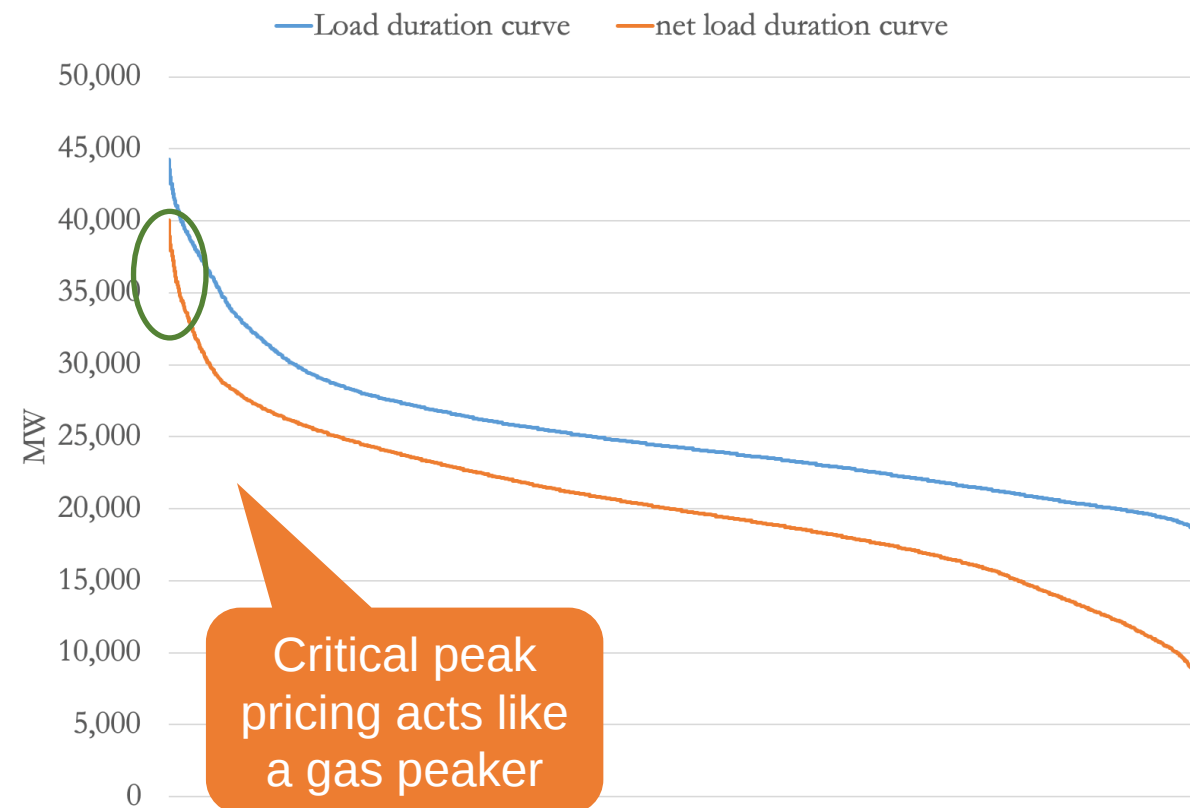
