DOCKETED	
Docket Number:	26-IEPR-03
Project Title:	Electricity and Gas Demand Forecast
TN #:	273465
Document Title:	Presentation - AAFS Scenario Draft Results
Description:	4a Ethan Cooper, CEC
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	11/9/2026 4:18:49 PM
Docketed Date:	11/9/2026



2026 IEPR Additional Achievable Energy Efficiency and Fuel Substitution Load Modifiers

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November 12, 2026

Abbreviations

AAEE – Additional Achievable Energy Efficiency
AAFS – Additional Achievable Fuel Substitution
AQMD – Air Quality Management District
C – Cooking
CARB – California Air Resources Board
CAISO – California Independent System Operator
CD – Clothes Drying
CEC – California Energy Commission
Com – Commercial
DOE – Department of Energy
EB – Existing Buildings
EE – Energy Efficiency
FS – Fuel Substitution
FSSAT – Fuel Substitution Scenario Analysis Tool
GT – Gradual Transformation
IEPR – Integrated Energy Policy Report
NC – New Construction
PAR – Proposed Amended Rule
PG&E – Pacific Gas and Electric
PiCS – Programs and incremental Codes and Standards
Res – Residential
ROB – Replace on burnout
RP – Residential Propane
SCE – Southern California Edison
SDG&E – San Diego Gas and Electric
SH – Space Heating
SIP – State Implementation Plan
SP – Scoping Plan
T24 – Title 24 California Building Standards Code
WB – Workbooks
WH – Water Heating
ZE – Zero-emission

2026 IEPR Modeling Updates

What Are AAEE & AAFS Load Modifiers?

Additional Achievable EE savings and FS impacts capture a range of incremental market potential impacts beyond what is included in the baseline demand forecast, but they are within the range of what is reasonably expected to occur

Label	Description
PiCS AAEE	AAEE savings from PiCS. Modeled using PiCS tool and workbooks.
PiCS AAFS	AAFS impacts from PiCS. Modeled using PiCS tool and workbooks.
ZE AAFS	AAFS impacts from zero-emission (ZE) appliance adoption above and beyond those realized in the **PiCS AAFS** scenarios. Modeled via Fuel Substitution Scenario Analysis Tool (FSSAT).

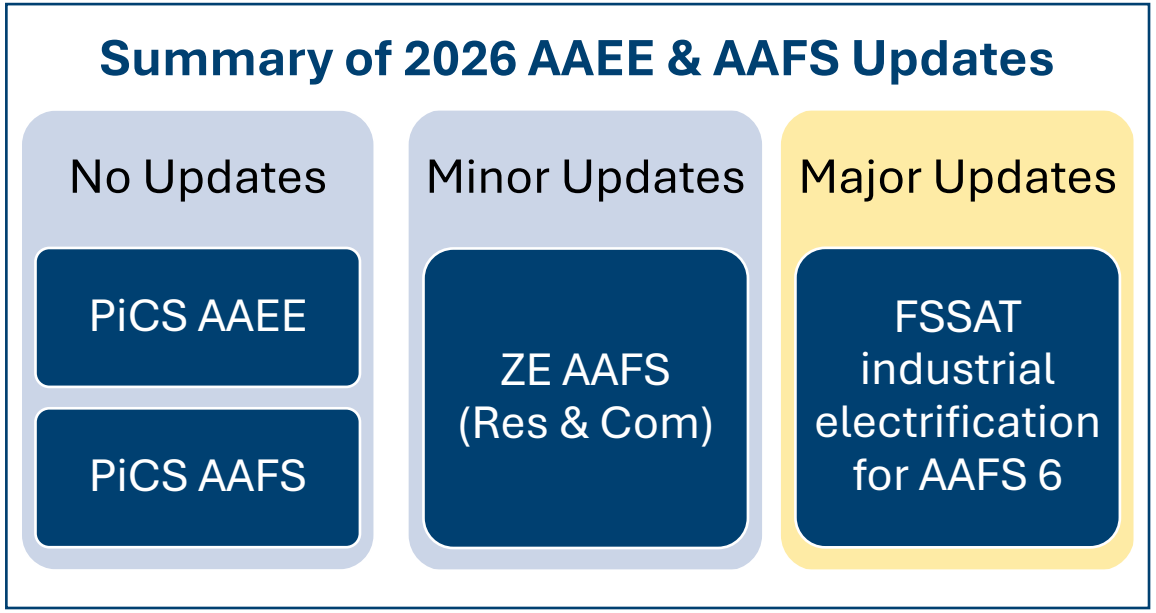
Source: CEC Staff

Note: PiCS AAEE, PiCS AAFS, and ZE AAFS each include aggregated impacts from both new construction and existing buildings.

