

DOCKETED

Docket Number:	21-IEPR-06
Project Title:	Building Decarbonization and Energy Efficiency
TN #:	239440
Document Title:	Presentation - 2021 SB 350 Metrics Translating between Energy Efficiency & Emissions Targets
Description:	S1.3C Ingrid, Neumann, CEC
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/23/2021 5:00:41 PM
Docketed Date:	8/24/2021

2021 SB 350 Metrics: Translating between Energy Efficiency & Emissions Targets

August 24, 2021

IEPR Commissioner Workshop on the Role of
Energy Efficiency in Building Decarbonization



Ingrid Neumann, Ph.D.

Energy Assessments Division

California Energy Commission



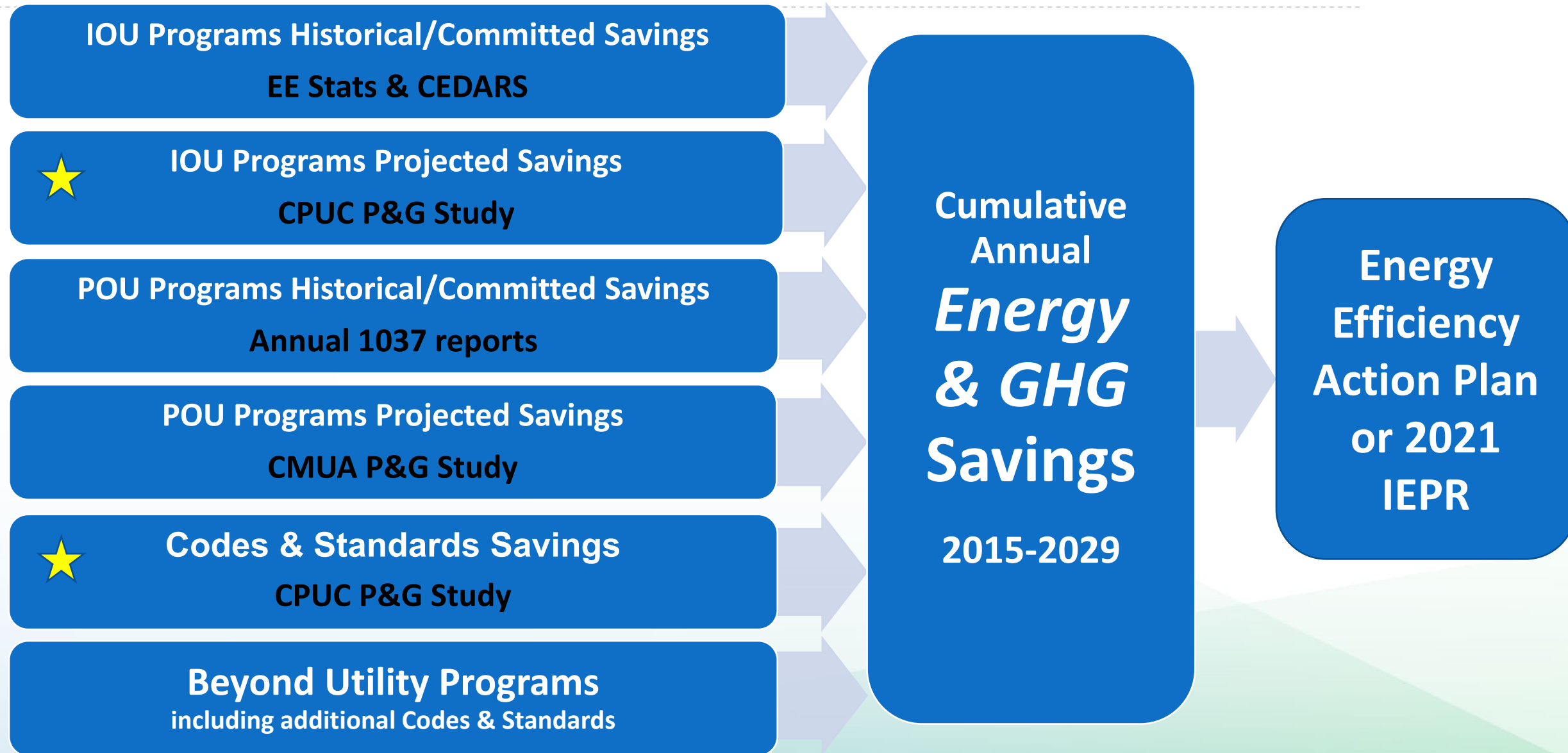
SB 350 Statute

SB 350 (De Leon, Chapter 547, Statutes of 2015) was passed in 2015.

