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California Energy Demand Update Forecast 2016

December 8, 2016

2016 *Integrated Energy Policy Report*

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Overview

- Update Process
- Economic/Demographic Assumptions
- Statewide Baseline Results
- Major Planning Area Results
- Updated Managed Forecasts
- Next Steps

California Energy Demand Update Forecast (CEDU 2016)

- Update for California ISO Transmission Planning and CPUC procurement planning covering 2017-2027
- Incorporates more recent economic and demographic expectations
- Includes new historical data (2015 for consumption/sales and 2016 for peak)
- Additional Achievable Energy Efficiency (AAEE) estimated for 2027 by Navigant
- No updates for committed efficiency, distributed generation (DR), or climate change, except to rescale or extrapolate to 2027

Update Process

- Re-estimate econometric models for the major sectors and peak demand:
  - Residential
  - Commercial
  - Manufacturing
  - Resource Extraction/Construction
  - Agriculture/Water Pumping
  - Transportation, Communication, and Utilities
  - Street Lighting

Update Process

- Run econometric models with economic and demographic data used in CED 2015
- Run econometric models with newer economic and demographic data (August 2016)
- Apply percentage differences in econometric forecasts to CED 2015 net of post processed impacts (efficiency, DR, electrification, etc.)

Update Process

- Develop one more year (out to 2027) for post-processed impacts
  - Committed efficiency decayed one more year
  - DR for 2027 is the same as 2026
  - Electric vehicles (EVs) and electrification extrapolated out one year
- Apply re-scaled post-processed impacts through 2027 to electricity consumption and initial peak forecasts

Update Process

- For electricity sales, subtract projected distributed generation (DG) from consumption (updated DG with 2015 adoptions and pending adoptions for 2016)
- Develop weather-normalized peaks for 2016 to serve as starting point for peak forecasts
- Post-processed planning area results to develop sales by load serving entity (LSE) (1.1c form) and sales and peak for local areas (1.5 forms)

Economic/Demographic Scenarios

Same scenarios as in CED 2015

- High Demand Case: Global Insight Optimistic Scenario
- Mid Demand Case: Moody's Baseline Scenario
- Low Demand Case: Moody's Lower Long-Term Growth Scenario

Comparison to CED 2015

Average annual growth 2015-2026

Driver	CED 2015 Mid	CEDU 2016 High	CEDU 2016 Mid	CEDU 2016 Low
Personal Income	2.88%	3.18%	2.94%	2.71%
Population	0.93%	0.88%	0.88%	0.86%
Manufacturing Output	2.38%	5.07%	2.68%	2.35%
Commercial Employment	1.19%	1.25%	1.17%	1.06%

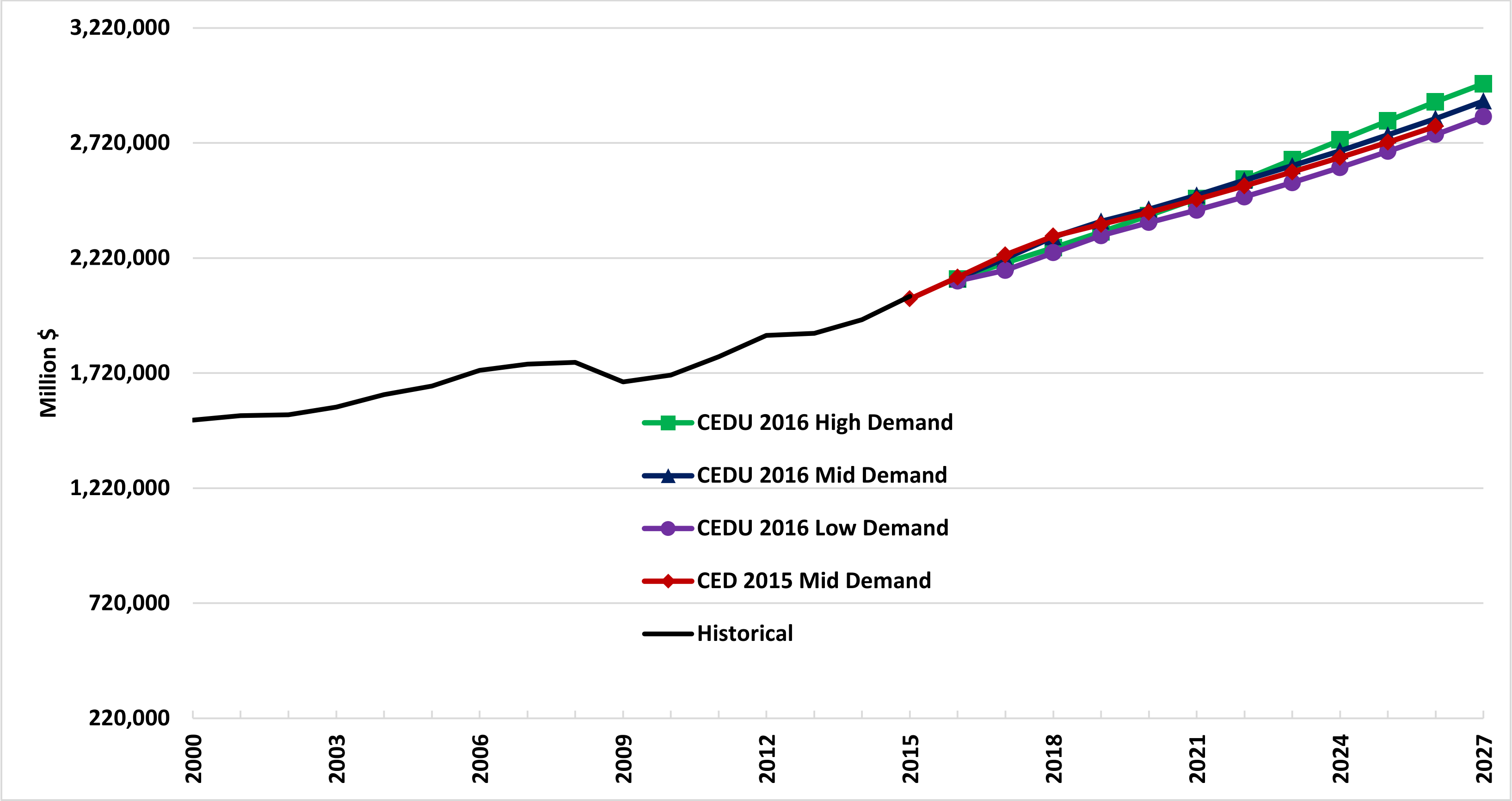
Economic/Demographic Data

Manufacturing growth from tech/biotech

- Manufacturing output growth has been concentrated in transportation, electronics, and chemicals/energy/plastics (autos, tech, and biotech)
- Strong innovation/bio-tech development in SoCal and Bay Area

