

DOCKETED

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CALIFORNIA ENERGY COMMISSION

Senate Bill 350 Results for Energy Efficiency Savings Through Non-Utility Programs

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Existing Buildings and Compliance Office
Efficiency Division

Joint Commissioners Workshop on Results and Recommendations
for SB 350 Energy Efficiency Target Settings
California Energy Commission
September 7, 2017



Outline

- Acknowledgements
- Core Presentation Concepts
- Codes and Standards
- Financing Overview
- Behavioral and Market Transformation Programs
- Industrial and Agricultural
- Combined Results



Acknowledgements

- NORESKO with TRC Energy Services and Center for Sustainable Energy (Efficiency Division's consulting team)
- California Public Utilities Commission
- Navigant (CPUC's consultant)



Core Presentation Concepts

- Where appropriate, updated methodologies:
 - Measure-based, energy modeling approach
 - Refined top-down estimates
 - Refined overarching assumptions
 - Reference scenario
- Savings projections categorized by:
 - Program type: Codes & Standards, Financing, Behavioral and Market Transformation
 - Building sector: Residential, Nonresidential, Industrial, Agricultural

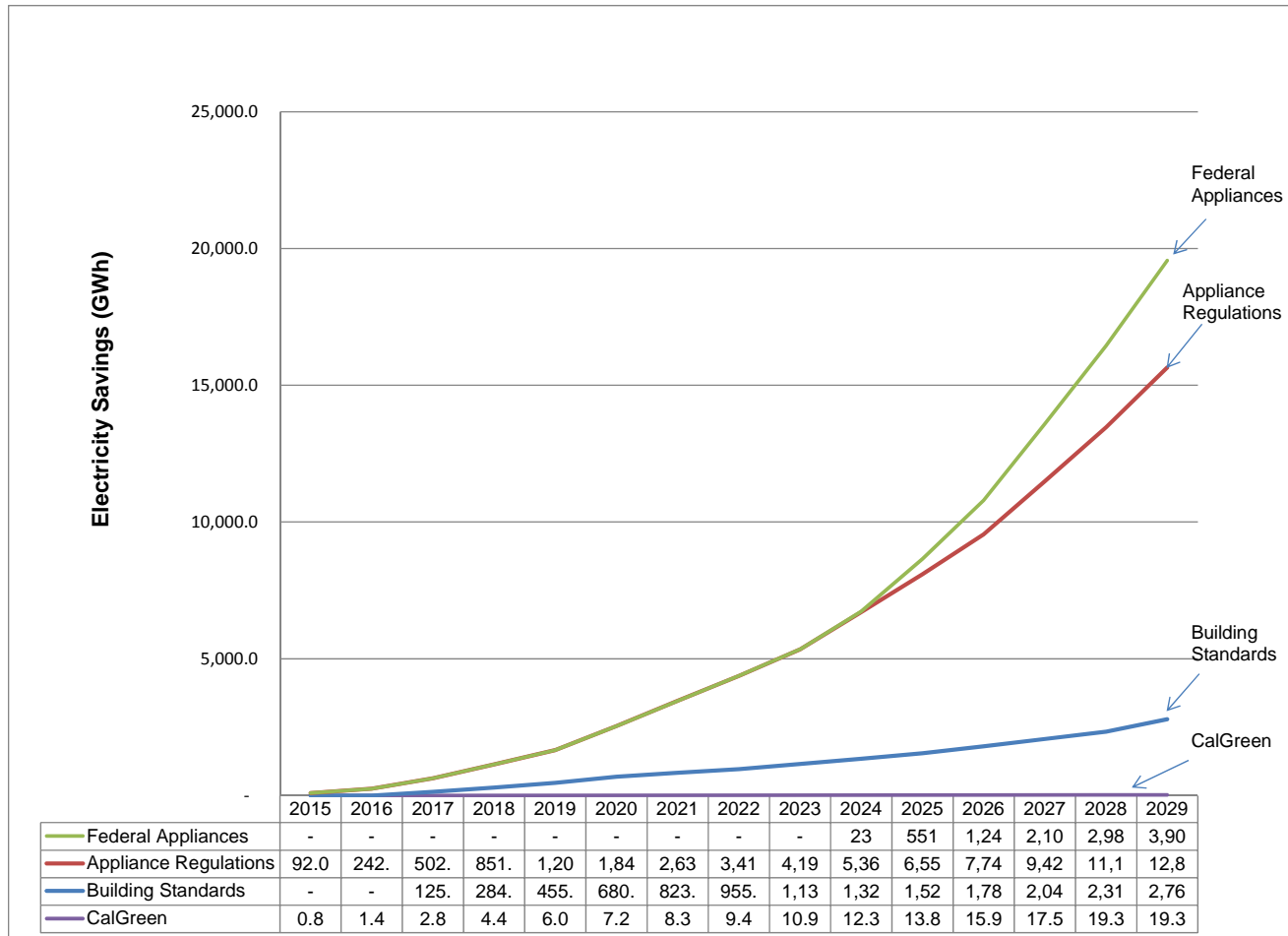


CODES AND STANDARDS

- Codes and Standards Results
- Building Energy Efficiency Standards
- California Green Building Standards Code
- Appliance Efficiency Regulations
- Federal Appliance Standards