- Establishes an aspirational goal for the state to double statewide energy efficiency savings in electricity and natural gas end-uses by 2030.
- May include programs that save energy in final end-uses by using cleaner fuels to reduce greenhouse gas emissions as measured on a lifecycle basis from the provision of energy services.
- Must be cost-effective and feasible and will not adversely impact public health and safety.

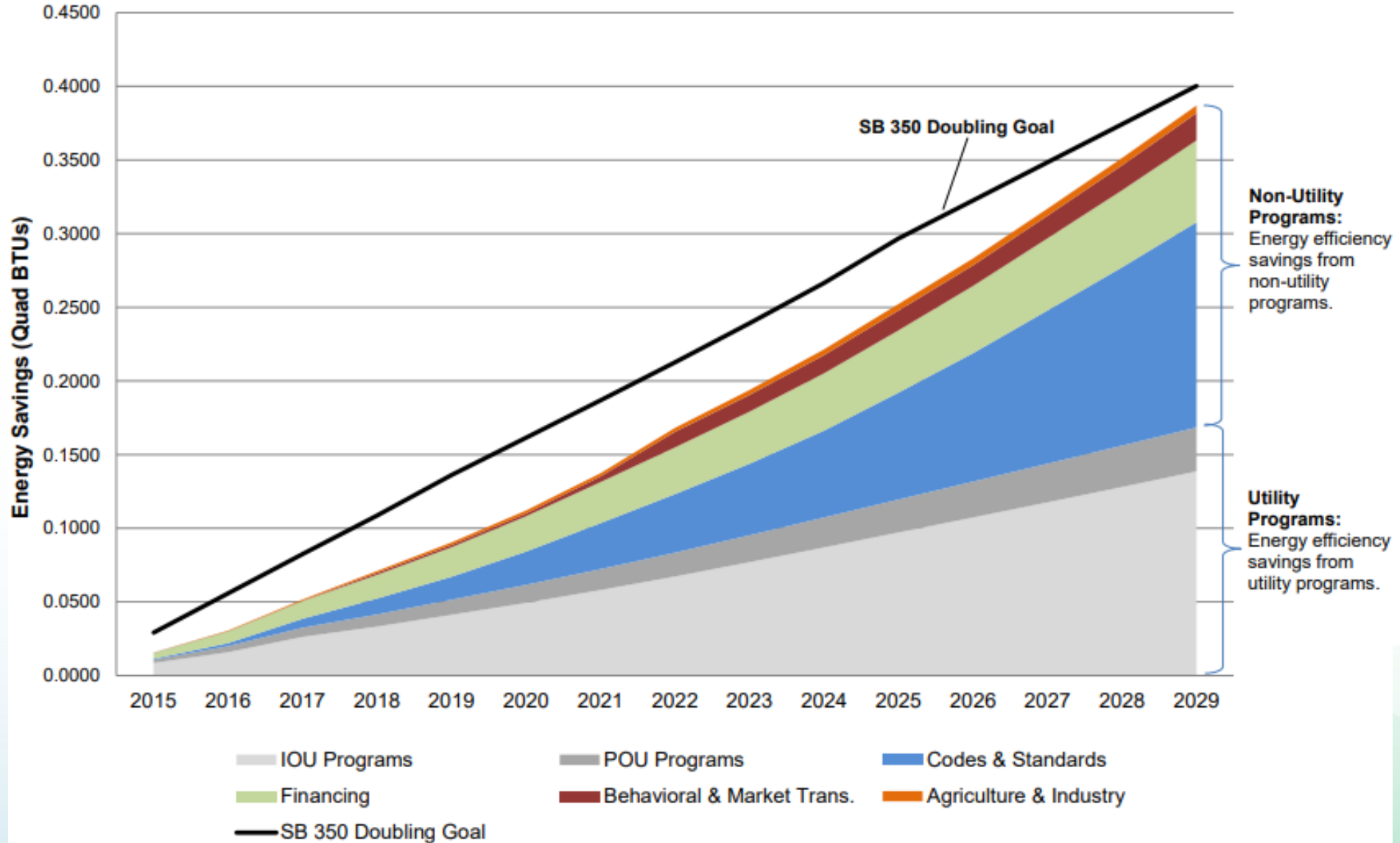


High Level Analytical Process Flow





SB 350 2017 Report Goals Set & Projections





SB 350 2017 Report

Goals Set: doubling of mid-mid 2015 AAEE Scenario target of 0.4 Quadrillion Btu (Quads) of energy savings

Projections: did not meet the doubling goal

Recommendations:

Explore savings from:

- Industrial & Agricultural sectors
