

DOCKETED

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2021 Update to SB 350 Tracking & Projections

December 16, 2021

IEPR Commissioner Workshop on Energy Demand Analysis



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California Energy Commission



Development of 2021 SB 350

- *For 2021 we utilized the same EE savings accounting, aggregation, and extrapolation methodology & tools as were developed for 2019*
- Historical data and potential savings projections were updated in all existing workbooks and some new workbooks were added based on recent programmatic activities



SB 350 EE in 2021

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

SB 350 analysis towards EE doubling goal

2015

2020

2025

2030

2035

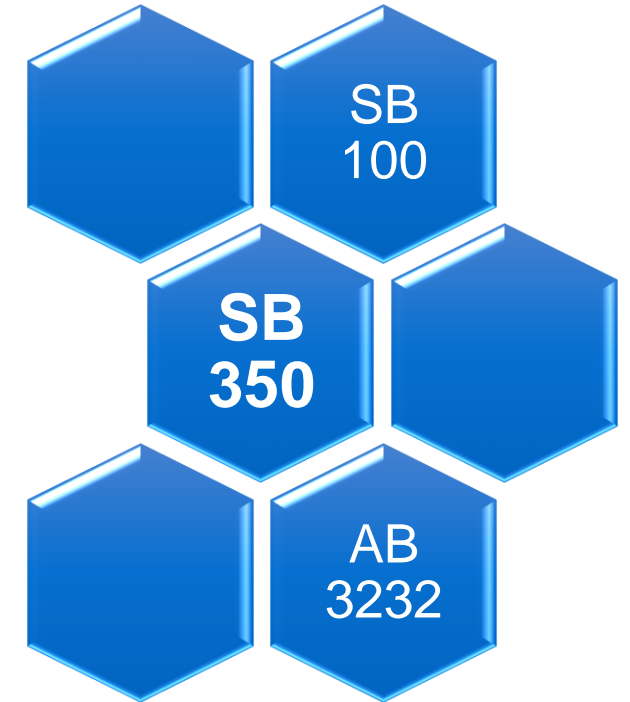
Additional Achievable Energy Efficiency (AAEE)
load modifier to IEPR forecast



SB 350 exists in the broader policy context of building decarbonization...

2019 - 2020 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





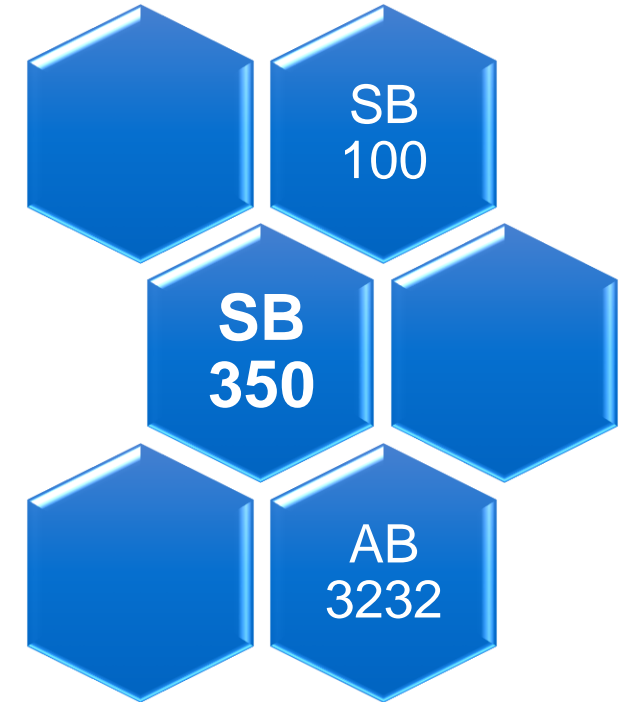
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2019 - 2020 Developed the Fuel Substitution Scenario Analysis Tool (FSSAT)

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2021 Developed a new forecasting product: Additional Achievable Fuel Substitution (AAFS) as an annual and hourly load modifier to the baseline demand forecast.

- Like AAEE it is focused on firm programs and projections since the core scenarios are used for planning and procurement purposes





New for SB 350 in 2021

Fuel Substitution – Building Electrification

- 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

Building Electrification incorporated into SB 350 analysis towards EE doubling goal

2015

2020

2025

2030

2035

AB 3232 “what-if scenarios”

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



2021 Additions and Enhancements

Removed Fuel Substitution

- Supplanted by Additional Achievable Fuel Substitution (AAFS)

ADDED new workbooks

- CCA and REN Program Savings (not yet modeled in PG Study)
- T24 Res & Com New Construction Fuel Sub
- Clean Energy Optimization Program (CEOP)
- IOU Low Income Fuel Sub
- POU Fuel Sub
- SGIP HPWH Incentives
- TECH-BUILD
(SB 1477 Low Emissions Buildings and Sources of Heat Energy)
- Food Processing Investment Program (FPIP)

ADDED added FS components in existing workbooks



Goals for SB 350 in the 2021 IEPR

- We aspired to understand what the difference is between a reference or Business-As-Usual SB 350 Scenario 1 including moderate electrification and a BAU EE Scenario in a High Electrification future
- We also examined an aggressive 2021 SB 350 Scenario 2 including additional electrification as could occur in a High Electrification future
- **Our 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**



Considerations

- Energy Efficiency saves electricity and gas reducing GWh and MM Therm demand
- Fuel Substitution or Building Electrification displaces gas and adds incremental electric demand



BAU Scenario 1

In addition to existing C&S savings and committed program savings and electrification impacts:

- **IOU Programs**
 - **PG Study Goals for 2021 as adopted by CPUC**
- **POU Programs**
 - **Projections as submitted in 2021 CMUA report & CEC analysis on FS**



