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IEPR Commissioner Workshop
2019 Preliminary California Energy Demand Electricity and Natural Gas Demand Forecast

Additional Achievable Energy Efficiency (AAEE) Process

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California Energy Commission

SB 350 vs. AAEE

Element	SB 350 Projections	AAEE Projections
Purpose	Identify whether the potential of programmatic targets achieve the doubling goal	Create EE projections incremental to baseline demand forecast to serve resource planning and procurement needs

SB 350 vs. AAEE

Element	SB 350 Projections	AAEE Projections
Purpose	Identify whether the potential of programmatic targets achieve the doubling goal	Create EE projections incremental to baseline demand forecast to serve resource planning and procurement needs
Accounting framework	Fixed 2015 base year	Rolling base year relative each IEPR cycle
Treatment of Uncertainty	Used a single reference case in 2017 but for 2019 a limited scenario capability exists.	Elaborate scenario design to condense uncertainty of specific elements into scenarios ranging from conservative to optimistic

SB 350 vs. AAEE

Element	SB 350 Projections	AAEE Projections
Purpose	Identify whether the potential of programmatic targets achieve the doubling goal	Create EE projections incremental to baseline demand forecast to serve resource planning and procurement needs
Accounting framework	Fixed 2015 base year	Rolling base year relative each IEPR cycle
Treatment of Uncertainty	Used a single reference case in 2017 but for 2019 a limited scenario capability exists.	Elaborate scenario design to condense uncertainty of specific elements into scenarios ranging from conservative to optimistic
Use by Other Agencies	Some agencies use SB 350 as a proxy for a very high efficiency scenario.	Explicit agreements to use specific AAEE scenarios in various resource planning and transmission planning studies
Implications of Targets Falling Short of Goals	CEC searches for additional efforts that might close the gap	NA

Additional Achievable Energy Efficiency (AAEE)
Improvements from 2017 to 2019 IEPR Cycle

- Improved analysis of decay and re-participation
  - Using cumulative results from IOU P&G Study
  - Using POU model cumulative results from work on potential savings
    - expansion of the number of POU AAEE element scenarios from the one case that is submitted in the CMUA report

- Update and expand the Beyond Utility Program workbooks originally developed in the last SB 350 cycle
  - Workbooks are embedded in a tool that assigns end use level decay based on EUL
  - total of 20 workbooks including:
    - Fuel Substitution
    - Conservation Voltage Reduction
    - Agricultural and Industrial Sectors

- Improved attribution to sector/end-use
- development of an hourly tool utilizing updated load shapes to generate 8760 hourly projections from annual AAEE savings for the ten year forecast period

- Improving natural gas demand analysis
  - building decarbonization is an emerging policy emphasis

Additional Achievable Energy Efficiency (AAEE)
2019 Process Flow Overview

2017 CMUA P&G Study
POU Projections

*Scenario Design
POU AAEE first year Projections 2020-2030

2020 CPUC P&G Study
IOU Projections

*Scenario Design
IOU AAEE first year Projections 2020-2030

CEC Beyond Utility Programs tool allows scenario design for **Beyond Utility AAEE first year Projections 2020-2030**

*Integration for
Total Cumulative AAEE Projections by year 2020-2030 by utility, sector, end use & scenario

AAEE Hourly Tool *
Total 8760 Hourly AAEE Projections by year 2020-2030 by utility, sector, end use & scenario

** In development*

Additional Achievable Energy Efficiency (AAEE) Scenario Design - for CED 2017 Revised Forecast

	Lever	Scenario 1	Scenario 2 (CPUC Adopted)	Scenario 3	Scenario 4	Scenario 4
Global Inputs	Building Stock	2016 IEPR Mid-Case	2016 IEPR Mid-Case	2016 IEPR Mid-Case	2016 IEPR Mid-Case	2016 IEPR Mid-Case
	Retail Prices	2016 IEPR Mid-Case	2016 IEPR Mid-Case	2016 IEPR Mid-Case	2016 IEPR Mid-Case	2016 IEPR Mid-Case
Equipment	Res/Com ETs		100% of model results			
	AIMS ETs		Reference			
	Incentive Levels	capped at 50% of incremental cost	capped at 50% of incremental cost	capped at 50% of incremental cost	capped at 50% of incremental cost	capped at 75% of incremental cost
	C-E Measure Screening Threshold		0.85			
	ET C-E Threshold		0.5			
	Cost-Effectiveness (C-E) Test	TRC using 2016 Avoided Costs	TRC using 2016 Avoided Costs + IOU proposed GHG Adder	TRC using 2016 Avoided Costs + CPUC Staff proposed GHG Adder	PAC using 2016 Avoided Costs	PAC using 2016 Avoided Costs
	Marketing & Outreach	Default calibrated value	Default calibrated value	Default calibrated value	Default calibrated value	Increased marketing strength
	Financing Programs	No modeled impacts	No modeled impacts	No modeled impacts	No modeled impacts	IOU financing programs broadly available to Res and Com customers
BROs	BROs Program Assumptions	Continued offering of existing BROs and sanctioned additions	Continued offering of existing BROs and sanctioned additions	Continued offering of existing BROs and sanctioned additions	Continued offering of existing BROs and sanctioned additions	Additional BROs interventions that show promise although verified data is limited
Low Income	Low Income	First Time + Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + Retreatment
Codes and Standards	Scope of Impacts	IOU Attributable	IOU Attributable	IOU Attributable	IOU Attributable	IOU Attributable
	Compliance Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction
	Standards Compliance	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements
	Title 24	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A
	Title 20	2018-2024 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20
	Federal Standards	2018-2024 On-the-books	2018-2024 On-the-books	2018-2024 On-the-books	2018-2024 On-the-books	2018-2024 On-the-books