 - Fuel Substitution
 - Conservation Voltage Reduction
 - Impacts on low income/disadvantaged communities (LI/DAC)
-
- ***All 2017 recommendations were included in the 2019 analysis; workbooks were posted online with the 2019 CA Energy Efficiency Action Plan***



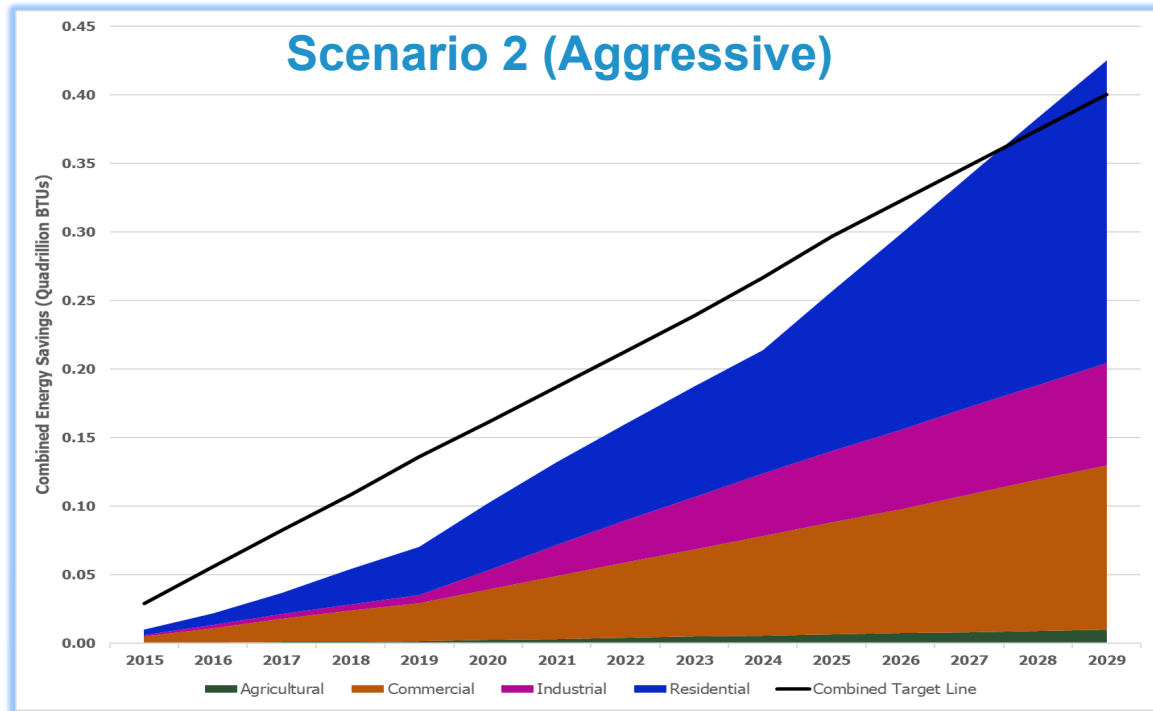
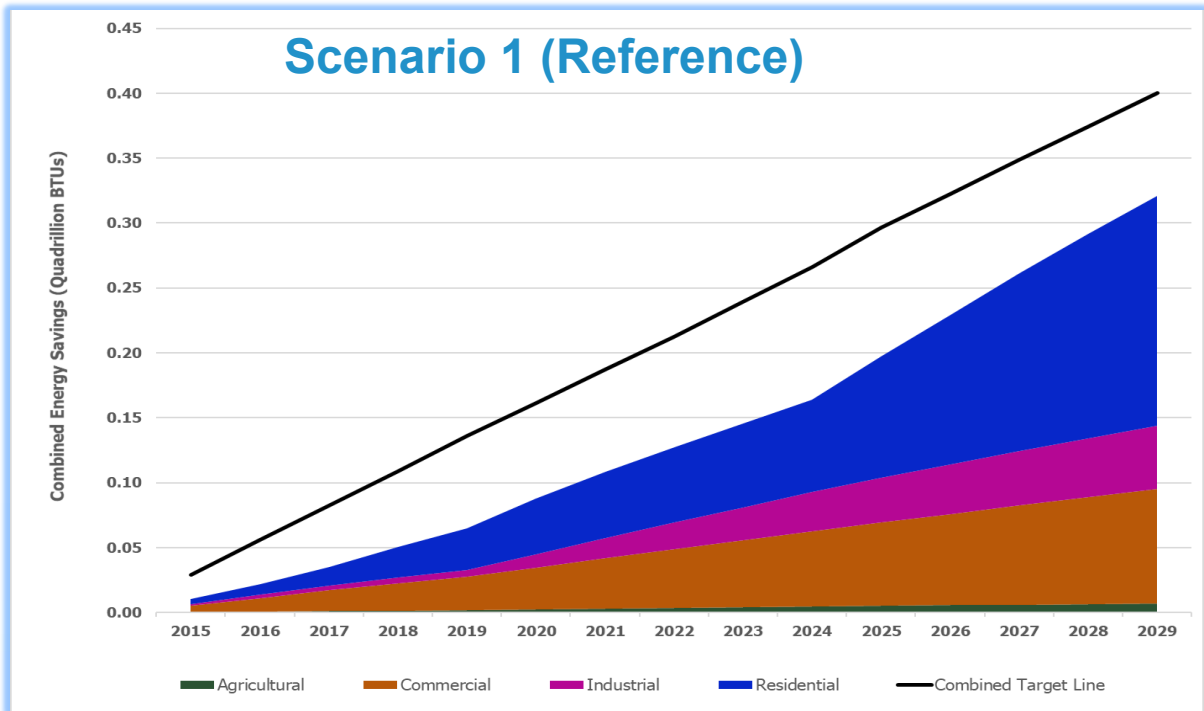
2019 Update: SB 350 Tool Created