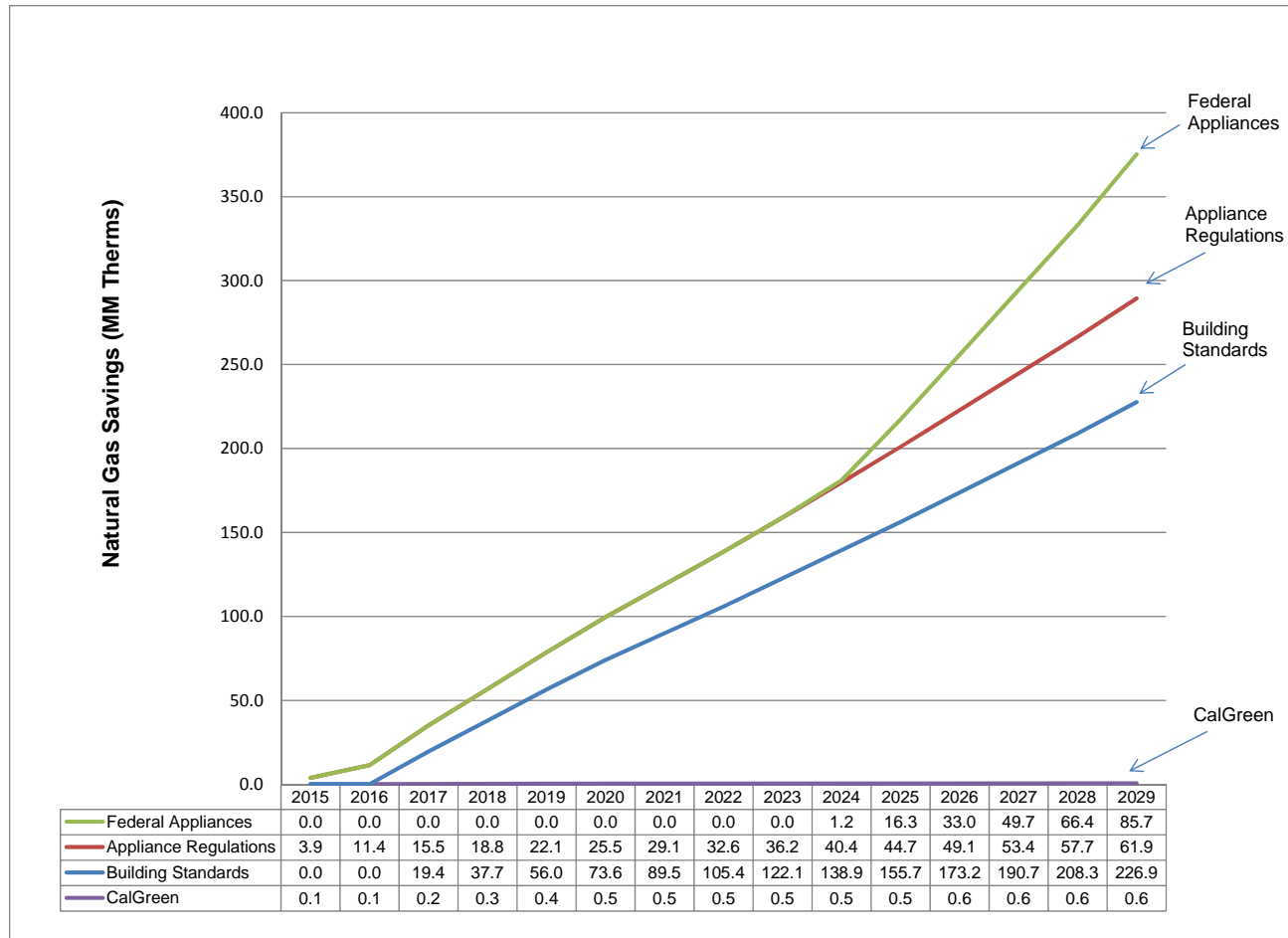


Codes and Standards Results (Electric)





Codes and Standards Results (Natural Gas)





Building Energy Efficiency Standards (Title 24, Part 6)

- Measure-based, energy modeling approach
- 2019, 2022, 2025, and 2028 Standards
- Existing building stock simulated by 1980s, 1990s, and 2000s vintage models
- New construction represented by models with 2013 or 2016 Standards
- 2029 building stock consists of measures likely to be in Standards by 2028



California Green Building Standards Code (Title 24, Part 11)

- Trends in more local governments adopting reach codes over the years
- Assumed efficiency of next Title 24 cycle
- Applied efficiency of next Title 24 cycle sooner for local governments
- Applied reduction factor for overlap with programs



Appliance Efficiency Regulations (Title 20)

- Updates to current Title 20 standards
- Adoption of new Title 20 standards
- Units Energy Savings and installation and sales from recent sources
- Installation and sales and Naturally Occurring Market Adoption static overtime
- Varying scenarios based on Compliance Adjustment Factor and adoption assumptions



Federal Appliance Standards by U.S. Department of Energy

- Updates to current Fed App standards
- Adoption of new Fed App standards
- Units Energy Savings and installation/sales from recent sources
- Installation and sales and Naturally Occurring Market Adoption static overtime
- Varying scenarios based on Compliance Adjustment Factor and adoption assumptions

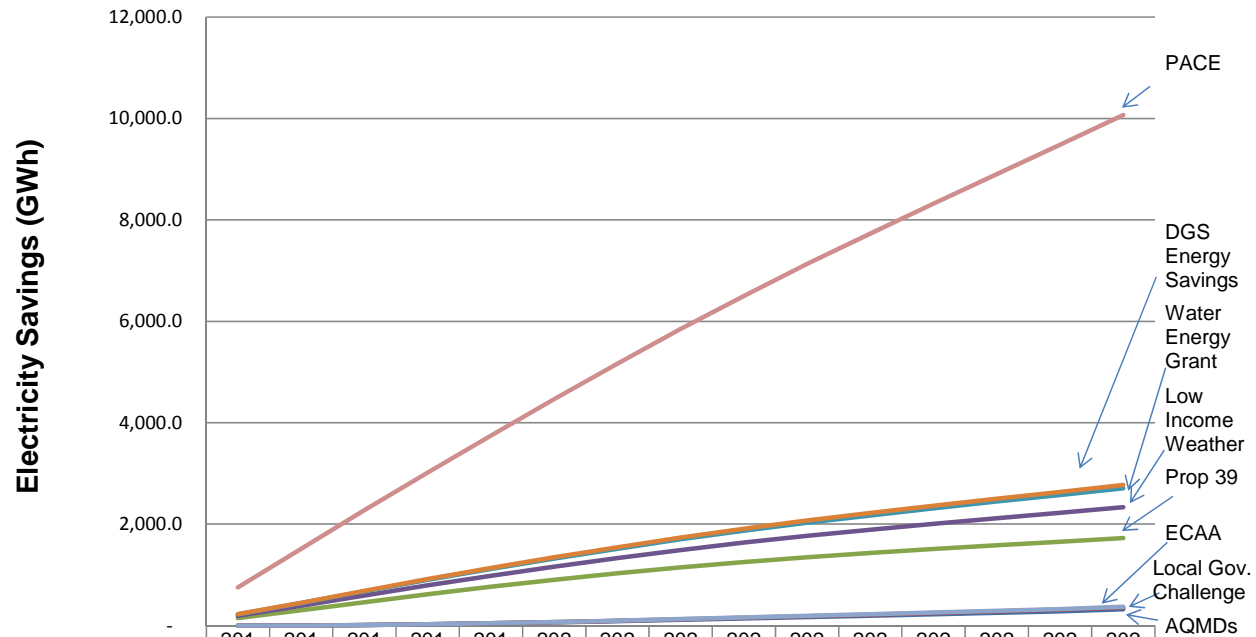


FINANCING OVERVIEW

- Financing Results
- Air Quality Management District Programs
- Property Assessed Clean Energy (PACE)
- Local Government Challenge
- Proposition 39
- Energy Conservation Assistance Act
- Low Income Weatherization Program
- Water-Energy Grant
- Energy Savings Program