- Scenarios quantified in the Final 2018 CPUC P&G Study

Additional Achievable Energy Efficiency (AAEE) Scenario Design - for CED 2017 Revised Forecast

	Lever	Scenario 2 (CPUC Adopted)
Global Inputs	Building Stock	2016 IEPR Mid-Case
	Retail Prices	2016 IEPR Mid-Case
Equipment	Res/Com ETs	100% of model results
	AIMS ETs	Reference
	Incentive Levels	capped at 50% of incremental cost
	C-E Measure Screening Threshold	0.85
	ET C-E Threshold	0.5
	Cost-Effectiveness (C-E) Test	TRC using 2016 Avoided Costs + IOU proposed GHG Adder
	Marketing & Outreach	Default calibrated value
	Financing Programs	No modeled impacts
BROs	BROs Program Assumptions	Continued offering of existing BROs and sanctioned additions
Low Income	Low Income	First Time + Retreatment
Codes and Standards	Scope of Impacts	IOU Attributable
	Compliance Reduction	No Compliance Reduction
	Standards Compliance	No Compliance Enhancements
	Title 24	2019 T24 NC (R/NR) + R A&A
	Title 20	2018-2024 T20
	Federal Standards	2018-2024 On-the-books

- Scenarios quantified in the Final 2018 CPUC P&G Study
- Scenario 2 adopted by the CPUC

IOU AAEE Scenario Design
- for CED 2017 Revised Forecast

	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock			Mid Demand Case			
	Retail Prices			Mid Demand Case			
	Res/Com ETs			100% of model results			
	AIMS ETs			Reference			
	Incentive Levels			Reference			
	C-E Measure Screening Threshold			0.85			
	ET C-E Threshold			0.5			
	Cost-Effectiveness Test			mTRC(GHG Adder #1)			
	Marketing & Outreach			Reference			
	Financing Programs			Reference			
	BROs Program Assumptions			Reference			
	Low Income			First Time + Retreatment			
	Compliance Reduction			No Compliance Reduction			
	Standards Compliance			No Compliance Enhancements			
	Title 24			2019 T24 NC (R/NR) + R A&A			
	Title 20			2018-2024 T20			
	Federal Standards			On-the-books			

