

# **CPUC Updates to CEC DAWG**

*(a) Daylight Savings Issue / Peak Load Shift Update*

*(b) Comparison to CEC Multipliers*

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# Updates: Daylight Savings Issue

- Bug found in CAISO EMS data
  - Daylight savings shift not handled accurately
  - Discovered immediately after last DAWG. No reply from CAISO yet...
- CPUC performed weather normalization with corrected EMS data
- Peak load shift analysis revisited to examine potential impact of this systematic bias
- Consequences of CAISO daylight savings error appear minor provided:
  - Time zones used consistently for each month
  - Not looking at March or November

# Load Types

Load Type	Definition
<b>Consumption</b>	Sum of electrical energy used to operate end-use devices excluding charge/discharge of storage
<b>Sales</b>	Consumption load less BTM onsite generation plus charge/discharge of storage
<b>System Load</b>	Sales load plus T&D losses plus theft and unaccounted for
<b>Net Load</b>	System load less system intermittent renewable generation (currently wind and solar)

*Note: For our modeling purposes, we treat all quantities at system level*

## Acronyms

BTM: Behind The Meter

PV: Photo Voltaic

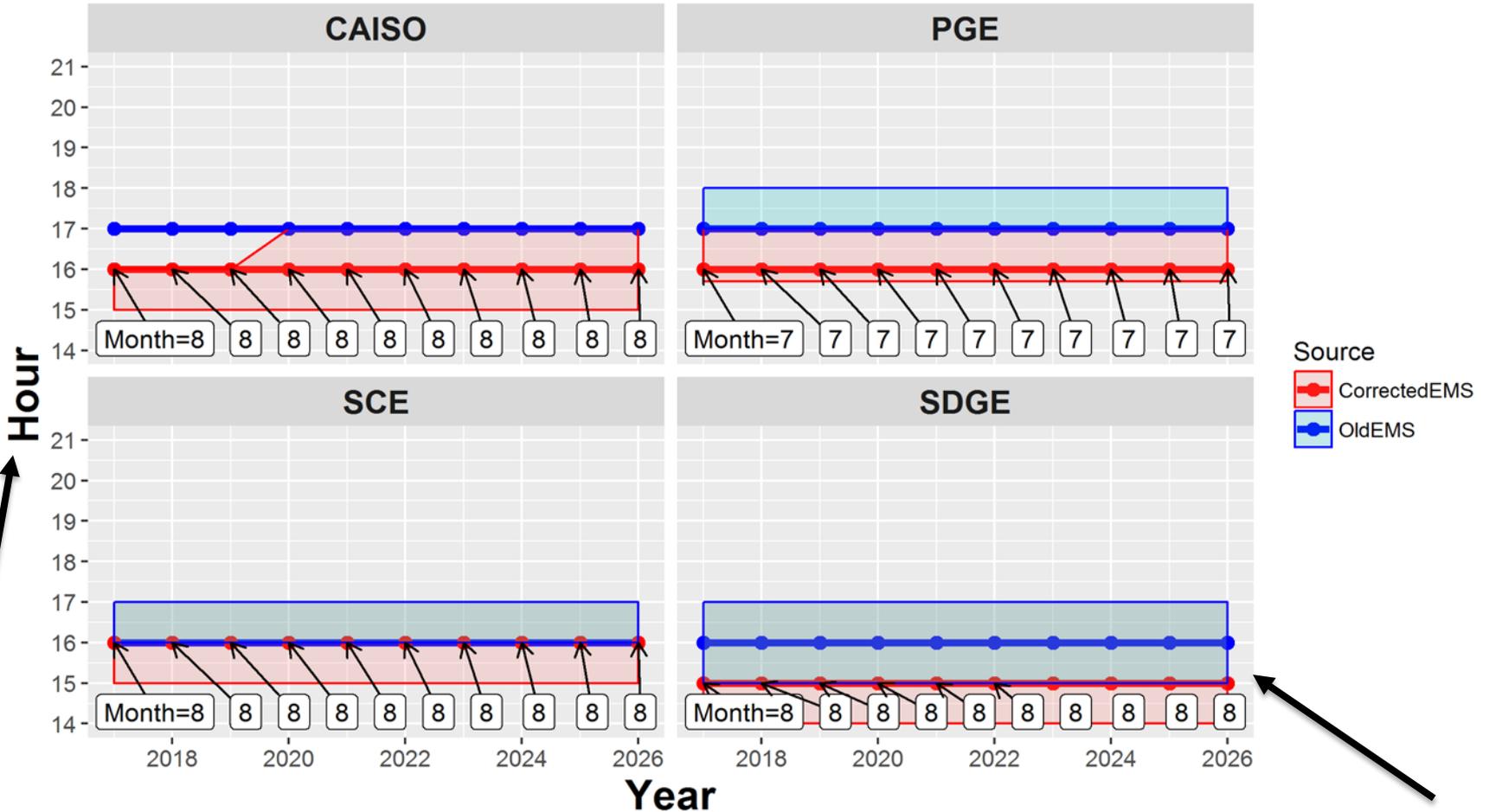
AAEE: Additional Achievable Energy Efficiency

