

**DOCKETED**

<b>Docket Number:</b>	22-IEPR-03
<b>Project Title:</b>	Electricity Forecast
<b>TN #:</b>	242550
<b>Document Title:</b>	Presentation - AAEE-AAFS-FSSATAs Deployed In The Demand Scenarios Project
<b>Description:</b>	I.C. Ingrid Neumann, Building Scenarios
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<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Commission Staff
<b>Submission Date:</b>	4/5/2022 8:33:54 AM
<b>Docketed Date:</b>	4/5/2022

# **AAEE-AAFS-FSSAT**

**As Deployed In The**

# **Demand Scenarios Project**



**Ingrid Neumann, Ph.D.**



# Buildings Components of Demand Scenarios

## Reference, Policy Compliance, & Mitigation

AAEE (Programmatic Contributions From EE/FS Tool)		Mid- Mid Business-As-Usual BAU ( Scenario 3)
AAFS	Programmatic Contributions From EE/FS Tool	Mid- Mid Business-As-Usual BAU ( Scenario 3)
	Additional Speculative FS Contribution From FSSAT Tool	None

AAEE (Programmatic Contributions From EE/FS Tool)		Mid-High (Scenario 4)	Mid -Mid (Scenario 3)
AAFS	Programmatic Contributions from EE/FS Tool	Mid –Mid Plus (Scenario 4)	
	Additional Speculative FS Contribution From FSSAT Tool	Incorporate WH & SH NOx control measures from CARB 2022 SIP Strategy beginning in 2029 for BAAQMD and 2030 for the rest of the State	

AAEE (Programmatic Contributions From EE/FS Tool)		Mid - High Plus (Scenario 6)	Mid -Mid (Scenario 3)
AAFS	Programmatic Contributions From EE/FS Tool	Mid -High Plus ( Scenario 6)	
	Additional Speculative FS Contribution From FSSAT Tool	CARB Scoping Plan Scenario (Alternate 4)	



# Buildings Components of Demand Scenarios

## Reference, Policy Compliance, & Mitigation

**AAEE 3 electricity & gas**

**AAFS 3**

**AAEE 4 electricity, 3 gas**

**AAFS 4**

AAFS	Additional Speculative FS Contribution From FSSAT Tool	Incorporate WH & SH NOx control measures from CARB 2022 SIP Strategy beginning in 2029 for BAAQMD and 2030 for the rest of the State

**AAEE 6 electricity, 3 gas**

**AAFS 6**

AAFS	Additional Speculative FS Contribution From FSSAT Tool	CARB Scoping Plan Scenario (Alternate 4)

- AAEE electricity and gas may be separated
- AAFS electricity and gas are joined



# Buildings Components of Demand Scenarios

## Reference, Policy Compliance, & Mitigation

AAEE 3 electricity & gas

AAFS 3

AAEE 4 electricity, 3 gas

AAFS 4

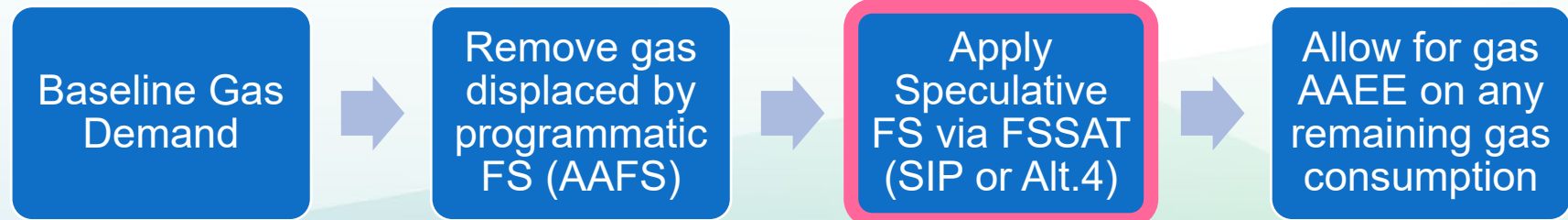
SIP via FSSAT

AAEE 6 electricity, 3 gas

AAFS 6

Alt. 4 via FSSAT

- AAEE electricity and gas may be separated
- AAFS electricity and gas are joined
- **We prioritize FS over EE** because the GHG impacts are approximately four time greater for FS than for EE