The SB 350 tool is able to:

- Track, analyze, and project energy efficiency savings from multiple data sources (analysis done in-house)
- Create variation in projections or scenarios based on a range of program variables
 - i.e., compliance rates, funding, market penetration
- Compile first year savings data, calculate cumulative savings based on expected useful life of measures
- **Report energy savings & GHG reductions**
 - **by utility service area, sector, end use**
 - **Separately quantify DAC and LI impacts**



SB 350 2019 tracking update



★ IOU Programs	Increased market strength, financing programs broadly available, higher incentive levels
POU Programs	Added new measures, increased promotional expenditures, implemented early retirement programs
Codes & Standards	Additional new measures & enhanced compliance rates
Beyond Utility Programs ★ ex. Fuel Substitution	Enhanced participation and funding ex. all electric new construction rising linearly from 0-10% vs. 25% in 2030



SB 350 EE in 2021...

- Expand on our technical capabilities for Energy Efficiency (EE) tracking and scenario projections/forecasts
 - incorporate new data such as from utility and other incentive programs to update historical savings as improve projections
 - add new EE programs savings projections
 - incorporate updates to code and standards in savings projections
 - consider overlap in customer segments being targeted by different programs
 - consider market-based activities that may result in EE savings that are not being captured elsewhere

SB 350
tracking towards EE doubling goal

Additional Achievable Energy Efficiency (AAEE)
load modifier to IEPR forecast



Towards the 2021 SB 350 update & beyond

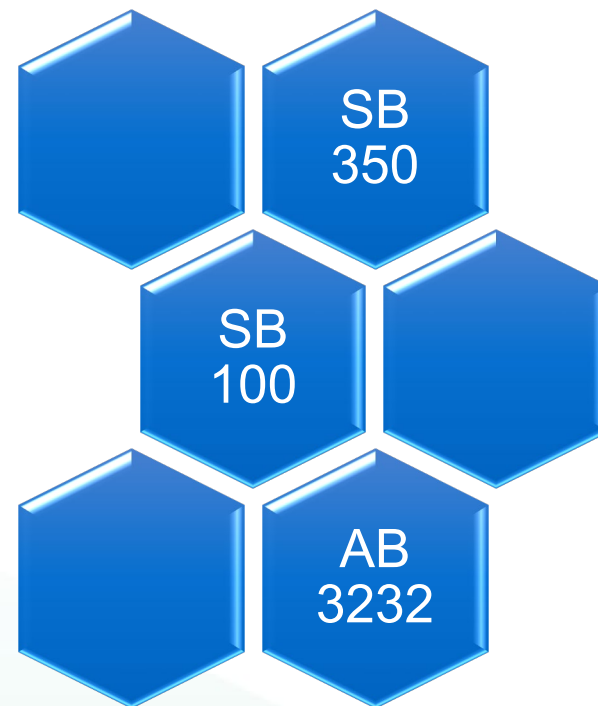
SB 350 exists in the broader policy context of building decarbonization

Work in progress:

- Create a common data visualization tool for use in state agencies, local governments, tribal governments, research institutes, and utility programs

Developed the Fuel Substitution Scenario Analysis Tool (FSSAT)

- Enhanced Fuel Substitution analysis utilized to support AB 3232 analysis recently published in the CA Building Decarbonization Assessment





Building Electrification in 2021...

- Expand our technical capabilities for Electrification scenarios from a “what-if” analysis to projections based on current and future program activity
 - Further disaggregation of low-income single family and low-income multifamily as separate Residential sectors for analysis
 - incorporate new data such as from utility and other on ground incentive programs into our analysis
 - incorporate electrification resulting from local ordinances, as well as the recently adopted 2022 T24 updates encouraging electrification
 - incorporate more diversity in space heating/cooling load profiles
 - explore additional end-uses and fossil fuels for electric technology substitution
 - explore various contributions to building electrification as load modifiers to our IEPR forecast

AB 3232 “what-if scenarios”

2015

2020

2025

2030

2035

AAEE & Additional Achievable Fuel Substitution (AAFS)
modifiers to IEPR forecast



Assembly Bill 3232

Friedman, Chapter 373, Statutes of 2018
requires the Energy Commission to:

“[A]ssess the potential for the state to reduce the emissions of greenhouse gases in the state’s residential and commercial building stock **by at least 40 percent** below 1990 levels by January 1, 2030”

