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Weather Data for 2022 Standards

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California Energy Commission

Background

- Weather files are used for all energy calculations in T24 for compliance and development of the Standards
  - Also critical element for TDV development
- Pre-2013 Standards:
  - Weather files based on data from 1950 to 1980
  - Calculated solar data differ from satellite sources
  - Not synchronized and not completely compatible with TDV
- 2013 Standards:
  - Historical weather data with satellite solar data from 1998-2009
  - State-wide typical months permits the development of State-wide TDV, which is more representative of actual grid impact

Goals for Updated Weather Data Files

- Update data from 1998-2009 dataset to a 1998-2017 dataset
  - Use the best publicly data available to support standards (NREL NSRDB)
  - 12-year dataset, which was the best available at the time, is inadequate given new data available. Also some of the data was proprietary.
- Align better with data proposed to be used for IOU performance-based incentive programs
- Better reflect changing climate conditions in California

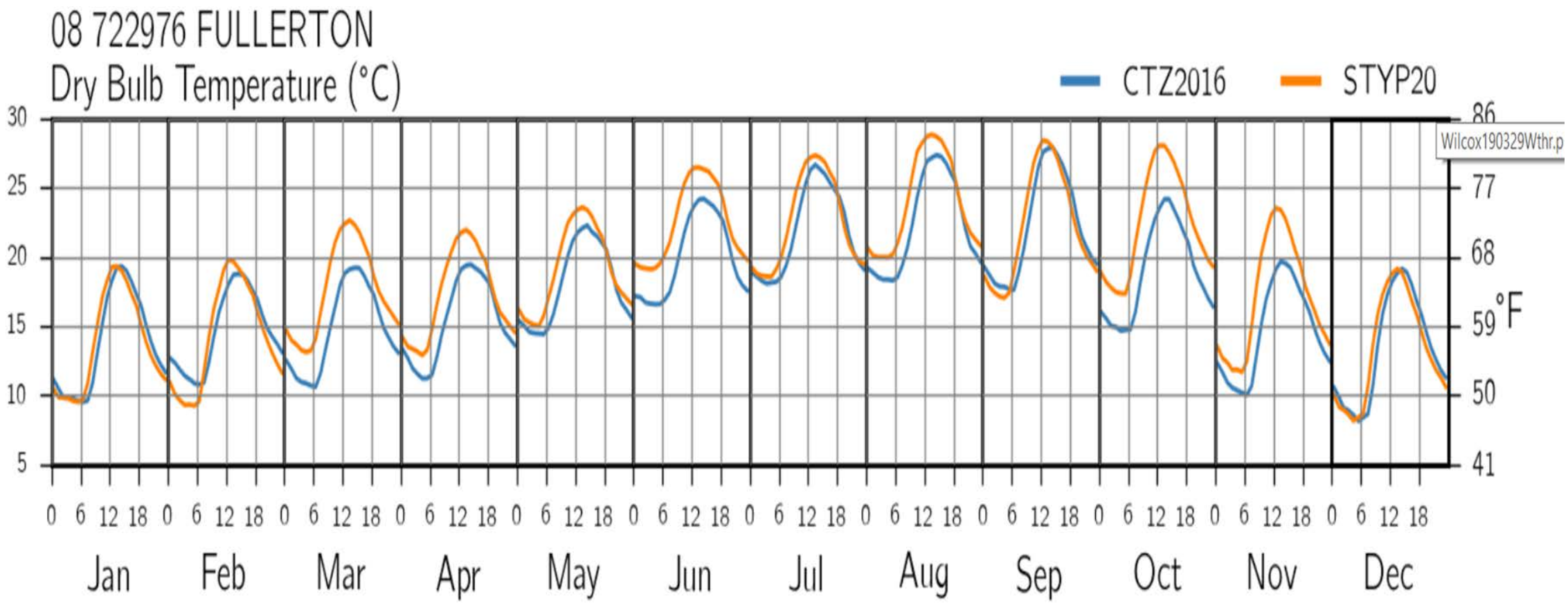
Comparison Cases

- Typical Meteorological Year (TMY)
  - Weather data selection method developed by NREL. Widely used for building simulation.
  - Elementals of selection includes global horizontal radiation, direct normal radiation, dry bulb temp, dew point temp and wind speed
  - Staff evaluated different scenarios using the most recent 20, 15, 12, 10, and 7 years of data
- CA Priority Climate Models (4 models)

