California Energy Commission

# Additional Achievable Energy Efficiency (AAEE) Savings

California Energy Commission
DOCKETED
13-IEP-1C
TN 72041
OCT. 07 2013

## October 1, 2013

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# AAEE 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

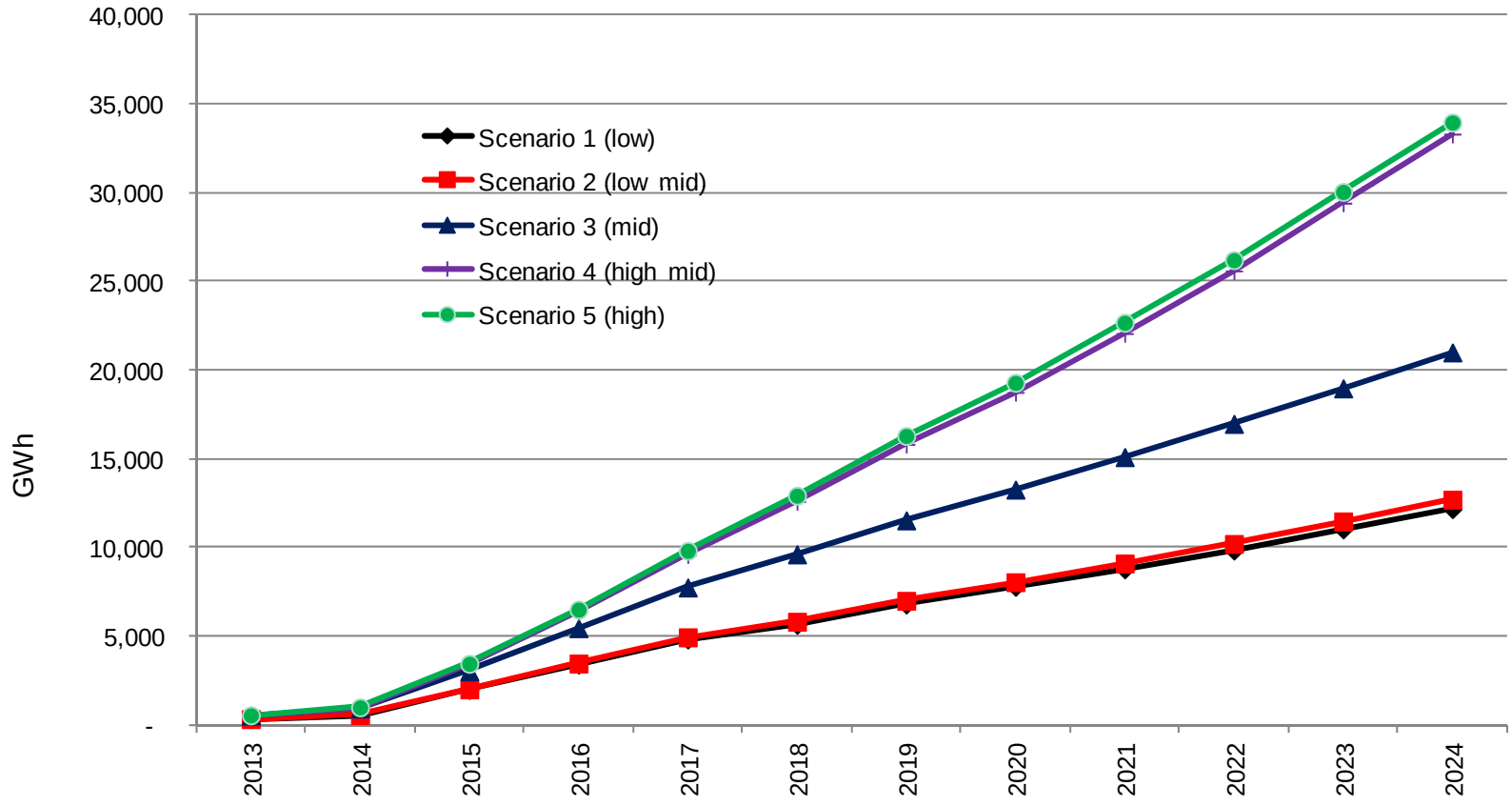
# 5 Proposed Scenarios

| Scenario Number | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Scenario Name | Low Savings | Low Mid Savings | Mid Savings | High Mid Savings | High Savings |
| ET's | 25% of model Results | 50% of model Results | 100% of model results | 150% of Model Results | 150% of Model Results |
| Building Stock | 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 |
| Retail Prices | 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 |
| Avoided Costs | 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 |
| UES | Estimate minus 25% | Estimate minus 25% | Best Estimate UES | Estimate plus 25% | Estimate plus 25% |
| Incremental Costs | Estimate plus 20% | Estimate plus 20% | Best Estimate Costs | Estimate minus 20% | Estimate minus 20% |
| Incentive Level | 50% of incremental cost | 50% of incremental cost | 50% of incremental cost | 50% of incremental cost | 50% of incremental cost |
| TRC Threshold | 1 | 1 | 0.85 | 0.75 | 0.75 |
| ET TRC Threshold | 0.85 | 0.85 | 0.5 | 0.4 | 0.4 |
| Measure Densities | Estimate minus 20% | Estimate minus 20% | Best Estimate Costs | Estimate plus 20% | Estimate plus 20% |
| Word of Mouth Effect* | 39% | 39% | 43% | 47% | 47% |
| Marketing Effect* | 1% | 1% | 2% | 3% | 3% |
| Implied Discount Rate | 20% | 20% | 18% | 14% | 14% |
| Standards Compliance | 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 |
| Title 24 Updates | None | None | 2016, 2019, 2022 | 2016, 2019, 2022 | 2016, 2019, 2022 |
| Title 20 Updates | None | None | 2016-2018 | 2016-2018 | 2016-2018 |
| Federal Standards | Already adopted | Already adopted | Already adopted | Future Federal Standards | Future Federal Standards |