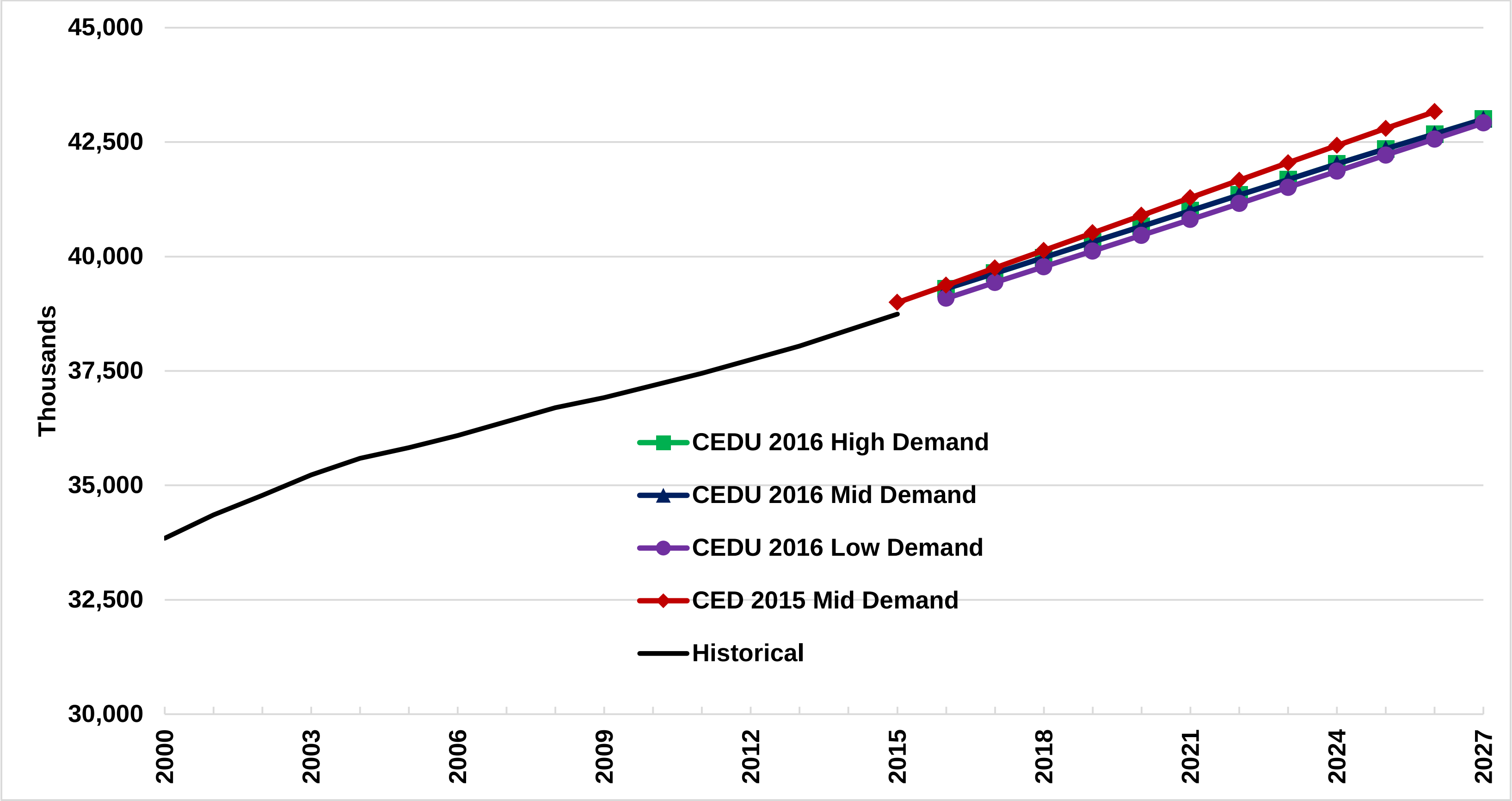
Statewide Personal Income

By 2026, mid case income is 1.19% greater than CED 2016



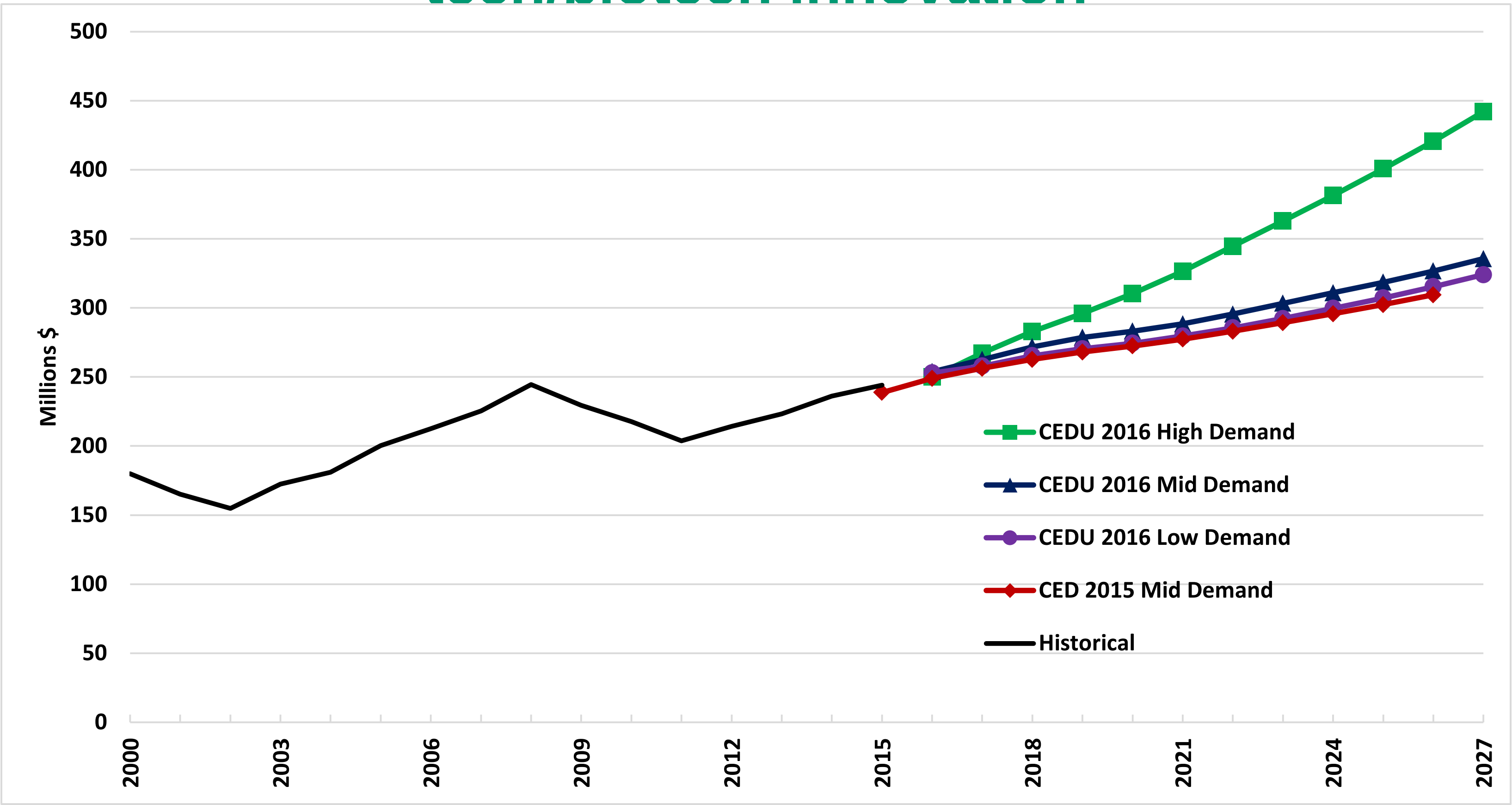
Statewide Population

Mid case lower by 1%+ in 2026 in comparison to CED 2015



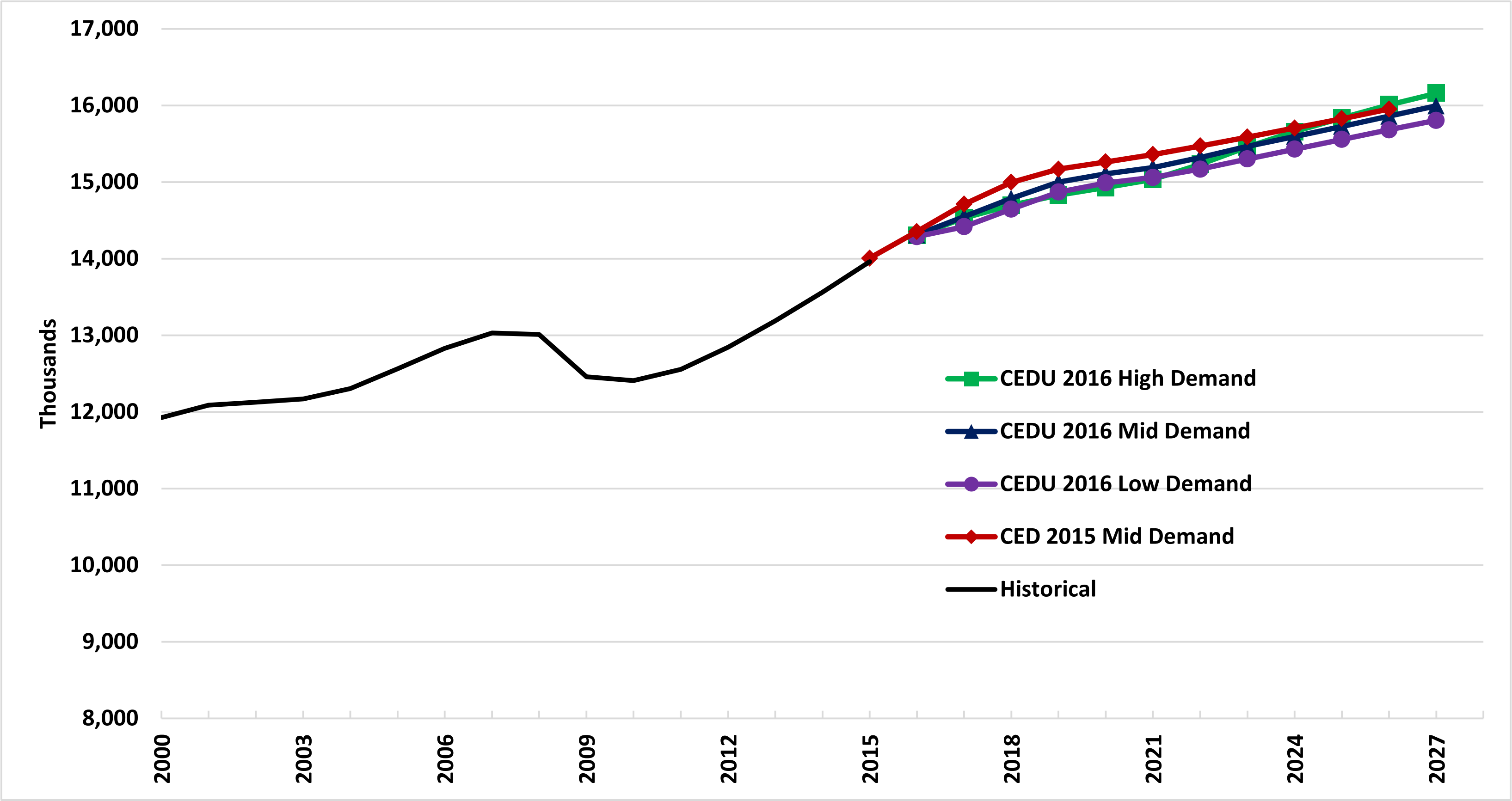
Statewide Manufacturing Output

Mid case 5.6% higher than CED 2015 due to more tech/biotech innovation



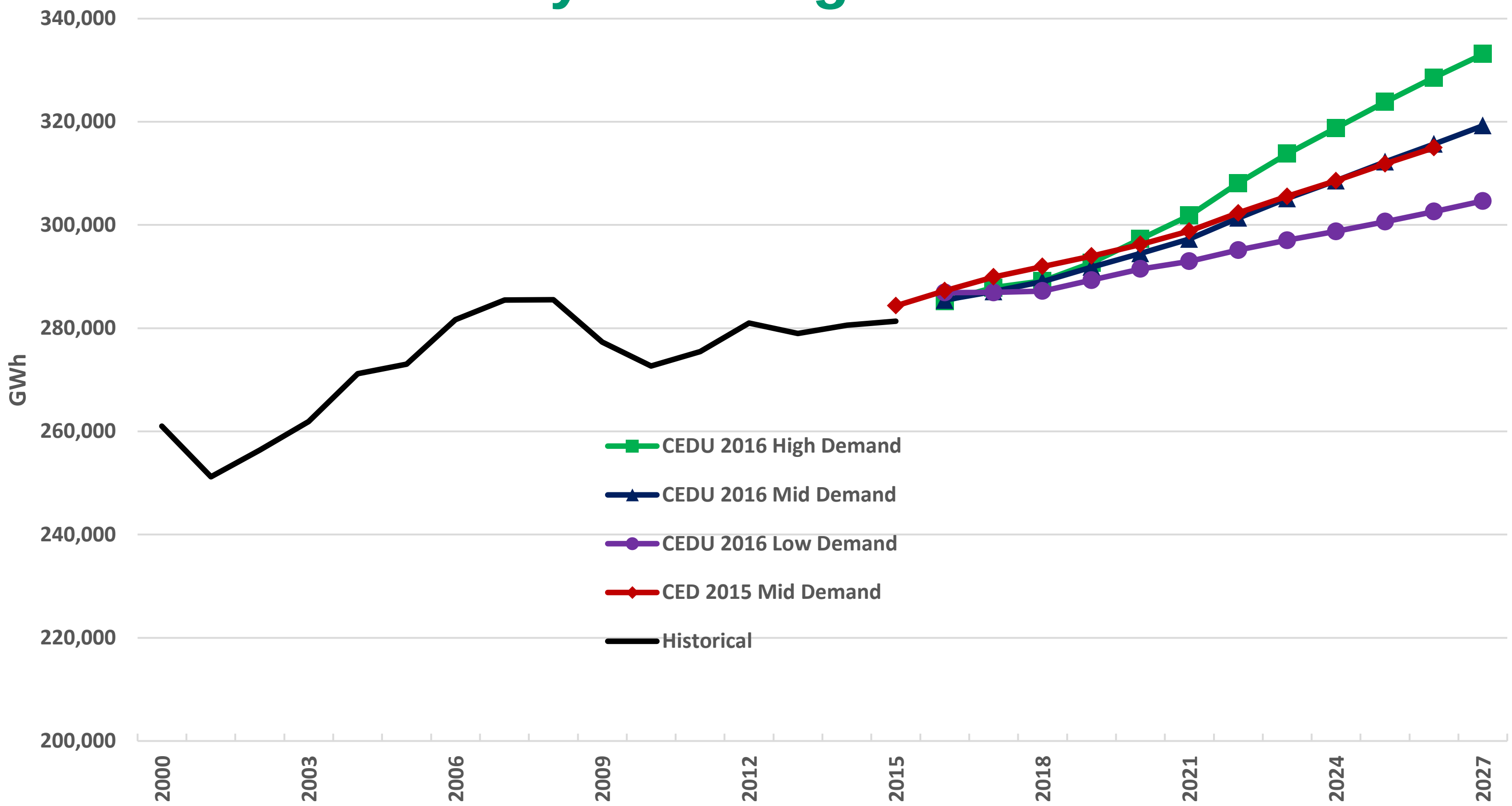
Statewide Commercial Employment

Mid case down by 0.6% in 2026 in comparison to CED 2015



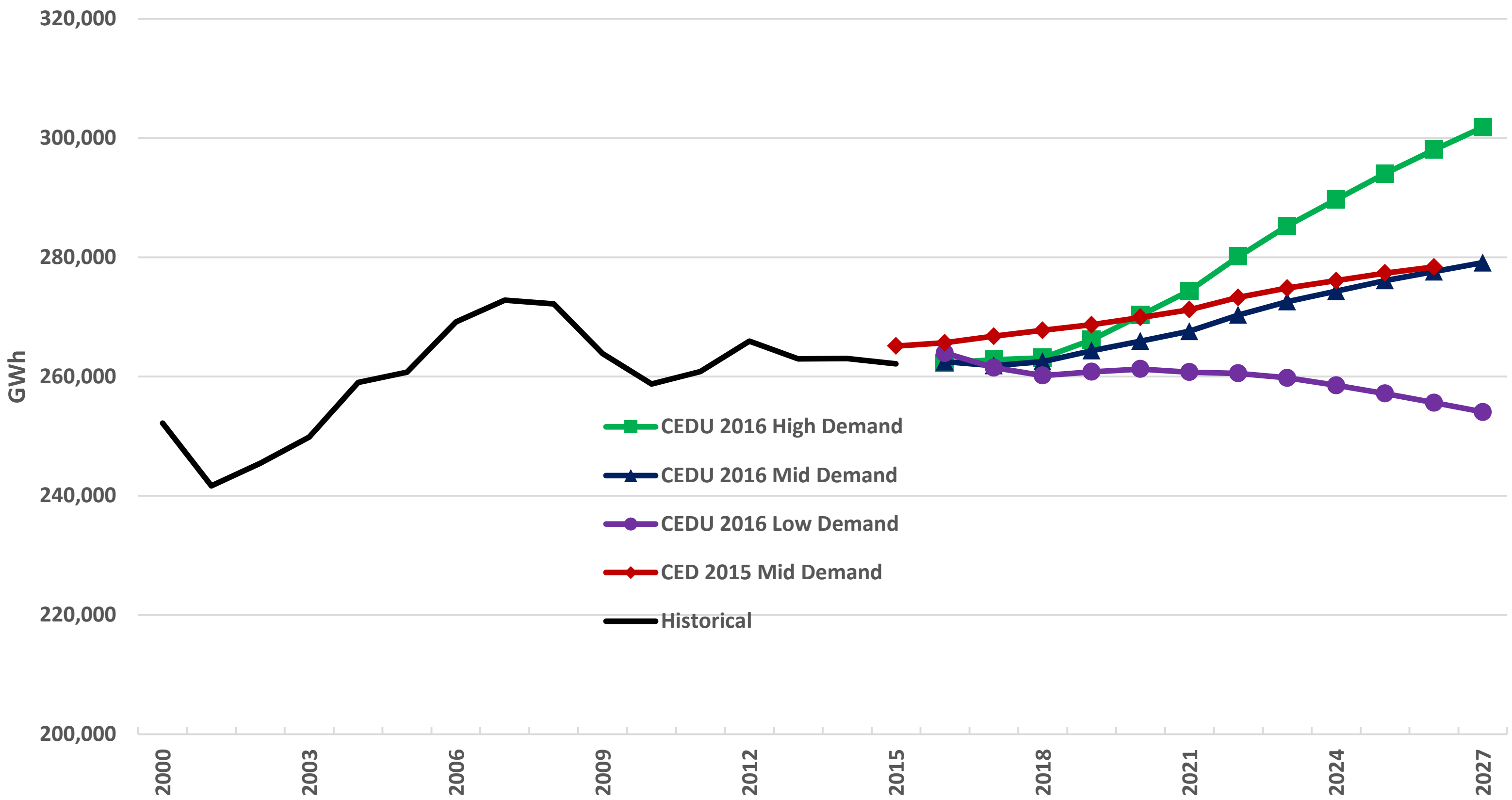
Statewide Consumption

Actual 2015 consumption lower than expected; Mid case is only 0.2% higher than CED 2015