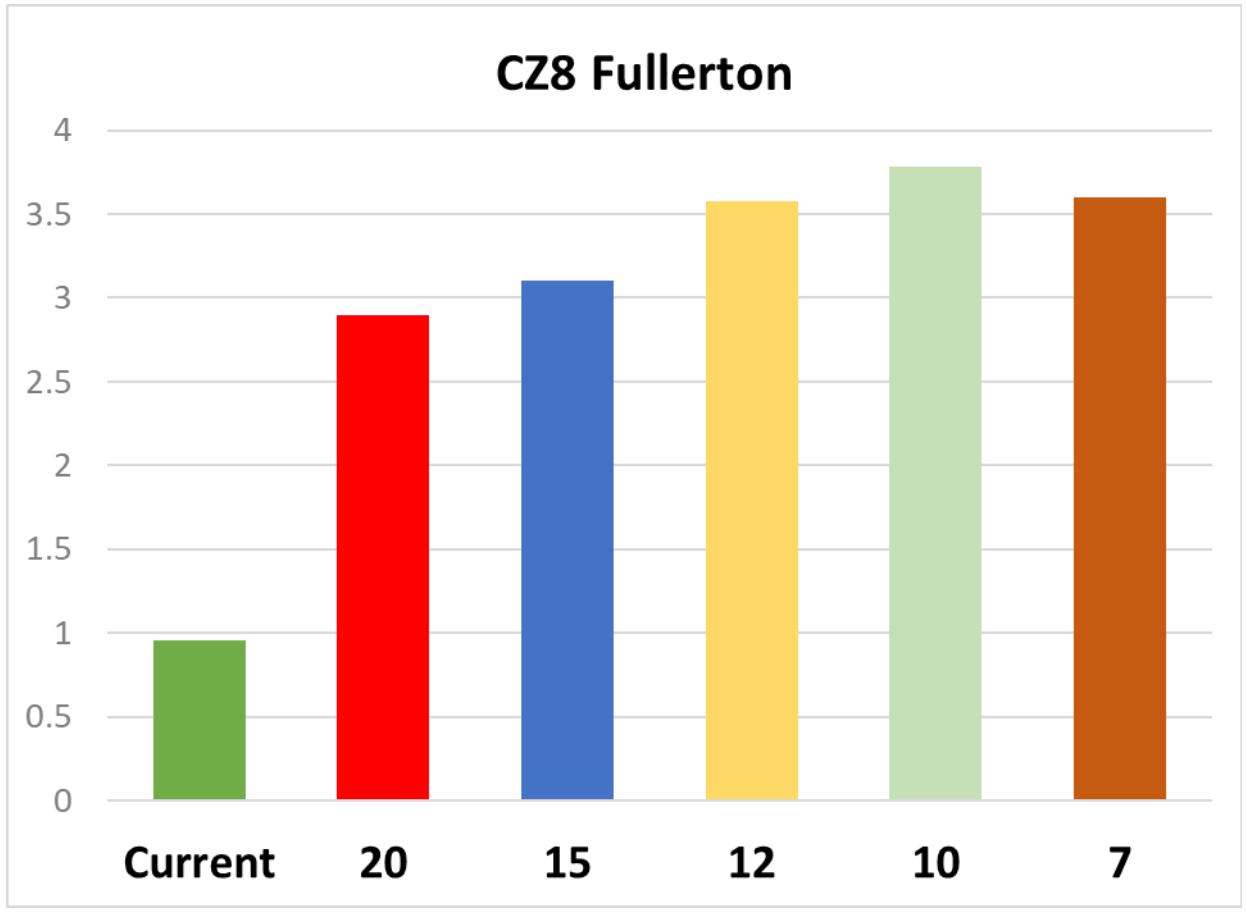
Proposed Updates for 2022 Standards

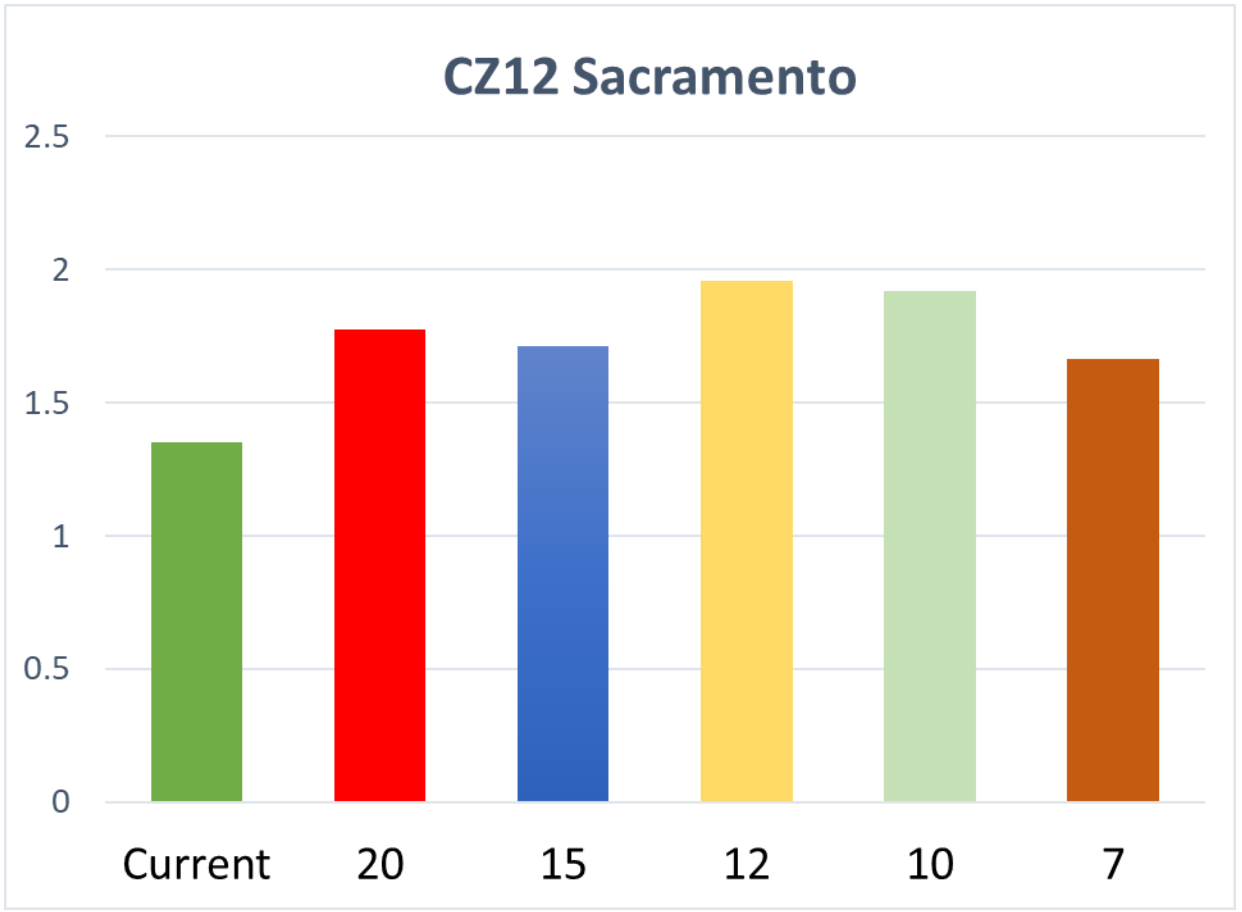
- Continue to use State-wide TMY methodology
  - Provides hourly weather data information to run CBECC
  - Compatible with development of State-wide TDV
- Use 1998-2017 weather data
  - Use maximum amount of satellite weather data available
  - Incorporate the latest available weather data to better reflect changing climate conditions
  - Results in more resilient buildings in response to climate uncertainties

