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Docket Number:	17-IEPR-03
Project Title:	Electricity and Natural Gas Demand Forecast
TN #:	220503
Document Title:	California Energy Demand 2018-2028 Preliminary Electricity and Natural Gas Baseline Forecast
Description:	8.3.17: Presentation by Chris Kavalec of CEC
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/2/2017 8:37:09 AM
Docketed Date:	8/2/2017

California Energy Demand 2018-2028 Preliminary Electricity and Natural Gas Baseline Forecast

August 3, 2017

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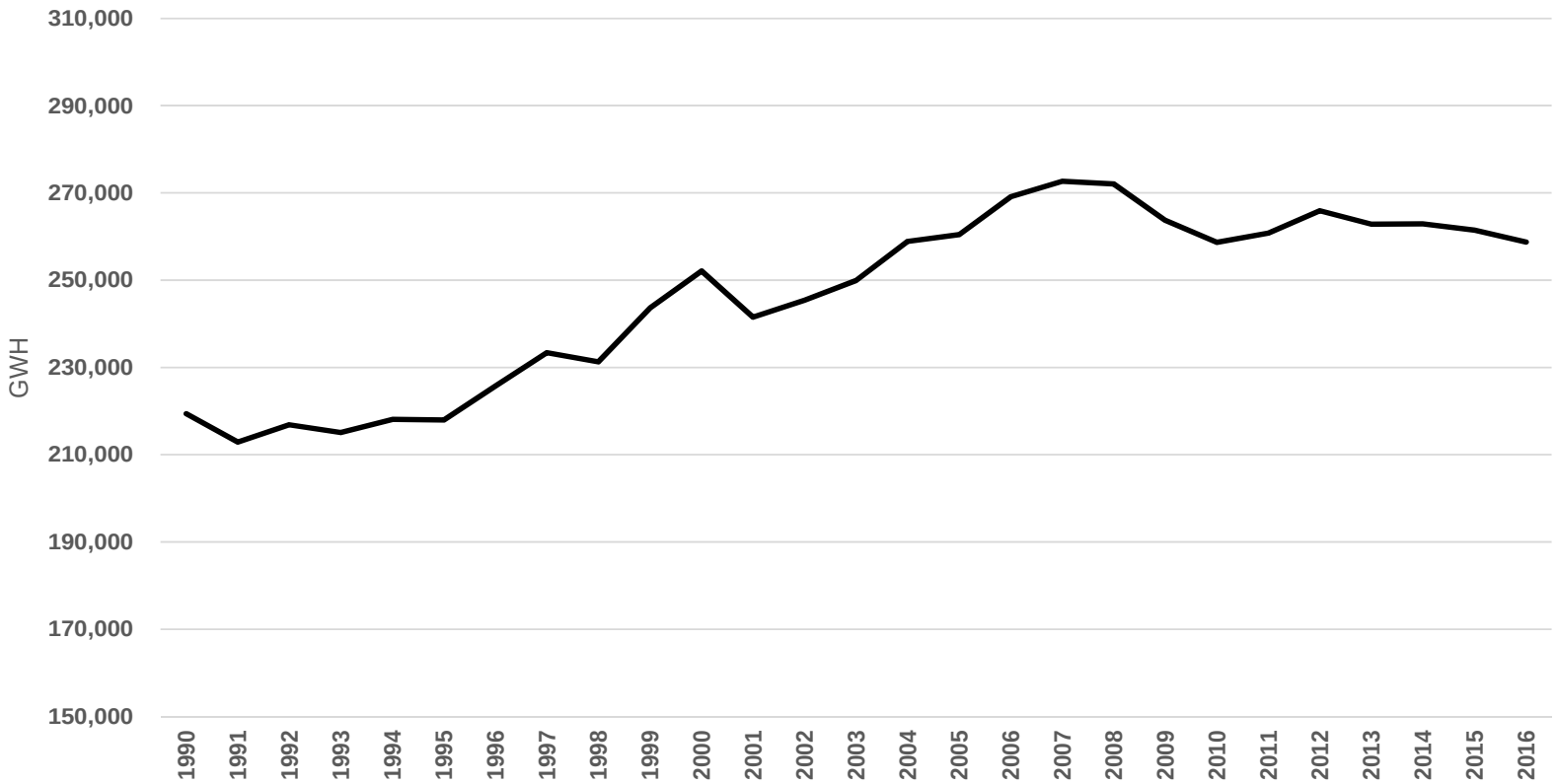
Presentation Summary

- Recent Trends: Statewide Sales
- Methods and Inputs
- Summary of Statewide Results
- Next Steps/Revised Forecast