The 2026 AAEE & AAFS Scenario Framework Remains Similar to 2025

For 2026 IEPR, use the 2025 AAEE & AAFS framework, which remains similar

- Maintain 2025 PiCS AAEE and PiCS AAFS
- Assumption updates to ZE AAFS (Res & Com)
  - Bay Area Air District zero-NOx Standards Amendments[1]
  - Incorporate final version of 2025 IEPR Baseline Demand Forecast
  - Revised treatment of residential electric resistance water heating to align with federal water heater standards
- FSSAT industrial electrification for AAFS Scenario 6



Staff is planning major model and scenario framework updates for the 2027 IEPR

[1] July 2026 Rule 9-6 Draft Flexibility Amendments (Adopted at a November 4, 2026, Air District Board Hearing)

Federal Energy Efficiency Standards – Residential Water Heaters

- DOE adopted new energy efficiency standards in April 2024[1,2]
  - Effective date of 2029
  - Targets residential water heaters
  - New efficiency performance requirement
    - For electric storage heaters >35 gal and ≤120 gal, only met by heat pumps

- Treatment for 2025 IEPR
  - Our model could not exclude replacement technologies by year
  - Assumed "highly-weighted" efficiency for all residential electric water heater replacements

- Treatment for 2026 IEPR
  - Staff enhanced the model to exclude replacement technologies by year
  - Exclude residential electric resistance water heater replacements starting in 2029

[1] U.S. Department of Energy. "DOE Finalizes Efficiency Standards for Water Heaters." Press release, April 30, 2024.
[2] U.S. Department of Energy. "EERE-2017-BT-STD-0019-1426." Regulations.gov. Posted May 6, 2024.

Residential and Commercial ZE AAFS Modeling

2026 AAFS Proposed Scenario Characterizations (Same as 2025)

Source: CEC Staff

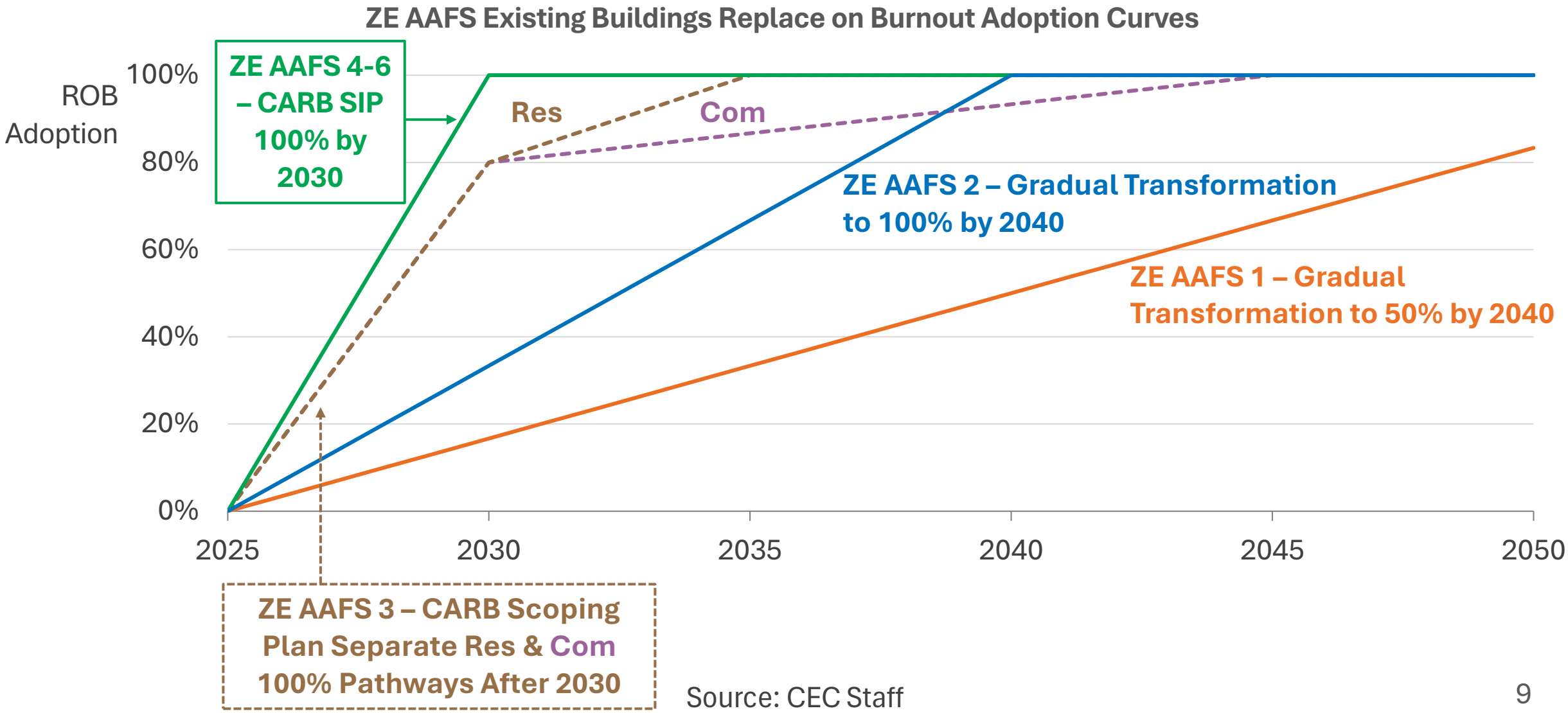
AAFS Component	AAFS 1	AAFS 2	AAFS 3	AAFS 4	AAFS 5	AAFS 6
PiCS AAFS	1	2	3	4	5	6
ZE AAFS	1	2	3	4	5	6
End Uses	SH & WH	SH & WH	SH & WH	SH & WH	SH, WH, C, CD	SH, WH, C, CD
Substituted Fuel Types	Gas	Gas	Gas	Gas	Gas	Gas & RP
NC (Beyond PiCS T24)	No	No	No	100% in 2029	100% in 2029	100% in 2029
Statewide EB	GT **50%** by 2040	GT **100%** by 2040	**CARB SP** 100% Targets	**SIP** linear to 100% by 2030	**SIP** linear to 100% by 2030	**SIP** linear to 100% by 2030
Bay Area PAR 9-4 & 9-6	No	No	Yes	Yes	Yes	Yes
South Coast PAR 1146.2	No	No	Yes	Yes	Yes	Yes