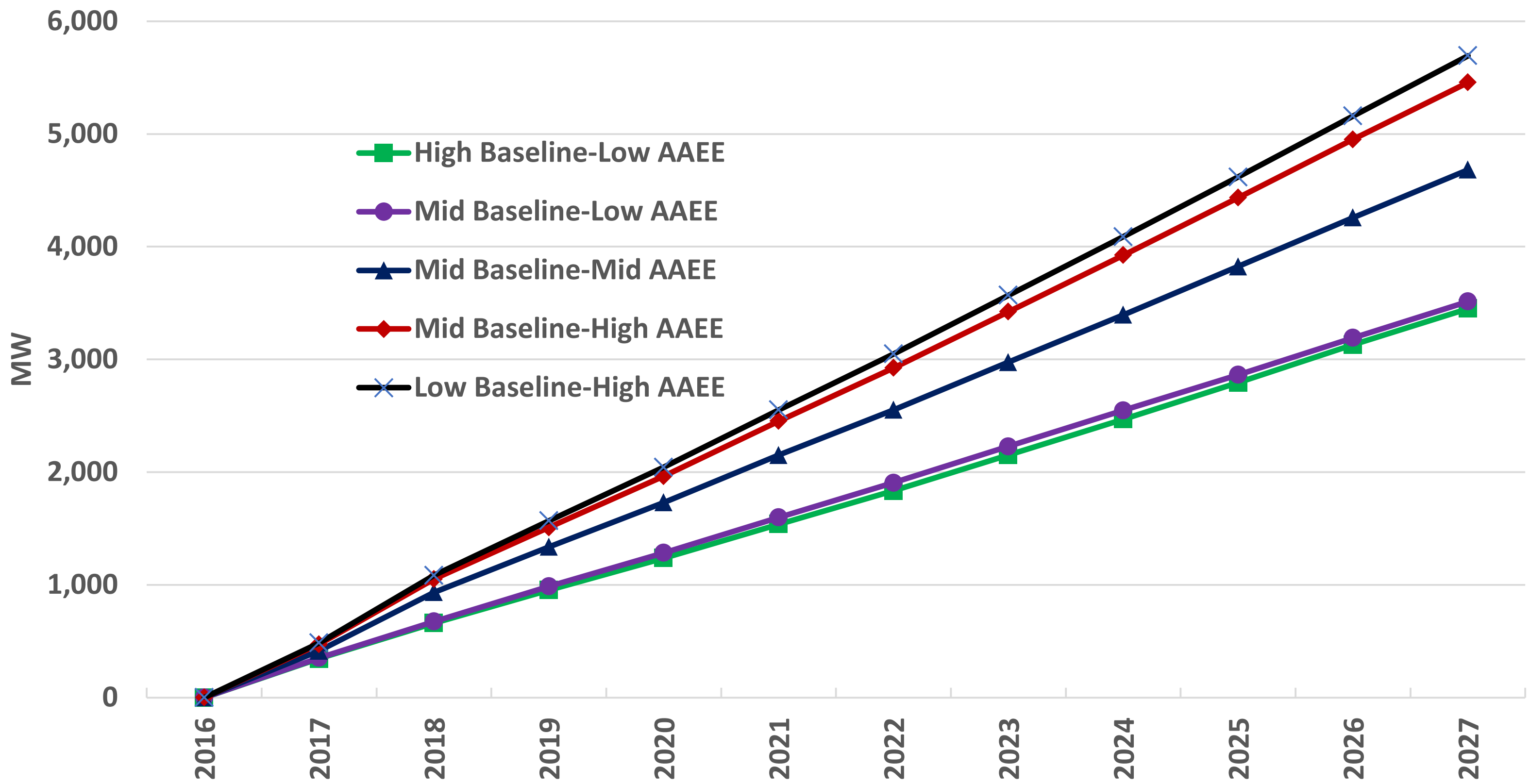
Statewide Sales

As with consumption, lower in near-term; Mid case 0.2% lower than CED 2015



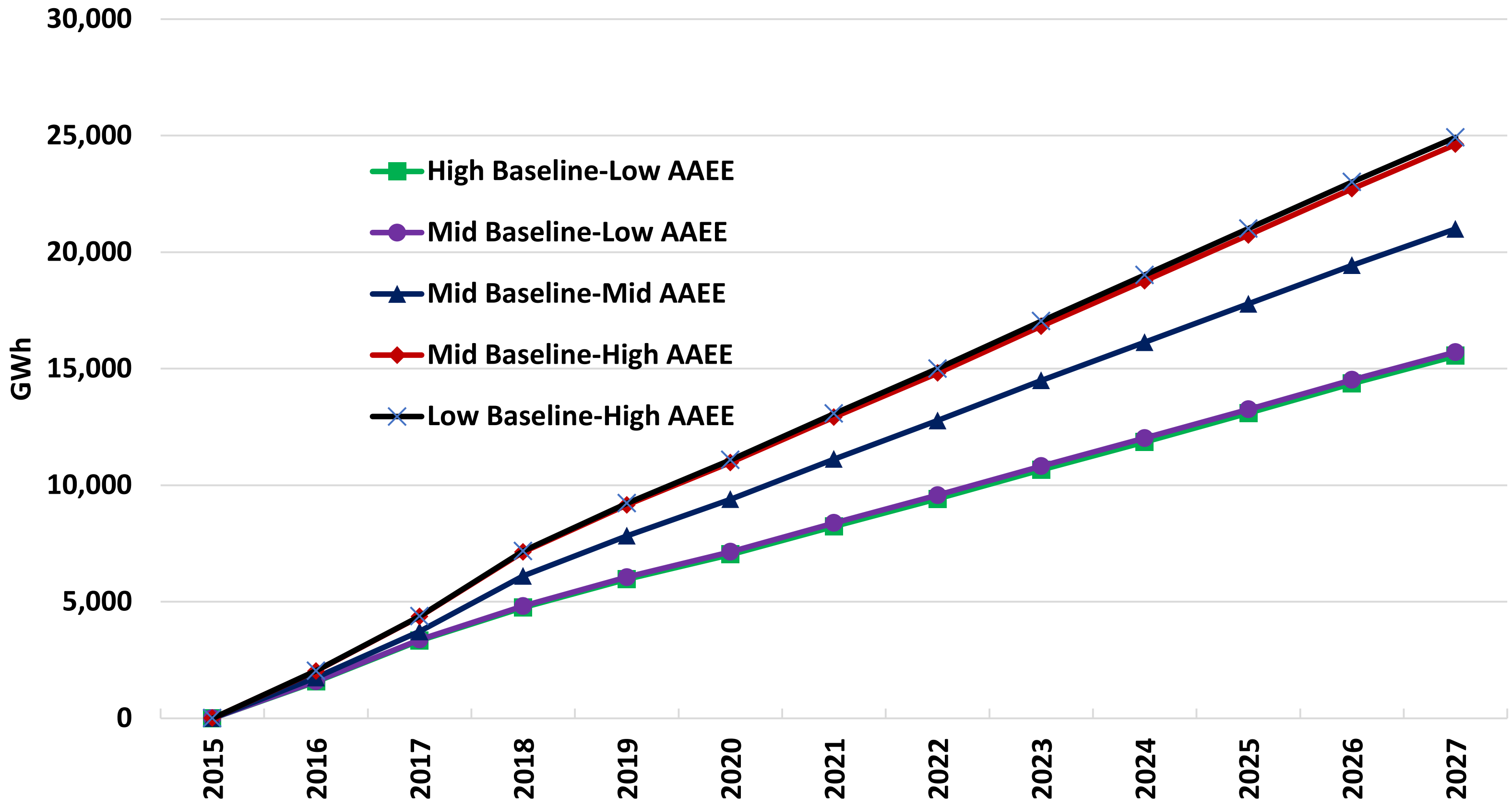
IOU AAEE Savings

Peak savings incremental to 2016; Mid Baseline - Mid AAEE exceeds 4,500 MW



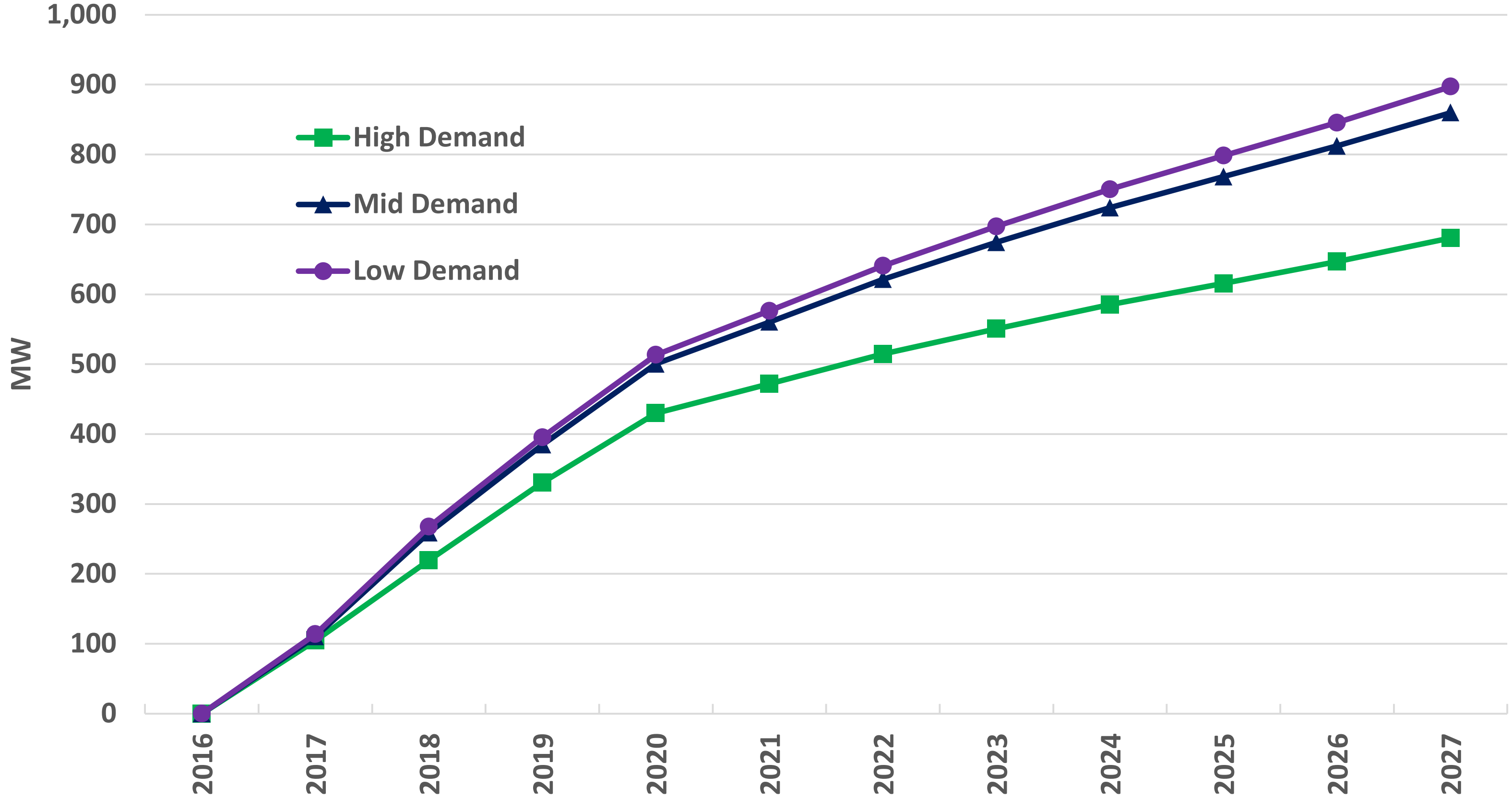
IOU AAEE Savings

Energy savings incremental to 2015; Mid Baseline - Mid AAEE ~21,000 GWh



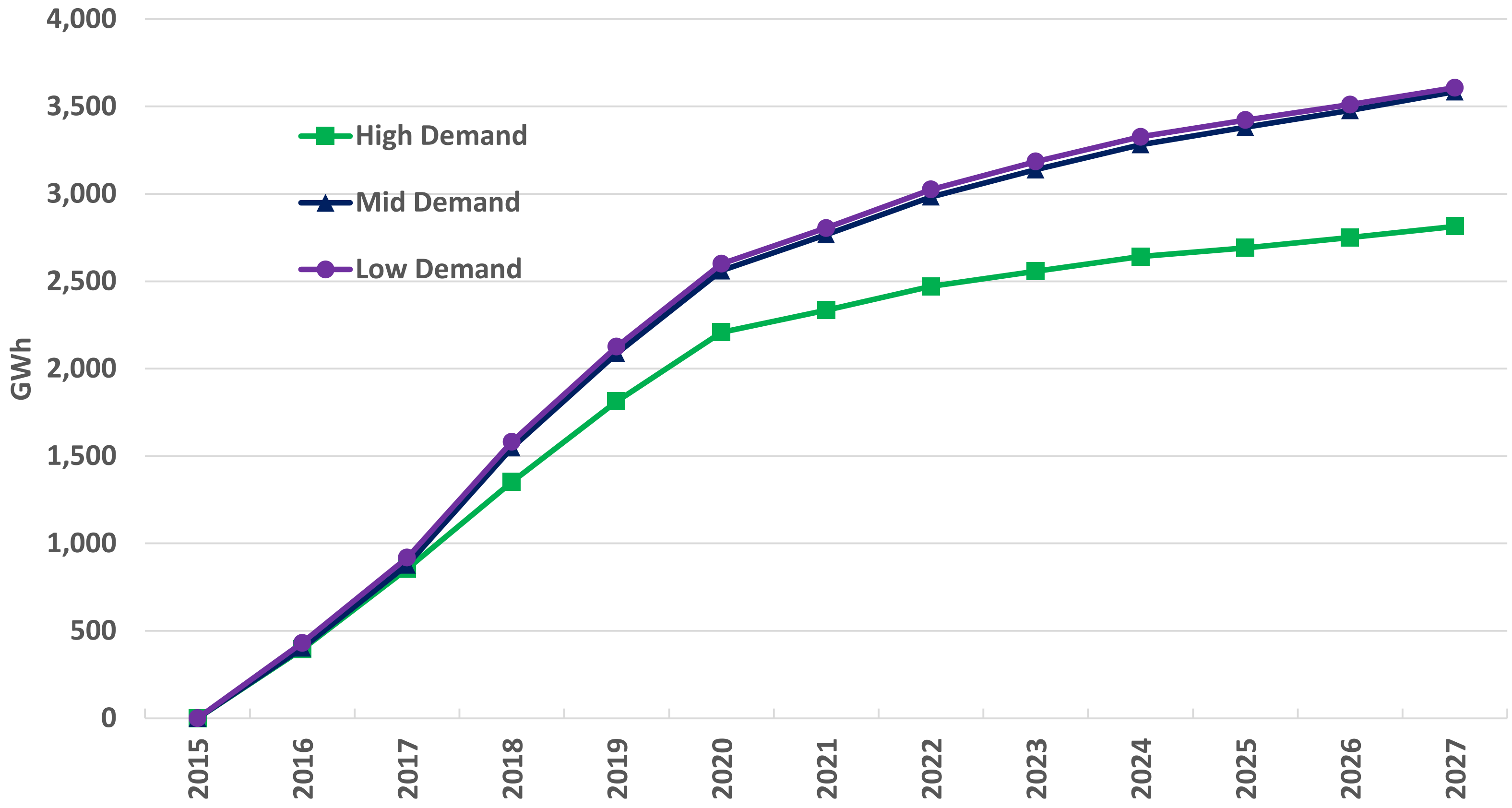
POU AAEE Savings

SMUD and LADWP;
Peak Mid Demand ~850 MW



