

DOCKETED

Docket Number:	23-IEPR-03
Project Title:	Electricity and Gas Demand Forecast
TN #:	253524
Document Title:	Presentation - 2023 California Energy Demand Consumption and Sales Forecast Results
Description:	2. Chris Kavalec, CEC
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	12/5/2023 10:32:20 AM
Docketed Date:	12/5/2023



California Energy Commission

2023 California Energy Demand: Consumption and Sales Forecast Results

Chris Kavalec and Mathew Cooper, Energy Assessments Division

December 6, 2023



Forecasting Process: Sectors/Models

- Residential (End Use)
- Commercial (End Use, Econometric)
- Industrial/Mining/Construction (Econometric)
- Agriculture/Water Pumping (Econometric)
- Transportation, Communication, Utilities (TCU) and Streetlighting (Trend Analysis)



Forecasting Process: Critical Inputs



Comparison of Statewide Economic and Demographic Drivers

- Average annual growth rates for some economic and demographic drivers in the CED 2023 baseline forecast are similar to CEDU 2022, but population and households are significantly lower.

Table 1: Average Annual Percent Growth in Economic and Demographic Drivers, 2022-2035

Economic/Demographic Driver	CEDU 2022	CED 2023
Gross State Product	2.3%	2.2%
Per Capita Personal Income	2.1%	2.2%
Commercial Employment	0.7%	0.6%
Population	0.5%	0.2%
Number of Households	0.9%	0.5%

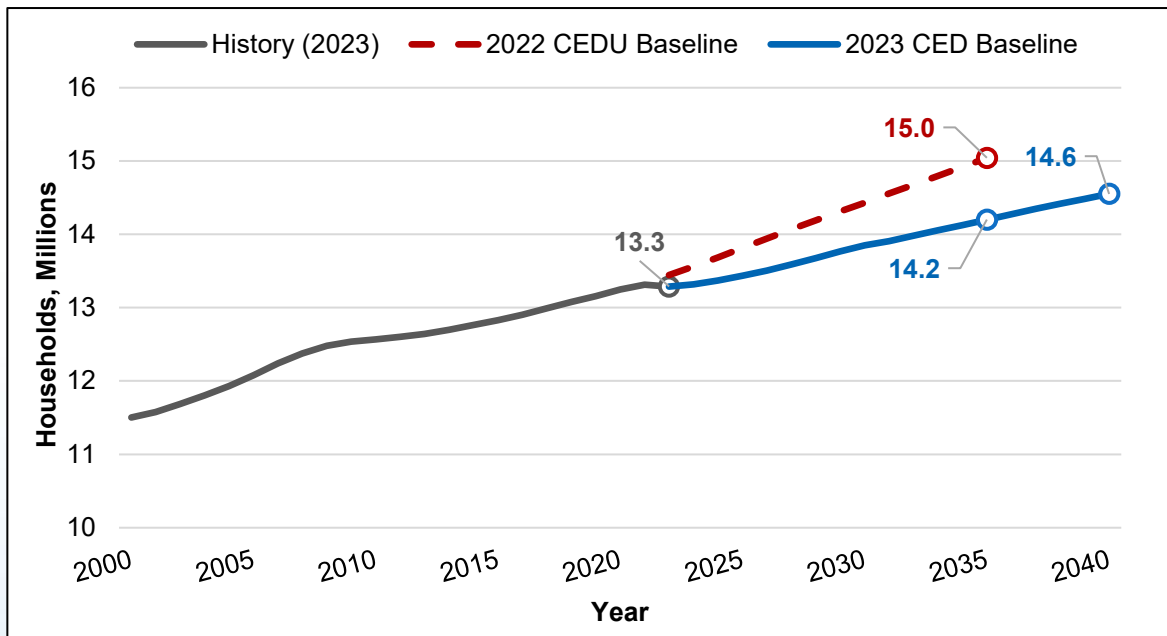
Source: CEC staff



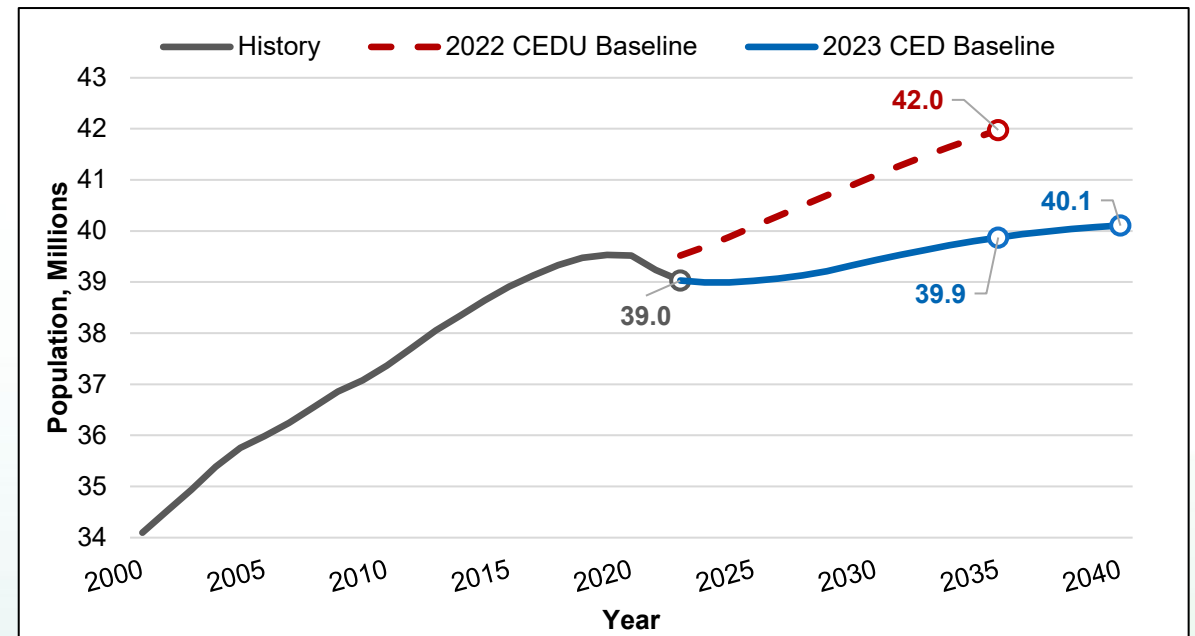
Comparison of Statewide Household and Population

- Households and Population both show lower growth over the whole forecast period.

Households



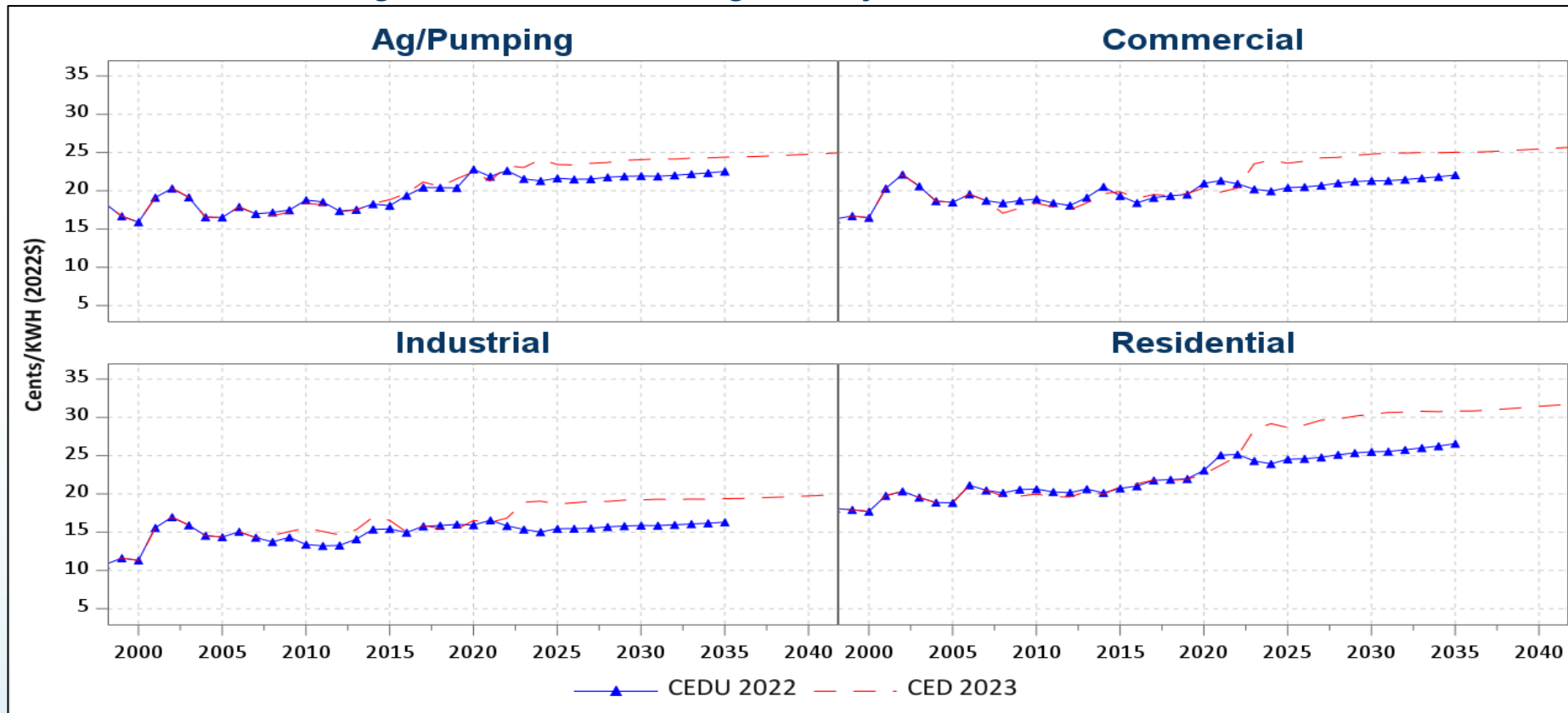
Population





Comparison of Statewide Average Electricity Rates

- Rates are calculated using updated revenue requirement projections and the sales forecast from the previous demand forecast iteration.
 - Transportation demand models use statewide average rates.
 - Planning area rates are weighted by sales.

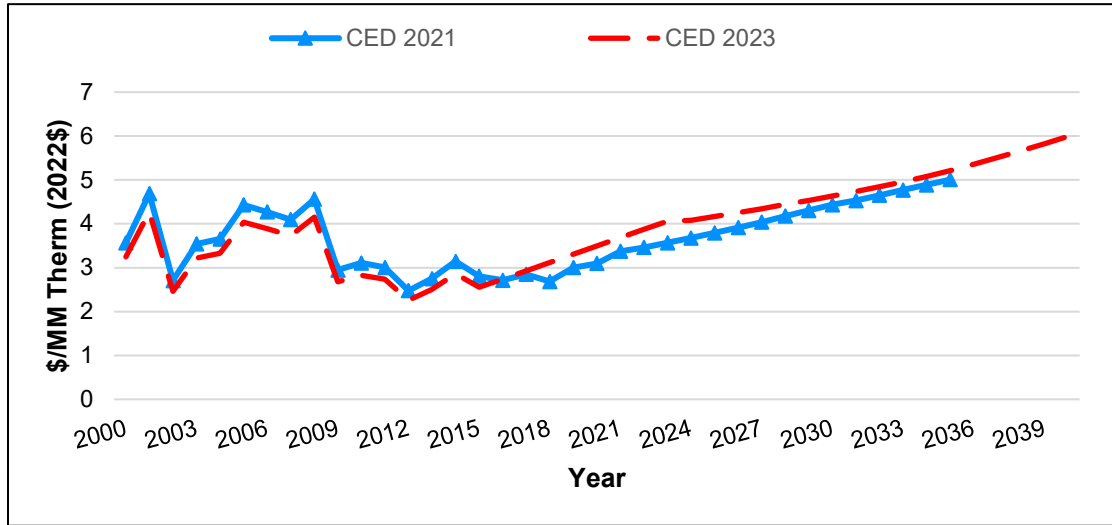


Source: CEC staff

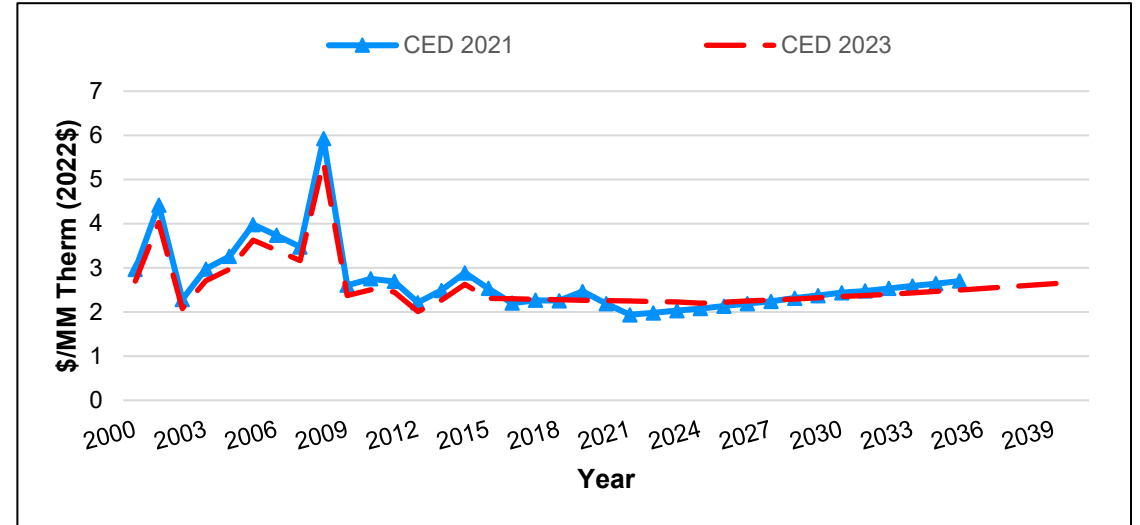


Comparison of Statewide Average Natural Gas Rates

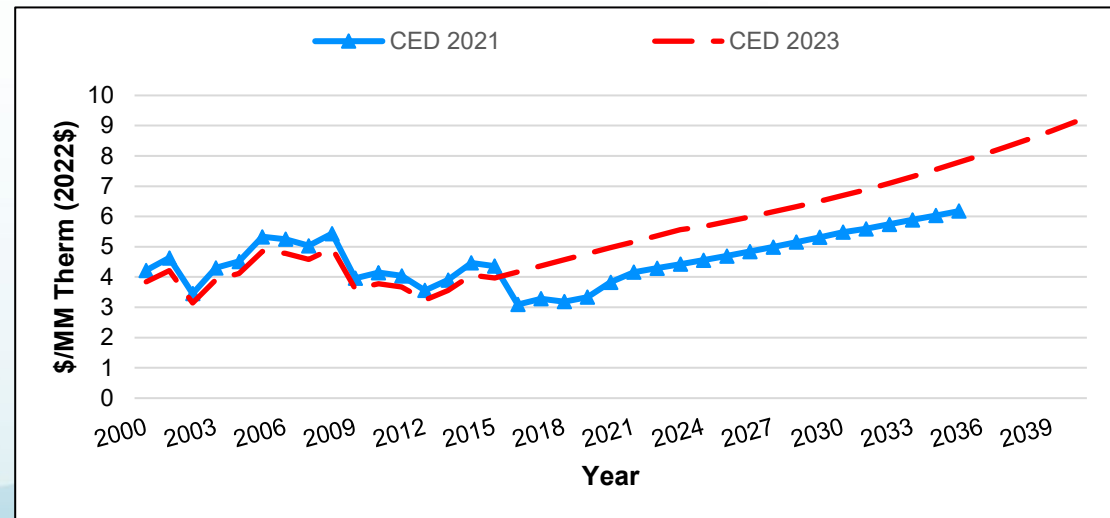
Commercial



Industrial



Residential

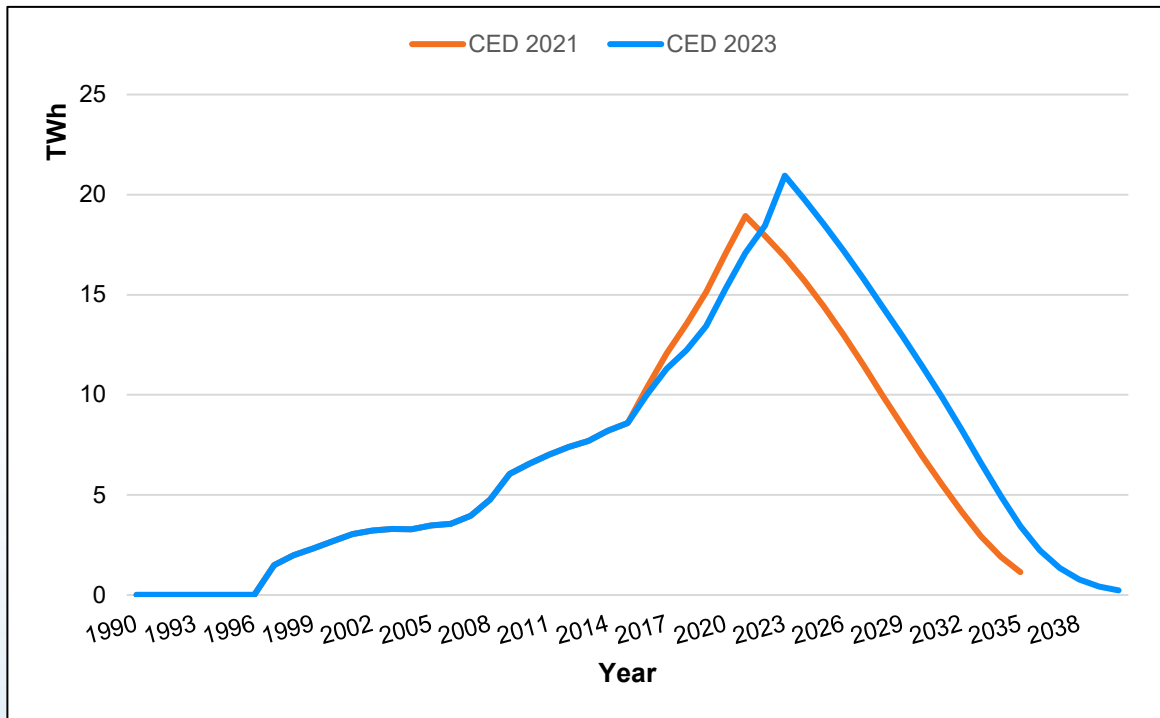




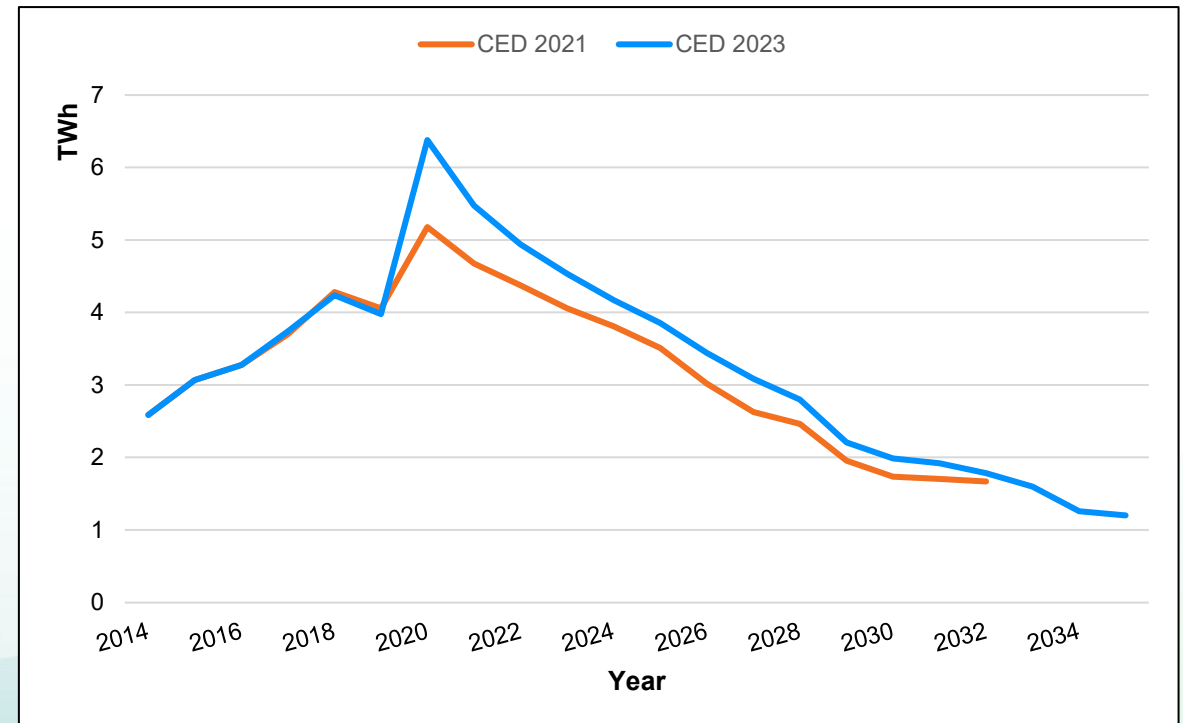
Statewide Electricity Programs & Standards Savings (Committed)

