



California Energy Commission

# Additional Achievable Energy Efficiency (AAEE) Savings

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## AEE Savings

- Incremental to committed savings in the baseline *CED 2013 Revised* forecasts
- Developed using Navigant's Potential, Goals, and Targets (PGT) model
- For IOU service territories
- 5 scenarios
- Adjusted forecasts for planning purposes



## Elements of AAEE Analysis

- Capture net market potential savings not incorporated in *CED 2013 Revised* baseline
  - Post- 2014 program measures
  - Future standards
    - Federal
    - Title 20 (2016-2018)
    - Title 24 (2016, 2019, 2022)
  - Behavioral programs



## Scenario Development

- PGT model requires a host of input assumptions
  - Building stock
  - Energy prices and avoided costs
  - Incremental costs
  - Incentive levels
  - Unit energy savings (UES)
  - Total Resource Cost (TRC) threshold
  - Measure density
  - Discount rates
  - Word of mouth and marketing effects
  - Assumptions for standards introduction and compliance



## Scenario Development

- 3 initial scenarios developed by Navigant/CPUC
- CEC and CPUC staff developed 4 additional scenarios as variations around the “mid” case
- Scenarios and preliminary results submitted to DAWG for comment
- Comments provided to Joint Agency Steering Committee (JASC)
- 5 proposed scenarios



## California Energy Commission

# 5 Proposed Scenarios

Scenario Number	1	2	3	4	5
<b>Scenario Name</b>	<b>Low Savings</b>	<b>Low Mid Savings</b>	<b>Mid Savings</b>	<b>High Mid Savings</b>	<b>High Savings</b>
<b>ET's</b>	25% of model Results	50% of model Results	100% of model results	150% of Model Results	150% of Model Results
<b>Building Stock</b>	High Demand Case from 2011 IEPR	Mid Case from 2011 IEPR	Mid Case from 2011 IEPR	Mid Case from 2011 IEPR	Low Demand Case from 2011 IEPR
<b>Retail Prices</b>	High Demand Case from 2011 IEPR	Mid Case from 2011 IEPR	Mid Case from 2011 IEPR	Mid Case from 2011 IEPR	Low Demand Case from 2011 IEPR
<b>Avoided Costs</b>	High Demand Case from 2011 IEPR	Mid Case from 2011 IEPR	Mid Case from 2011 IEPR	Mid Case from 2011 IEPR	Low Demand Case from 2011 IEPR
<b>UES</b>	Estimate minus 25%	Estimate minus 25%	Best Estimate UES	Estimate plus 25%	Estimate plus 25%
<b>Incremental Costs</b>	Estimate plus 20%	Estimate plus 20%	Best Estimate Costs	Estimate minus 20%	Estimate minus 20%
<b>Incentive Level</b>	50% of incremental cost	50% of incremental cost	50% of incremental cost	50% of incremental cost	50% of incremental cost
<b>TRC Threshold</b>	1	1	0.85	0.75	0.75
<b>ET TRC Threshold</b>	0.85	0.85	0.5	0.4	0.4
<b>Measure Densities</b>	Estimate minus 20%	Estimate minus 20%	Best Estimate Costs	Estimate plus 20%	Estimate plus 20%
<b>Word of Mouth Effect*</b>	39%	39%	43%	47%	47%
<b>Marketing Effect*</b>	1%	1%	2%	3%	3%
<b>Implied Discount Rate</b>	20%	20%	18%	14%	14%
<b>Standards Compliance</b>	No Compliance Enhancements, Compliance Rates Reduced by 20 percent	No Compliance Enhancements, Compliance Rates Reduced by 20 percent	No Compliance Enhancements	No Compliance Enhancements	Compliance Enhancements
<b>Title 24 Updates</b>	None	None	2016, 2019, 2022	2016, 2019, 2022	2016, 2019, 2022
<b>Title 20 Updates</b>	None	None	2016-2018	2016-2018	2016-2018
<b>Federal Standards</b>	Already adopted	Already adopted	Already adopted	Future Federal Standards	Future Federal Standards

