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CEDU 2020
Peak Forecast Update

For Investor-Owned Utility Planning Areas

Presenter: Nick Fugate, Energy Assessments

Date: December 3, 2020

Purpose and Scope

- The Energy Commission develops and adopts a completely new IEPR forecast every 2 years
- In intervening years, the adopted forecast is updated to reflect more recent load history, econ/demo projections, and select demand modifiers
- Staff resources in “update” years are typically devoted to model maintenance/development, data improvements, and other analytic projects in support of the next full IEPR
- Existing tools are aimed at an efficient process
  - Econometric models to adjust the adopted consumption forecast
  - Load-profiles to translate consumption to hourly and peak demand
  - Limited refresh of load modifiers

Method Review

Staff used the Hourly Load Model (HLM) to project peak and hourly loads for IOU planning areas

At a very high level, the model:

- Estimates expected hourly consumption profiles based on historical load, weather, and calendar effects
- Applies those profiles to the updated annual consumption forecast to estimate hourly and peak consumption load
- Adjusts that hourly consumption load to account for the impacts of behind-the-meter PV, battery storage, electric vehicle charging, energy efficiency, residential time-of-use rates, climate change impacts, and other load modifiers

What has changed

- One additional year of historical load and interconnection data
- Updated annual consumption forecasts have been applied to CED 2019 hourly load ratios
- Key demand modifiers have been updated
  - Light-duty / medium- and heavy-duty electric vehicle charging
  - Behind-the-meter PV and battery storage
  - Climate change impacts made incremental to new 2019 base year
- Consumption profiles have been adjusted to align with weather normalized estimates of recent annual peak load (“weather normalized benchmark”)

Weather Normalized Peaks

Method Review

1. Estimate counter-factual daily peaks by adding DR impacts to observed system loads
2. Model these daily peaks as a response to daily weather statistics and calendar effects using most recent three years of data
3. Simulate daily peaks for 30 historical weather years
4. From the distribution of simulated peaks, select the median

Results

	2019 Normalized	2020 Forecast*	2020 Actual	2020 Normalized
PGE	20,779	20,486	21,065	20,370
SCE	23,623	23,343	24,246	23,364
SDGE	4,194	4,138	4,412	4,173

*CED 2019, mid-mid managed, 1-in-2 peak

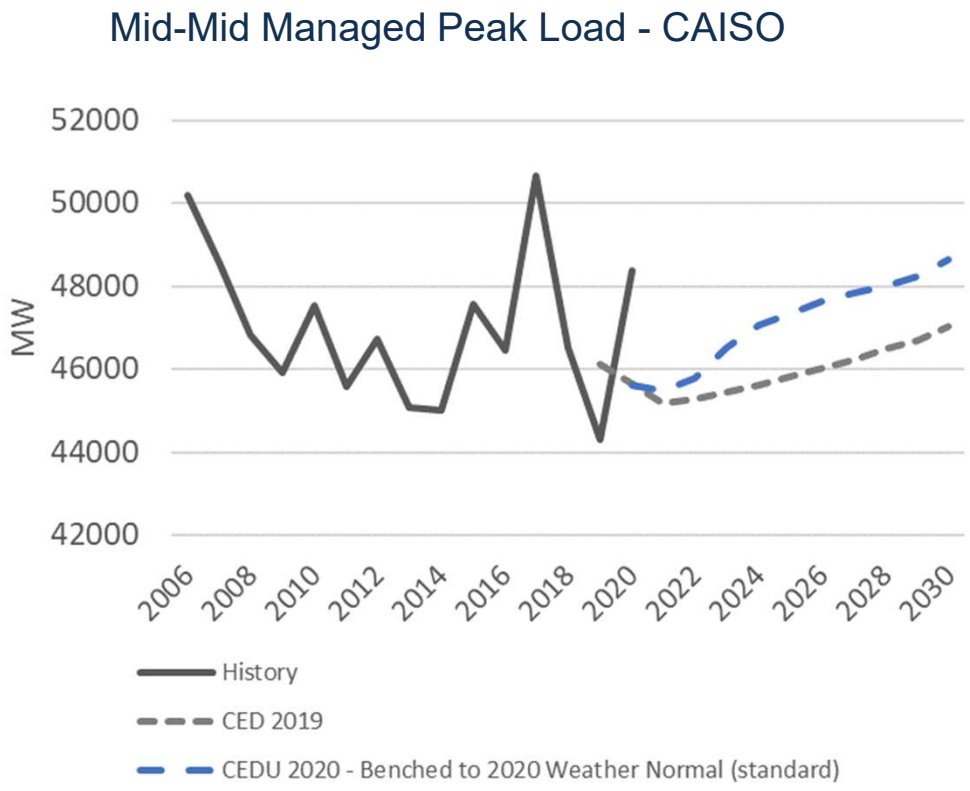
2020 normalized values are lower than 2019 normalized and relatively close to CED 2019 forecast values