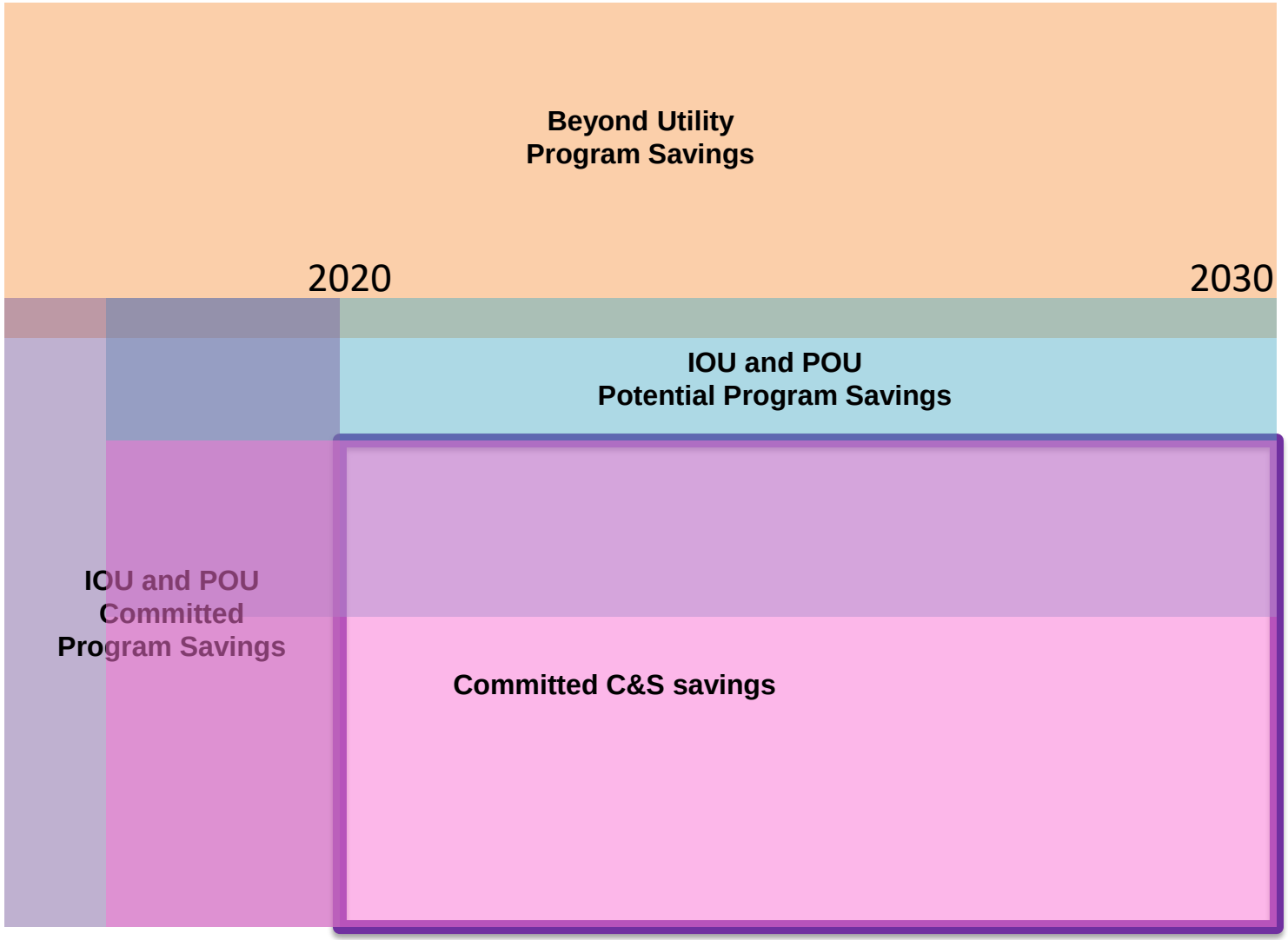
- Design IOU AAEE Scenarios around the base case chosen by the CPUC from the IOU P&G Study Scenarios

IOU AAEE Scenario Design
- for CED 2017 Revised Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock	High Demand Case	Mid Demand Case	Mid Demand Case	Mid Demand Case	Low Demand Case	Mid Demand Case
	Retail Prices	High Demand Case	Mid Demand Case	Mid Demand Case	Mid Demand Case	Low Demand Case	Mid Demand Case
Post-process P&G results to eliminate duplication with baseline forecast	Res/Com ETs	50% of model Results	50% of model Results	100% of model results	150% of model results	150% of model results	150% of model results
	AIMS ETs	Reference	Reference	Reference	Reference	Reference	Aggressive
	Incentive Levels	Reference	Reference	Reference	Reference	Reference	Aggressive
	C-E Measure Screening Threshold	1	1	0.85	0.75	0.75	0.75
	ET C-E Threshold	0.85	0.85	0.5	0.4	0.4	0.4
	Cost-Effectiveness Test	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	PAC
	Marketing & Outreach	Reference	Reference	Reference	Aggressive	Aggressive	Aggressive
	Financing Programs	Reference	Reference	Reference	Aggressive	Aggressive	Aggressive
	BROs Program Assumptions	Reference	Reference	Reference	Reference	Reference	Aggressive
	Low Income	First Time + 50% Retreatment	First Time + 50% Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + 150% Retreatment
Use P&G C&S model results directly for IOUs and allocate "statewide" shares to each POU or POU grouping	Compliance Reduction	20% Compliance Rate Reduction	20% Compliance Rate Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction
	Standards Compliance	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements	Compliance Enhancements	Compliance Enhancements	Compliance Enhancements
	Title 24	No additional Codes	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A
	Title 20	2018 T20	2018 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20
	Federal Standards	On-the-books	On-the-books	On-the-books	On-the-books	On-the-books	On-the-books

- Design IOU AAEE Scenarios around the base case chosen by the CPUC from the IOU P&G Study Scenarios
  - **eliminate duplication with baseline forecast**

Additional Achievable Energy Efficiency (AAEE) Scenario Design - for CED 2017 Revised Forecast