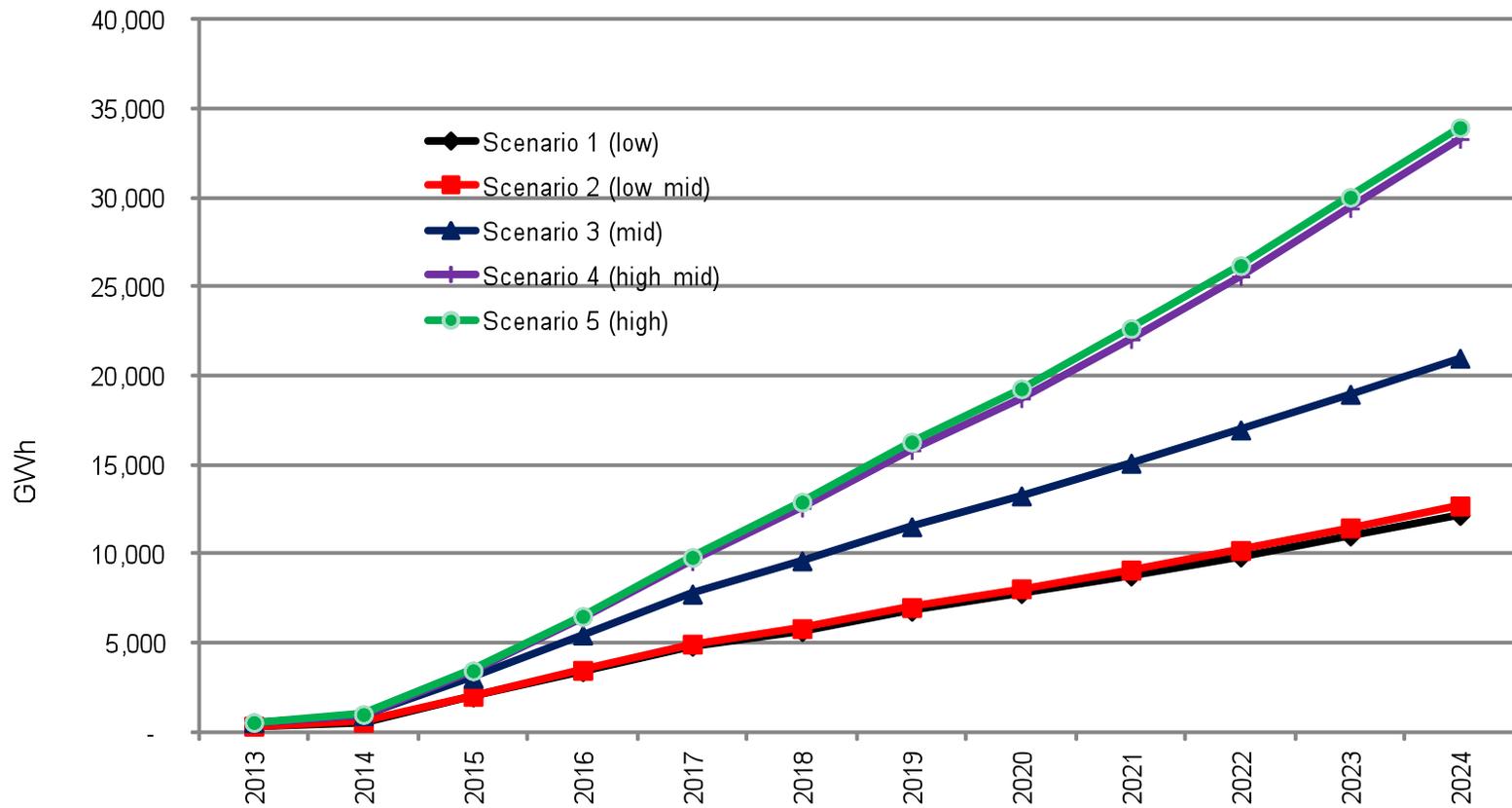


## **Additional Overlap with Baseline: Lighting**

- Lighting UECs in end-use models decline beginning in 2007 consistent with Huffman requirements
- New lighting savings accumulating during the forecast period overlaps with new market potential
- By 2024, overlap reaches 3,200 GWh and 450 MW for combined IOUs