Near-term Uncertainty

Three flavors of uncertainty:

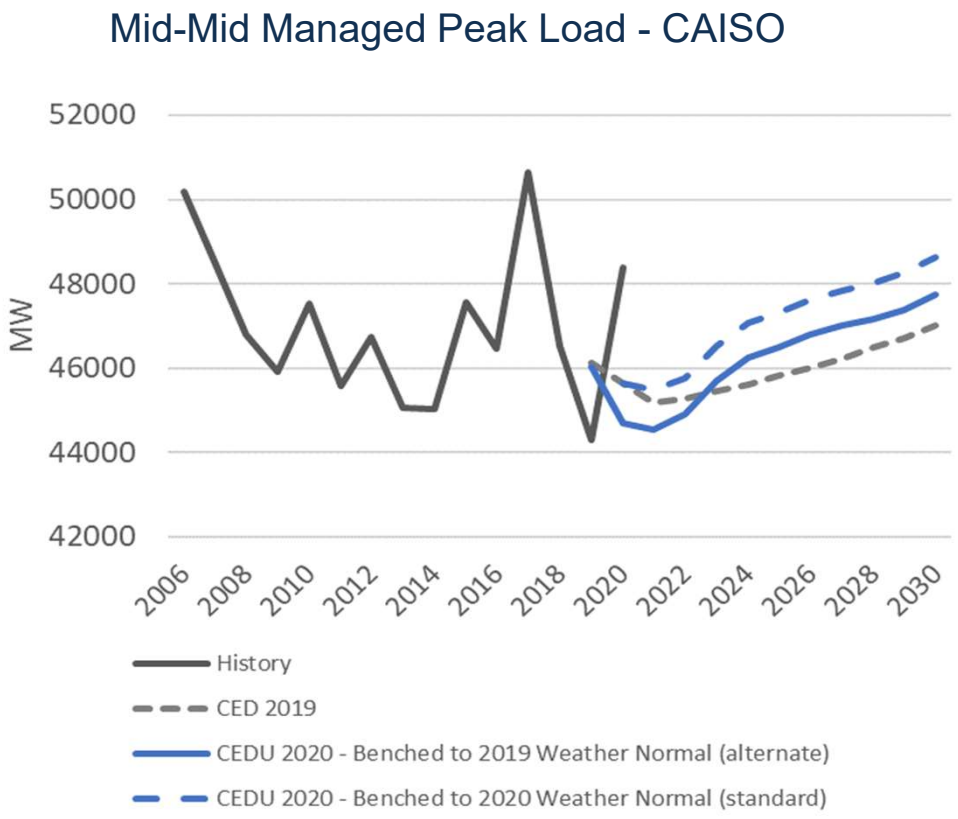
1. Extent of economic downturn and pace of recovery
2. Abrupt, large-scale, and intermittent changes to patterns of energy consumption
   - More complicating to the modeling process
   - Standard tools and data collection efforts are not well-suited for this type of real-time analysis
   - The problem does not pare well with our streamlined update process
3. Structural changes to business, transportation, and other energy use patterns may persist beyond the pandemic experience

