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2024 California Energy Demand

Annual Consumption and Sales Forecast Results

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Mathew Cooper, Energy System Planning Coordinator
Energy Assessments Division
California Energy Commission



Abbreviations, Acronyms & Initialisms

AAEE – Additional Achievable Energy Efficiency

AAFS – Additional Achievable Fuel Substitution

AATE – Additional Achievable Transportation Electrification

AGWP – Agriculture and Water Pumping

BTM – Behind-the-Meter

CEC – California Energy Commission

CED / CEDU – California Energy Demand Forecast [Update]

DG – Distributed Generation

FZ – Forecast Zone

IEPR – Integrated Energy Policy Report

GW – GigaWatt [power]

GWh – GigaWatt hours [energy]

kW – KiloWatt [power]

kWh – KiloWatt hours [energy]

MW – MegaWatt [power]

MWh – MegaWatt hours [energy]

PA – Planning Area

PV – Photovoltaic

QFER – Quarterly Fuel and Energy Reports

Selfgen / SG – Self Generation

SL – Streetlighting

TCU – Transportation, Communication, Utilities

TWh – TeraWatt hours [energy]



Forecasting Process: Critical Inputs



Recap of Forecast Changes

- Historical sales data update ↓
- Self-gen changes
 - PV capacity factors ↓
- Econ-Demo update
 - Demographics ↑
 - Economics ↓
- New data and model for Data Centers ↑
- AGWP results
 - new cannabis data ↑
- Transportation updates (≈)
- Load Modifier updates ↑
 - AAEE (=)
 - AAFS (↑↓)
 - AATE ↑
 - Low Selfgen scenario (for Local Reliability) ↑



Comparison of Statewide Economic and Demographic Drivers

Table 1: Annual Percent Growth in Economic and Demographic Drivers, 2023-2040

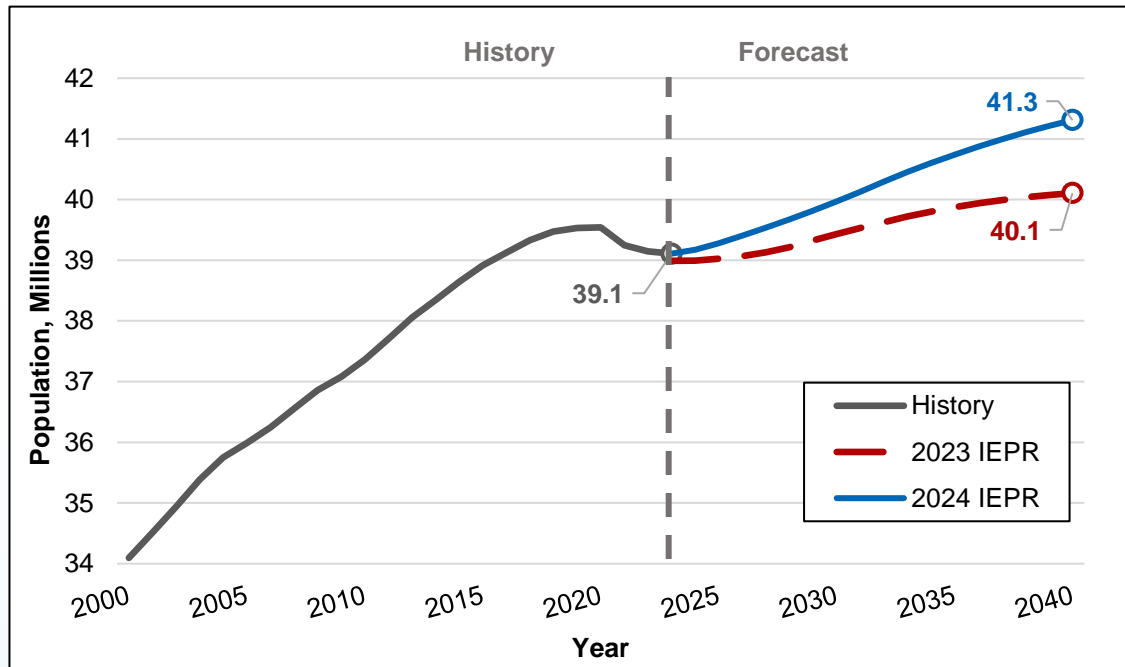
Economic/Demographic Driver	2023 IEPR	2024 IEPR
Gross State Product	2.1%	1.8%
Per Capita Personal Income	2.1%	1.8%
Commercial Employment	0.4%	0.3%
Population	0.2%	0.3%
Number of Households	0.5%	0.6%

Source: CEC staff

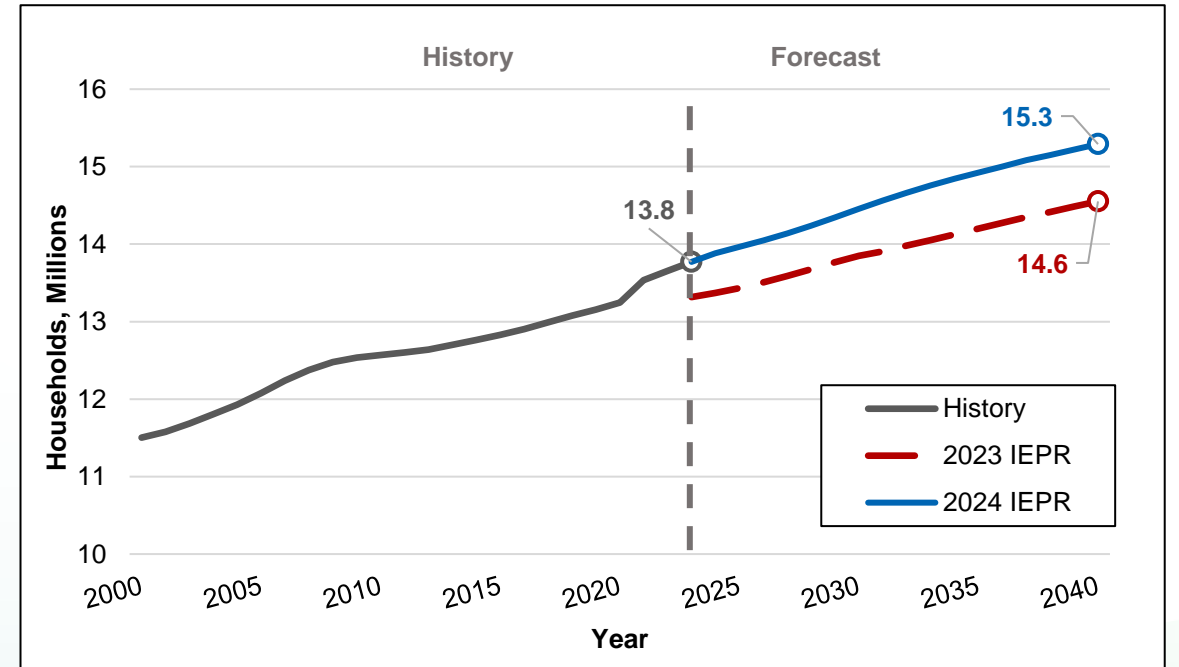


Comparison of Statewide Households and Population

Population



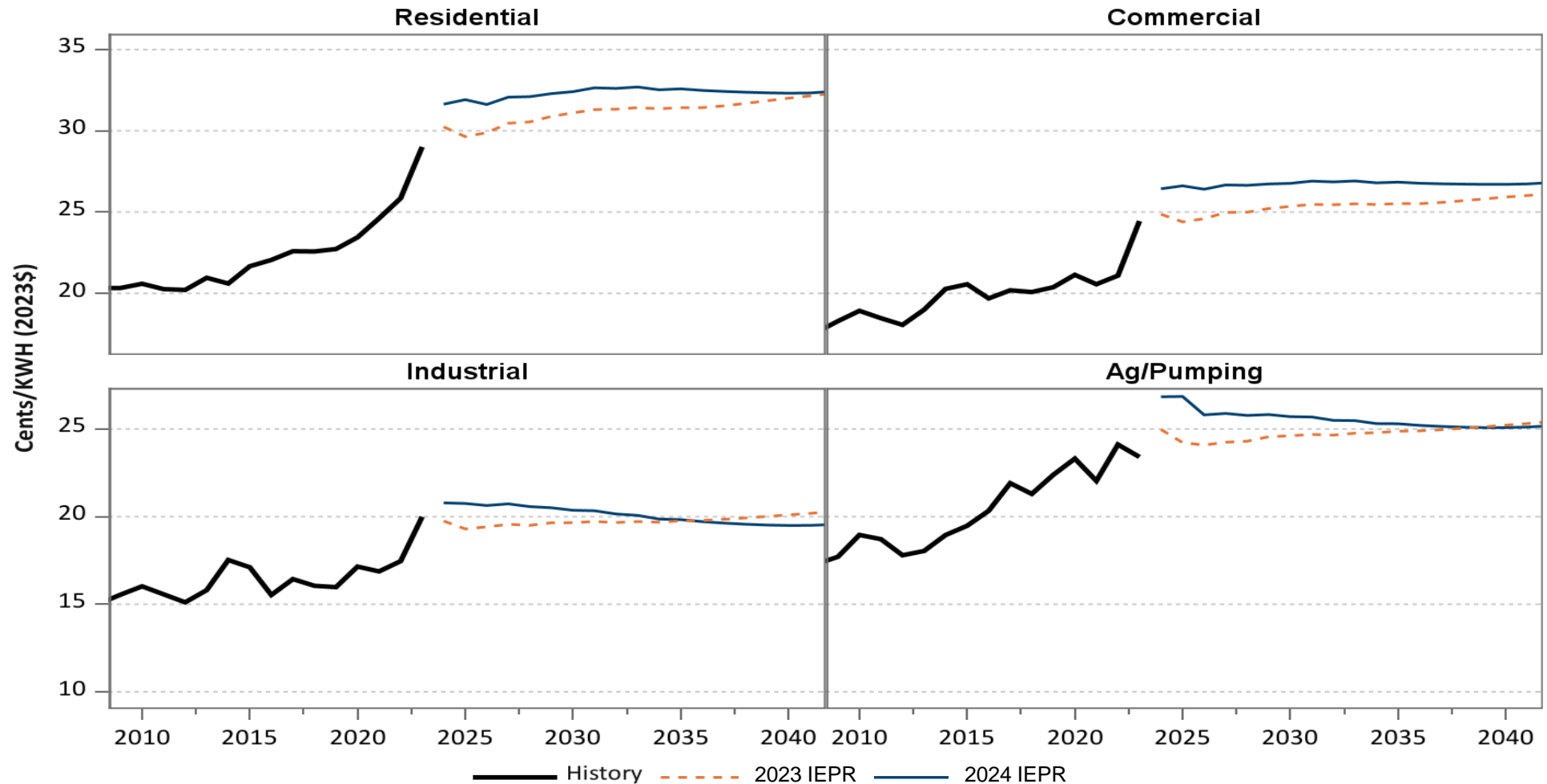
Households





Comparison of Statewide Average Electricity Rates

- Rates are calculated using updated revenue requirement projections and the sales forecast from the previous demand forecast iteration.

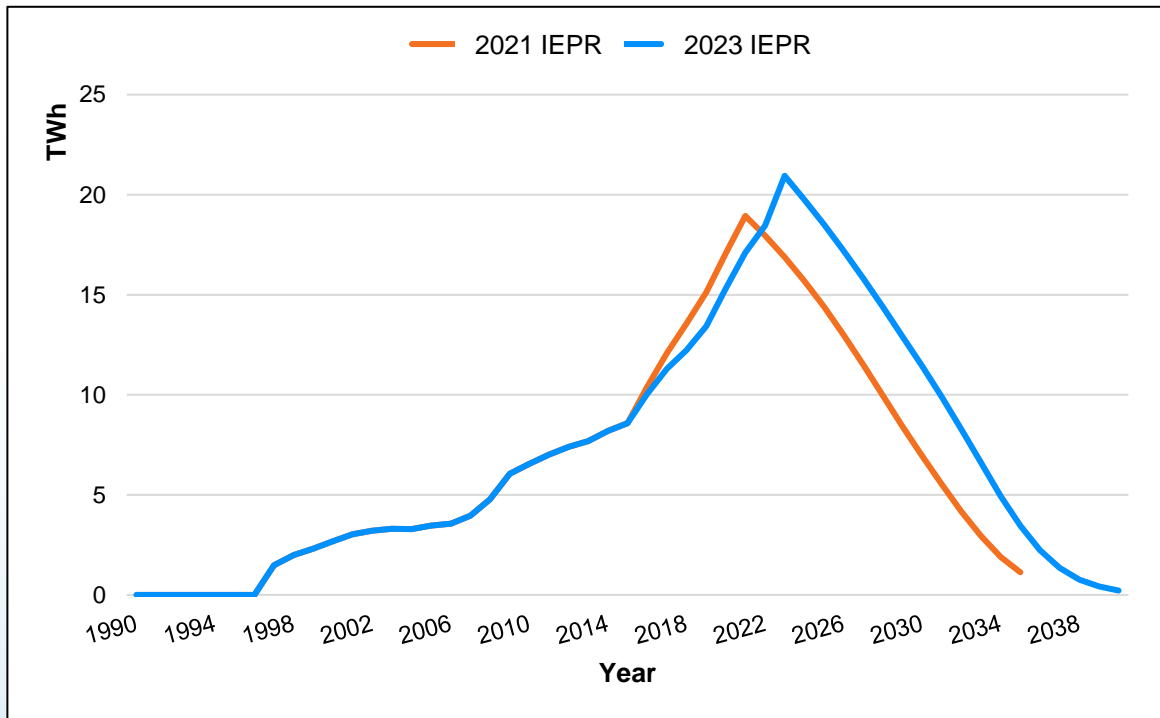




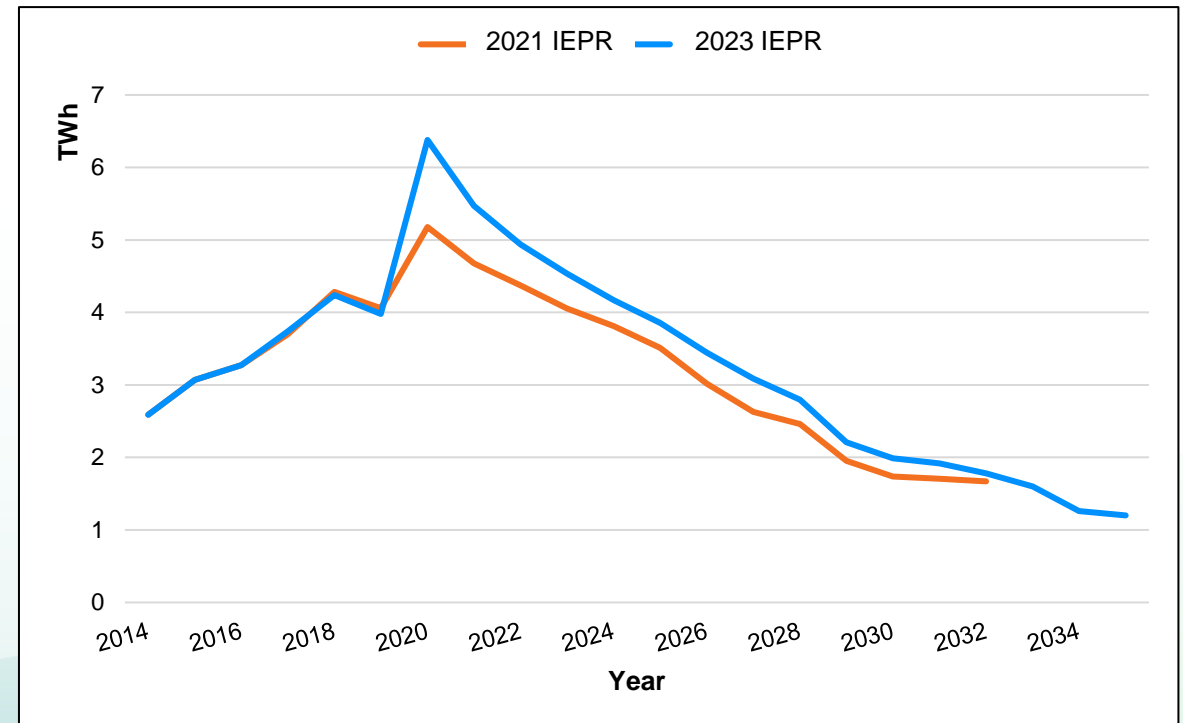
Statewide Electricity Committed Programs & Standards Savings