# Development of 2021 AAEE

- *For 2021 we utilized the same saving accounting, aggregation, and extrapolation methodology & tools as were established in previous IEPR cycles*
- Historical data and potential savings projections were updated in all existing workbooks and some new workbooks were added based on recent programmatic activities



# 2021 Additions and Enhancements

## **Removed** Fuel Substitution

- Supplanted by Additional Achievable Fuel Substitution (AAFS)

## **ADDED** new workbooks

- CCA and REN Program Savings (not yet modeled in PG Study)
- T24 Res & Com New Construction Fuel Sub
- Clean Energy Optimization Program (CEOP)
- IOU Low Income Fuel Sub
- POU Fuel Sub
- SGIP HPWH Incentives
- TECH-BUILD  
(SB 1477 Low Emissions Buildings and Sources of Heat Energy))
- Food Processing Investment Program (FPIP)

***Extrapolation of potential savings/impacts out to 2050***



# Used AAEE as a template for **AAFS**

- *For 2021 we developed Additional Achievable Fuel Substitution (AAFS) as an hourly load modifier to the baseline demand forecast.*
- We used a manner similar to the one which was developed for AAEE for AAFS; ie. a “template”
- **AAFS was conceptualized as separate from AAEE**





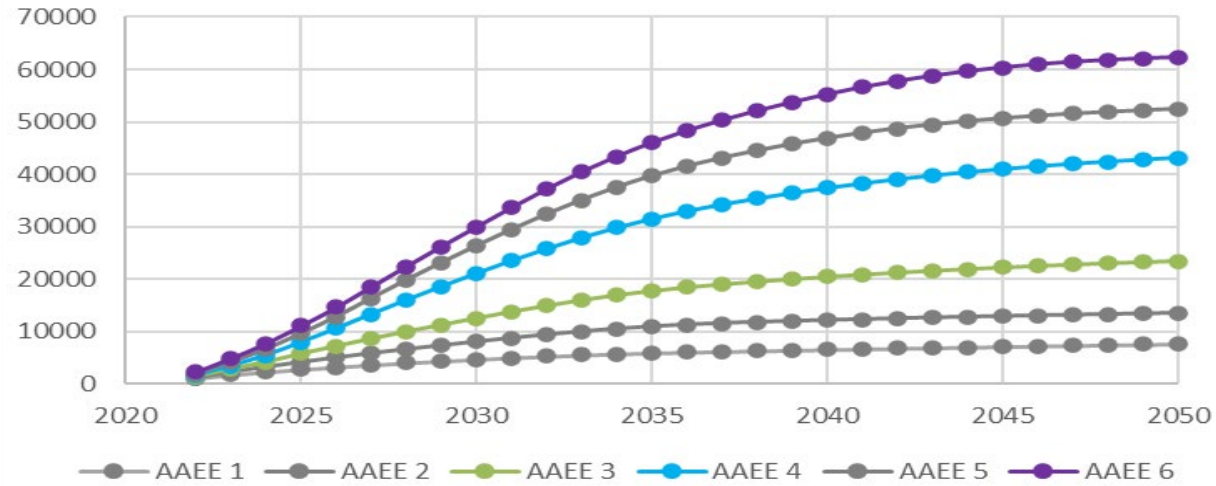
# Development of 2021 AAFS

- DAWG stakeholder workshops June 23 & September 9
- IEPR Commissioner Workshop August 5  
Electricity & Natural Gas Demand Forecast: Inputs and Assumptions
- IEPR Commissioner Workshop December 2  
Electricity & Natural Gas Demand Forecast: Results
- **As in the 2019 AAEE forecast, and before, the objective is to continue to focus on firm programs and projections since the core scenarios will be used for planning and procurement purposes**
- **As in previous iterations, develop variations around these most probable futures to show other possible outcomes given less or more effort input to realize the potential of existing or proposed EE and FS programs**