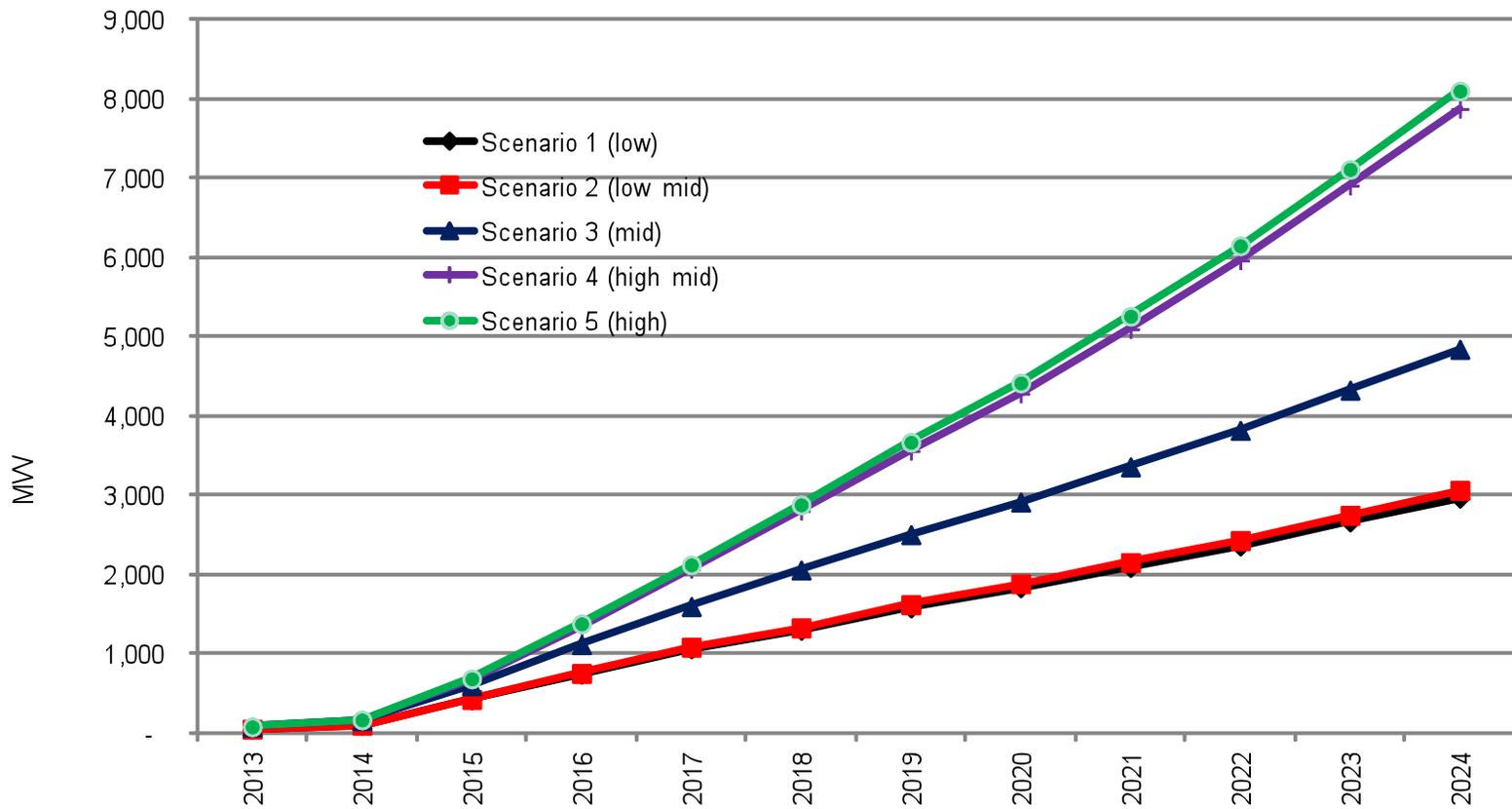


# AAEE Scenario Results: Combined IOU GWh



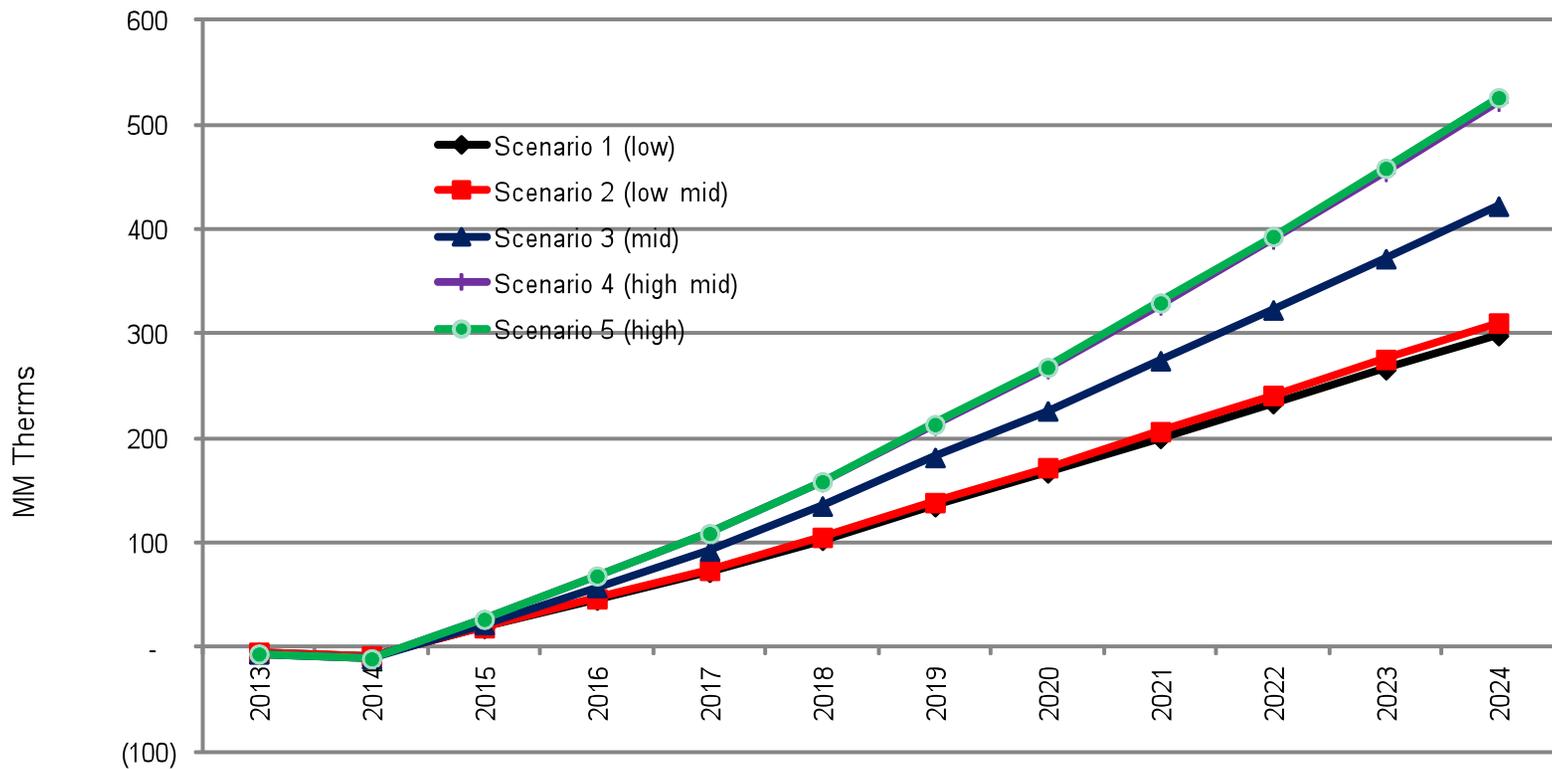


# AAEE Scenario Results: Combined IOU MW





# AAEE Scenario Results: Combined IOU MM Therms





## AAEE Factoids (Combined IOUs)

- Savings from emerging technologies range from 280 GWh in Scenario 1 (low savings) to 9,700 GWh in Scenario 4 (high mid savings) in 2024
- Standards savings make up 33-37% of GWh total in 2024 and 48-50% of MW total; natural gas much less
- Commercial sector has largest % of GWh and MW savings; residential largest for gas