- Committed Programs and Standards forecasts are the same as last cycle.
- Many programs and standards will expire over the forecast period, which causes electricity demand to increase.

Electricity Programs Impacts



Electricity Standards Impacts

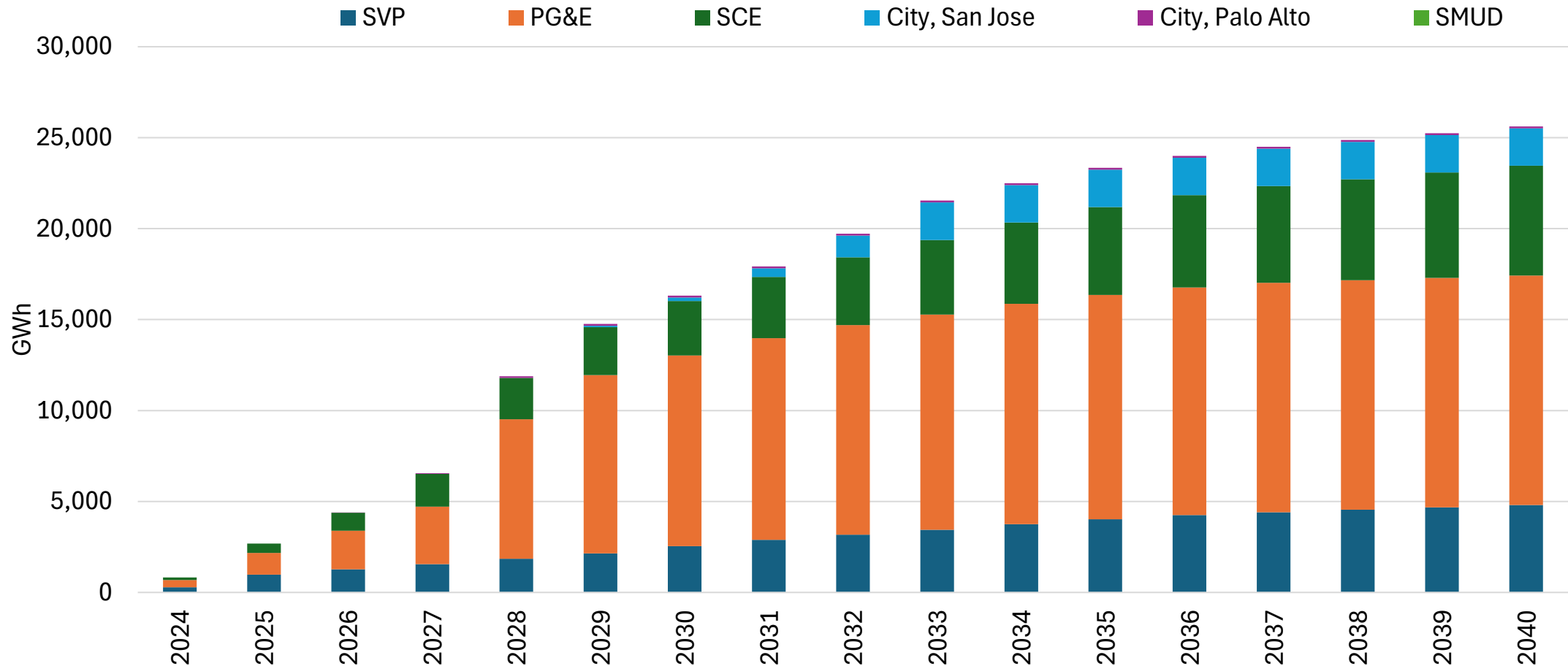


Source: CEC staff



Annual Data Center Consumption

Scenario 1, Incremental to 2023



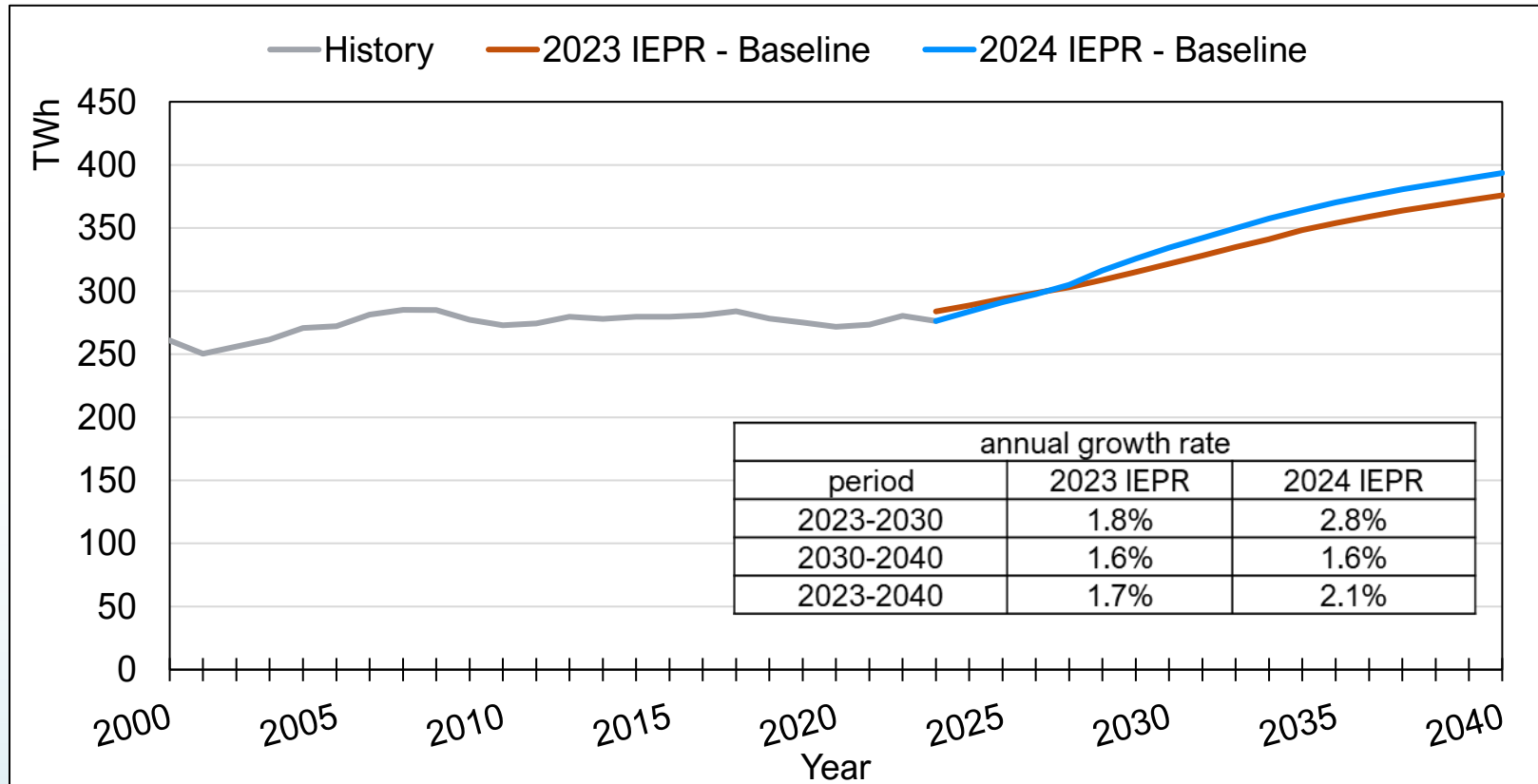


Baseline Demand Forecast: Statewide Consumption and Sales



Statewide Baseline Electricity Consumption

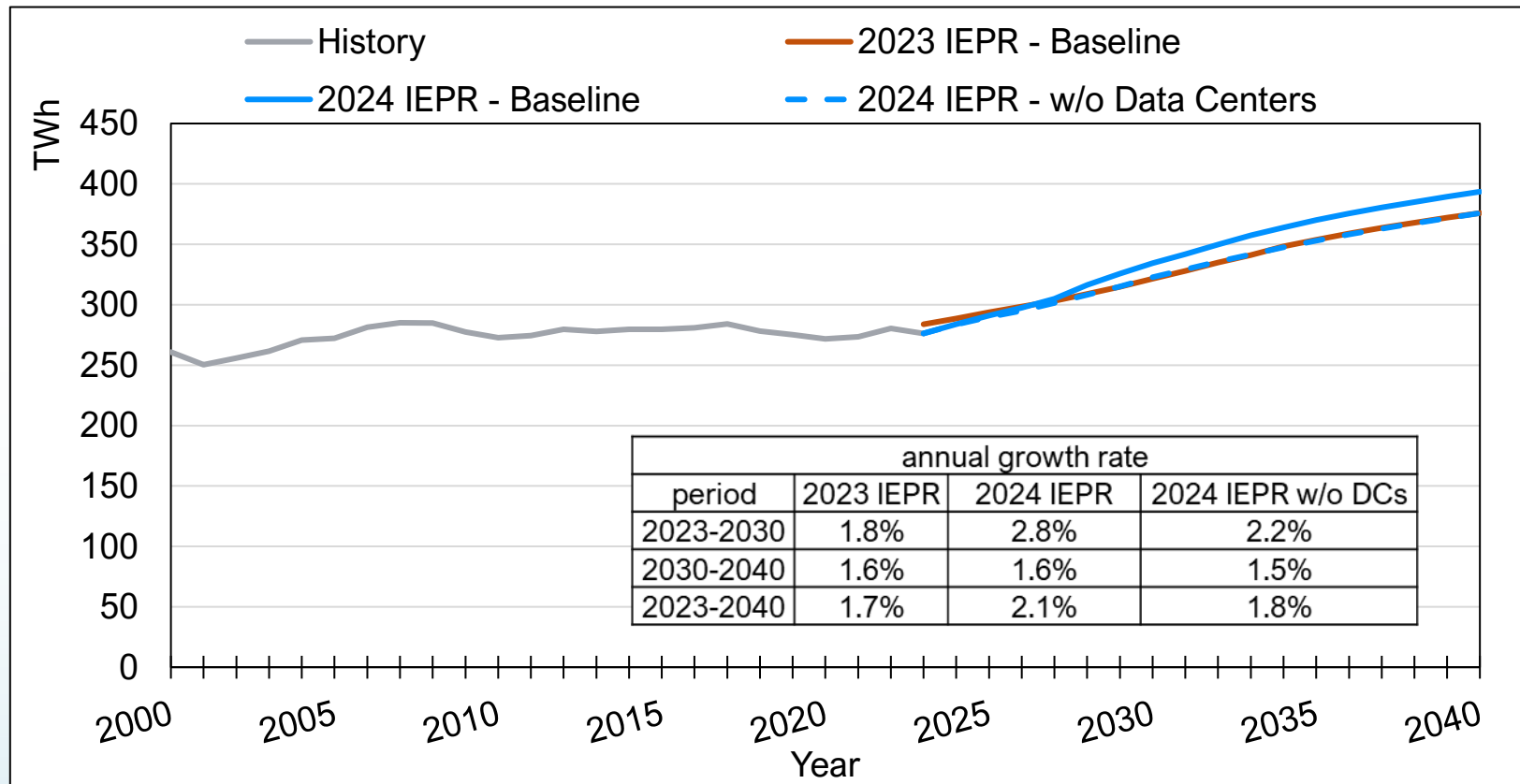
- Historical sales data revision causes lower 2024 IEPR forecast from 2024 to 2027. The higher forecast after 2027 is primarily due to the rise of data centers.
- 2024 IEPR grows at 2.8% per year from 2023-2030, while 2023 IEPR is 1.8% during the same period. After 2030, both are 1.6%.



