

DOCKETED	
Docket Number:	26-IEPR-03
Project Title:	Electricity and Gas Demand Forecast
TN #:	272222
Document Title:	Presentation - 2026 IEPR Additional Achievable Energy Efficiency and Fuel Substitution Load Modifiers
Description:	5A. Ethan Cooper, CEC
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/28/2026 7:56:58 AM
Docketed Date:	8/28/2026



2026 IEPR Additional Achievable Energy Efficiency and Fuel Substitution Load Modifiers

Ethan Cooper, Building Decarbonization Load Allocation Specialist,
Energy Assessments Division
August 31, 2026



Acronyms, Initialisms, and Abbreviations

AAEE – Additional Achievable Energy Efficiency

AAFS – Additional Achievable Fuel Substitution

AQMD – Air Quality Management District

C – Cooking

CARB – California Air Resources Board

CD – Clothes Drying

CEC – California Energy Commission

Com – Commercial

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



Overview of AAEE and AAFS



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).



How Do AAEE & AAFS Modify Demand

- Both **AAEE** and **AAFS** reduce gas consumption
- While **AAEE** also reduces electricity consumption, **AAFS** increases electricity consumption
- Thus, AAEE has “savings” and AAFS has “impacts”

		Load Modifier	Modeled by	Gas Consumption	Electricity Consumption
AAFS {	PiCS AAFS	EE/FS PiCS Tool & WBs	Decreases	Increases	
	ZE AAFS	FSSAT	Decreases	Increases	
	AAEE	EE/FS PiCS Tool & WBs	Decreases	Decreases	



2026 IEPR Modeling Updates



The 2026 AAEE & AAFS Scenario Framework Remains Similar to 2025

- More than 2.4M heat pumps in California as of April 2026¹
- Evolving policies since the 2025 IEPR
 - CARB [Clean Space and Water Heater Standards](#)
 - AQMDs' zero-NOx Standards Amendments
 - Local jurisdictions and reach codes
- For 2026 IEPR, use the 2025 AAEE & AAFS framework, which remains similar
 - Maintain 2025 PiCS AAEE and PiCS AAFS
 - Small assumption updates to ZE AAFS
 - FSSAT industrial electrification for AAFS Scenario 6

Summary of 2026 AAEE & AAFS Updates

No Updates

PiCS AAEE

PiCS AAFS

Minor Updates

ZE AAFS
(Res & Com)

Major Updates

FSSAT
industrial
electrification
for AAFS 6

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

¹ Source: [Heat Pump Partnership](#)



ZE AAFS: Policy Modeling Updates

South Coast AQMD: Keep PAR 1146.2 the same

- NC: 2028 Com Water Heating
- *ROB: 2031 Com Water Heating*

CEC staff made simplifying assumptions on equipment sizing impacts in FSSAT

Bay Area Air District

- Keep Rule 9-4 the same
 - NC/ROB: 2029 Res & Com Space Heating
- Revise Rule 9-6 based on July 2026 draft proposal (Amendments yet to be adopted)
 - NC/ROB: 2028 Res (Single-family) Water Heating
 - *NC/ROB: 2033 Com and Res (Multi-family) Water Heating*
 - Exclude proposed Low-Income exemption

2031 & 2033 compliance dates superseded by CARB's earlier concept of their SH & WH Standard

CARB

- 2025 IEPR adoption scheme for CARB's earlier concept of their space and water heater standard and CARB scoping plan



ZE AAFS Additional Modeling Updates

Federal

- Maintain “highly-weighted” efficiency for all residential electric water heater replacements
- Remove residential electric water heater replacements starting in 2029

