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SoCalGas Hot Summer Demand

A Scenario Analysis Based on Historical Data

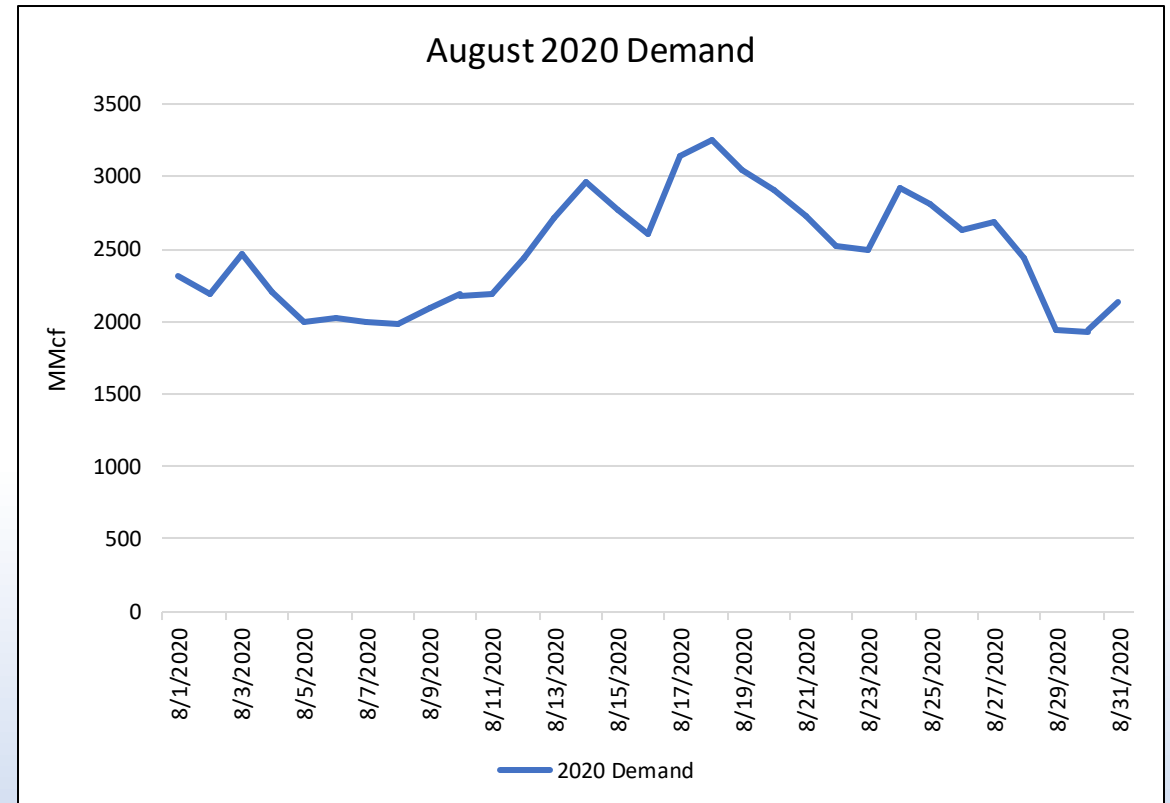


Reasons for Study

- August 2020 heat storm
- Increased probability of extreme weather events
- The Energy Commission doesn't have a model to predict a hot Summer/dry hydro demand scenario.
- SoCalGas and PG&E don't provide a hot Summer/dry hydro demand scenario in the CGR
- Assess gas system ability to serve hot summer demand while refilling storage for winter