BAU Scenario 1

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- IOU Programs
 - PG Study Goals for 2021 as adopted by CPUC
- POU Programs
 - Projections as submitted in 2021 CMUA report & CEC analysis on FS
- **Title 24 CA Building Standards**
 - **adding the 2022 Standards at the reference compliance rate;**
adding the 2025 Standards at a 20% compliance rate reduction
 - **Including the electrification components of NC and A&A for the above code cycles**
- **Title 20 (California State) Appliance Energy Efficiency Standards**
 - **adding possible new measures starting 2022-2024 at the reference compliance rate**
- **Federal Appliance Energy Efficiency Standards**
 - **adding possible new measures starting 2023-2026 at a 20% compliance rate reduction**



BAU Scenario 1

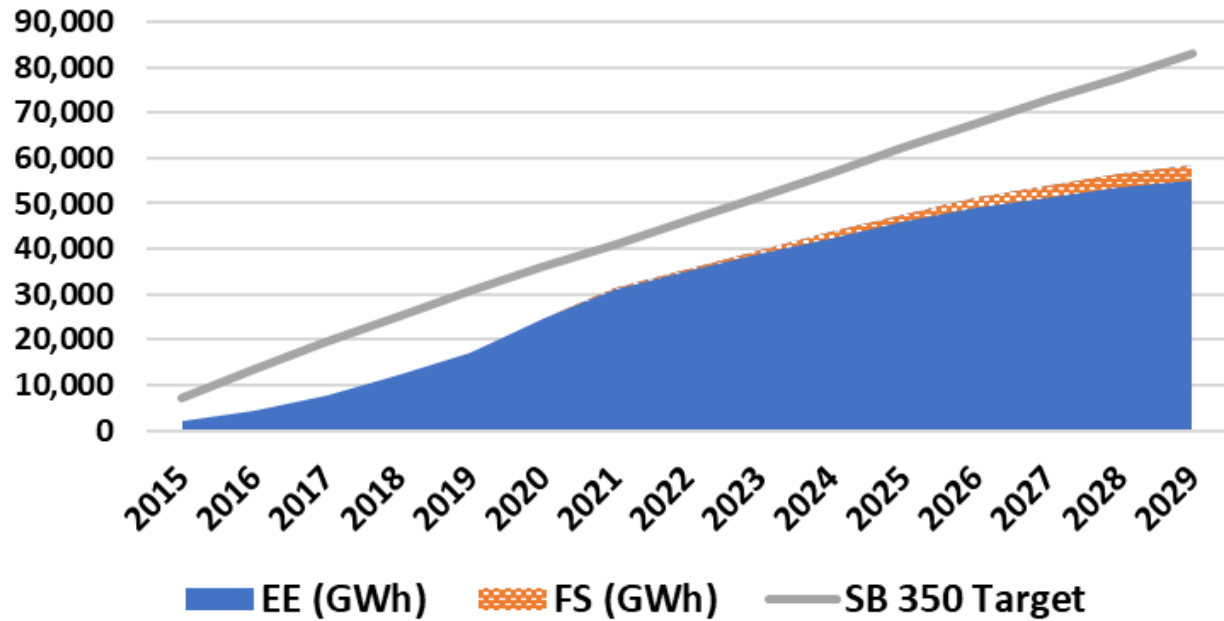
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- IOU Programs
 - PG Study Goals for 2021 as adopted by CPUC
- POU Programs
 - Projections as submitted in 2021 CMUA report & CEC analysis on FS
- Title 24 CA Building Standards
 - adding the 2022 Standards at the reference compliance rate; adding the 2025 Standards at a 20% compliance rate reduction
 - Including the electrification components of NC and A&A for the above code cycles
- Title 20 (California State) Appliance Energy Efficiency Standards
 - adding possible new measures starting 2022-2024 at the reference compliance rate
- Federal Appliance Energy Efficiency Standards
 - adding possible new measures starting 2023-2026 at a 20% compliance rate reduction
- **Addition of various Beyond Utility (BU) programs at reference or conservative levels depending on how much historical data is available and how many assumptions must be made to generate savings/impacts**

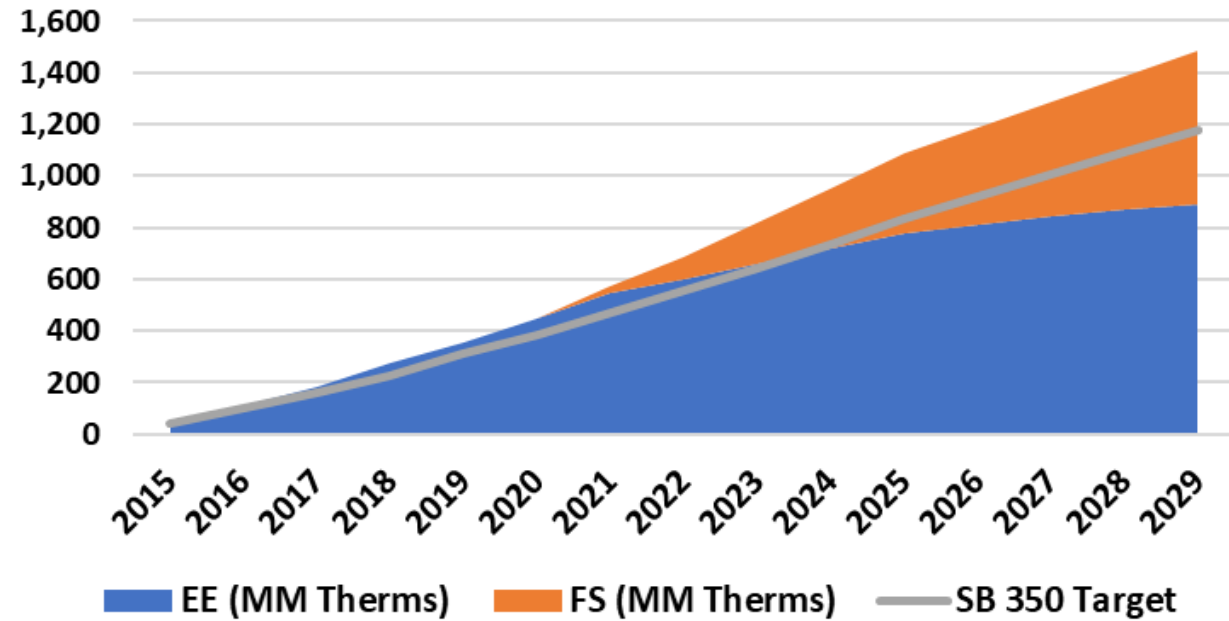


Statewide BAU Scenario 1

Electricity - BAU Sc 1



Gas - BAU Sc 1



- 66% of targeted electricity savings met
- Fuel Sub is efficient electrification
- Traditional EE becomes more difficult to add at same rate as in earlier years
 - Cumulative savings continue to grow but new first year savings diminish over time
- 126% of targeted gas savings met