- Some programs and standards are embedded in the sector models, some are considered exogenously.
- Many programs will expire over the forecast period, which means they cause electricity demand to increase starting in 2024.

Electricity Programs Impacts



Electricity Standards Impacts



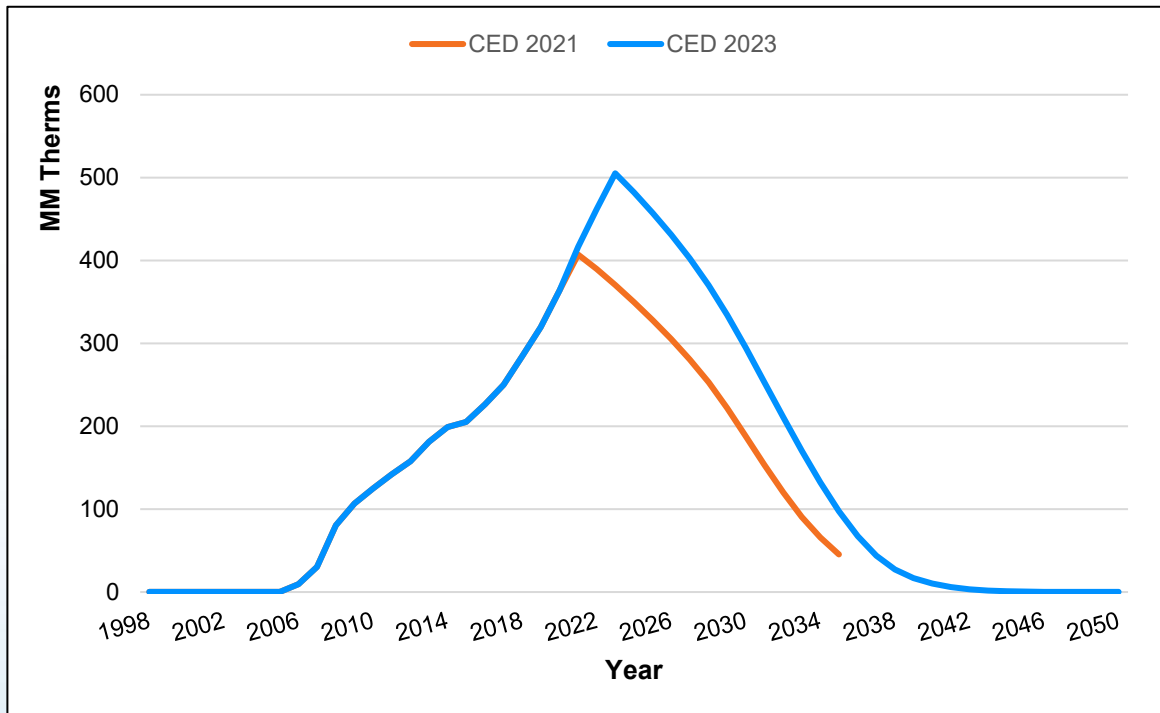
Source: CEC staff



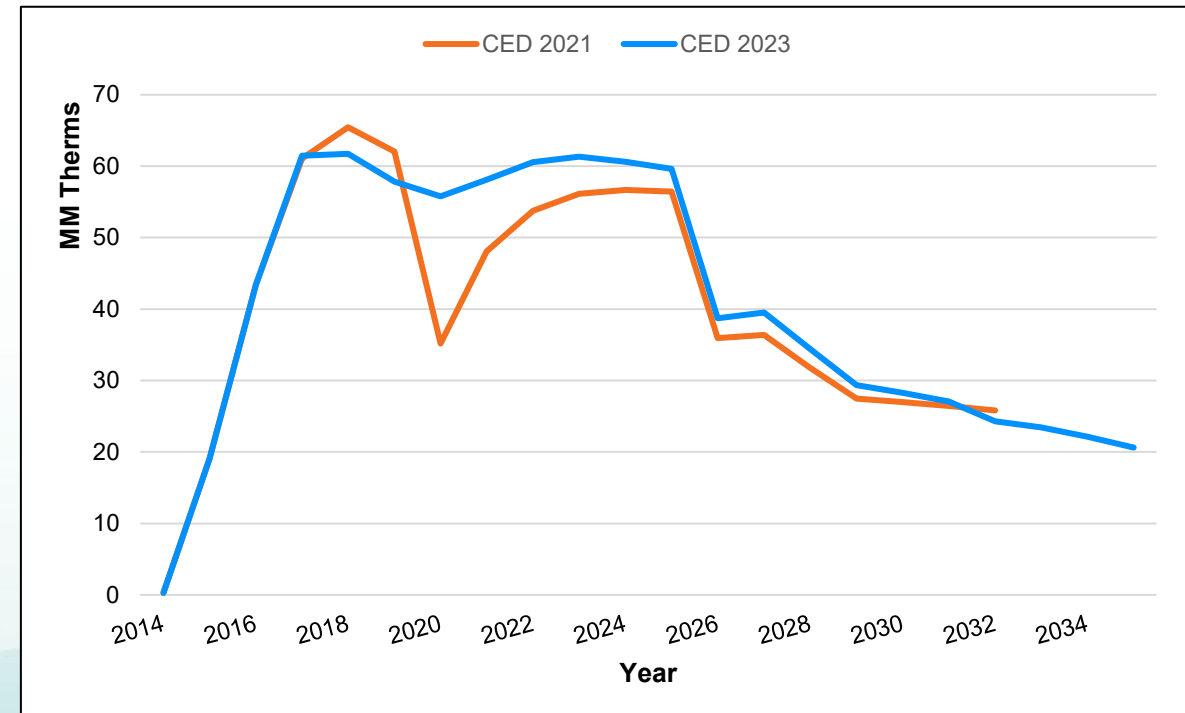
Statewide Gas Programs & Standards Savings (Committed)

- Some programs and standards are embedded in the sector models, some are considered exogenously.
- Many programs will expire over the forecast period, which means they cause gas demand to increase starting in 2024.

Gas Programs Impacts



Gas Standards Impacts



Source: CEC staff

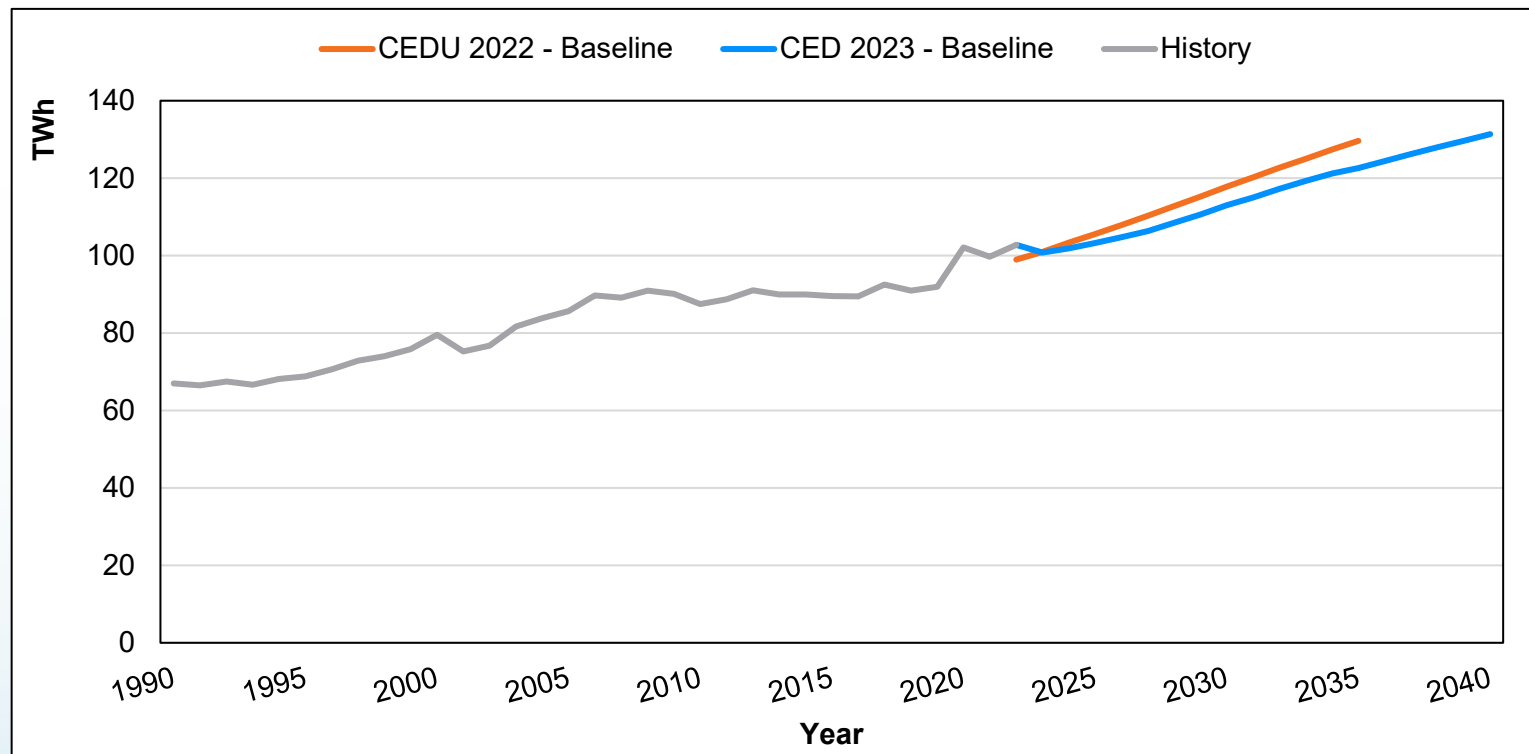


Baseline Demand Forecast: Electricity Consumption Results



Statewide Residential Electricity Consumption

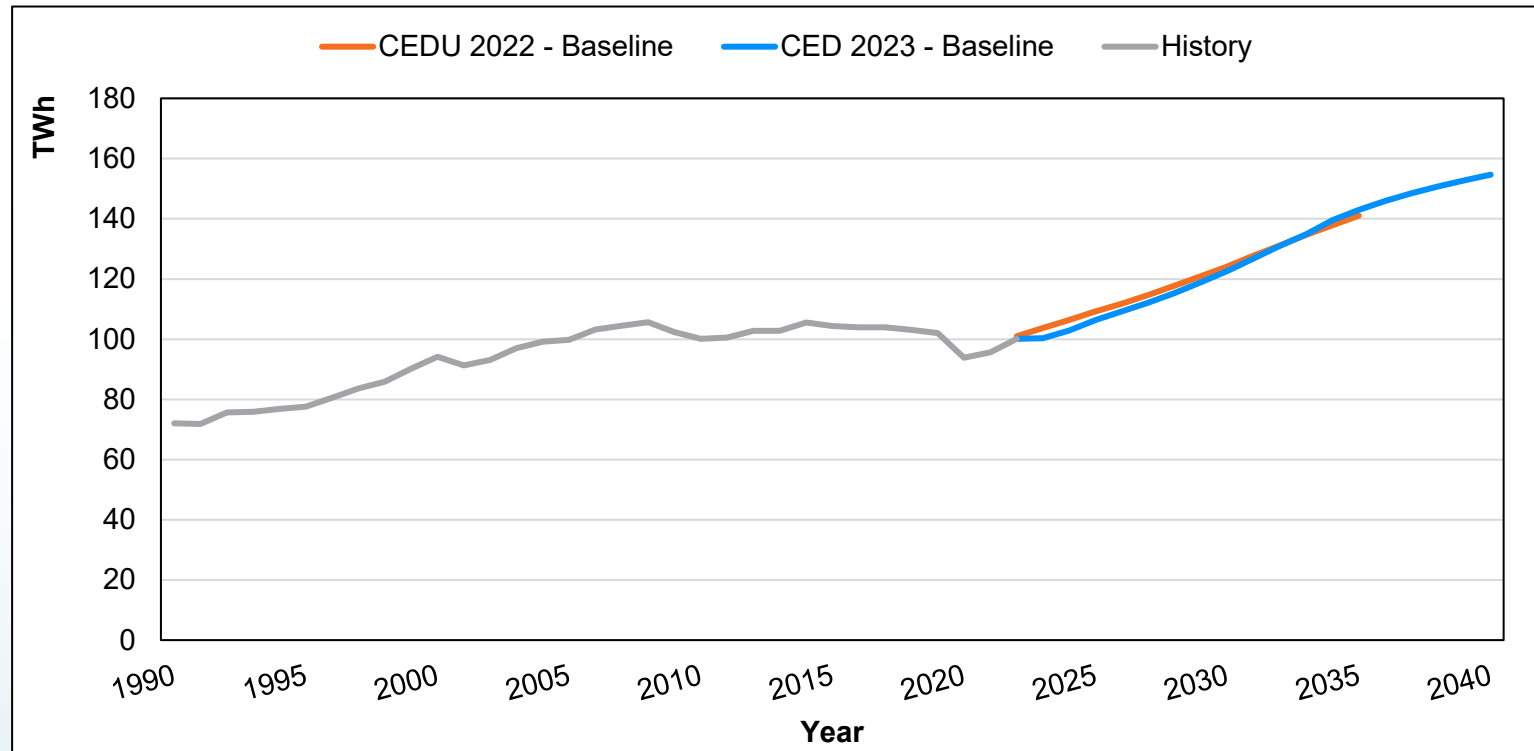
- Overall, CED 2023 residential electricity consumption is lower compared to the CEDU 2022 forecast.
- The CED 2023 baseline average annual growth rate (2023 – 2040) is 1.4%, compared to 1.9% for the CEDU 2022 forecast period (2022 – 2035).





Statewide Commercial Electricity Consumption

- CED 2023 forecasted commercial electricity consumption is lower than the CEDU 2022 baseline in the near term but exceeds it later in the forecast.
- The CED 2023 average annual growth rate (2023 – 2040) is 2.4%, compared to 2.8% for CEDU 2022 (2022 – 2035).

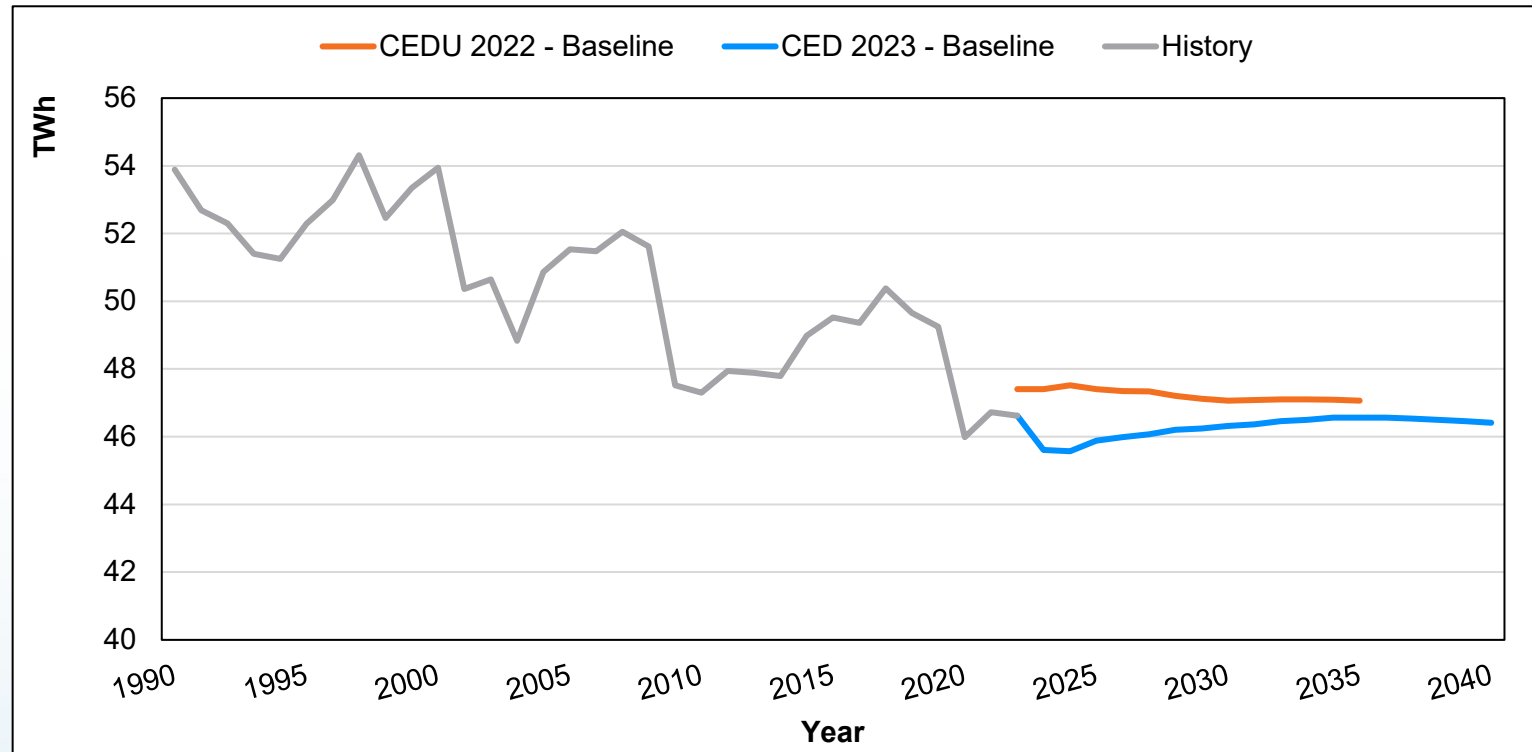


Source: CEC staff



Statewide Industrial Electricity Consumption

- Electricity consumption trend is lower in the near term due to economic drivers (GSP) and electricity price increases.