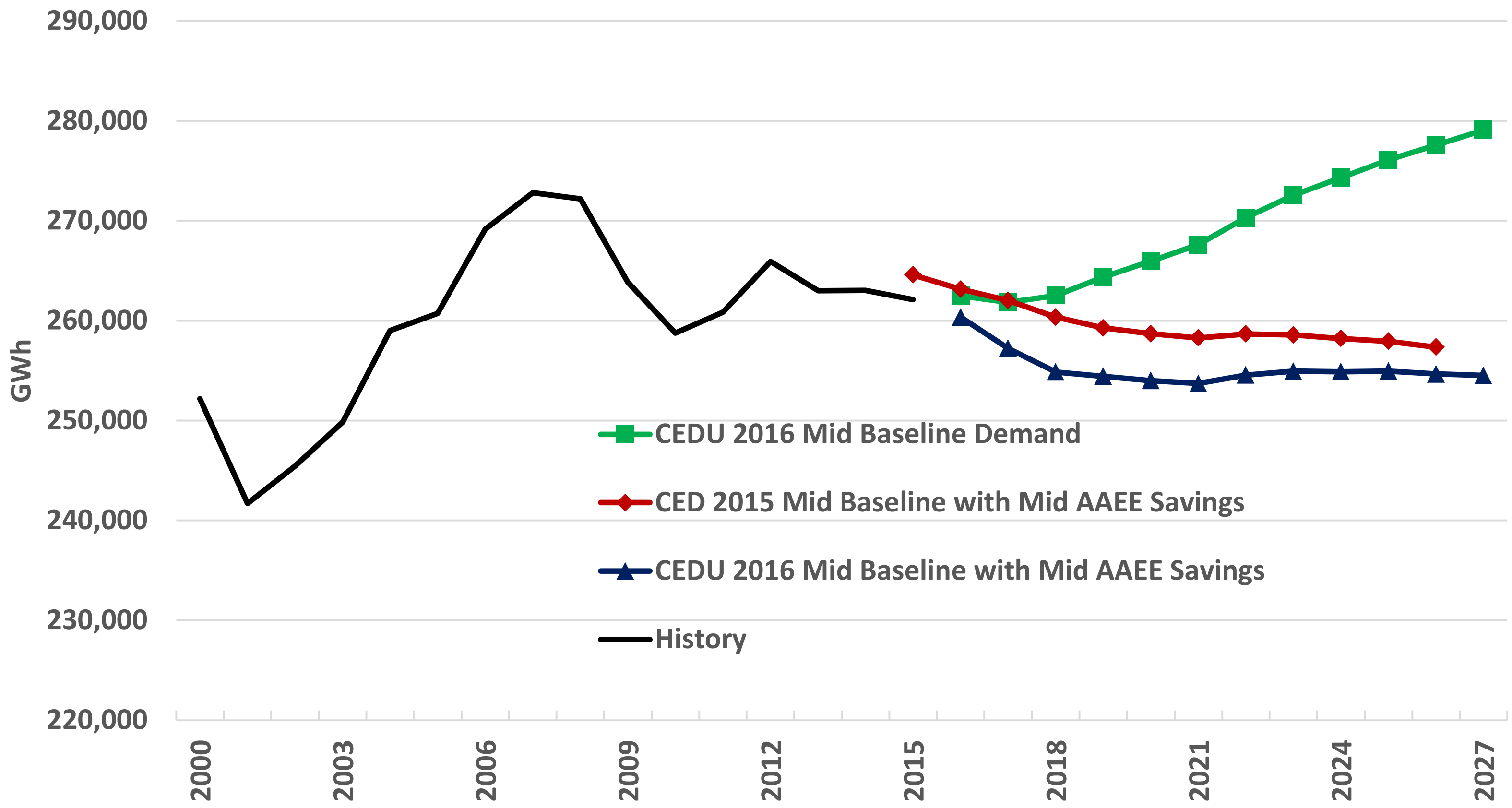
POU AAEE Savings

Energy savings incremental to 2015; Mid Demand ~3,500 GWh



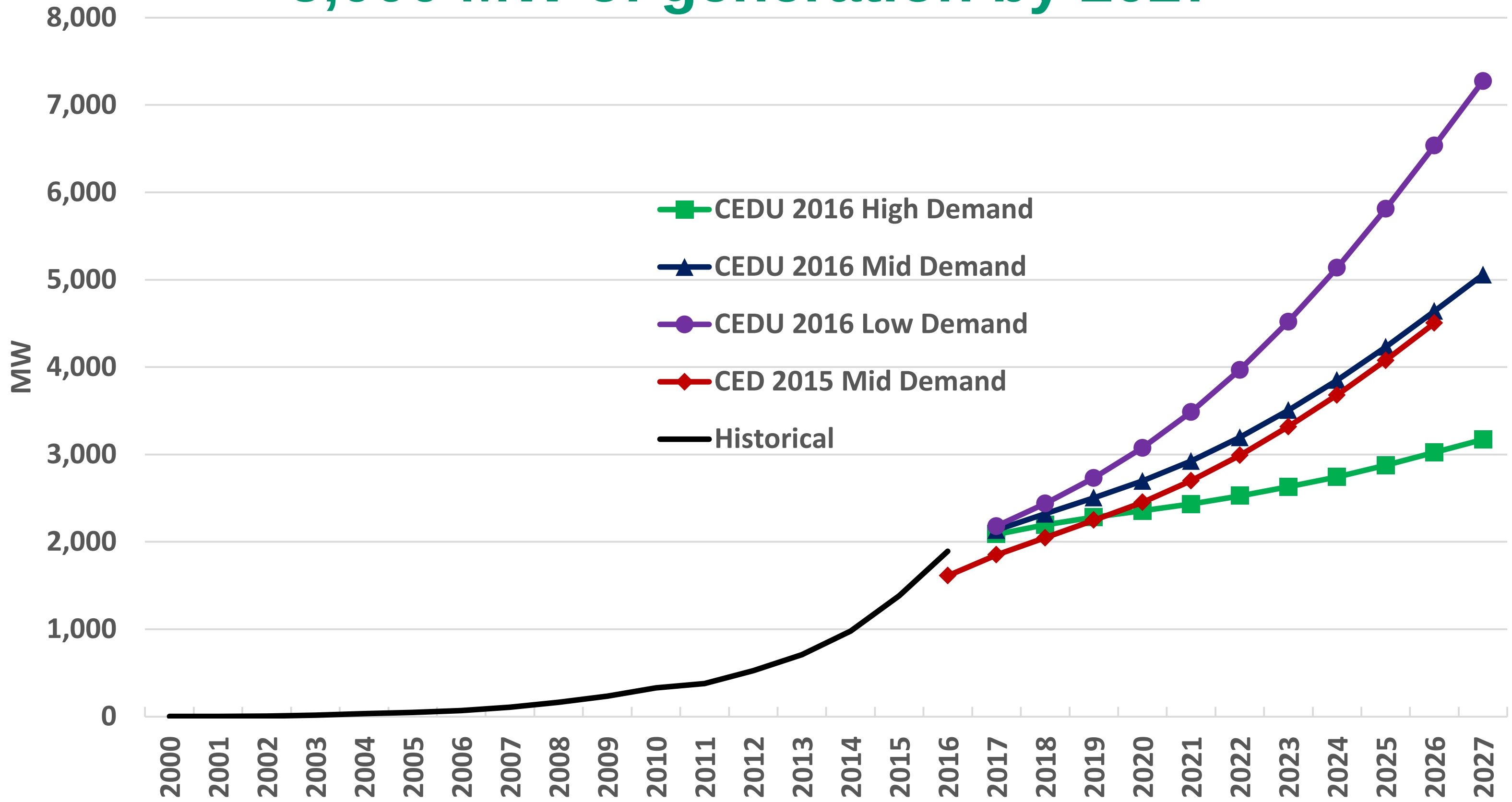
Managed Statewide Sales

Mid-Mid AAEE case 1% lower than CED 2015; ~25,000 GWh of AAEE impact



Statewide PV Generation

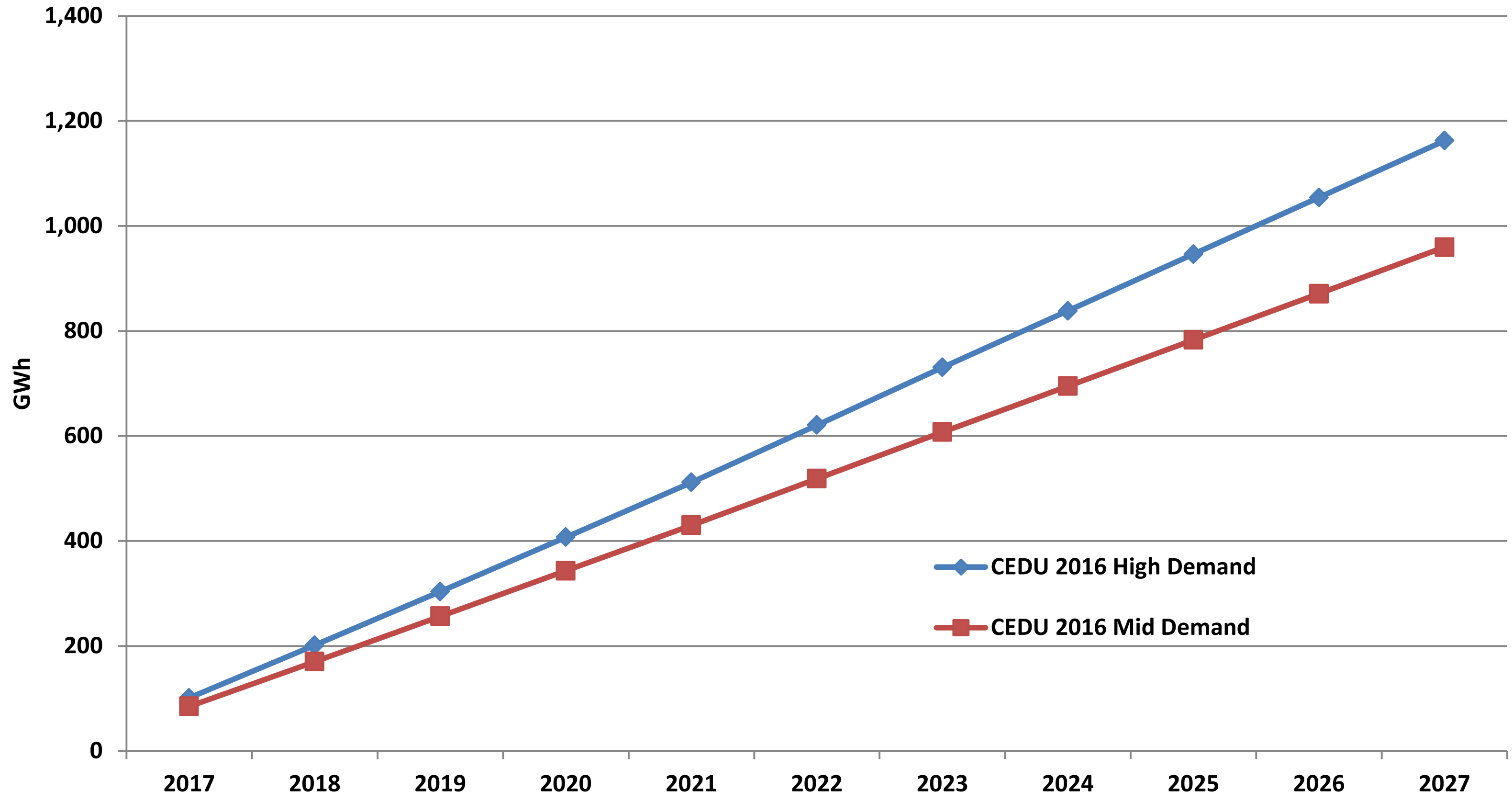
Updated for 2016 capacity; 5,000 MW of generation by 2027



California Energy Commission

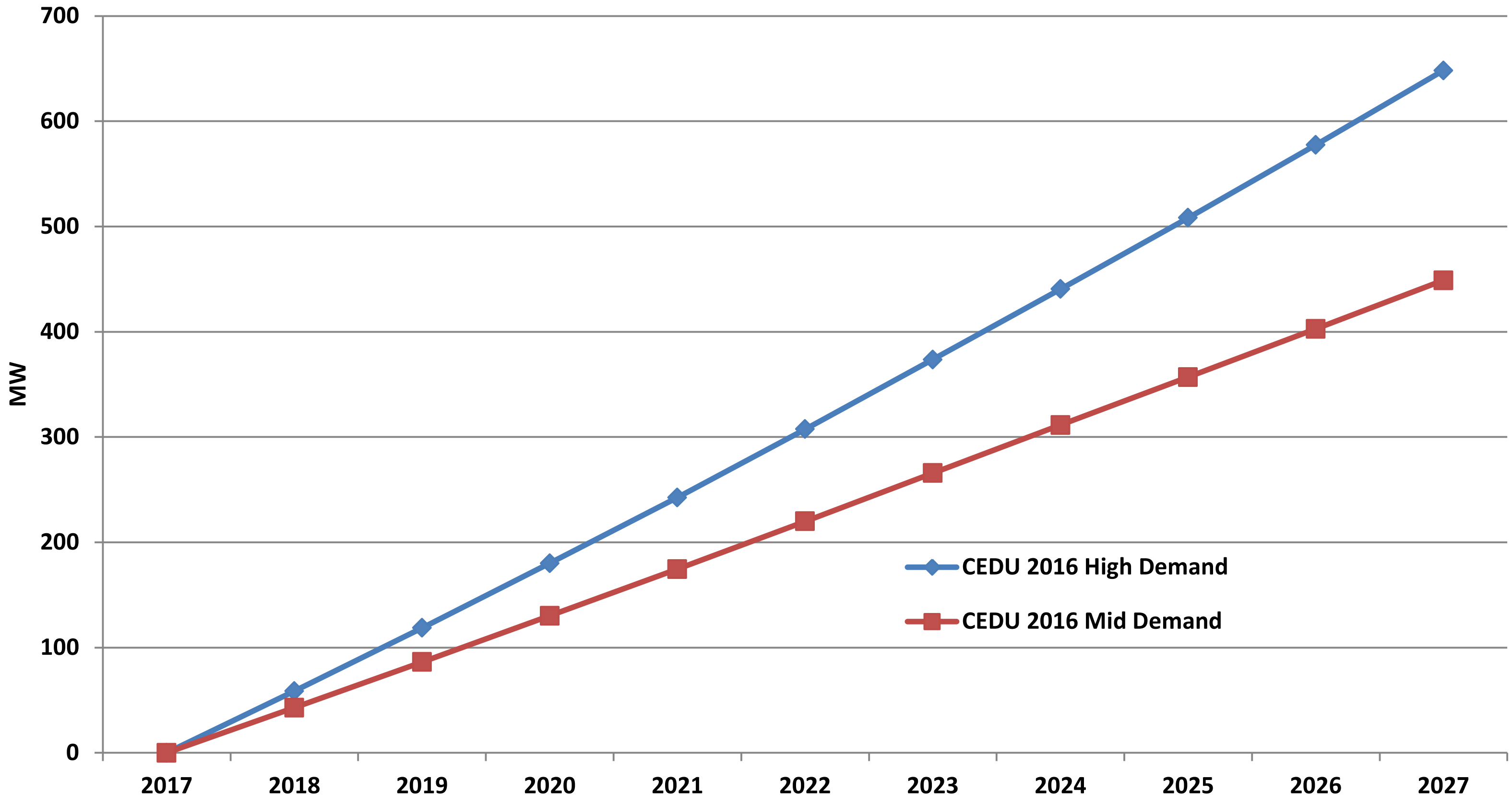
Climate Change Impacts: Electricity Consumption