BAU Scenario 1 in a High Electrification Future

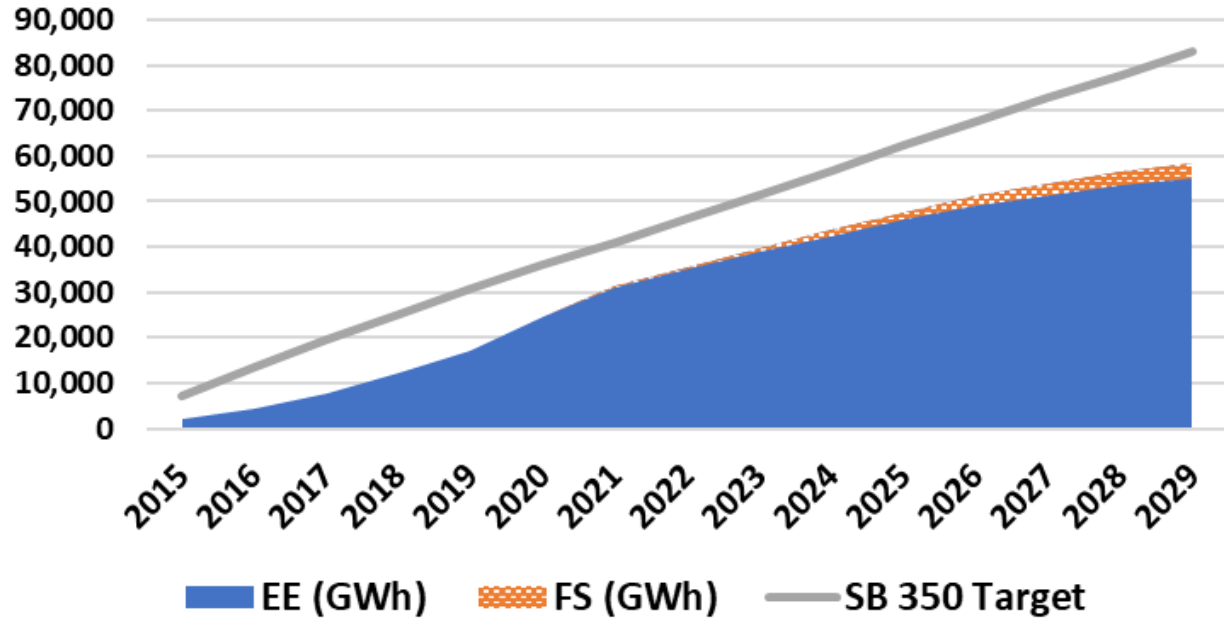
In addition to existing C&S savings and committed program savings & elements in BAU 1:

- Focus on a high electrification future by including aggressive building electrification instead of gas efficiency
 - Only keep first year gas savings though 2024 then decay
 - Maximized programmatic electrification impacts

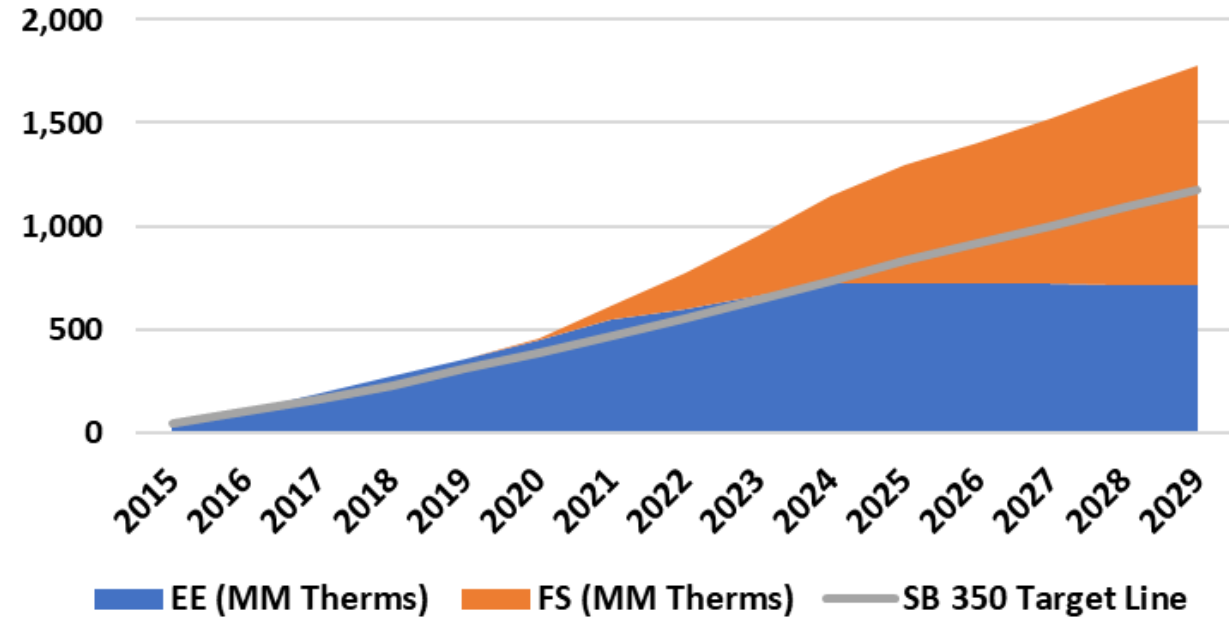


Statewide BAU Sc 1 in HE future

Electricity - BAU Sc 1



Gas - BAU Sc 1 in HE future



- 64% of targeted electricity savings met
- Fuel Sub is at a more aggressive/optimistic level of efficient electrification
- Traditional gas EE is supplanted with FS starting in 2025
 - Cumulative savings continue to contain gas savings starting prior and decay as no new gas savings are added
- 152% of targeted gas savings met