Recent Trends: Statewide Sales

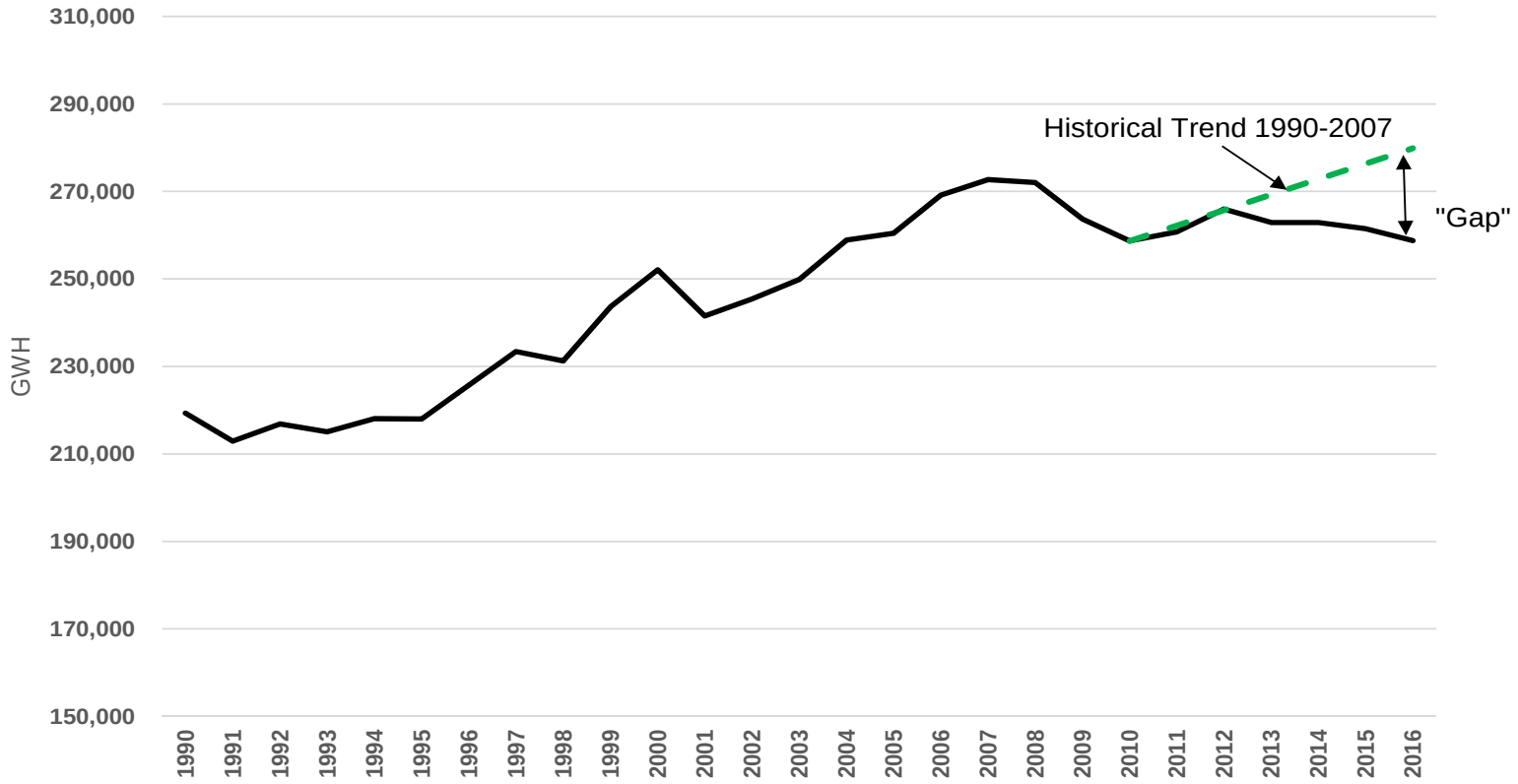
Statewide Historical Electricity Sales

Flat or Declining Since 2012



Statewide Historical Electricity Sales

2012-2016 versus historical trend



What Explains Sales "Gap"?

- Self-generation, particularly behind-the-meter solar photovoltaic
  - Residential PV "boom" begins in 2012
- Intensified energy efficiency efforts and market transformation
- Rate increases 2012-2016
- Lower population growth

California Energy Demand 2018-2018 Preliminary Baseline Forecast (*CED 2017 Preliminary*): Methods and Inputs