Climate Zone 8 Average Temperature STYP20 compared to CTZ2016

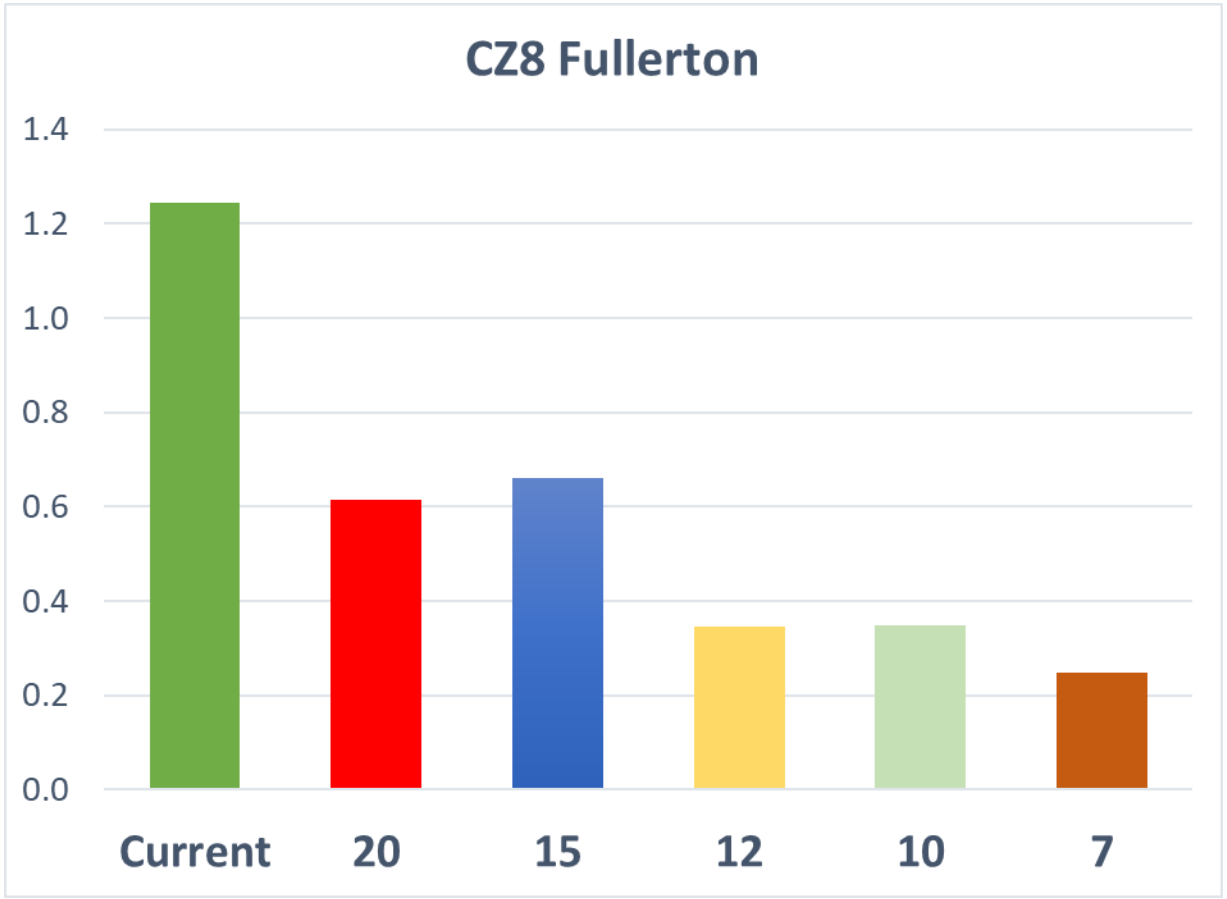