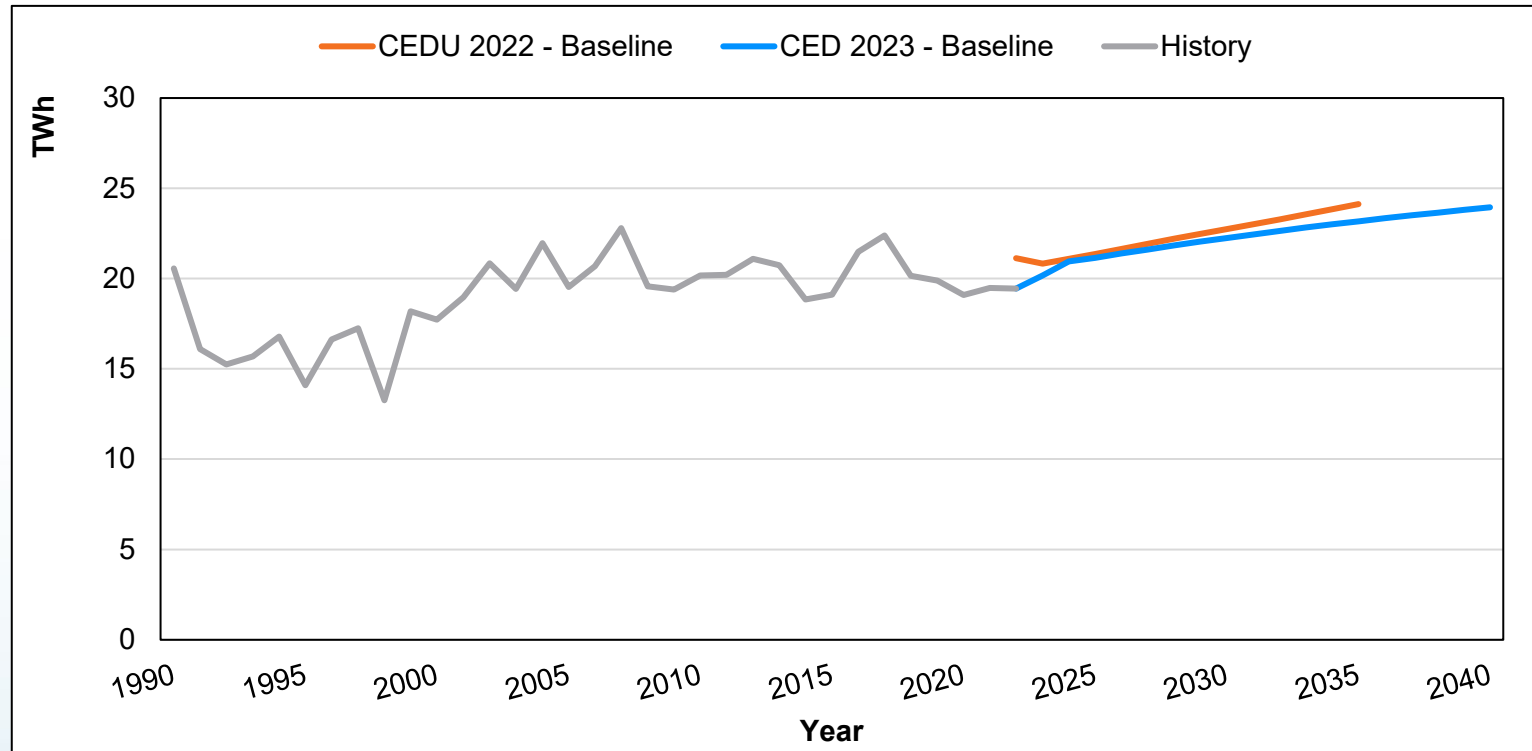


Source: CEC staff



Statewide Agriculture and Water Pumping Electricity Consumption

- CED 2023 baseline agriculture and water pumping forecast is similar to the CEDU 2022 baseline forecast, but with a lower growth rate later in the forecast period.

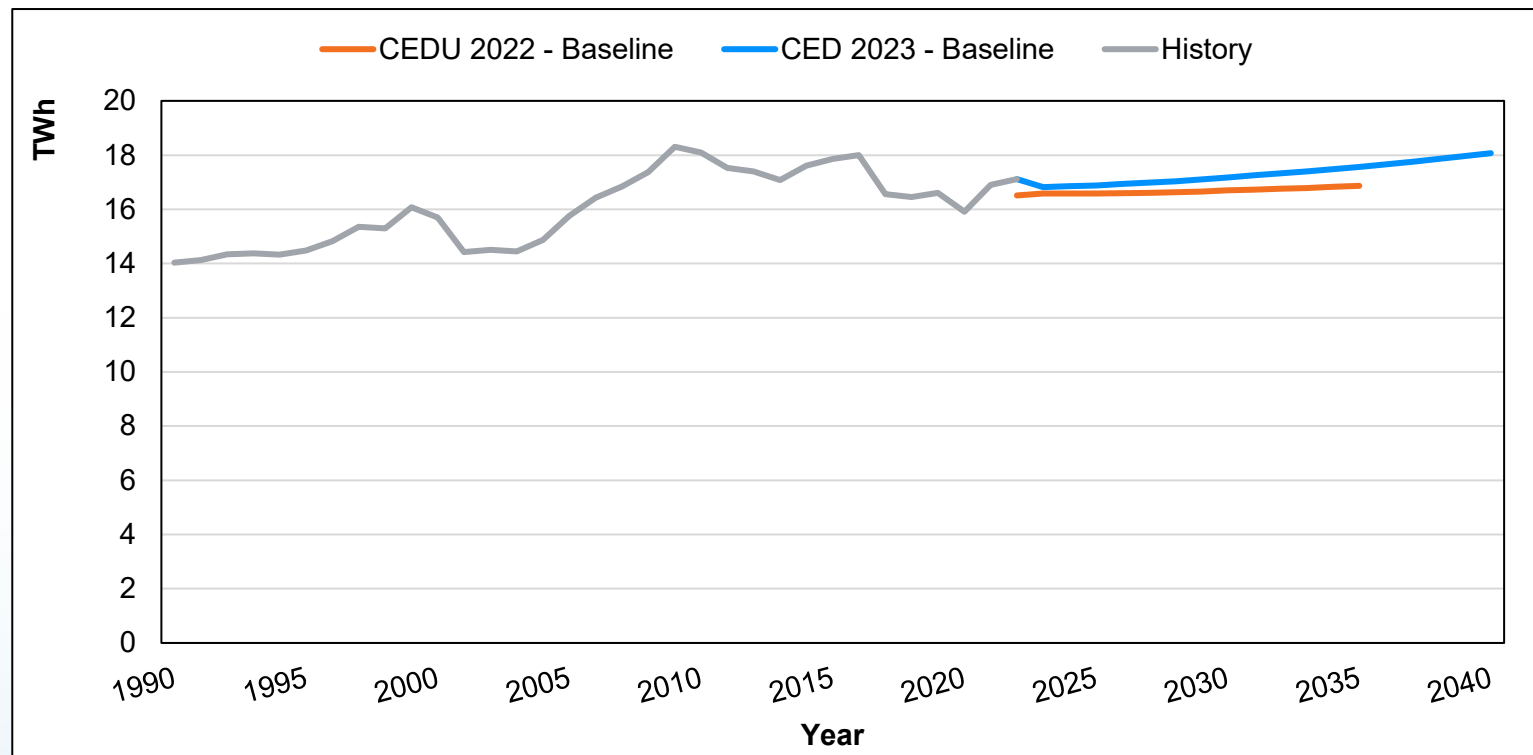


Source: CEC staff



Statewide TCU & Streetlighting Electricity Consumption

- CED 2023 baseline TCU and streetlighting forecast is similar to the CEDU 2022 baseline forecast, but with a higher growth rate across the forecast period.

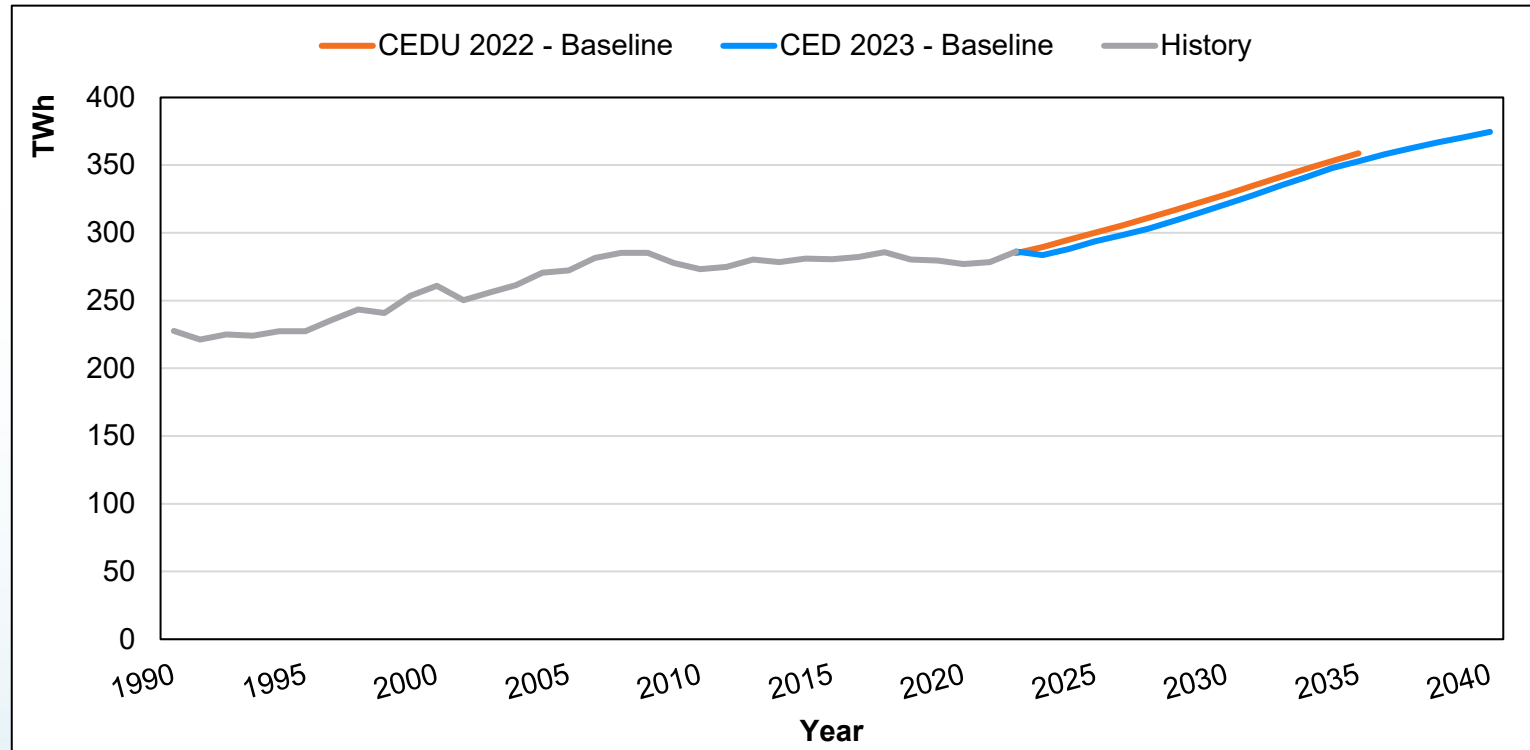


Source: CEC staff



Statewide Electricity Consumption

- Lower electricity consumption is primarily due to household/population changes and price increases.
- The difference in annual average growth rate is approximately -0.3%, but most of this reduction is in the first forecast year, after which CED 2023 growth is consistent with CEDU 2022.

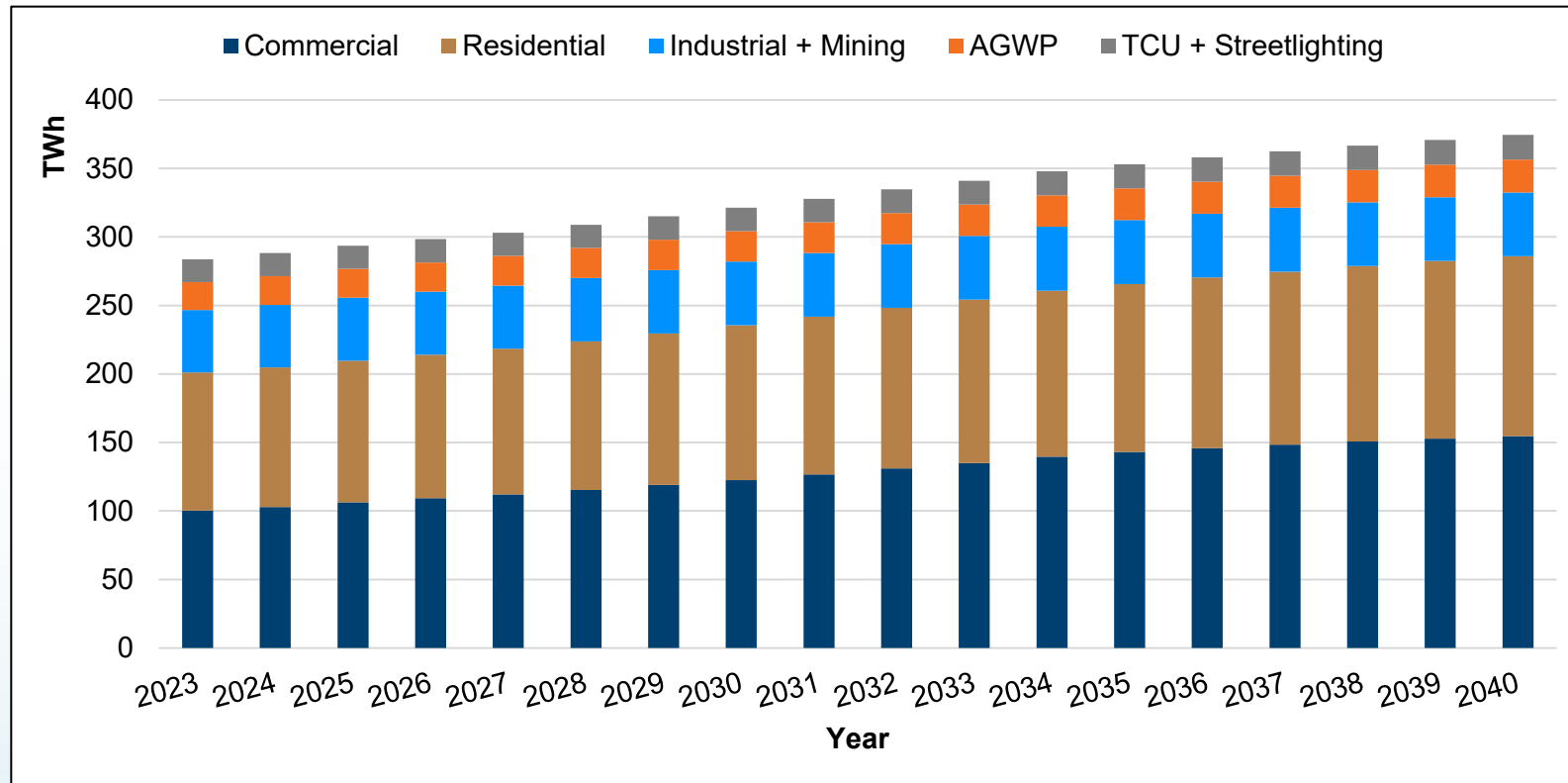


Source: CEC staff



Statewide Electricity Consumption Forecast by Sector

- For CED 2023, the share of electricity consumption by sector remains relatively constant.
- Commercial electricity consumption share grows the most from 35.4% in 2023 to 41.3% in 2040.