Source: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB3232

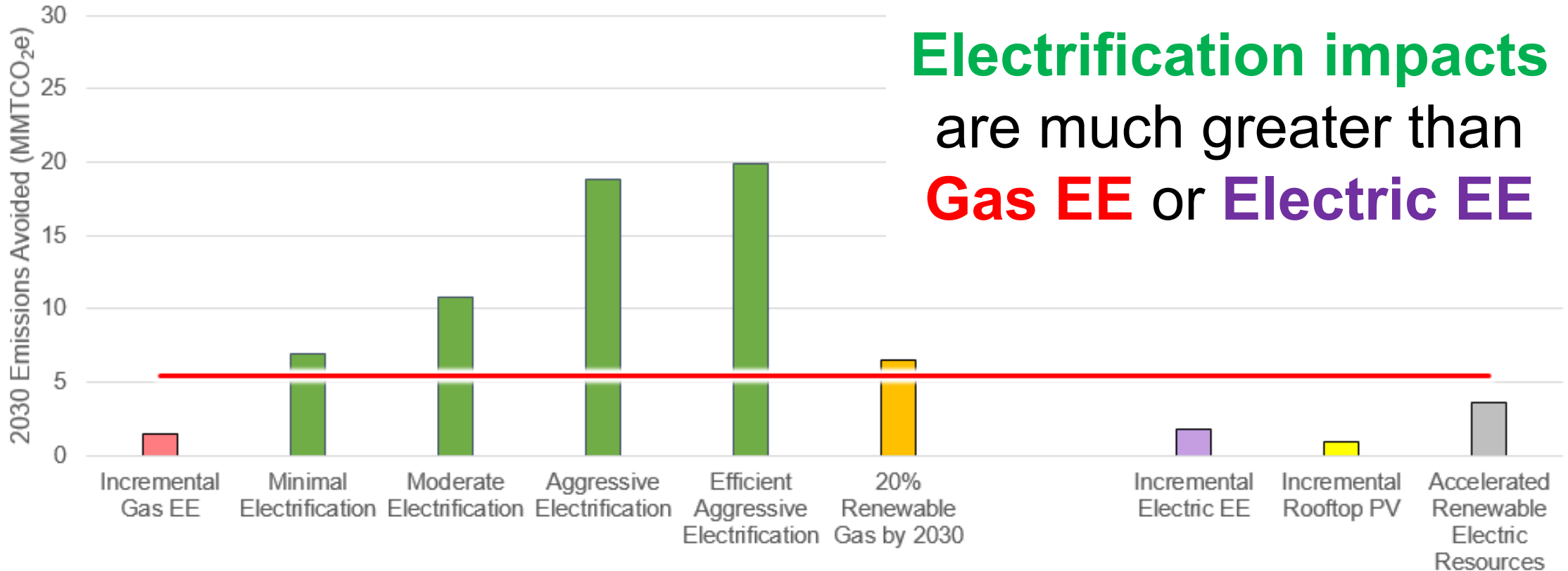


AB 3232 2030 Systemwide GHG Emissions

- **Reduce** Gas combustion
 - Reduce Behind-the meter gas leakage
- Incremental **Increase** in Hydrofluorocarbon leakage from refrigeration and air conditioners
- Incremental **Increase** electric generation system emissions from building electrification
- **NET GHG savings**



Abatement Potential: Annual GHG Reduction for 2030 by Scenario



Electrification impacts
are much greater than
Gas EE or **Electric EE**

Patterned regions indicate the potential HFC leakage reduction from SB 1383 goals (7.5 MMT CO₂e)

