translates to a lower utility peak
- Addressing these issues will require changes to how CEC forecasts peak demand



# Other Issues

- Yes, BTM PV production but other load modifiers exist:
  - Electric vehicle charging profiles
  - Energy storage
  - TOU pricing
  - Hourly AAEE impacts



# Modeling Shift in Peak Hour Data and Approach

- Load data comes from ISO EMS
- Hourly AAEE savings and EV forecast derived from *CED 2015 Revised*
- EV forecast translated to average hourly load impacts
- PV data from CPUC NEM interconnection data (current through 12/31/2015)



# Modeling Shift in Peak Hour Data and Approach...Continued

- Hourly EMS data and estimated PV production combined to recreate consumption for each day of 2015
- 2015 consumption scaled based on growth from *CED 2015 Revised*
- Re-estimate “metered load” by subtracting PV and AEE impacts from the adopted forecast
- Observe metered load for shift in peak over the 10 year forecast horizon



# Findings

- Simplified projections including PV and AAEE effects, see shifts up to 4 hours as soon as 2017
- CAISO staff currently observing peak shifts in local areas
- Better idea of magnitude and timing but constant baseline shape is a limiting factor
- In addition to peak, off-peak loads and ramp may be of concern





# California Energy Commission

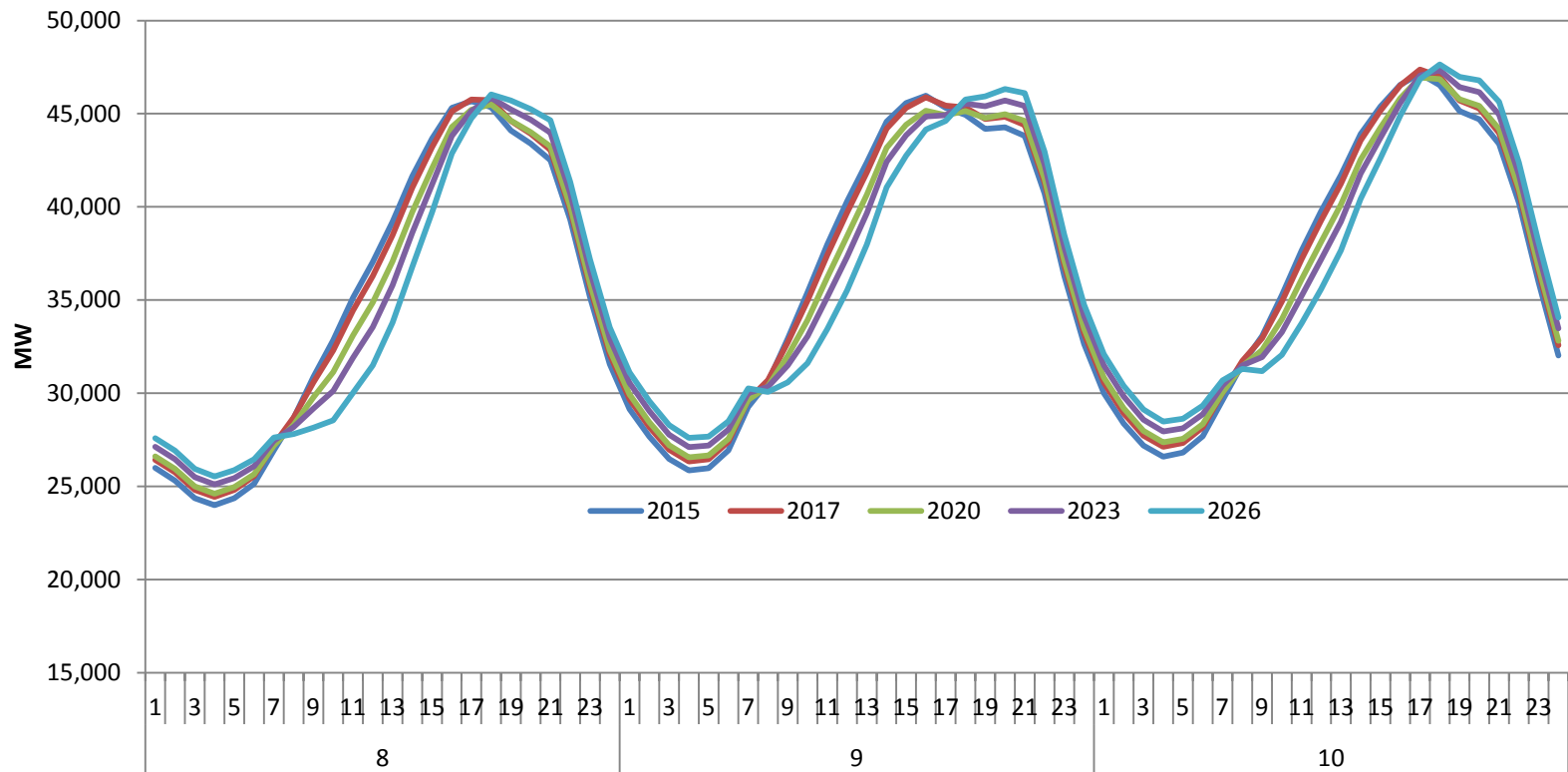
## CAISO September - 8, 9, 10

		HR	2017	2020	2023	2026
CAISO	8-Sep	16	45128.42	44283.95	43816.3	42873.42
		17	45764.04	45206.28	45137.65	44754.9
		18	45718.98	45496.21	45851.1	46035.44
		19	44621.14	44632.96	45229.91	45716.07
		20	43922.85	44019.4	44688.75	45255.36
	9-Sep	16	45878.36	45157.28	44861.82	44143.37
		17	45437.93	44928.36	44921.01	44617.01
		18	45330.27	45147.03	45541.62	45765.83
		19	44721.76	44768.26	45403.38	45925.61
		20	44842.13	44981.09	45704.47	46320.09
	10-Sep	16	46521.67	45832.26	45574.86	44891.76
		17	47371.31	46939.96	47039.44	46853.64
		18	46989.44	46859.72	47330.76	47640.32
		19	45714.64	45777.22	46437.19	46983.3
		20	45282.38	45425.55	46156.91	46780.34



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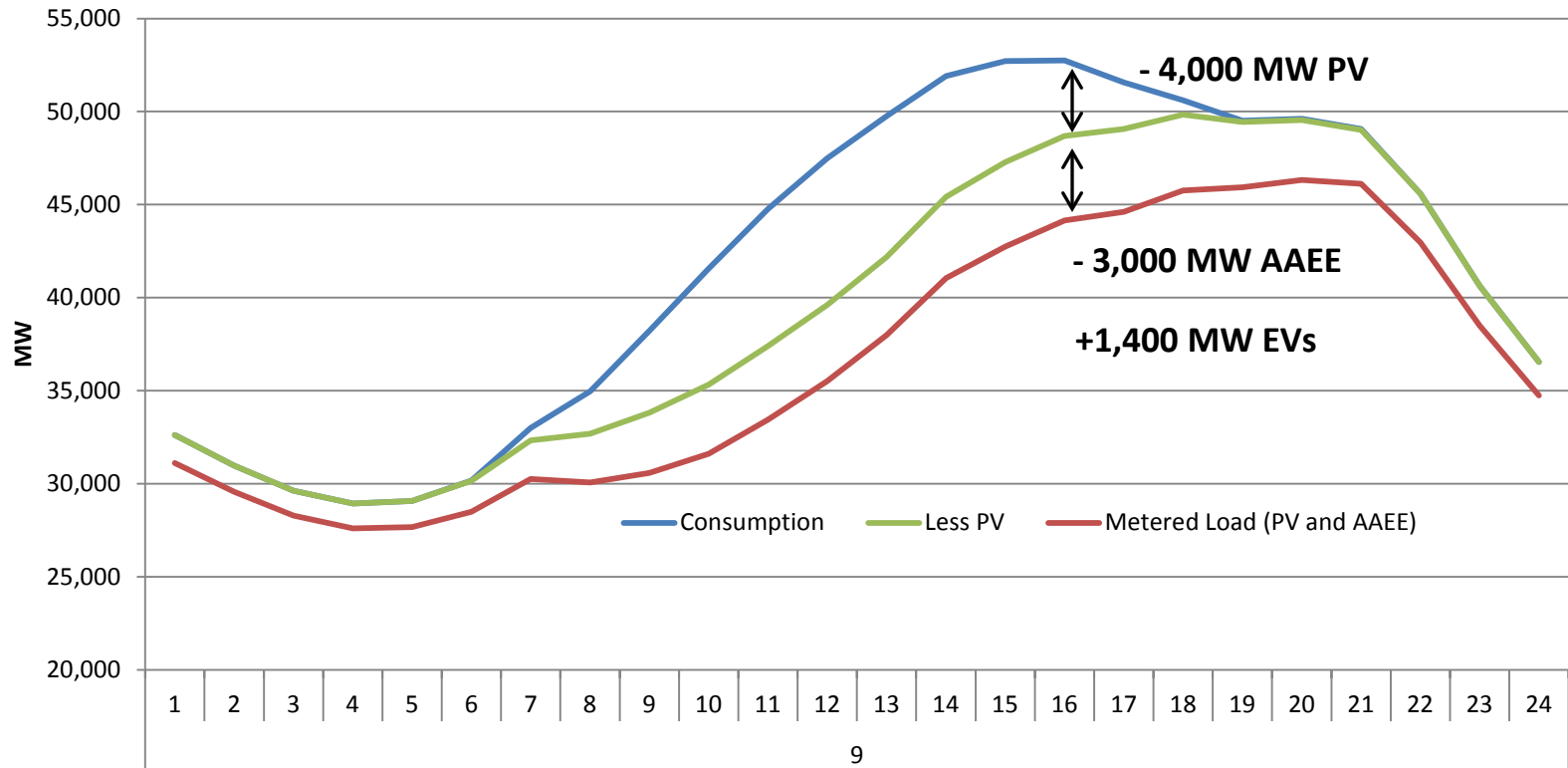
# CAISO September 8-10