Aggressive Scenario 2 in a High Electrification Future

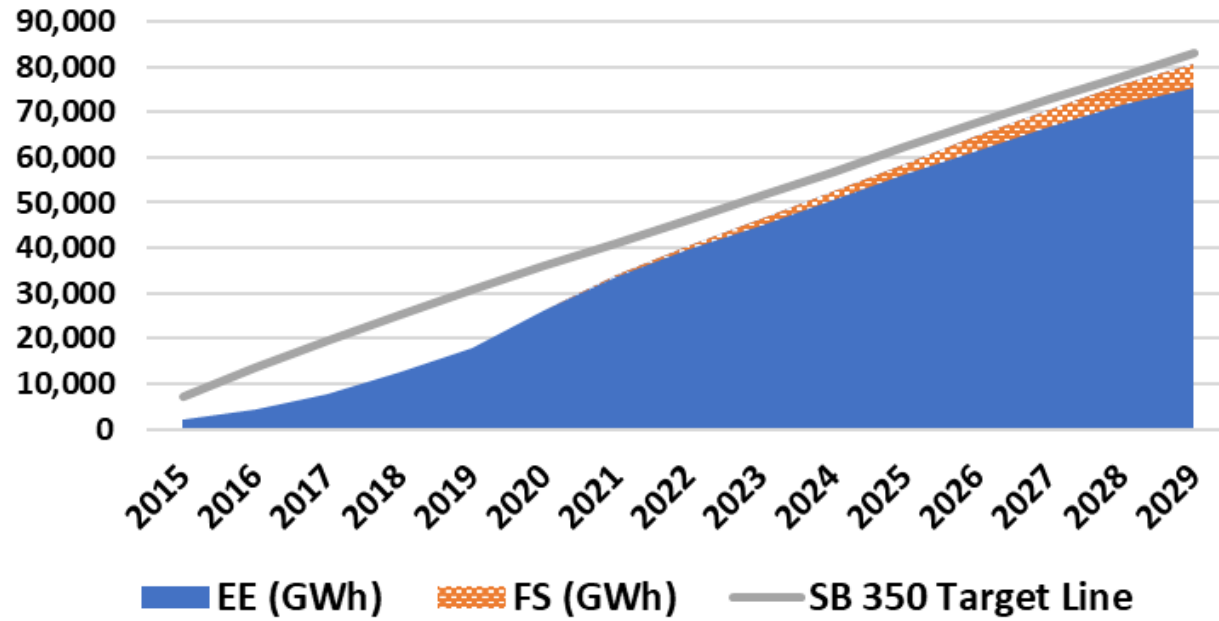
In addition to existing C&S savings and committed program savings & elements in BAU 1:

- Maximize IOU and POU electric EE programmatic savings potential
- Focus on a high electrification future by including aggressive building electrification instead of gas efficiency
 - Maximized programmatic electrification impacts
 - Only keep first year gas savings though 2024 then decay

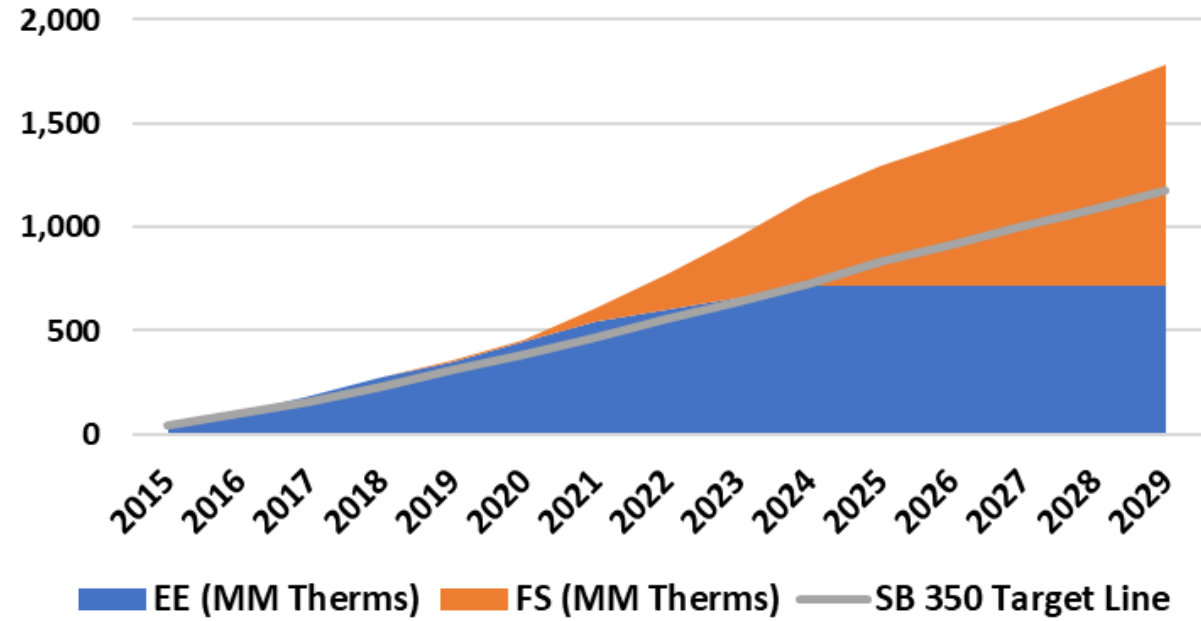


Statewide Aggressive Sc 2 in HE future

Electricity - AGGR Sc 2 in HE future



Gas - AGGR Sc 2 in HE future



- 91% of targeted electricity savings met
- 152% of targeted gas savings met
- Fuel Sub is at a more aggressive/optimistic level of efficient electrification
- Traditional gas EE is supplanted with FS starting in 2025
- Electric EE is at a more aggressive/optimistic level than BAU