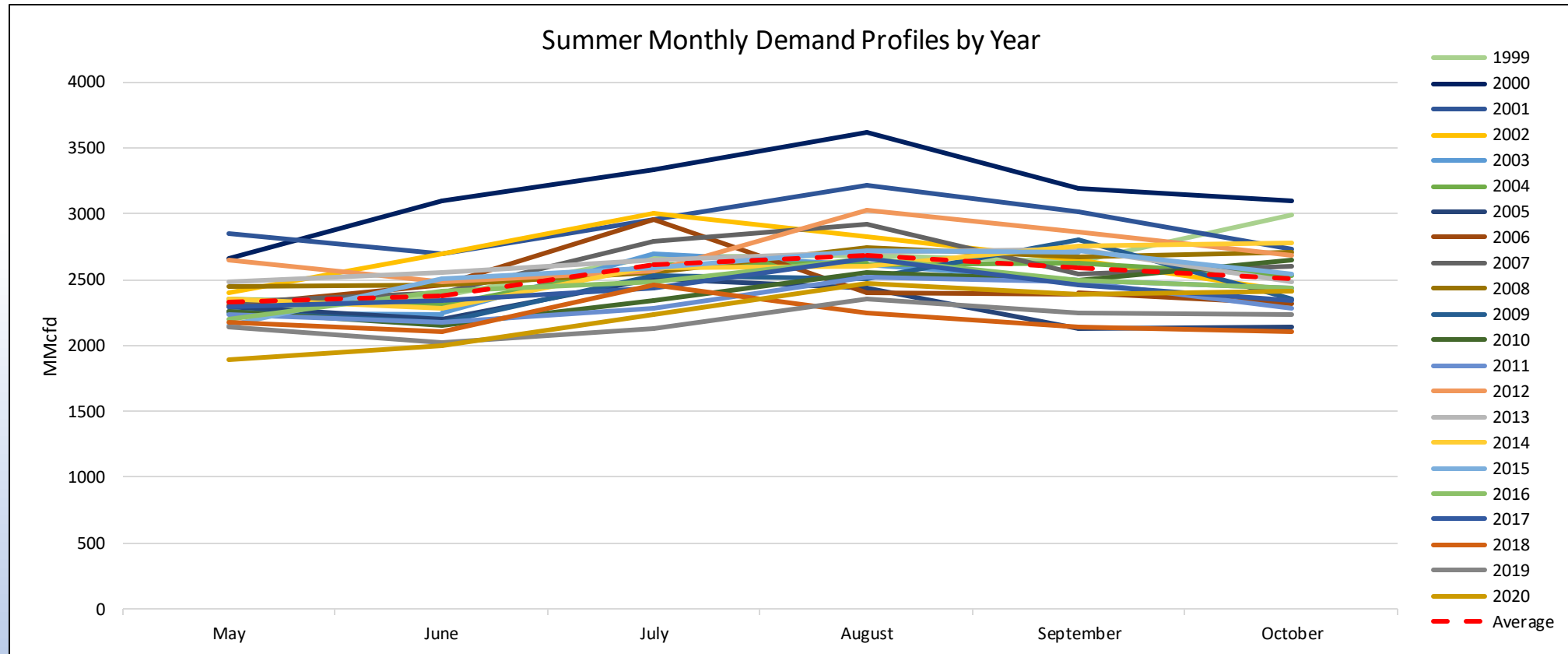
August 2020 Heat Storm

The August 2020 heat storm caused blackouts over the weekend of the 14th and 15th. The heat persisted through the 19th and gas demand ranged from 261 MMcfd to 3249 MMcfd. SoCalGas’s 2020 CGR forecasts a Summer high sendout day demand to be 3206 MMcfd in 2020. Demand during the heat storm exceeded SoCalGas’s forecast.