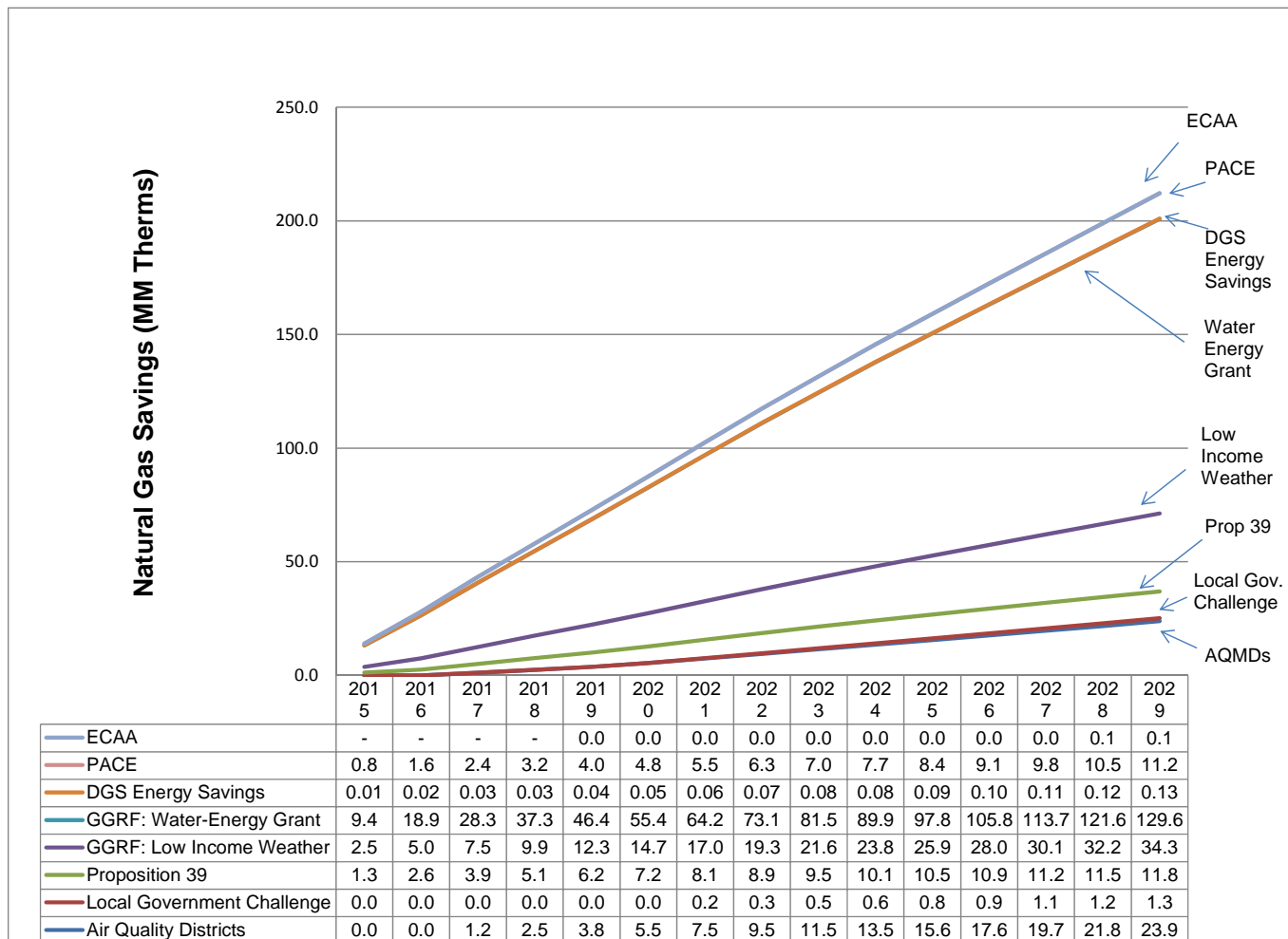
Financing Results (Electric)



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
— PACE	531.	1,06	1,59	2,10	2,61	3,11	3,61	4,11	4,58	5,06	5,50	5,95	6,40	6,84	7,29
— DGS Energy Savings	4	8	13	17	21	25	29	33	38	42	46	50	54	59	63
— GGRF: Water-Energy Grant	27.24	54.47	81.71	107.7	133.8	159.9	185.3	210.8	235.2	259.3	282.3	305.3	328.2	351.0	373.9
— GGRF: Low Income Weather	44.3	88.6	133.	175.	217.	260.	301.	343.	382.	422.	459.	496.	534.	571.	608.
— Proposition 39	149	299	448	591	719	834	933	1022	1096	1160	1210	1255	1293	1327	1357
— ECAA	-	-	-	-	1.0	2.1	3.1	4.1	5.1	6.1	7.1	8.0	9.0	9.9	10.7
— Local Government Challenge	-	-	-	-	-	-	4.4	8.9	13.3	17.6	21.8	26.1	30.2	34.4	38.3
— Air Quality Districts	-	-	10.7	26.1	41.9	64.1	88.6	112.	138.	164.	191.	220.	249.	279.	317.