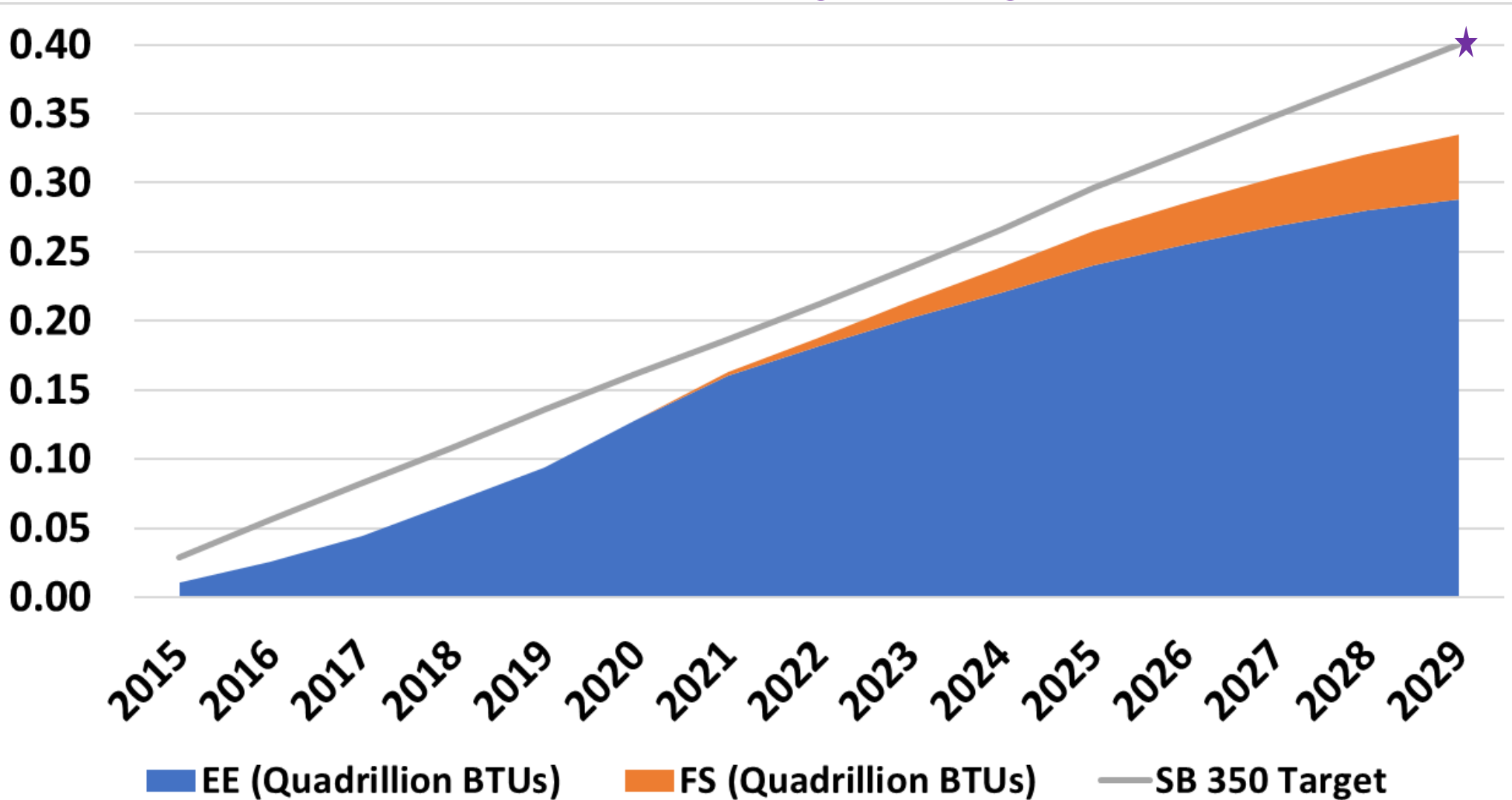
Considerations

- Energy Efficiency saves electricity and gas reducing GWh and MM Therm demand
- Fuel Substitution or Building Electrification displaces gas and adds incremental electric demand
- **Convert to common metric of BTU savings to see combined effect towards goals set**
- **What scenarios reach the SB 350 doubling goal and when?**