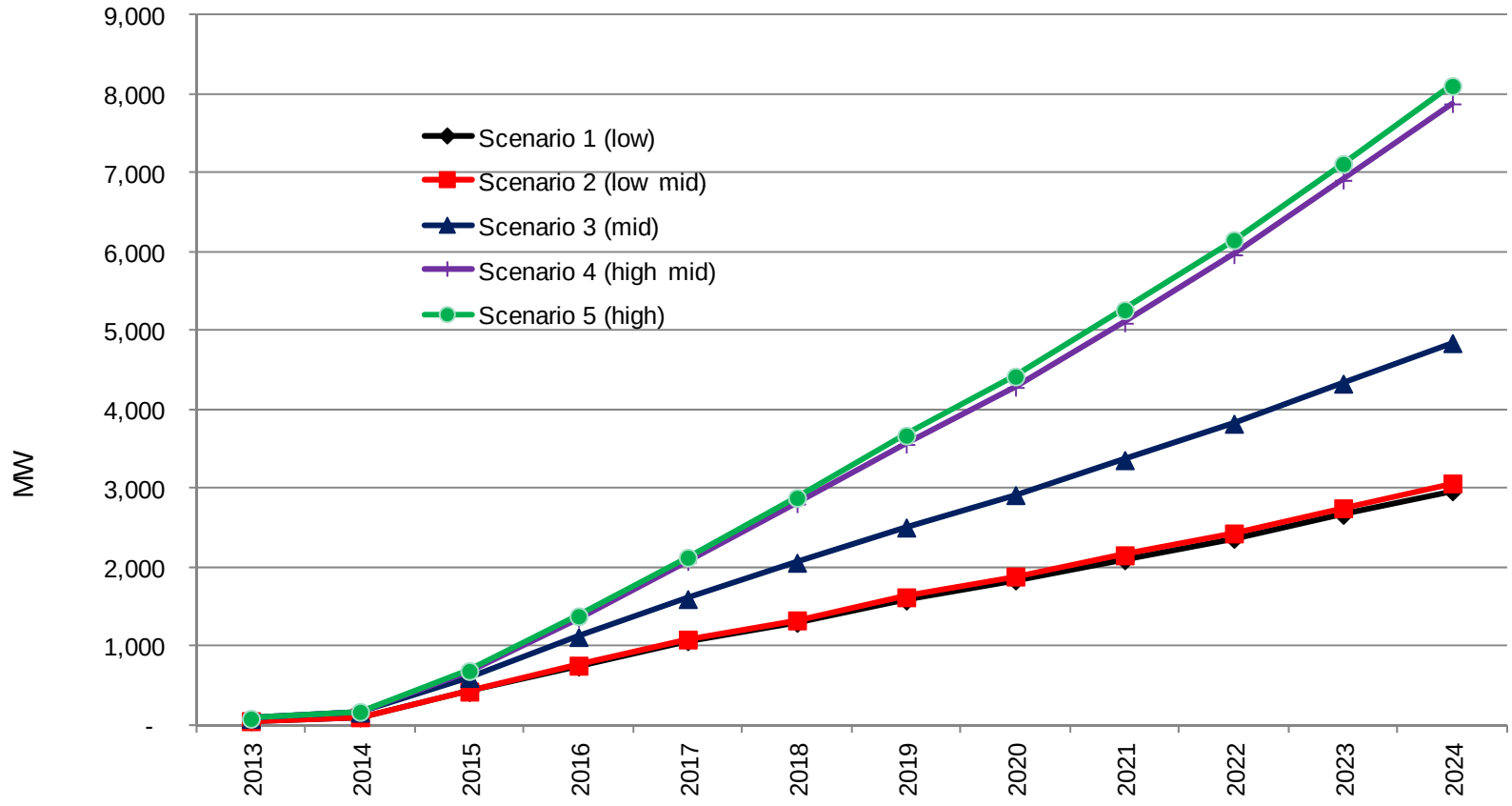
# Additional Overlap with Baseline: Lighting