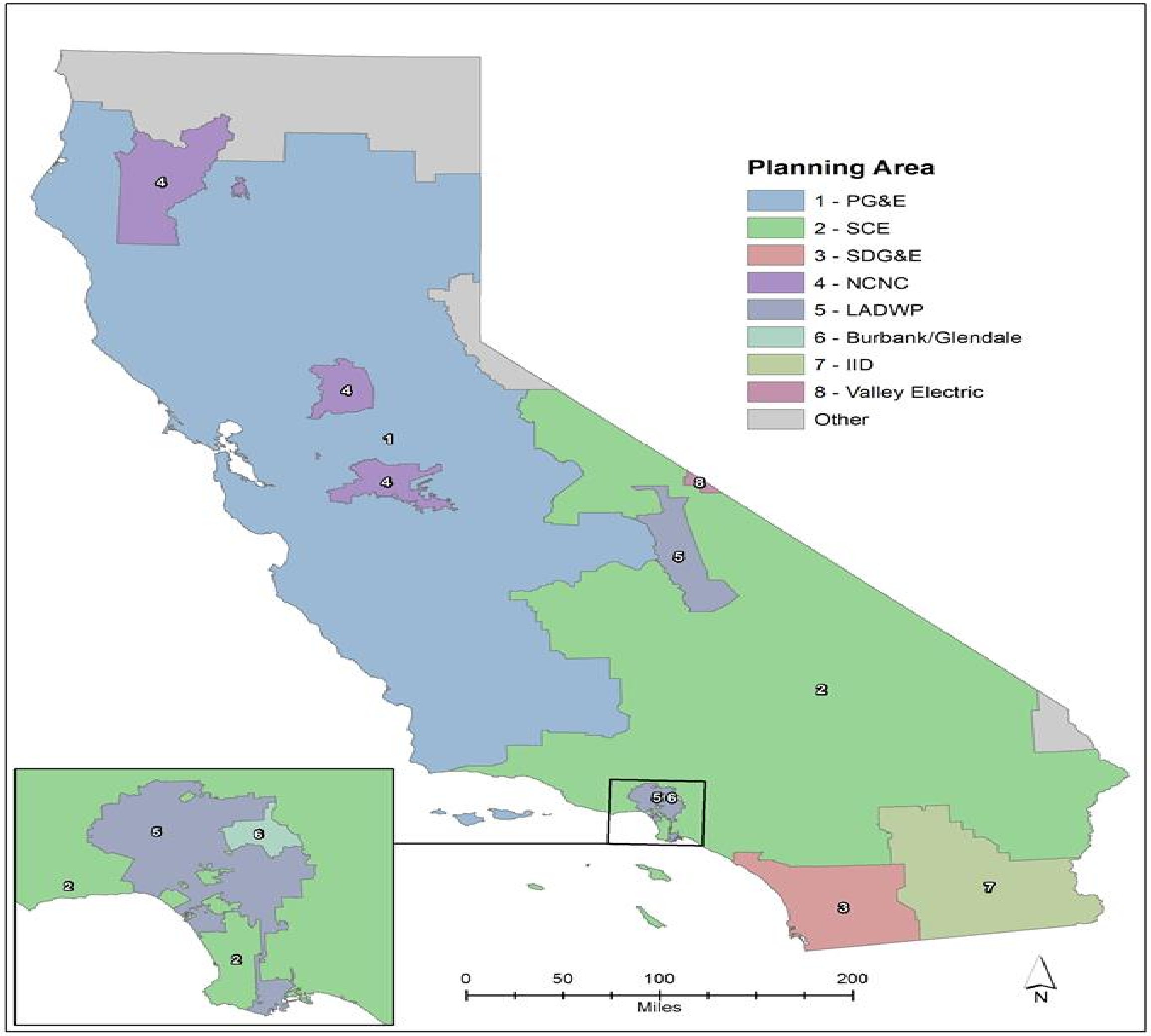
1,000 GWh impact in Mid Case by 2027



Climate Change Impacts: Peak

450 MW impact in Mid Case by 2027





Planning Areas

Planning Area Results

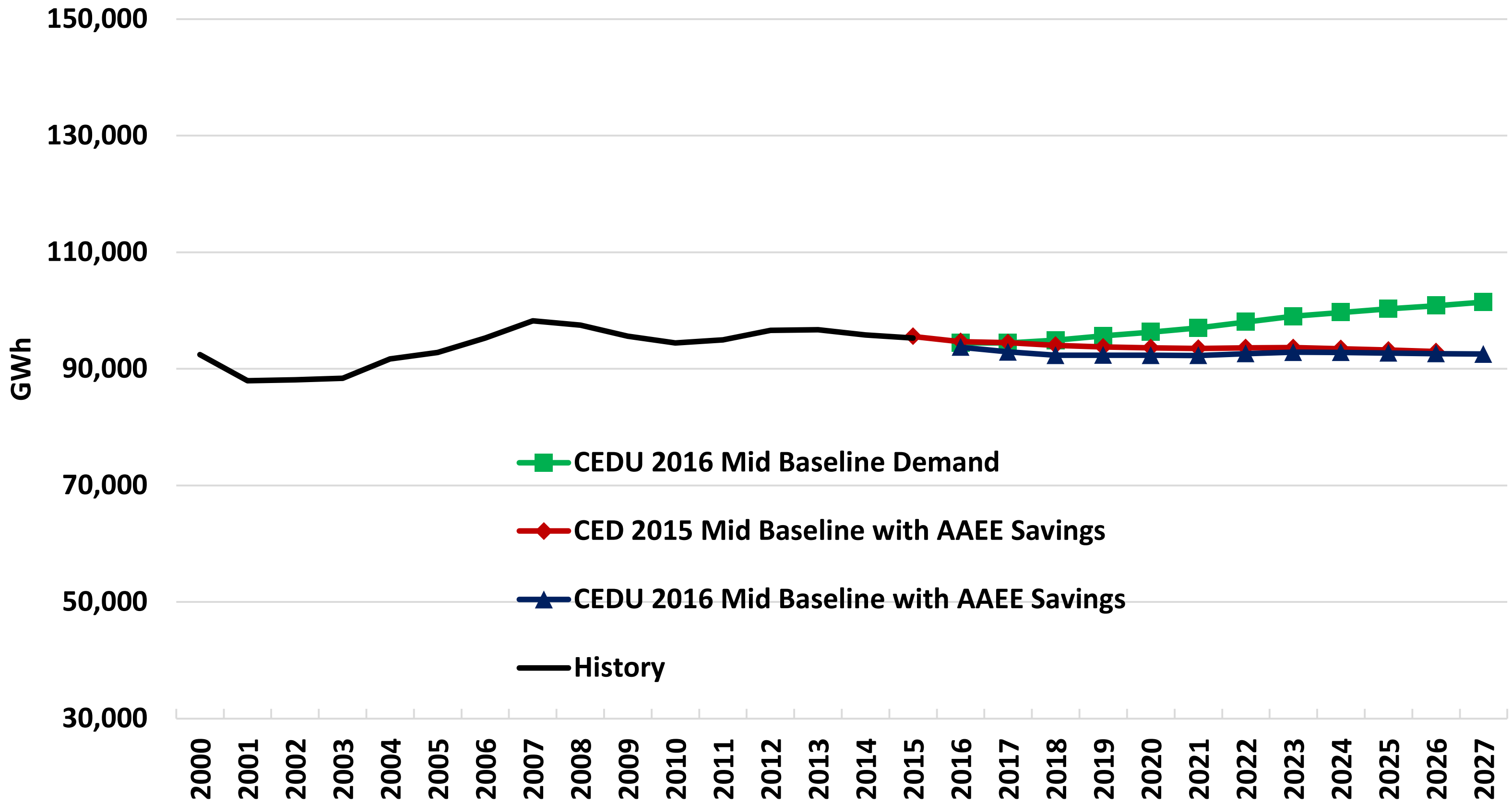
- PG&E
- SCE
- SDG&E
- NCNC (Northern California Non-CAISO)
- LADWP

Planning Area Economics/Demographics

- SCE and LADWP planning areas see modest decrease in population growth in comparison to the rest of the state
- More personal income growth in Central and Northern California regions
- Commercial employment generally reduced in all planning areas in comparison to the expectation in 2015
- Manufacturing output up in all planning areas expect for NCNC