Statewide BAU Scenario 1

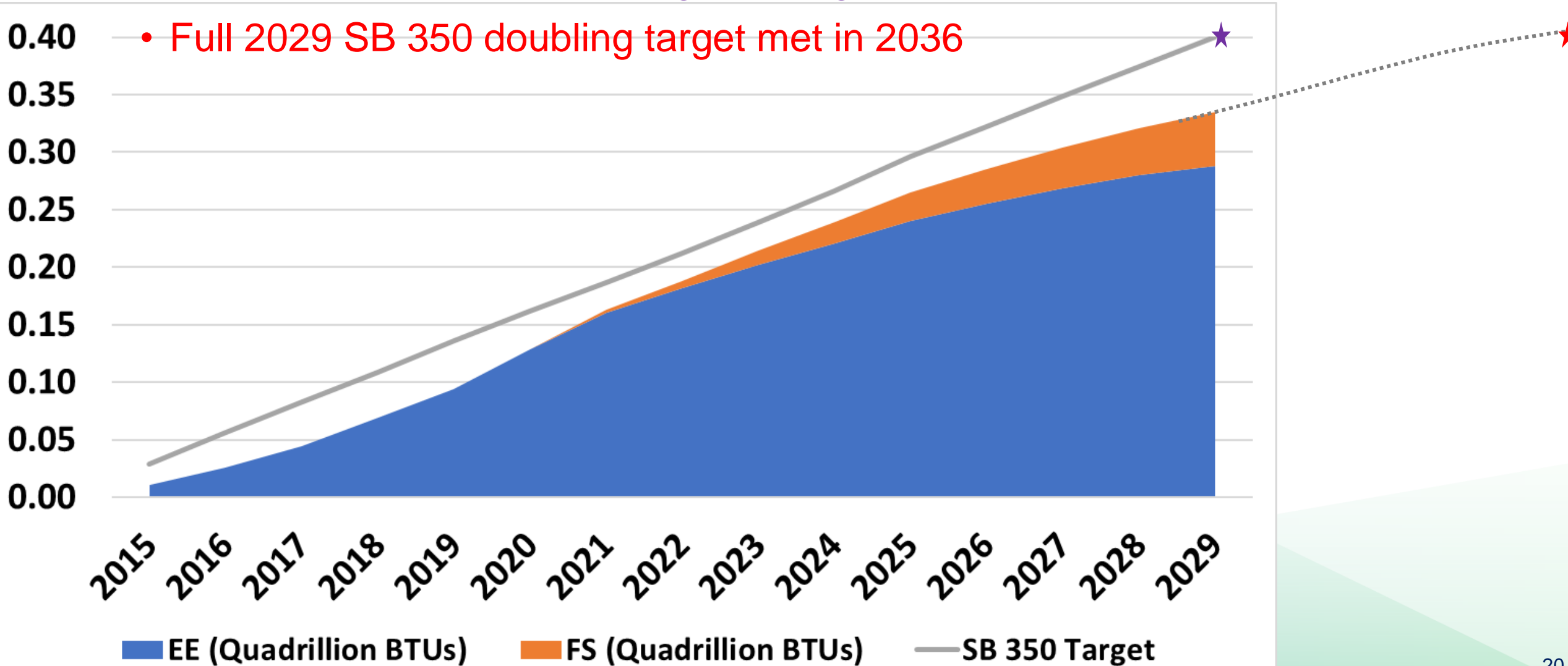
- 84% of combined SB 350 target savings met





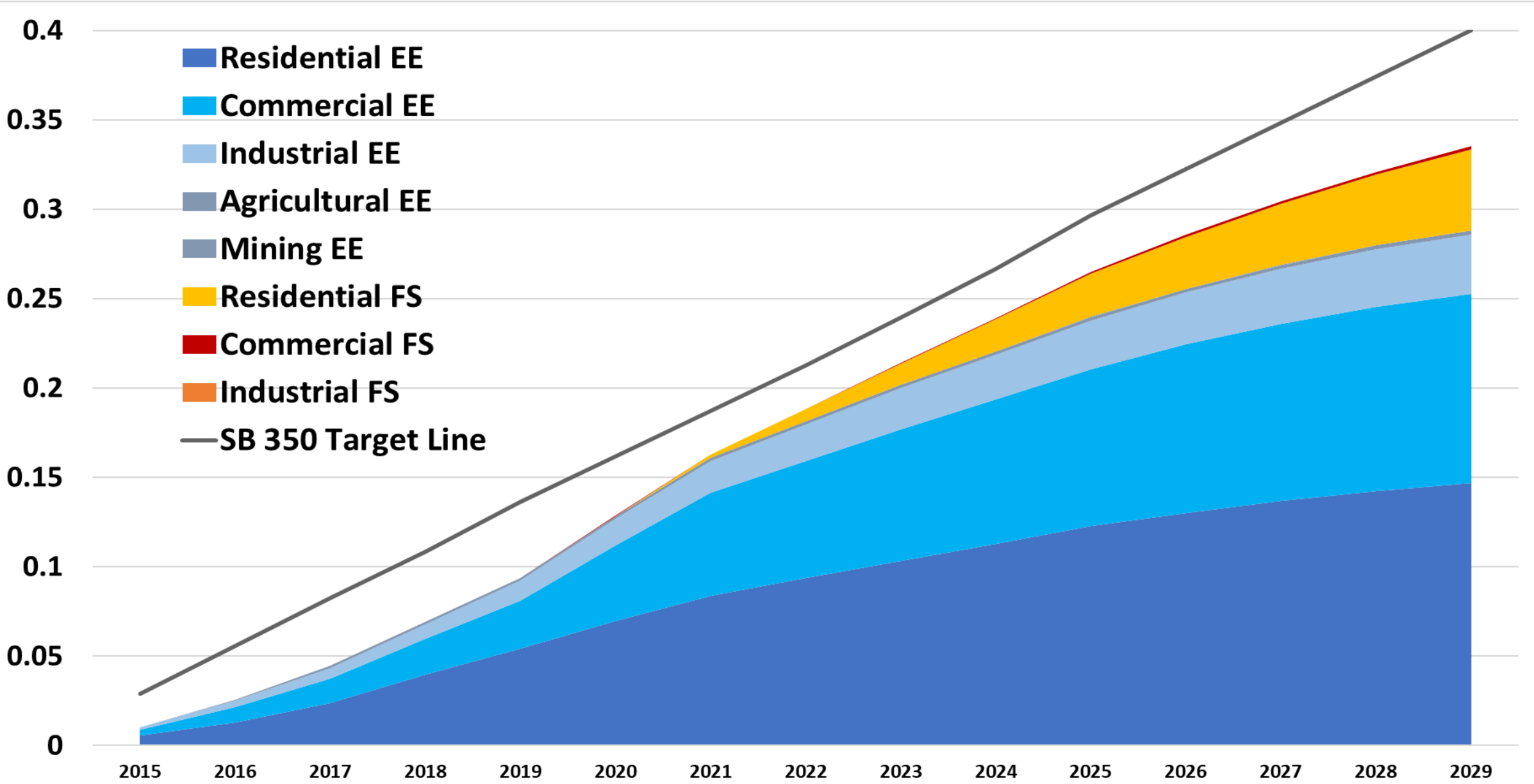
Statewide BAU Scenario 1

- 84% of combined SB 350 target savings met
- Full 2029 SB 350 doubling target met in 2036