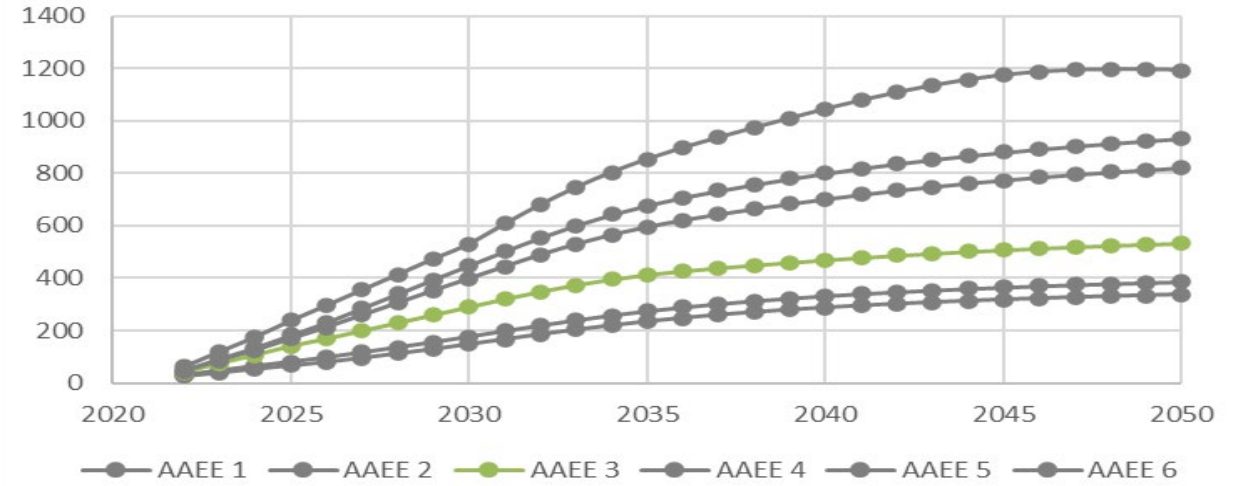


# Statewide Spectrum of 2021 AAE & AAFS Scenarios

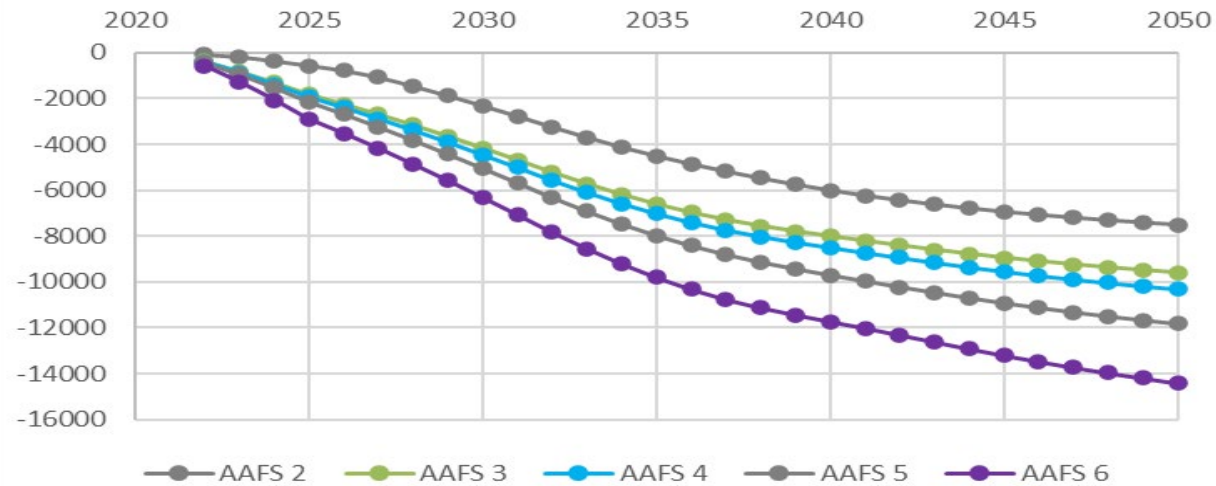
### 2021 IEPR GWh Savings



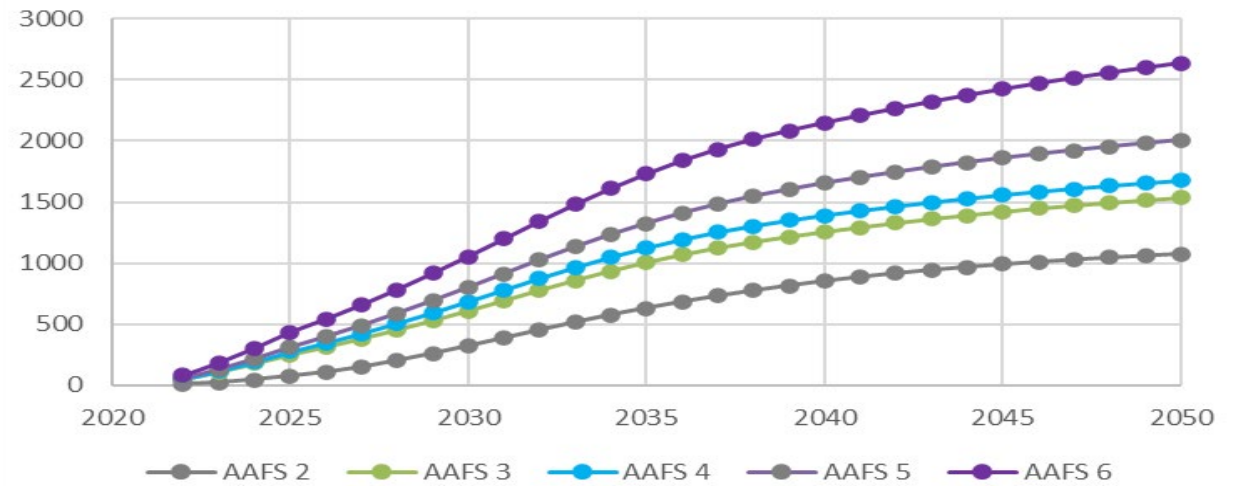
### 2021 IEPR MM Therms Savings



### 2021 IEPR GWh Impacts



### 2021 IEPR MM Therms Savings Impacts





# Development of Speculative Fuel Substitution using FSSAT

- Programmatic FS may