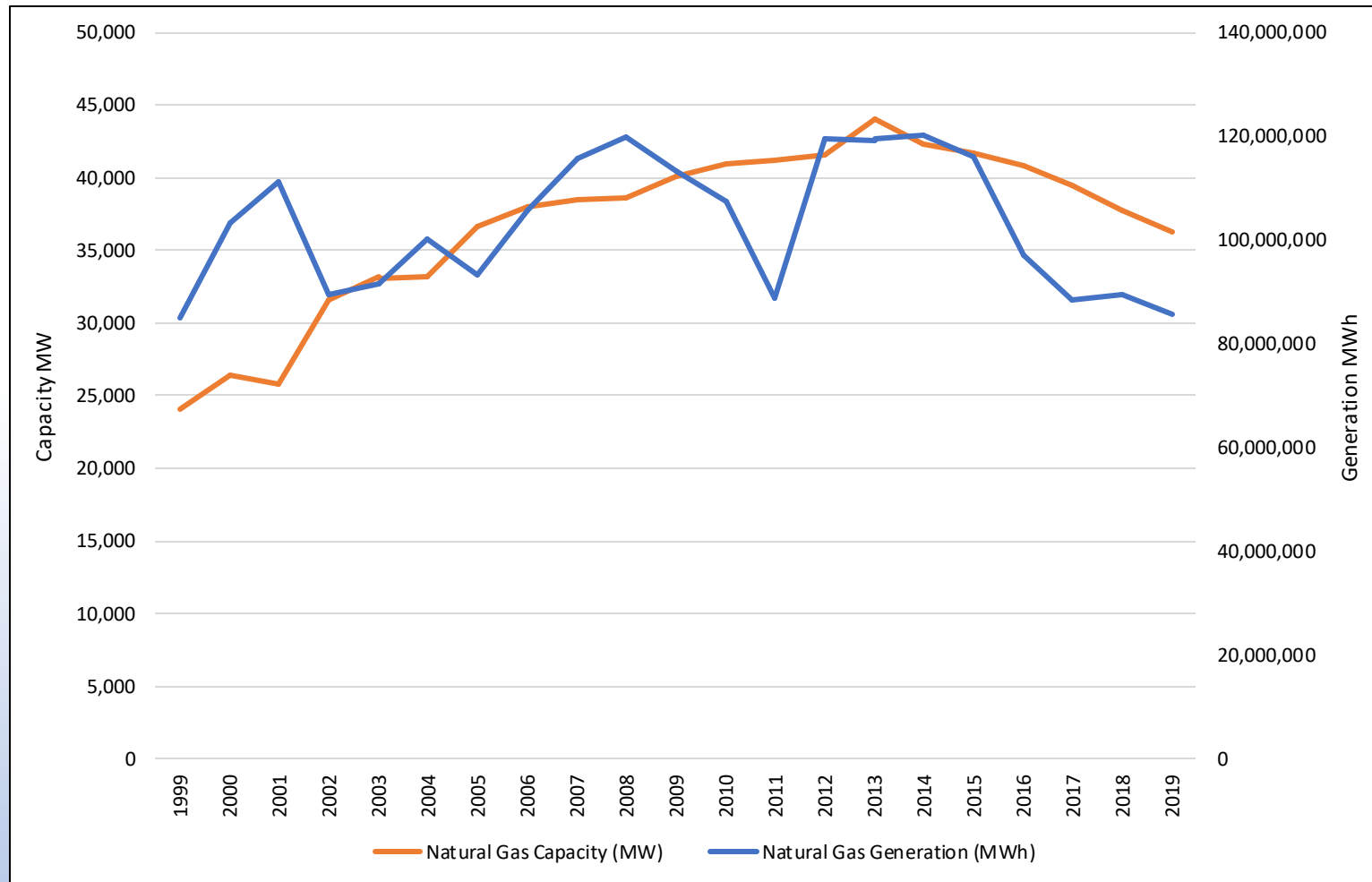


Summer Demand Over Last 22 Years

- Daily sendout data from SoCalGas Envoy
- Determined average demand by summer month for each year. (All Mays, All Junes, etc..)
- August has the highest average demand in 15 of the 22 years
- August 2000's average demand = **3616 MMcfd**