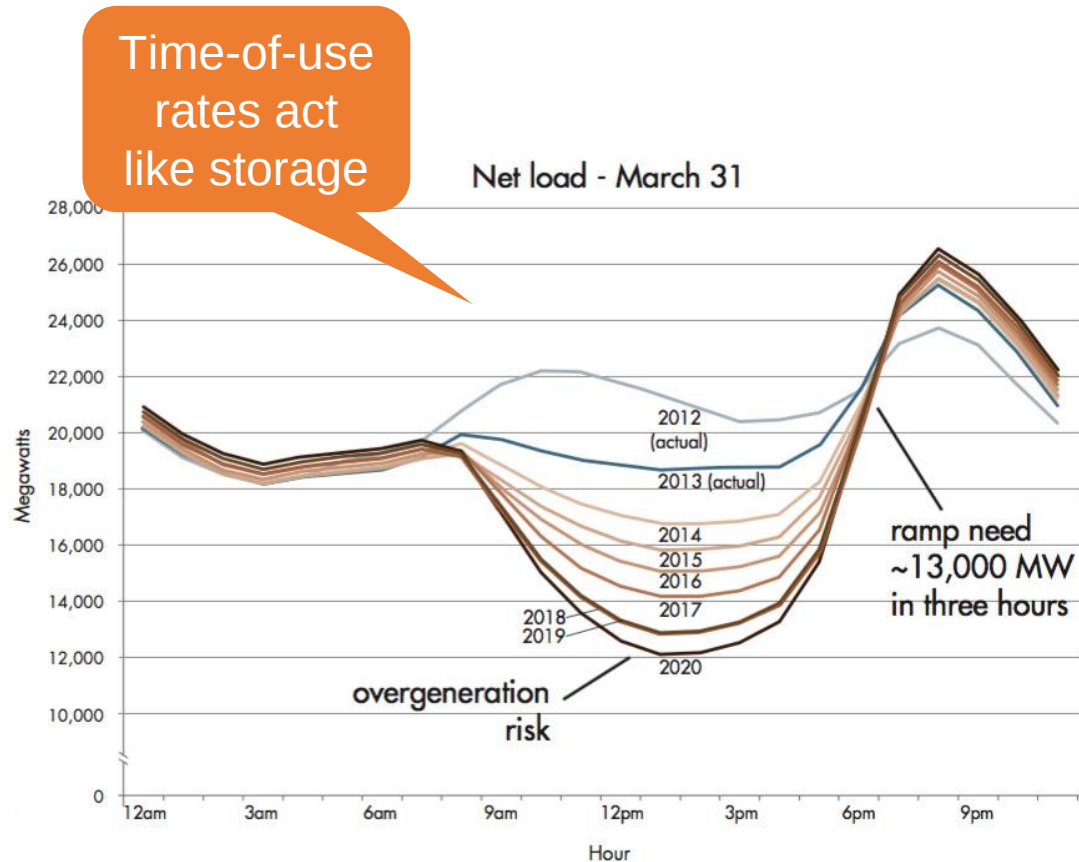