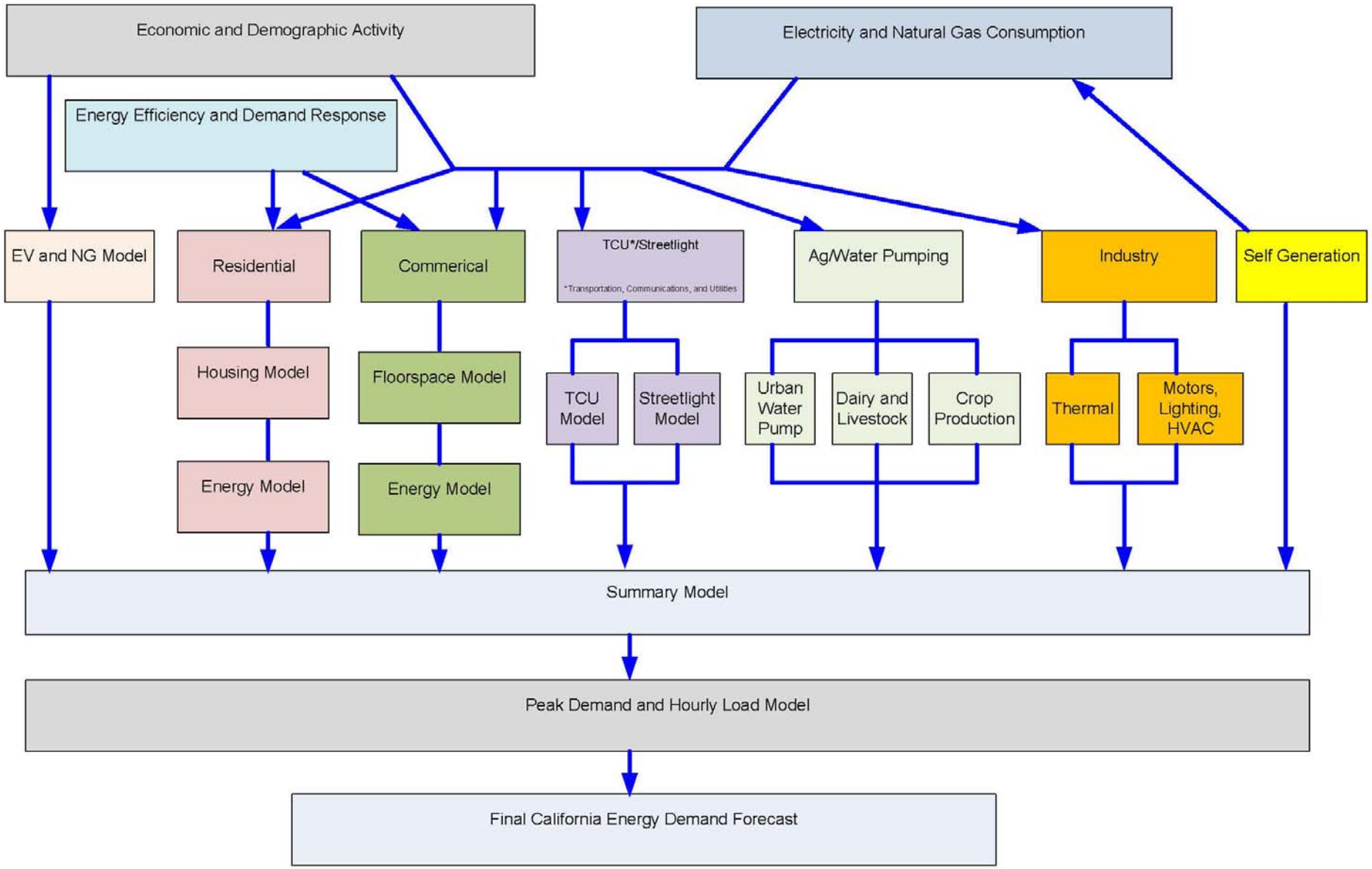
Electricity Planning Areas

- Pacific Gas and Electric (PG&E)
- Southern California Edison (SCE)
- San Diego Gas & Electric (SDG&E)
- Northern California Non-California ISO (NCNC)
- Los Angeles Department of Water and Power (LADWP)
- Imperial Irrigation District (IID)
- Burbank/Glendale (BUGL)
- Valley Electric Association (VEA)

Natural Gas Planning Areas

- Pacific Gas and Electric Company (PG&E)
- Southern California Gas Company (SoCal Gas)
- San Diego Gas & Electric (SDG&E)
- Other

California Energy Demand Model System



G:\ANDREA\Data Collection 2014 BCP\Training\California Energy Demand Model System.pdf

Three Baseline Demand Cases

- High Demand Case: Higher economic and demographic growth, higher climate change impacts, EV high case, lower electricity rates, less self-generation
- Low Demand Case: Lower economic and demographic growth, no climate change impacts, EV low case, higher electricity rates, more self-generation
- Mid Demand Case: Assumptions in between the high and low demand cases

Economic Assumptions

- High Demand Case: Moody's *Custom High* Scenario
- Mid Demand Case: Moody's *Baseline* Scenario
- Low Demand Case: Moody's *Lower Long-Term Growth* Scenario
- Overall, little difference in drivers for mid case vs. *CEDU 2016* mid

Comparison of Economic Assumptions by Demand Case

Average Annual % Growth, 2015-2027

Variable	High	Mid	Low	CEDU 2016 Mid
Personal Income	3.12	2.82	2.59	2.92
Commercial Employment	1.23	1.13	1.04	1.14
Manufacturing Output	3.29	3.00	2.72	2.69
Population	0.82	0.82	0.82	0.87
Households	1.31	1.00	1.00	1.11

Energy Efficiency

- *CED 2017 Preliminary* incorporates 2016-2017 utility program savings (IOU and POU)
- *CED 2017 Preliminary* incorporates 2016 Title 24 building standards updates
- Additional achievable energy efficiency (AAEE) under development (IOU and POU)
- Efficiency savings beyond AAEE being developed by Efficiency Division in support of SB 350