Source: CEC staff



Self-Generation and Electricity Sales Forecasts



Self-Generation Forecast

Table 2: CED 2023 Baseline Self-Generation Energy (GWh) by Planning Area

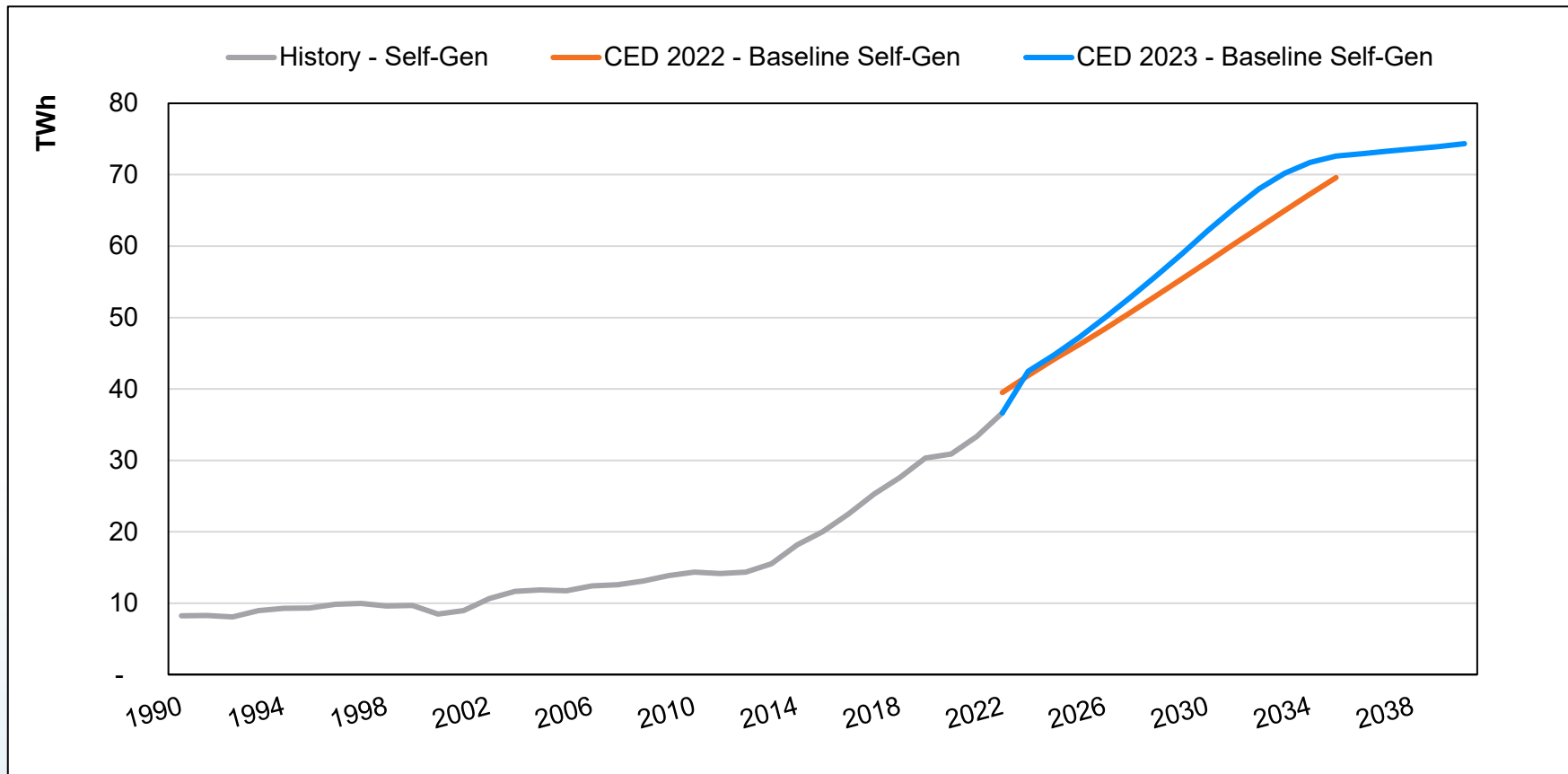
Planning Area	2022	2025	2030	2035	2040	CED 2023 Average Annual % Increase (2022- 2040)	CEDU 2022 Average Annual % Increase (2021- 2035)
Statewide	35,662	45,085	61,454	73,135	76,444	4.4%	4.6%
PGE	17,102	20,853	26,721	30,879	31,964	3.6%	4.5%
SCE	11,460	15,243	21,875	26,528	27,805	5.1%	4.5%
SDGE	3,840	4,590	5,867	6,772	7,125	3.5%	4.9%
LADWP	2,052	2,744	4,149	5,153	5,471	5.7%	4.3%
NCNC	939	1,239	2,086	2,761	2,952	6.6%	8.4%
IID	148	213	375	505	546	7.6%	8.2%
BUGL	79	130	251	351	379	9.3%	9.6%

Source: CEC Staff



Statewide Electricity Self-Generation Forecasts

- Initially, growth in electricity generated is higher than previous CEDU 2022 forecast, but growth slows later in the CED 2023 forecast period.

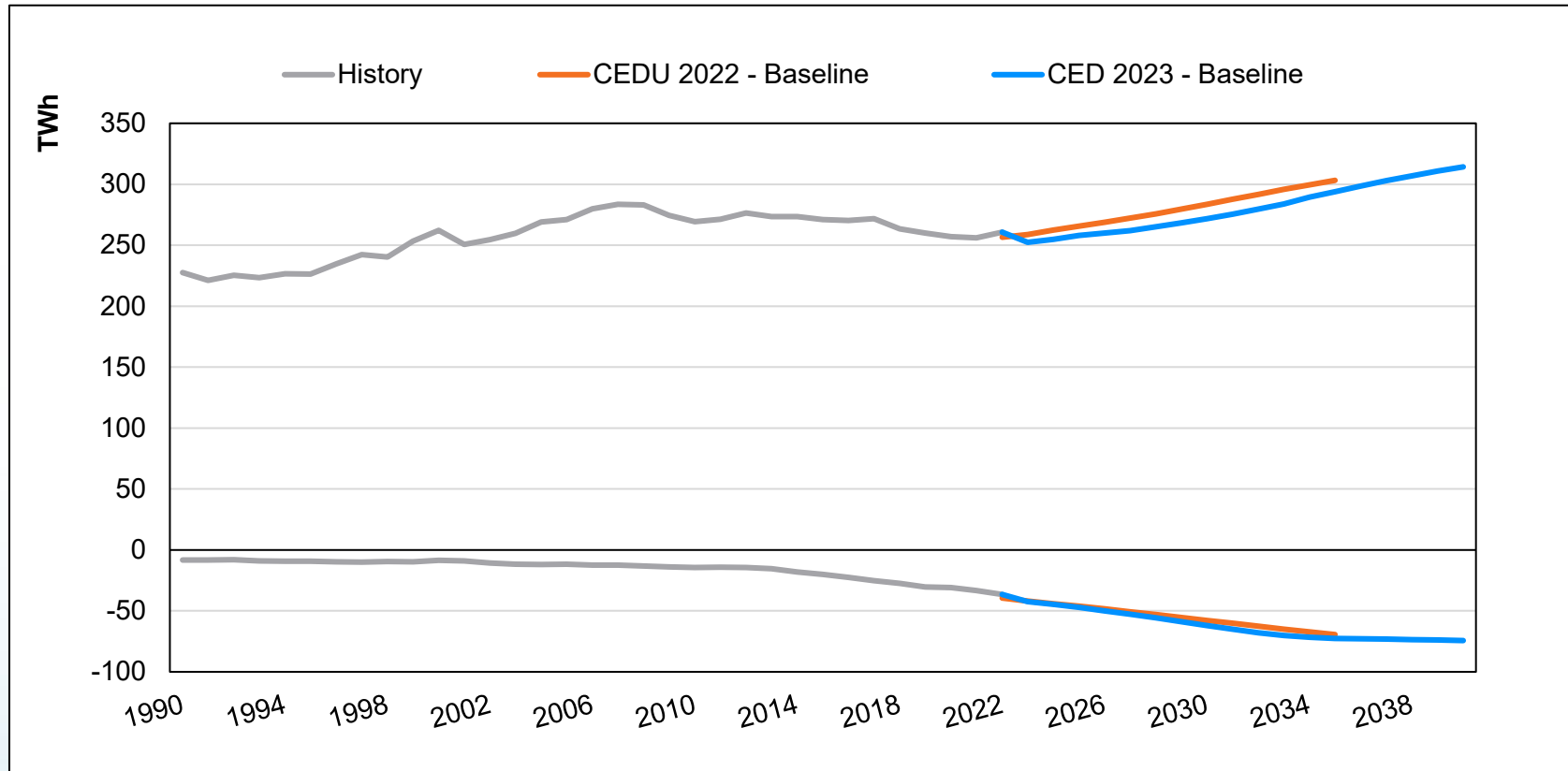


Source: CEC staff



Statewide Electricity Forecasts: Baseline Sales

- Without self-generation, forecasted sales in 2040 would be 74.3 TWh or about 23.6% higher than what's currently projected.
- In 2035, statewide sales are down by about 3.1% relative to the CEDU 2022 baseline forecast.

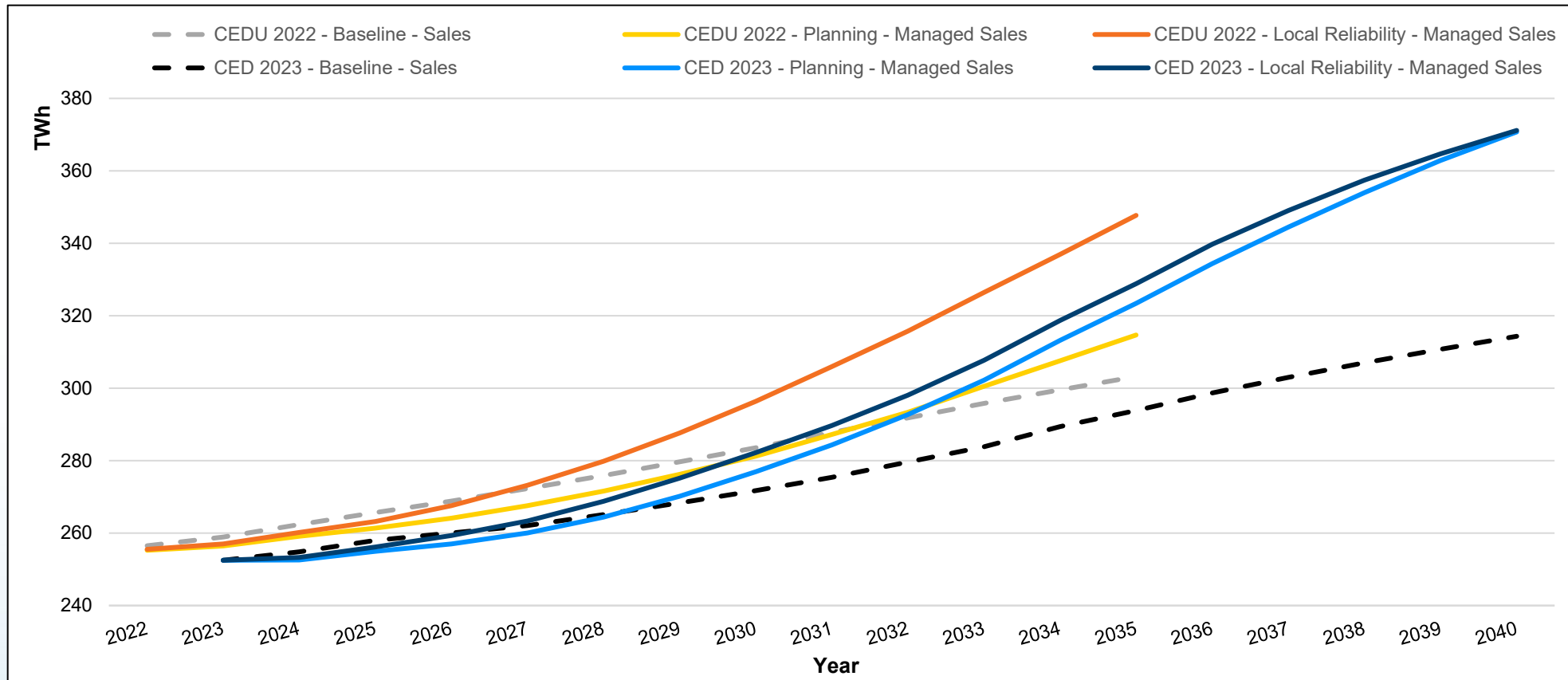


Source: CEC staff



Statewide Electricity Forecasts: Managed Sales

- The CED 2023 Scenarios are more similar to each other compared to CEDU 2022.
- In 2040, the CED 2023 Planning and Local Reliability managed sales projections reach 370.8 TWh and 371.2 TWh respectively, about 18% higher than baseline sales.



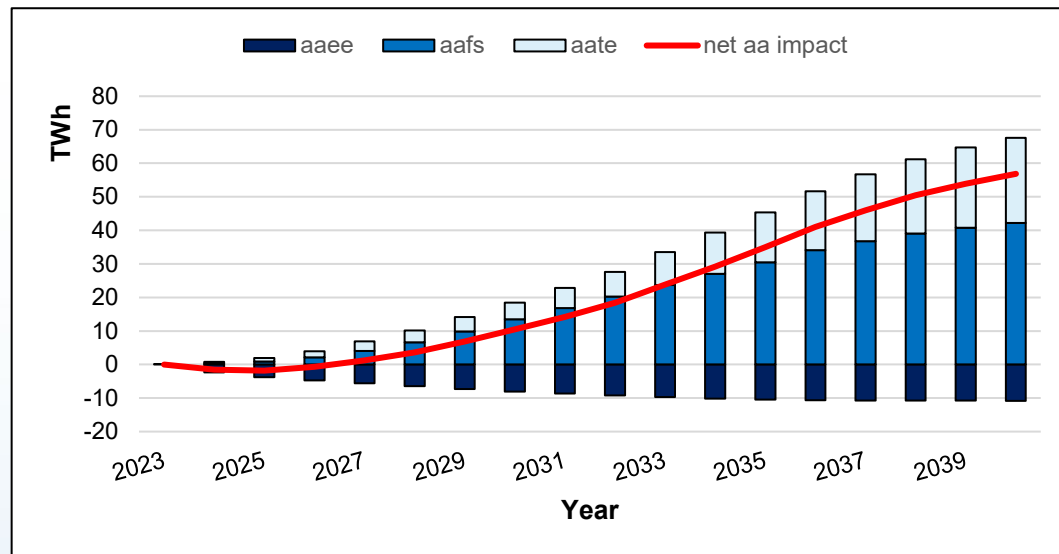
Source: CEC staff



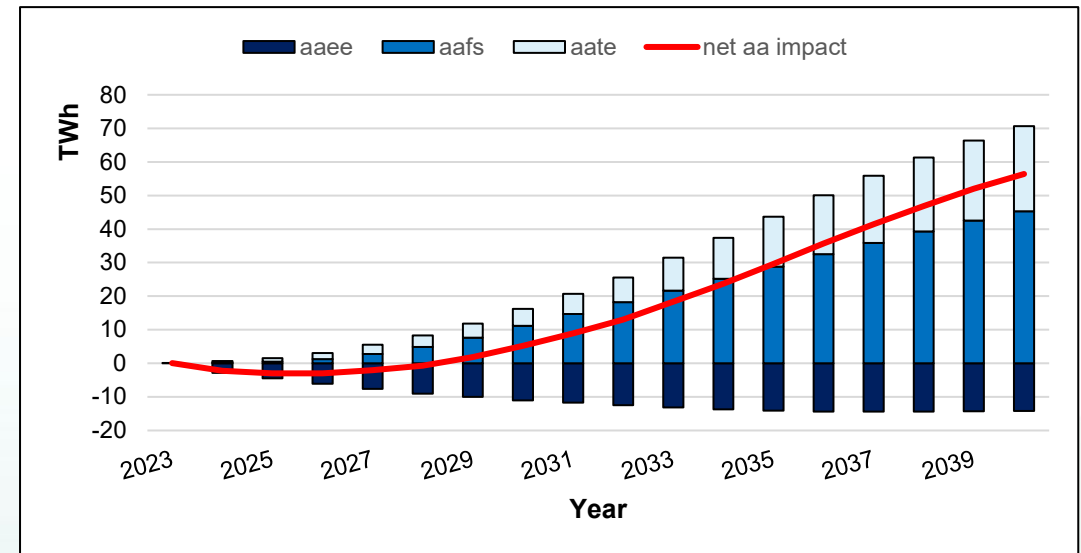
Statewide Electricity Forecasts: Additional Achievable Load Modifiers

- Local Reliability scenario net AA impacts reach about 56.8 TWh in 2040. That's about 18.0% of the total baseline electricity sales or 76.4% of the electricity generated by self-generation.
- The Planning Forecast net AA impacts are similar at 56.4 TWh in 2040, although there is slightly more divergence in the middle of the forecast.

CED 2023 Local Reliability Forecast



CED 2023 Planning Forecast



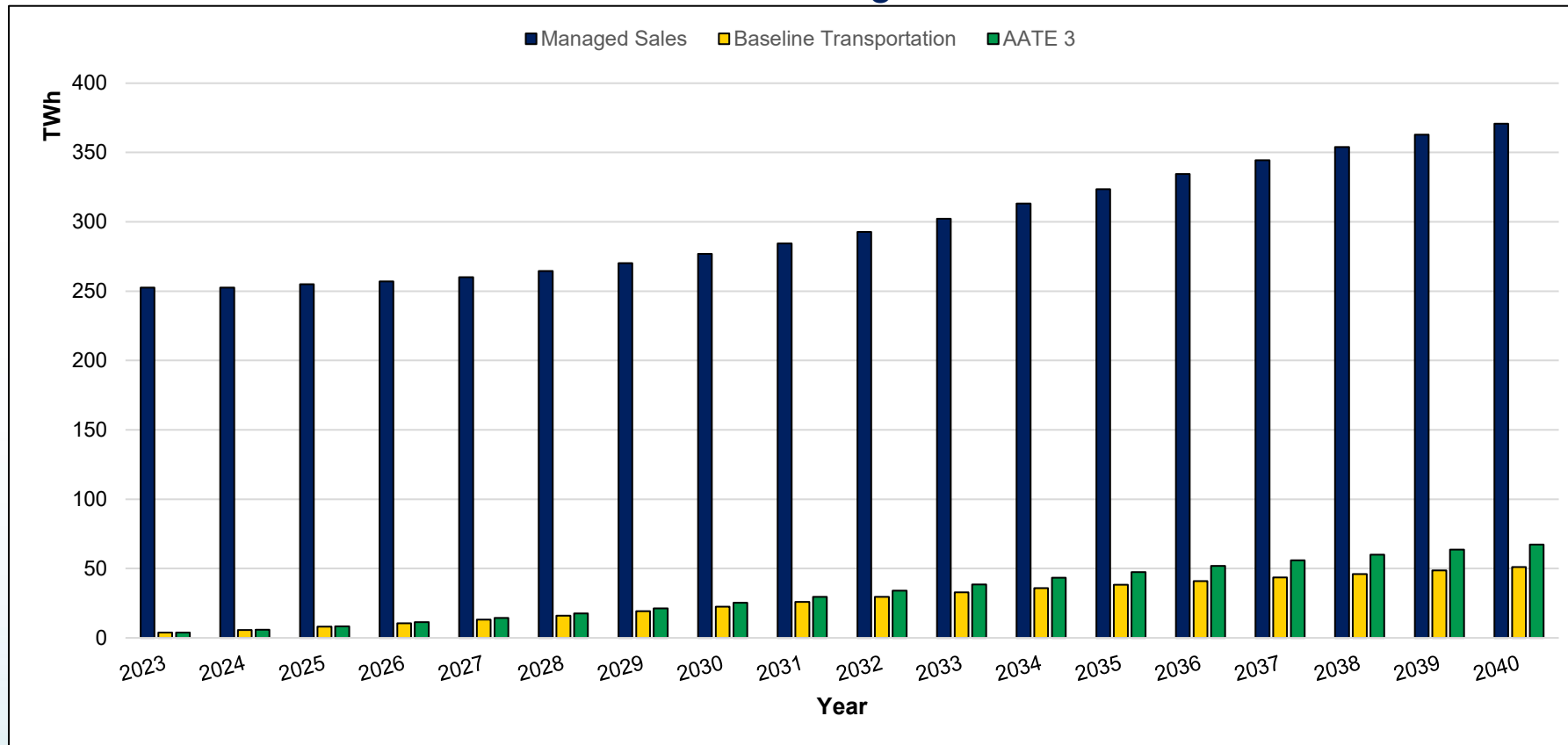
Source: CEC staff



Statewide Transportation Electrification Impacts

- In 2040, the forecasted incremental impact of transportation electrification is approximately 51.1 TWh without AATE 3 or 67.3 TWh with AATE 3.
- AATE 3 is about 18.2% of managed sales in 2040.