An aerial photograph of a river flowing through a dense forest. The river is clear, showing the rocky riverbed and the surrounding green trees. The title 'Electricity Pricing' is overlaid in white text on the upper part of the image.

Electricity Pricing

Debra Lew, ESIG
Mar 4, 2021

Pricing needs depend on grid needs



Left: CAISO, 2013; Right: CAISO data

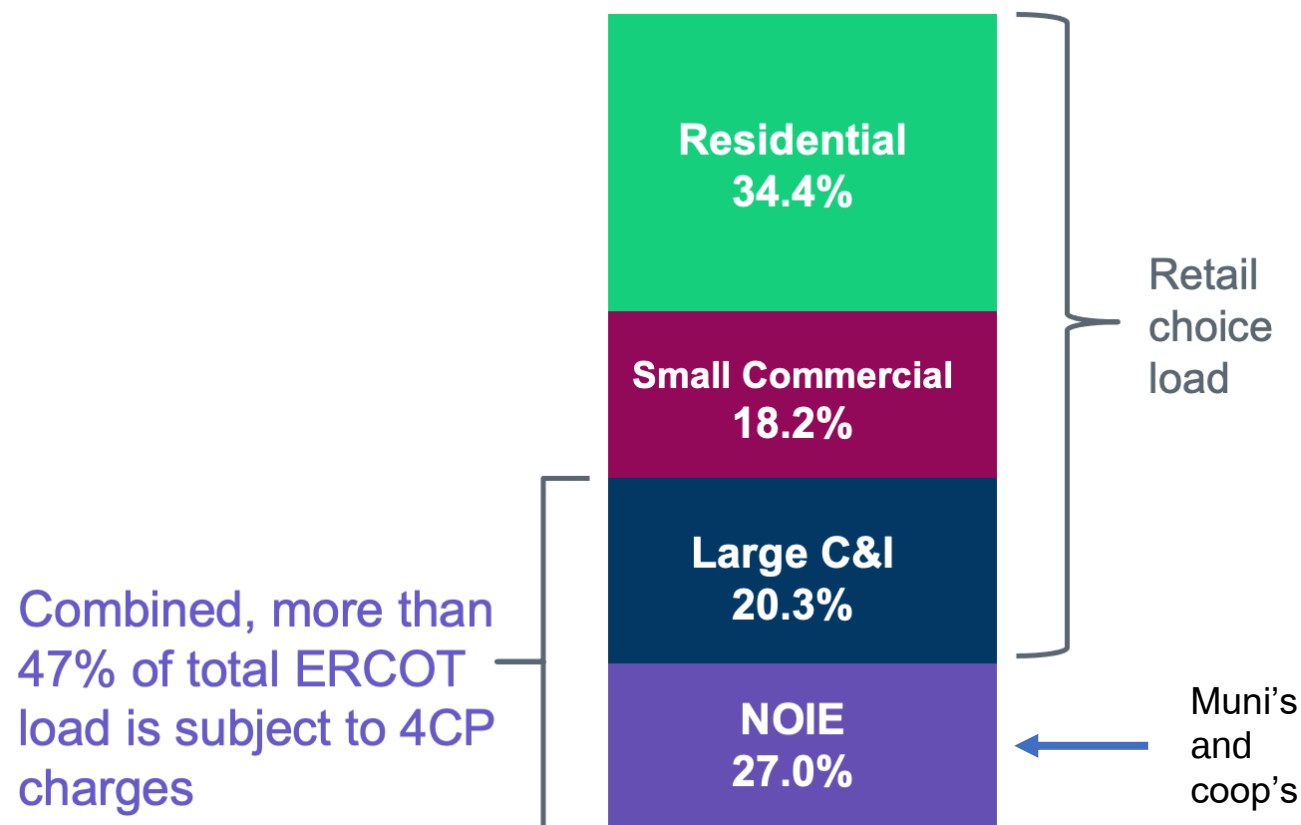
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PUCT's 4 Coincident Peaks (4CP) tariff