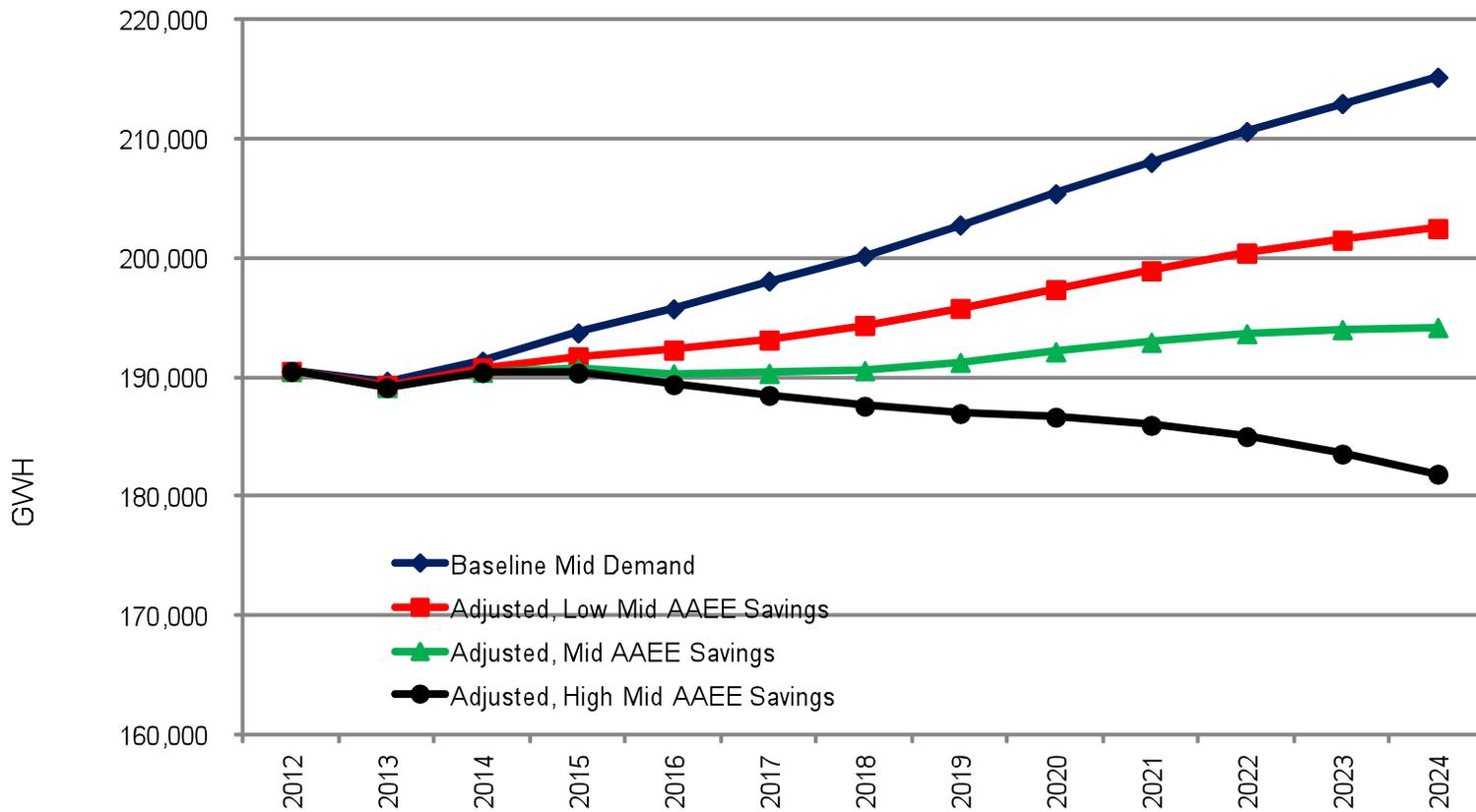


# AAEE Savings by IOU

	Utility	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
GWh	PG&E	5,332	5,562	9,208	14,646	14,924
	SCE	5,554	5,748	9,628	15,205	15,492
	SDG&E	1,280	1,389	2,154	3,442	3,530
	Total IOU	12,166	12,699	20,990	33,293	33,947
MW	PG&E	1,274	1,319	2,141	3,514	3,613
	SCE	1,367	1,401	2,183	3,544	3,632
	SDG&E	322	342	518	816	856
	Total IOU	2,963	3,063	4,841	7,874	8,101
Million	PG&E	131	137	184	229	229
Therms	SoCalGas	147	152	210	254	256
	SDG&E	20	22	28	38	41
	Total IOU	298	310	422	522	526