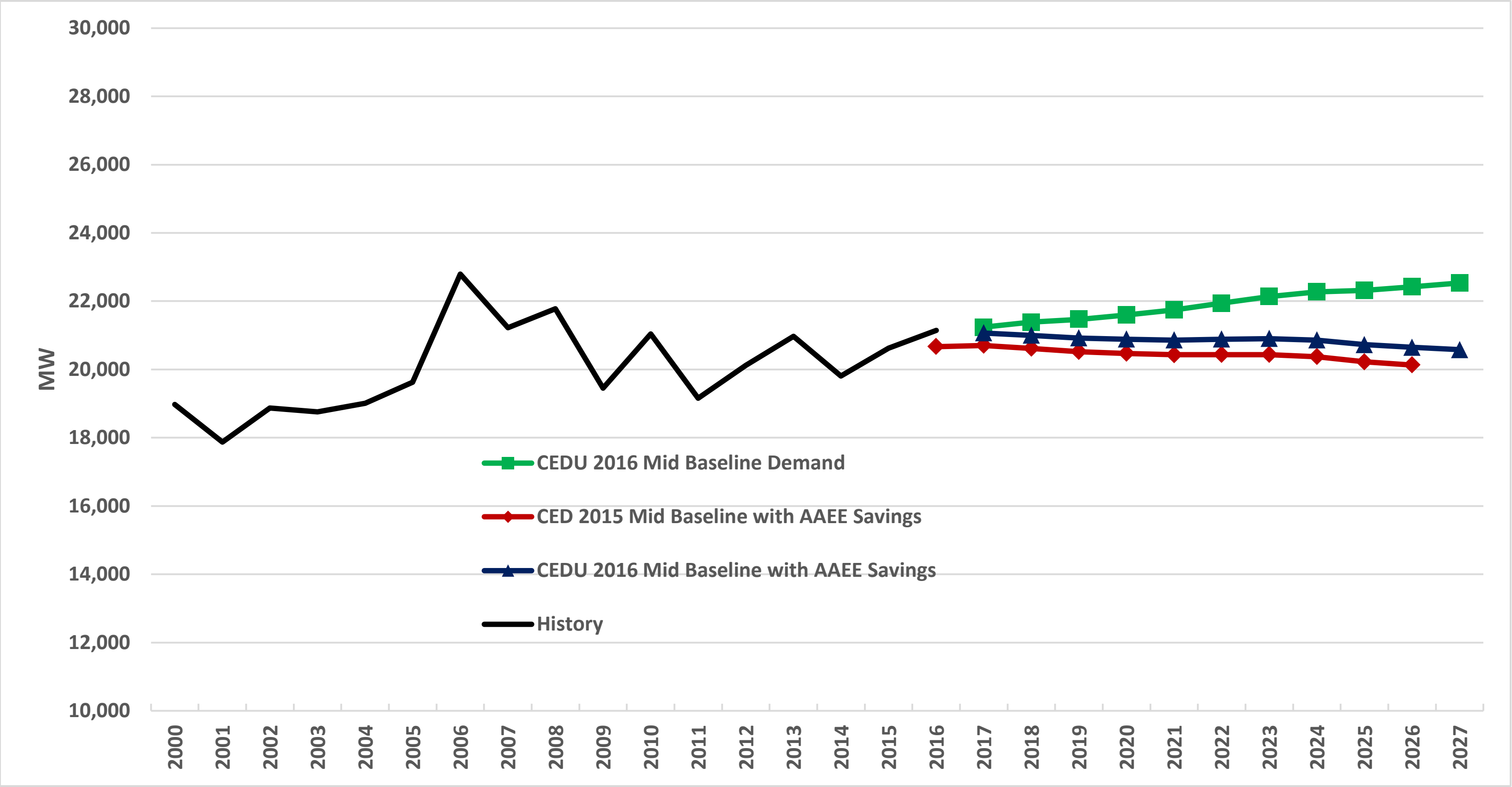
PG&E Planning Area Managed Sales

Mid case 0.3% lower than CED 2015



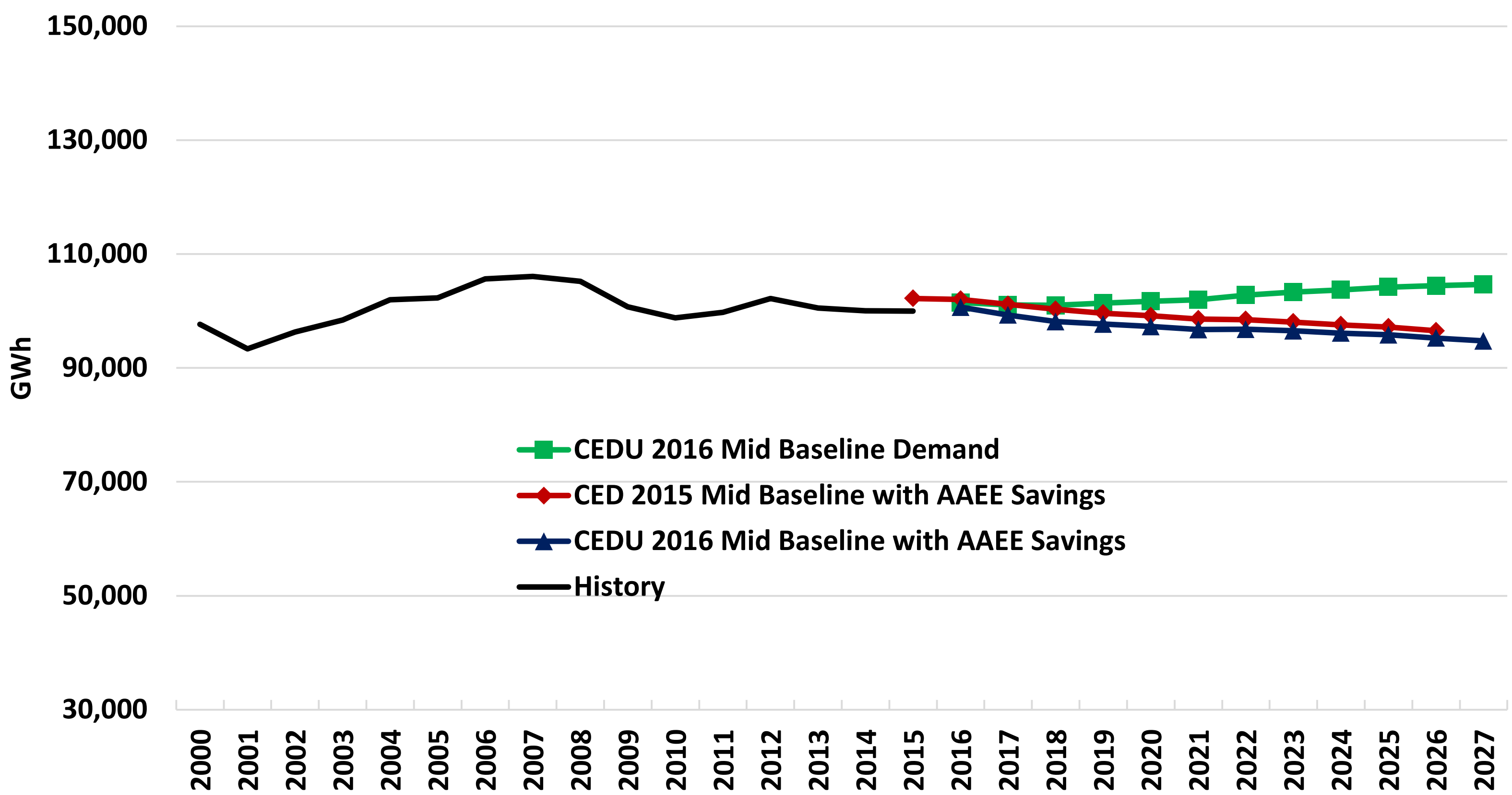
PG&E Planning Area Managed Peak

AAEE incremental to 2016; CEDU 2016 ~500 MW higher in 2026



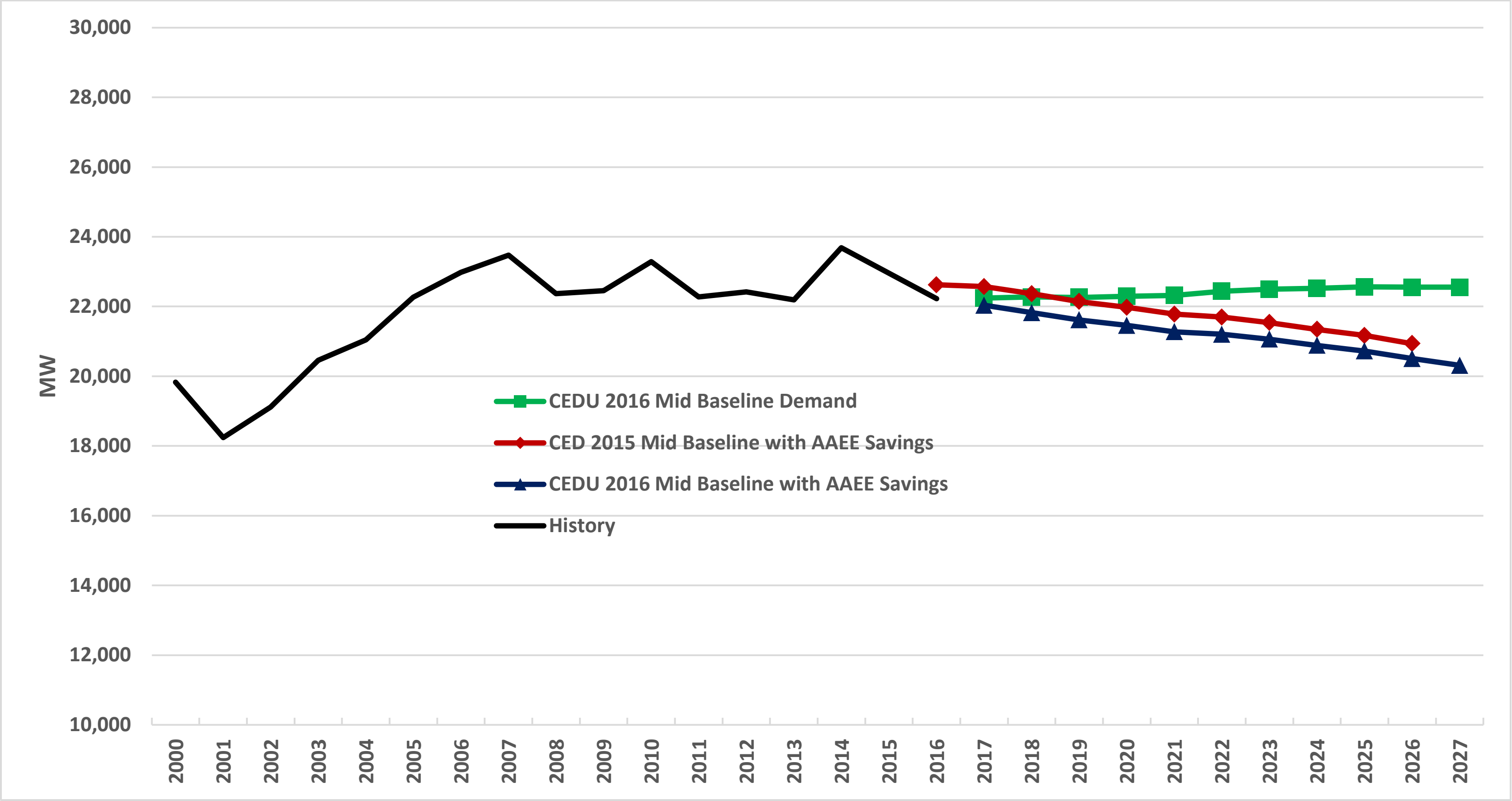
SCE Planning Area Managed Sales

Mid case CEDU 2016 is 1.3% lower than CED 2015



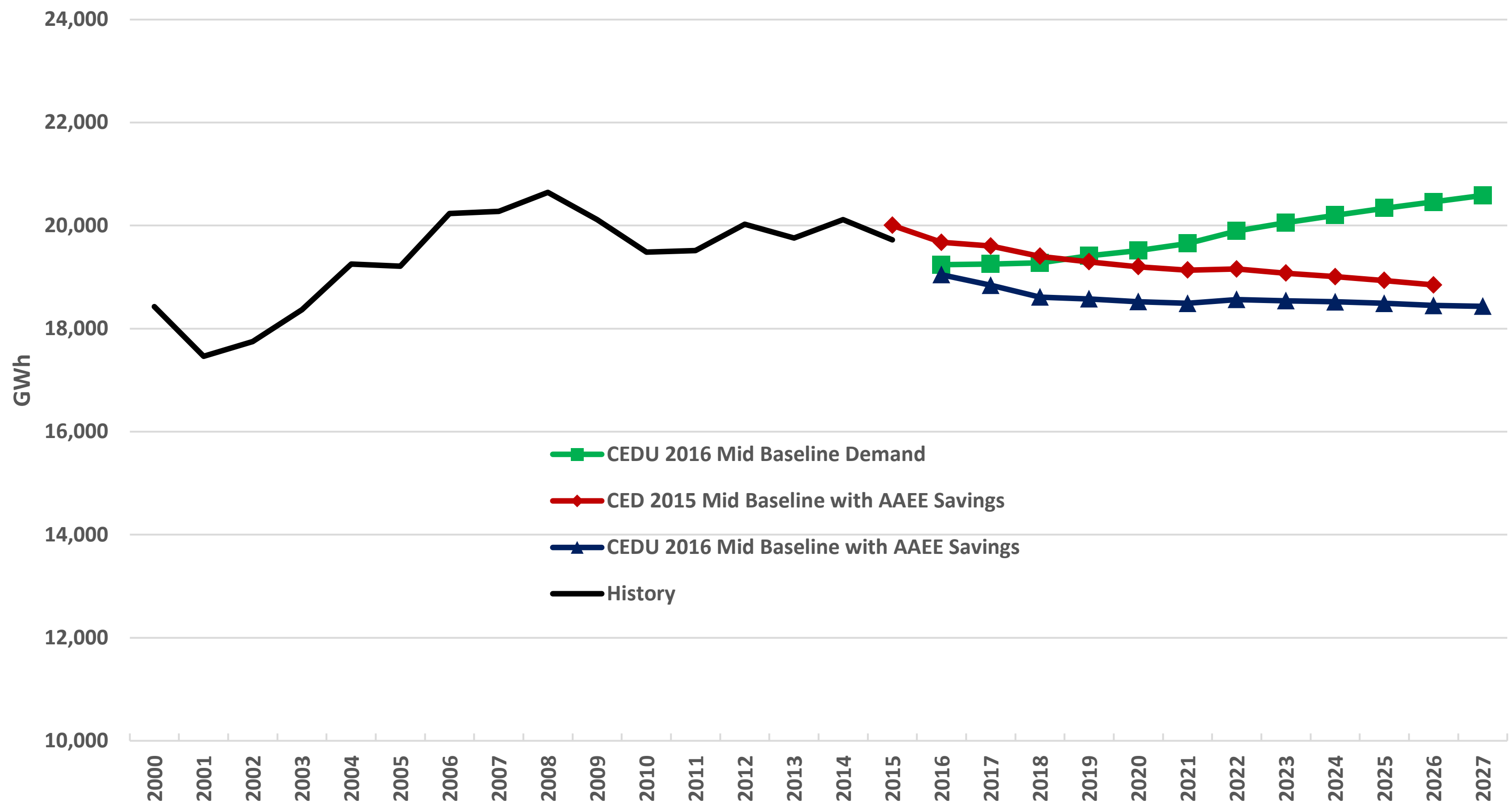