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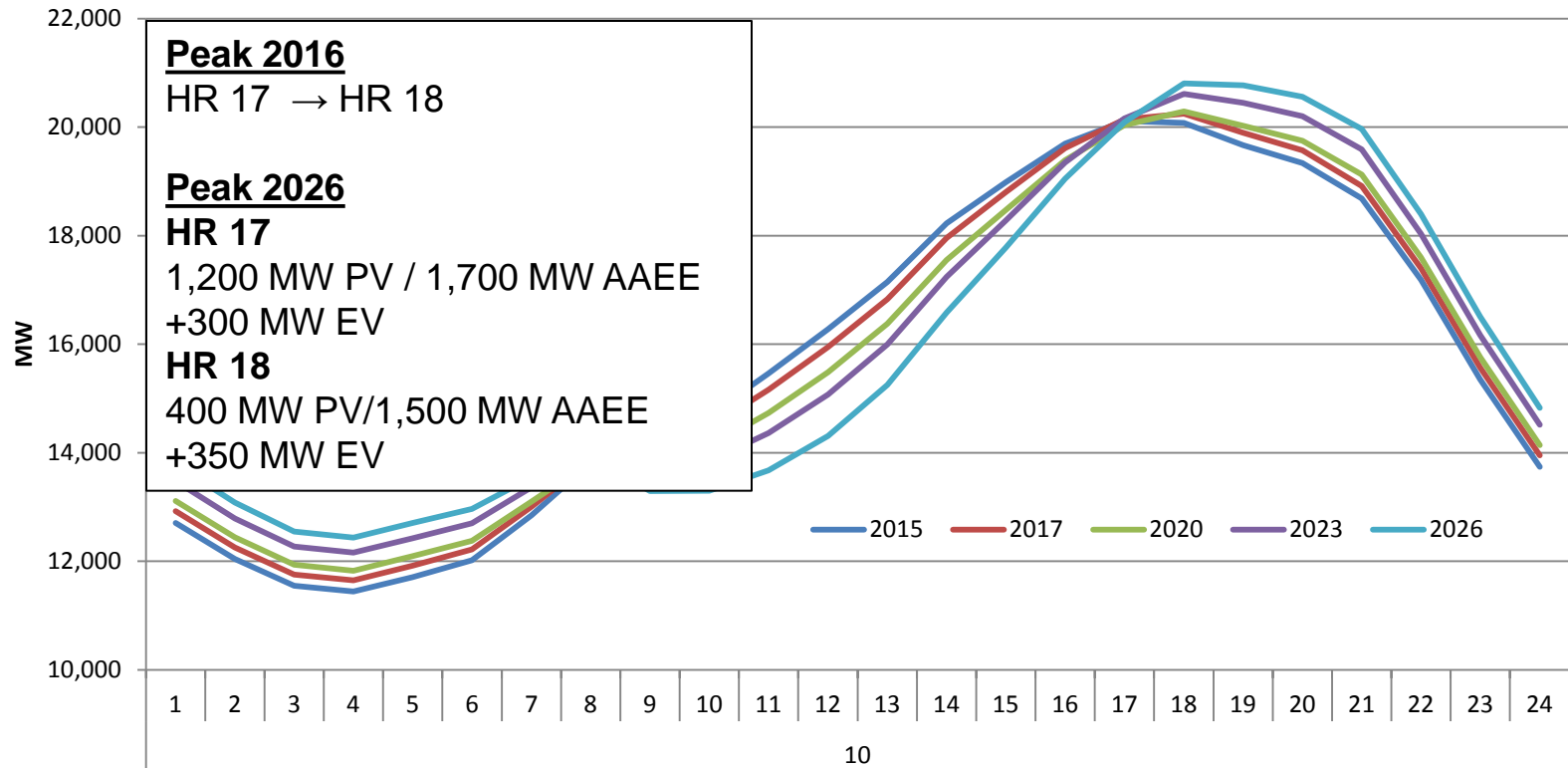
# CAISO – PV, AAEE, and EVs September 9, 2026