- eliminate duplication with baseline forecast

Code and Standards Savings Contributions

Scenario Design - for CED 2017 Revised Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock	High Demand Case	Mid Demand Case	Mid Demand Case	Mid Demand Case	Low Demand Case	Mid Demand Case
	Retail Prices	High Demand Case	Mid Demand Case	Mid Demand Case	Mid Demand Case	Low Demand Case	Mid Demand Case
Post-process P&G results to eliminate duplication with baseline forecast	Res/Com ETs	50% of model Results	50% of model Results	100% of model results	150% of model results	150% of model results	150% of model results
	AIMS ETs	Reference	Reference	Reference	Reference	Reference	Aggressive
	Incentive Levels	Reference	Reference	Reference	Reference	Reference	Aggressive
	C-E Measure Screening Threshold	1	1	0.85	0.75	0.75	0.75
	ET C-E Threshold	0.85	0.85	0.5	0.4	0.4	0.4
	Cost-Effectiveness Test	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	PAC
	Marketing & Outreach	Reference	Reference	Reference	Aggressive	Aggressive	Aggressive
	Financing Programs	Reference	Reference	Reference	Aggressive	Aggressive	Aggressive
	BROs Program Assumptions	Reference	Reference	Reference	Reference	Reference	Aggressive
	Low Income	First Time + 50% Retreatment	First Time + 50% Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + 150% Retreatment
Use P&G C&S model results directly for IOUs and allocate "statewide" shares to each POU or POU grouping	Compliance Reduction	20% Compliance Rate Reduction	20% Compliance Rate Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction
	Standards Compliance	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements	Compliance Enhancements	Compliance Enhancements	Compliance Enhancements
	Title 24	No additional Codes	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A
	Title 20	2018 T20	2018 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20
	Federal Standards	On-the-books	On-the-books	On-the-books	On-the-books	On-the-books	On-the-books

- **Use CPUC P&G C&S model results for IOU territory C&S savings**
  - *Total savings not just attributable*
- **Scale up to "statewide savings" and allocate shares to each POU or POU grouping**
  - *Essential for the small POU's inside CAISO planning area*

POU AAEE Scenario Design
- for CED 2017 Revised Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock	High Demand Case	Mid Demand Case	Mid Demand Case	Mid Demand Case	Low Demand Case	Mid Demand Case
	Retail Prices	High Demand Case	Mid Demand Case	Mid Demand Case	Mid Demand Case	Low Demand Case	Mid Demand Case
Post-process P&G results to eliminate duplication with baseline forecast	Res/Com ETs	50% of model Results	50% of model Results	100% of model results	150% of model results	150% of model results	150% of model results
	AIMS ETs	Reference	Reference	Reference	Reference	Reference	Aggressive
	Incentive Levels	Reference	Reference	Reference	Reference	Reference	Aggressive
	C-E Measure Screening Threshold	1	1	0.85	0.75	0.75	0.75
	ET C-E Threshold	0.85	0.85	0.5	0.4	0.4	0.4
	Cost-Effectiveness Test	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	mTRC(GHG Adder #1)	PAC
	Marketing & Outreach	Reference	Reference	Reference	Aggressive	Aggressive	Aggressive
	Financing Programs	Reference	Reference	Reference	Aggressive	Aggressive	Aggressive
	BROs Program Assumptions	Reference	Reference	Reference	Reference	Reference	Aggressive
	Low Income	First Time + 50% Retreatment	First Time + 50% Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + Retreatment	First Time + 150% Retreatment
Use P&G C&S model results directly for IOUs and allocate "statewide" shares to each POU or POU grouping	Compliance Reduction	20% Compliance Rate Reduction	20% Compliance Rate Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction	No Compliance Reduction
	Standards Compliance	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements	Compliance Enhancements	Compliance Enhancements	Compliance Enhancements
	Title 24	No additional Codes	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A	2019 T24 NC (R/NR) + R A&A
	Title 20	2018 T20	2018 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20	2018-2024 T20
	Federal Standards	On-the-books	On-the-books	On-the-books	On-the-books	On-the-books	On-the-books
create cumulative savings from first year	POU Programs	Reference					