Table Abbreviations

C – Cooking
CD – Clothes Drying
EB – Existing Buildings
GT – Gradual Transformation Scenario
NC – New Construction
PAR – Proposed Amended Rule
RP – Residential Propane
SH – Space Heating
SIP – State Implementation Plan
SP – Scoping Plan
T24 – Title 24
WH – Water Heating

Note: AAFS scenario impacts are the sum of the PiCS AAFS and ZE AAFS Scenario impacts modeled by FSSAT. FSSAT finalizes gas AAEE savings based on the AAFS effect on available gas in AAEE.

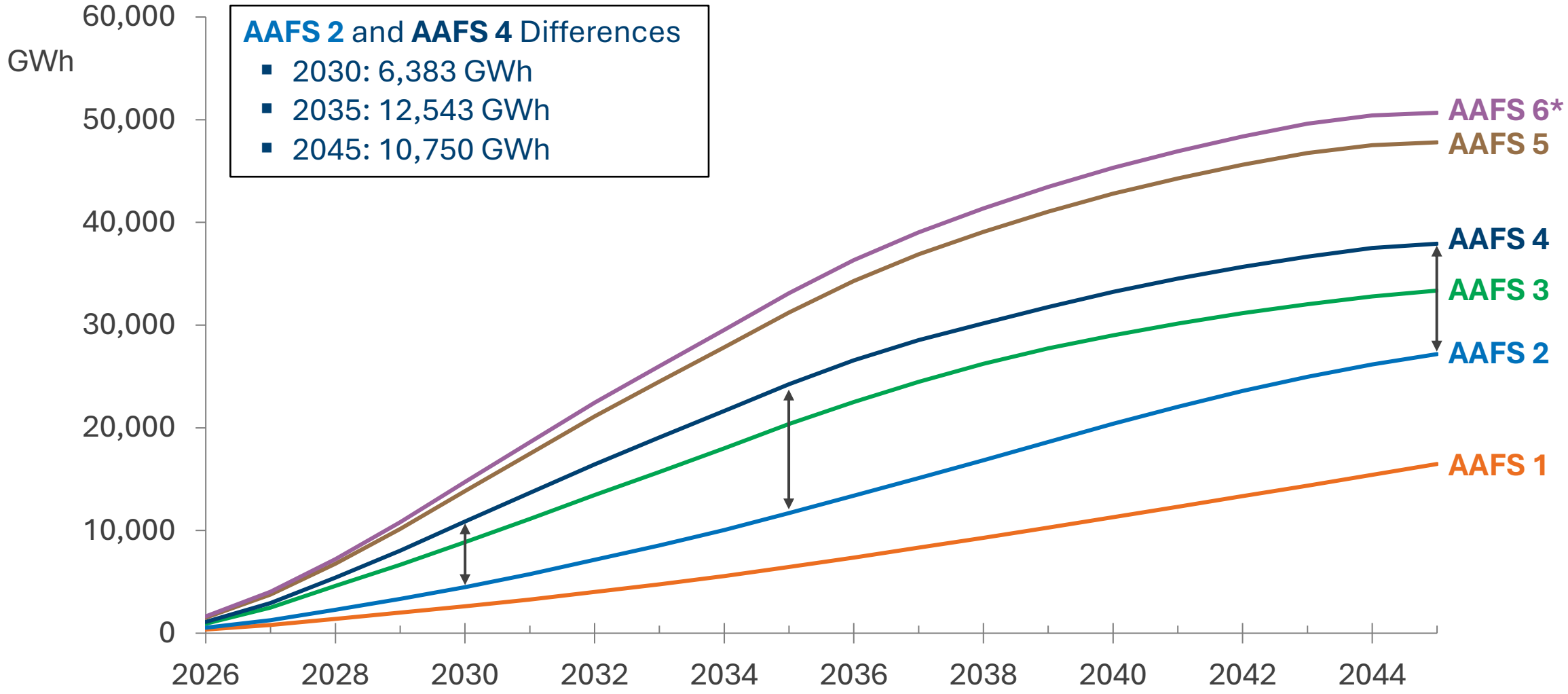
Proposed 2026 AAFS Scenario Replace-on-Burnout Adoption Curves