Source: CEC staff

Statewide Impact of Data Centers

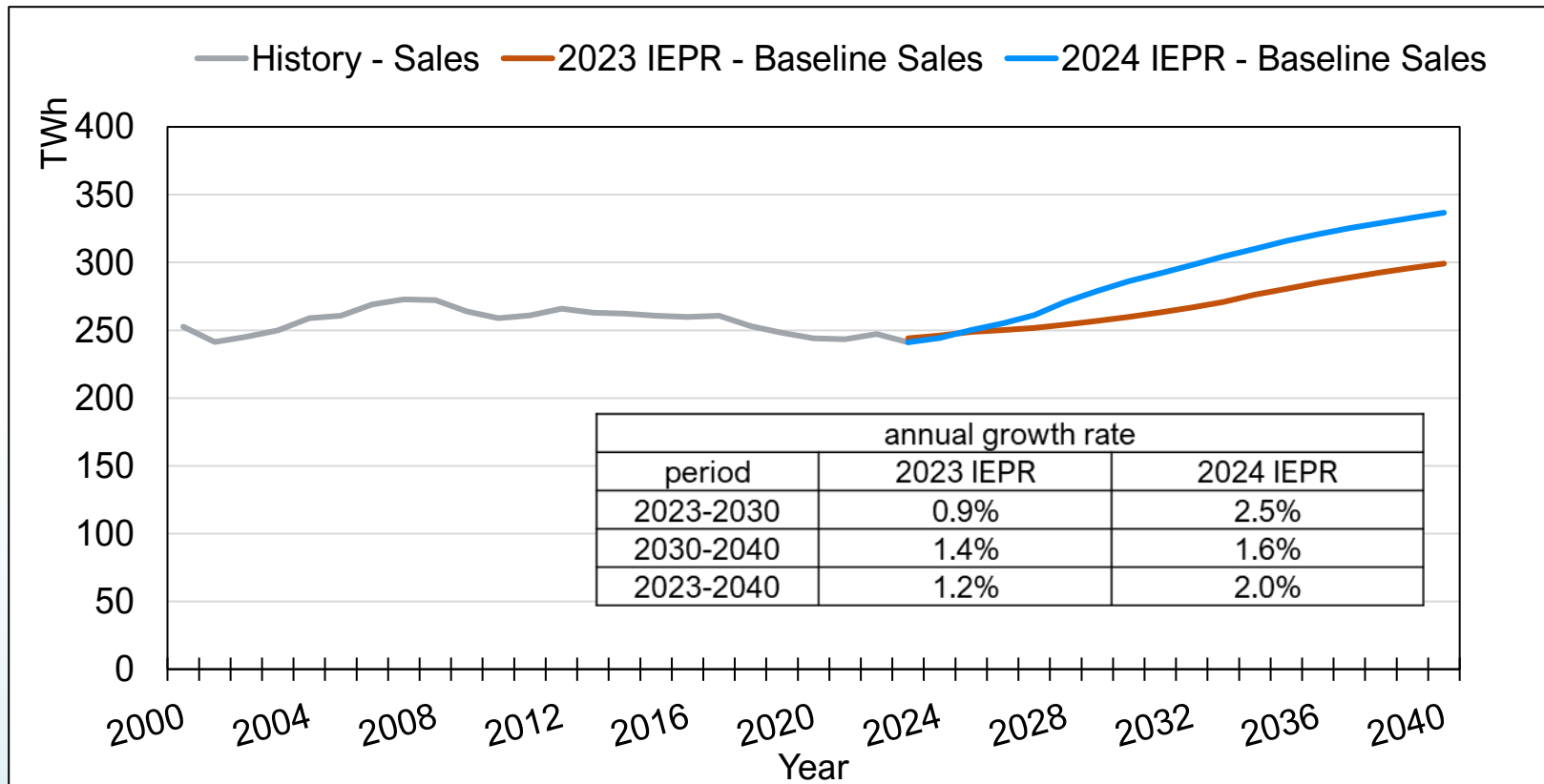
- Without the new data center model, the 2024 IEPR statewide consumption is much more similar to the 2023 IEPR statewide consumption.



Source: CEC staff

Statewide Baseline Electricity Sales

- Higher sales forecast (34 TWh higher in 2040 compared to 2023 IEPR) is due to the higher consumption forecast (14 TWh in 2040 vs 2023 IEPR) and lower self-generation forecast (20 TWh in 2040 vs 2023 IEPR).
- 2024 IEPR growth is initially higher. After 2030, 2024 IEPR growth is more consistent with 2023 IEPR.



Source: CEC staff



Baseline Demand Forecast: Electricity Consumption by Sector





Forecasting Process: Sectors and Models

Table 2: Sector Model Types

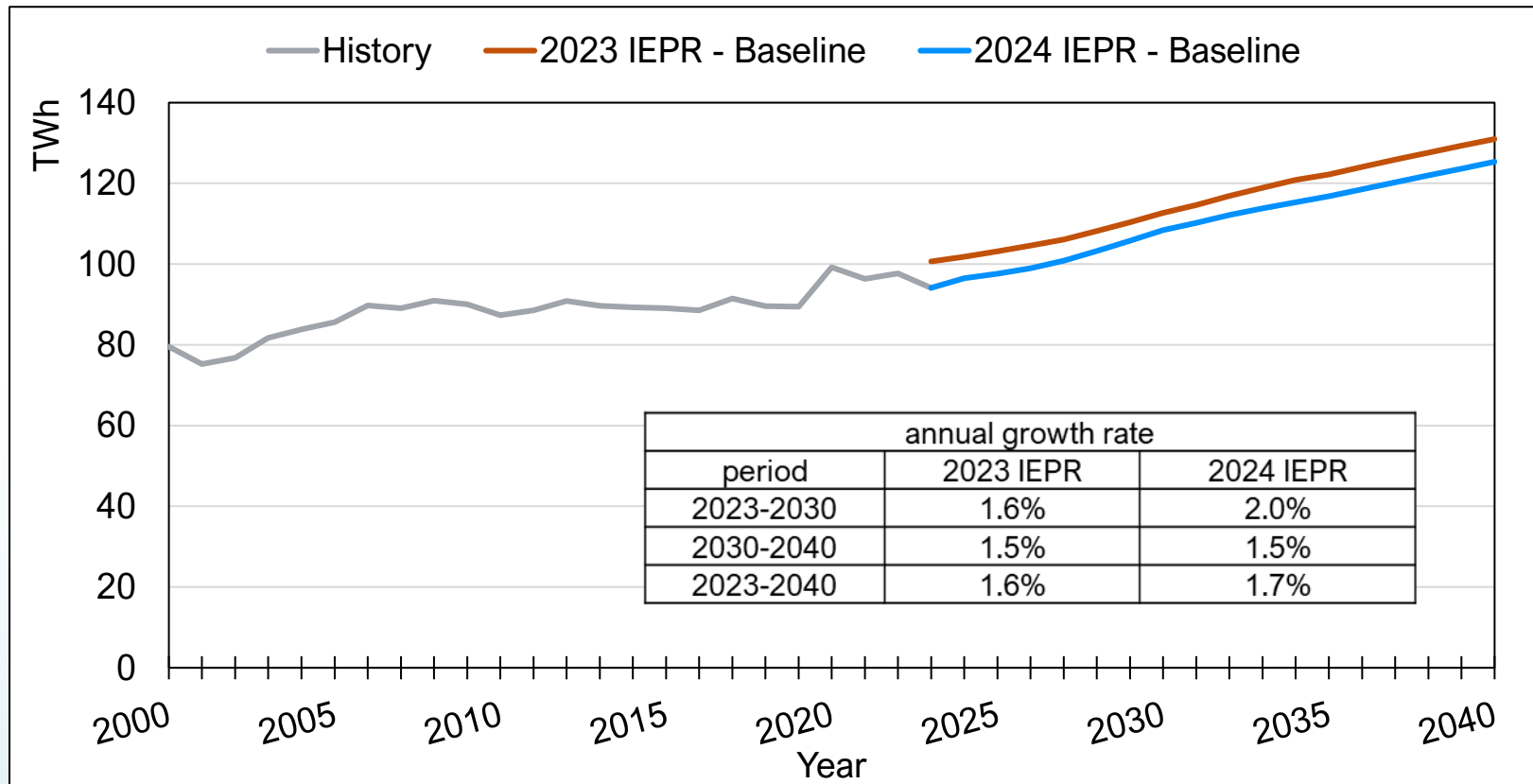
Sector	Model Type
Residential	End Use Model Calibrated by Econometric Model
Commercial	Econometric Model (End Use Model in work)
Industrial (Mfr + Mining & Cons)	Econometric by NAICS code <i>(2023 results calibrated with 2024 inputs)</i>
Ag / Cannabis / Water Pumping	Econometric by NAICS code
TCU / Streetlighting	Trend Analysis <i>(2023 results calibrated with 2024 inputs)</i>

Source: CEC staff



Statewide Baseline Residential Electricity Consumption

- 2024 IEPR residential electricity consumption is lower compared to 2023 IEPR, due to the revision to historical data (both reported sales and self-gen estimates).
- 2024 IEPR baseline annual growth rate (2024 – 2040) is 1.7%.

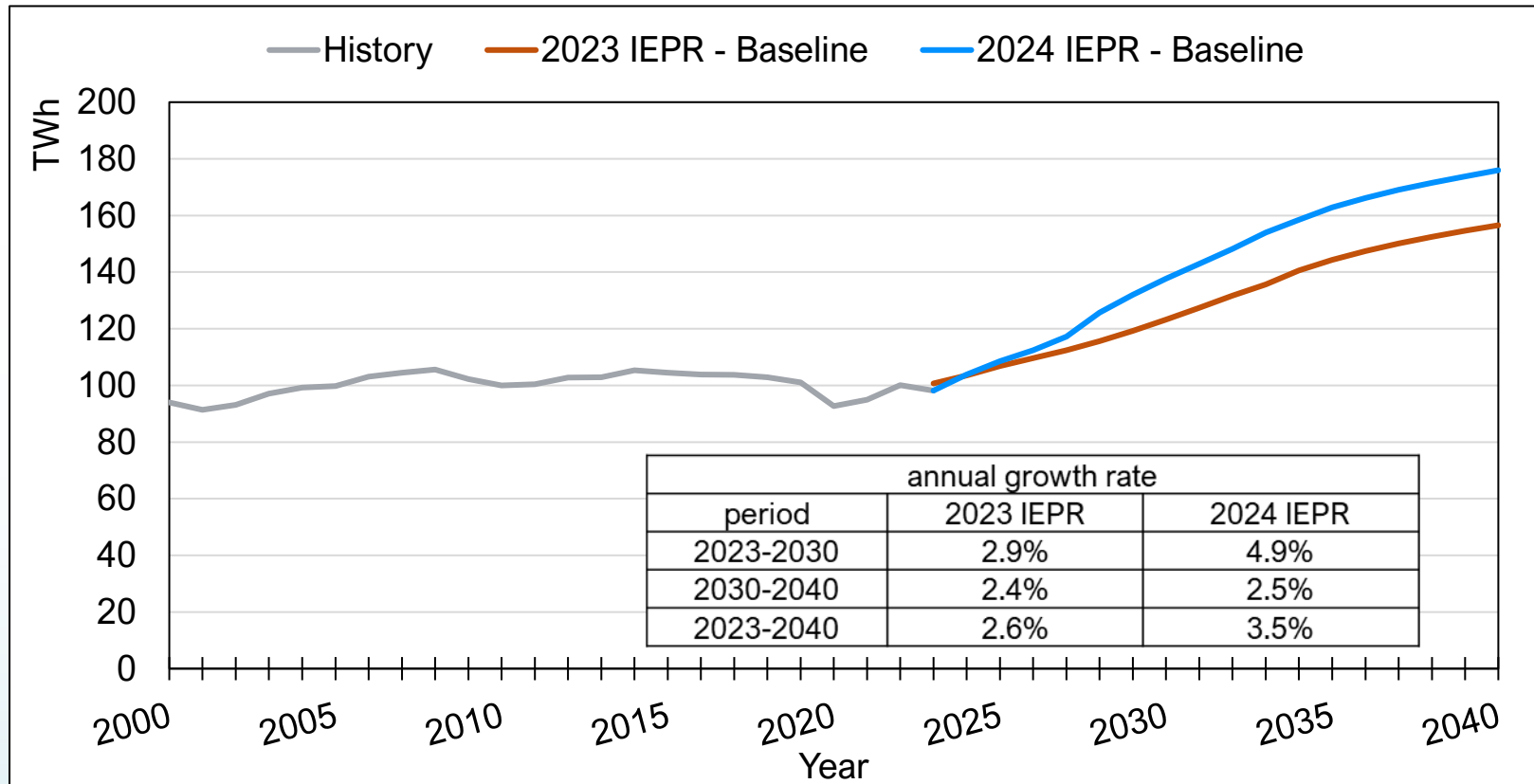


Source: CEC staff



Statewide Baseline Commercial Electricity Consumption

- Inclusion of additional data center load growth in 2024 IEPR causes a steep rise in commercial electricity consumption.
- The 2024 IEPR annual growth rate (2024 – 2040) is 3.5%, compared to 2.6% for 2023 IEPR. The later forecast period shows more similar growth.

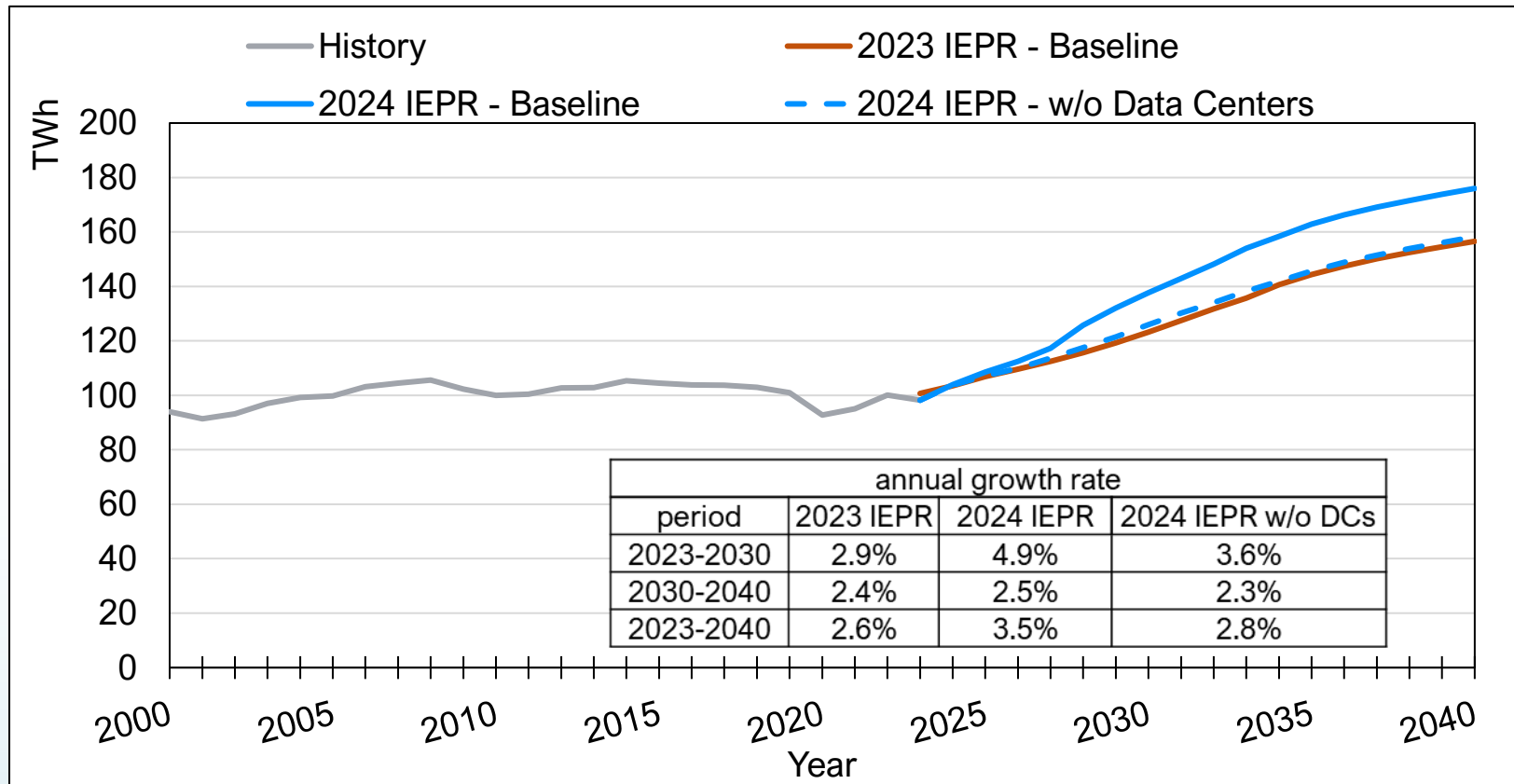


Source: CEC staff



Impact of Data Centers on Commercial Consumption

- Without new data center model, 2024 IEPR commercial consumption is much more similar to 2023 IEPR commercial consumption.