Baseline Demand Forecast

- Incorporate final version of the 2025 IEPR baseline demand forecast

Industrial Fuel Substitution – discussed separately

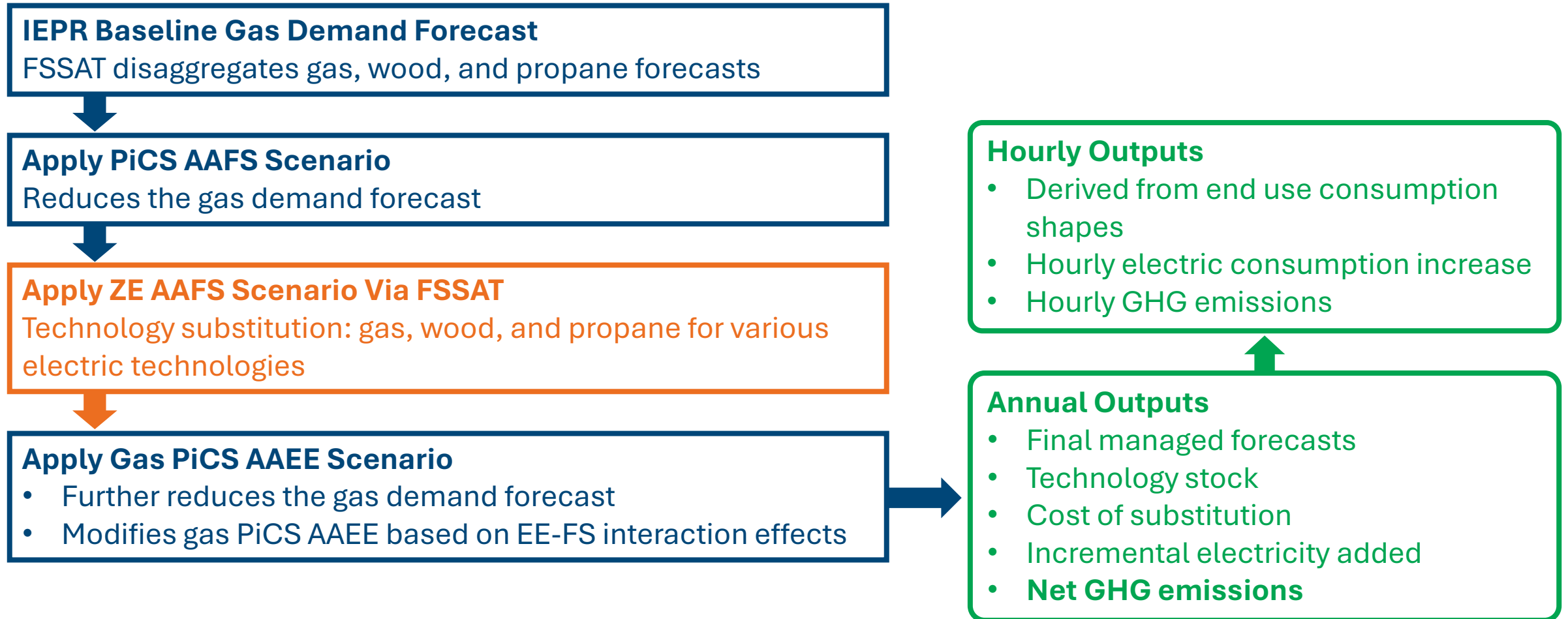
- Use FSSAT’s improved Industrial & Agricultural module
- Include in AAFS scenario 6