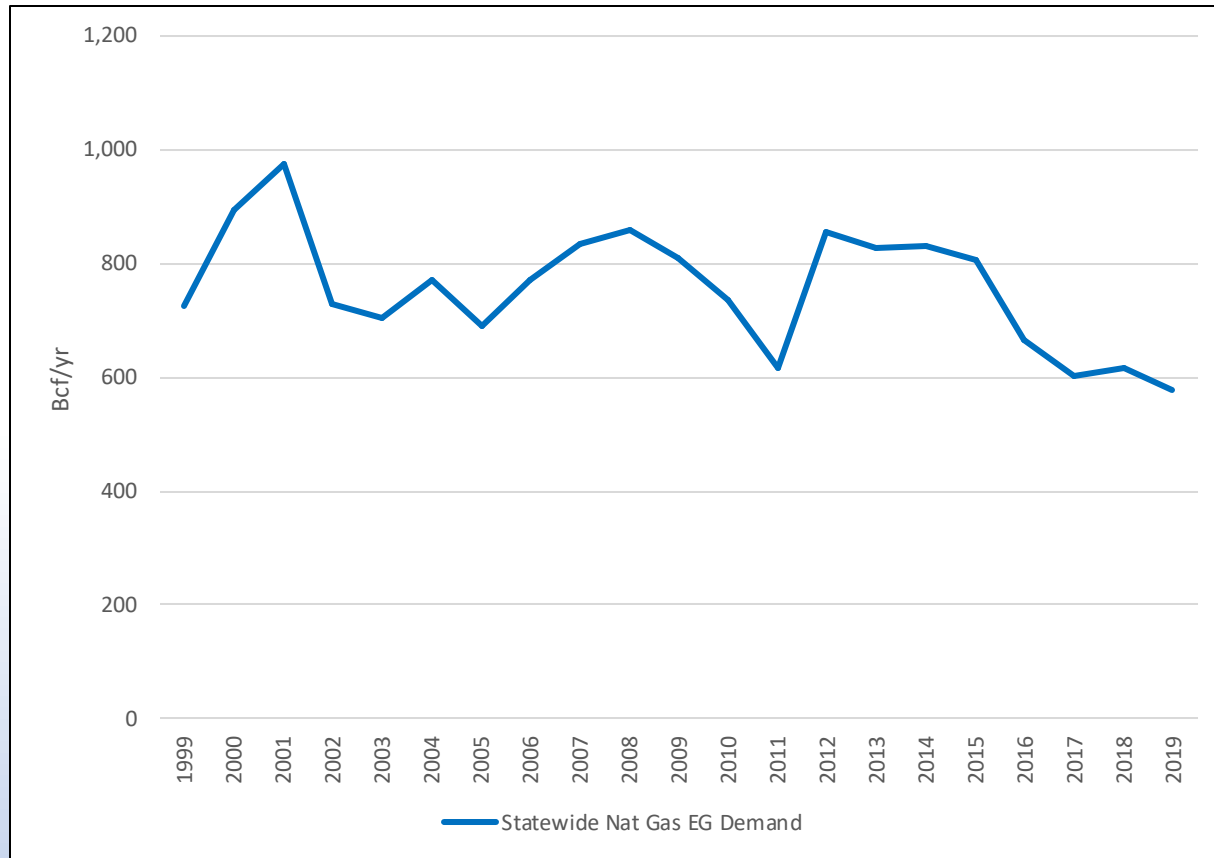


Hypothesis Test: How Different is 2019 CA Capacity and Generation Versus 2000?