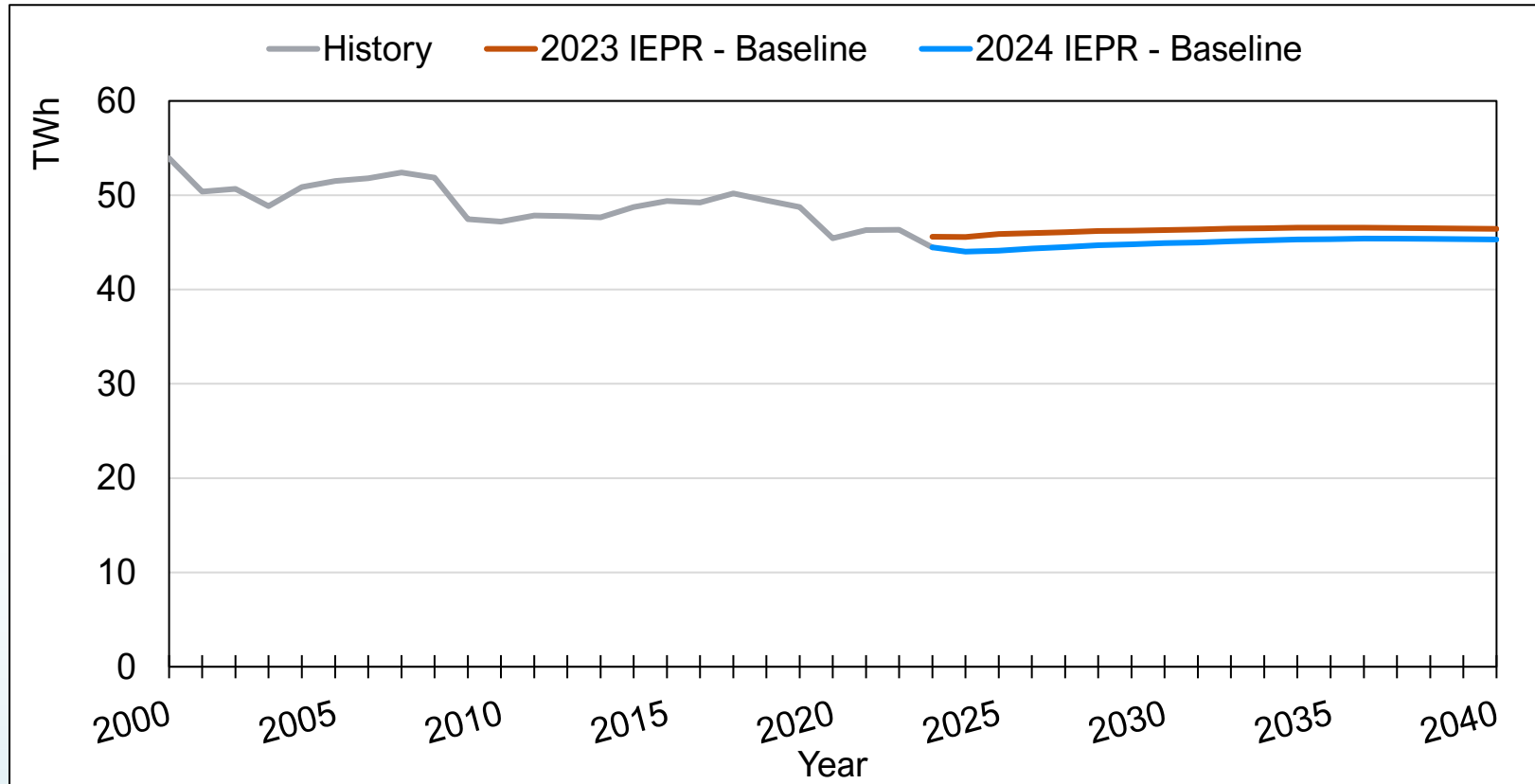


Source: CEC staff



Statewide Baseline Industrial Electricity Consumption

- Chart includes consumption from Industrial Manufacturing and Industrial Mining & Construction combined.
- 2024 IEPR consumption is 1.3 TWh lower across the forecast due to calibration with 2023 historical sales data.

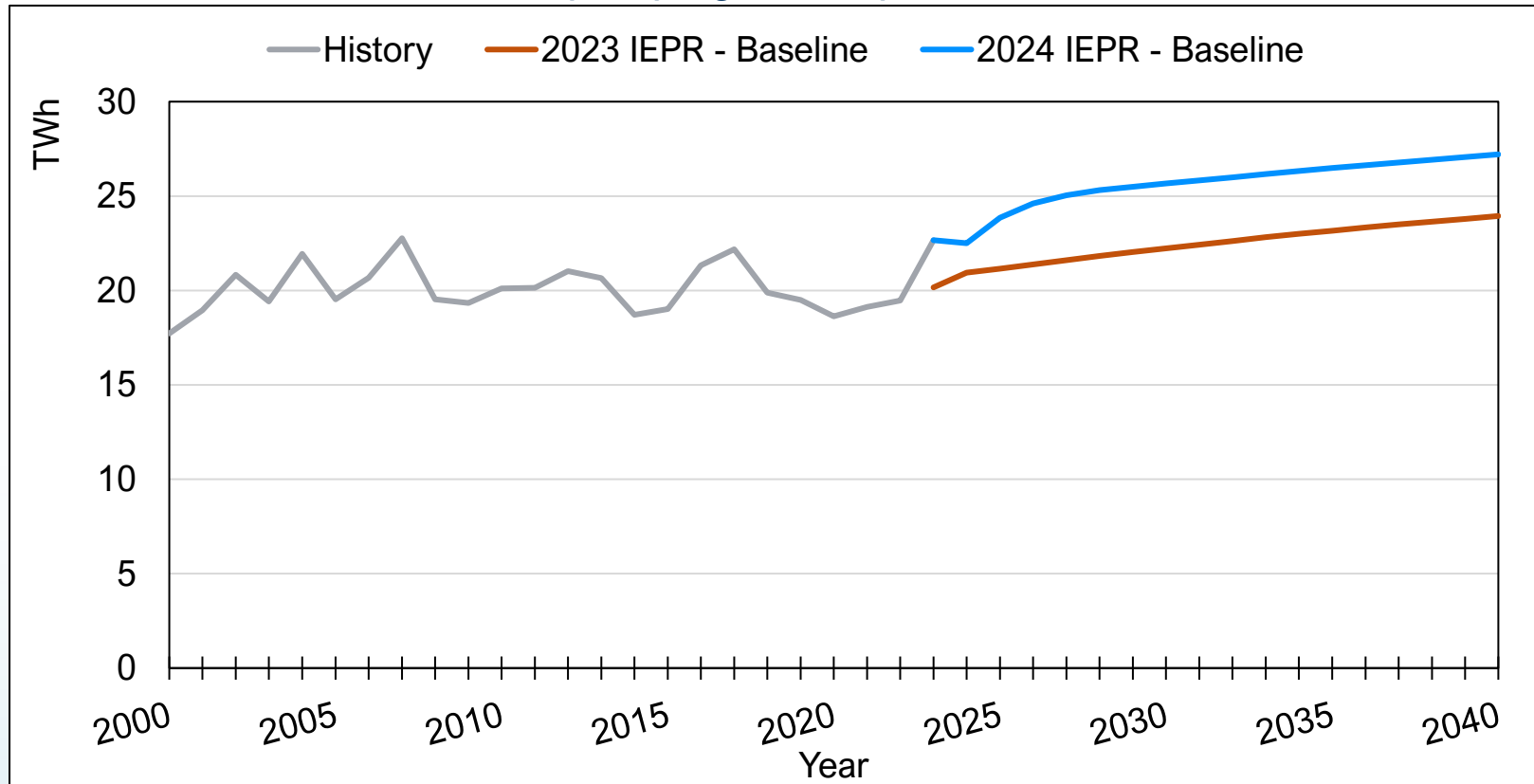


Source: CEC staff



Statewide Baseline Ag and Water Pumping Electricity Consumption

- 2024 IEPR baseline agriculture and water pumping forecast is about 3.1 TWh higher than 2023 IEPR across most of the forecast period, with similar growth rates of about 0.5 - 1.0% later in the forecast (2028-2040).
- Cannabis cultivation and water pumping are responsible for the increase.

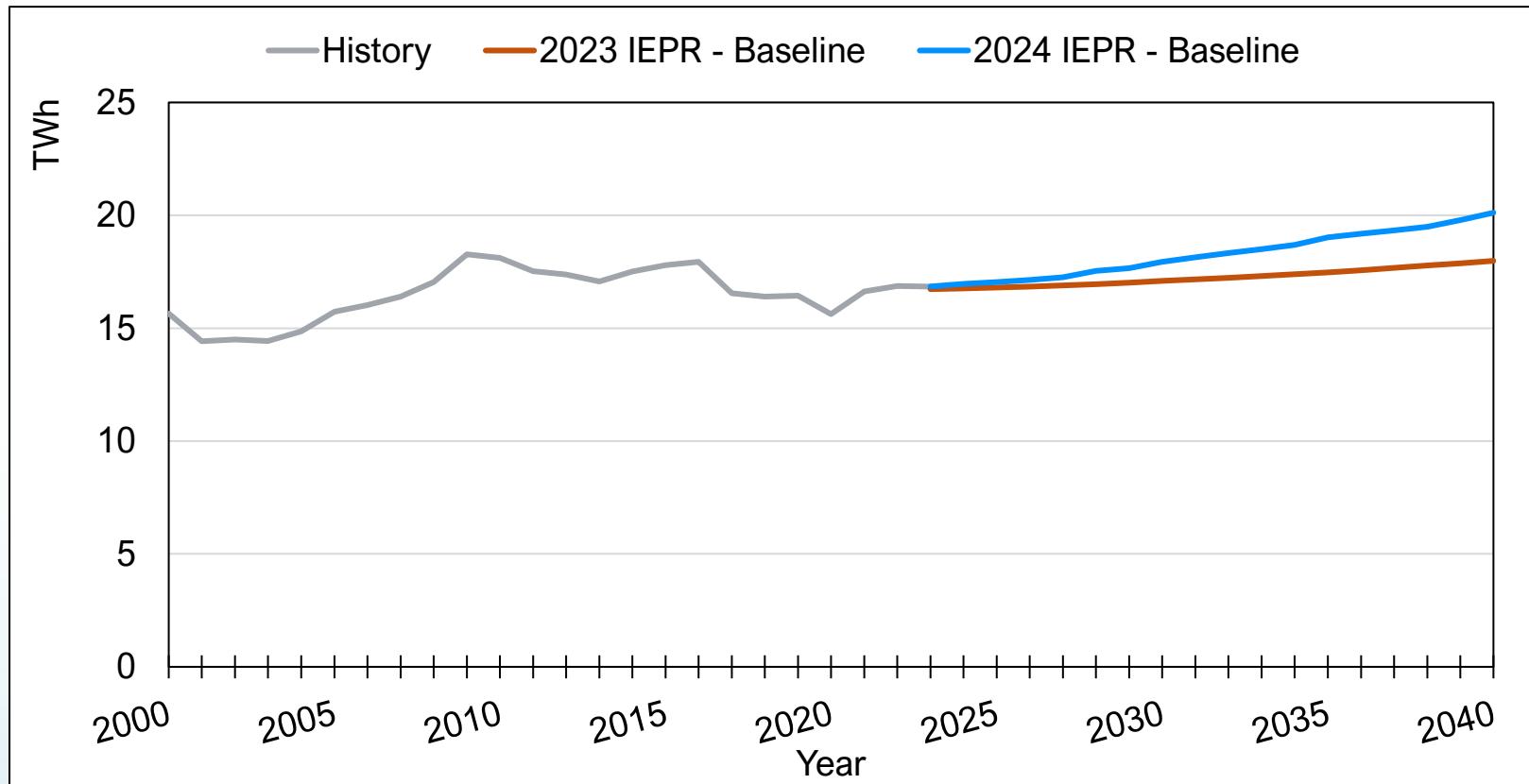


Source: CEC staff



Statewide Baseline TCU & SL Electricity Consumption

- 2024 IEPR baseline TCU and Streetlighting forecast has a higher growth rate across the forecast period.
- Increased consumption is driven by higher MDHD and miscellaneous transportation electrification, as well as the Coronado Naval Base Aircraft Carrier upgrades.