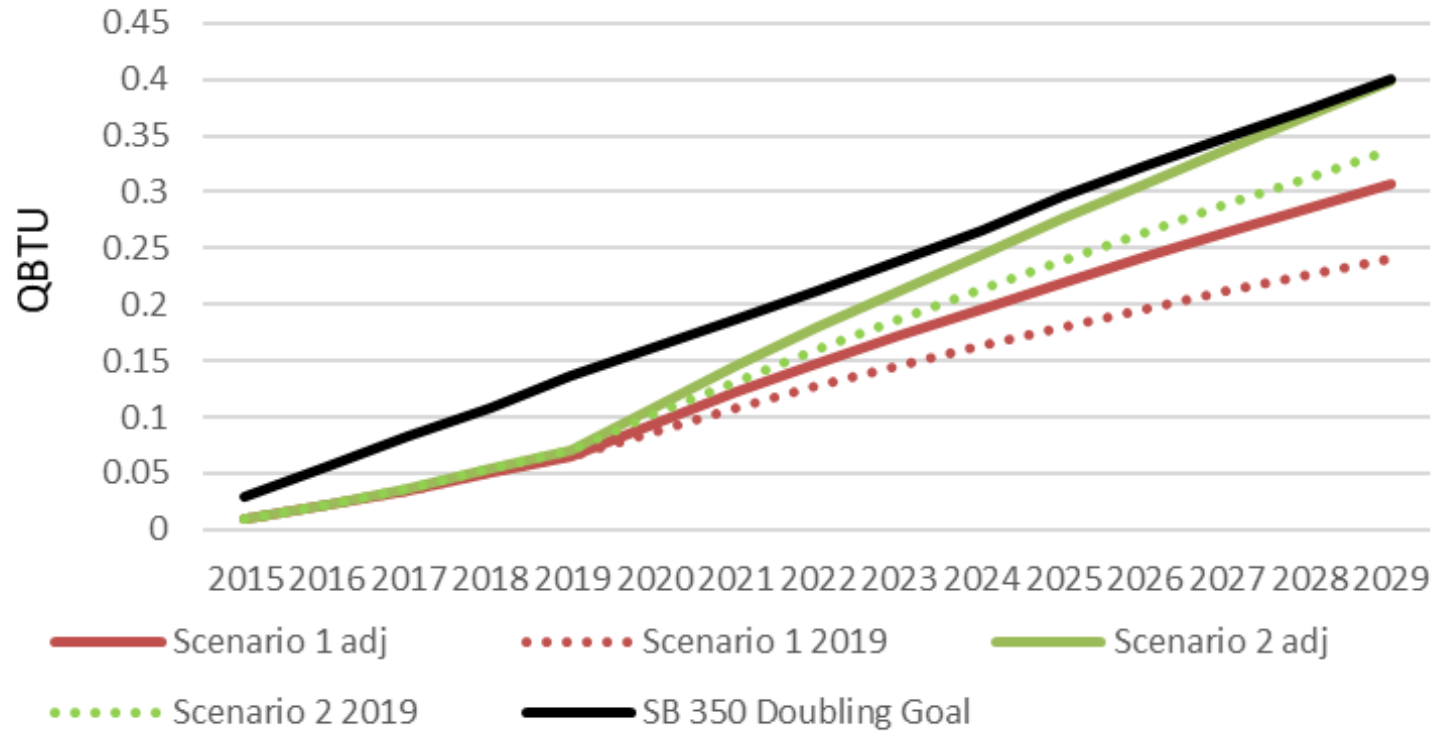
Solid regions indicate the estimated avoided emissions from a scenario

Systemwide emissions 40-percent AB 3232 target (Requires 5.5 MMT CO₂e more emissions avoided compared to the systemwide emissions 2020-30 Baseline Case)