not be of the magnitude needed to meet various policy goals.
- Programmatic FS can be input to the FSSAT to determine what available gas displacement remains.

Speculative FSSAT Contribution	% NC
	% ROB
	% RET

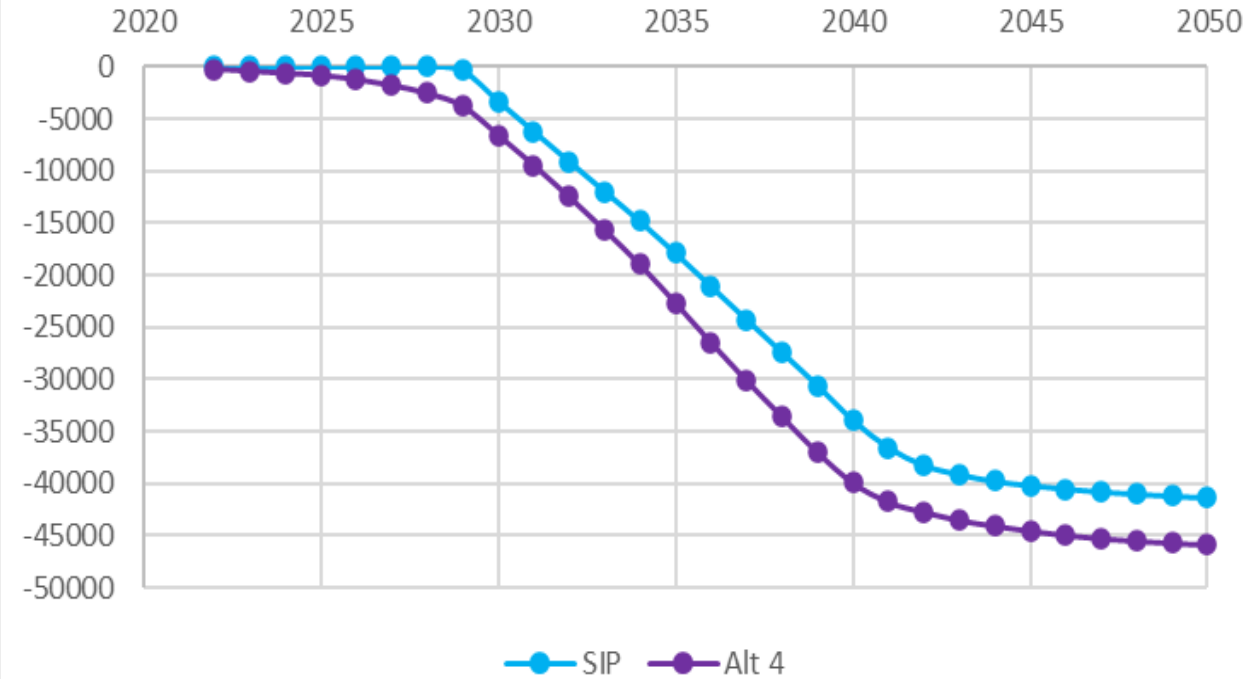
- We are able to add speculative “what if” technology-based FS to show what additional types of efforts may be developed to reach these goals.