Key Assumptions/Inputs Discussed in Upcoming Presentations

- Electricity Rates
- Light-duty electric vehicles
- Self-generation

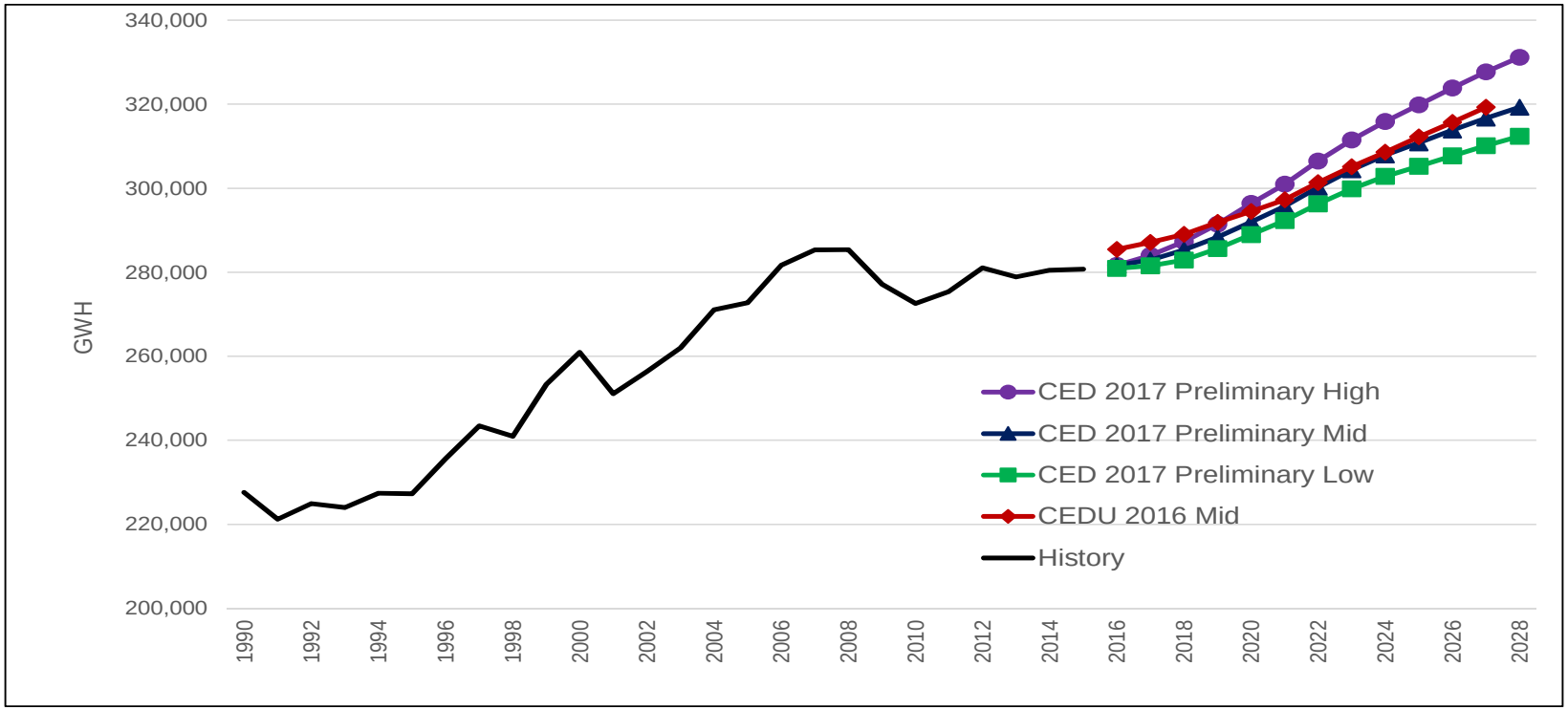
Other Assumptions/Inputs

- Impact of climate change
- Other transportation electrification, including and high-speed rail
- Load-modifying demand response
- Natural gas rates

CED 2017 Preliminary: Summary of Statewide Results

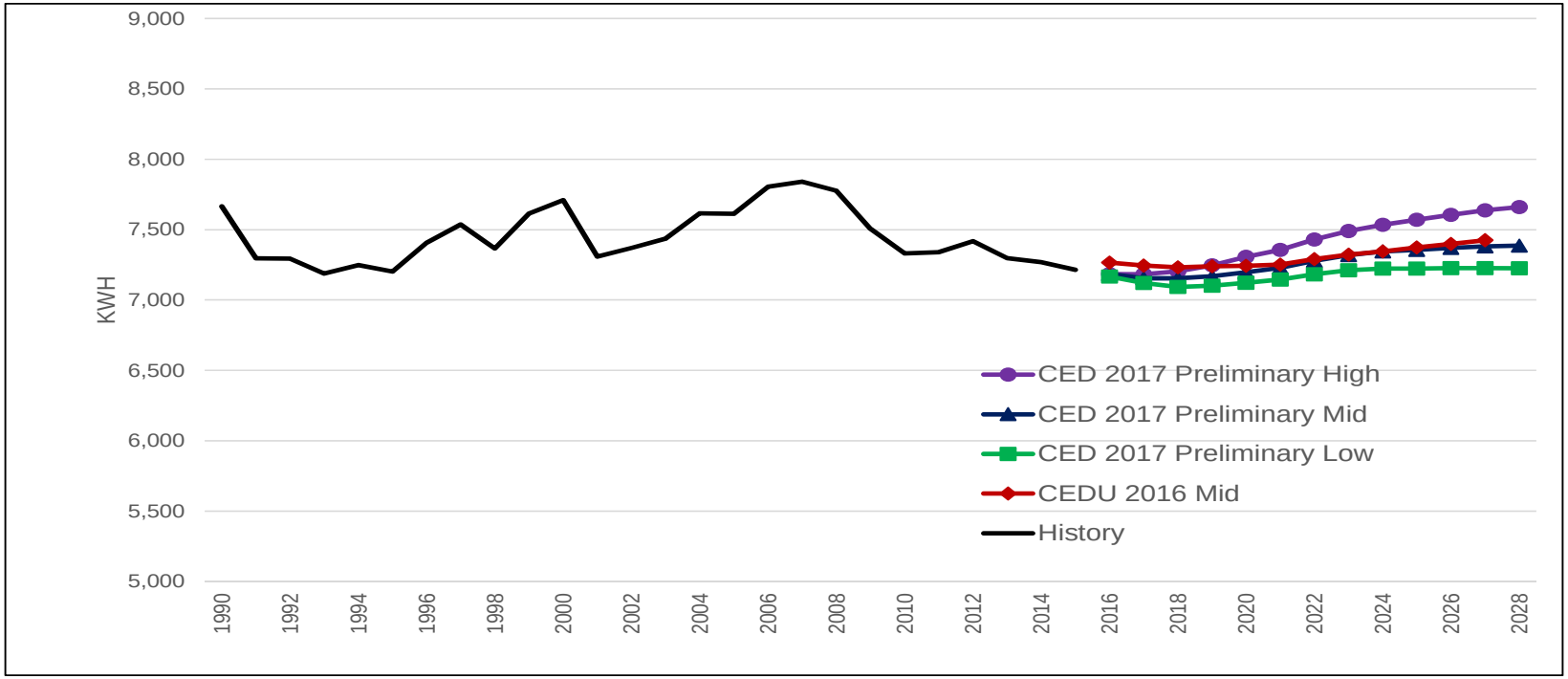
Statewide Baseline Electricity Consumption