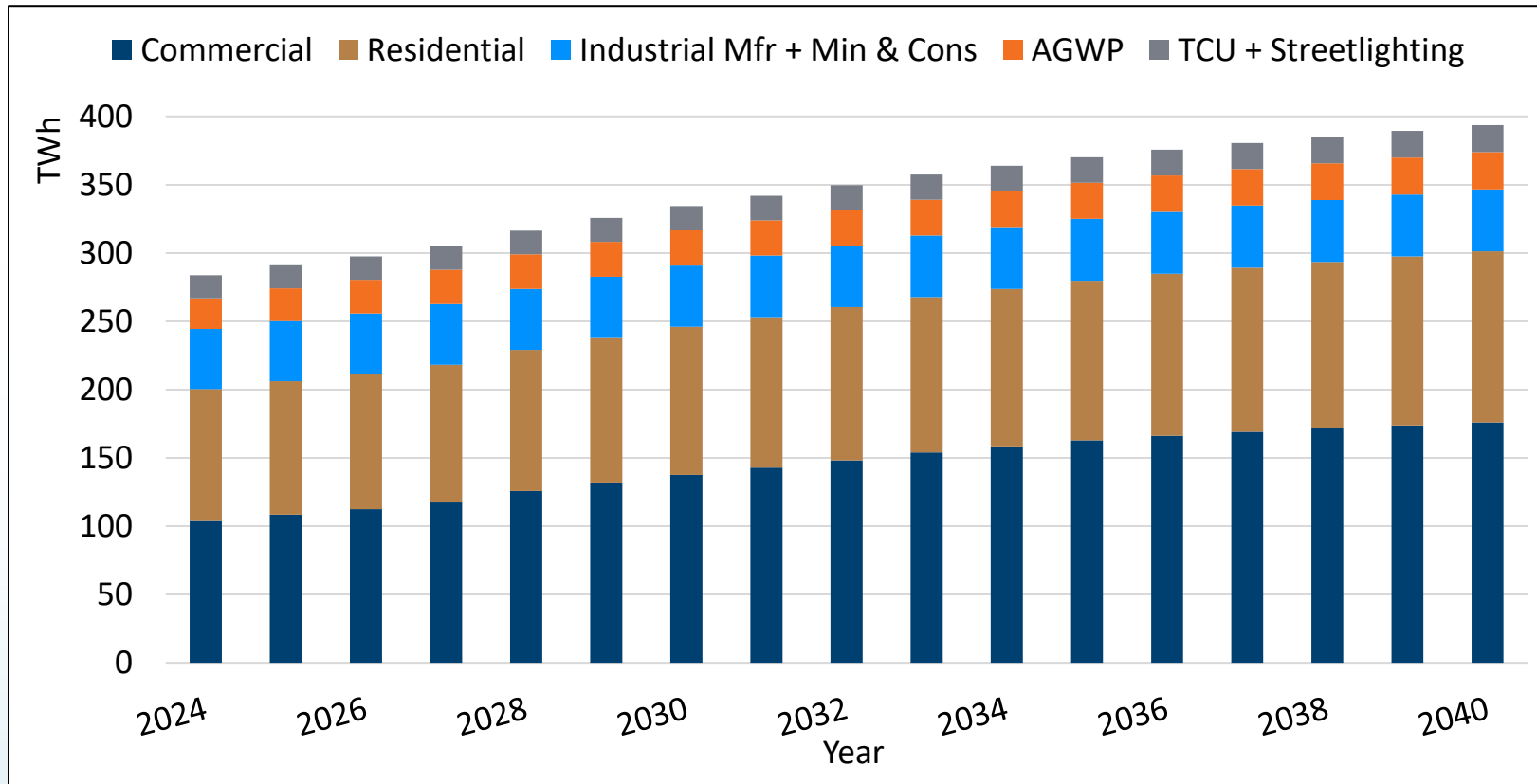


Source: CEC staff



Statewide Baseline Electricity Consumption Forecast by Sector

- The share of commercial electricity consumption grows the most over the forecast period, from 36.6% in 2024 to 44.7% in 2040.
- Industrial consumption share declines from 15.5% in 2024 to 11.5% in 2040.



Source: CEC staff



Self-Generation and Electricity Sales Forecasts





Self-Generation Forecasts

Table 3: 2024 IEPR Baseline Self-Generation Energy (GWh) by Planning Area

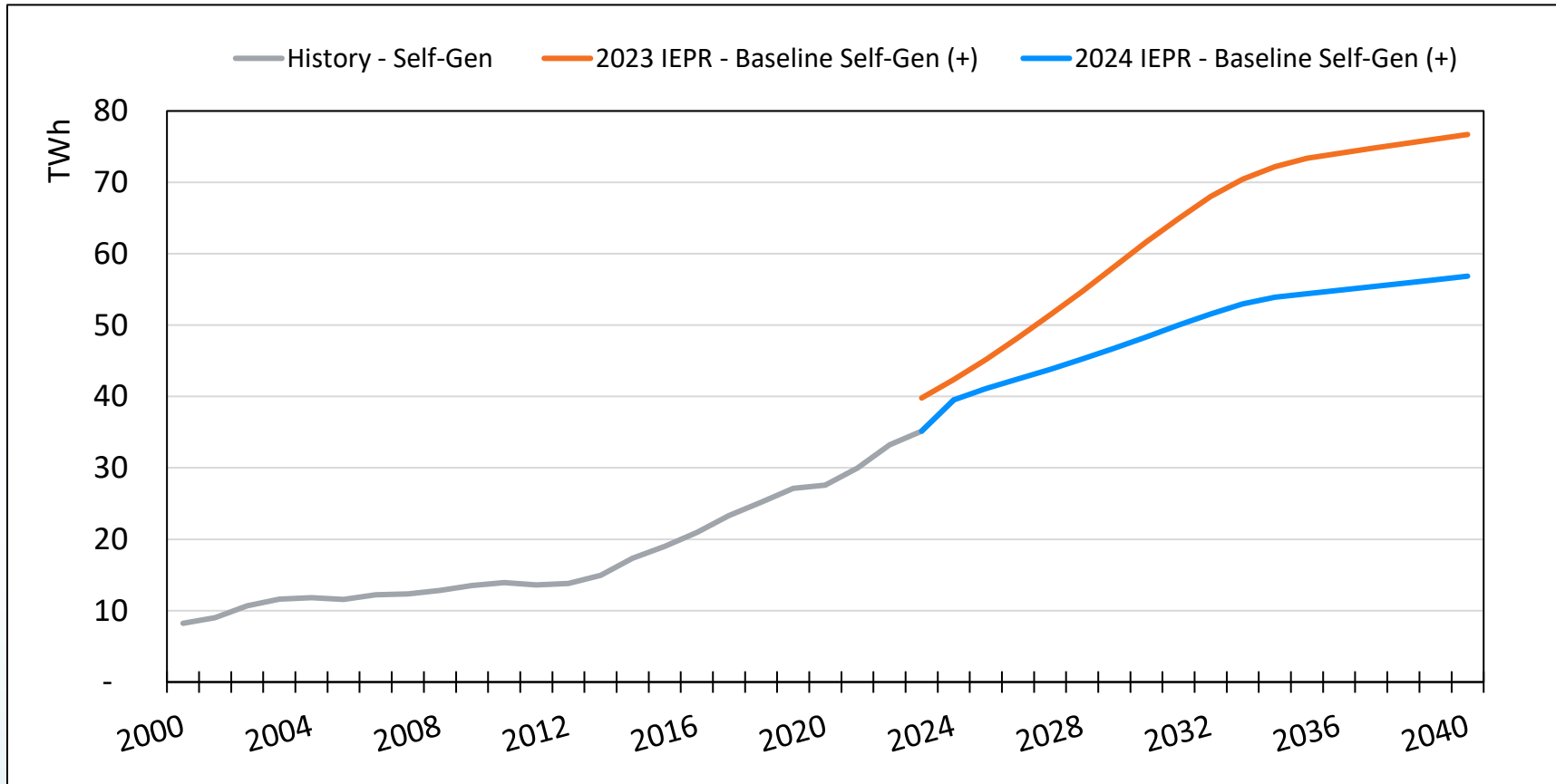
Planning Area	2023	2025	2030	2035	2040	2024 IEPR Annual % Increase (2024 - 2040)	2023 IEPR Annual % Increase (2024 - 2040)
Statewide	35,145	41,114	48,358	54,385	56,856	2.9%	3.9%
PGE	17,166	19,401	22,267	24,558	25,400	2.3%	3.2%
SCE	11,220	13,706	16,532	18,943	19,994	3.5%	4.6%
SDGE	3,558	4,260	4,914	5,392	5,577	2.7%	3.3%
LADWP	1,891	2,247	2,801	3,308	3,494	3.7%	5.3%
NCNC	993	1,136	1,370	1,598	1,739	3.4%	6.4%
IID	256	282	342	406	454	3.4%	7.4%
BUGL	61	82	132	180	198	7.1%	8.6%

Source: CEC Staff



Statewide Electricity Self-Generation Forecasts

- Self generation in 2024 IEPR is 19.9 TWh lower in 2040 than 2023 IEPR.

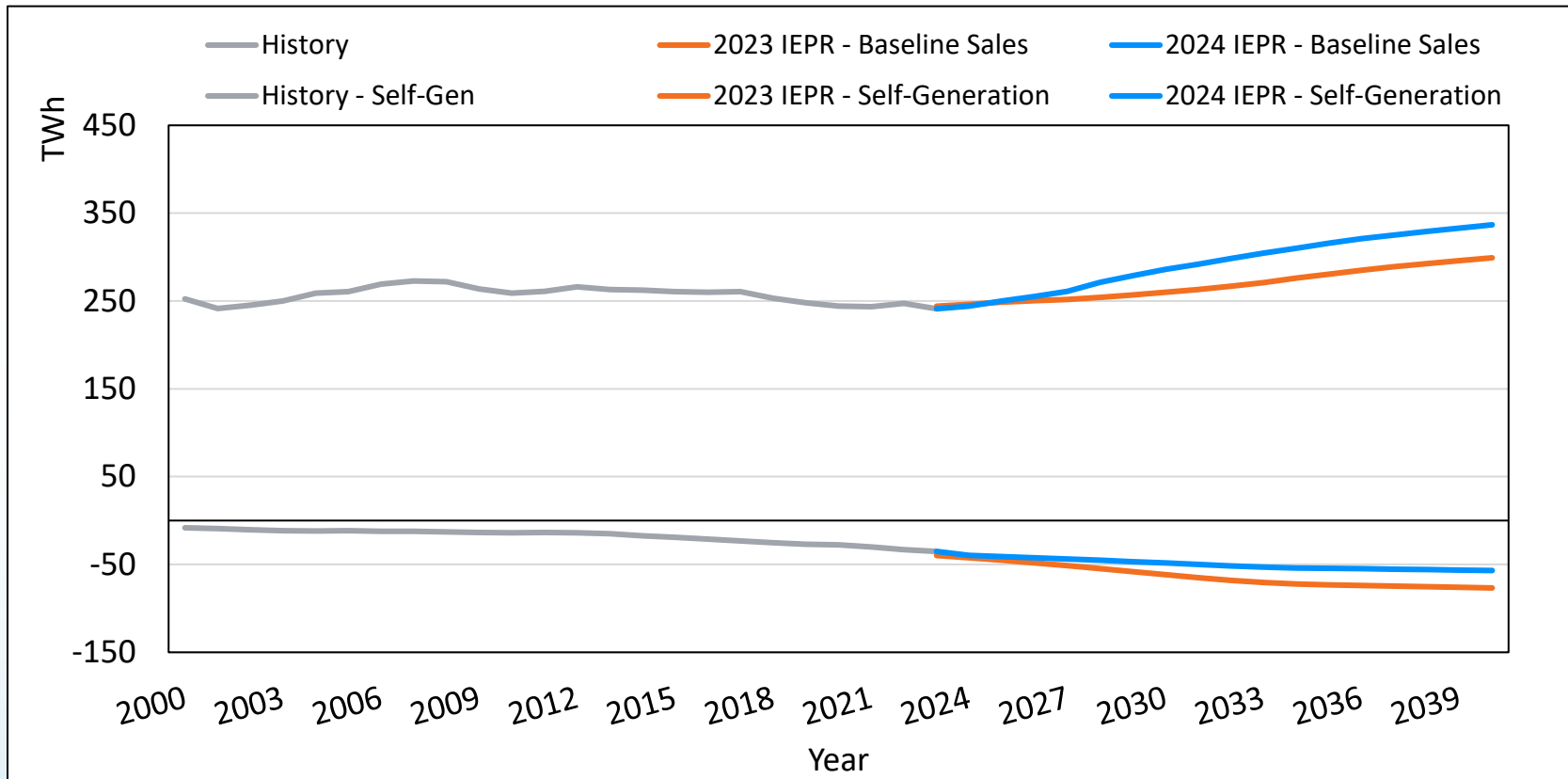


Source: CEC staff



Statewide Electricity Forecasts: Baseline Sales and Self-Gen

- In 2040, 2024 IEPR baseline sales are 337 TWh
 - 37.5 TWh (13%) higher than the 2023 IEPR forecast.
- Without self-generation, forecasted sales in 2040 would be 394 TWh
 - about 17% higher than what's currently projected.