- 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

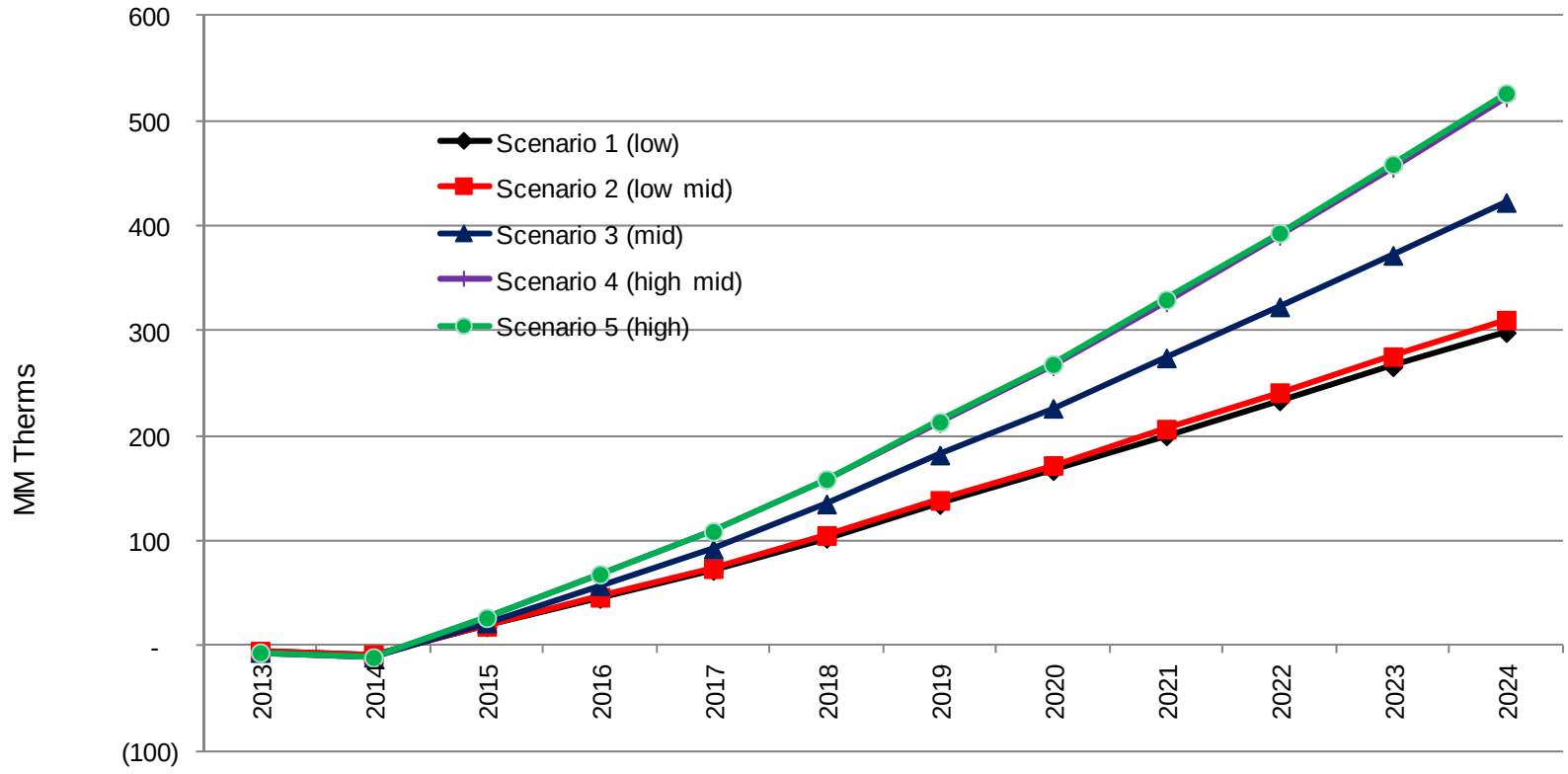
# AAEE Scenario Results: Combined IOU GWh