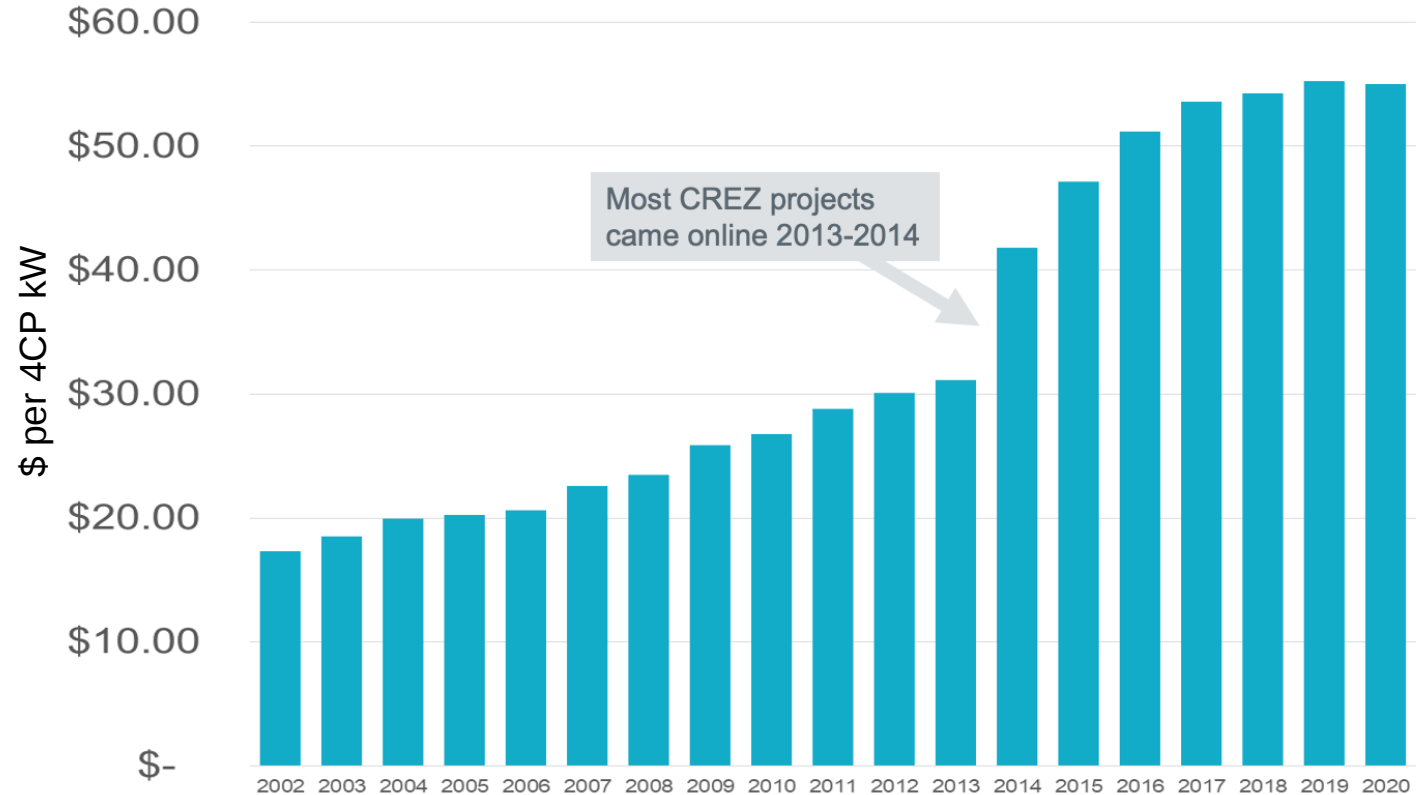
- 4-Coincident Peaks (4CP) = 15-minute interval peak ERCOT load in June, July, Aug and Sep
- 4CP is used to set transmission charges for about half of ERCOT load based on consumption during the 4CP intervals



Data is from 2018; Graphic is from ERCOT

Transmission charges have increased over the last two decades

- Current rate is \$54.28 per 4CP kW
- Savings can be significant, e.g., \$49,352 of next year's transmission charges for a Centerpoint transmission-connected customer to reduce load by 1 MW for each of 4CP
- There is now a whole industry around predicting 4CP and planning demand response for those intervals