CED 2023 Planning Forecast

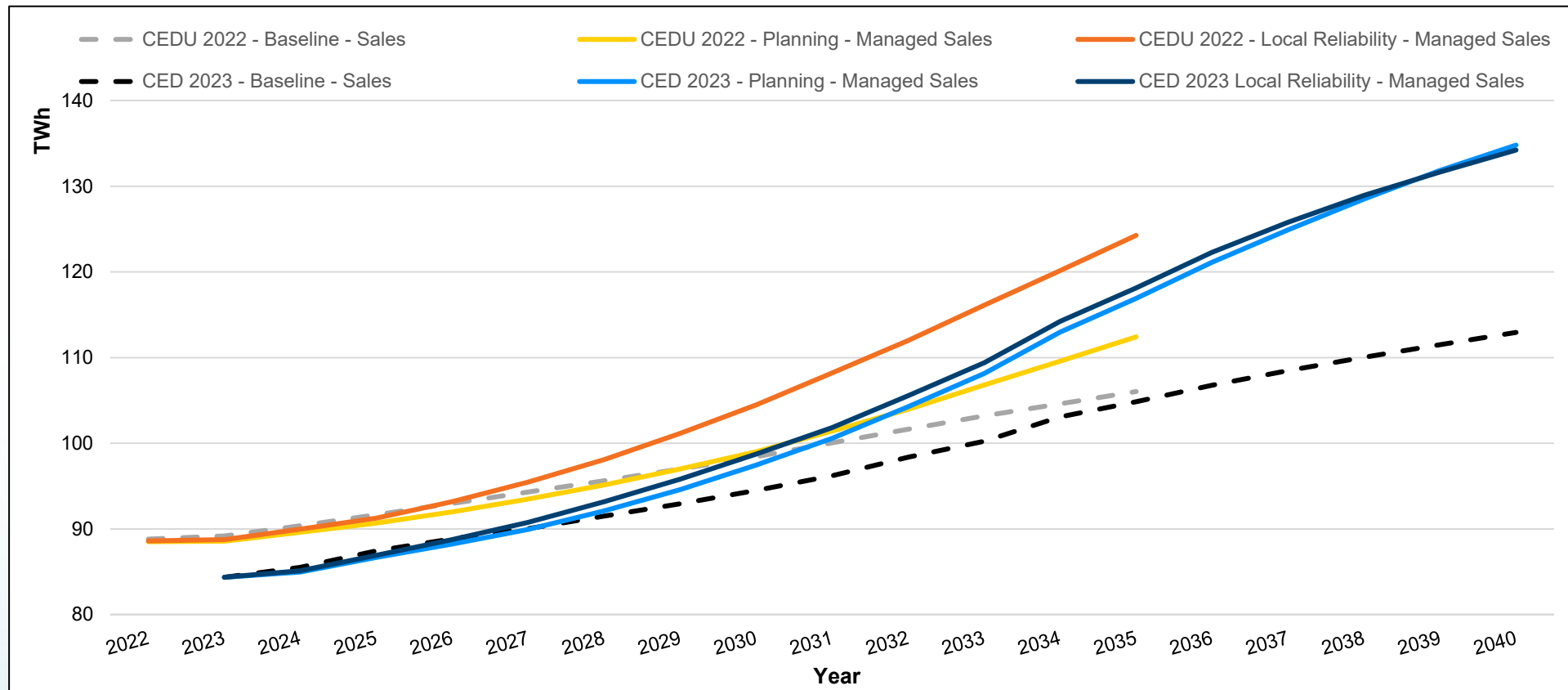


Source: CEC staff



Electricity Sales Forecasts: PG&E Planning Area

- In the near-term, CEDU 2023 managed sales forecast are less than baseline sales.
 - By 2027, Local Reliability Forecast sales surpass baseline sales.
 - By 2028, Planning Forecast sales surpass baseline sales.

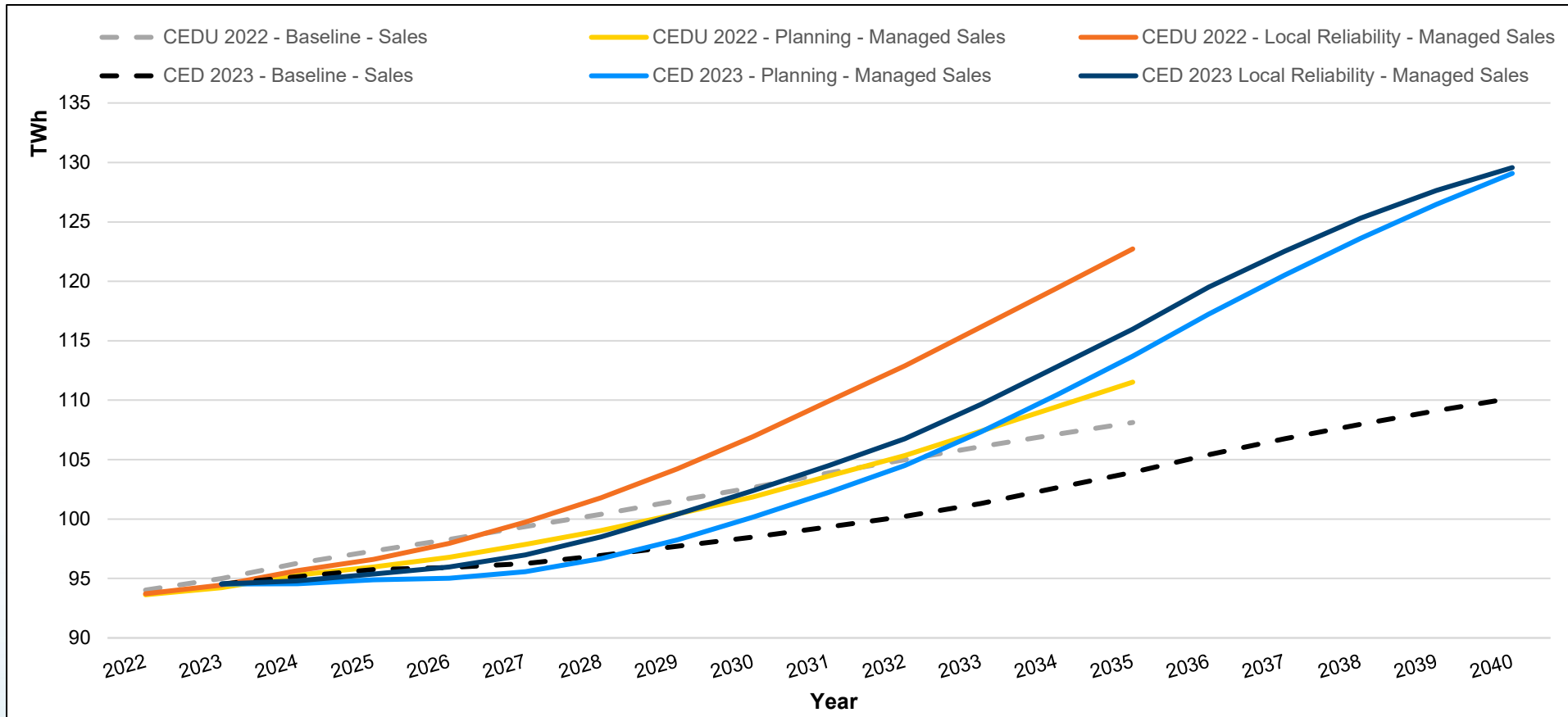


Source: CEC staff



Electricity Sales Forecasts: SCE Planning Area

- In the near-term, CED 2023 managed sales forecast are less than baseline sales.
 - By 2026, Local Reliability Forecast sales surpass baseline sales.
 - By 2028, Planning Forecast sales surpass baseline sales.

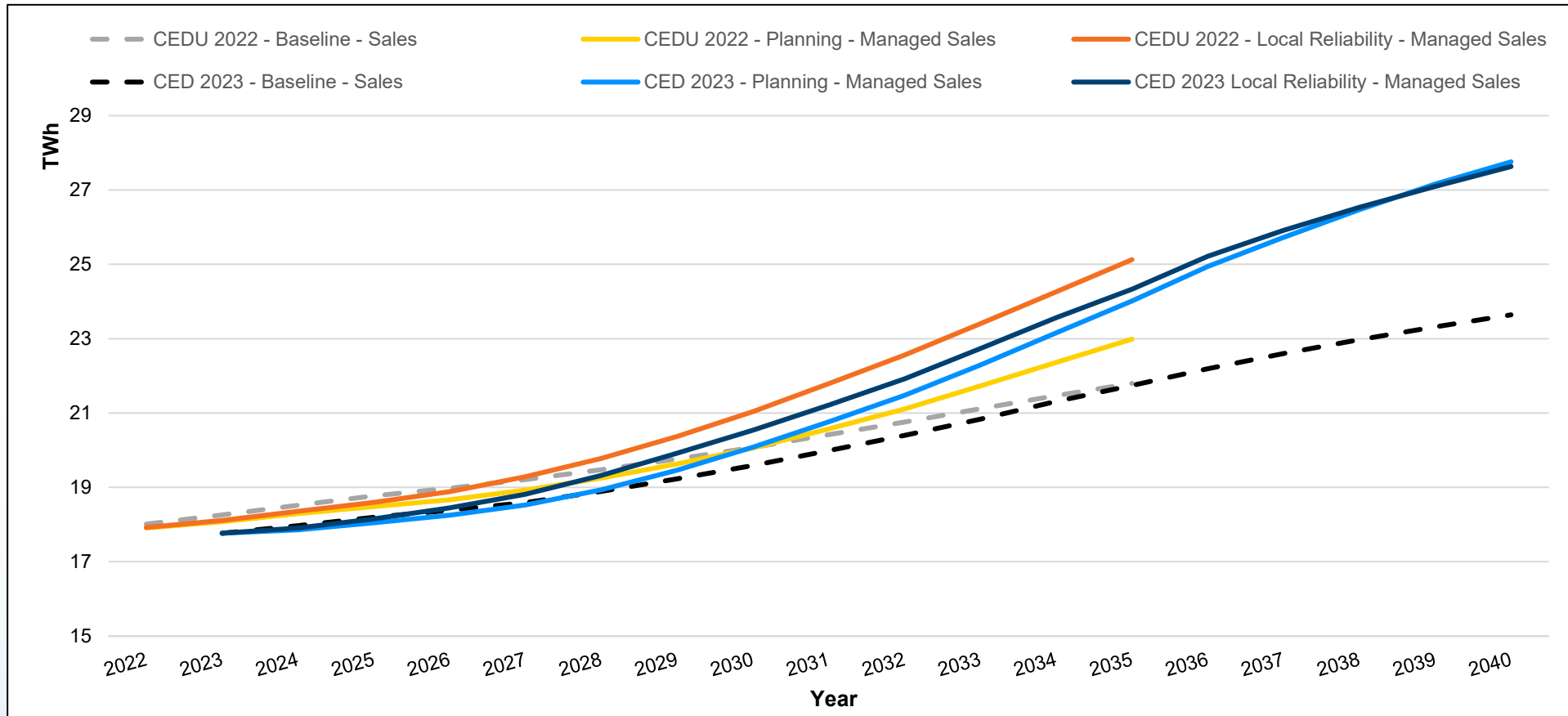


Source: CEC staff



Electricity Sales Forecasts: SDG&E Planning Area

- In the near-term, CEDU 2023 managed sales forecast are less than baseline sales.
 - By 2026, Local Reliability Forecast sales surpass baseline sales.
 - By 2028, Planning Forecast sales surpass baseline sales.

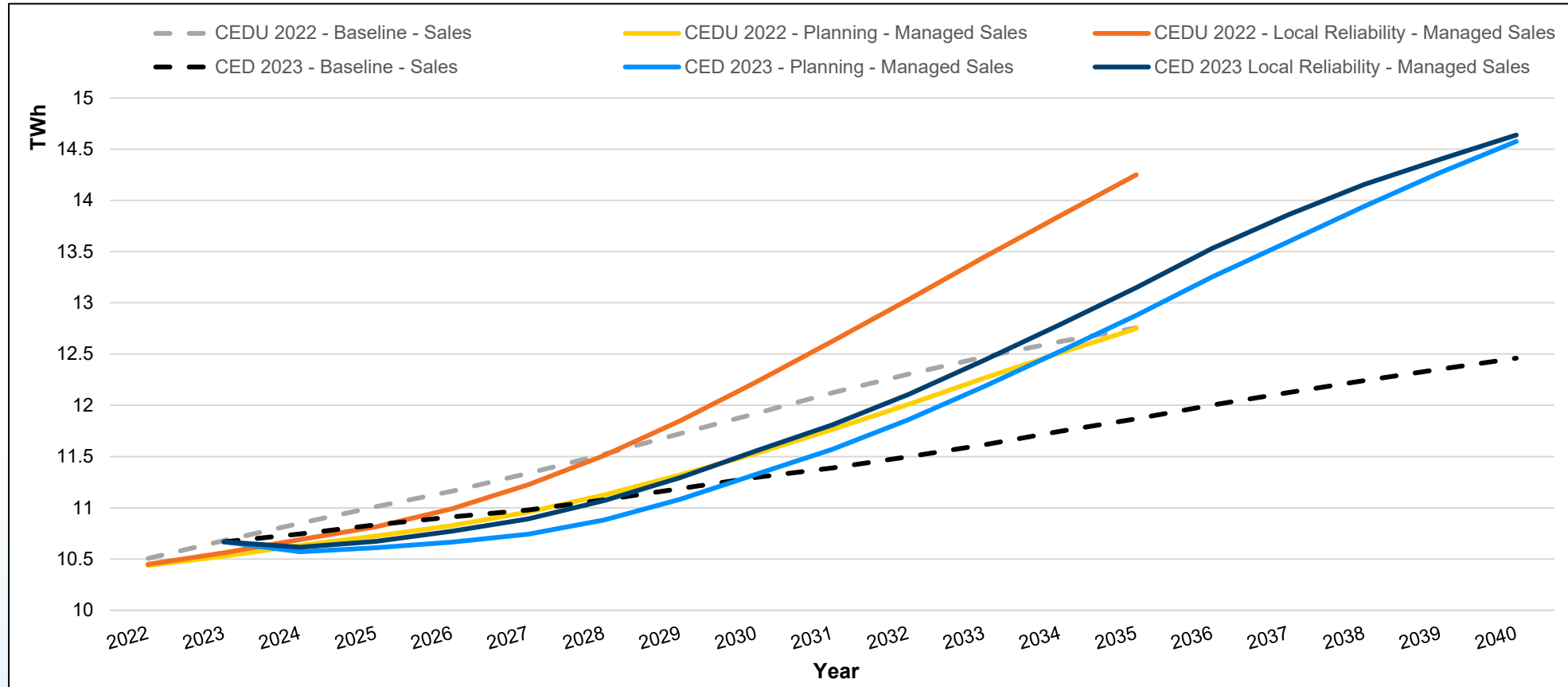


Source: CEC staff



Electricity Sales Forecasts: SMUD Planning Area

- In the near-term, CED 2023 managed sales forecast are less than baseline sales.
 - By 2029, Local Reliability Forecast sales surpass baseline sales.
 - By 2030, Planning Forecast sales surpass baseline sales.

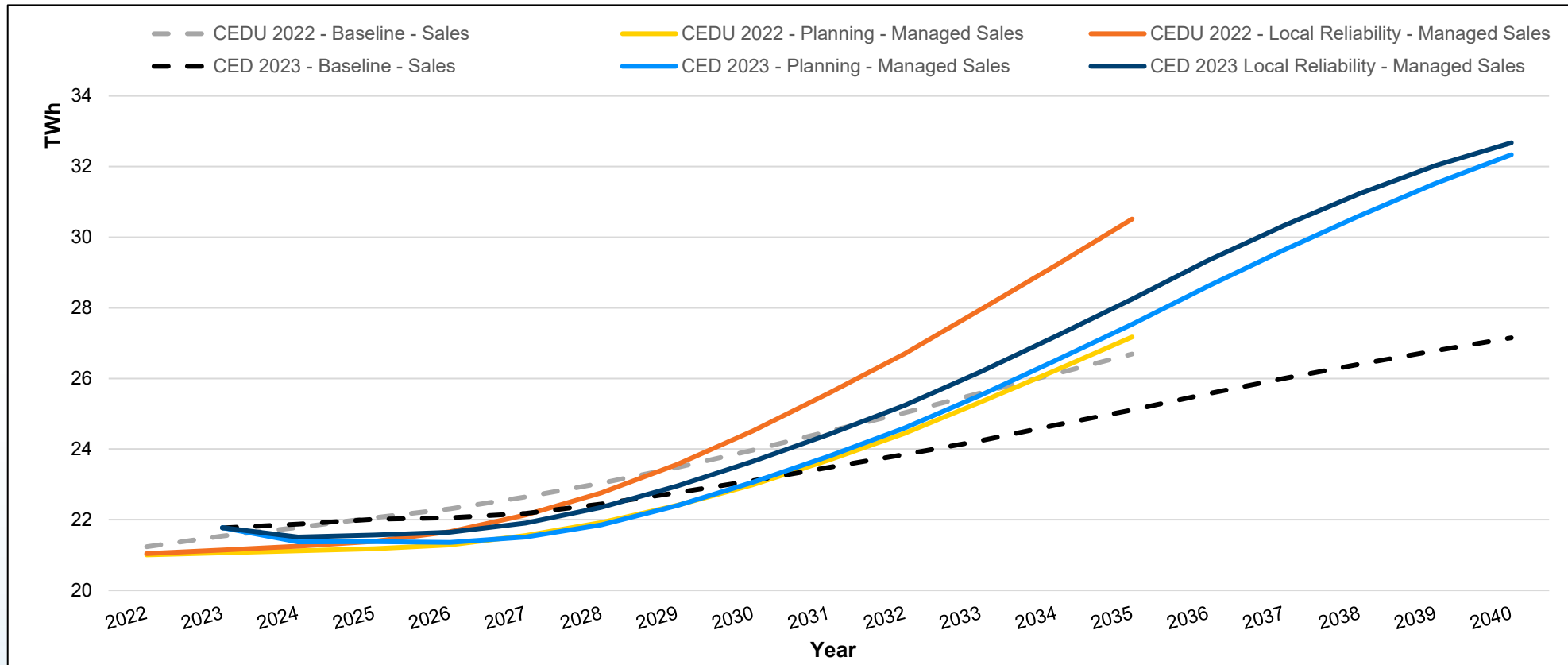


Source: CEC staff



Electricity Sales Forecasts: LADWP Planning Area

- In the near-term, CED 2023 managed sales forecast are less than baseline sales.
 - By 2029, Local Reliability Forecast sales surpass baseline sales.
 - By 2031, Planning Forecast sales surpass baseline sales.