CED 2017 Preliminary mid case around 2,500 GWh lower than *CEDU 2016* in 2027



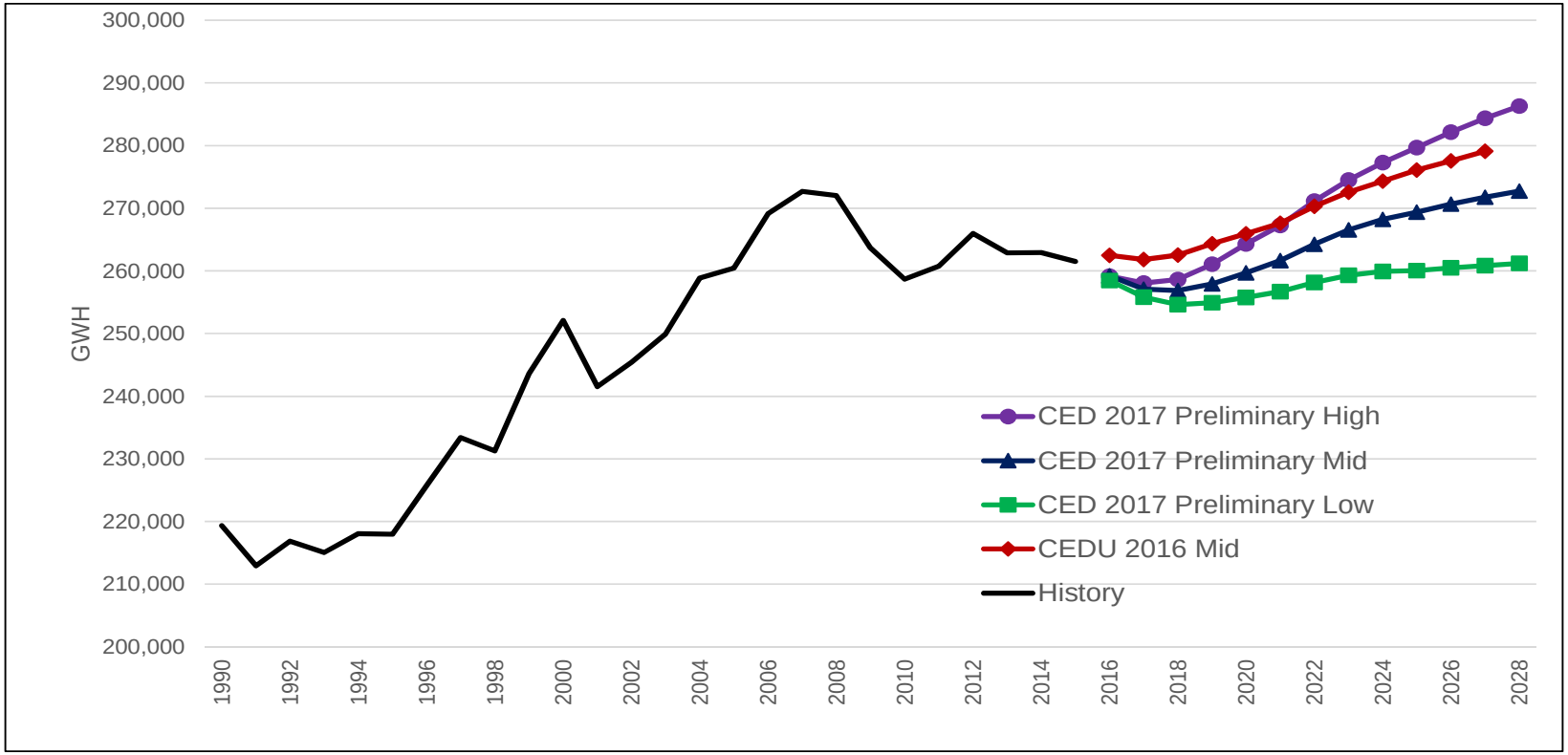
Statewide Baseline Electricity Consumption per Capita

Begins to increase later in the forecast period because of EVs and decaying program savings