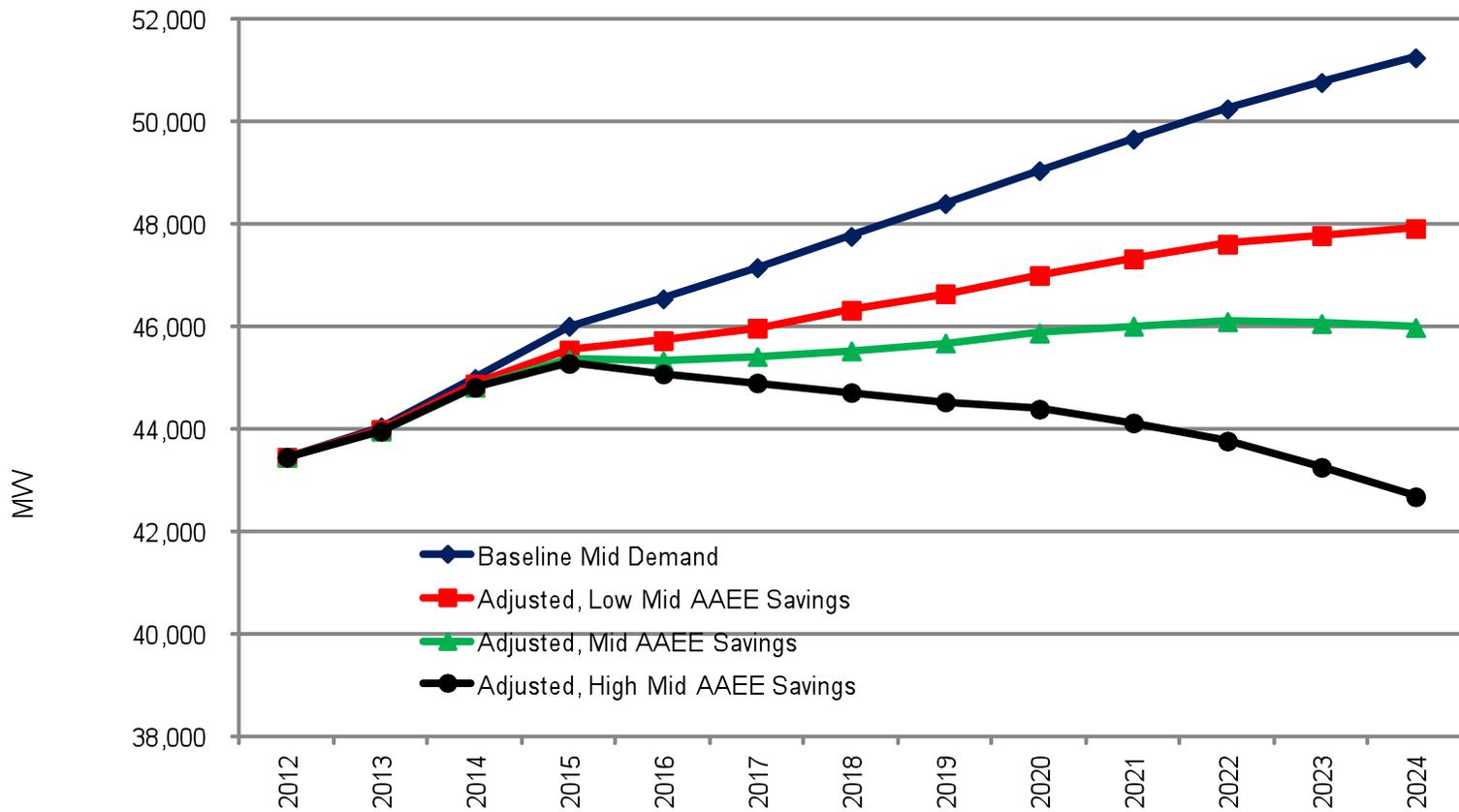


# Combined IOU Baseline and Adjusted Sales Forecasts: Mid Case



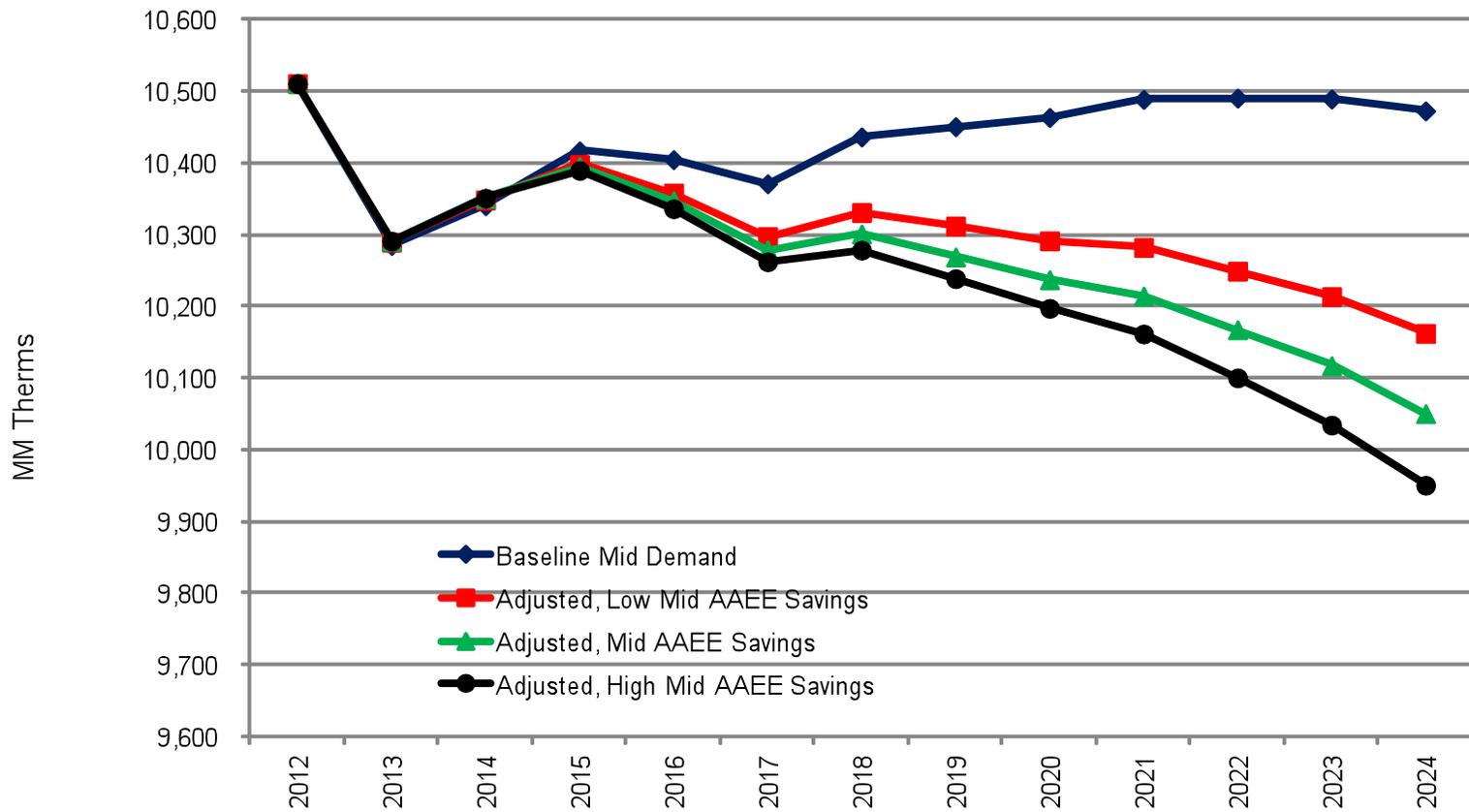


# Combined IOU Baseline and Adjusted Peak Forecasts: Mid Case





# Combined IOU Baseline and Adjusted Natural Gas Forecasts: Mid Case



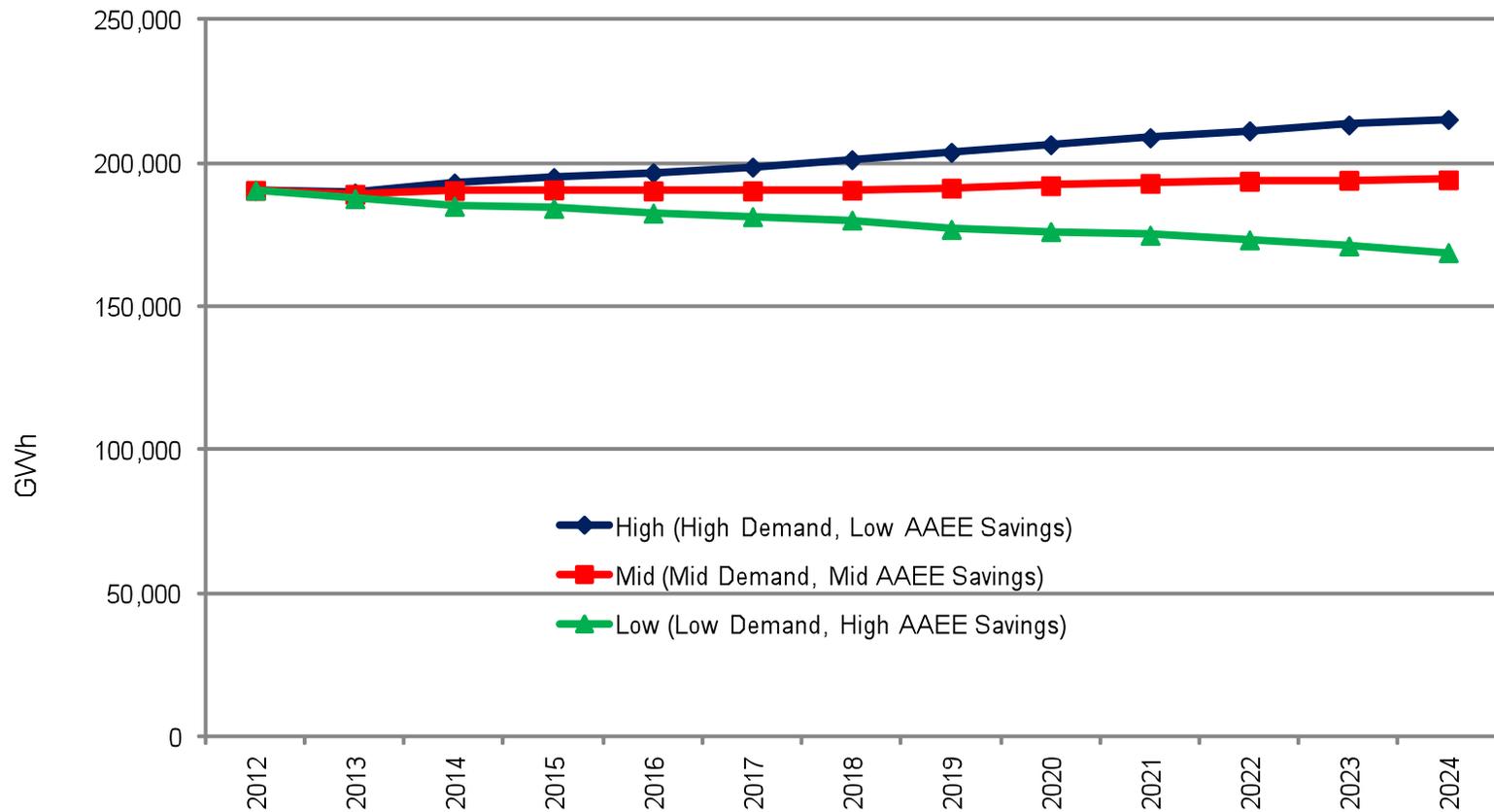


## Combining Demand and Savings Scenarios

1. High demand baseline with low savings
2. Mid demand baseline with mid savings
3. Low demand baseline with high savings
  - Consistent in terms of building stock, energy prices and program savings
  - Inconsistency: higher economic growth may mean more measure adoptions and vice versa