Source: CEC staff

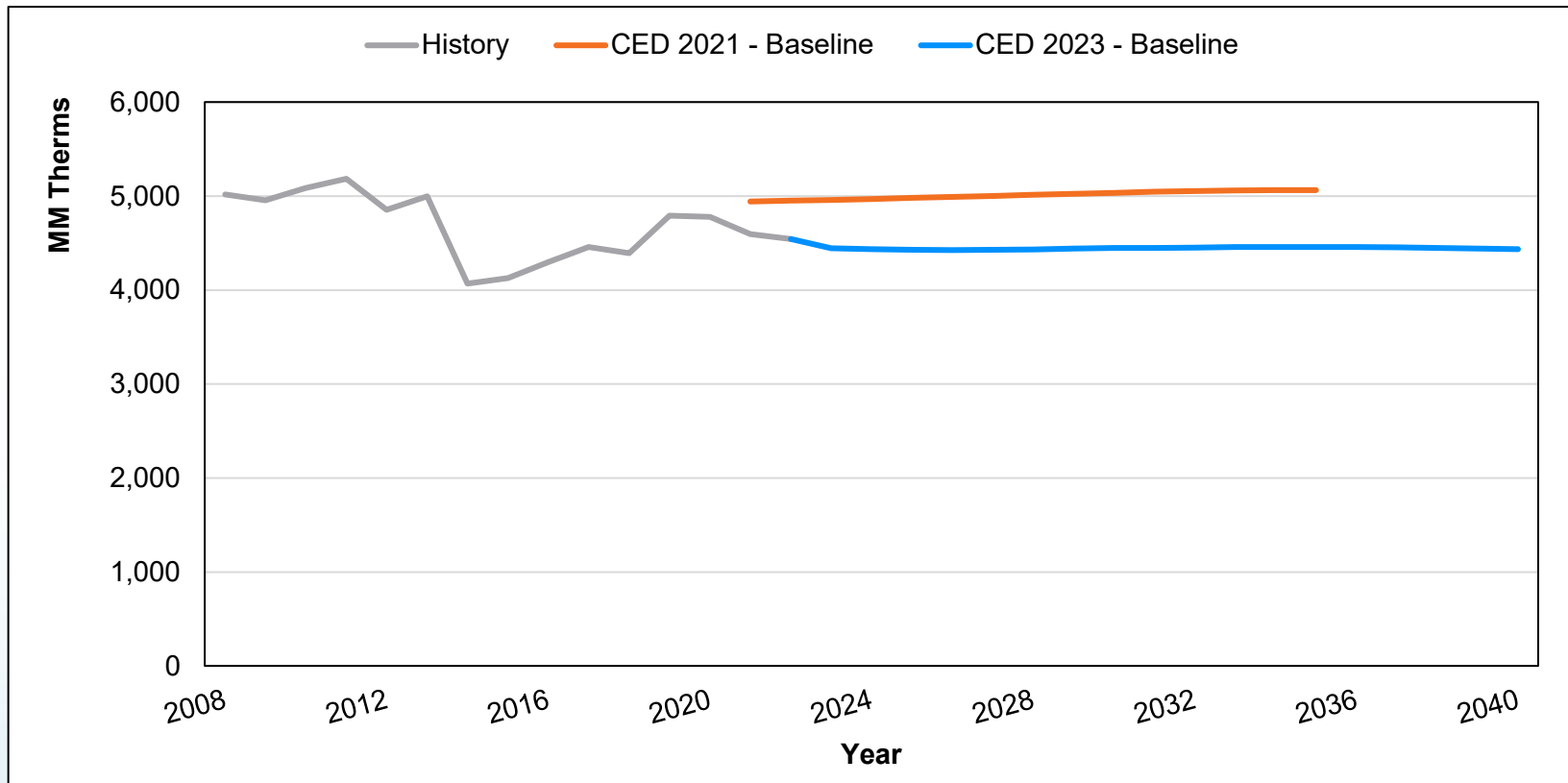


Baseline Demand Forecast: Natural Gas Consumption Results



Statewide Residential Gas Consumption

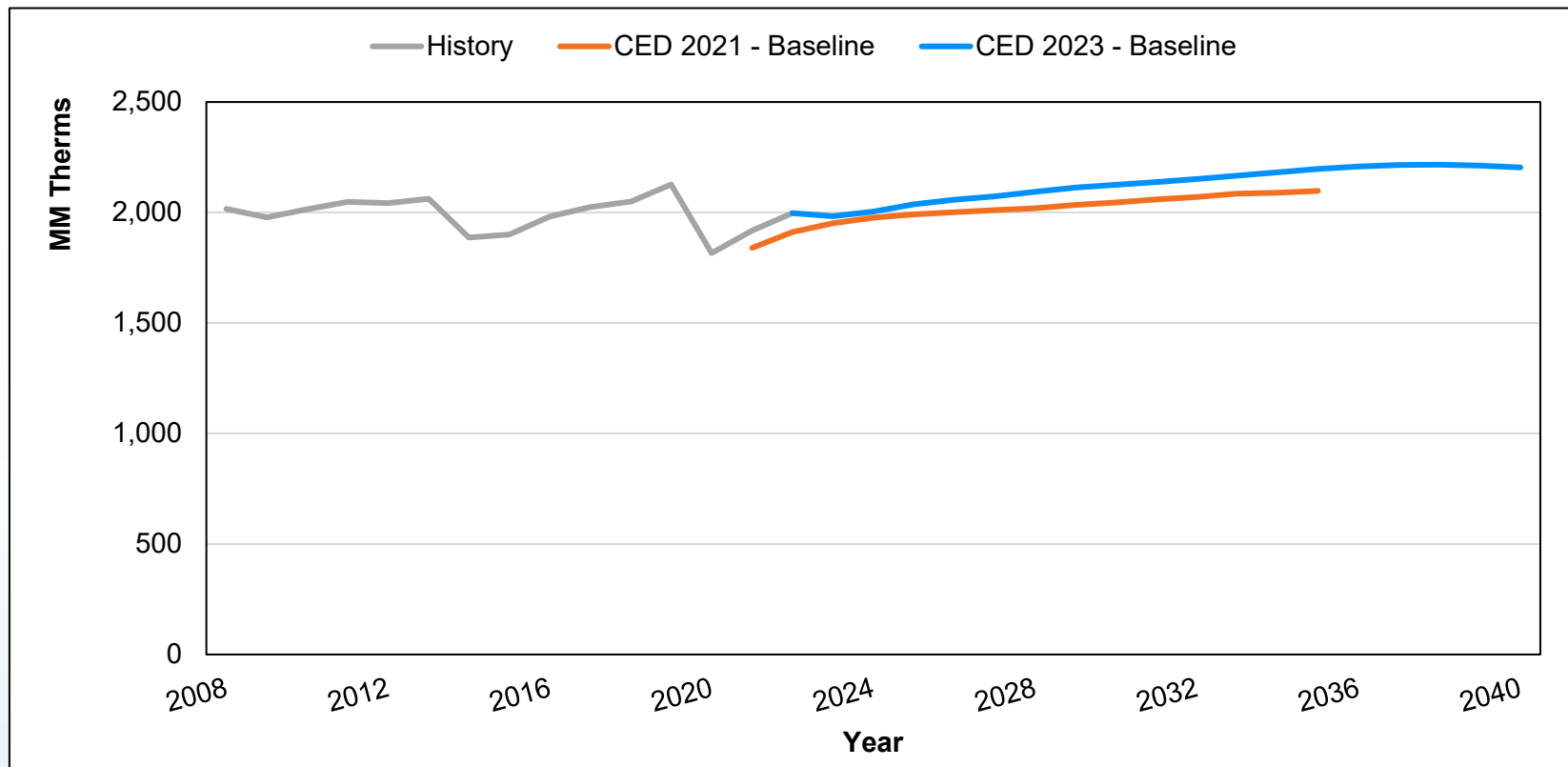
- Overall, CED 2023 residential gas consumption is lower compared to CED 2021.
- Long term growth rates are both small, turning slightly negative towards the end of the forecast period.





Statewide Commercial Gas Consumption

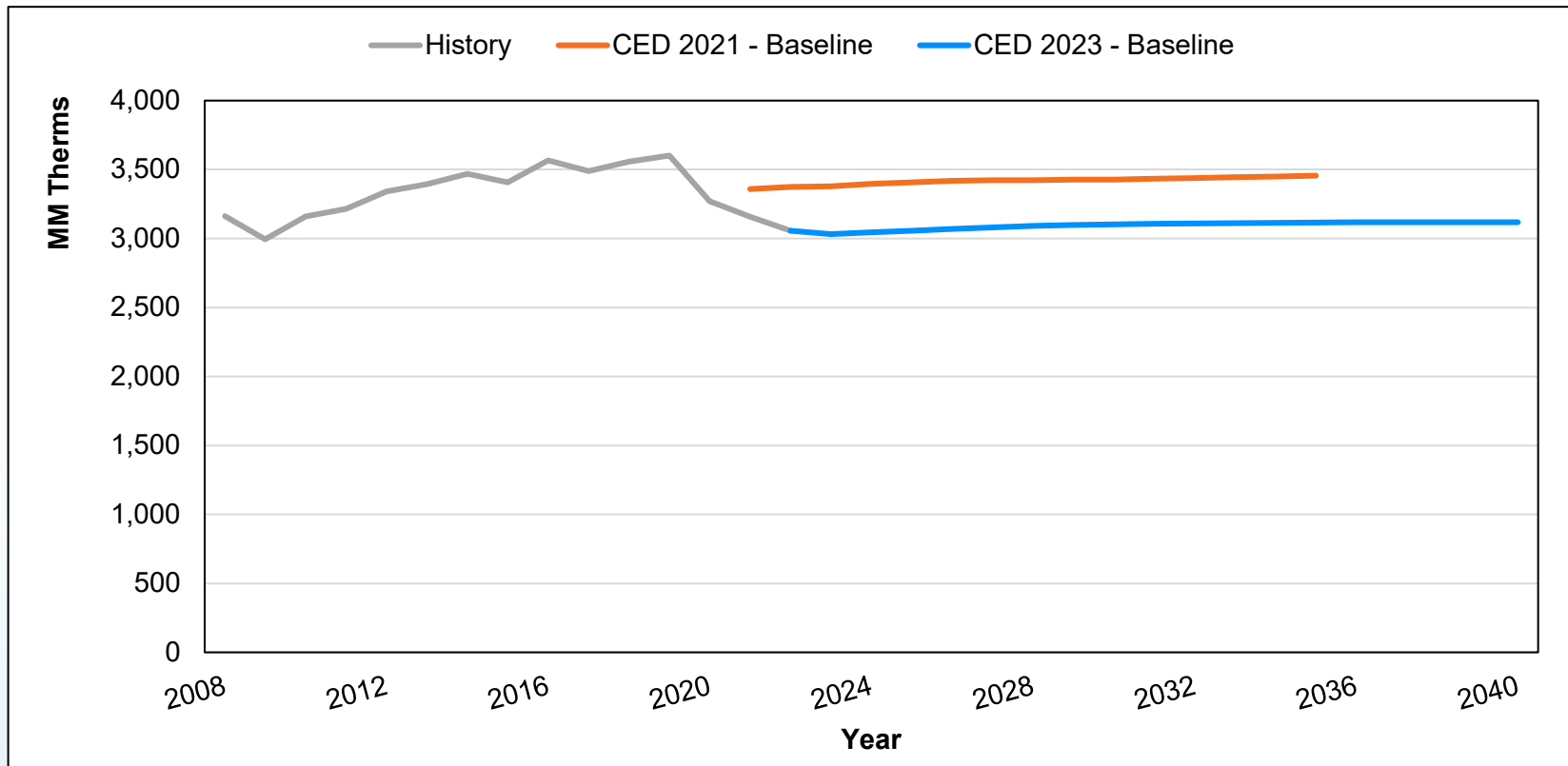
- Overall, CED 2023 commercial gas consumption is higher compared to CED 2021.
- Growth rates slow over the forecast period, CED 2023 turns slightly negative towards the end of the forecast period.





Statewide Industrial (Manufacturing) Gas Consumption

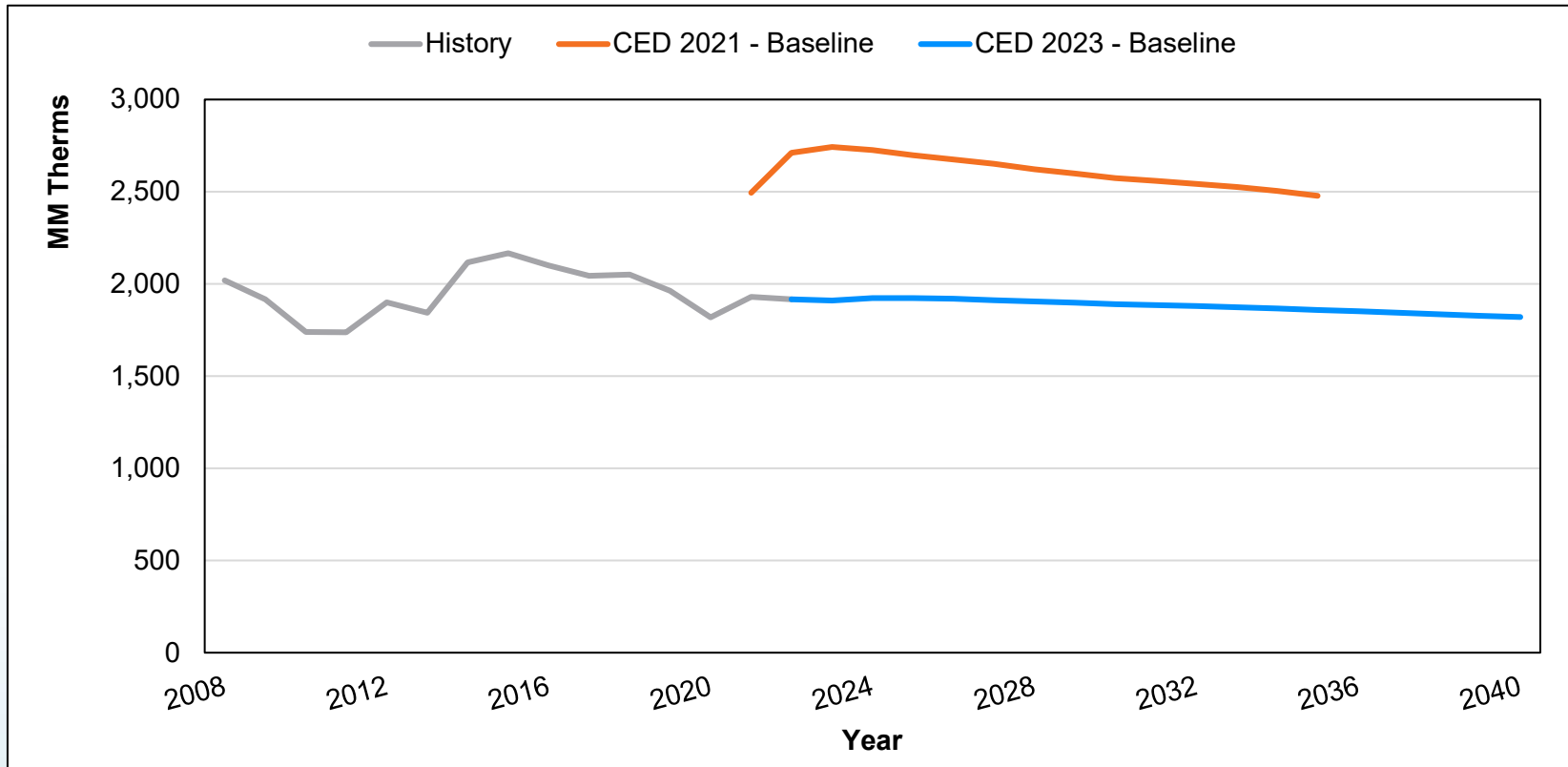
- Overall, CED 2023 industrial manufacturing gas consumption is lower compared to CED 2021.
- Growth rates slow over the forecast period, CED 2023 turns slightly negative towards the end of the forecast period.