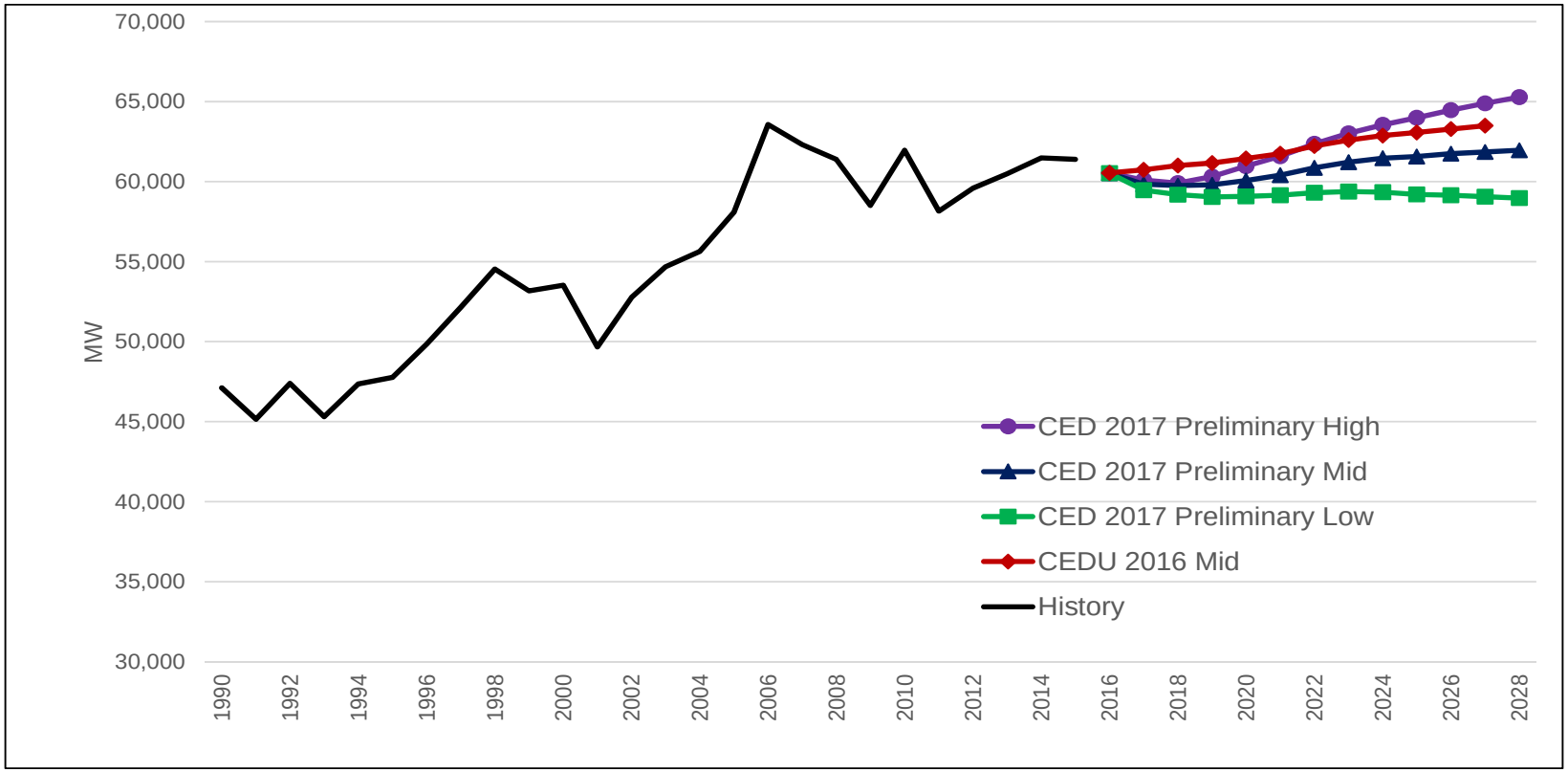
Statewide Baseline Electricity Sales

Increase in self-generation keeps *CED 2017 Preliminary* mid case well below *CEDU 2016* mid