SCE Planning Area Managed Peak

Mid case 2% lower than CED 2015



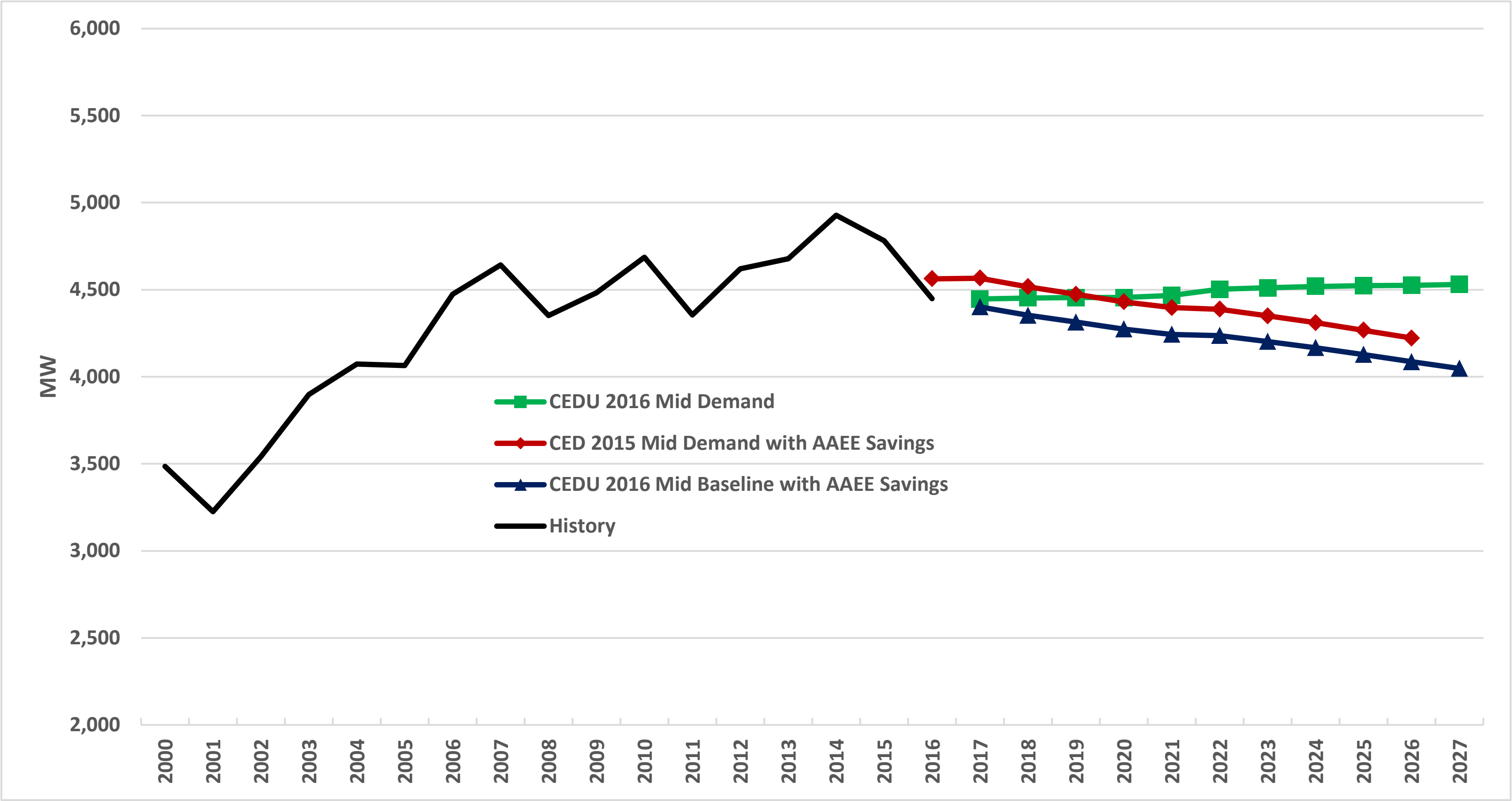
SDG&E Managed Sales

CEDU 2016 Mid case 2% lower vs. CED 2015



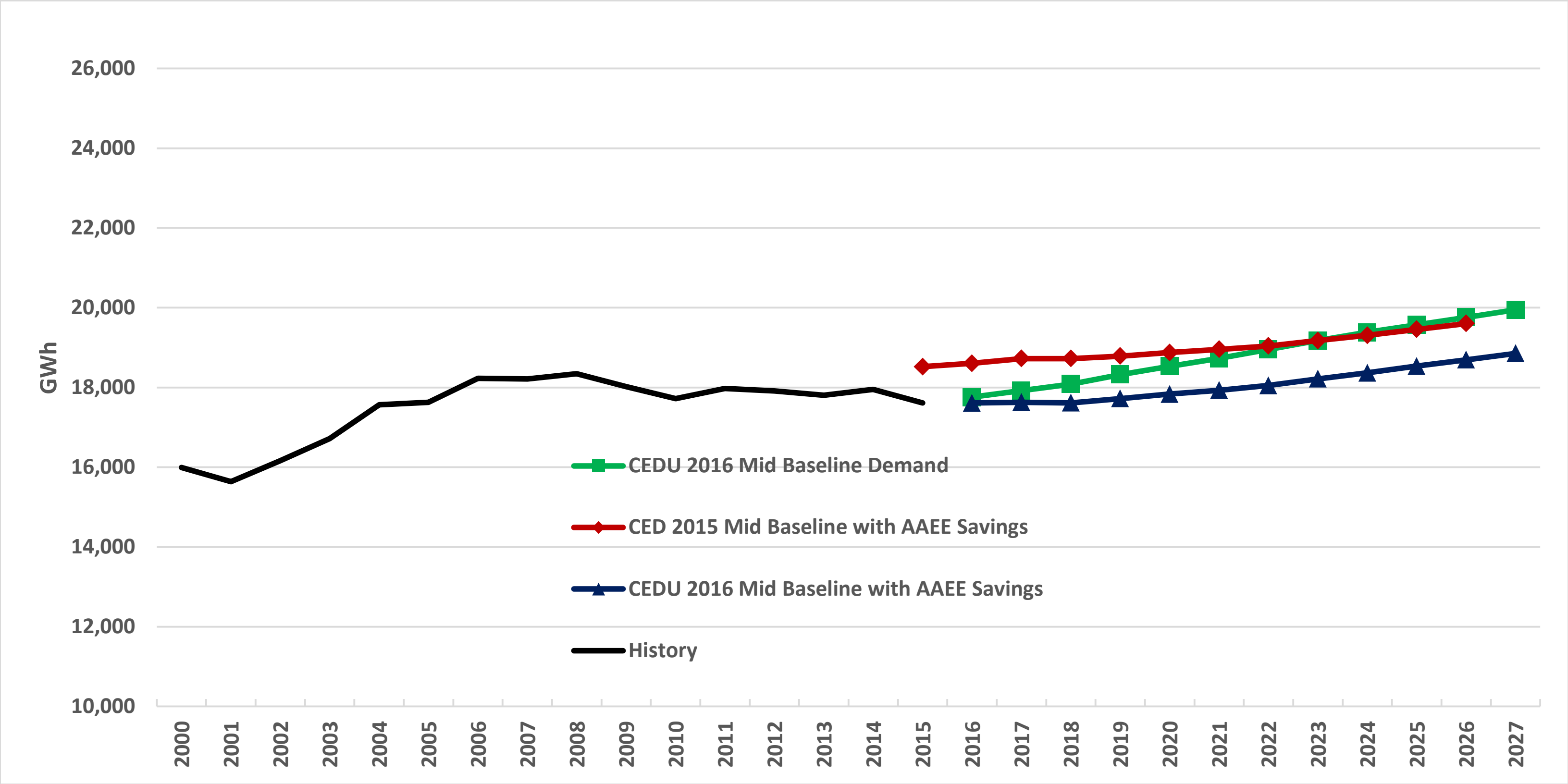
SDG&E Planning Area Managed Peak

Mid case 3% lower than CED 2015



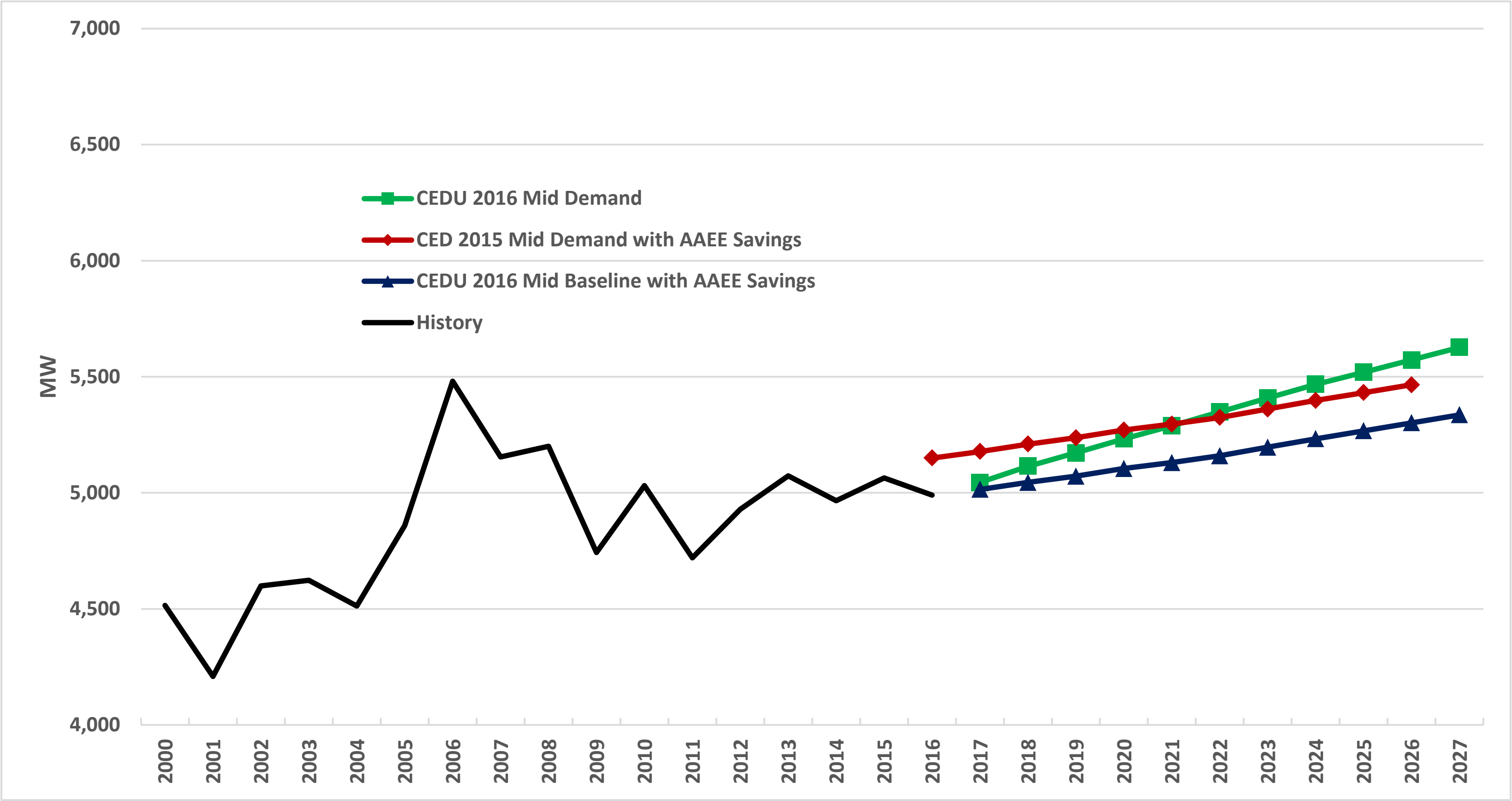
NCNC Planning Area Managed Sales

Mid case sales 4.6% lower than CED 2015



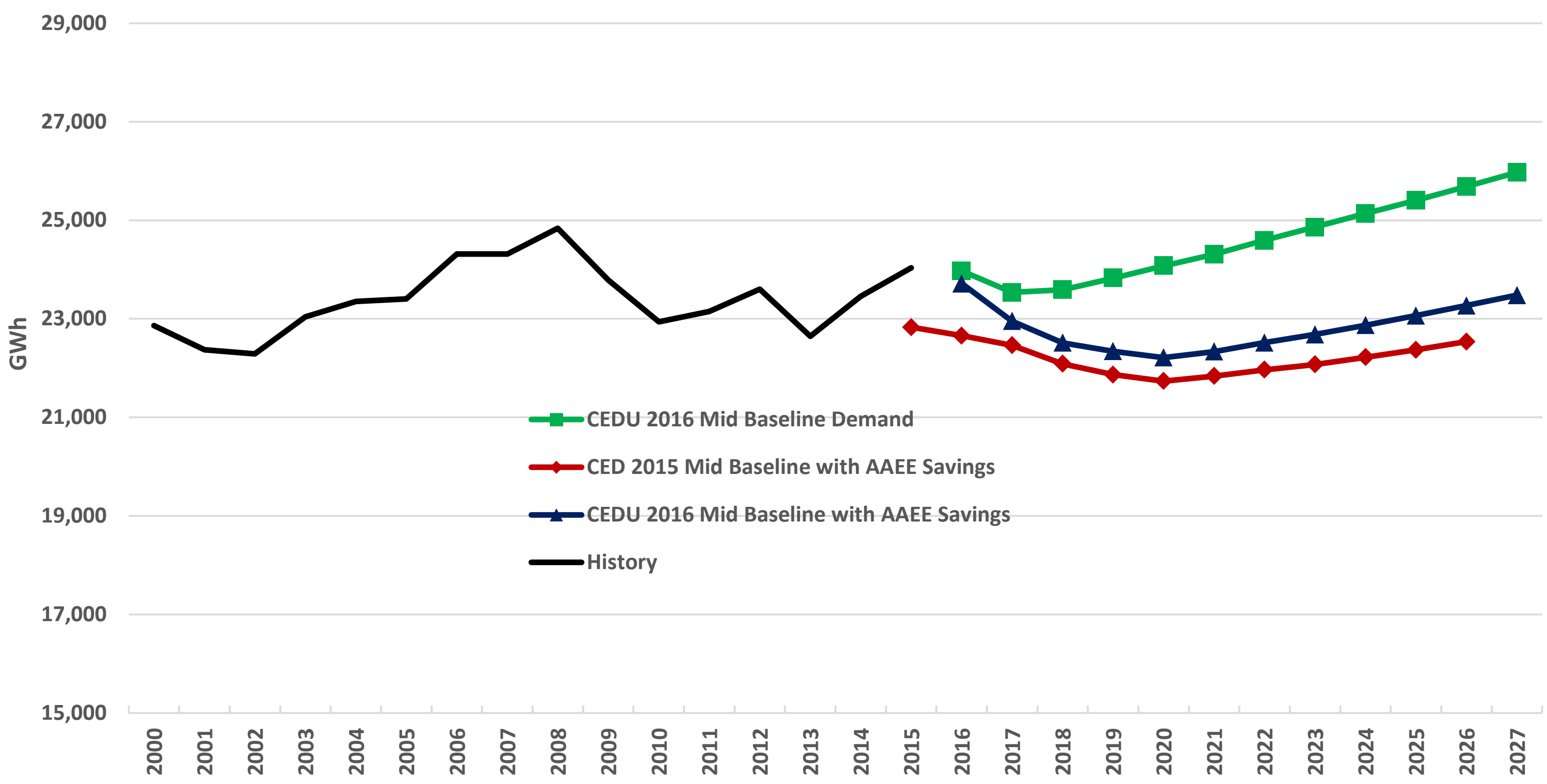