# AAEE Scenario Results: Combined IOU MW



# AAEE Scenario Results: Combined IOU MM Therms



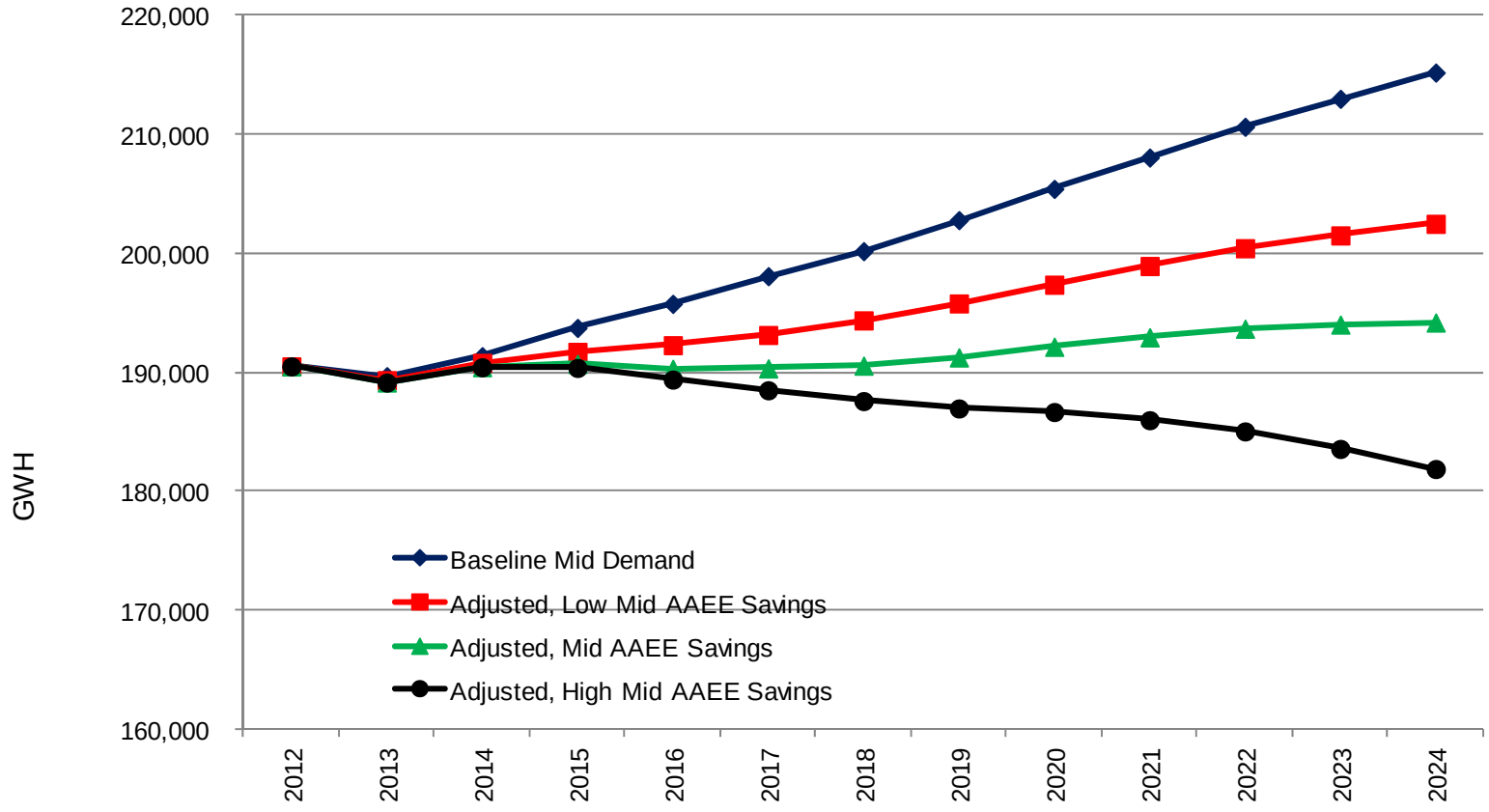
# AAEE Factoids (Combined IOUs)