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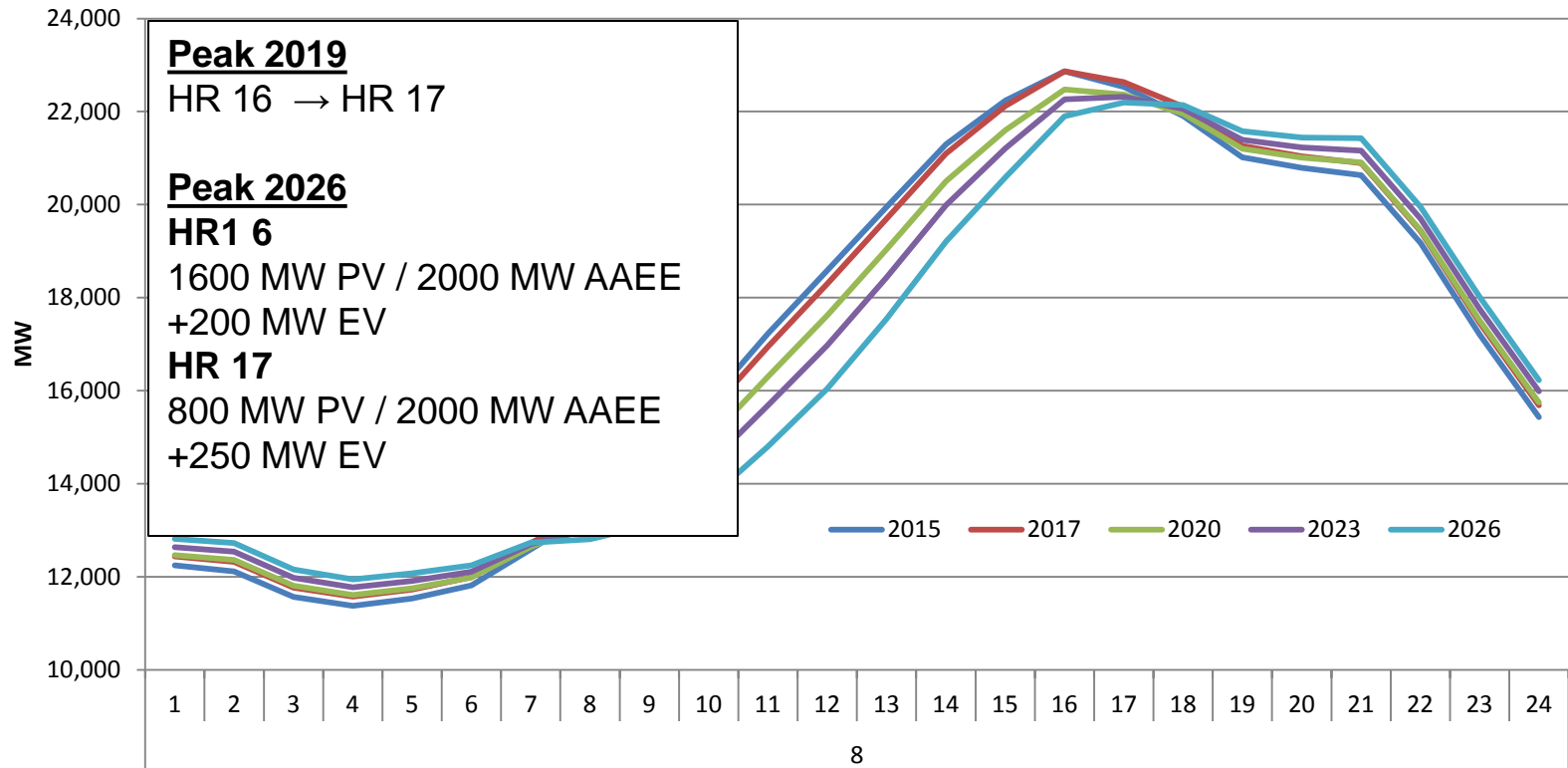
## PG&E September 10