SIP Plan Inputs																									
End-Uses	Territory	Replacement Type	Sector	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Space & Water Heating	Statewide	NC/ROB	Res & Com	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Space & Water Heating	CZ03 - Oakland	NC/ROB	Res & Com	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Alt. 4 Inputs																									
End-Uses	Territory	Replacement Type	Sector	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
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All	Statewide	NC/ROB	Res	0%	75%	75%	75%	75%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
All	Statewide	NC/ROB	Com	0%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	100%	100%	100%	100%	100%	100%

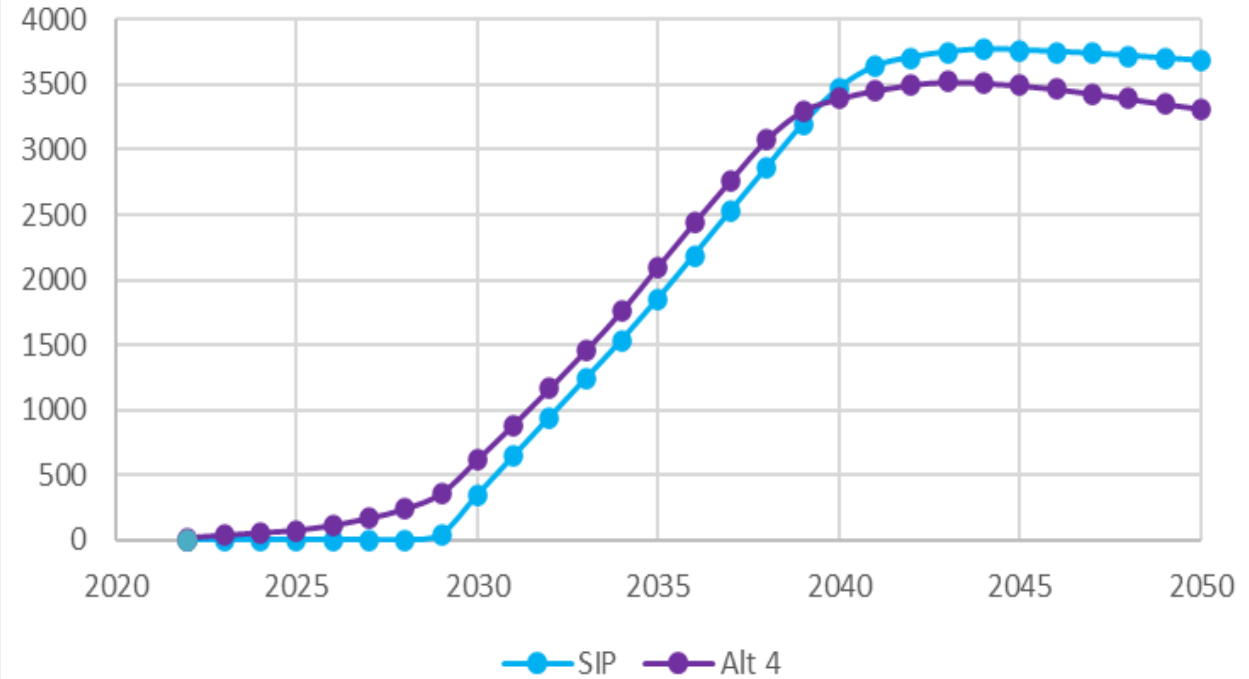


# FSSAT utilized for CARB proposed SIP & Scoping Plan Sc. Alt 4. Modeling

### GWh Impacts



### MM Therms Savings Impacts





# Buildings Components of Demand Scenarios

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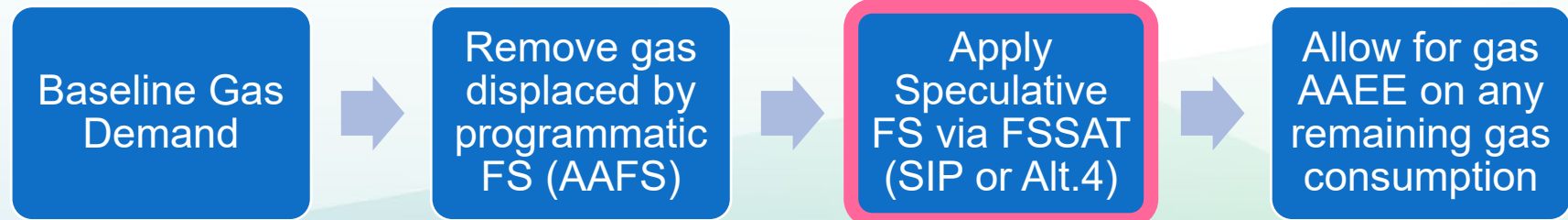
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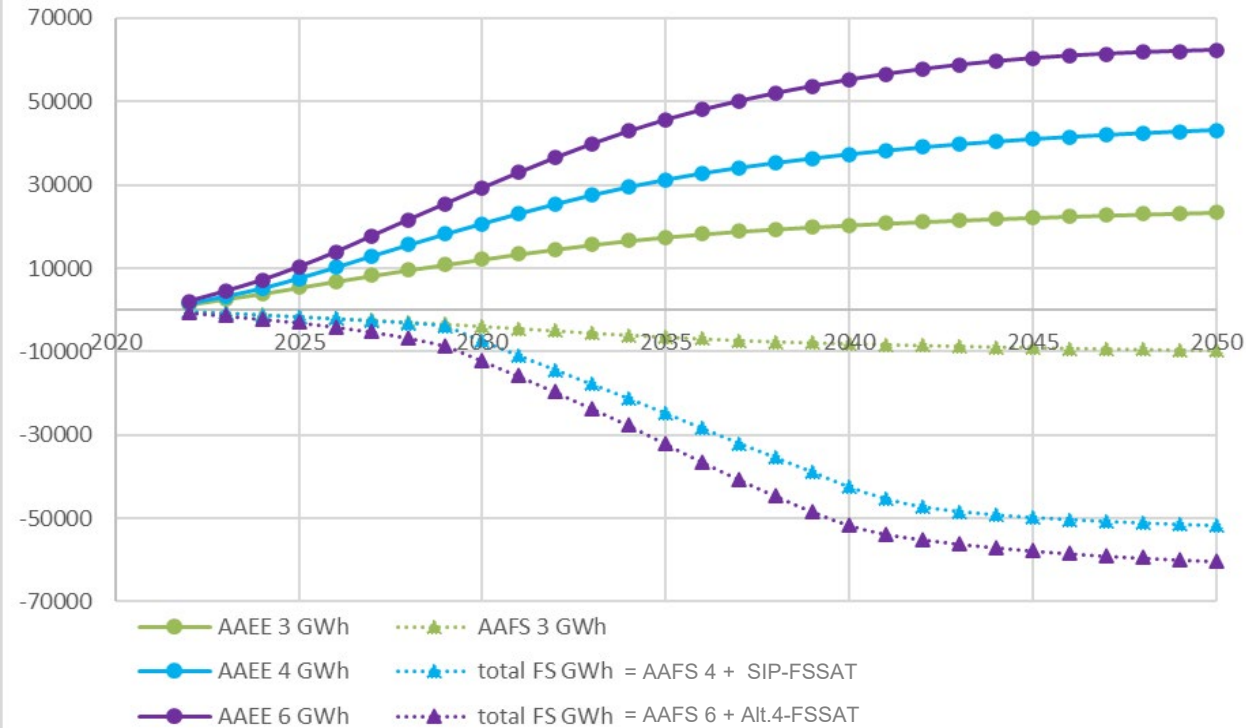