- 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

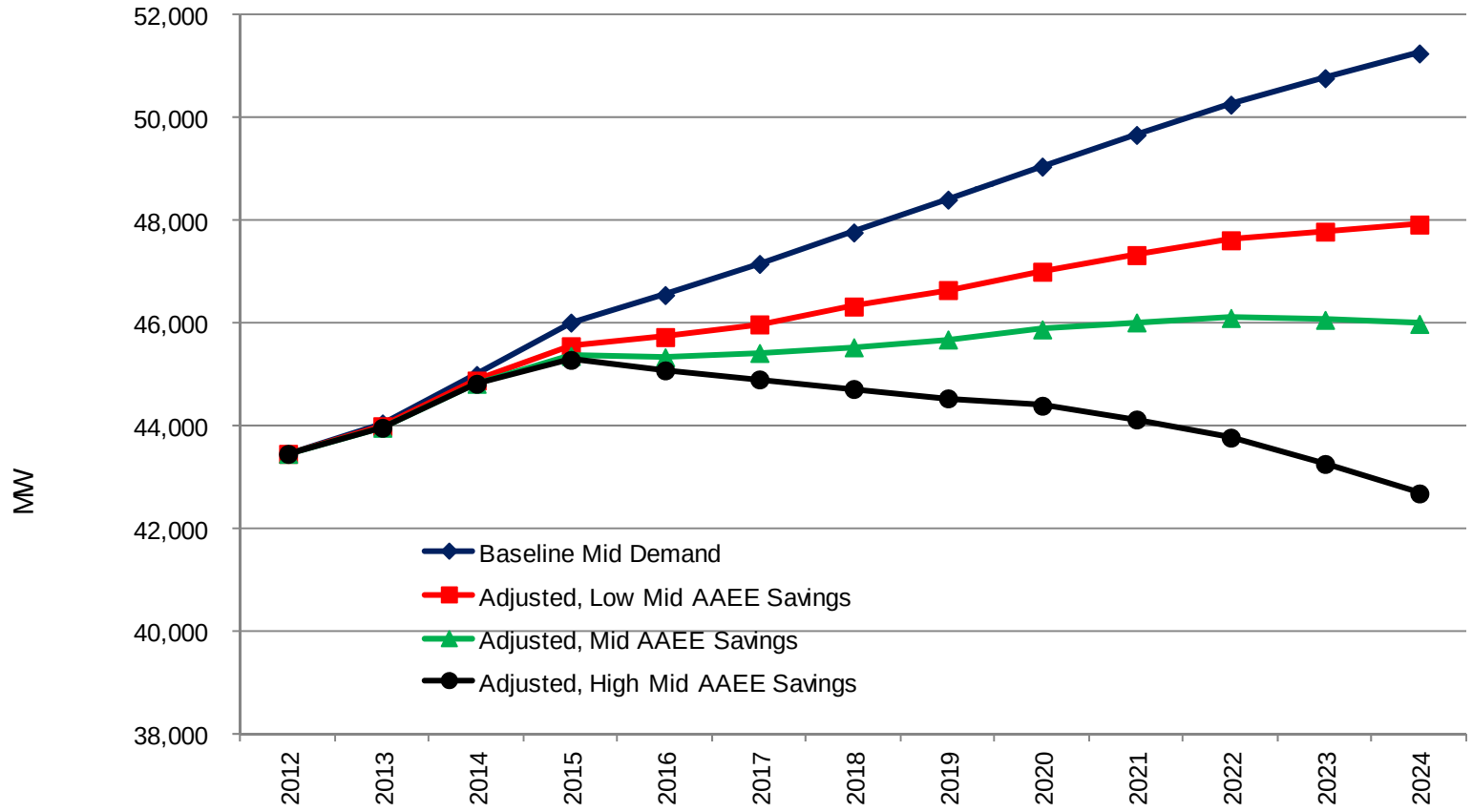
# AAEE Savings by IOU

| | 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 |

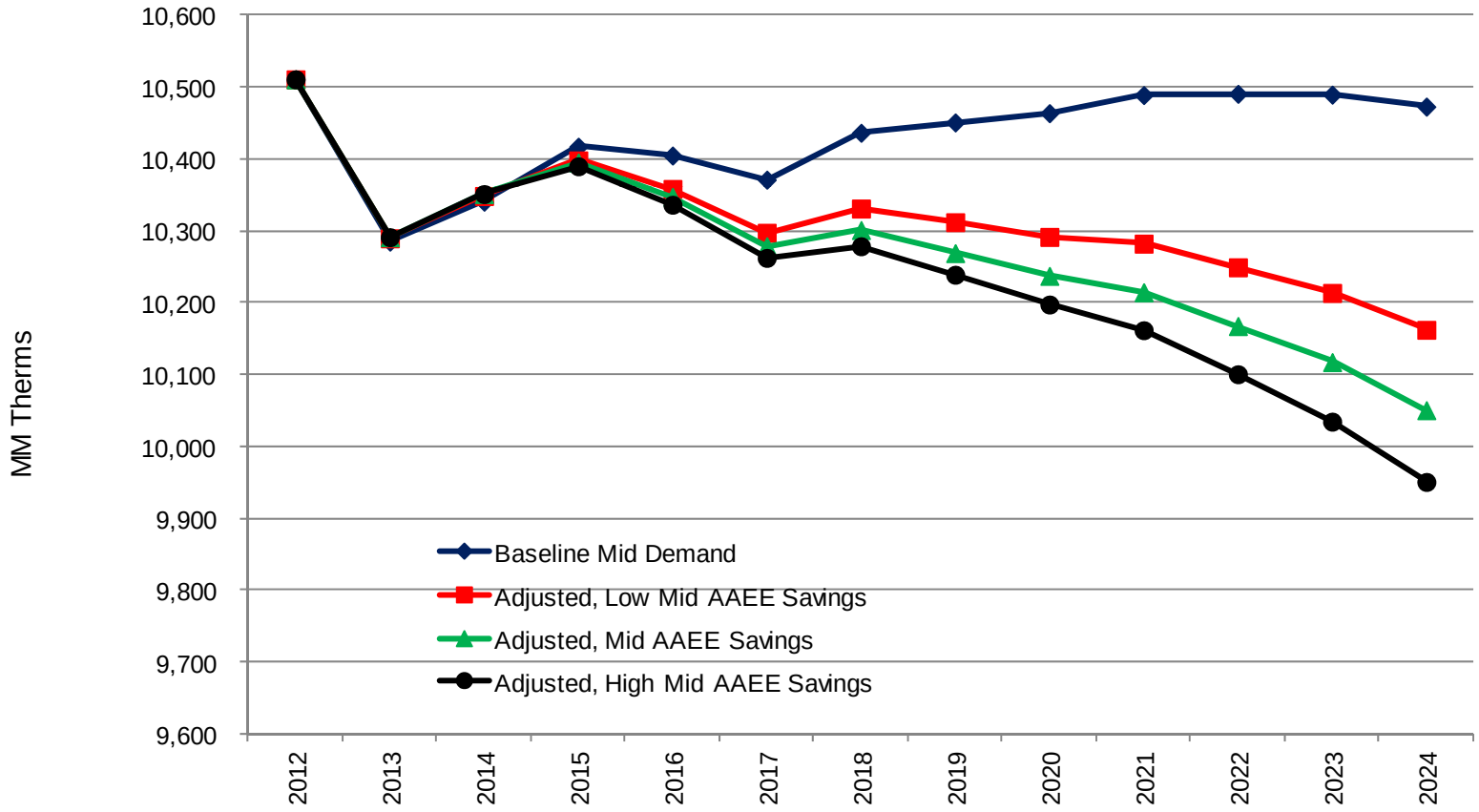
# Combined IOU Baseline and Adjusted Sales Forecasts: Mid Case