Statewide Industrial (Mining & Construction) Gas Consumption

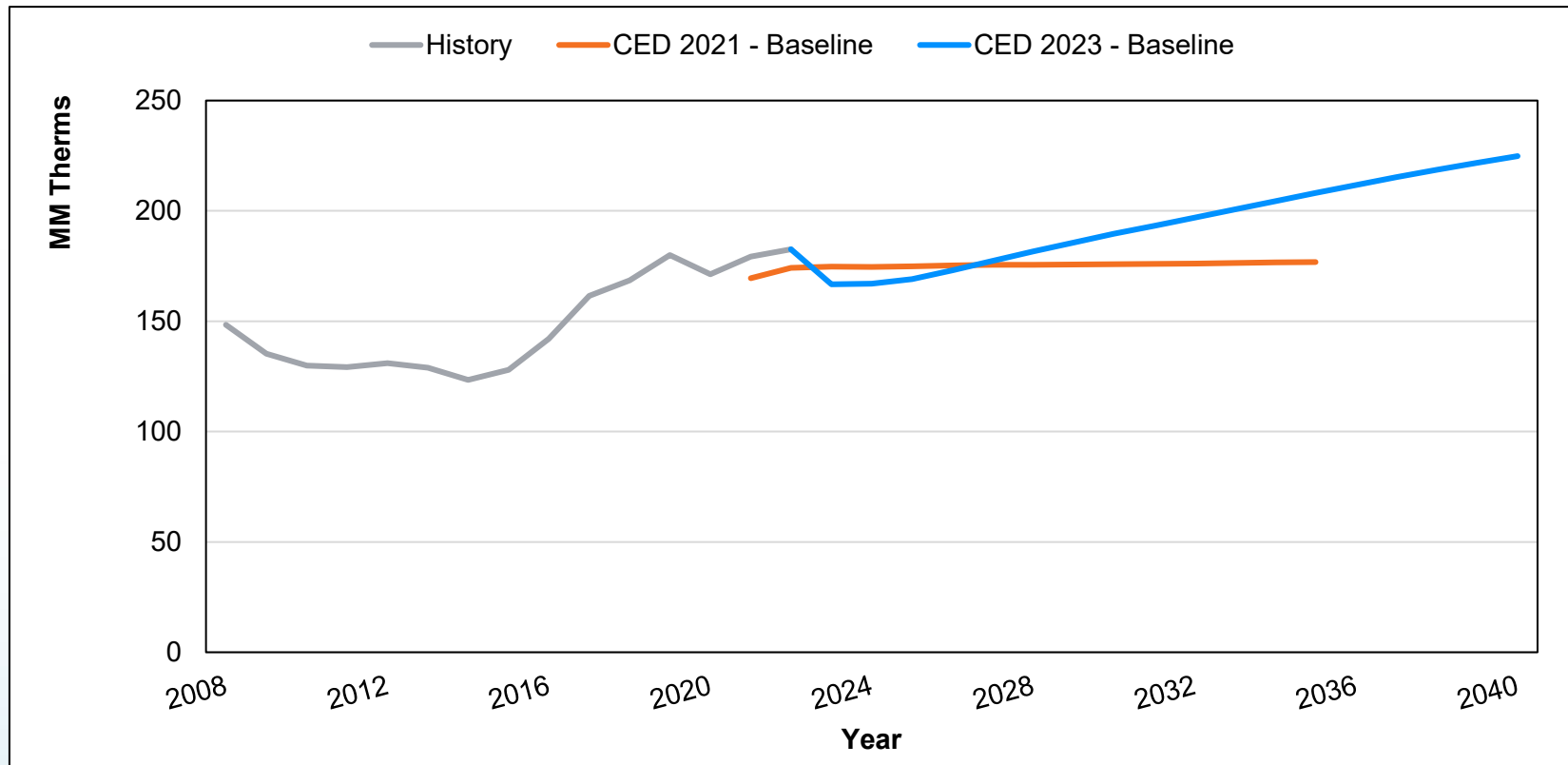
- Overall, CED 2023 industrial mining & construction gas is lower compared to CED 2021.
- Growth rates slow over the forecast period, CED 2023 turns slightly negative towards the end of the forecast period.





Statewide TCU Gas Consumption

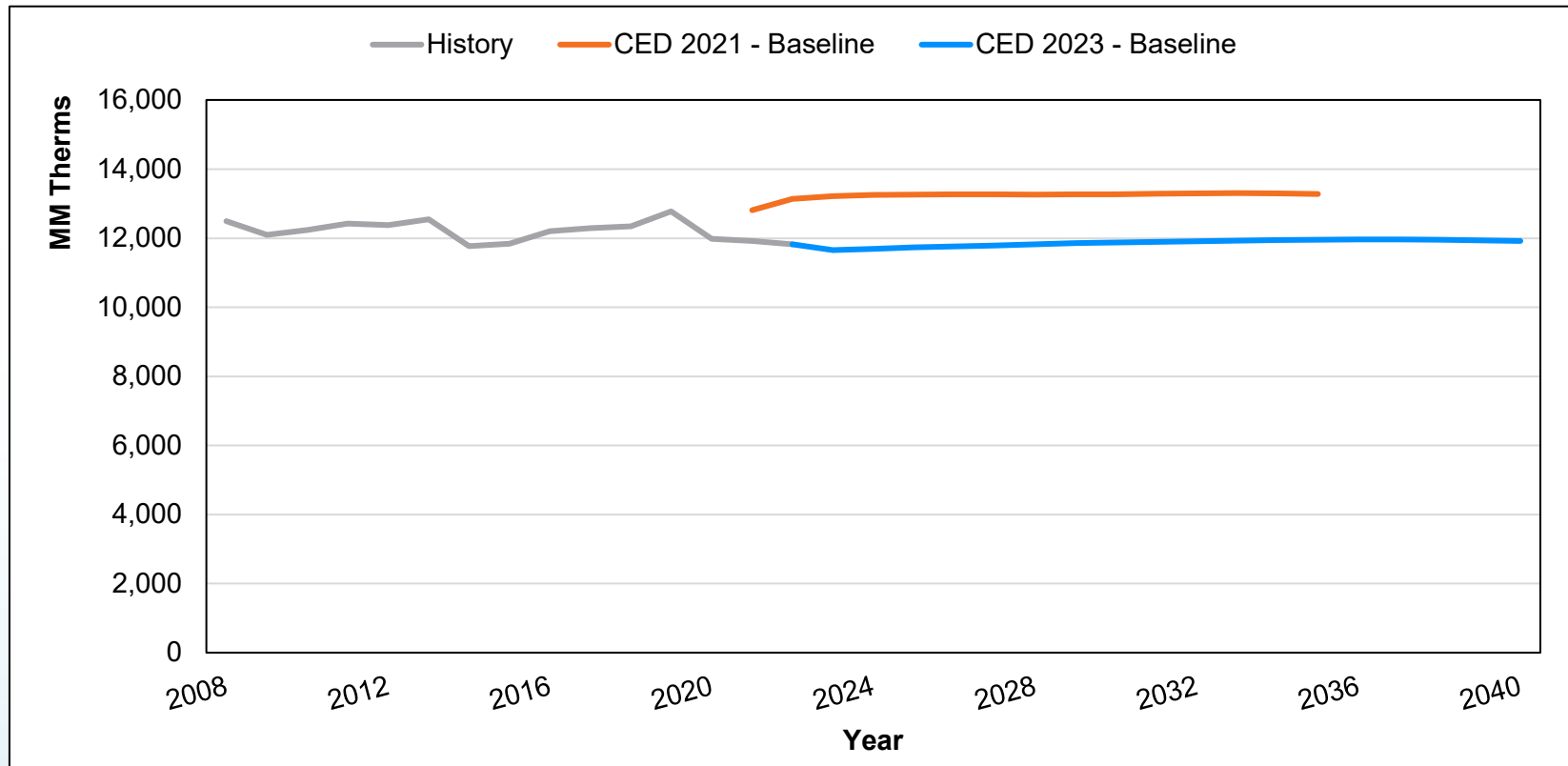
- Overall, CED 2023 TCU gas consumption is higher compared to CED 2021.
- After an initial decrease, growth is higher.





Statewide Natural Gas Consumption

- Overall, CED 2023 gas consumption is lower compared to CED 2021.
- Long-term average growth rates are near zero in both forecasts.



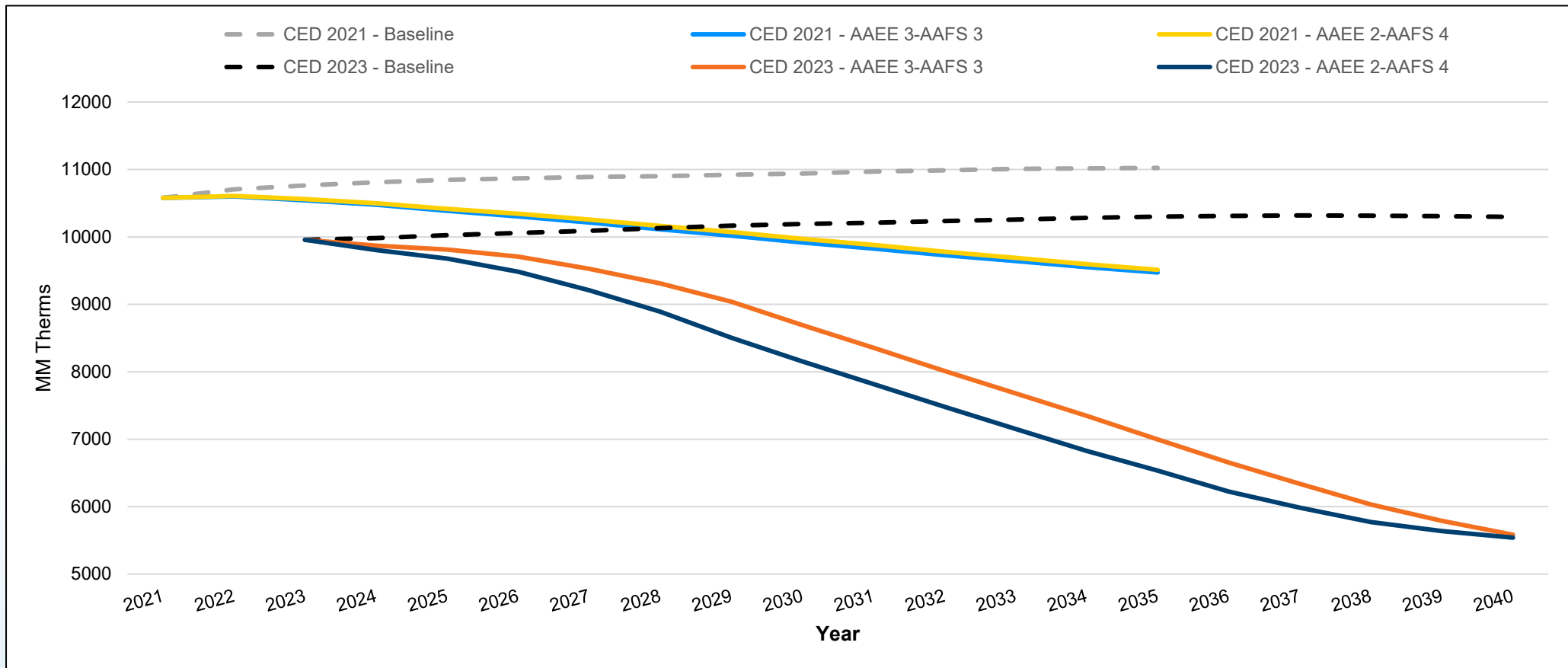


Natural Gas Managed Forecasts



Statewide Gas Managed Forecasts

- In 2040, the CED 2023 Planning and Local Reliability managed sales projections are about 46% lower than baseline sales.
- Results shown include PG&E, SCG (without Mojave-Kern), and SDG&E.

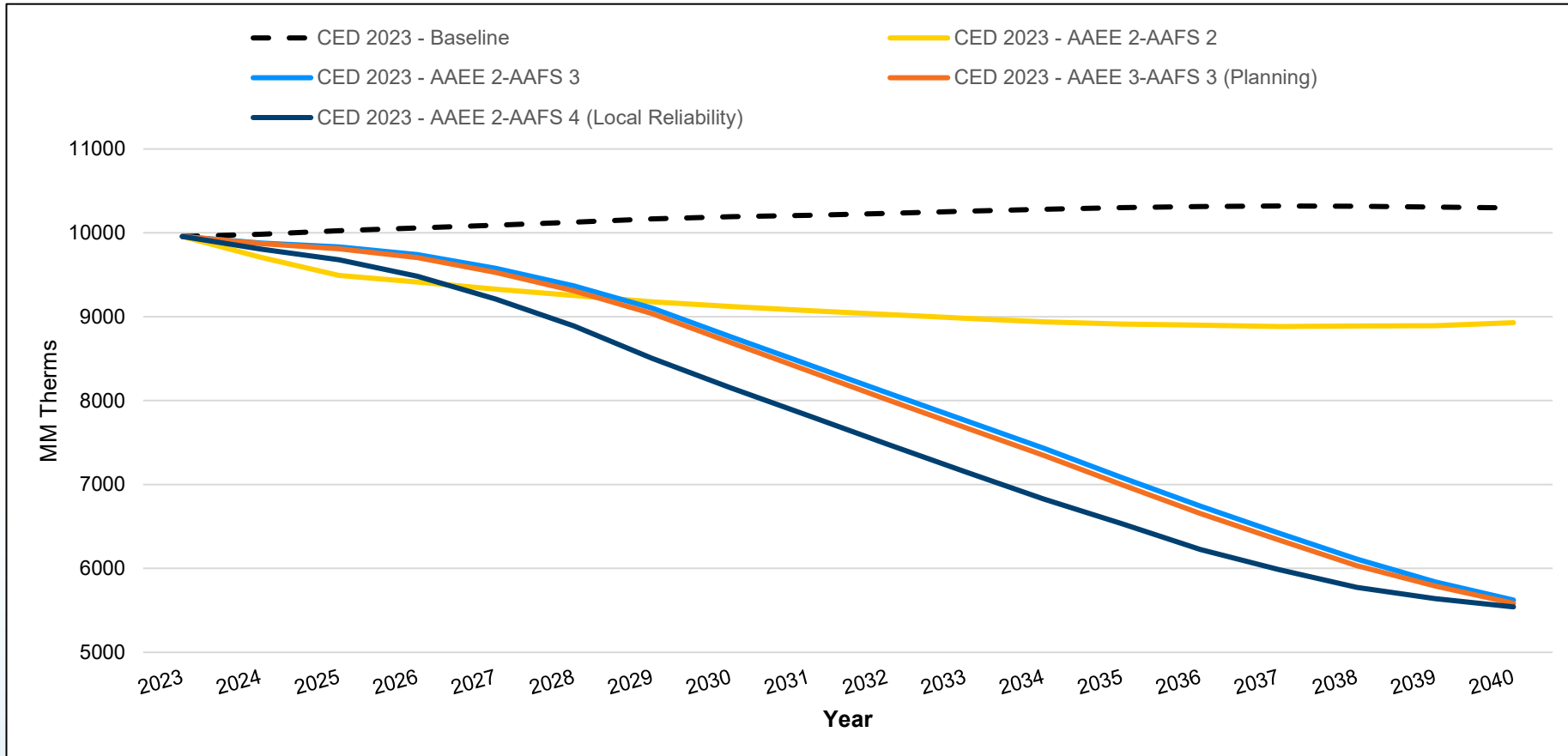


Source: CEC staff



Statewide Gas Managed Forecasts

- CED 2023 AAFS 2 is much more conservative, only 13% less than baseline sales.
- Results shown include PG&E, SCG (without Mojave-Kern), and SDG&E.



Source: CEC staff



Thank You!