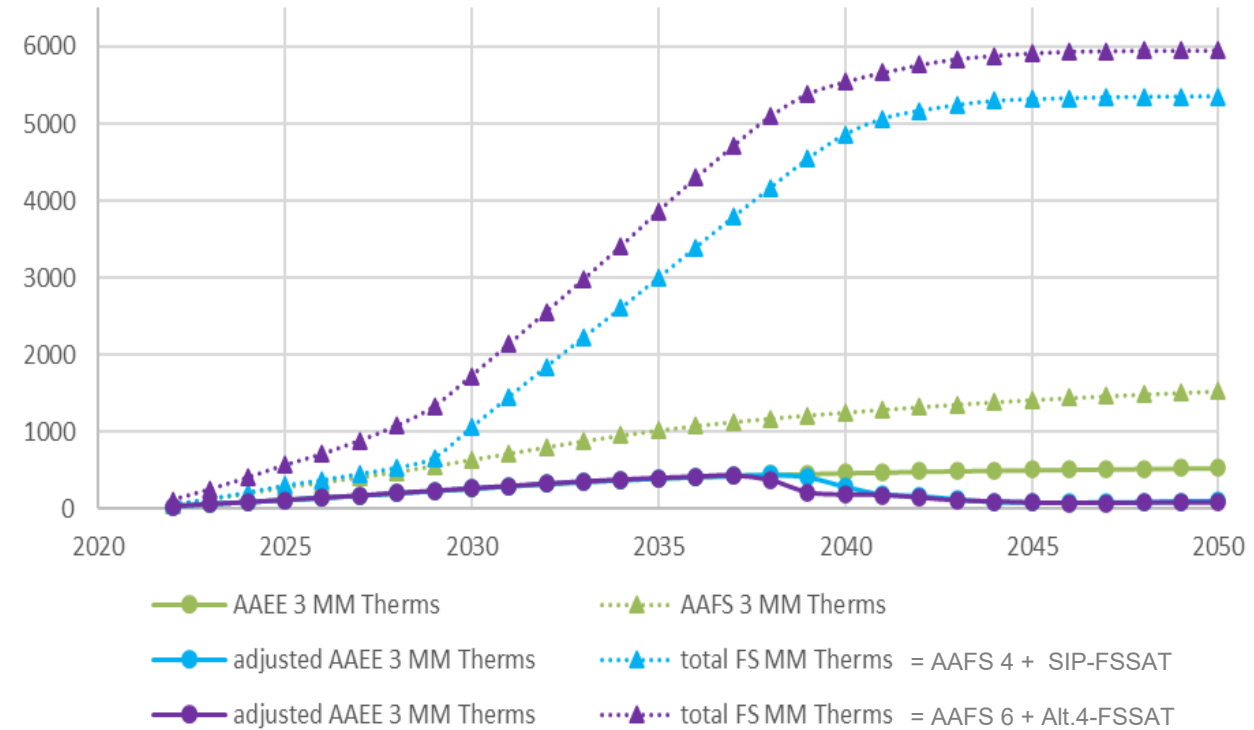
# Buildings Components of Demand Scenarios

## Reference, Policy Compliance, & Mitigation

GWh Savings/Impacts



MM Therms Savings



- We focus on fuel substitution and modify the gas energy efficiency contributions when gas displacement potential is reached; hence the adjusted AAE 3 values in gas savings.
- ***As expected, the scenarios become more aggressive moving from Reference, to Policy Compliance, & Mitigation; though the gas displacement in the later two from EE is not significantly different.***

# Thank you!



***IEPR Volume IV (p33-49 & Appendix A) “CA Energy Demand Forecast”***

<https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2021-integrated-energy-policy-report>



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