# Combined IOU Baseline and Adjusted Peak Forecasts: Mid Case



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

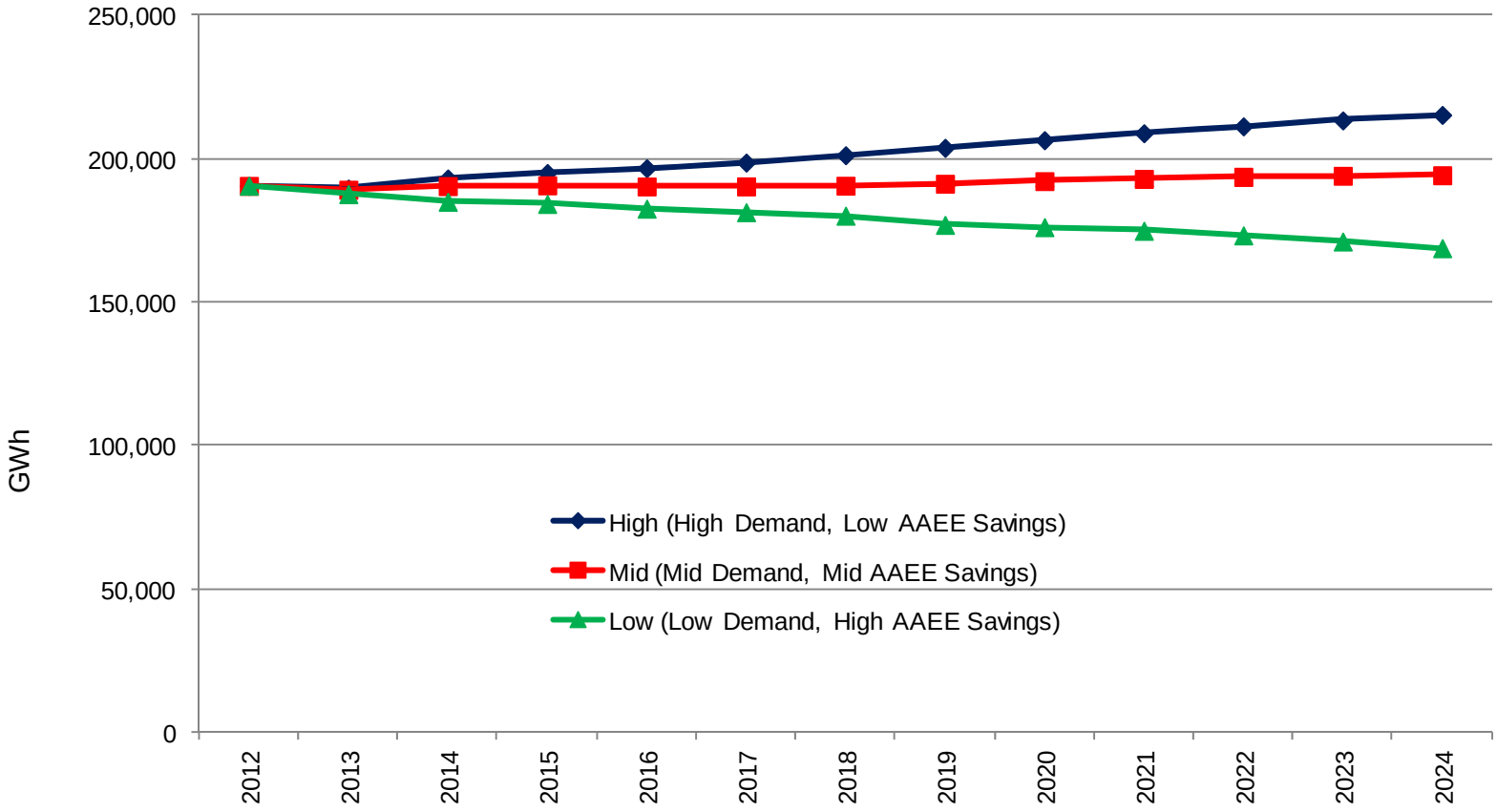


# Combining Demand and Savings Scenarios

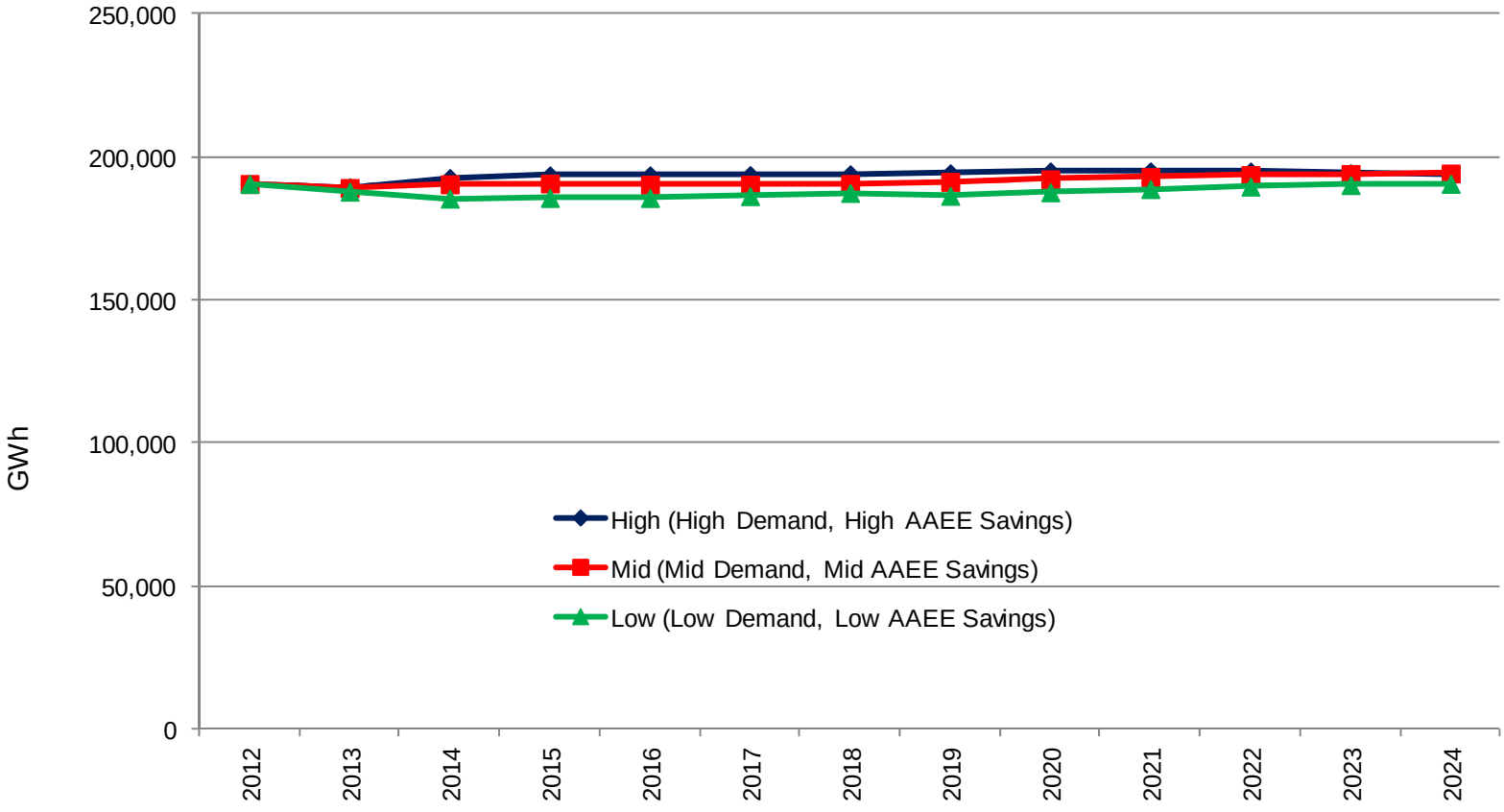
1. High demand baseline with low savings
2. Mid demand baseline with mid savings