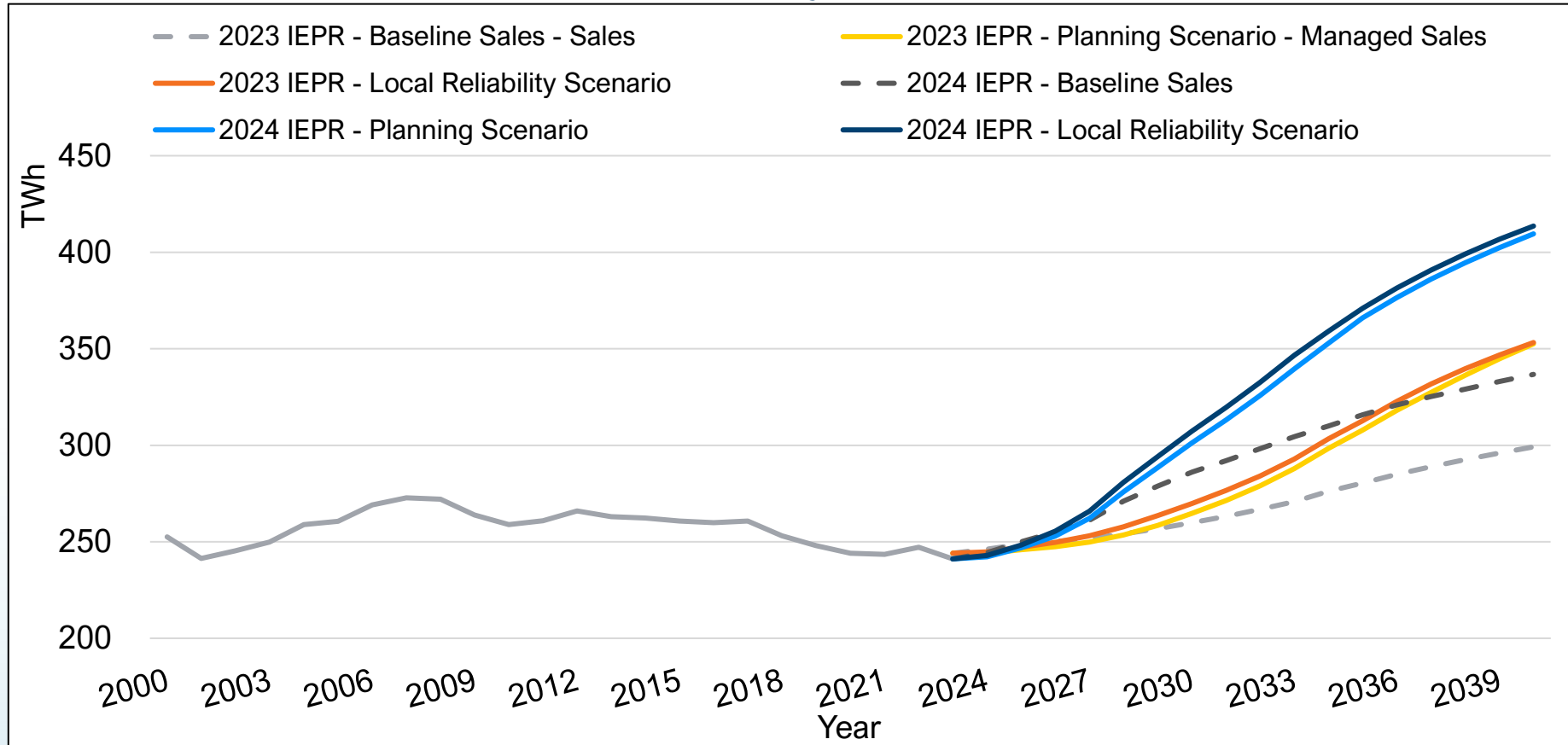


Source: CEC staff



Statewide Electricity Forecasts: Managed Sales

- 2024 IEPR Scenarios are higher than 2023 IEPR due to the higher baseline forecast and higher AATE.
- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections reach 410 TWh and 414 TWh respectively.



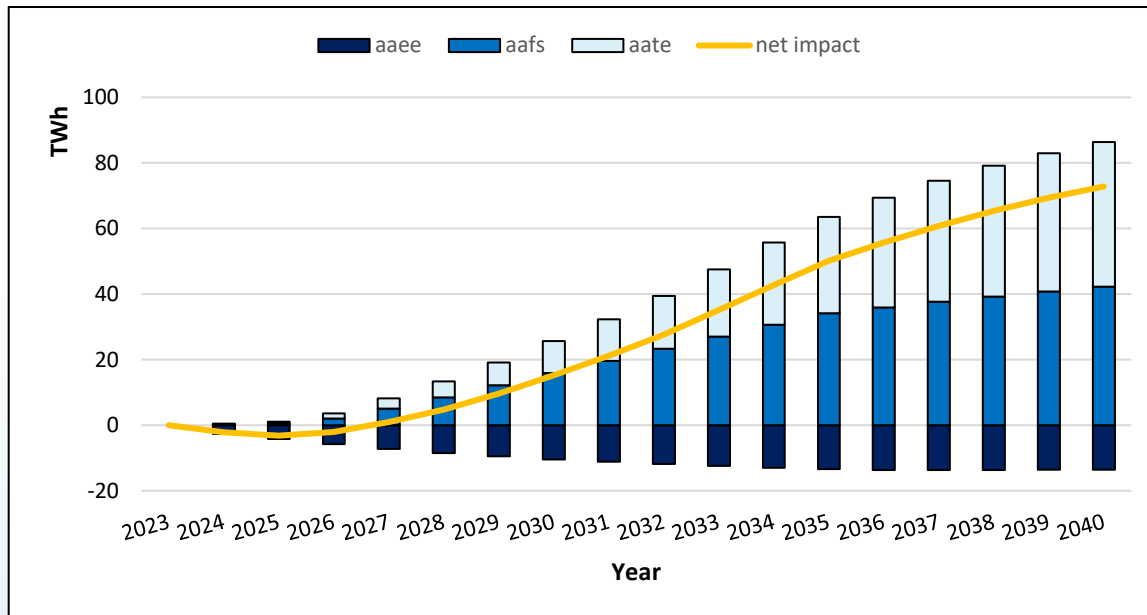
Source: CEC staff



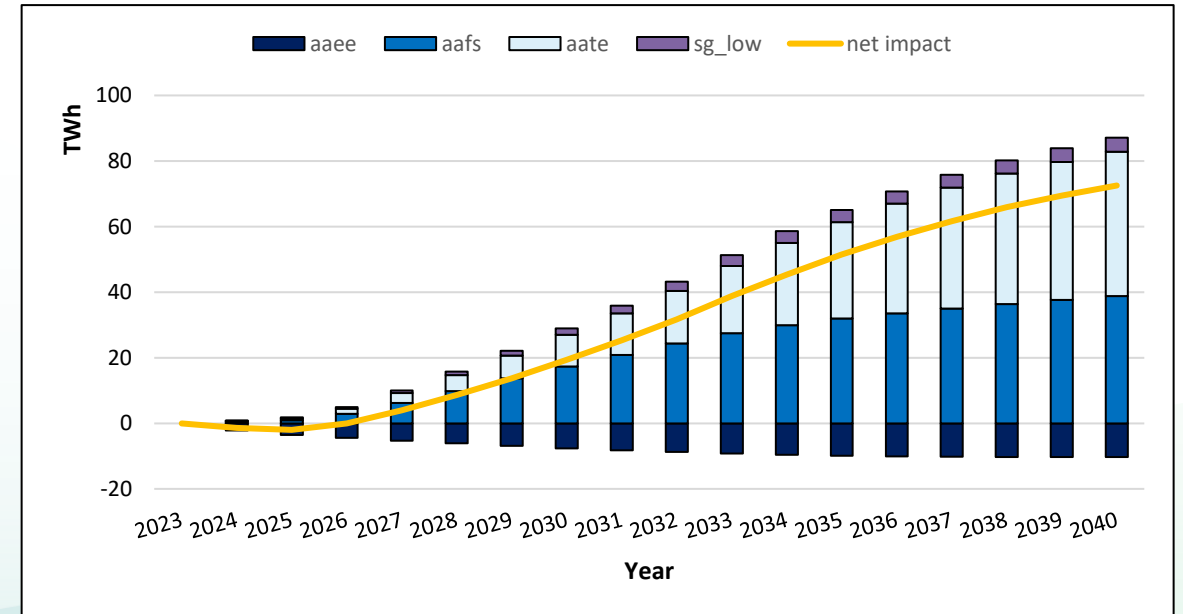
Statewide Electricity Forecasts: Load Modifying Scenarios

- Planning Scenario net impacts reach about 72.8 TWh in 2040; about 21.6% of the total baseline electricity sales.
- Local Reliability net impacts are similar at 76.9 TWh in 2040; about 22.8% of the total baseline electricity sales.
- Net impacts are roughly 16-17% higher than in 2023 IEPR, primarily due to the increased baseline and increased AATE.

2024 IEPR Managed Sales Planning Forecast



2024 IEPR Managed Sales Local Reliability Forecast



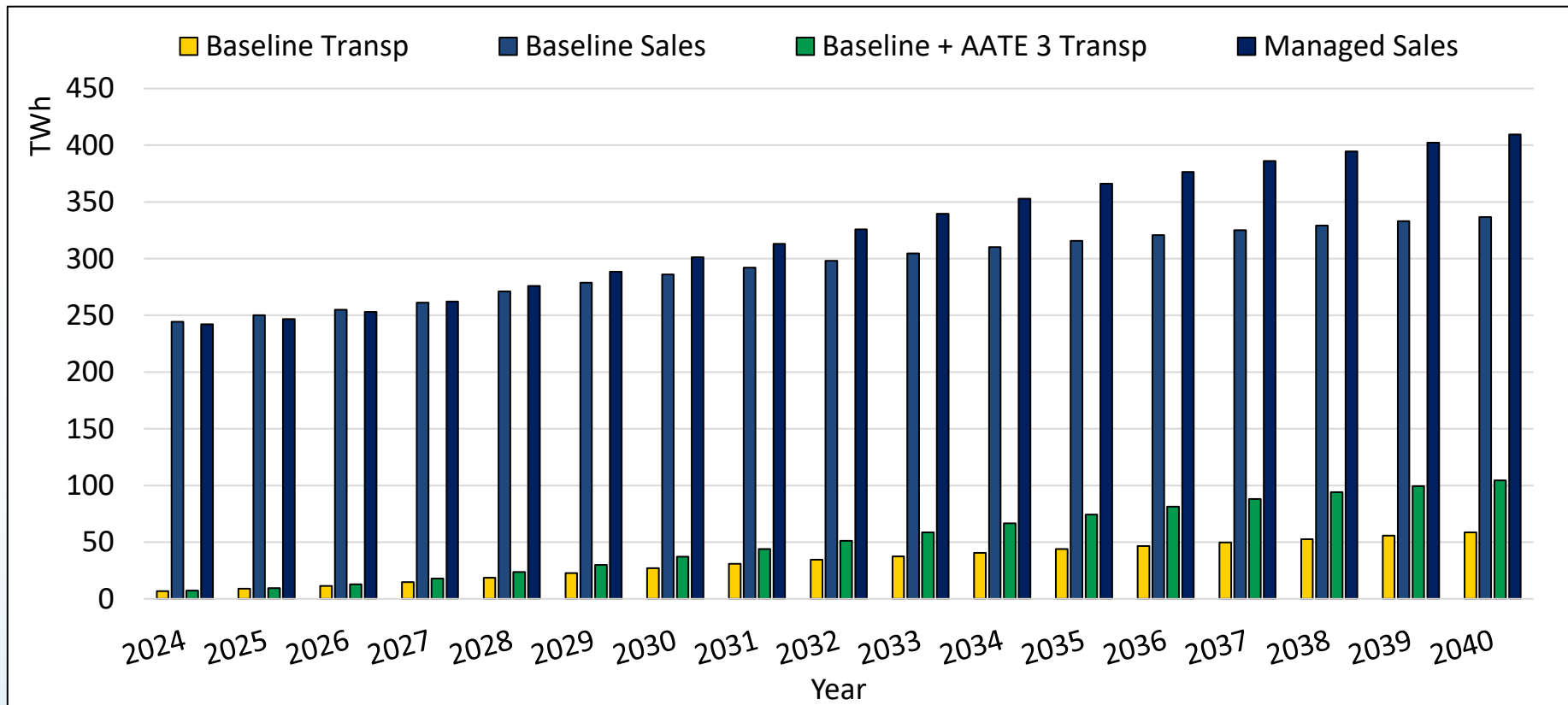
Source: CEC staff



Statewide Transportation Electrification Impacts

- In 2040, the forecasted incremental impact of transportation electrification is approximately 58.7 TWh without AATE 3 or 104.5 TWh with AATE 3.
- AATE 3 is about 25% of managed sales in 2040.

2024 IEPR Transportation Impacts in Baseline and Managed Sales Planning Forecast



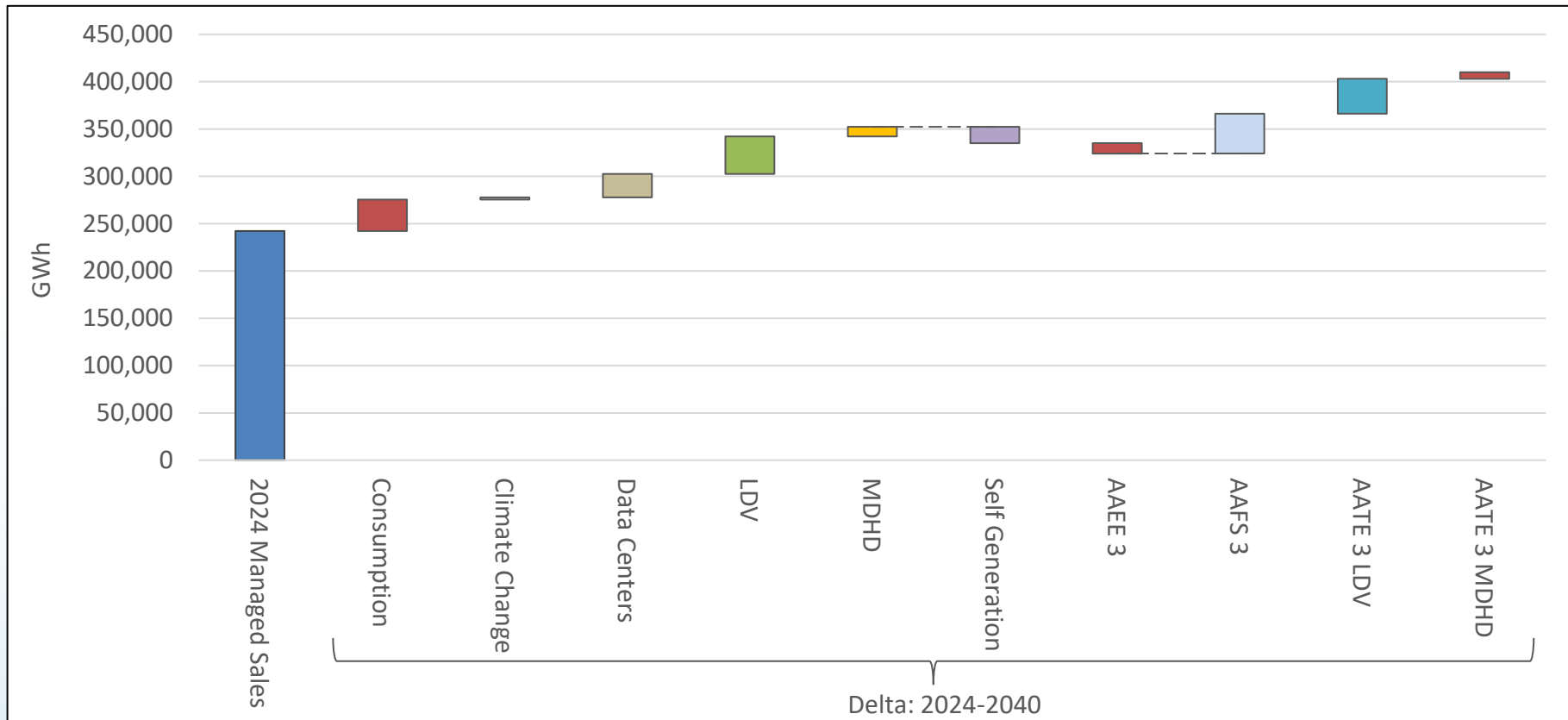
Source: CEC staff



Load Modifier Impacts over the Forecast Period

- Planning Scenario Managed Sales are 242 TWh in 2024 and 410 TWh in 2040, a total increase of 168 TWh over the forecast period.
- The largest deltas are transportation (baseline and AATE).