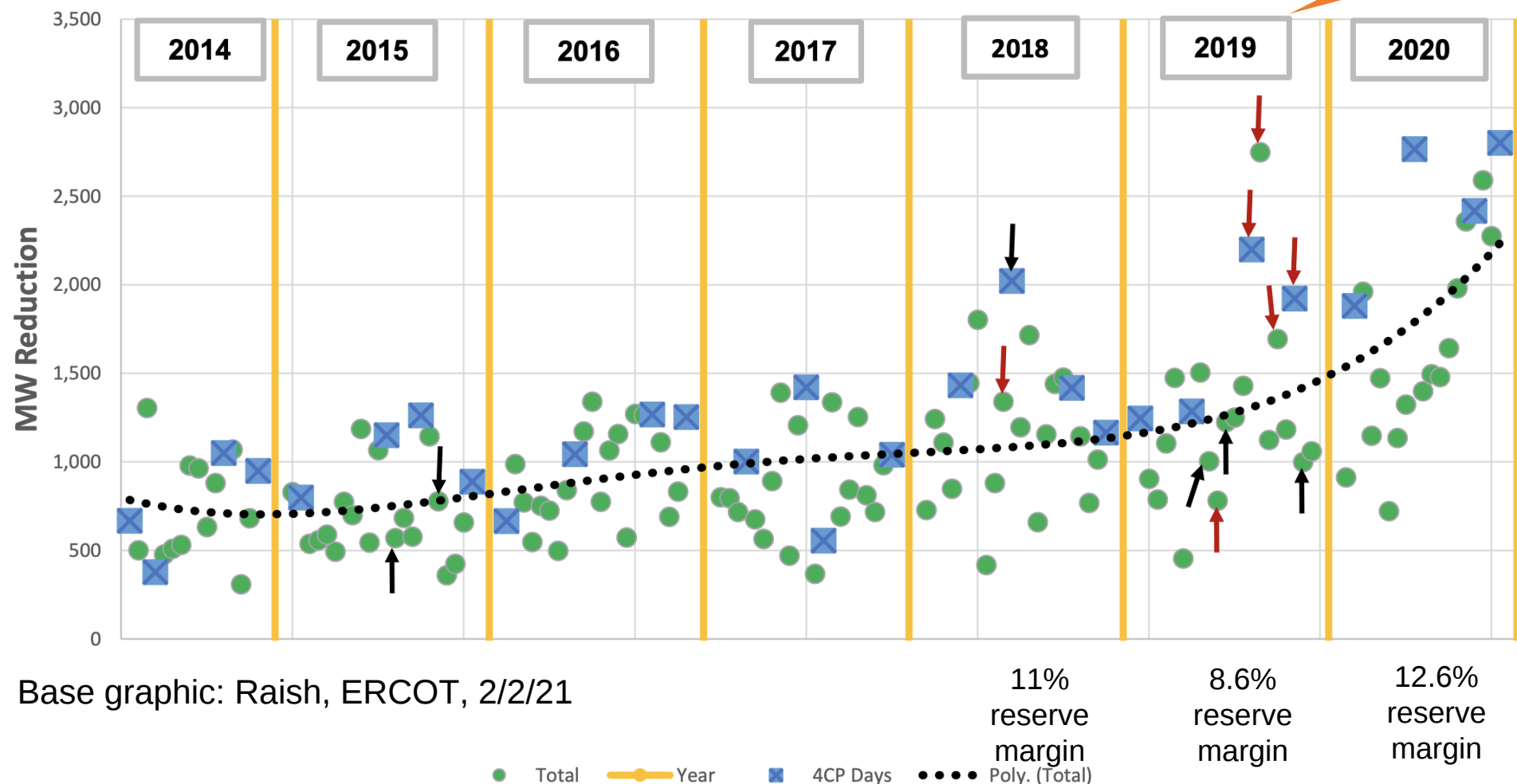


Source: ERCOT

4CP voluntary reductions in demand

New peak demand of 74,820 MW reached;
Very low 8.6% reserve margin

4CP and Near CP HE17 Reductions 2014 - 2020



Base graphic: Raish, ERCOT, 2/2/21

En

How much response comes from 4CP vs high energy prices?

- ~7.7M accounts in retail choice areas:
 - Over 104,000 customers on pricing indexed directly to 15-minute wholesale market prices
 - Over 572,000 customers on time-of-use or “free days/hours”
- 4CP and high energy prices do not always coincide

Day (HE17)	Day Type	Total System DR	4CP Competitive	4CP NOIE	Indexed Real-Time (IRT)	Indexed Day-Ahead (IDA)	NOIE Price Response	Peak Rebate (PR)	Other Direct Load Control (OLC)	Category Total	Overlap
8-Jun-20	4CP	1,882	1,039	841	-	6	-	-	-	1,886	4
9-Jun-20	NearCP	1,961	1,328	633	-	-	-	-	-	1,961	0
13-Jul-20	4CP	2,765	1,373	1,392	-	-	-	-	-	2,765	0
6-Aug-20	NearCP, High Prices (South)	1,509	959	536	86	-	465	-	1	2,047	538
10-Aug-20	NearCP, High Prices (South)	1,676	1,051	591	115	-	416	-	2	2,175	500
11-Aug-20	NearCP	1,980	1,284	697	-	-	-	-	-	1,980	0
12-Aug-20	NearCP	2,358	1,352	1,006	-	-	-	-	-	2,358	0
13-Aug-20	4CP	2,418	1,439	977	-	15	-	-	-	2,431	13
14-Aug-20	NearCP, High Prices	2,791	1,301	1,289	797	10	966	-	38	4,401	1,611
28-Aug-20	NearCP, High Prices (Houston,North,West)	2,409	1,286	989	554	5	865	-	34	3,734	1,325
1-Sep-20	4CP, High Prices (South)	2,860	1,355	1,448	65	-	967	0	41	3,876	1,015