Source: CEC Staff

Electricity Results

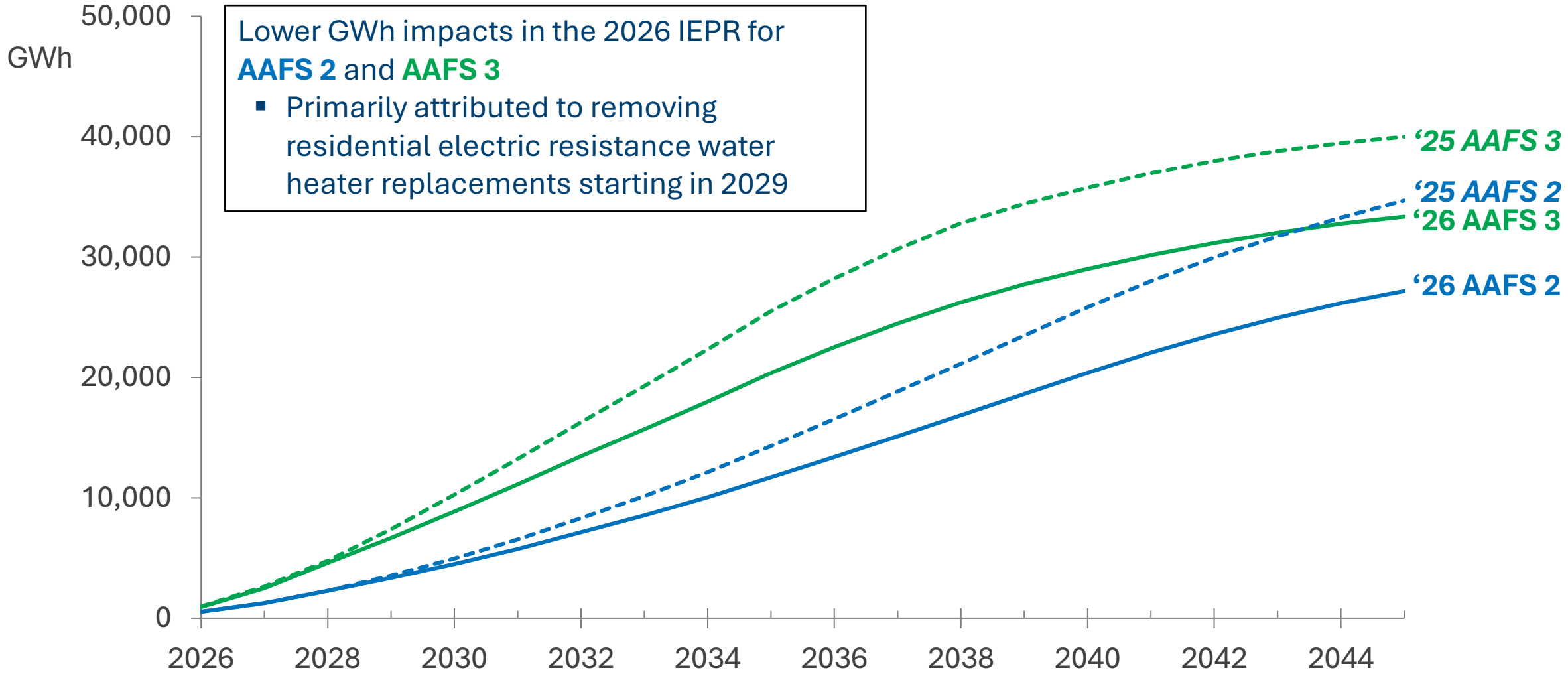
2026 AAFS Electricity Impacts



Source: CEC Staff