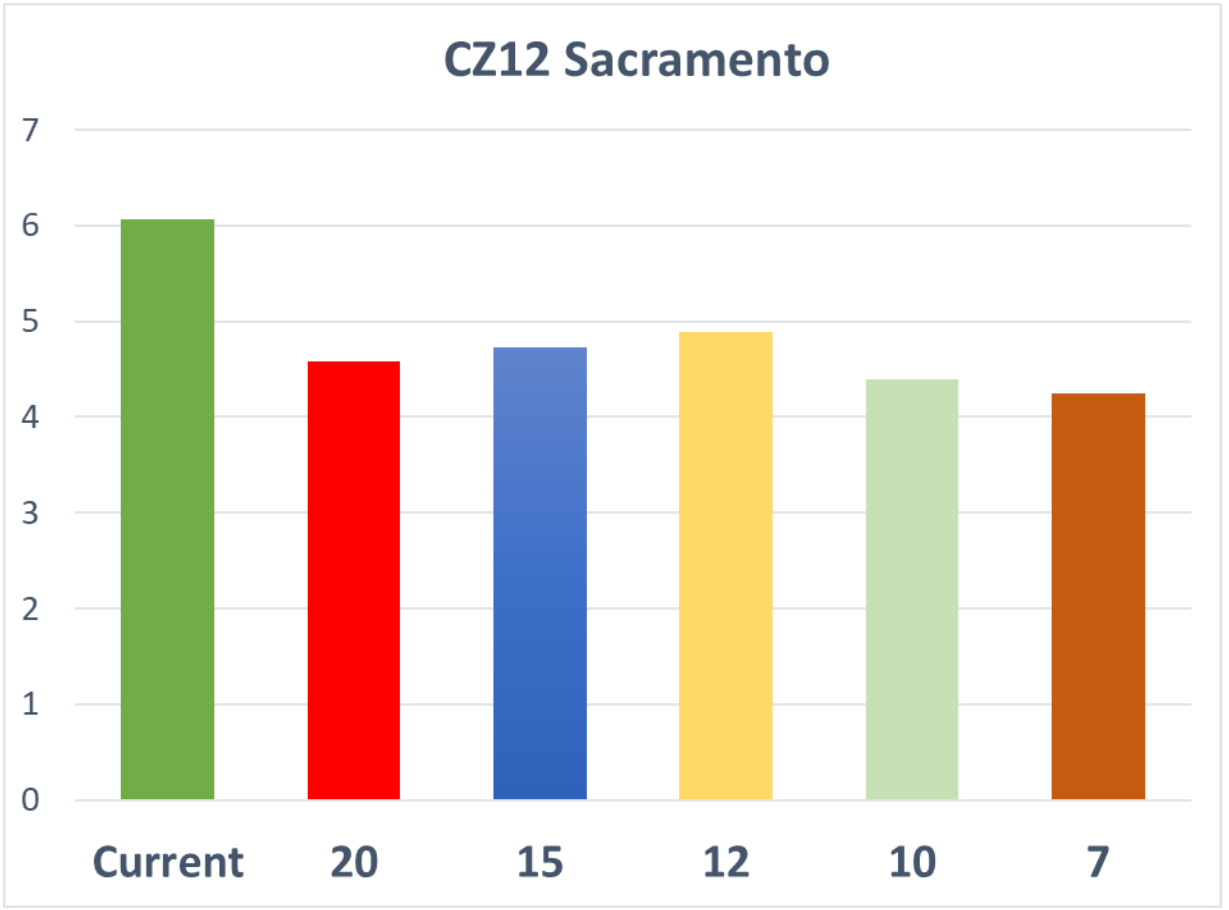
Cooling Load Comparison (kBtu/ft²)





Heating Load Comparison (kBtu/ft²)