Source: ERCOT 2020 Analysis of REP and NOIE DR (Credit: Carl L. Raish)

Source: ERCOT

Includes premise level response for customers in retail choice areas and NOIE response at the boundary meter level (ERCOT does not have premise-level data for NOIE customers). Total System DR MWs are additive (no double counting)

http://mis.ercot.com/misdownload/servlets/mirDownload?mimic_duns=000000000&doclookupId=748667142

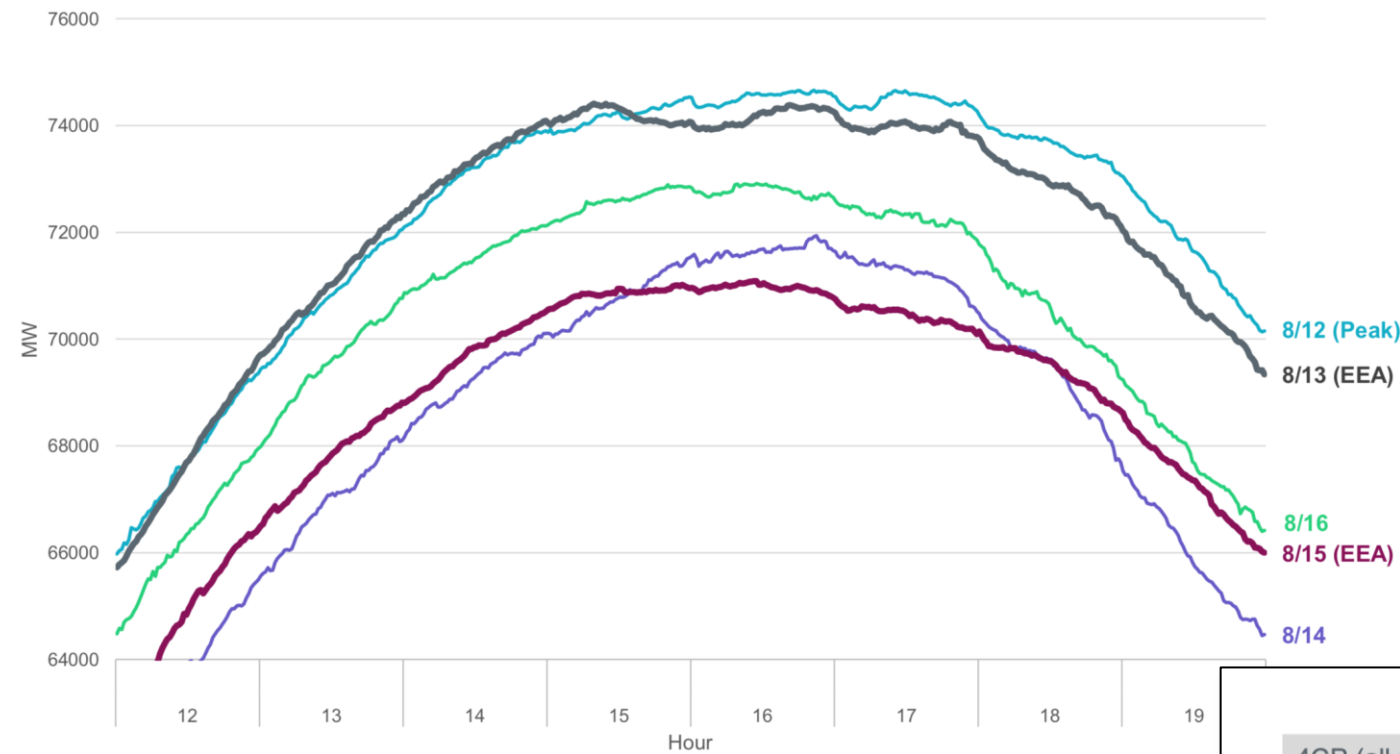
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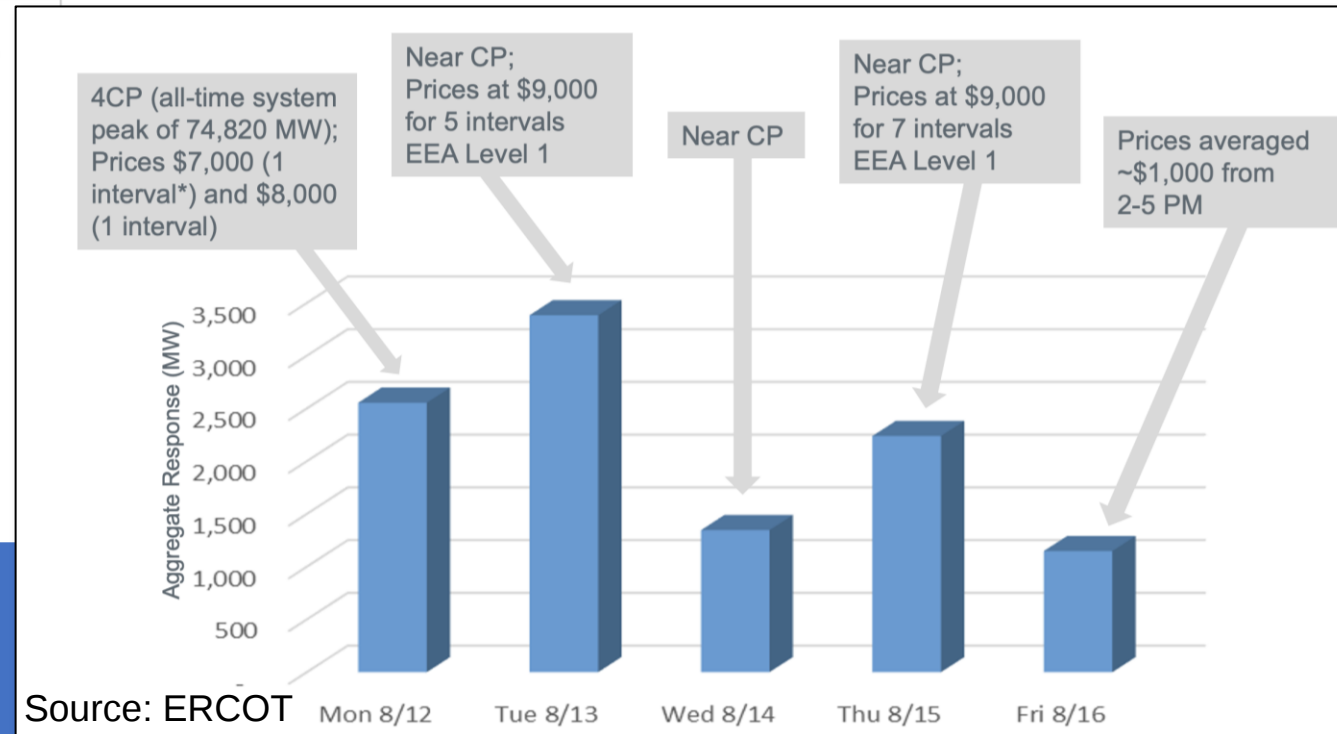


Meeting record peak demand in 2019

4CP, energy prices, emergency response service



Source: ERCOT, "ERCOT's Review of Summer 2019", Oct 11, 2019



Source: ERCOT

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Charting the Future of Energy Systems Integration and Operations

Overview of session

- Ahmad Faruqui, The Brattle Group – *The Changing Landscape of Rate Design*
- Charles Miessner, Arizona Public Service – *Modernizing Residential Electric Rates – The Arizona Experience*
- Steve Beuning, Holy Cross Energy – *Electricity Rates and Demand Flexibility*