Financing Results (Natural Gas)





Air Quality Management District (AQMD) Programs

- Refined top-down estimates of energy savings
- Assumed a five percent greater savings beyond current Title 24 projections
- Re-categorized as a financing program as mitigation fees are used to fund projects including energy efficiency
- Lack of AQMD funding and project data to support measure-level analysis



Property Assessed Clean Energy (PACE)

- Refined top-down estimates of energy savings
- PACE stakeholders affirmed lack of public PACE data
 - Limited aggregate data from PACE Loss Reserve Program
 - Limited market data from PACENation
- Data extrapolated to estimate the full potential of residential and nonresidential buildings
- Pending legislative actions (e.g. SB 242) that call for PACE data collection requirements



Local Government Challenge

- Refined top-down estimates of energy savings
- Estimated baseline energy consumption levels for each project
- Used attribution matrix to identify incremental savings potential through an attribution matrix
- Applied measure savings decay and utility overlap assumptions



Proposition 39

- Refined top-down estimates of energy savings
- Removed savings from solar PV projects
- Assumed savings overlap of 4% based on funding and utility rebate data
- Applied measure savings decay assumptions



Energy Conservation Assistance Act

- Refined top-down estimates of energy savings
- Limited by lack of more granular data
- Removed savings from solar PV projects
- Assumed additional funding of \$100 million (through SB 110)
- Applied measure savings decay and utility overlap assumptions



Low-Income Weatherization Program

- Refined top-down estimates of energy savings
- Limited to 2015-2016 project data
- Removed savings from solar PV and retained savings from solar thermal projects
- Applied measure savings decay and utility overlap assumptions



Water-Energy Grant

- Refined top-down estimates of energy savings
- Limited to 2014-2015 and 2016-2017 data
- Confirmed that data excluded solar PV projects
- Applied measure savings decay and utility overlap assumptions



Energy Savings Program (DGS)

- Refined top-down estimates of energy savings
- Evaluated new data for 2015-2017
- Conducted interview with DGS staff
- Assumed overlap to be 3% based on funding and utility rebate data
- Assumed no measure decay

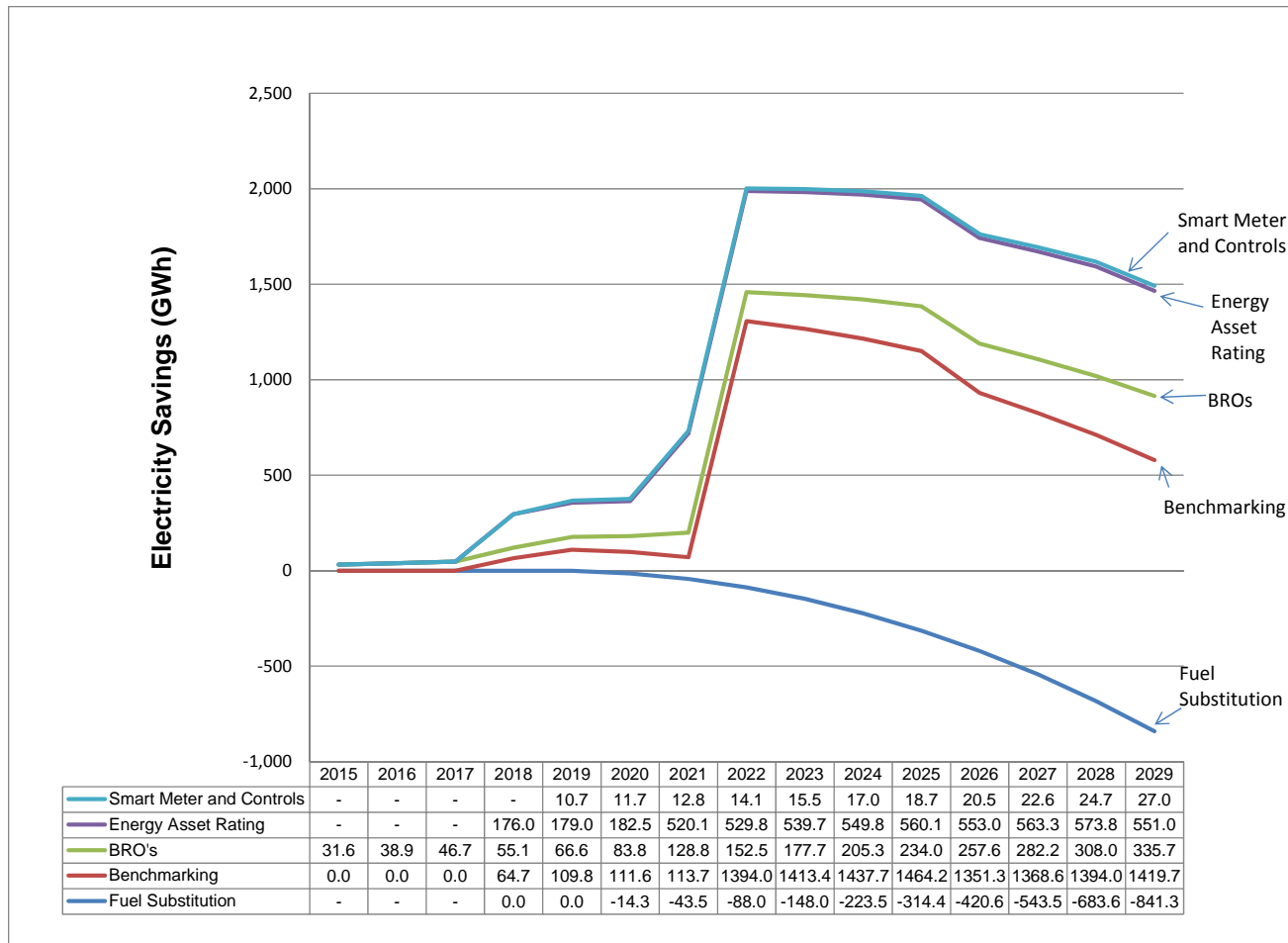


BEHAVIORAL AND MARKET TRANSFORMATION PROGRAMS

- Behavioral and Market Transformation Results
- State-Wide Benchmarking and Public Disclosure Program
- Energy Asset Rating
- Smart Meter and Controls Program
- Behavioral, Retrocommissioning, Operational Savings
- Fuel Substitution