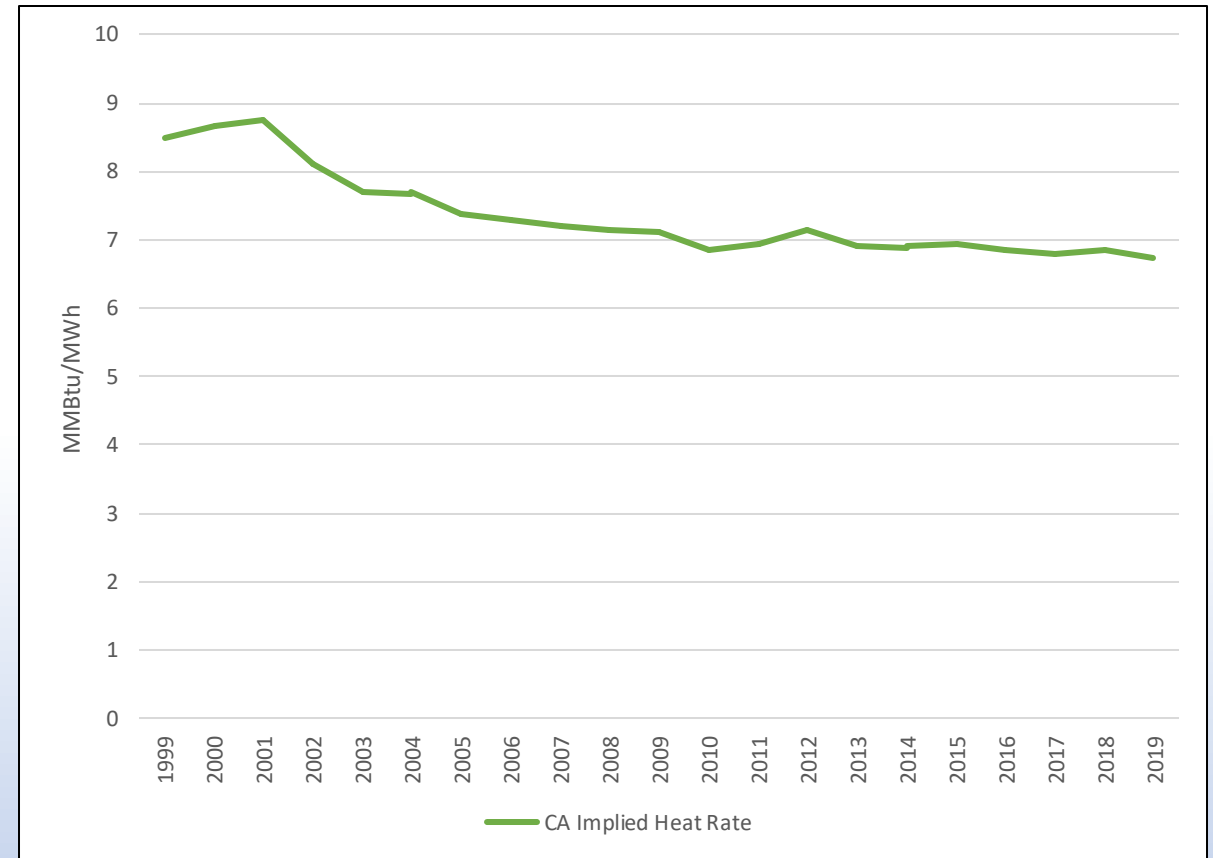


EIA data of total California generation and capacity

More Hypothesis Testing: How Different is 2019 Versus 2000 Gas Burn?