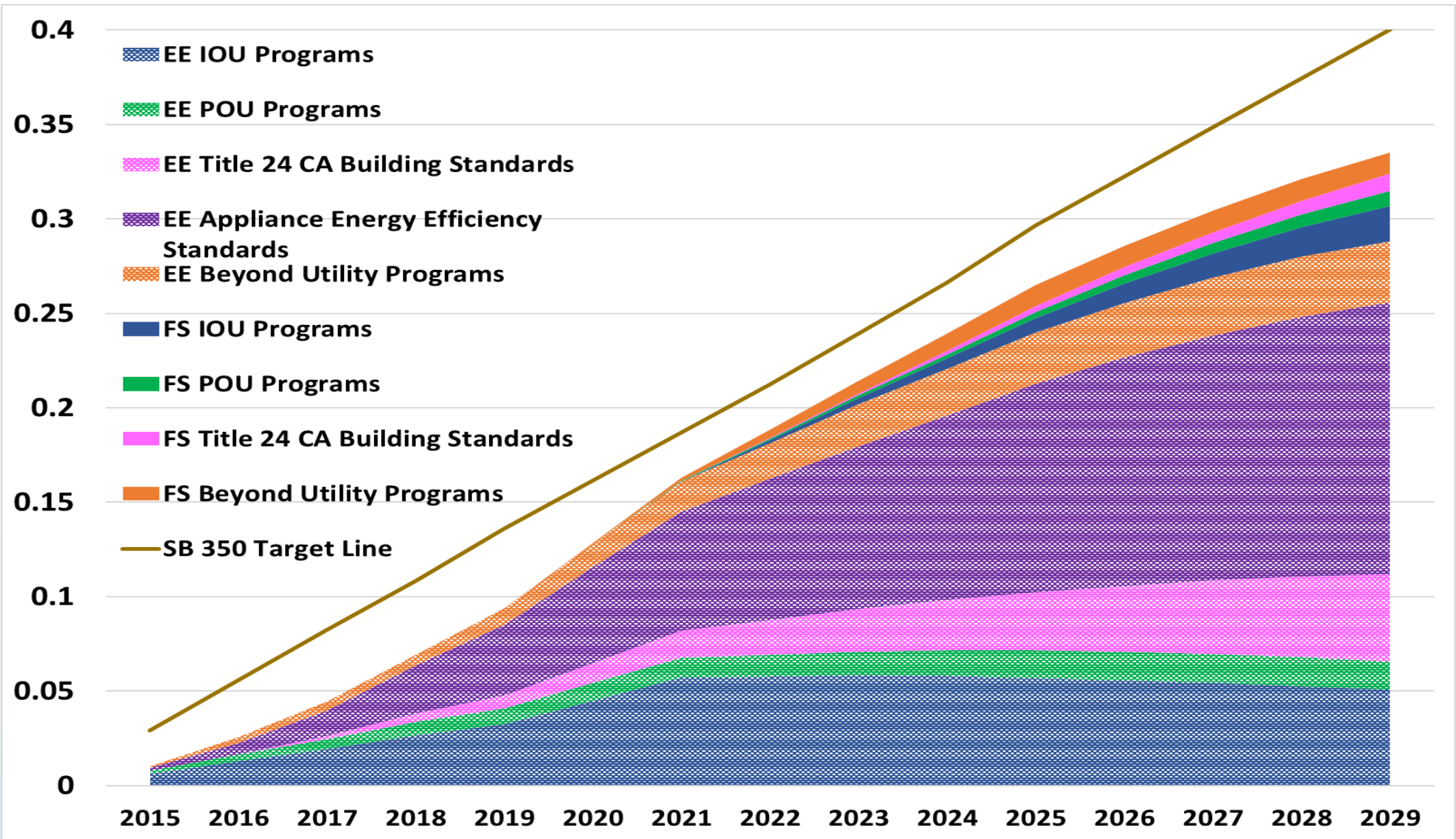


Statewide BAU Scenario 1 (QBTUs)