T&D: Transmission and Distribution

# CPUC Peak Load Shift Analysis

- Uses dataset underlying CPUC stochastic production cost model, without doing any PCM runs
- Analysis based on:
  - 35 synthetic / historical hourly profiles (1980 – 2014)
  - 2015 CEC IEPR Forecast (2017 – 2026)
    - Peak and Annual Average Consumption
    - Installed BTM PV capacity
    - Hourly AAEE Profiles
- Using this data we can examine peak load from 8760 hourly profiles for:
  - Consumption
  - Sales
  - Net Load

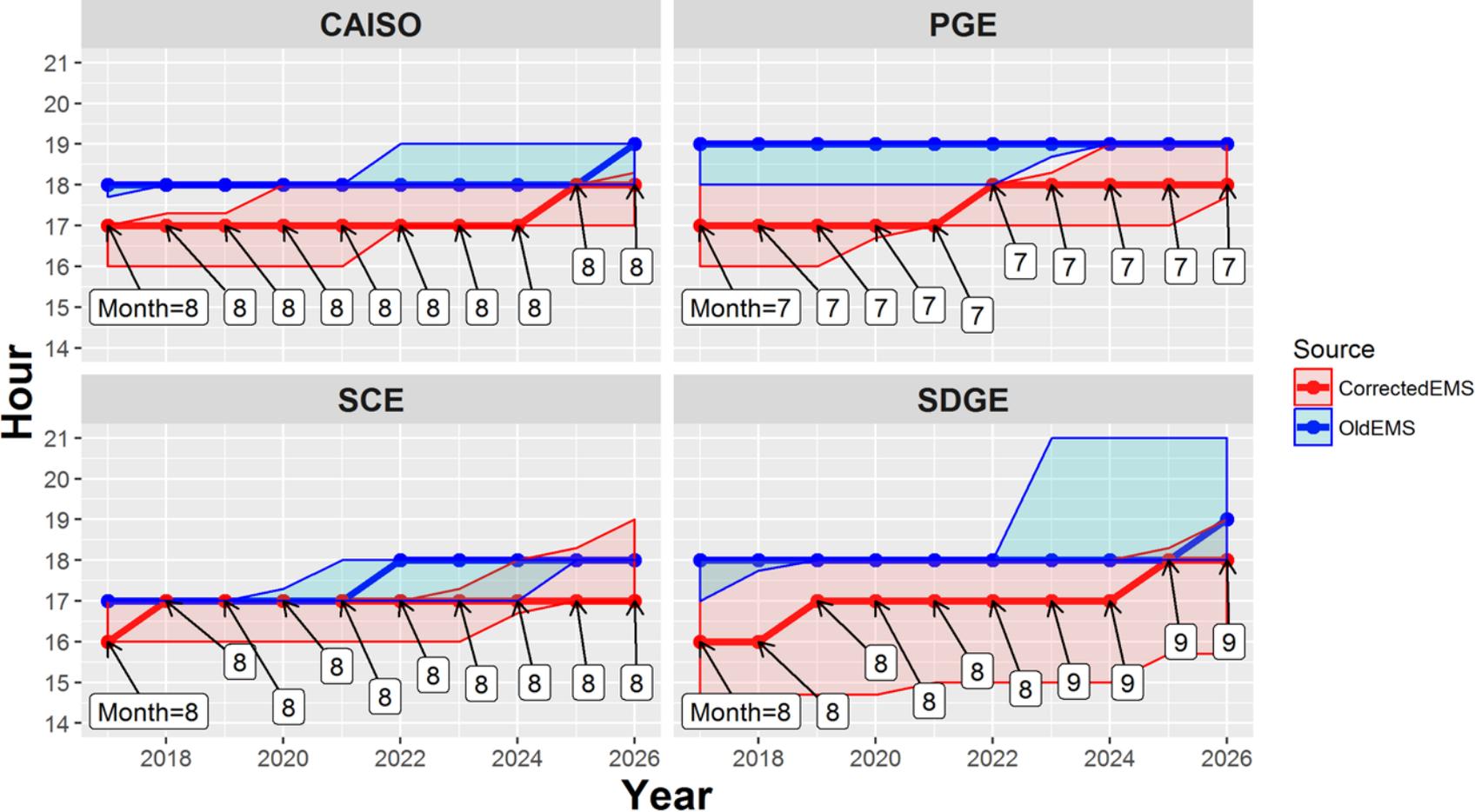
# Hour of Peak Consumption By Year



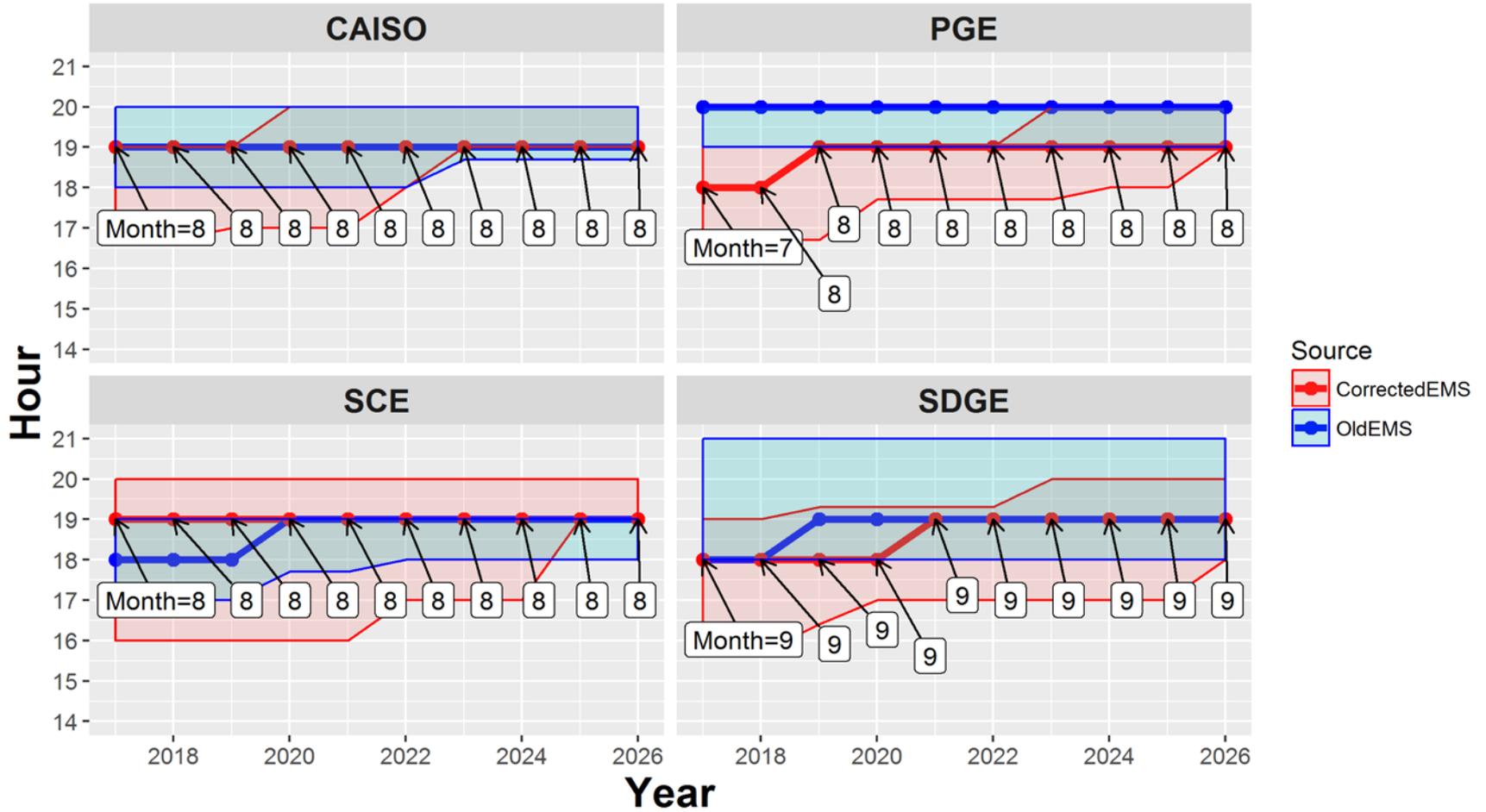
Hour Ending [1, 24]