EIA data of CA natural gas deliveries



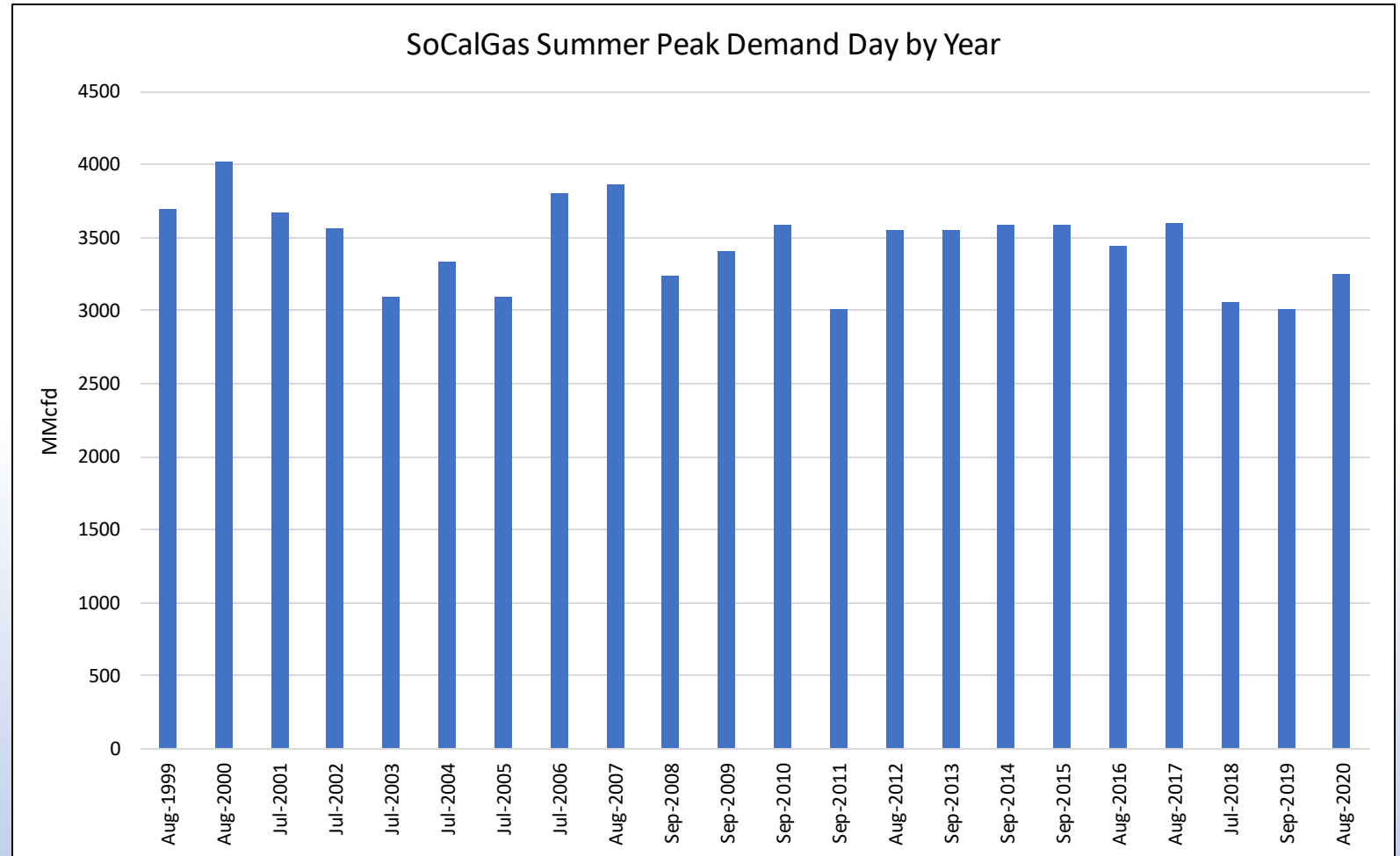
SoCalGas Average Monthly Demand

Year	May	June	July	August	September	October
1999	2247	2381	2675	2683	2634	2987
2000	2666	3098	3334	3616	3192	3105
2001	2850	2697	2955	3216	3012	2735
2002	2402	2697	3001	2828	2652	2409
2003	2245	2241	2693	2618	2491	2437
2004	2350	2304	2617	2620	2628	2526
2005	2290	2195	2504	2437	2134	2140
2006	2306	2455	2963	2397	2395	2324
2007	2325	2405	2796	2926	2537	2606
2008	2448	2462	2552	2742	2671	2710
2009	2258	2180	2534	2502	2803	2349
2010	2257	2158	2337	2556	2501	2651
2011	2236	2178	2281	2520	2480	2278
2012	2646	2482	2569	3029	2858	2681
2013	2483	2559	2653	2712	2733	2481
2014	2357	2288	2605	2607	2754	2775
2015	2157	2510	2595	2725	2715	2541
2016	2196	2415	2486	2666	2493	2435
2017	2297	2347	2440	2659	2461	2337
2018	2178	2108	2459	2248	2142	2106
2019	2137	2020	2125	2348	2245	2235
2020	1890	2001	2233	2475	2389	2410
Average	2327	2371	2608	2686	2586	2510

Units are in MMcfd

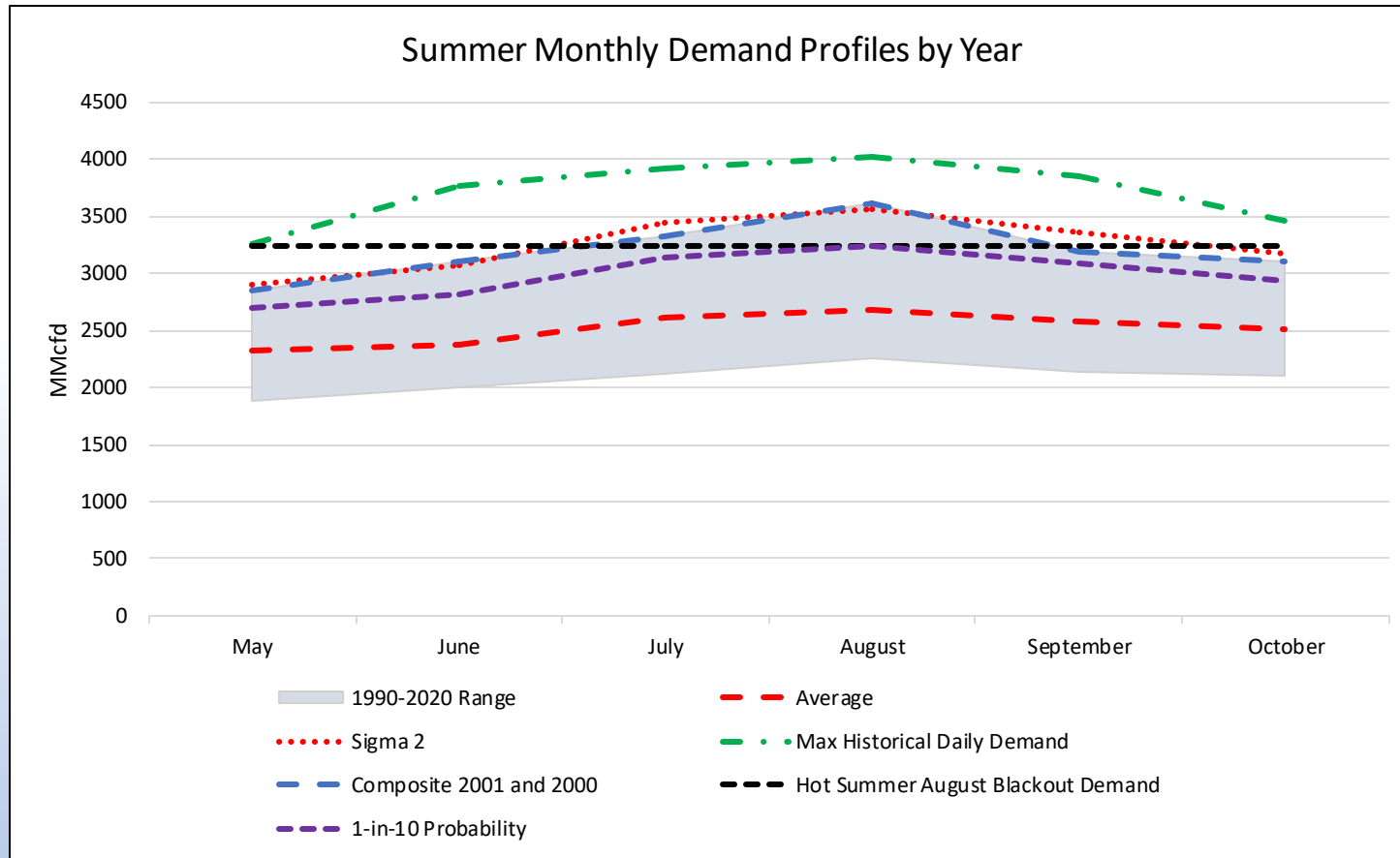
Historical SoCalGas Summer Demand Continued