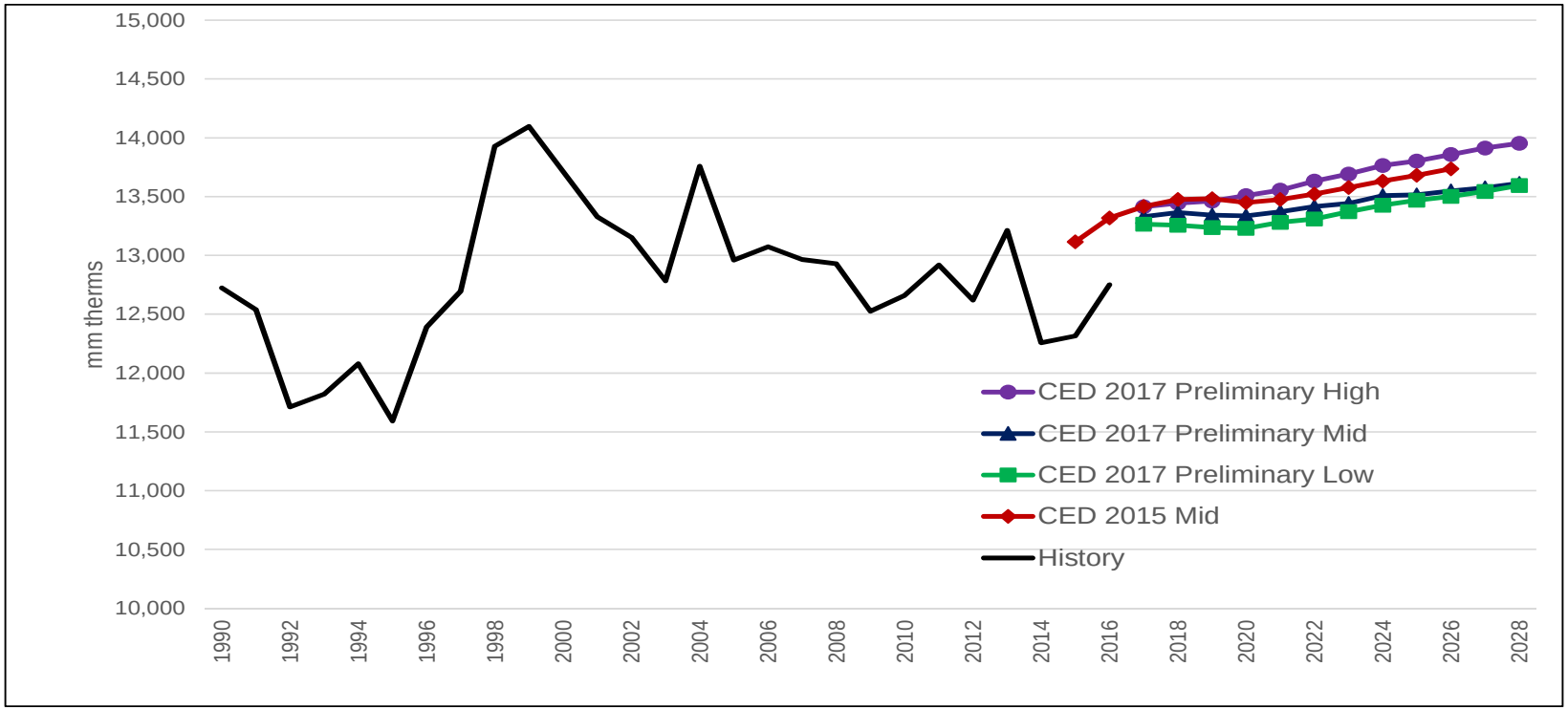
Statewide Baseline Noncoincident Peak

CED 2017 Preliminary mid case around 1,600 MW lower than *CEDU 2016* by 2027



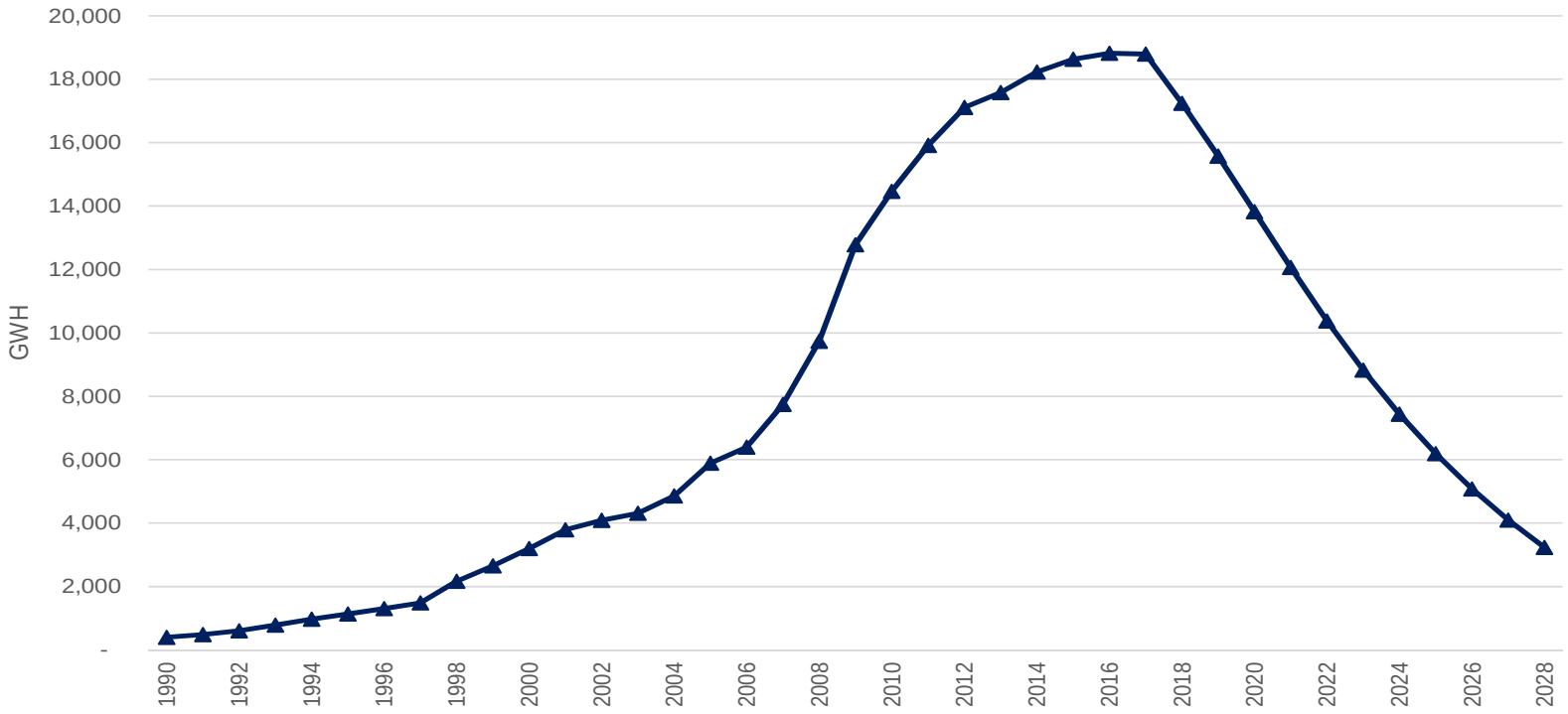
Statewide Baseline End-User Natural Gas Demand

Transition from actual historical to "normal" weather creates significant jump in 2017



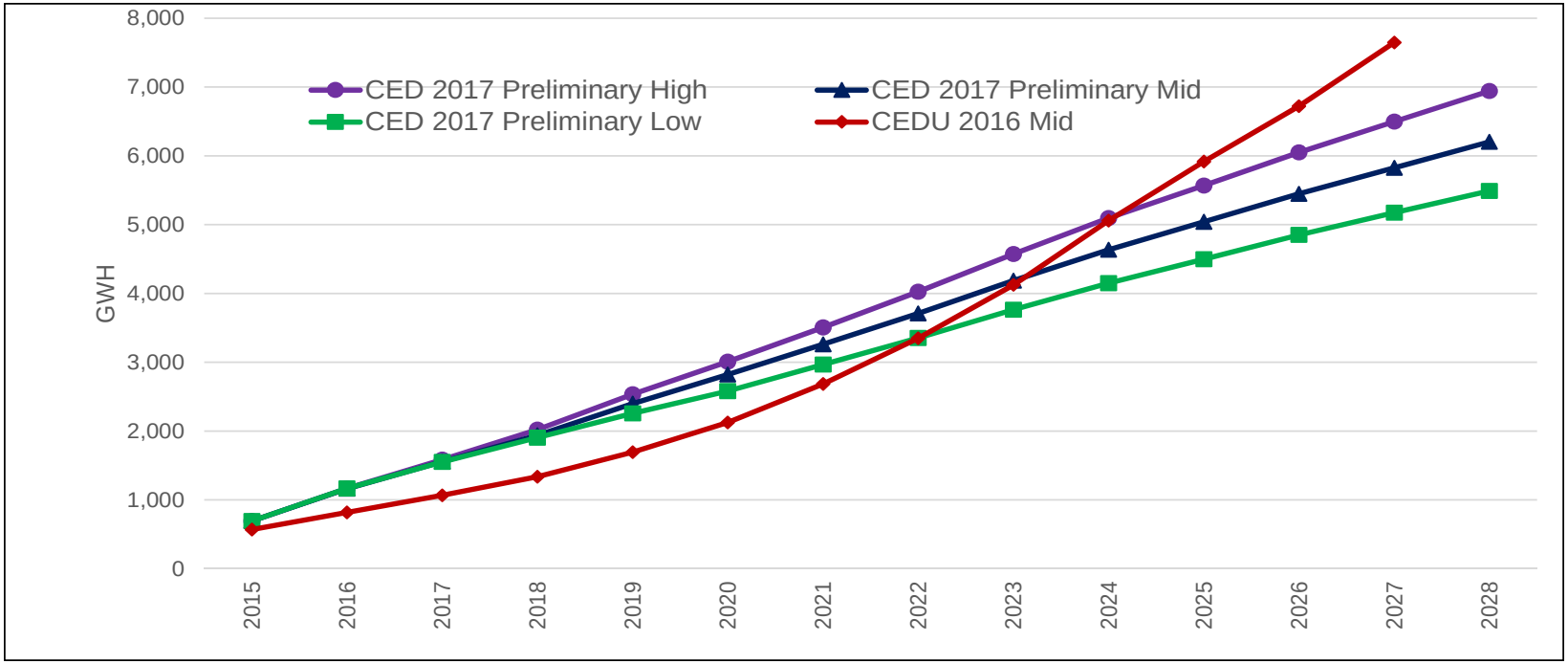
Statewide Baseline Committed Efficiency Program Savings