2024-2040 Load Modifier Impacts



Source: CEC staff



Questions

Email: Mathew.Cooper@Energy.ca.gov

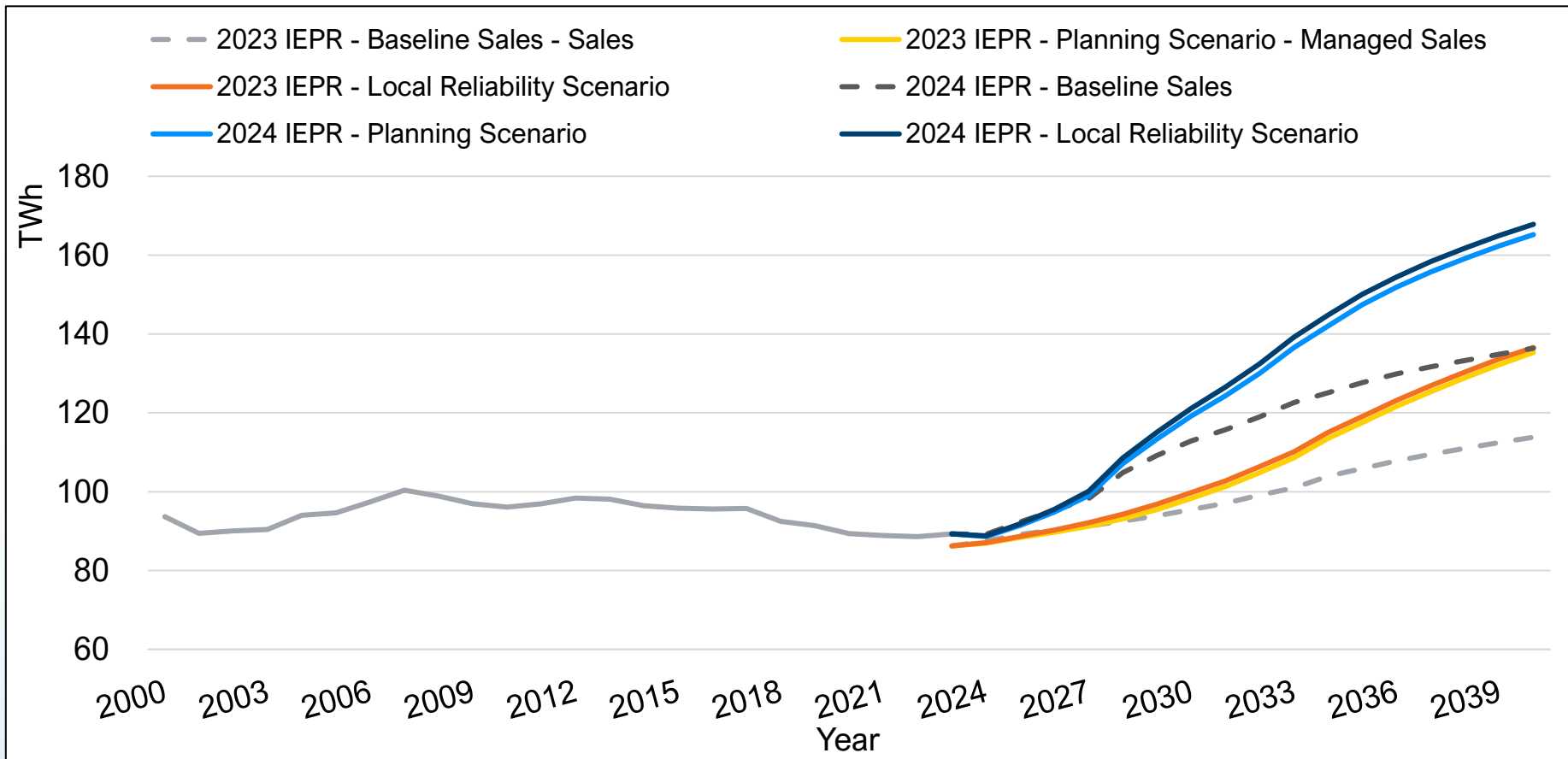


Appendix – Managed Electricity Sales Forecasts by Planning Area



Electricity Sales Forecast: PG&E Planning Area

- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for the PG&E Planning Area reach 165 TWh and 168 TWh respectively.

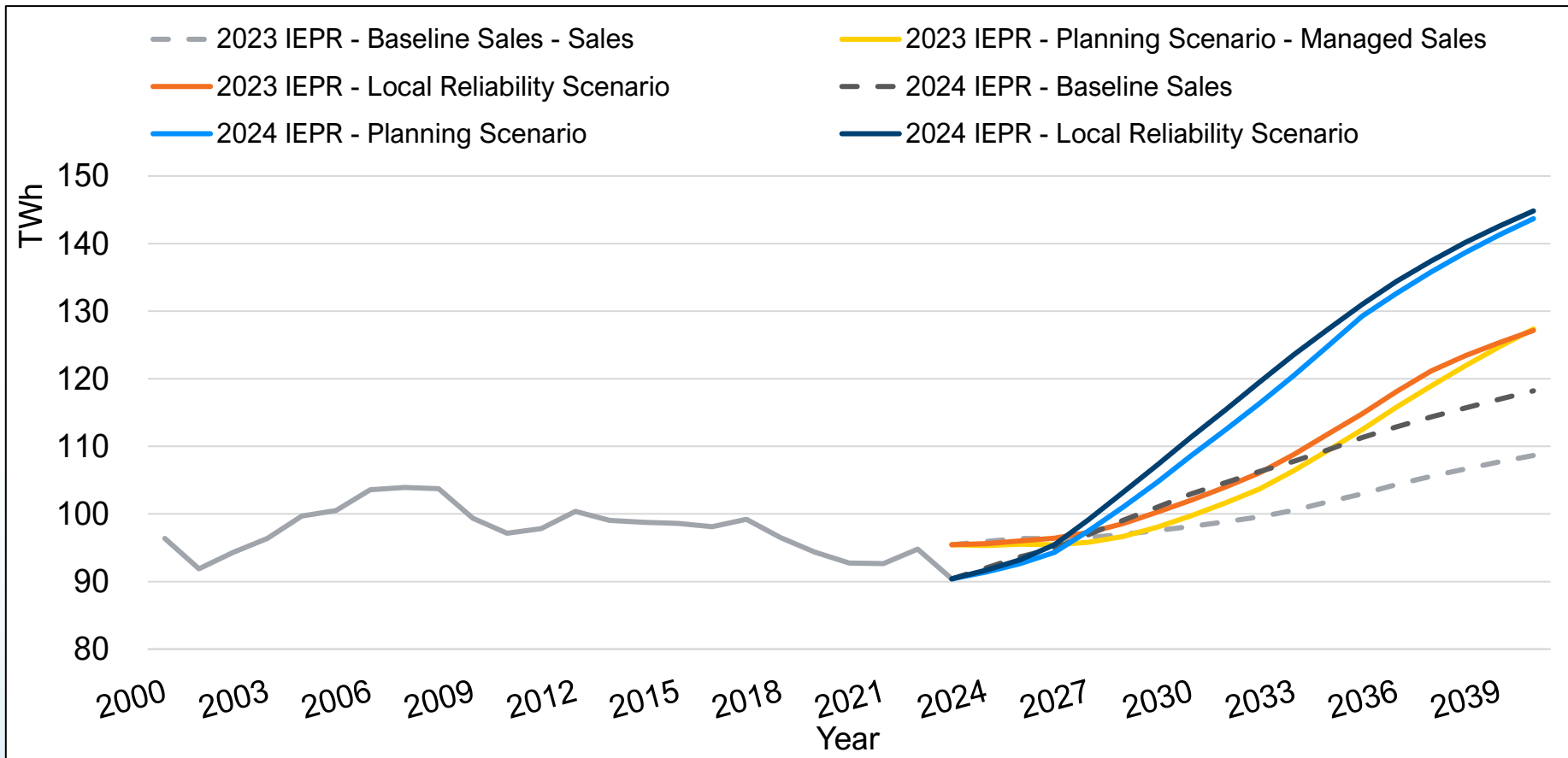


Source: CEC staff



Electricity Sales Forecast: SCE Planning Area

- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for the SCE Planning Area reach 144 TWh and 145 TWh respectively.

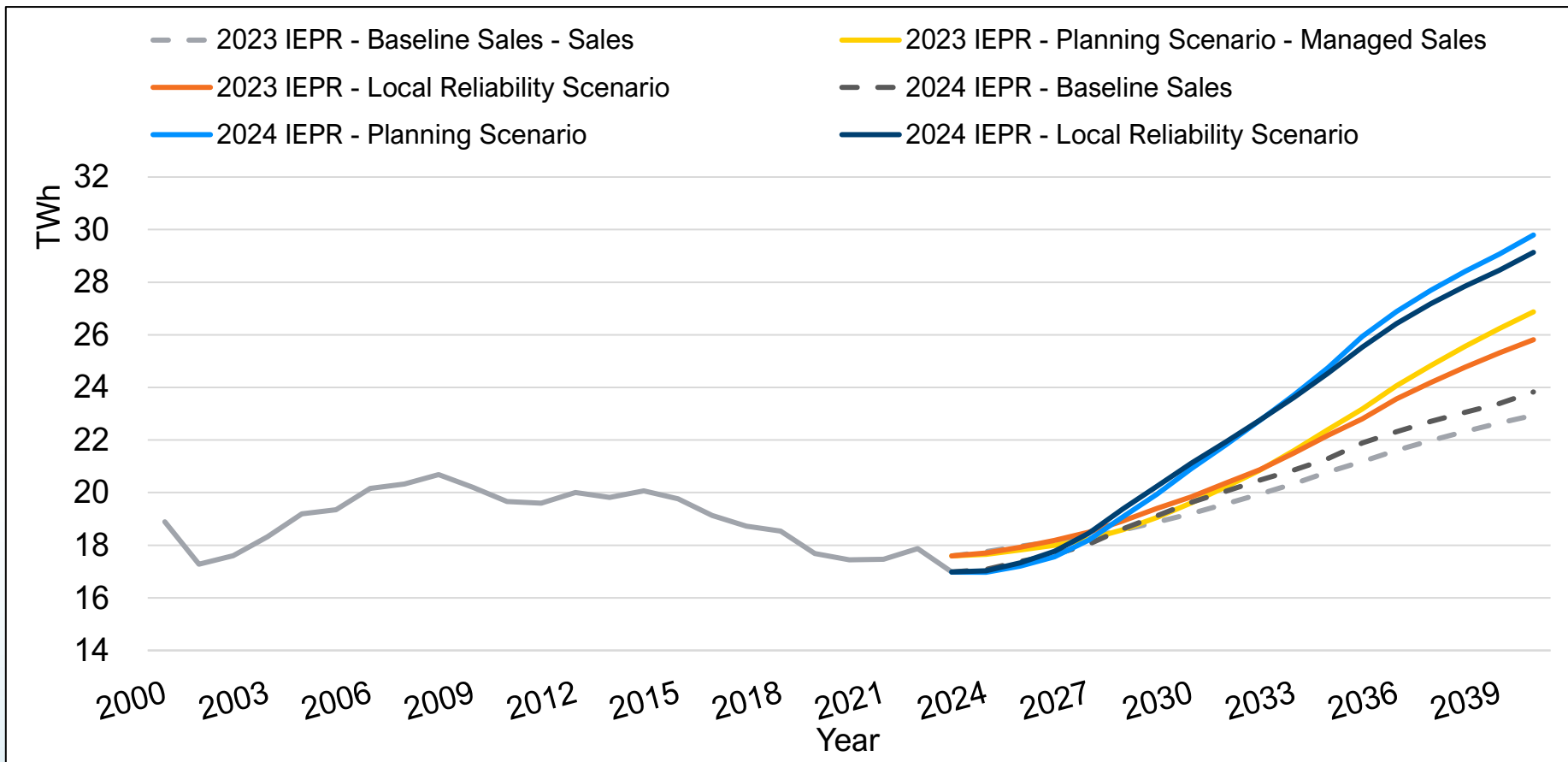


Source: CEC staff



Electricity Sales Forecast: SDG&E Planning Area

- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for the SDG&E Planning Area reach 29.4 TWh and 28.7 TWh respectively.