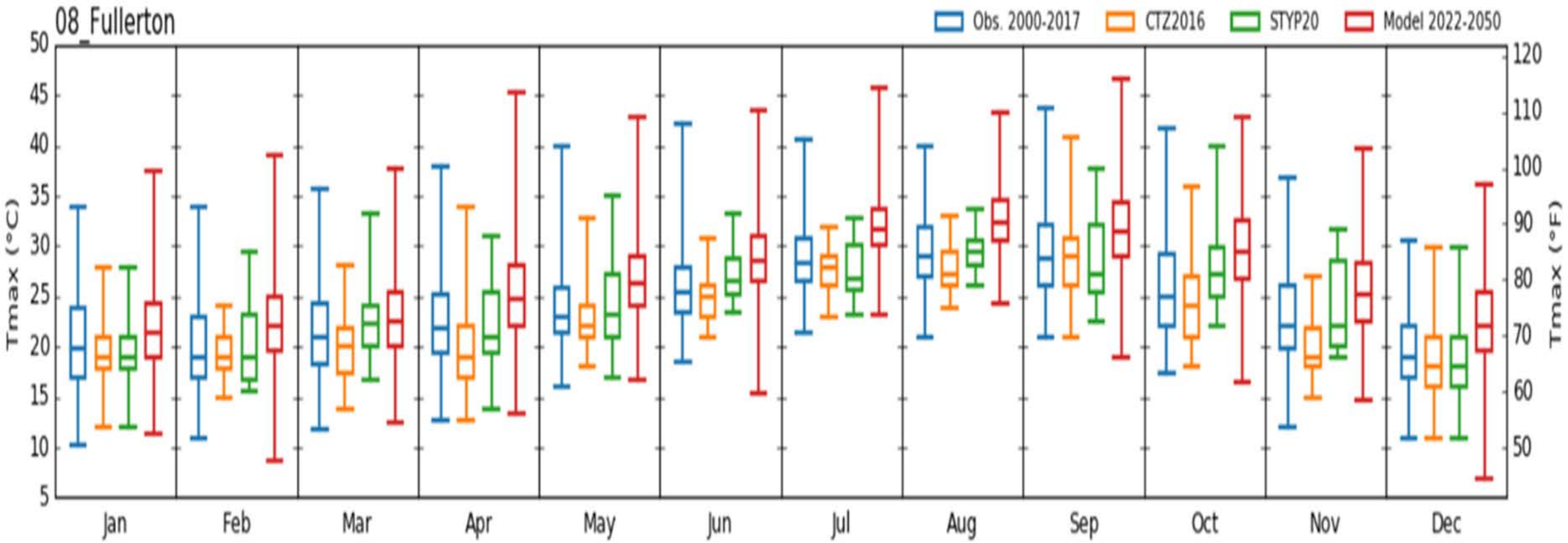
Cooling Load Comparison (kBtu/ft²)

Climate	% Difference from Current				
	STYP20	STYP15	STYP12	STYP10	STYP07
01					
02	1022%	660%	890%	994%	913%
03					
04	609%	649%	948%	790%	537%
05					
06	208%	154%	117%	198%	614%
07	7072%	6048%	7971%	8520%	19366%
08	202%	223%	273%	294%	275%
09	34%	45%	62%	67%	84%
10	44%	51%	74%	67%	57%
11	3%	7%	12%	13%	-4%
12	32%	27%	45%	42%	23%
13	27%	29%	37%	32%	30%
14	0%	7%	17%	16%	0%
15	-1%	2%	7%	7%	0%
16	35%	75%	88%	92%	-56%
Average	714%	614%	811%	856%	1680%