Red and blue ribbons encompass 90% confidence interval (5<sup>th</sup> to 95<sup>th</sup> percentile)

# Hour of Peak Sales By Year



# Hour of Peak Net Load By Year



# Daylight Savings / Peak Load Shift

## *Observations and Conclusions*

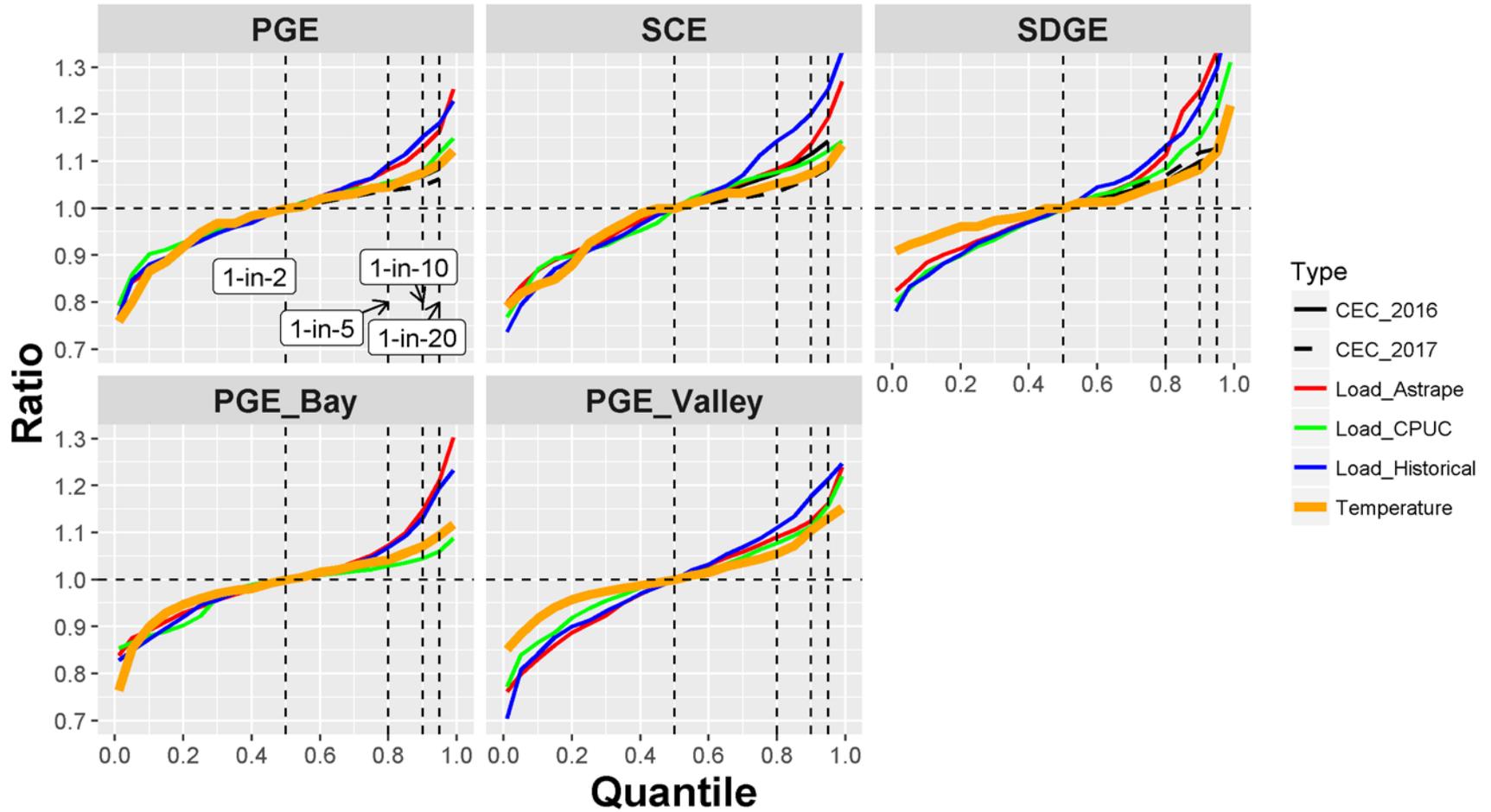
- Peak shifts using corrected EMS data appear to be one hour earlier than uncorrected EMS data
- All peaks (consumption, sales and net load) fall within daylight savings, so uncorrected EMS hour is entirely within daylight savings time
- Corrected analysis uses standard time, which explains hour offset, within confidence intervals
- Even though impacts may not be significant, still important to resolve this error especially if March or November results need to be examined
- Peak hour for consumption is independent of year
- Peak months for sales and net load tend to shift to later months with increasing year

## Updates: Comparing CEC Multipliers with CPUC

- Multipliers (or ratios) versus Quantile can be used to quantify distributions of expected load
- Used by CEC to establish 1-in-5, 1-in-10 and 1-in-20 loads from 1-in-2 loads
- CPUC weather normalization developed ratios from weather normalized load distributions and compared to CEC
- Reasonable agreement CEC analysis and
  - Old CPUC weather normalization (Astrape)
  - New CPUC weather normalization

# Ratio Versus Quantile

Daily Peaks Summer Only



# CPUC vs CEC Weather Normalization

## *Observations and Conclusions*

- Reasonable agreement between CPUC, CEC load and temperature distributions
- CEC ratios are based on temperature distribution which may explain why they appear so consistent
- Astrape approach manually adjusts peak loads by region which may explain why historical versus Astrape load distributions are so close
- Both CPUC and CEC show some slight discrepancy to historical at distribution tail
- This analysis demonstrates consistency between CPUC and CEC weather normalization process.
- Further comparisons should be made with CEC hourly profiles
- CPUC is independently performing a weather normalization process in order to run stochastic production cost modeling as mandated by RA and IRP proceedings