- use the one **POU AAEE Scenario** submitted in CMUA Potential Study

Beyond Utility AAEE Scenario Design

- for CED 2017 Revised Forecast

Extract Results from workbook based Modeling and allocate "statewide" shares to each utility	**Compliance Reduction**			Compliance Rate Reduction	Compliance Rate Reduction	Compliance Rate Reduction	Compliance Rate Reduction
	Standards Compliance	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements	Compliance Enhancements	Compliance Enhancements	Compliance Enhancements
	Title 24			2019 T24 NR A&A	2019 T24 NR A&A plus T24 NC ratchets	2019 T24 NR A&A plus T24 NC ratchets	2019 T24 NR A&A plus T24 NC ratchets
	Title 20				SB 350 T20 < 2025 start	SB 350 T20 < 2025 start	SB 350 T20 scaled down
	Federal Standards				SB 350 Fed < 2025 start	SB 350 Fed < 2025 start	SB 350 Fed scaled down
Scale and Extend workbook based Analyses of Beyond Utility Programs Using Energy Scaling Factor Approach and then allocate "statewide" shares to each utility	Savings from additional SB 350 programs that are not utility programs or standards that are considered likely	Prop 39	Prop 39	Prop 39	Prop 39	Prop 39	Prop 39, Local Government Ordinances, Local Government Challenge, GGRF: Low Income and GGRF: Water-Energy Grant, DGS Energy Retrofits, ECAA, PACE, Benchmarking, and BROs

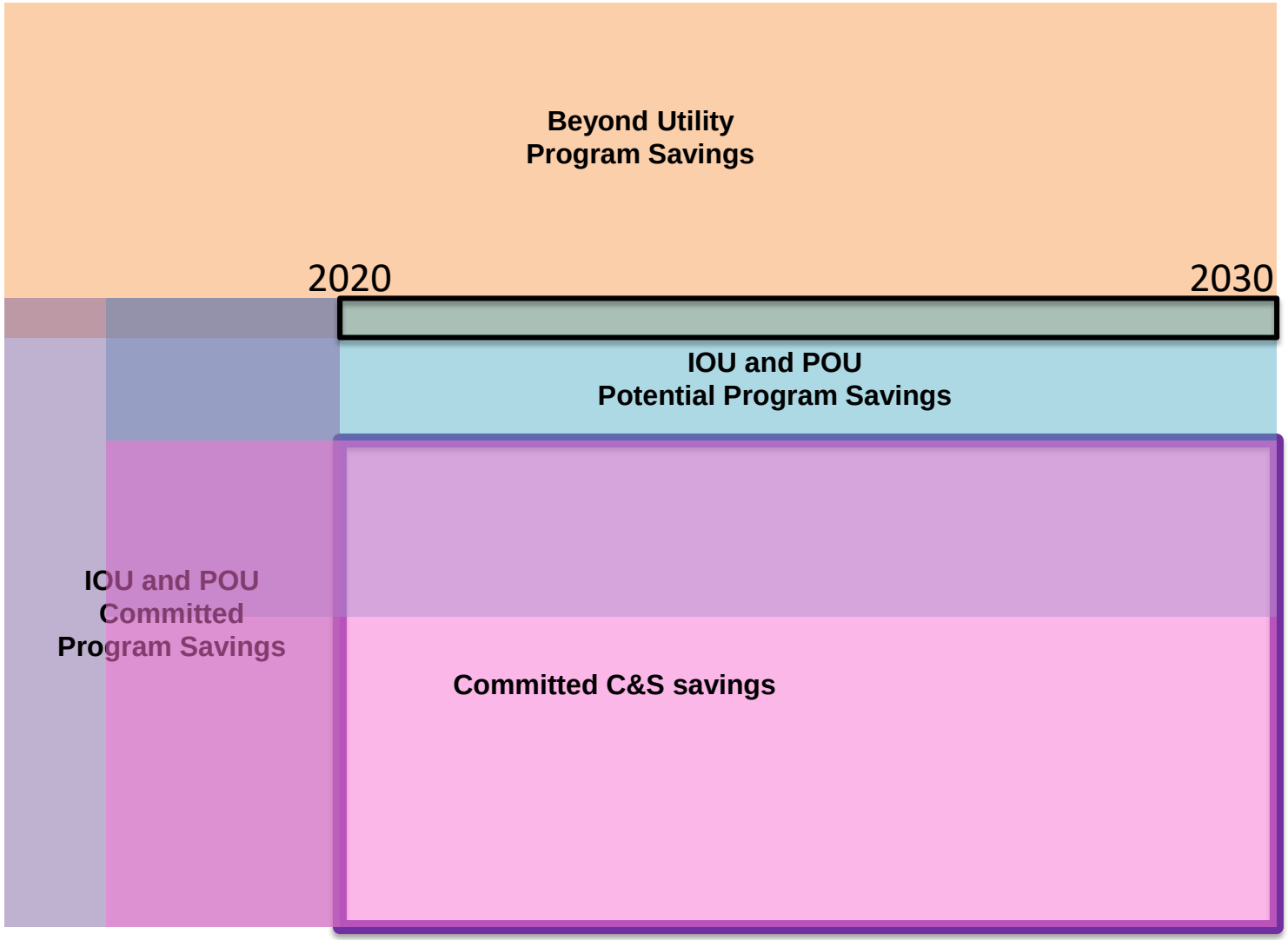
- allocated “statewide” C&S shares to utility from workbook based analysis
  - Considered C&S future ratchets by Building Sector as well as New vs. A&A not previously considered in IOU P&G Study