Issue With Standard Benchmark



- Standard approach would benchmark to 2020 weather normalized peaks
- Departs from underlying consumption forecast by not capturing the initial decline from 2019 to 2020
- Hence, standard approach reflects the impacts from a projected economic recovery without fully capturing the downturn

Alternate Benchmark



- 2019 benchmark reflects expected load response to high-level economic drivers, all else equal
- Near-term inconsistencies are highlighted by the delta between forecast and weather normalized 2020 annual peak
- Implicit in the long-term forecast is a return to a more normal relationship between economic indicators, consumption, and peak load
- 2022 represents a key use-case (system RA)

  ~350 MW delta from CED2019

Updating the Peak Forecast

Both standard and alternate benchmarks have issues

- Alternate benchmark provides a more reasonable long term forecast at the cost of alignment to recently observed peaks
- Helpful to think of the forecast period as being bifurcated into two periods
  - ➢Near term period of high-uncertainty
  - ➢Period representing a return to normalcy in the out-years

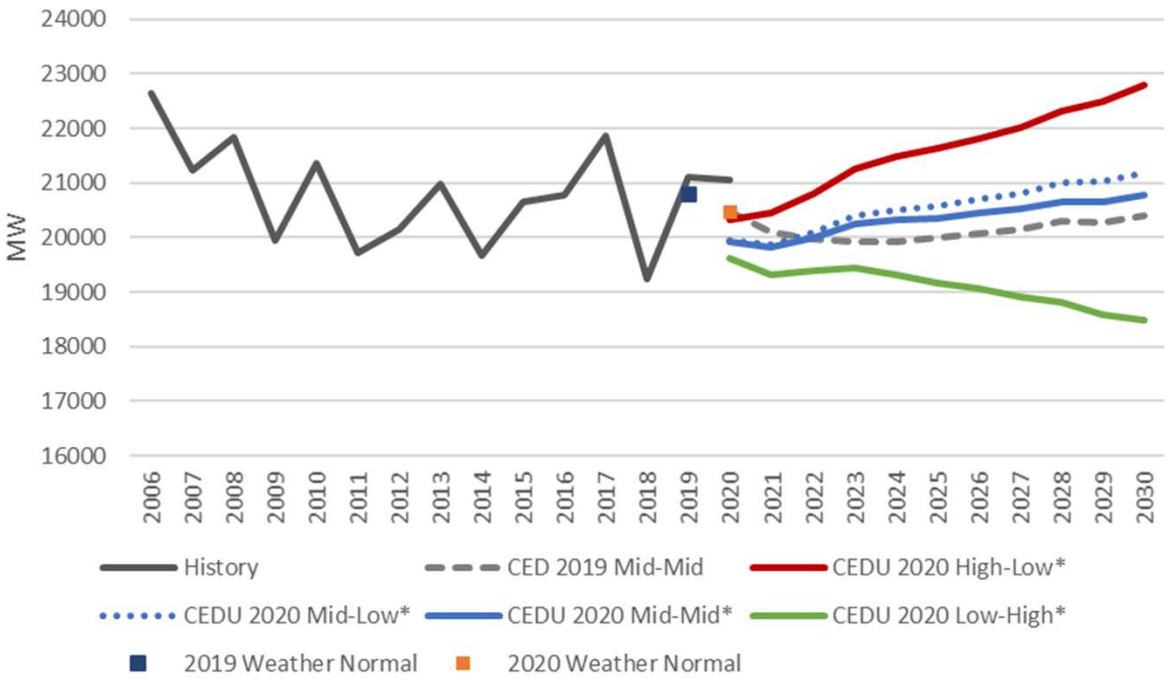
Staff believe that the alternate benchmark approach is reasonable for the out-years, but seek input from stakeholders as to what should be adopted or used for planning in the near-term