Residential and Commercial ZE AAFS Modeling



FSSAT main processes flow chart





2026 AAFS Proposed Scenario Characterizations (Same as 2025)

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

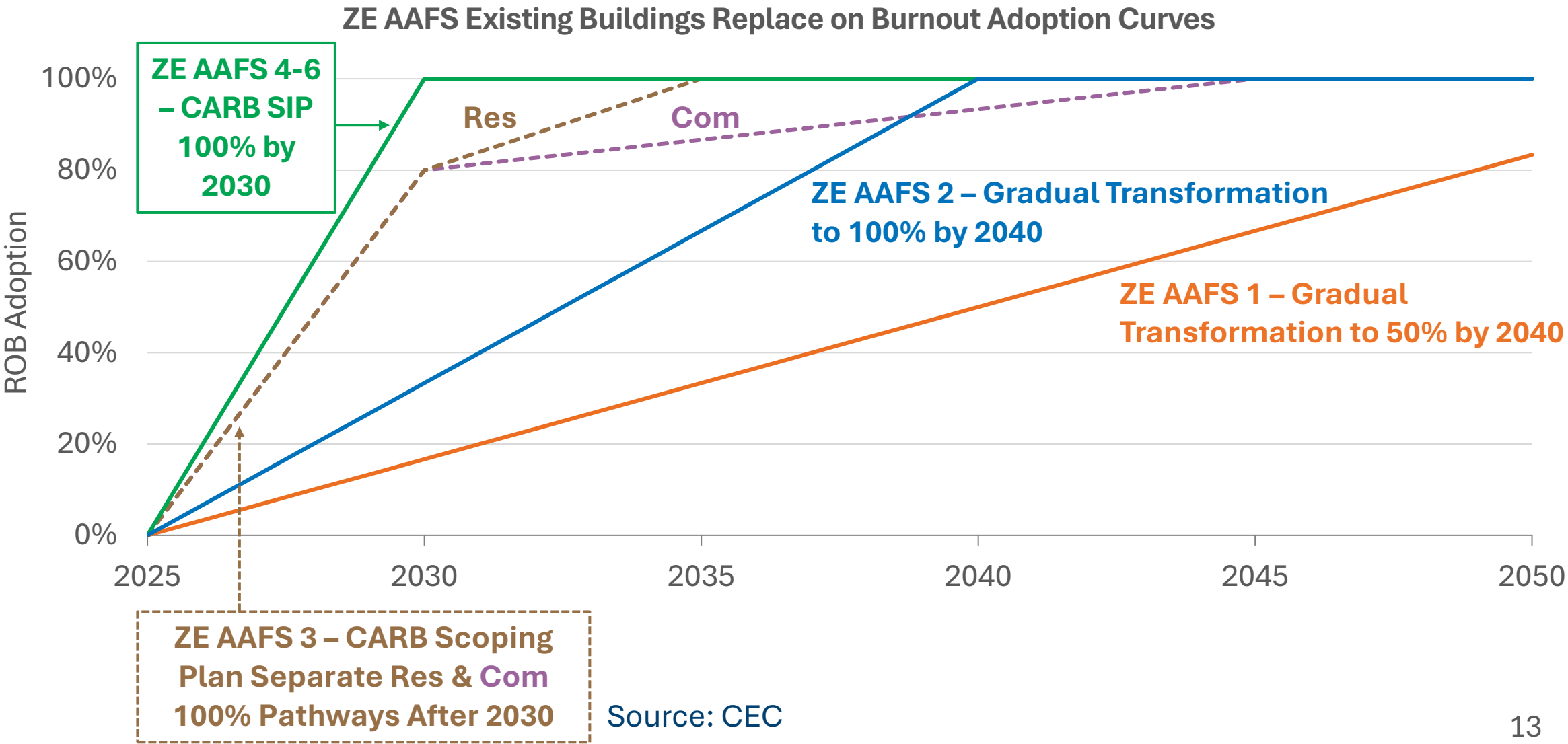
T24 – Title 24

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 AAE savings based on the AAFS effect on available gas in AAE.



Proposed 2026 AAFS Scenario Replace-on-Burnout Adoption Curves





Future Modeling



Considerations for 2027 IEPR

Overhaul of Scenario Characterizations

- Model CARBs revised 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



Thank You!

Ethan Cooper
Advanced Electrification Analysis Branch
Energy Assessments Division
Ethan.Cooper@energy.ca.gov



Appendix



How Can AAEE & AAFS Coordinate

- Need to consider which combinations of AAEE and AAFS scenarios are compatible with each other given total gas displacement potential and program funding sources
- **AAEE scenarios** can be separated by fuel (electricity vs. gas)
- **AAFS scenarios** are necessarily coupled

		Order of Operations	Load Modifier	Gas Consumption	Electricity Consumption	Dual or Separate Impacts?
AAFS	{	1	PiCS AAFS	Decreases	Increases	Dual Gas and Electric Impacts
		2	ZE AAFS	Decreases	Increases	Dual Gas and Electric Impacts
		3	AAEE	Decreases	Decreases	Savings can be Separated