Beyond Utility AAEE Scenario Design
- for CED 2017 Revised Forecast

Extract Results from workbook based Modeling and allocate "statewide" shares to each utility	**Compliance Reduction**			Compliance Rate Reduction	Compliance Rate Reduction	Compliance Rate Reduction	Compliance Rate Reduction
	Standards Compliance	No Compliance Enhancements	No Compliance Enhancements	No Compliance Enhancements	Compliance Enhancements	Compliance Enhancements	Compliance Enhancements
	Title 24			2019 T24 NR A&A	2019 T24 NR A&A plus T24 NC ratchets	2019 T24 NR A&A plus T24 NC ratchets	2019 T24 NR A&A plus T24 NC ratchets
	Title 20				SB 350 T20 < 2025 start	SB 350 T20 < 2025 start	SB 350 T20 scaled down
	Federal Standards				SB 350 Fed < 2025 start	SB 350 Fed < 2025 start	SB 350 Fed scaled down
Scale and Extend workbook based Analyses of Beyond Utility Programs Using Energy Scaling Factor Approach and then allocate "statewide" shares to each utility	Savings from additional SB 350 programs that are not utility programs or standards that are considered likely	Prop 39	Prop 39	Prop 39	Prop 39	Prop 39	Prop 39, Local Government Ordinances, Local Government Challenge, GGRF: Low Income and GGRF: Water-Energy Grant, DGS Energy Retrofits, ECAA, PACE, Benchmarking, and BROs

- allocated “statewide” C&S shares to utility from workbook based analysis
  - Considered C&S future ratchets by Building Sector as well as New vs. A&A not previously considered in IOU P&G Study
- scaled and extended Beyond Utility programs and allocated “statewide” share to each utility

Additional Achievable Energy Efficiency (AAEE) Scenario Design - for CED 2017 Revised Forecast



- **eliminate any other duplication between savings streams**

- **eliminate duplication with baseline forecast**

IOU AAEE Scenario Design
- for CED 2019 Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock			2017 IEPR Mid-Case			
	Retail Prices			2017 IEPR Mid-Case			
Post-process P&G results to eliminate duplication with baseline forecast	Res/Com ETs			100% of model results			
	AIMS ETs			Reference			
	Incentive Levels			capped at 50% of incremental cost			
	C-E Measure Screening Threshold			1			
	ET C-E Threshold			1			
	Cost-Effectiveness Test			TRC using 2019 Avoided Costs			
	Marketing & Outreach			Default calibrated value			
	Financing Programs			No modeled impacts			
	BROs Program Assumptions			Reference			
	Low Income			Reference			

- Design IOU AAEE Scenarios around the base case chosen by the CPUC from the IOU P&G Study Scenarios

Code and Standards Savings Contributions
Scenario Design - for CED 2019 Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock			2017 IEPR Mid-Case			
	Retail Prices			2017 IEPR Mid-Case			
Post-process P&G results to eliminate duplication with baseline forecast	Res/Com ETs			100% of model results			
	AIMS ETs			Reference			
	Incentive Levels			capped at 50% of incremental cost			
	C-E Measure Screening Threshold			1			
	ET C-E Threshold			1			
	Cost-Effectiveness Test			TRC using 2019 Avoided Costs			
	Marketing & Outreach			Default calibrated value			
	Financing Programs			No modeled impacts			
	BROs Program Assumptions			Reference			
	Low Income			Reference			
Use P&G C&S model results directly for IOUs and allocate "statewide" shares to each POU or POU grouping	Compliance Reduction			No Compliance Reduction			
	Standards Compliance			No Compliance Enhancements			
	Title 24			2019 (NR/R x NC/A&A) + 2022 (NR x NC/A&A)			
	Title 20			Through 2019 + Selected Stds. Through 2022			
	Federal Standards			Through 2023 (excluding 2020 GSL Std) + 2026 Water Source Heat Pump			

- Use CPUC P&G C&S model results for IOU territory C&S savings
  - *Total savings not just attributable*
- Scale up to “statewide savings” and allocate shares to each POU or POU grouping
  - *Essential for the small POU’s inside CAISO planning area*