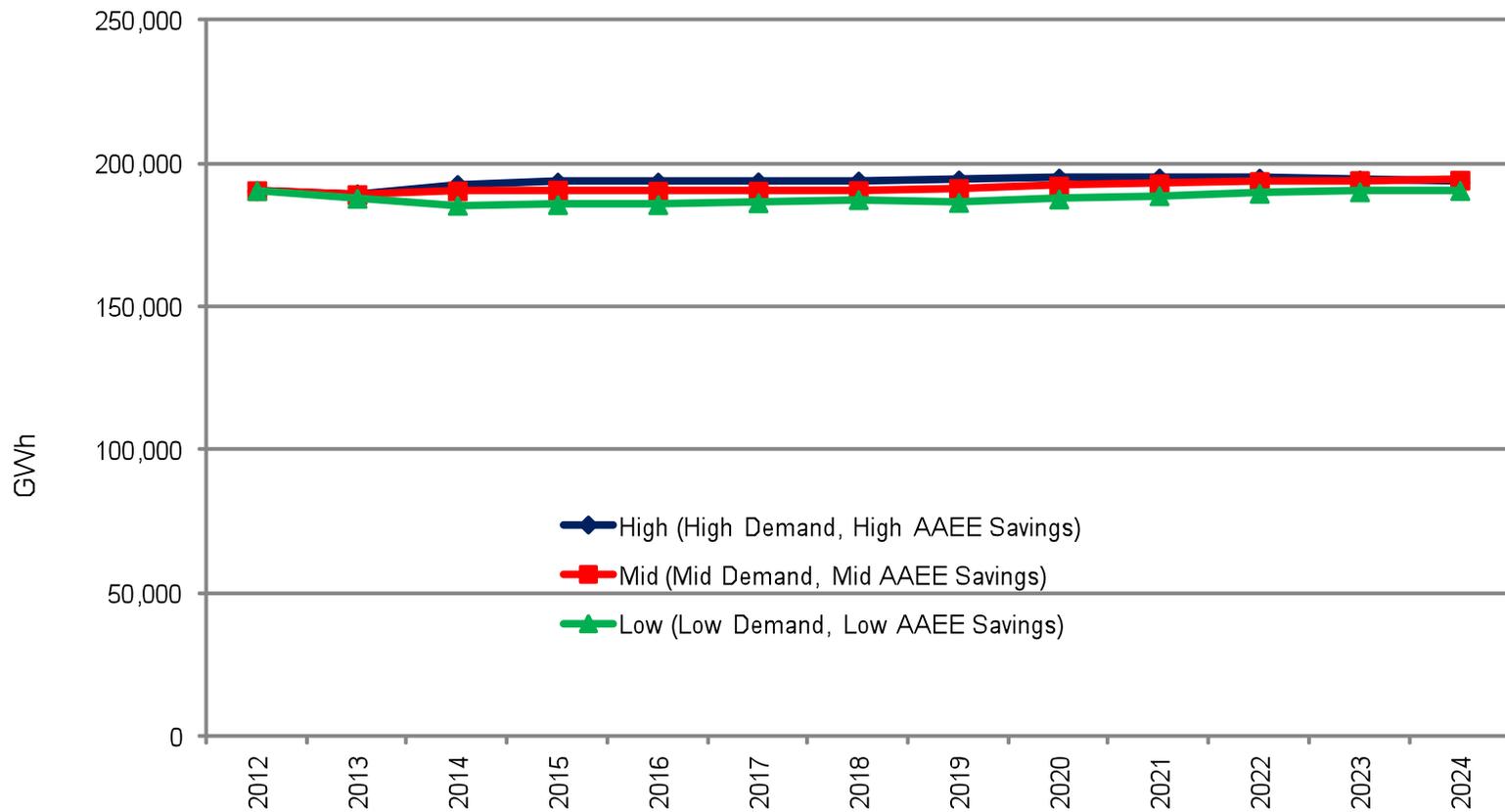


# Combined IOU Baseline and Adjusted Sales Forecasts: 3 Demand Scenarios



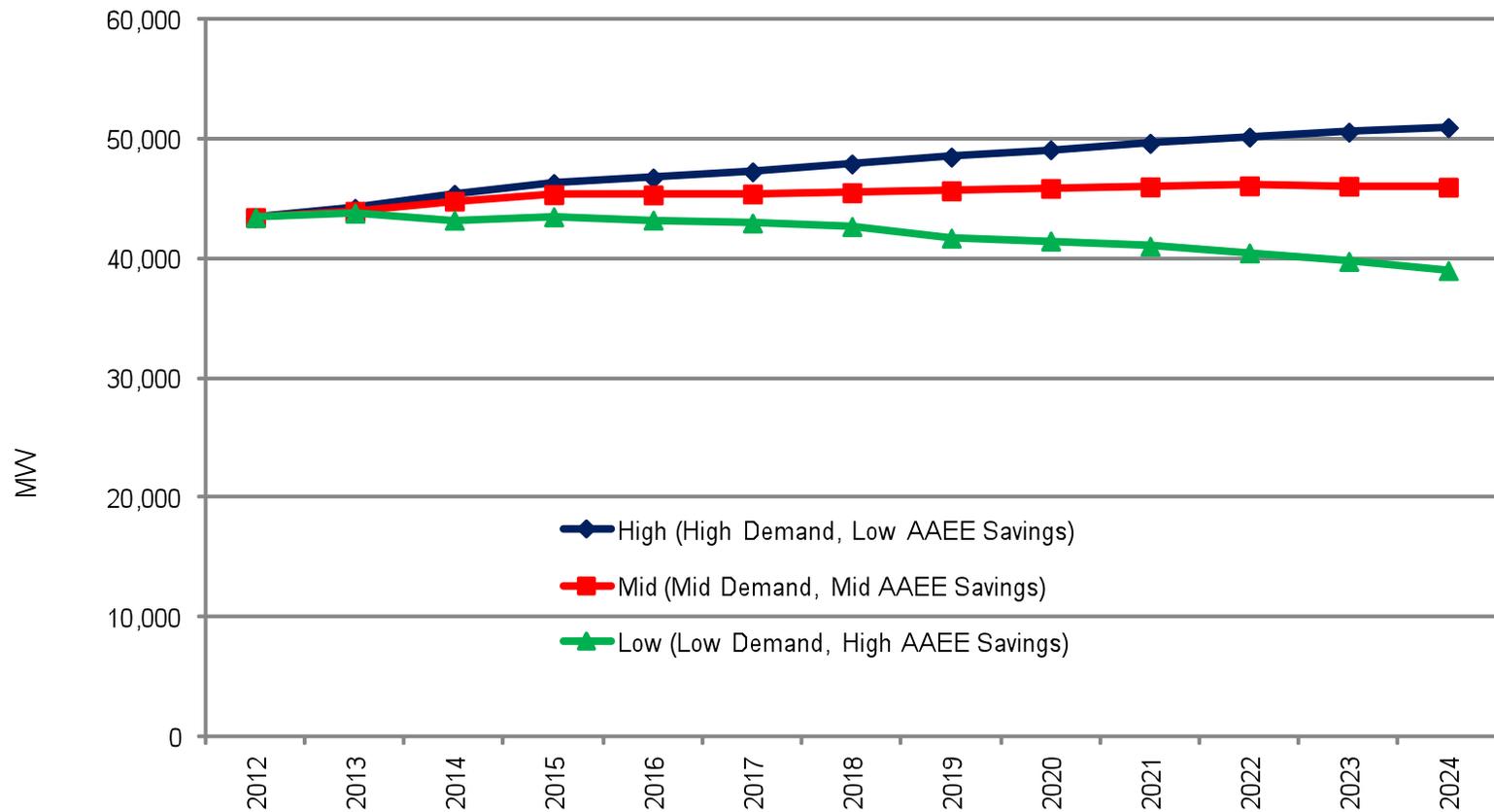


# Combined IOU Baseline and Adjusted Sales Forecasts: 3 Demand Scenarios



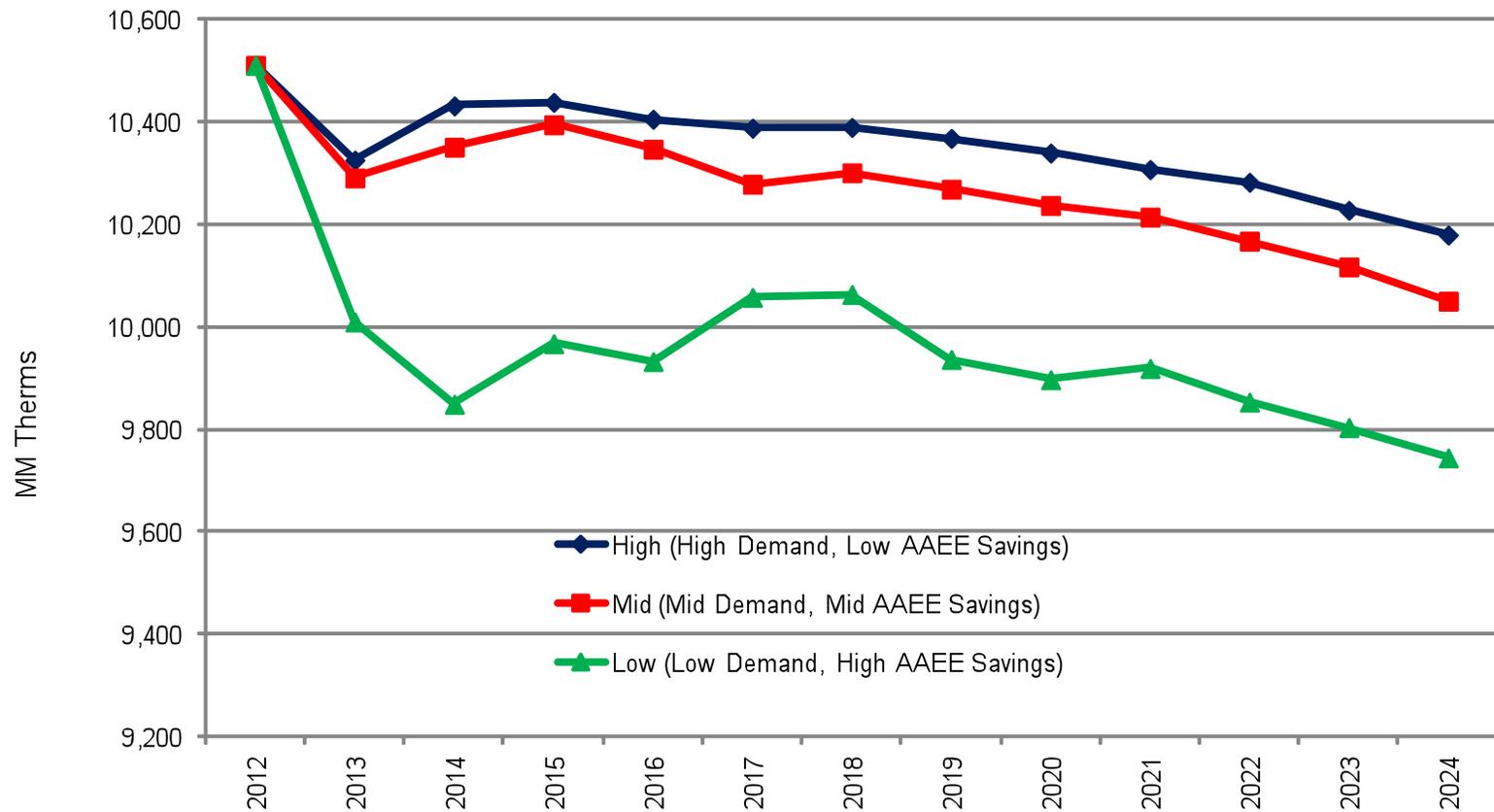


# Combined IOU Baseline and Adjusted Peak Forecasts: 3 Demand Scenarios





# Combined IOU Baseline and Adjusted Gas Forecasts: 3 Demand Scenarios





## **AAEE Uncertainties**

- Decay
- Does not include Prop. 39 and AB 758
- Emerging technologies
- Future standards savings very preliminary
- Need for updated data