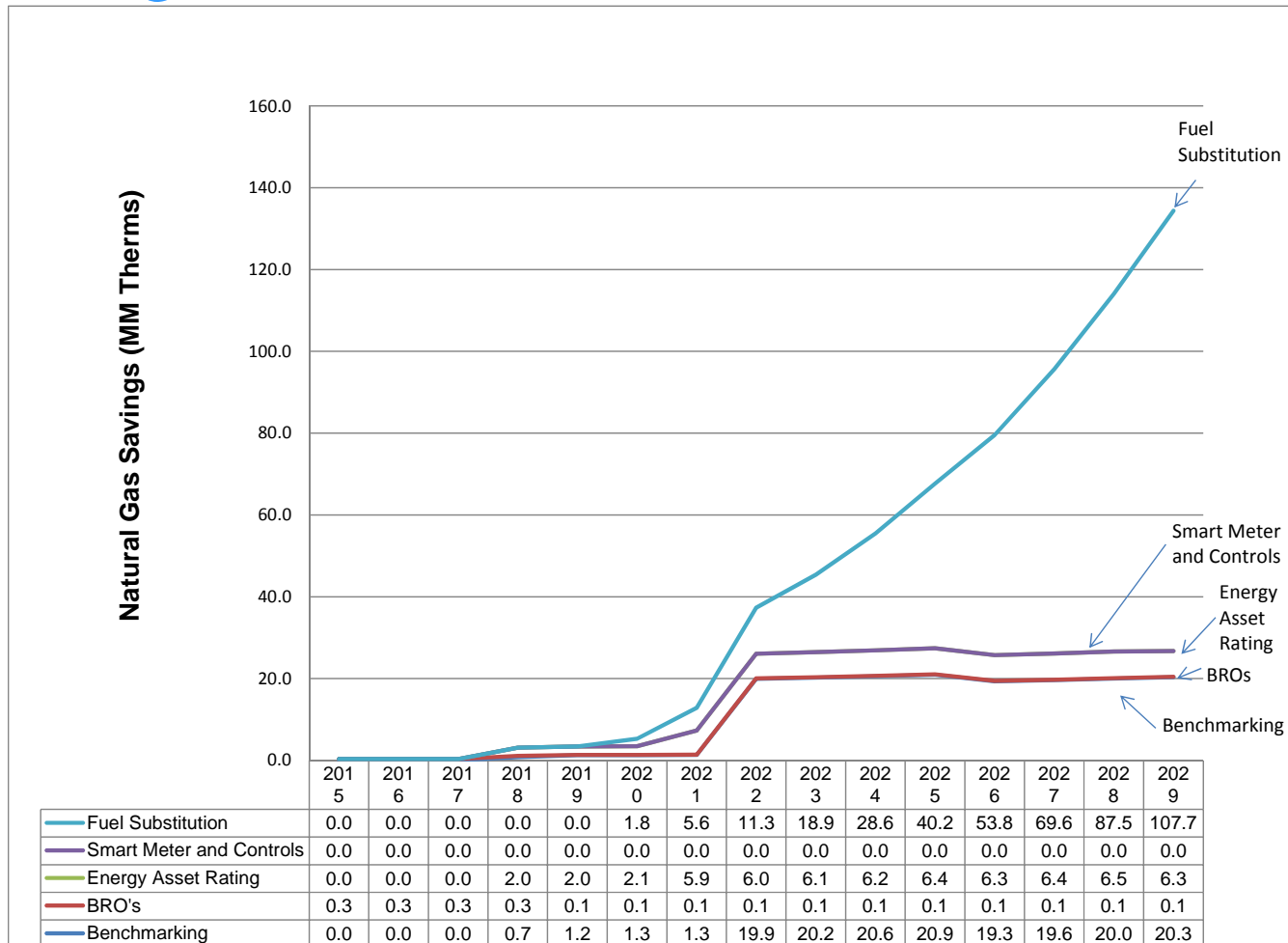


Behavioral and Market Transformation Programs Results (Electric)





Behavioral and Market Transformation Programs Results (Natural Gas)





State-Wide Benchmarking and Public Disclosure Program

- Adopted top-down analysis developed by Energy Commission staff
- Assumed benchmarking increased uptake of participation in IOU programs due to benchmarking
- Estimated for 2018-2021 savings based on initial program uptake
- Savings improvements beginning 2022



Energy Asset Rating

- Estimated more savings potential from nonresidential asset rating than residential (HERS Whole House)
- Adjusted assumptions for program uptake, participation and response rates
- Applied consistent top-down approach and same assumptions for benchmarking



Smart Meter and Controls Program

- Assumed IOU AMI savings from 2018 CPUC/Navigant PG Study for bottom wedge
- Included POU savings as incremental savings
- Developed scenario with projected savings from PG study



Behavioral, Retrocommissioning, Operational (BRO) Savings

- Assumed IOU BRO savings from the 2018 CPUC/Navigant PG Study in bottom wedge
- Included POU BRO savings as incremental savings for SB 350
- Captured incremental savings from IOU BRO not included in the 2018 PG study



Fuel Substitution

- Refined top-down estimates of energy savings
- Savings potential based on total natural gas use for space and water heating
- Reference case assumes 10% municipality adoption by 2029