3. Low demand baseline with high savings

- Consistent in terms of building stock, energy prices and program savings
- Inconsistency: higher economic growth may mean more measure adoptions and vice versa

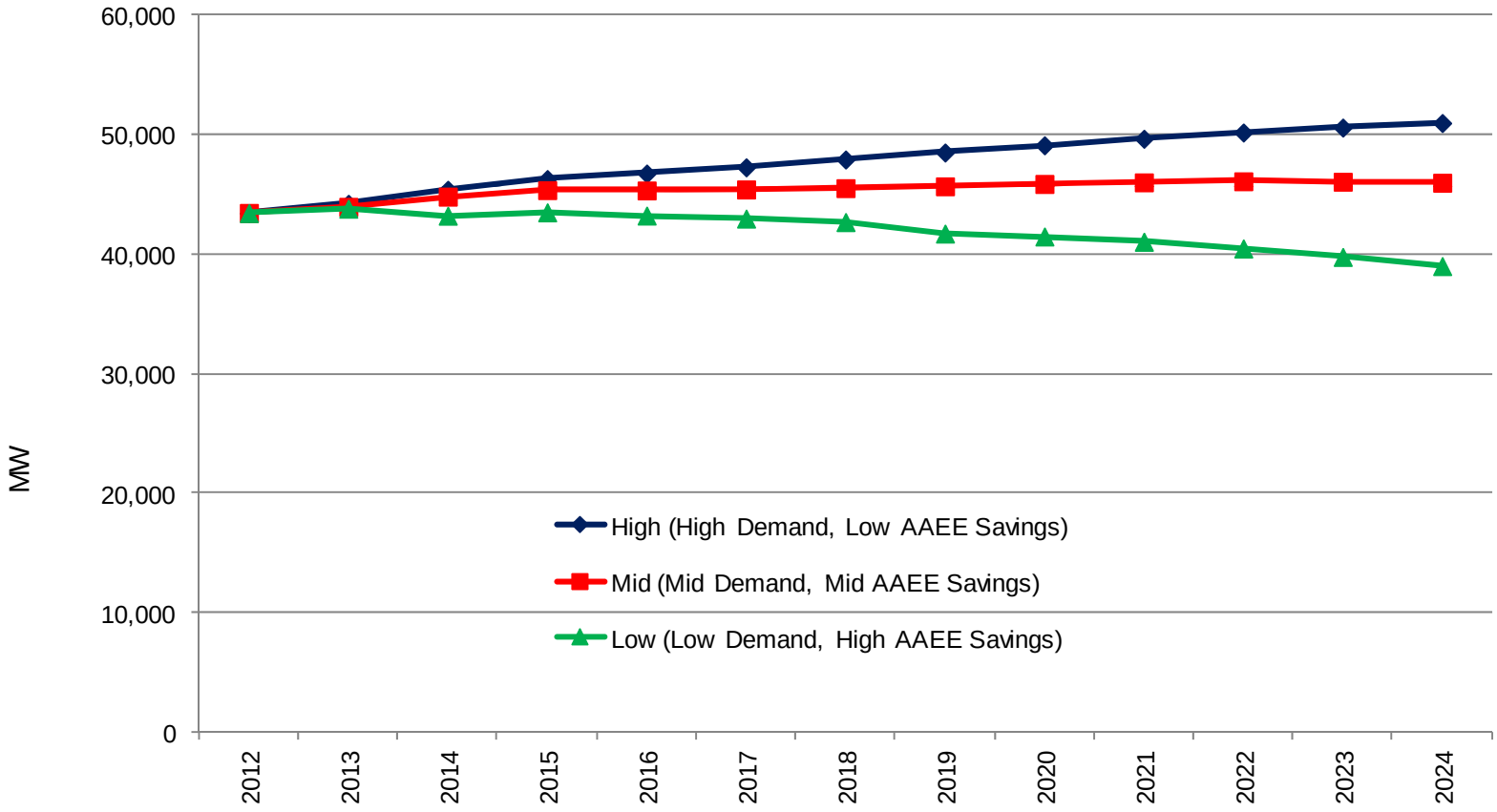
# Combined IOU Baseline Adjusted Sales Forecasts: 3 Demand Scenarios