POU AAEE Scenario Design
- for CED 2019 Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock			2017 IEPR Mid-Case			
	Retail Prices			2017 IEPR Mid-Case			
Post-process P&G results to eliminate duplication with baseline forecast	Res/Com ETs			100% of model results			
	AIMS ETs			Reference			
	Incentive Levels			capped at 50% of incremental cost			
	C-E Measure Screening Threshold			1			
	ET C-E Threshold			1			
	Cost-Effectiveness Test			TRC using 2019 Avoided Costs			
	Marketing & Outreach			Default calibrated value			
	Financing Programs			No modeled impacts			
	BROs Program Assumptions			Reference			
	Low Income			Reference			
Use P&G C&S model results directly for IOUs and allocate "statewide" shares to each POU or POU grouping	Compliance Reduction			No Compliance Reduction			
	Standards Compliance			No Compliance Enhancements			
	Title 24			2019 (NR/R x NC/A&A) + 2022 (NR x NC/A&A)			
	Title 20			Through 2019 + Selected Stds. Through 2022			
	[illegible]			Through 2023 (excluding 2020 GSL Std) + 2026 Water Source [illegible]			
Post-process CMUA P&G Study Results to yield scenario variations built around the submitted potential savings	Expand Measure List			Reference			
	Incentive Level			Reference			
	Promotional Expenditures			Reference			
	Behavioral Programs			Reference			
	Early Retirement Programs			Reference			

- Design POU AAEE Scenarios around the one scenario of potential saving submitted by the CMUA

Beyond Utility AAEE Scenario Design – for CED 2019 Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
Extract Results from workbook based Modeling and allocate "statewide" shares to each utility	Compliance Reduction						
	Standards Compliance						
	Title 24						
	Title 20						
	Federal Standards						
Scale and Extend workbook based Analyses of Beyond Utility Programs Using Energy Scaling Factor Approach and then allocate "statewide" shares to each utility	Execise various options within individual program workbooks to generate statewide savings scenarios and/or scale projections with override assumptions						

Large contractual effort this cycle to update and expand the Beyond Utility Program workbooks

- Inputs are loaded to the maximum savings potential to measure progress towards SB 350 savings goals
- Even for the high plus scenario developed in 2017 the Beyond Utility Program Savings were scaled down from this maximum savings potential

- Workbooks vary in level of sophistication but all have various savings parameters that can be adjusted
  - staff is able to design scenarios using low, mid, and high 2017 IEPR econ/demo drivers
  - Conservative, reference, and aggressive savings estimates defined for each program in the individual workbooks
  - individual weights are assigned for each of the BU programs included

Beyond Utility AAEE Scenario Design – for CED 2019 Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
Extract Results from workbook based Modeling and allocate "statewide" shares to each utility	Compliance Reduction						
	Standards Compliance						
	Title 24						
	Title 20						
	Federal Standards						
Scale and Extend workbook based Analyses of Beyond Utility Programs Using Energy Scaling Factor Approach and then allocate "statewide" shares to each utility	Execise various options within individual program workbooks to generate statewide savings scenarios and/or scale projections with override assumptions						

Beyond Utility Program Workbooks
Title 24
Title 20
Fed Appliance
Local Government Ordinances
Air Quality Management District
Local Government Challenge
Prop 39
GGRF: Low Income Weatherization
GGRF: Water Energy Grant
DGS Energy Retrofit
ECAA Financing
PACE Financing
Benchmarking and Public Disclosure
Behavioral, Retrocommissioning, Operational Savings
Energy Asset Rating
Smart Meter Data Analytics
Fuel Substitution
Agricultural
Industrial
Conservation Voltage Reduction

Beyond Utility AAEE Scenario Design – for CED 2019 Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
Extract Results from workbook based Modeling and allocate "statewide" shares to each utility	Compliance Reduction						
	Standards Compliance						
	Title 24						
	Title 20						
	Federal Standards						
Scale and Extend workbook based Analyses of Beyond Utility Programs Using Energy Scaling Factor Approach and then allocate "statewide" shares to each utility	Execise various options within individual program workbooks to generate statewide savings scenarios and/or scale projections with override assumptions						

Beyond Utility Program Workbooks
Title 24
Title 20
Fed Appliance
Local Government Ordinances
Air Quality Management District
Local Government Challenge
Prop 39
GGRF: Low Income Weatherization
GGRF: Water Energy Grant
DGS Energy Retrofit
ECAA Financing
PACE Financing
Benchmarking and Public Disclosure
Behavioral, Retrocommissioning, Operational Savings
Energy Asset Rating
Smart Meter Data Analytics
Fuel Substitution
Agricultural
Industrial
Conservation Voltage Reduction

Beyond Utility AAEE Scenario Design – for CED 2019 Forecast

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
Extract Results from workbook based Modeling and allocate "statewide" shares to each utility	Compliance Reduction						
	Standards Compliance						
	Title 24						
	Title 20						
	Federal Standards						
Scale and Extend workbook based Analyses of Beyond Utility Programs Using Energy Scaling Factor Approach and then allocate "statewide" shares to each utility	Execise various options within individual program workbooks to generate statewide savings scenarios and/or scale projections with override assumptions						