Email: Christopher.Kavalec@Energy.ca.gov

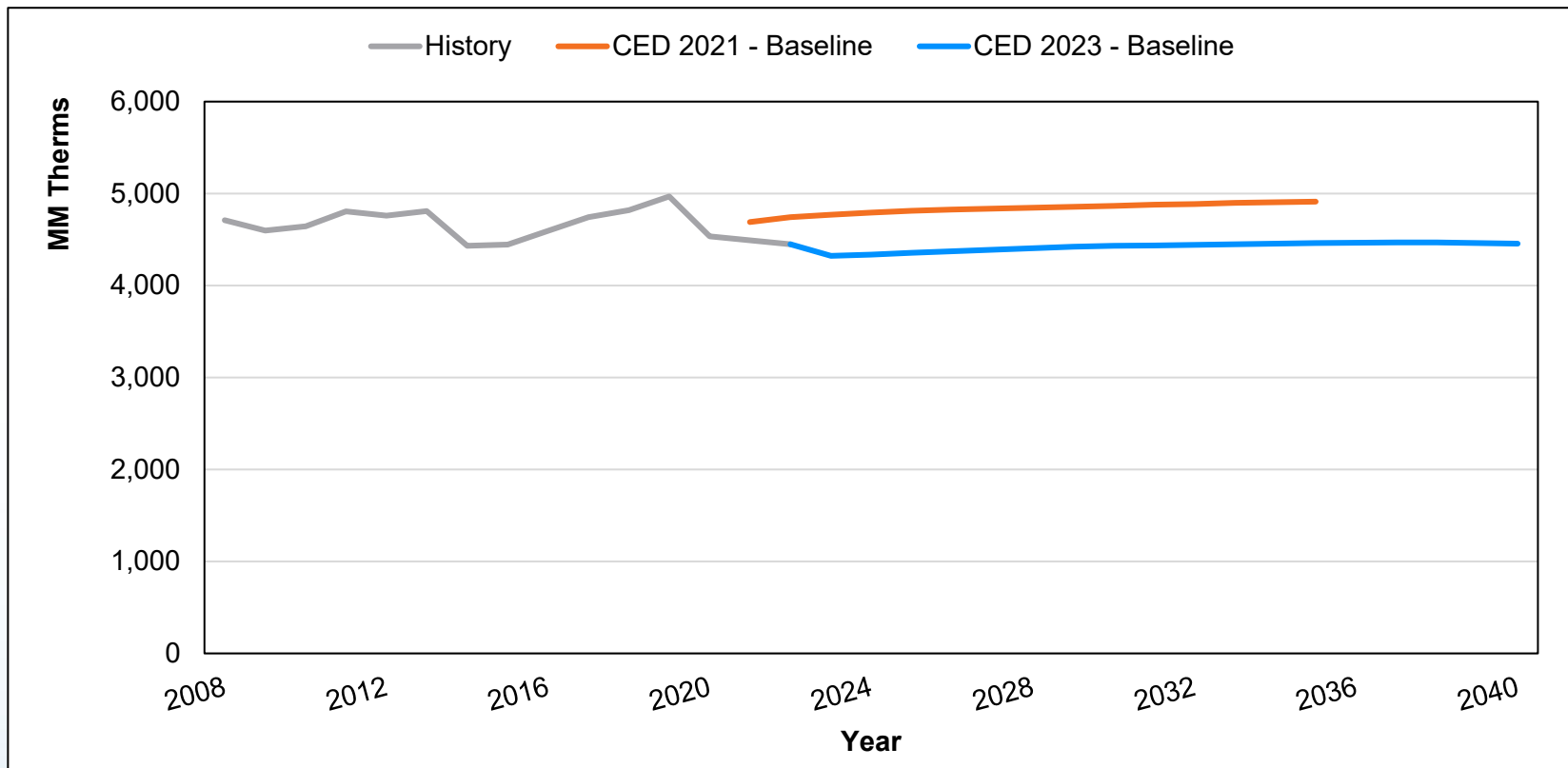


Appendix – Natural Gas Forecasts by Planning Area



PG&E Gas Consumption

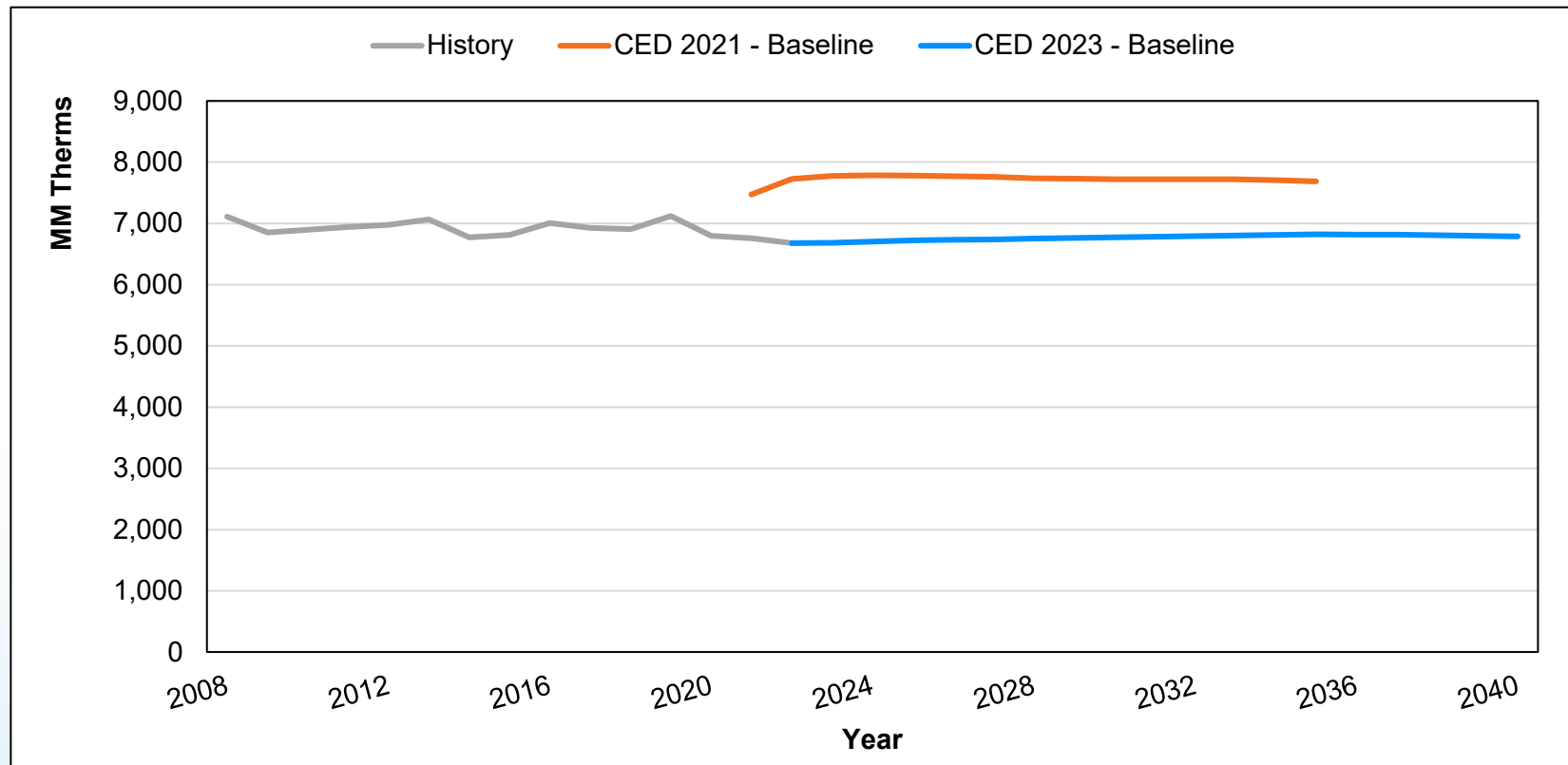
- Overall, CED 2023 gas consumption is lower compared to CED 2021.
- Long-term average growth rates are small, become slightly negative in 2038 for CED 2023.





SCG Gas Consumption

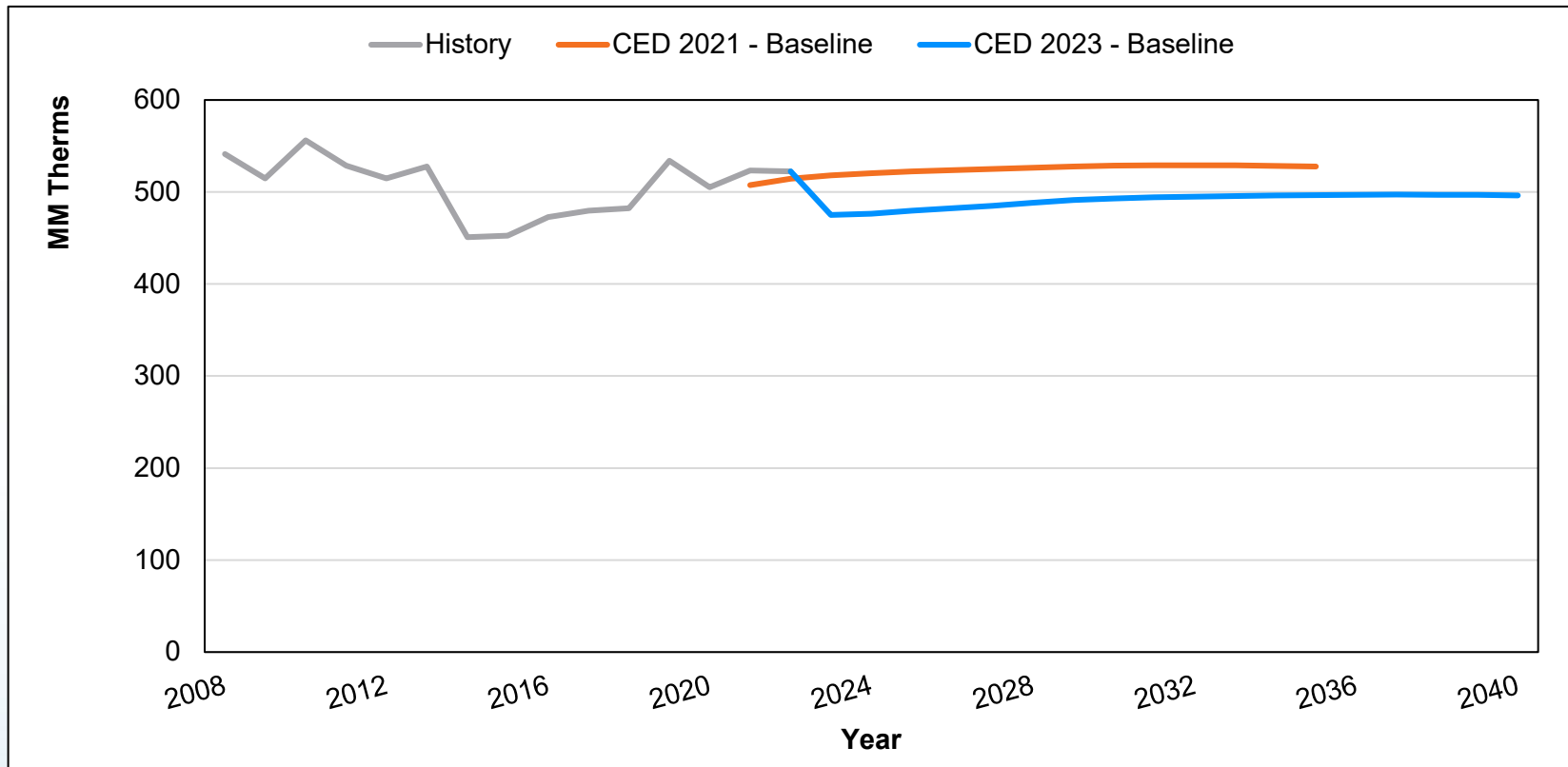
- Overall, CED 2023 gas consumption is lower compared to CED 2021.
- Long-term average growth rates are small, become slightly negative in 2037 for CED 2023.
- Includes Mojave-Kern River Pipeline consumption.





SDG&E Gas Consumption

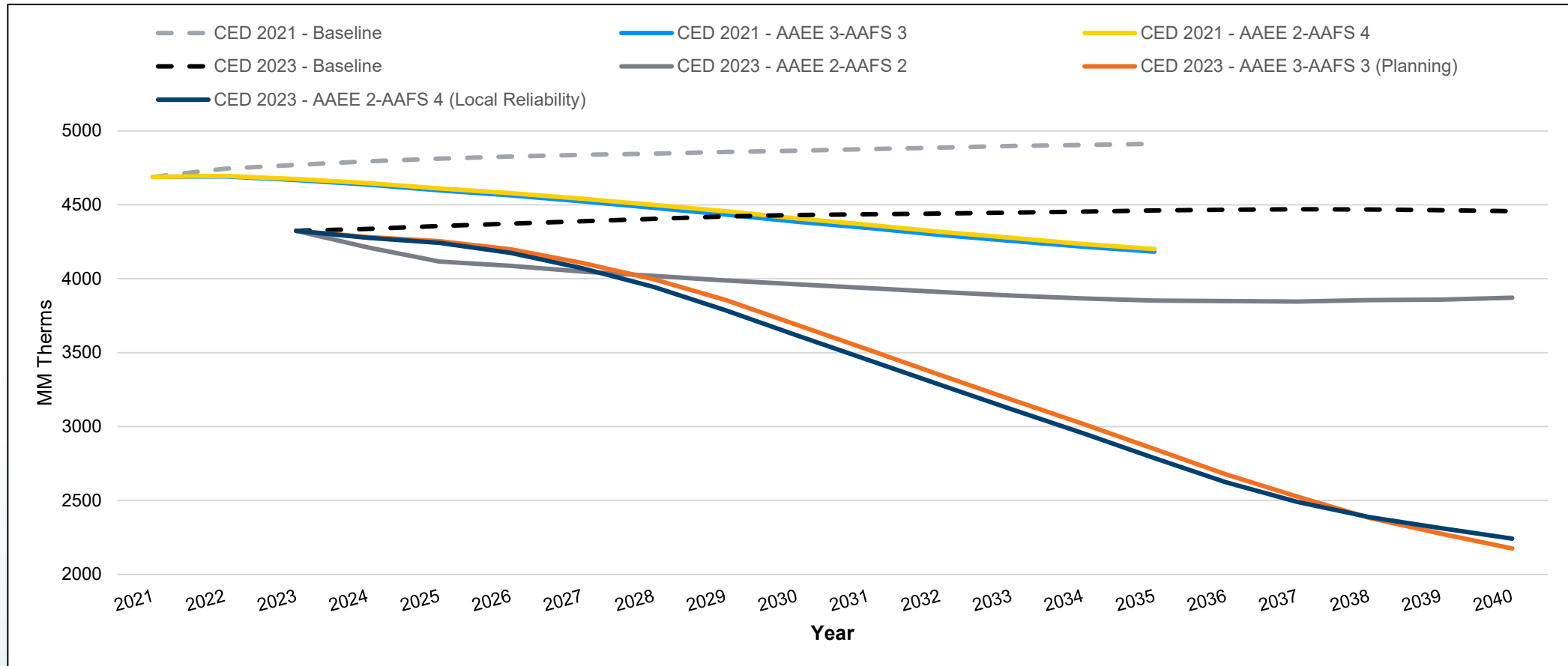
- Overall, CED 2023 gas consumption is lower compared to CED 2021.
- Long-term average growth rates are small, become slightly negative in 2038 for CED 2023.





Gas Managed Forecasts: PG&E

- Consistent with statewide results

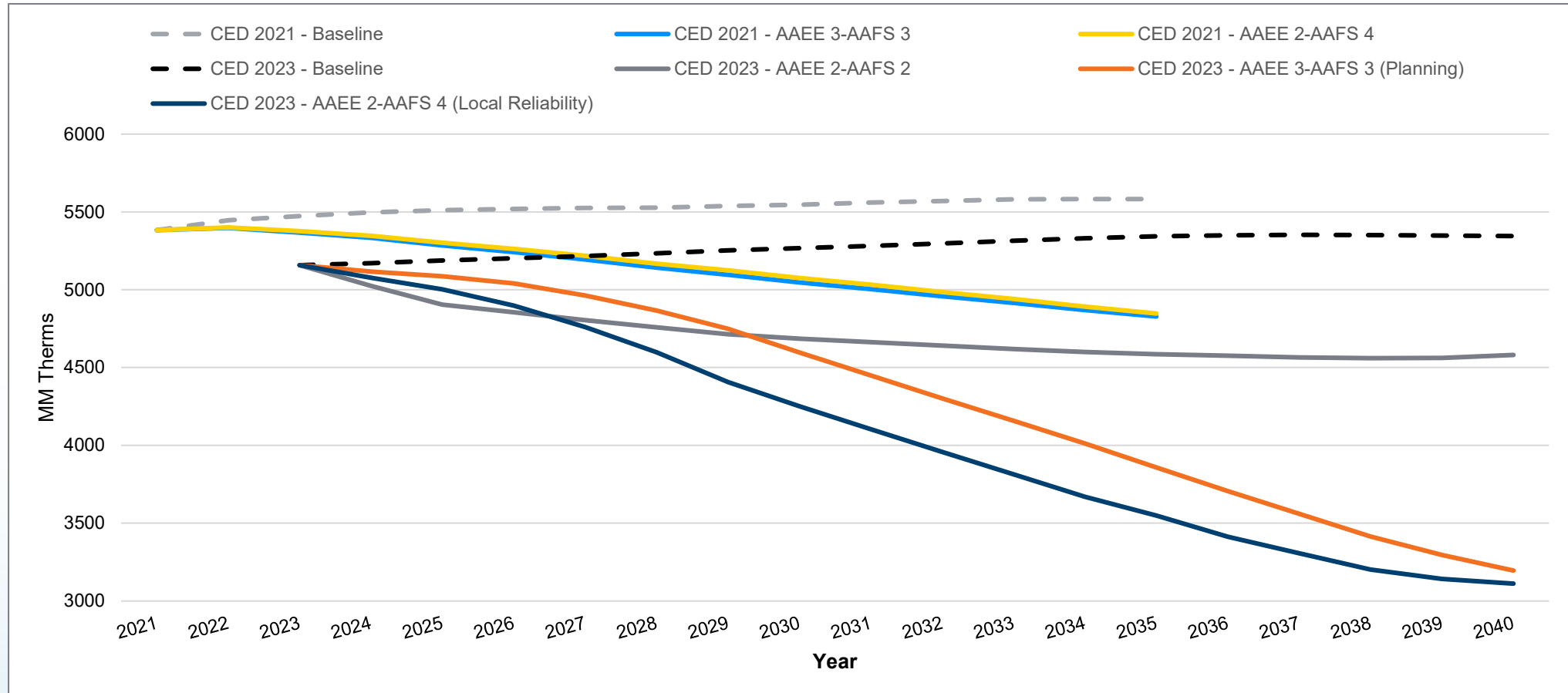


Source: CEC staff



Gas Managed Forecasts: SCE

- Consistent with statewide results
- Does not include Mojave-Kern River Pipeline

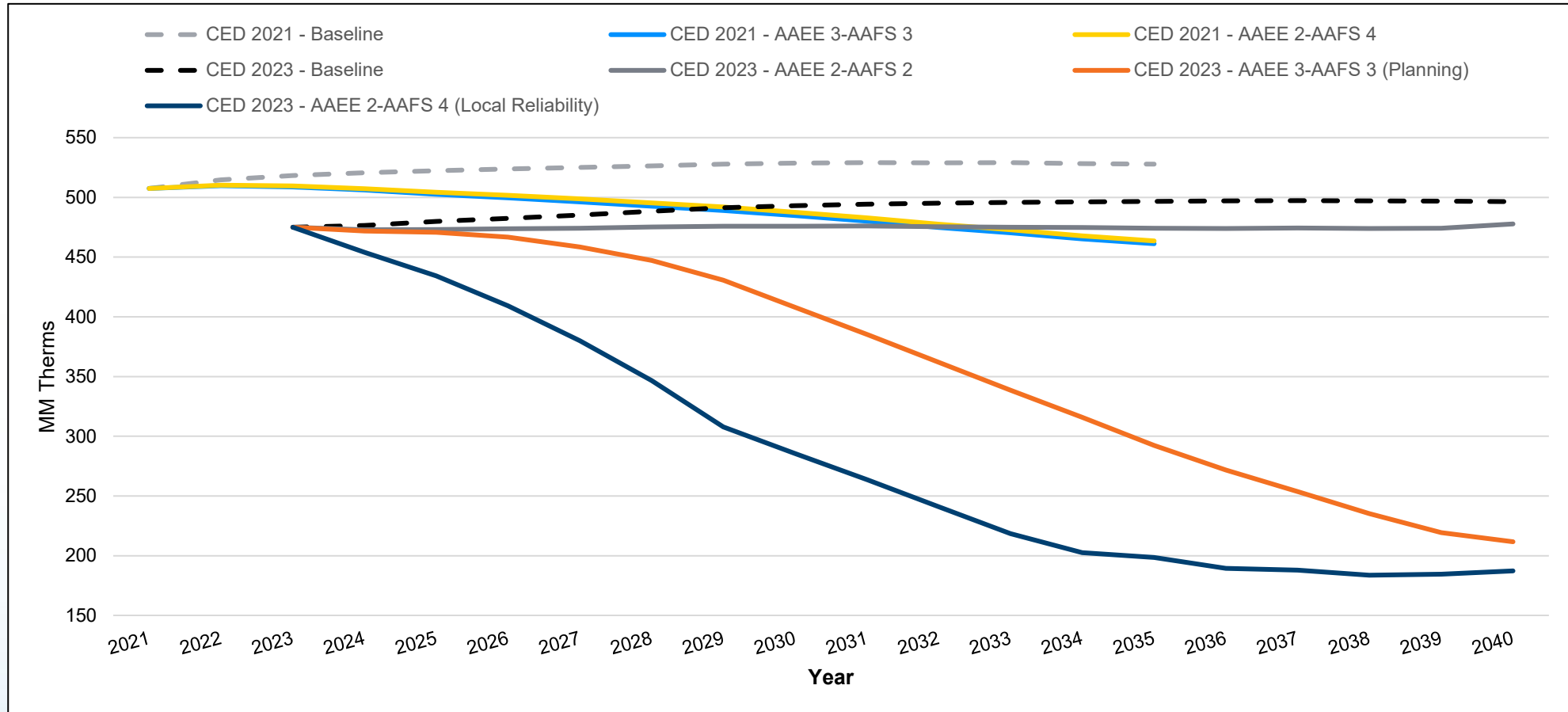


Source: CEC staff



Gas Managed Forecasts: SDG&E

- Consistent with statewide results



Source: CEC staff