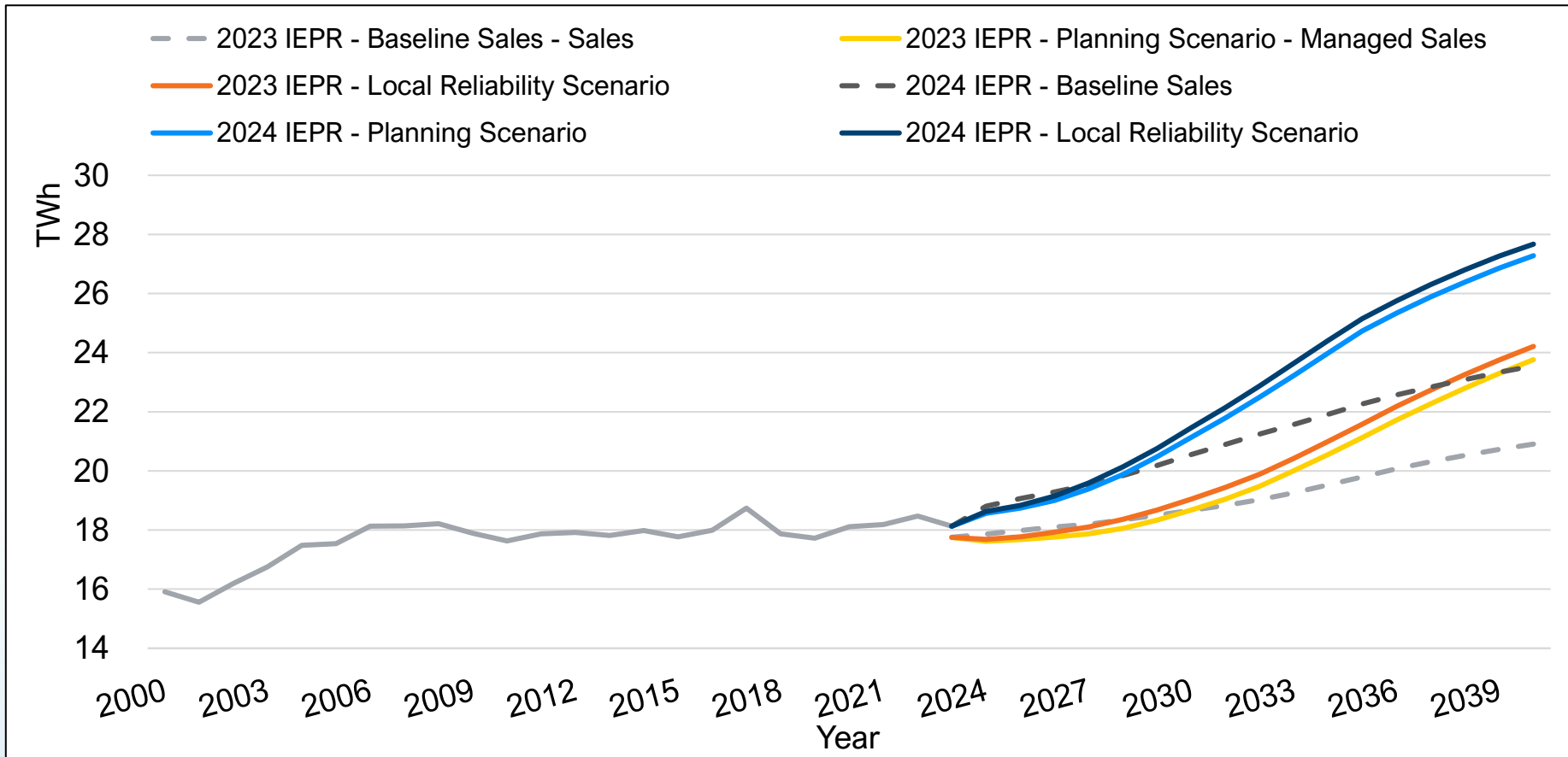


Source: CEC staff



Electricity Sales Forecast: NCNC Planning Area

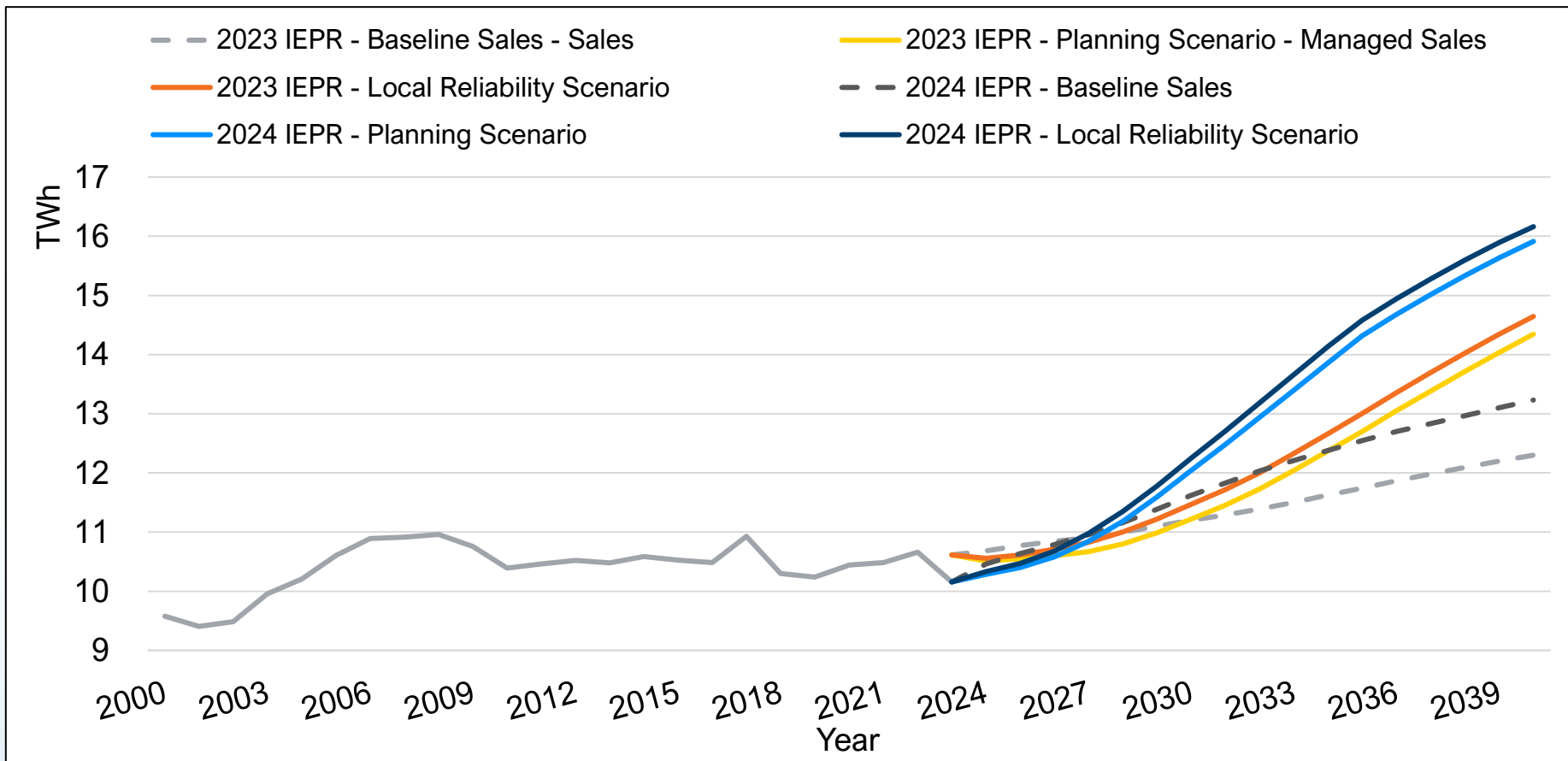
- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for the NCNC Planning Area (including SMUD) reach 27.3 TWh and 27.7 TWh respectively.





Electricity Sales Forecast: SMUD

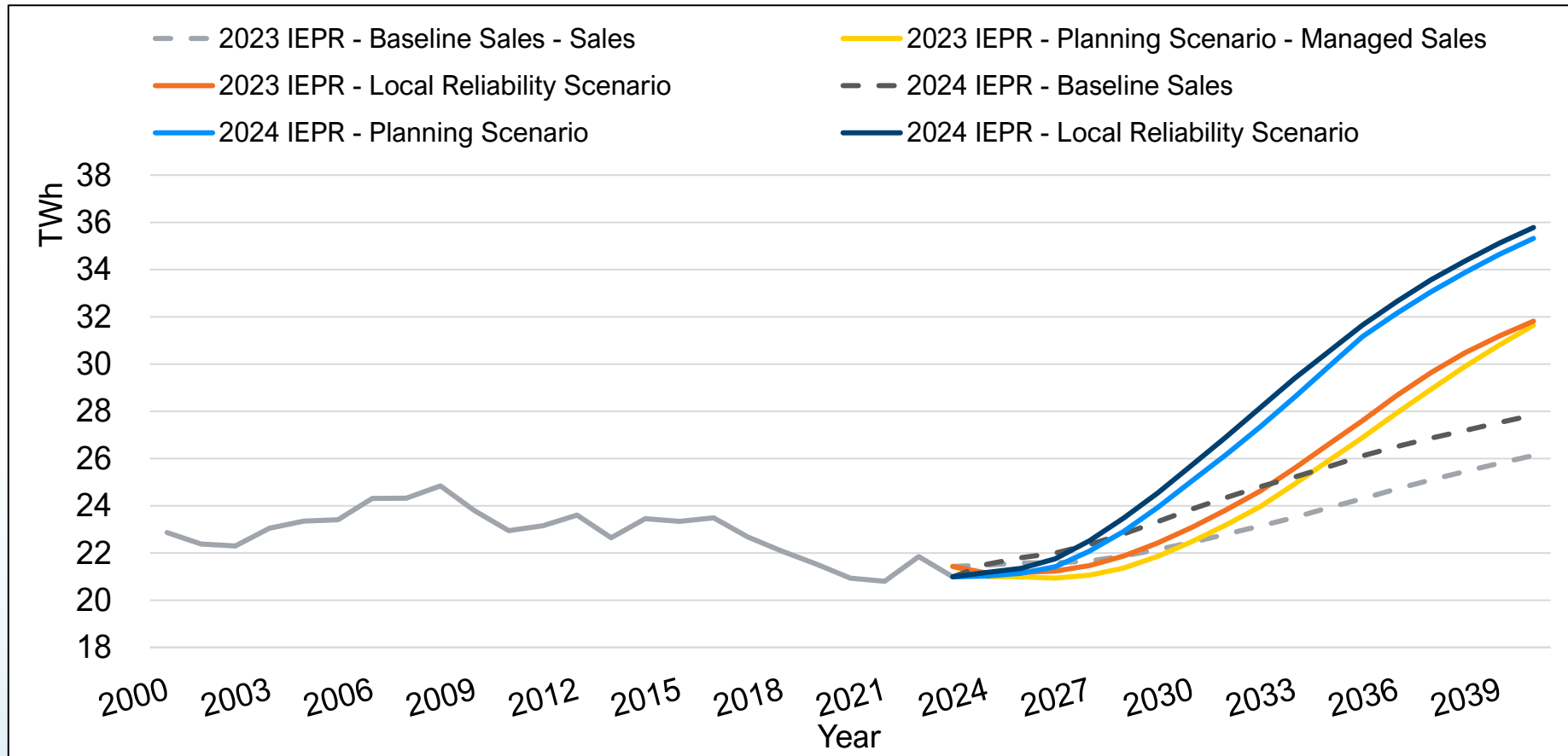
- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for SMUD reach 15.9 TWh and 16.2 TWh respectively.





Electricity Sales Forecast: LADWP Planning Area

- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for the LADWP Planning Area reach 35.3 TWh and 35.8 TWh respectively.

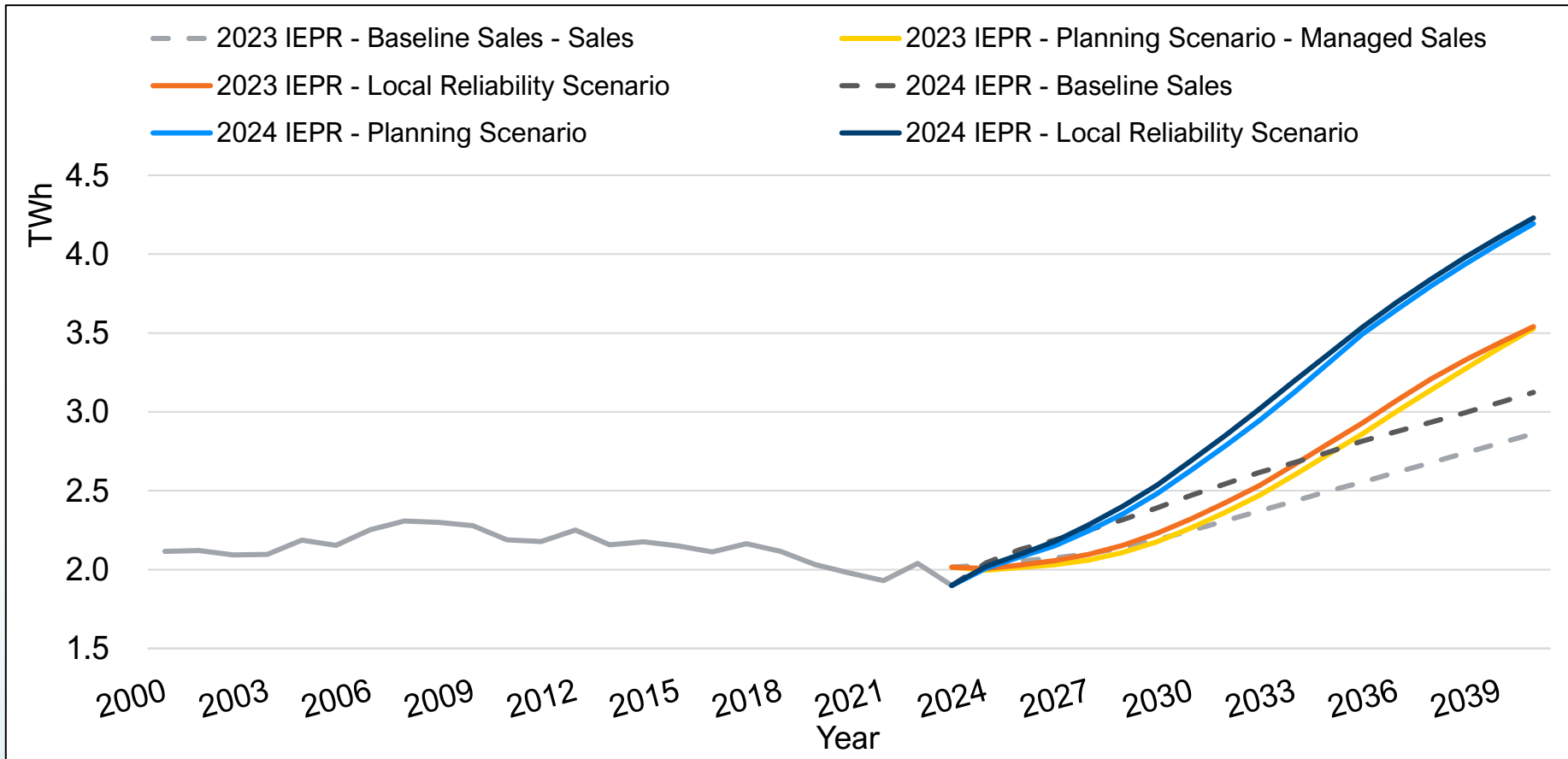


Source: CEC staff



Electricity Sales Forecast: BUGL Planning Area

- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for the BUGL Planning Area reach 4.2 TWh and 4.2 TWh respectively.





Electricity Sales Forecast: IID Planning Area

- In 2040, the 2024 IEPR Planning and Local Reliability managed sales projections for the IID Planning Area reach 4.4 TWh and 4.5 TWh respectively.