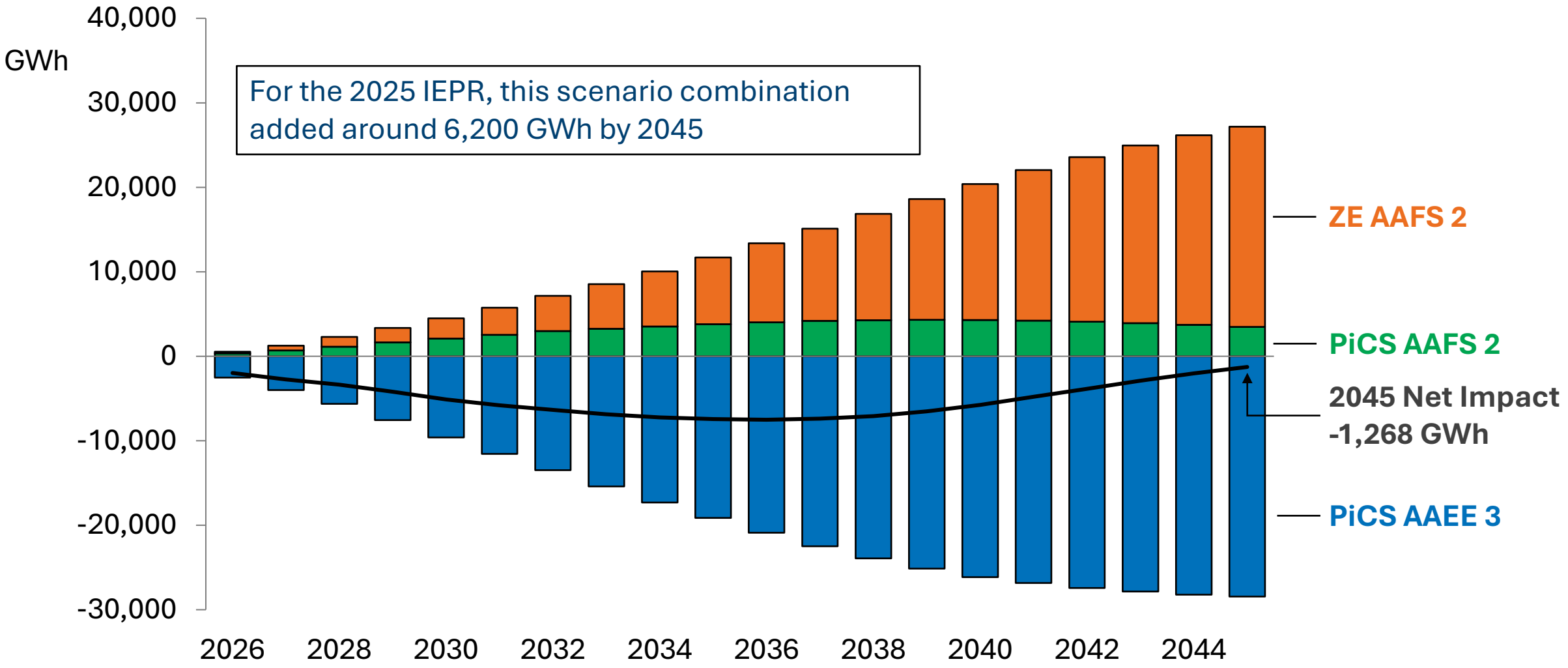
*Note that AAFS 6 includes FSSAT industrial electrification (discussed in the next presentation)