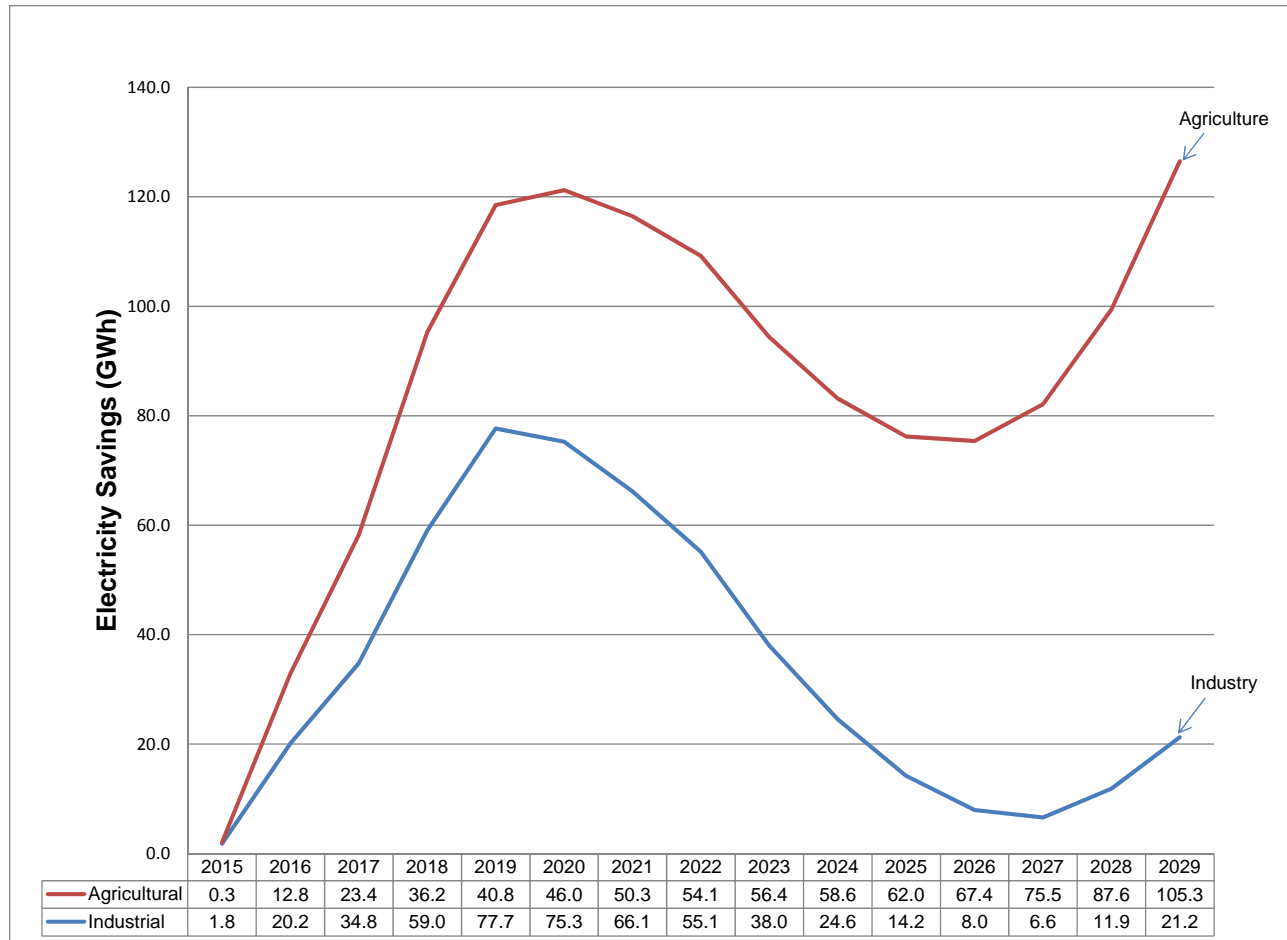


INDUSTRIAL AND AGRICULTURAL

- Industrial and Agricultural Results
- Industrial and Agricultural

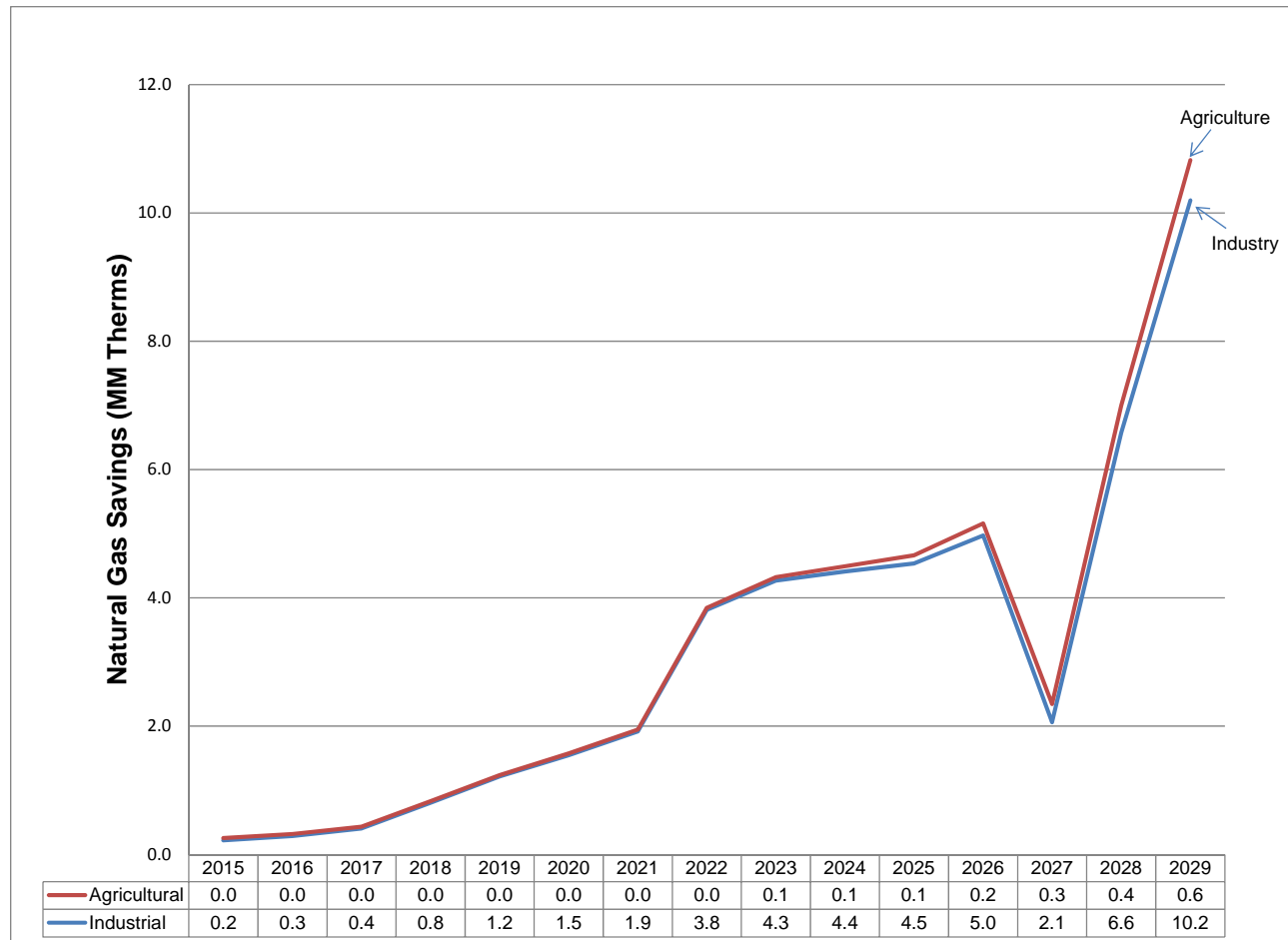


Industrial and Agricultural Results (Electric)





Industrial and Agricultural Results (Natural Gas)





Industrial and Agricultural

- Energy savings based on data in the 2018 Potential and Goals Study
- Difference Between Project Administrator Cost-Aggressive and TRC-Reference with GHG adder #1, scenario 2
- Approach applied to both sectors.