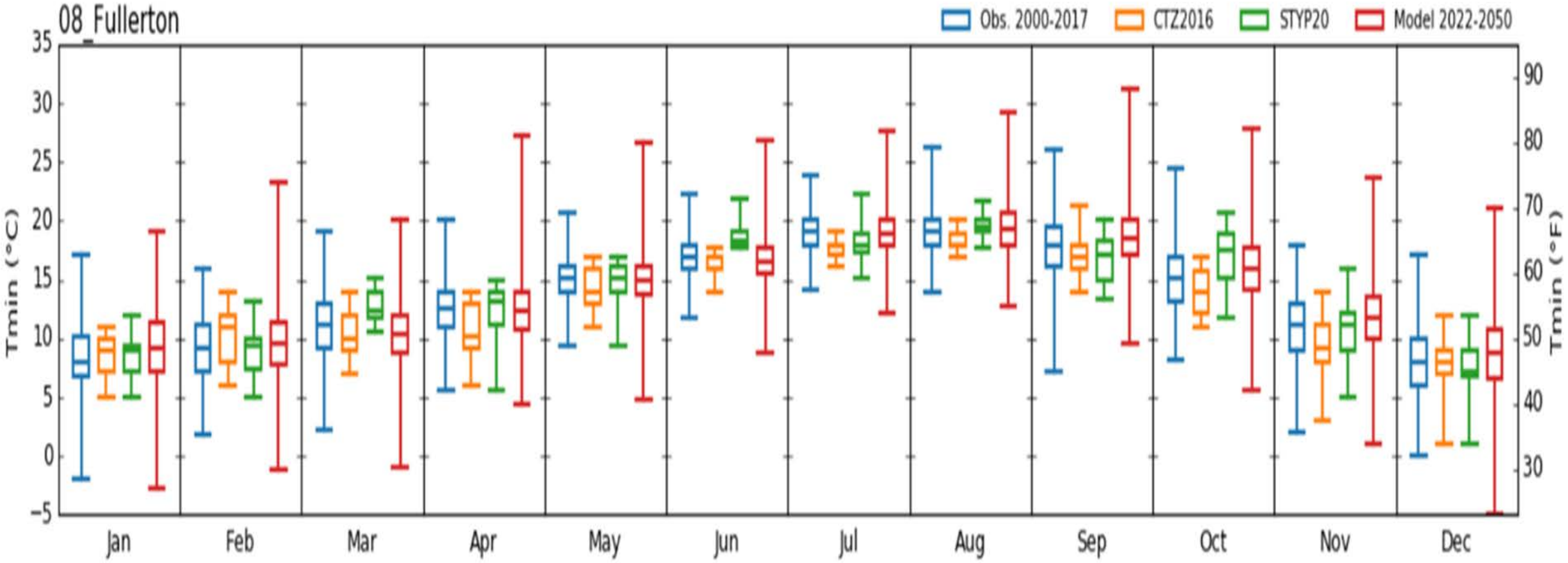
Heating Load Comparison (kBtu/ft^2)

Climate	% Difference from Current				
	STYP20	STYP15	STYP12	STYP10	STYP07
01	-9%	-10%	-12%	-11%	-20%
02	-19%	-16%	-14%	-23%	-24%
03	-32%	-27%	-26%	-39%	-40%
04	-42%	-37%	-42%	-46%	-49%
05	-40%	-49%	-38%	-39%	-48%
06	-56%	-60%	-78%	-73%	-79%
07	-23%	-17%	-19%	-60%	-63%
08	-51%	-47%	-72%	-72%	-80%
09	-42%	-38%	-56%	-56%	-59%
10	-22%	-29%	-63%	-64%	-72%
11	-17%	-18%	-14%	-23%	-25%
12	-24%	-22%	-19%	-27%	-30%
13	-36%	-34%	-45%	-48%	-53%
14	-23%	-19%	-13%	-25%	-30%
15	-37%	-29%	-85%	-69%	-72%
16	-13%	-10%	-19%	-16%	-20%
Average	-30%	-29%	-39%	-43%	-48%

Max Temp Comparison to Climate Models



Min Temp Comparison to Climate Models



Summary

- Cooling load – goes up; heating load – goes down
- Less change for climate zones that are already hot or cold
- Biggest change for transitional climate zones such as climate zone 8
- Full 20 year dataset is most technically solid and provides the path for the most resilient buildings
  - Avoids introducing data anomalies that result from smaller data sets

Questions?