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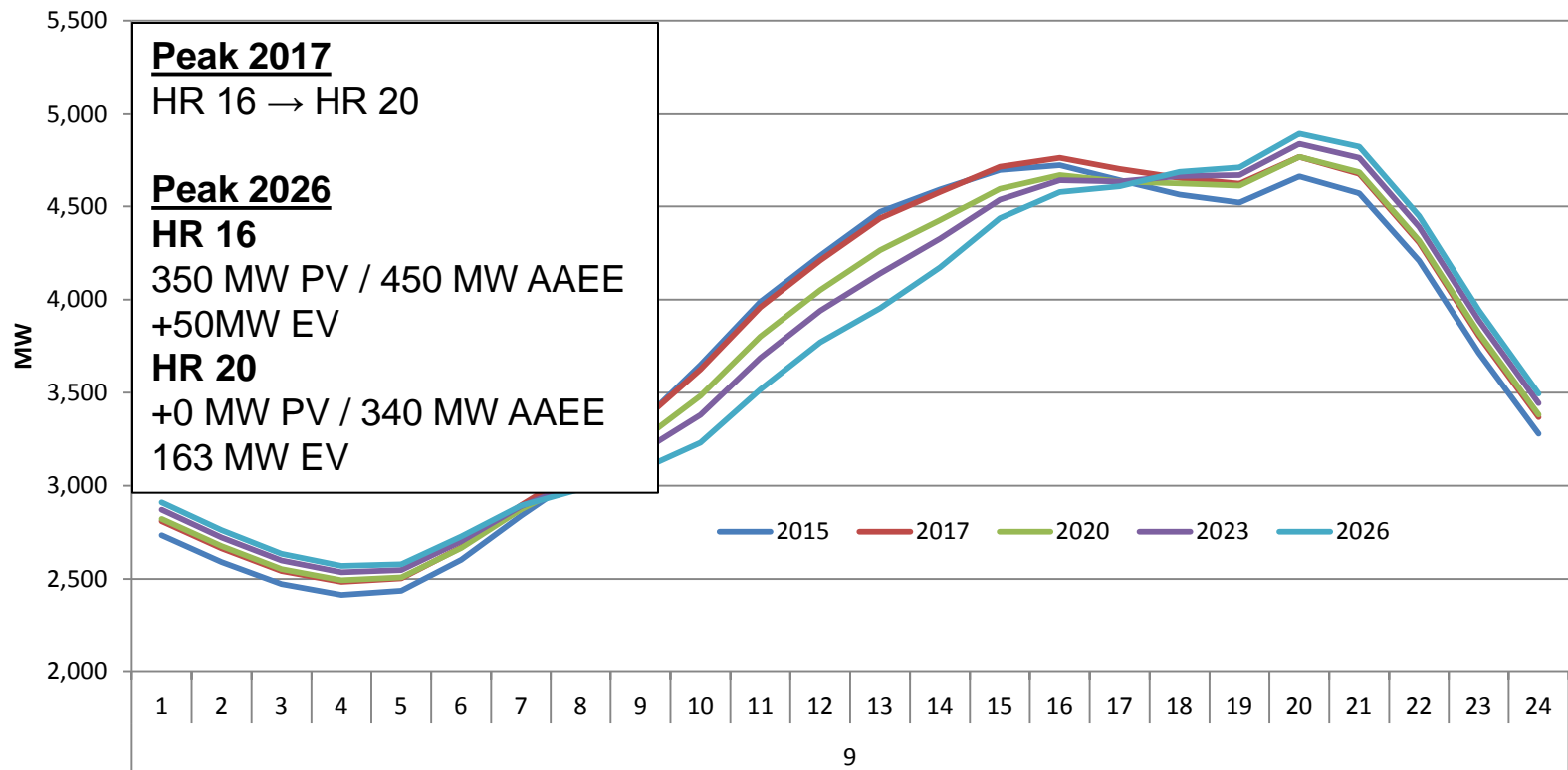
## SCE September 8