One potential option is to not update one or more initial years of the adopted peak forecast

Planning Area Peak Forecast Update Results

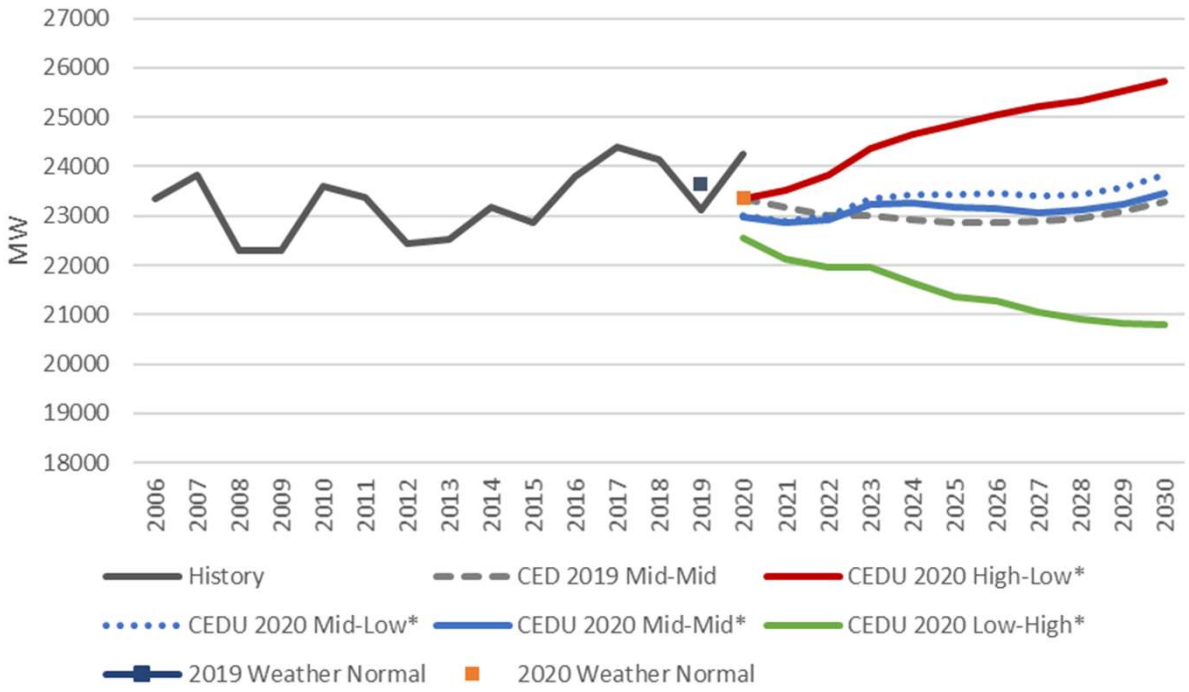
PG&E – Non-Coincident Peak

CEDU 2020 - Mid Mid*		
Year	Hour	MW
2019	17	20,779
2020	17	19,928
2021	18	19,821
2022	18	20,009
2023	18	20,254
2024	18	20,313
2025	19	20,342
2026	19	20,461
2027	19	20,537
2028	19	20,652
2029	19	20,661
2030	19	20,767