Simplistic adjustment of 2019 SB 350 Scenarios and Minimum AB 3232 Goal

SB 350 Scenarios, adjusted

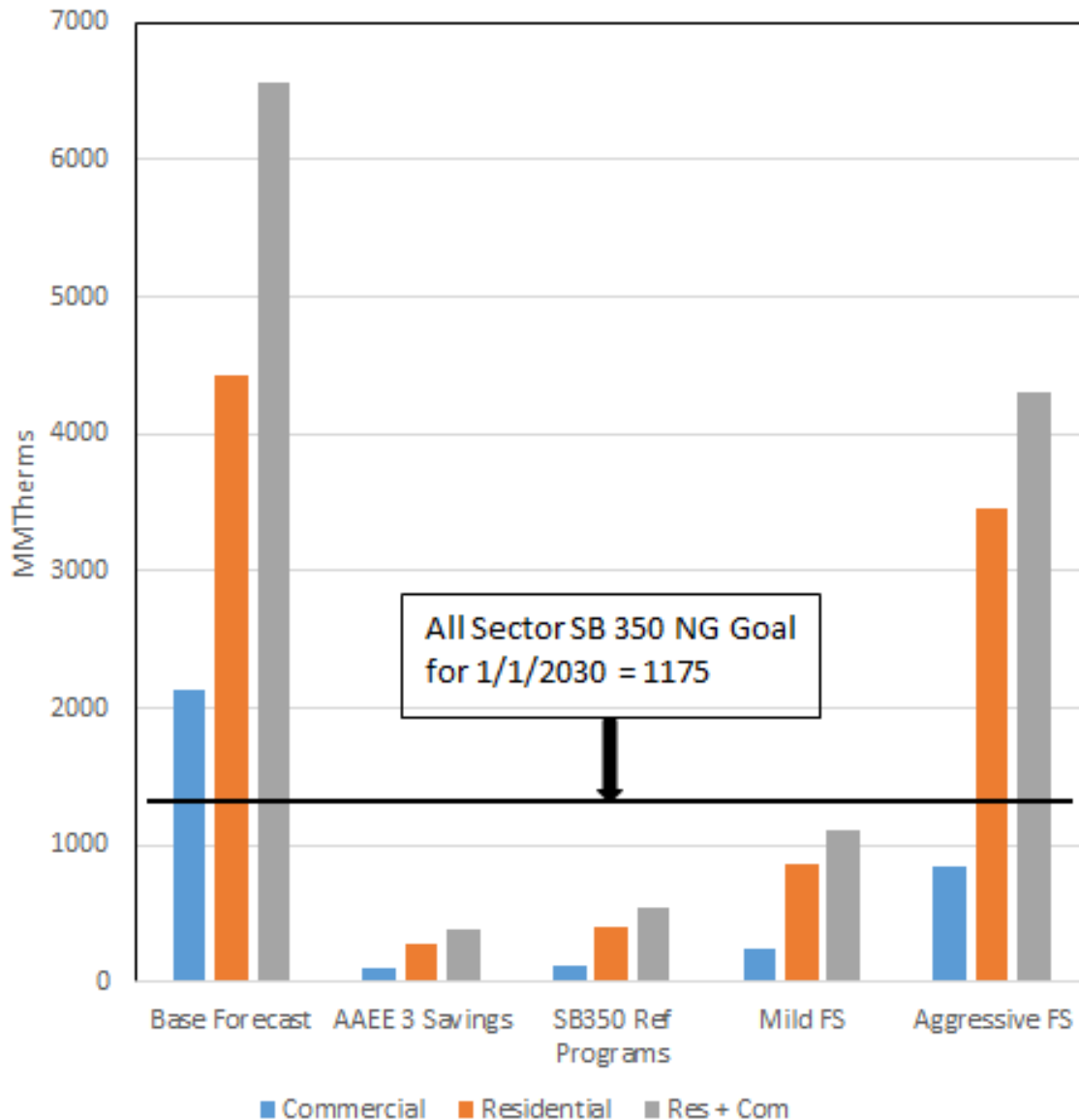


- Scenario 1 adjusted shows that SB 350 goals cannot be met with 'business as usual' energy efficiency plus meeting the minimum AB 3232 goal
- Scenario 2 adjusted is close to the goal, reaching 0.398 QBTU by January 1, 2030, just short of the target of 0.4 QBTU



Not so fast!

AB 3232 “What If” Impacts overshadow 2019 SB 350 Reference Scenario AND gas reduction GOALS



- Some combination can project non-physical results: displacement of more than 100% gas consumption by 2045 using AB 3232 minimum scenario and gas 2x; by 2030 with aggressive AB 3232 “what-if” scenario
- **Gas and electrification do compete physically as well as for program funding**
- **EE can not be extrapolated linearly indefinitely; limits of technical potential as well as economic and market...**



Under further consideration...

- **Need to pair appropriate gas EE and FS/electrification scenarios**
 - Limits to gas potential as well as funding
- Incorporating cost info & analytical capability
- Collecting programmatic bottom-up data sources for creation of electrification scenarios
 - different level of stringency for each, which have their own level of uncertainty
- **We are currently working with GH on incorporating more program-oriented inputs in our improved EE/FS analysis tools for use in the 2021 IEPR**



Developing an Electrification Load Modifier

- 2021 PG Study measures
- Local ordinances
encouraging electrification of some or all end-uses as well as local natural gas bans
- 2022 Building Standards
proposing all electric baselines for prescriptive compliance for new construction
- POU data on recent fuel substitution activities
(especially SMUD, LADWP, Palo Alto)
- IOU data (CEDARS) on recent fuel substitution activities
- BUILD/TECH programs being rolled out per SB 1477
- Programs operating outside of Utility EE Portfolios
(ex. SCE San Joaquin program electrifying propane)



Goal for the 2021 IEPR

- Once data collection and analysis is completed, we can aspire to understand what the difference is between an aggressive 2021 SB 350 Scenario 2 including electrification and a reference/BAU SB 350 Scenario 1 including electrification
- Goal for the 2021 IEPR is to shed more light on the difference between our BAU track and the track we prefer to be on which meets energy and GHG goals