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## SDG&E September 9





# CAISO Off-Peak

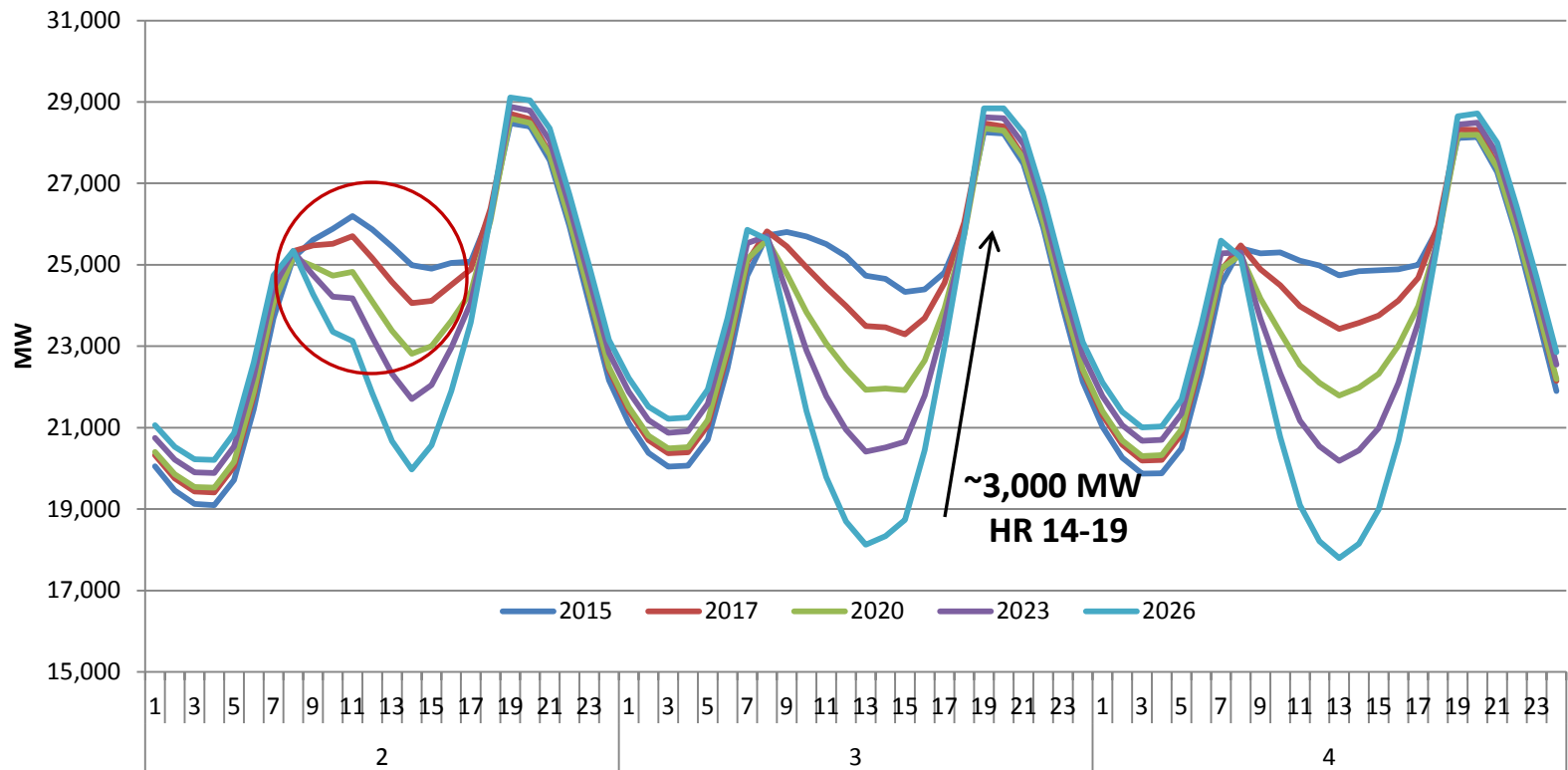
## March 2-4

- Observing shoulder months revealed significant “belly” due to lower loads but continued BTM PV production and AEEE savings
- Solar production variability due to weather



## California Energy Commission

# CAISO Off-Peak March – 2, 3, 4







# Conclusions

- Other future load modifiers to incorporate
  - EVs, storage, TOU
- Weather variation for hourly forecasts
  - Normalized based on history plus climate change impacts?
  - PV Production variation?



# Conclusions

- We've assumed baseline consumption shapes do not change
- Full analysis requires projections of underlying baseline loads i.e., hourly forecasting