- The Summer peak day occurs in August in 8 out of the last 22 years.
- Summer peak day demand occurs 7 times in July and September.



Options for Constructing a Hot Summer Scenario

1. Scale demand relative to August 2020. Highest sendout at 3,249 MMcfd
2. A composite profile of the highest average monthly demand in each year. Combines 2000 and 2001.
3. Sigma 2 case uses daily demand to calculate two standard deviations for each month. This covers 97.5% of demand days from the sample
4. A 1-in-10 probability case



- The Sigma 2 case is approximately a 1-in-35 probability.
- For comparison, maximum daily recorded demand is still higher than the Sigma 2 case.
- Probabilities for the max historical daily demand in each given month are all under a percent given the historical distribution.

Probabilities of Max Historical Daily Demand					
May	June	July	August	September	October
0.06%	0.00%	0.08%	0.11%	0.06%	0.21%

Gas Balance Allows Look at Inventory Impact


- Summer demand from Sigma 2 case. Other months use CGR normal year.
- Assumed pipeline supply is 2,820 MMcfd with Line 4000 back in service.¹
- Result is SoCalGas must withdraw in almost every summer month. Inventory is negative by end of September.
- To avoid this outcome, SoCalGas would undoubtedly implement Summer curtailments of noncore load: Curtailing 370 MMcfd per month would allow inventory of 60 bcf at start of winter (Nov 1st)

		2021 Demand Year									2022		
1	Month	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
2	Demand (MMcf)	2194	2897	3079	3439	3559	3368	3172	2597	3158	2956	2933	2397
3	Pipeline Supply (MMcf)	2820	2820	2820	2820	2820	2820	2820	2820	2820	2820	2820	2820
4	Inj/(With) (MMcf)	626	-77	-259	-619	-739	-548	-352	223	-338	-136	-113	423
5	End of Month SoCalGas Inventory (Bcf)	72	69	61	42	19	3	-8	-1	-12	-16	-19	-6
6	Estimated Curtailment		370	370	370	370	370	370					
7	Inj/(With) (MMcf) after Curtailment	626	293	111	-249	-369	-178	18	223	-338	-136	-113	423
8	End of Month SoCalGas Inventory (Bcf)	72	81	84	76	65	59	60	67	56	52	49	62

Supply Estimates				
Northern Sys	1590	990	990	900
Southern Sys	1210	1010	1010	1010
Kern River	765	765	760	760
CA Production	60	60	60	60
Total	3625	2825	2820	2730
OTF	1343	1343	1343	
Total w/o Aliso	4968	4168	4163	

Next Steps

- Sensitivity cases
- PG&E analysis
- Refine our view of SoCalGas’s EG gas demand
- CAISO and LADWP would need to recalculate minimum generation
- The higher reliability standard adopted the lower the probability of a worse case occurring, so the trick is to determine what level of risk the state should bear

Scenario	Increasing Cost	Summer Curtailment
1-in-10 Probability Case		105 MMcfd
Composite Case		315 MMcfd
2020 August Blackout Demand		365 MMcfd
Sigma 2		370 MMcfd