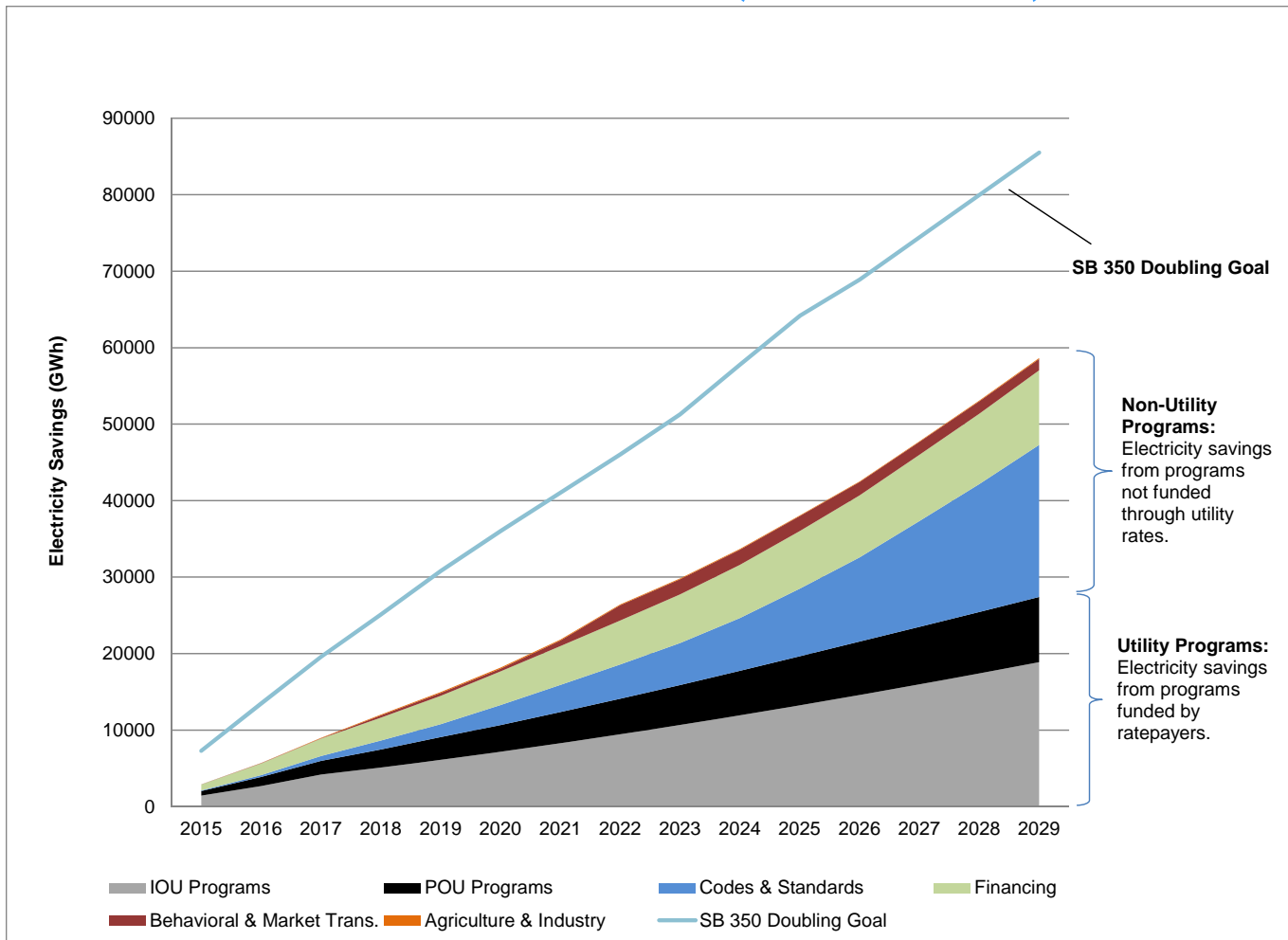


COMBINED RESULTS

- Combined Results (Electric)
- Combined Results (Natural Gas)
- Combined Results (Electric and Natural Gas)