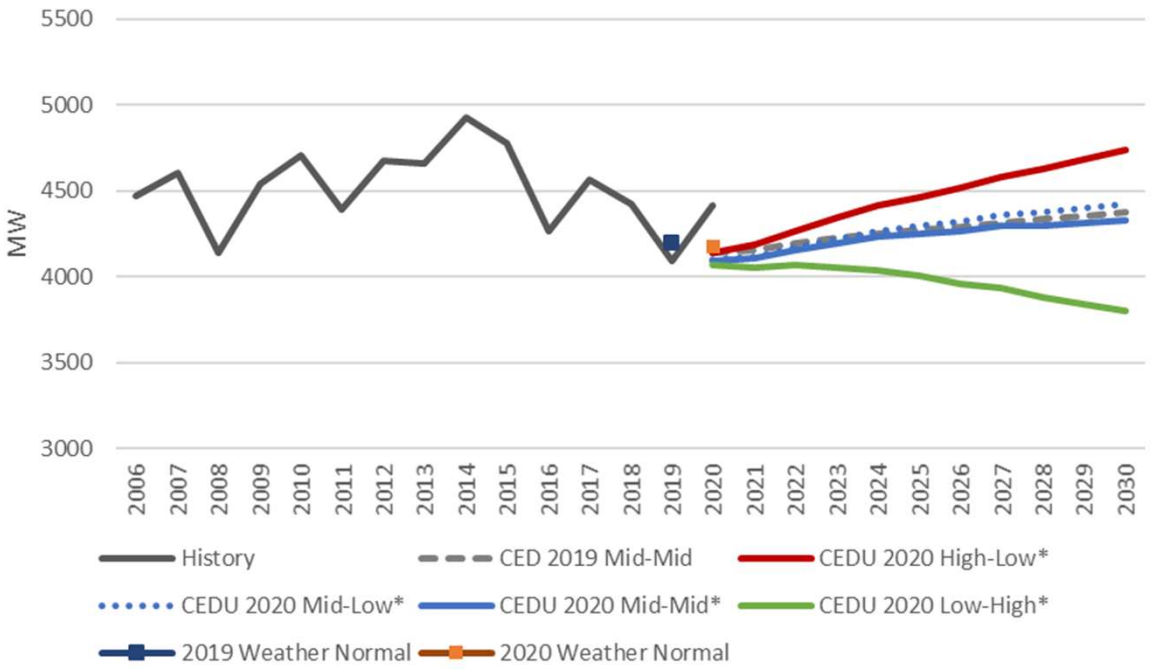
SCE – Non-Coincident Peak

CEDU 2020 - Mid Mid*		
Year	Hour	MW
2019	15	23,623
2020	16	22,992
2021	16	22,864
2022	16	22,934
2023	16	23,225
2024	16	23,249
2025	16	23,186
2026	16	23,149
2027	17	23,063
2028	19	23,116
2029	19	23,241
2030	19	23,446



SDG&E – Non-Coincident Peak

CEDU 2020 - Mid Mid*		
Year	Hour	MW
2019	19	4,194
2020	19	4,094
2021	19	4,107
2022	19	4,152
2023	19	4,195
2024	19	4,230
2025	19	4,248
2026	19	4,263
2027	19	4,293
2028	19	4,297
2029	19	4,312
2030	19	4,326



CAISO Coincident Peaks

Year	Hour	CAISO	PGE	Coincidence	SCE	Coincidence	SDGE	Coincidence
2020	17	44,705	18,311	91.9%	22,468	97.7%	3,806	93.0%
2021	17	44,552	18,241	92.0%	22,426	98.1%	3,757	91.5%
2022	18	44,925	18,858	94.2%	22,024	96.0%	3,919	94.4%
2023	19	45,690	19,094	94.3%	22,378	96.4%	4,098	97.7%
2024	19	46,248	19,306	95.0%	22,686	97.6%	4,134	97.7%
2025	19	46,483	19,367	95.2%	22,838	98.5%	4,155	97.8%
2026	19	46,789	19,464	95.1%	23,015	99.4%	4,184	98.2%
2027	19	47,003	19,626	95.6%	23,045	99.9%	4,204	97.9%
2028	19	47,156	19,701	95.4%	23,116	100.0%	4,211	98.0%
2029	19	47,396	19,796	95.8%	23,241	100.0%	4,228	98.0%
2030	19	47,758	19,934	96.0%	23,446	100.0%	4,245	98.1%

Next Steps

- Docket additional forecast detail
- Further discussion with stakeholders during comment period
- Comments due December 17
- January 13 Energy Commission Business Meeting
- February IEPR Workshop
  - Economic outlook
  - Structural changes to transportation and business practices

Thank You!