Reaches almost 19,000 GWH in 2017 (6.5% reduction in consumption)



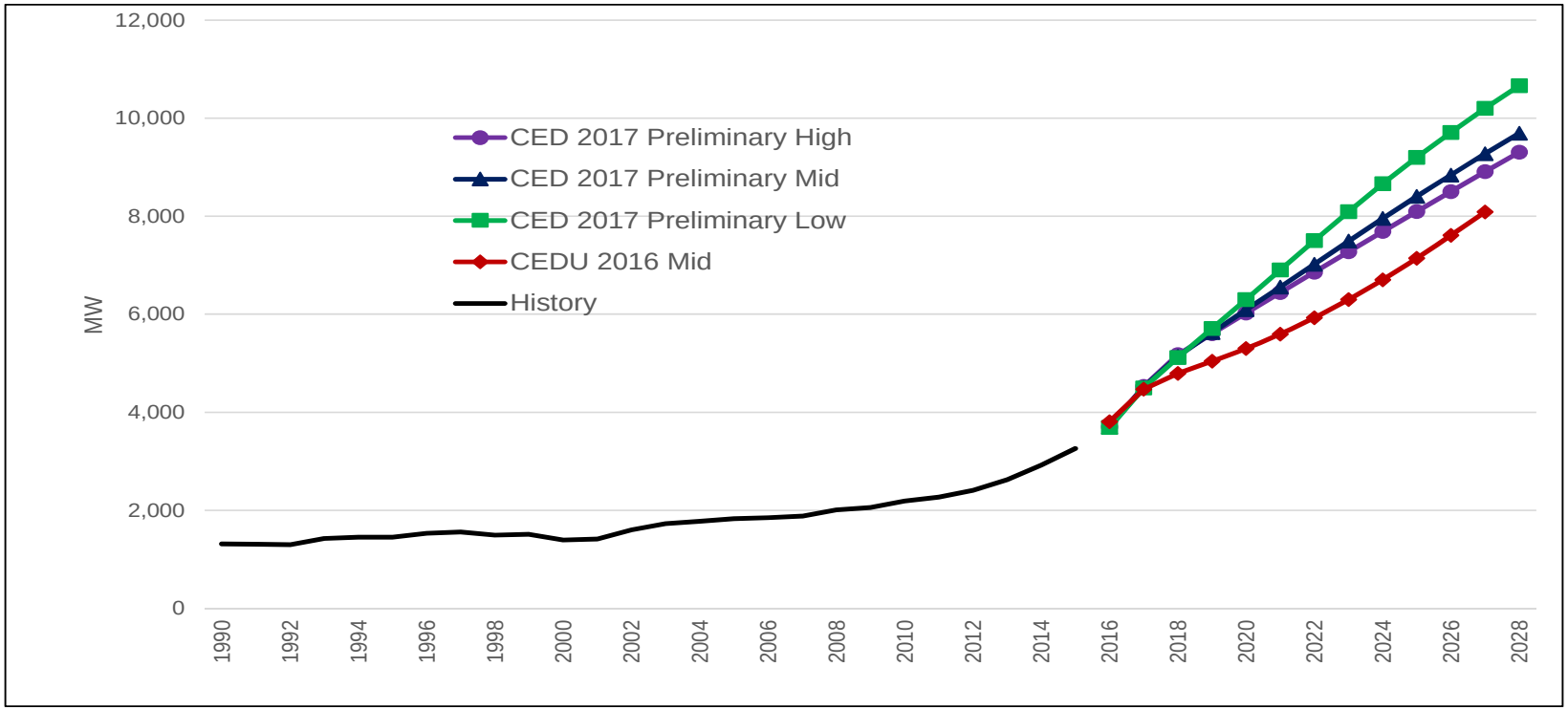
Statewide Light-Duty Electric Vehicle Consumption

Around 1.7 million vehicles on the road in the *CED 2017 Preliminary* mid case in 2028



Statewide Self-Generation Peak Impacts

CED 2017 Preliminary mid case around 1,200 MW higher than *CEDU 2016* in 2027



Next Steps/Revised Forecast

Efficiency and Self-Generation

- With CPUC, develop AAEE estimates for IOUs, including 8760 load impacts for hourly load forecasting model
- Develop AAEE estimates for as many POUs as possible
- If feasible, incorporate other efficiency savings provided by the Efficiency Division
- Develop "uncommitted" PV impacts attributable to 2019 T24/ZNE

Light-Duty Electric Vehicles

- DAWG meeting and other discussions dedicated to EV forecast methodologies and scenario development
- Involve JASC, including CARB, in establishing final EV scenarios
- Refine and improve EV usage estimates
- Complete work on EV charging profiles for incorporation into hourly load forecasting model

Hourly Load Forecasting Model

- Complete 2017 version of model to project 8760 consumption loads for PG&E, SCE, and SDG&E TAC areas
- Incorporate hourly impacts of AAEE, EVs, PV, and residential time-of-use pricing for "net consumption" 8760 loads
- Account for "peak shift" in developing projected IOU annual peaks for revised forecast

Comments/Questions?