Beyond Utility Program Workbooks
Title 24
Title 20
Fed Appliance
Local Government Ordinances
Air Quality Management District
Local Government Challenge
Prop 39
GGRF: Low Income Weatherization
GGRF: Water Energy Grant
DGS Energy Retrofit
ECAA Financing
PACE Financing
Benchmarking and Public Disclosure
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T24 Building Standards ratchet end years				Appliance Standards ratchet end years	
New Construction		Additions & Alterations			
Residential Sector	Commercial Sector	Residential Sector	Commercial Sector	T20	Federal

AAEE SCENARIOS

Modeling Approach	Lever	Low (Scenario 1)	Low (Scenario 2)	Mid (Scenario 3)	High (Scenario 4)	High (Scenario 5)	High Plus (Scenario 6)
	Building Stock			2017 IEPR Mid-Case			
	Retail Prices			2017 IEPR Mid-Case			
Post-process P&G results to eliminate duplication with baseline forecast	Res/Com ETs			100% of model results			
	AIMS ETs			Reference			
	Incentive Levels			capped at 50% of incremental cost			
	C-E Measure Screening Threshold			1			
	ET C-E Threshold						
	Cost-Effectiveness Test			TRC using CPUC Avoided Cost			
	Marketing & Outreach			Default calibrated value			
	Financing Programs			No modeled impacts			
	BROs Program Assumptions			Reference			
	Low Income			Reference			
Use P&G C&S model results directly for IOUs and allocate "statewide" shares to each POU or POU grouping	Compliance Reduction			No Compliance Reduction			
	Standards Compliance			No Compliance Enhancements			
	Title 24			2019 (NR/R x NC/A&A) + 2022 (NR x NC/A&A)			
	Title 20			through 2019 Scheduled Through 2023			
	Federal Standards			Through 2023 (excluding 2020 GSL Std) + 2026 Water Source Heat Pump			
Post-process CMUA P&G Study Results to yield scenario variations built around the submitted potential savings	Expand Measure List			Reference			
	Incentive Level			Reference			
	Promotional Expenditures			Reference			
	Behavioral Programs			Reference			
	Early Retirement Programs			Reference			
Extract Results from workbook based Modeling and allocate "statewide" shares to each utility	Compliance Reduction						
	Standards Compliance						
	Title 24						
	Title 20						
	Federal Standards						
Scale and Extend workbook based Analyses of Beyond Utility Programs Using Energy Scaling Factor Approach and then allocate "statewide" shares to each utility	Execise various options within individual program workbooks to generate statewide savings scenarios and/or scale projections with override assumptions						

IOU Potential Program Savings

Codes and Standards Savings

POU Potential Program Savings

Beyond Utility Program Savings

Additional Achievable Energy Efficiency (AAEE)
2019 Process Flow Overview

2017 CMUA P&G Study
POU Projections

→

*Scenario Design
POU AAEE first year Projections 2020-2030

→

*Integration for
Total Cumulative AAEE Projections by year 2020-2030
by utility, sector, end use & scenario

2020 CPUC P&G Study
IOU Projections

→

*Scenario Design
IOU AAEE first year Projections 2020-2030

↕

CEC Beyond Utility Programs tool allows scenario design for **Beyond Utility AAEE first year Projections 2020-2030**

↓

AAEE Hourly Tool *
Total 8760 Hourly AAEE Projections by year 2020-2030
by utility, sector, end use & scenario

** In development*

Additional Achievable Energy Efficiency (AAEE)
Hourly Tool Development

AAEE Hourly Tool *
Total 8760 Hourly AAEE Projections by year 2020-2030
by utility, sector, end use & scenario

- Have mapped 48 named end uses to new ADM load shape profiles and supplemented with Navigant load profiles used in 2017 CED Forecast as needed

- Input menu allows for selection of:
  - Forecast start and end years
  - Utility: IOU's, named POU's, North and South small POU groupings
  - Simple by Sector or Detailed by End Use
  - include or omit Transmission and Distribution Losses

- Outputs are 8760 hourly results for each scenario for each forecast year

Additional Achievable Energy Efficiency (AAEE)

2019 Process Schedule *is compact! We appreciate comments/feedback as soon as you are able to share!*

Formal comments due 8/22

9/26 CEC presents proposed <u>AAEE Scenario Designs</u> at IEPR workshop

10/1 internal deadline for CEC EE team to provide draft <u>AAEE Hourly Projections</u> results to CEC forecast team

11/1 deadline for <u>final AAEE Hourly Projections</u> for use in revised 2019 Demand Forecast

Additional Achievable Energy Efficiency (AAEE)

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Questions/Comments?