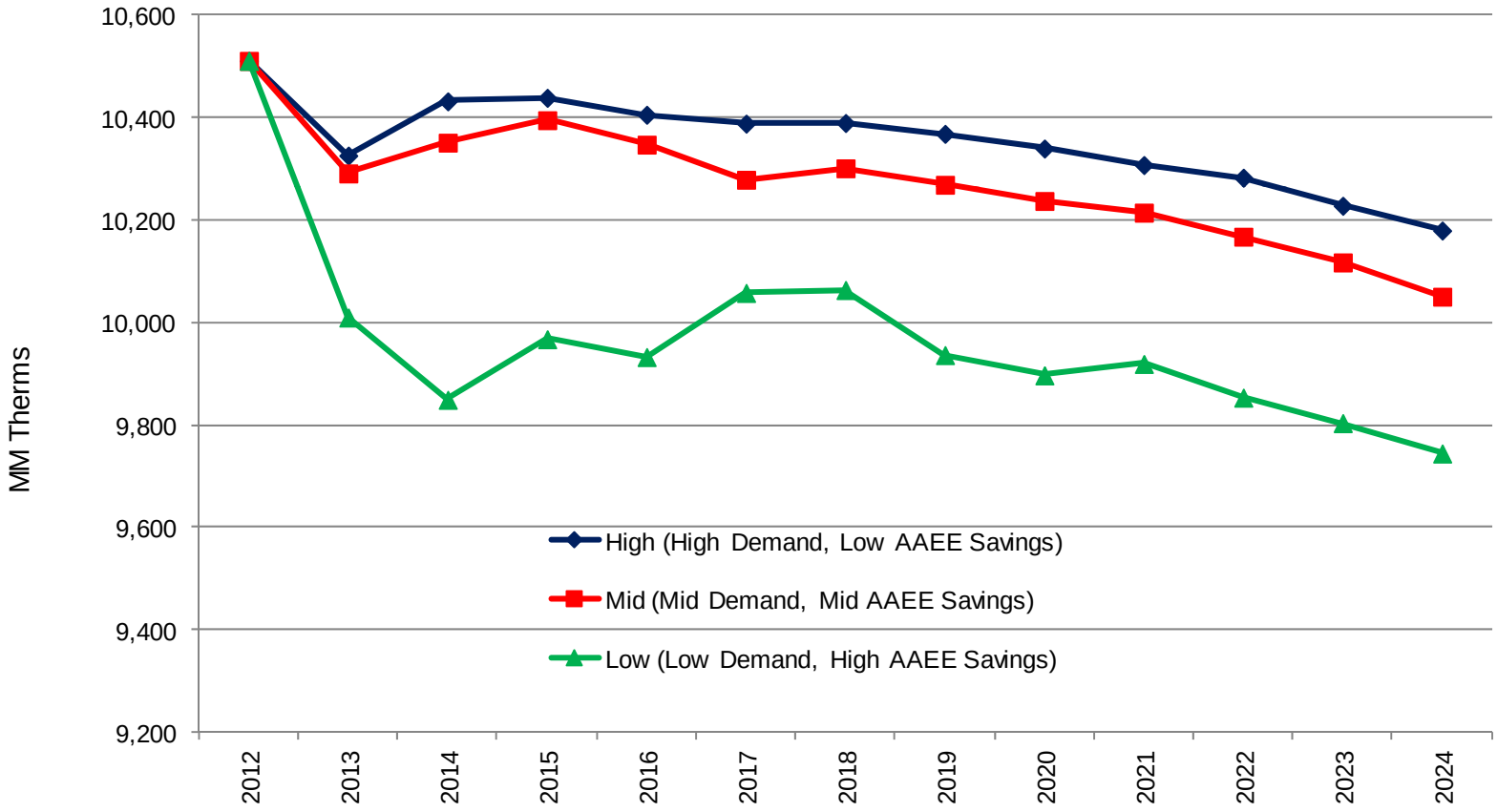
# Combined IOU Baseline and Adjusted Sales Forecasts: 3 Demand Scenarios



# 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