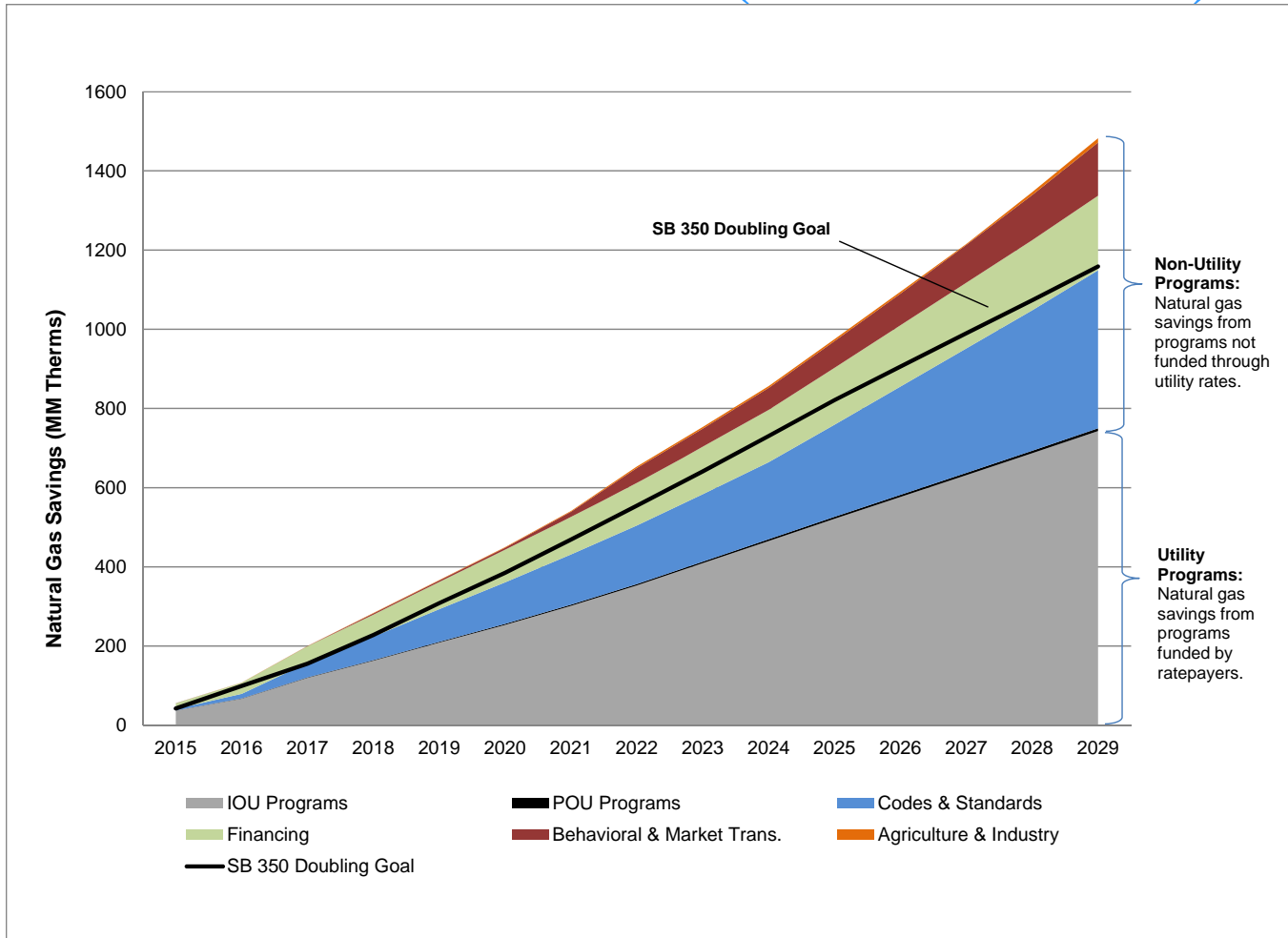


Combined Results (Electric)



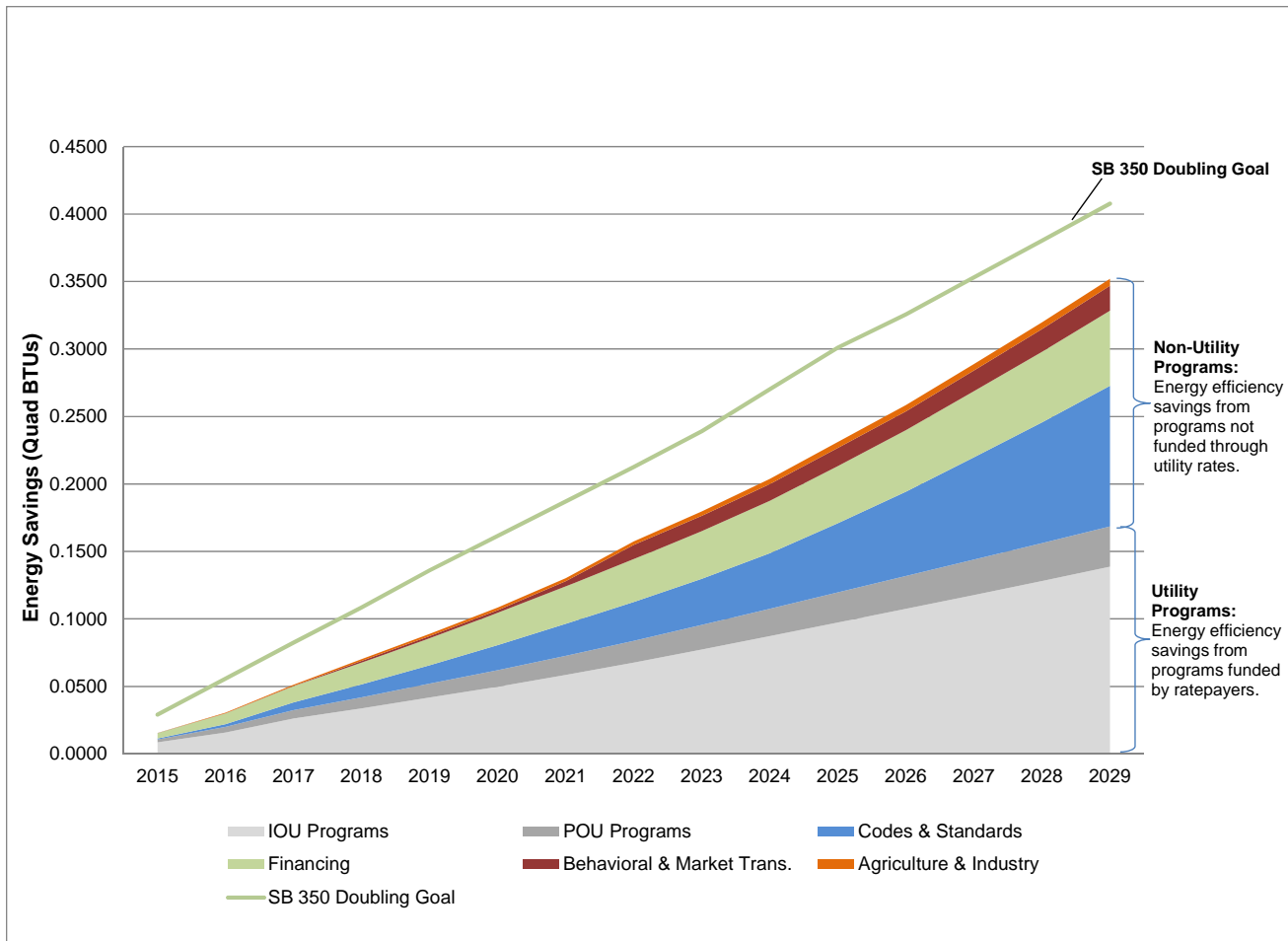


Combined Results (Natural Gas)





Combined Results (Electric and Natural Gas)





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