NCNC Planning Area Managed Peak

Mid case 3% lower than CED 2015



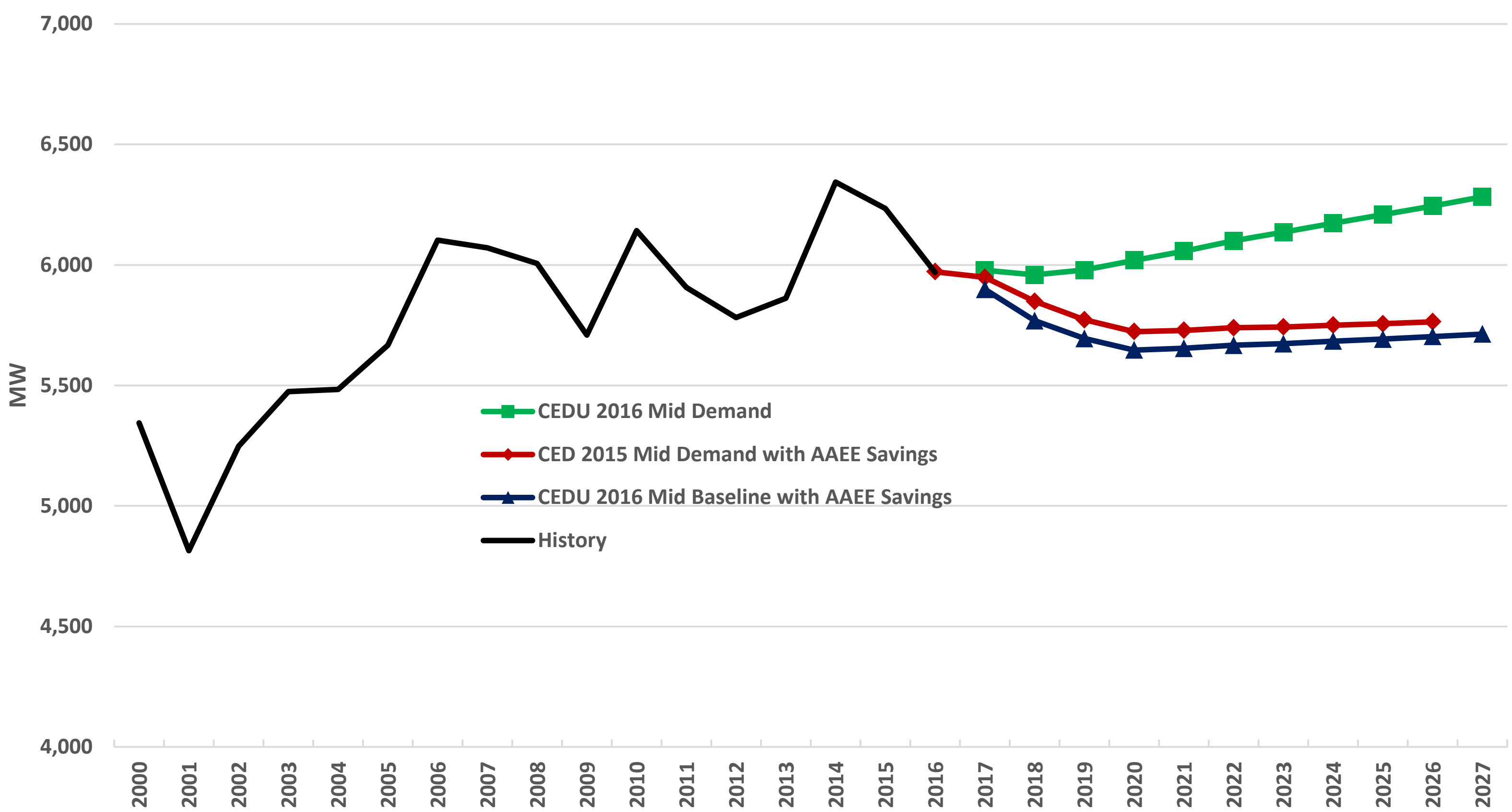
LADWP Planning Area Managed Sales

Mid case sales 3.3% higher than CED 2015



LADWP Planning Area Managed Peak

Mid case 1% lower than CED 2015



Next Steps

- Written comments from stakeholders due by Monday, December 19th
- Incorporate these comments as appropriate
- Forecast adopted January 2017