AAFS 2 and 3 Electricity Impacts – Comparison to 2025 IEPR



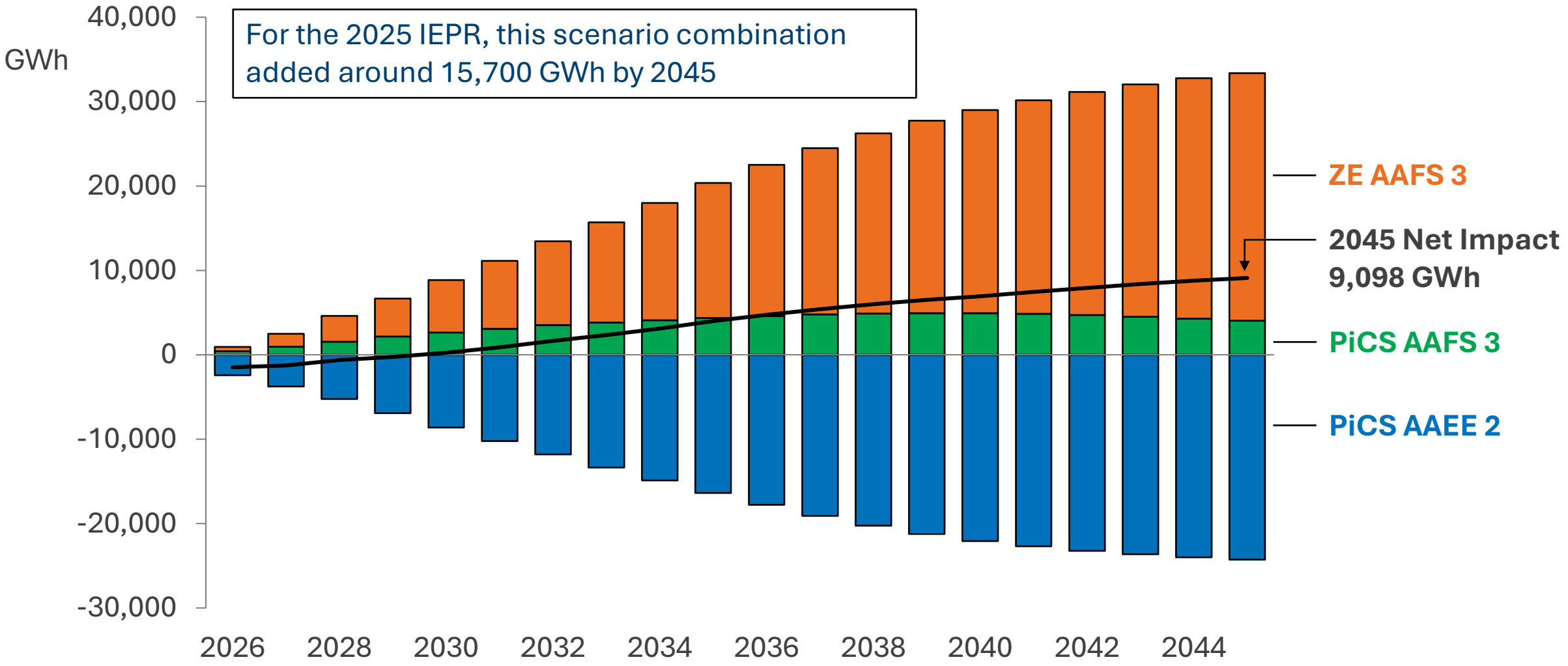
Source: CEC Staff

AAFS 2 + AAEE 3 Electricity Impacts



Source: CEC Staff

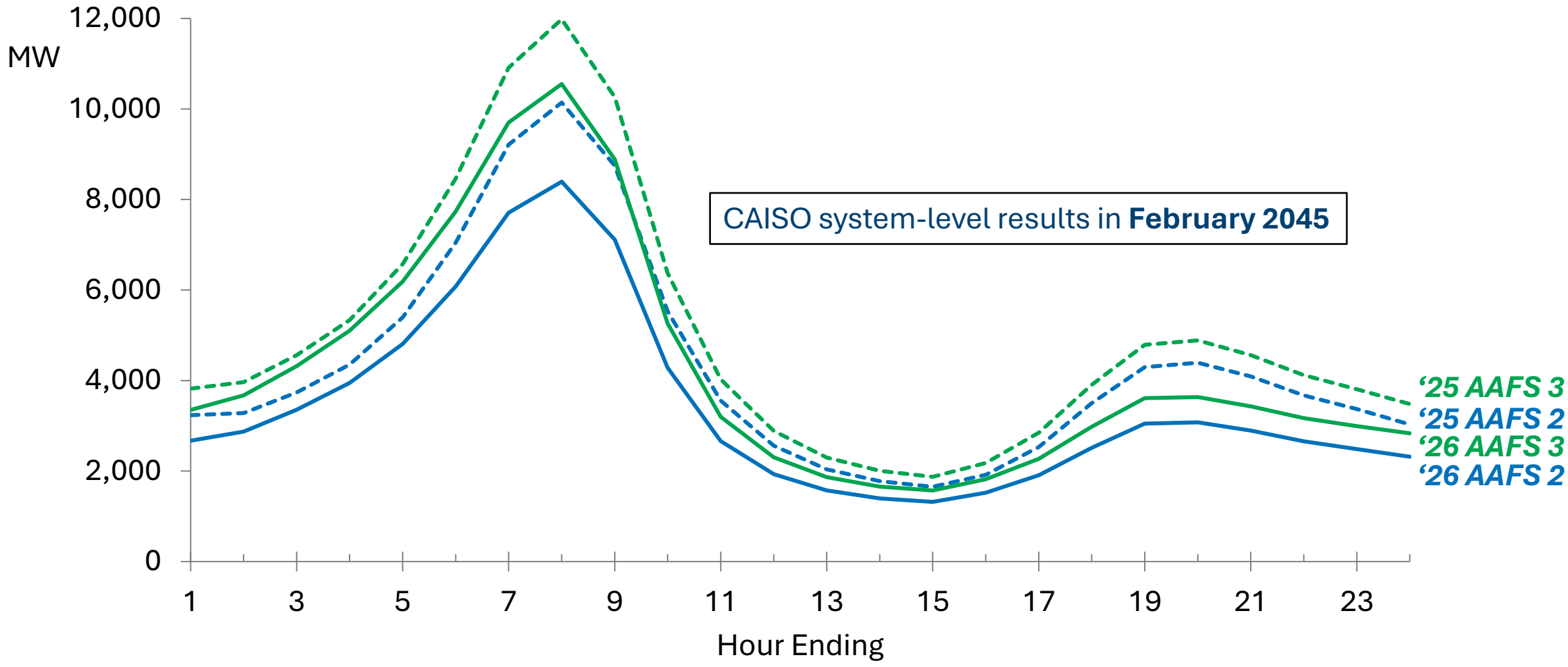
AAFS 3 + AAEE 2 Electricity Impacts



Source: CEC Staff

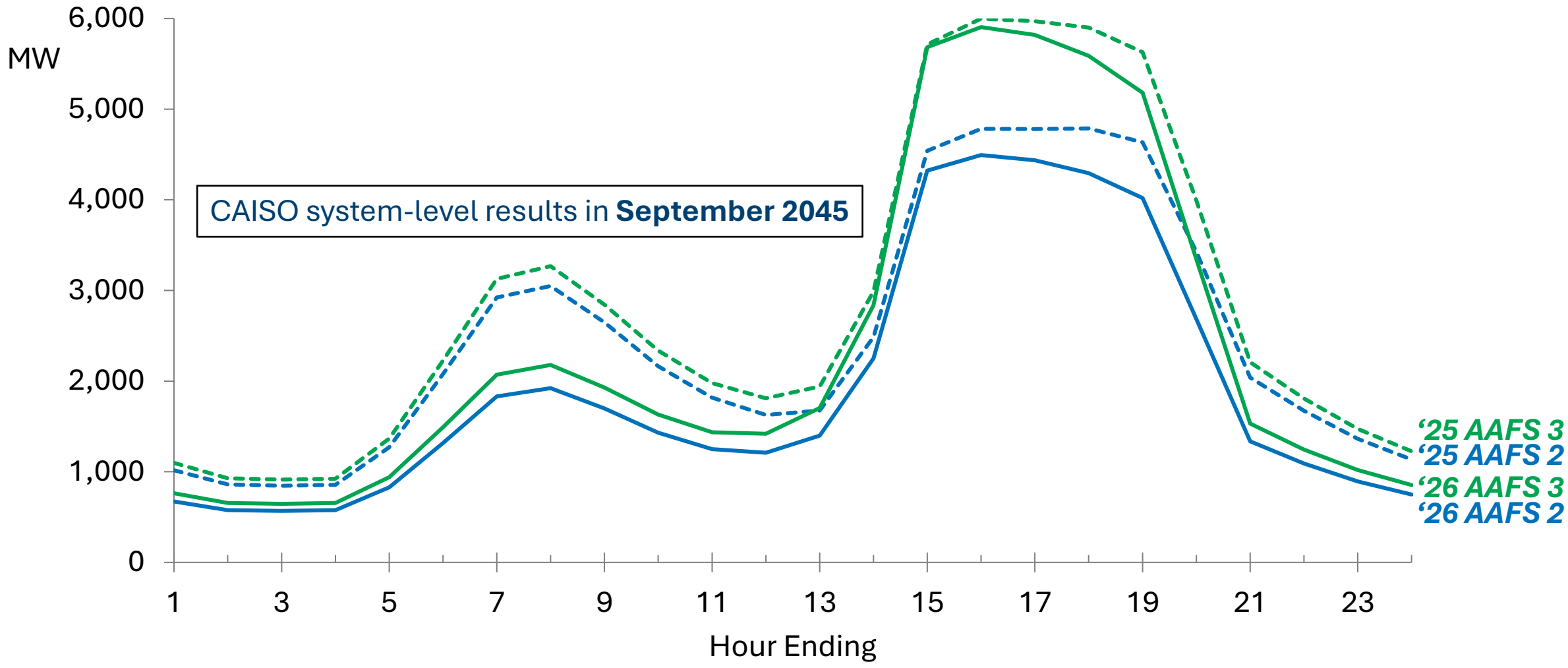
Hourly Results

AAFS 2 and 3 Average February Hourly Impacts – Comparison to 2025 IEPR



Source: CEC Staff

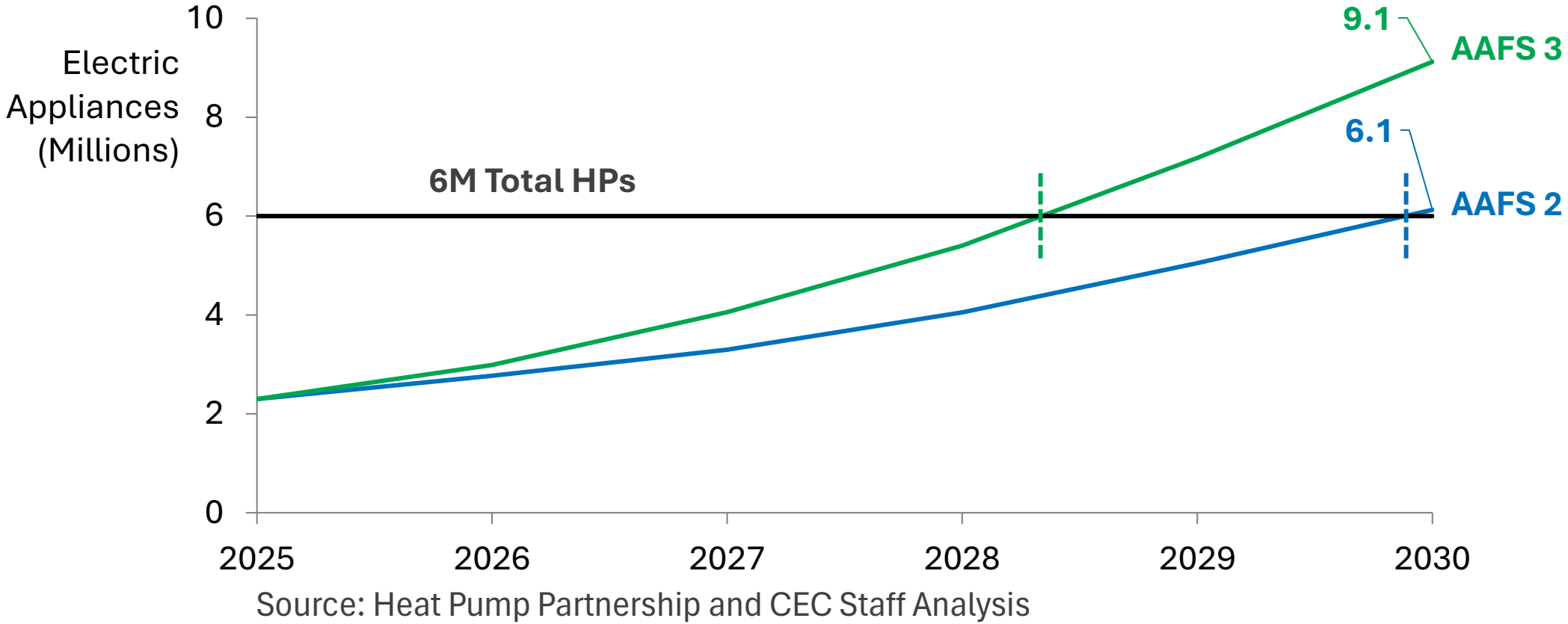
AAFS 2 and 3 Average September Hourly Impacts – Comparison to 2025 IEPR



Source: CEC Staff

Electric Appliance Results

Estimated Cumulative Heat Pumps Under AAFS 2 and AAFS 3



Source: Heat Pump Partnership and CEC Staff Analysis

Caveats

- Based on an existing cumulative **2025 2.3M Res and Com HP estimate** (Source: Heat Pump Partnership)
- The added appliances are only from Res sector, as FSSAT currently does not estimate Com stock
- CEC staff will continue to improve HP tracking and projection mechanisms

Future Modeling

Anticipated Modeling Updates - 2027 IEPR

Overhaul of Scenario Characterizations

- Model CARB's revised concept of their Clean Space and Water Heater Standards
- Review new or revised local air district rules
- Expand Industrial and Agricultural modeling into additional AAFS scenarios

FSSAT Structural Improvements

- Improve FSSAT's appliance stock accounting
- Refine tool's annual adoption methodology

Refresh Data Inputs

- 2027 IEPR Demand and Building Forecasts

Inputs and Assumptions Documentation

- Continue posting documentation for AAEE and AAFS modeling on CEC's Energy Planning Library
- Previous IEPR documentation workbook - 2025 IEPR AAEE-AAFS

Thank You!

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