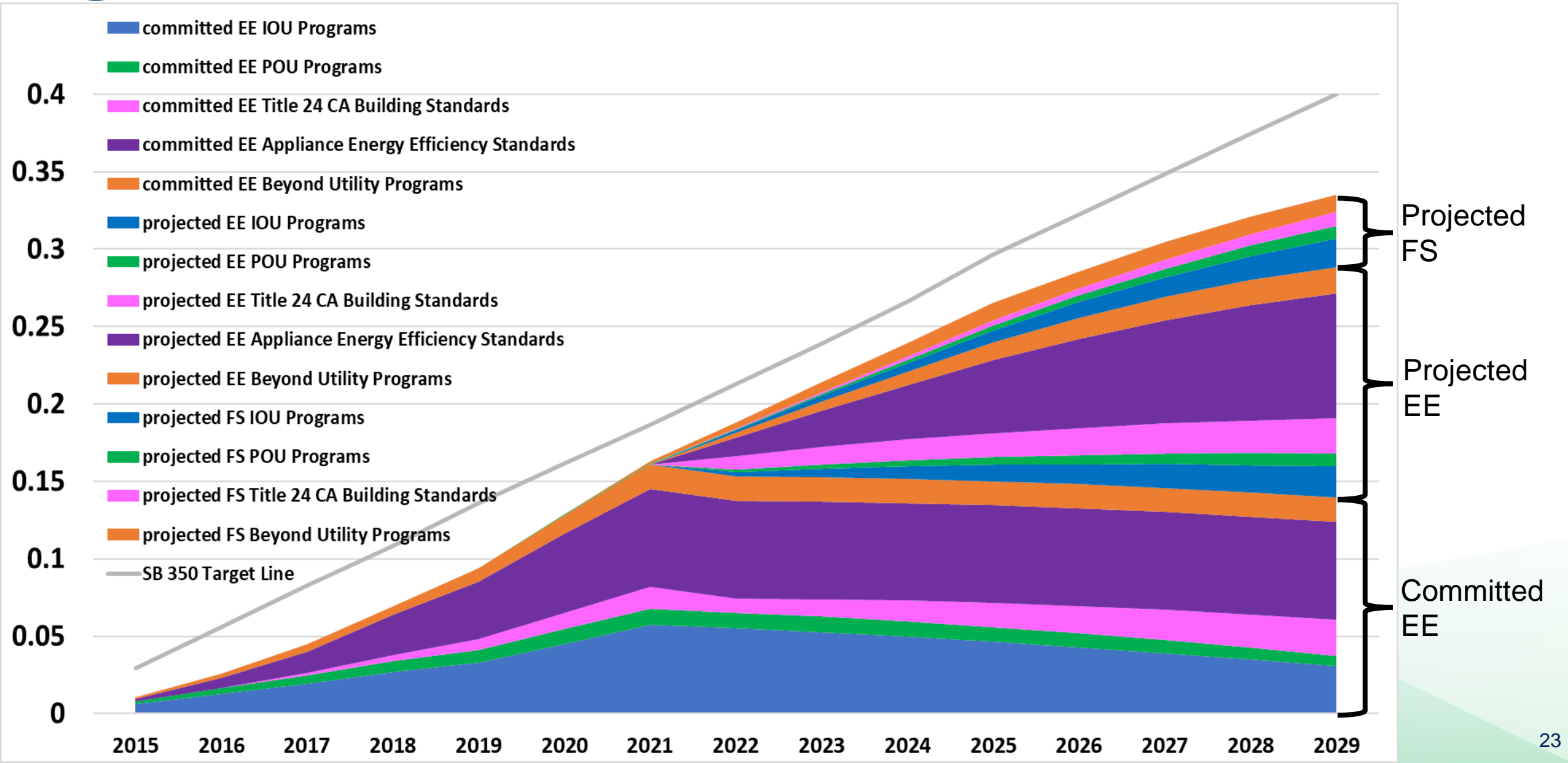


Statewide BAU Scenario 1 (QBTUs)





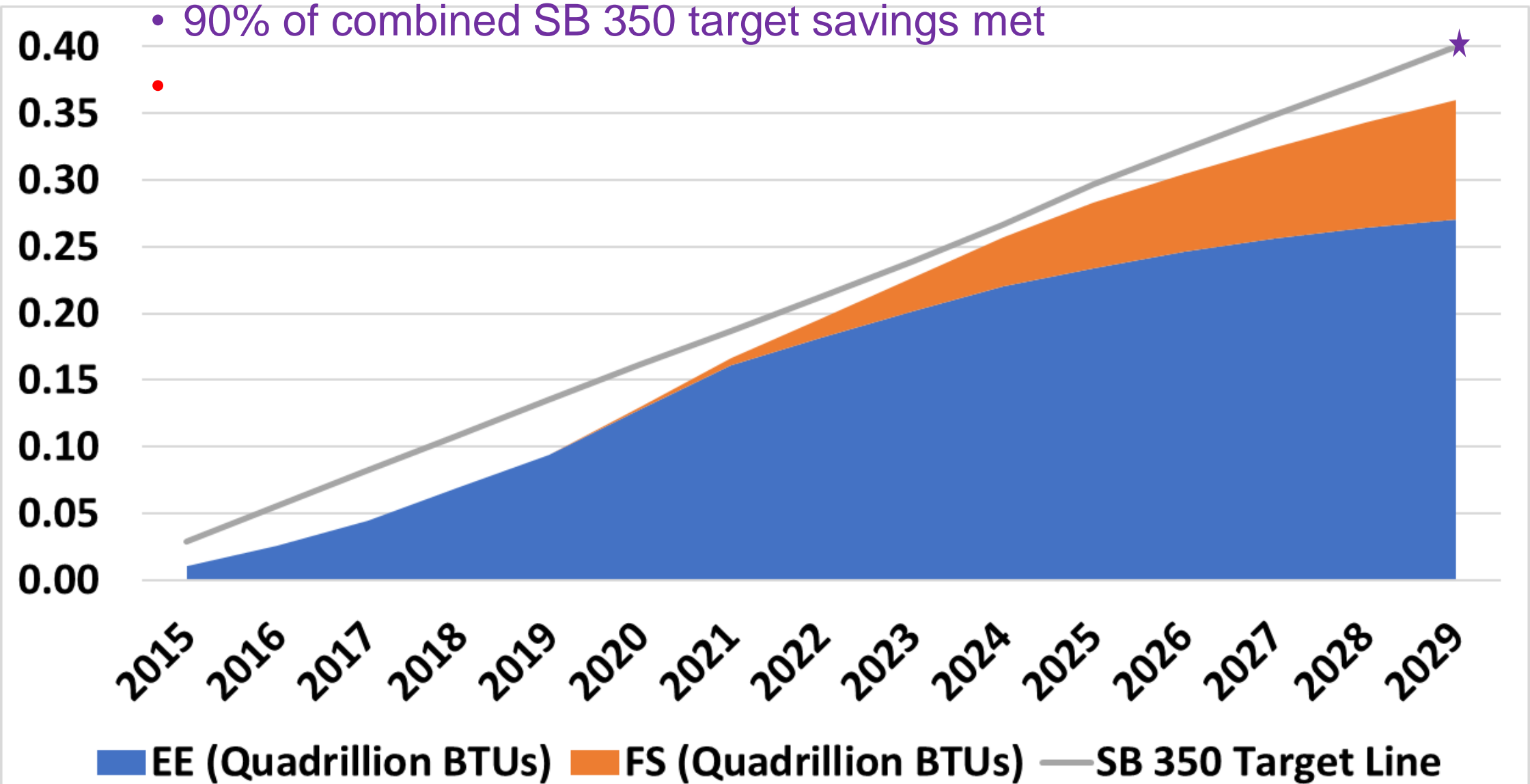
Statewide BAU Scenario 1 (QBTUs)





Statewide BAU Sc 1 in HE future

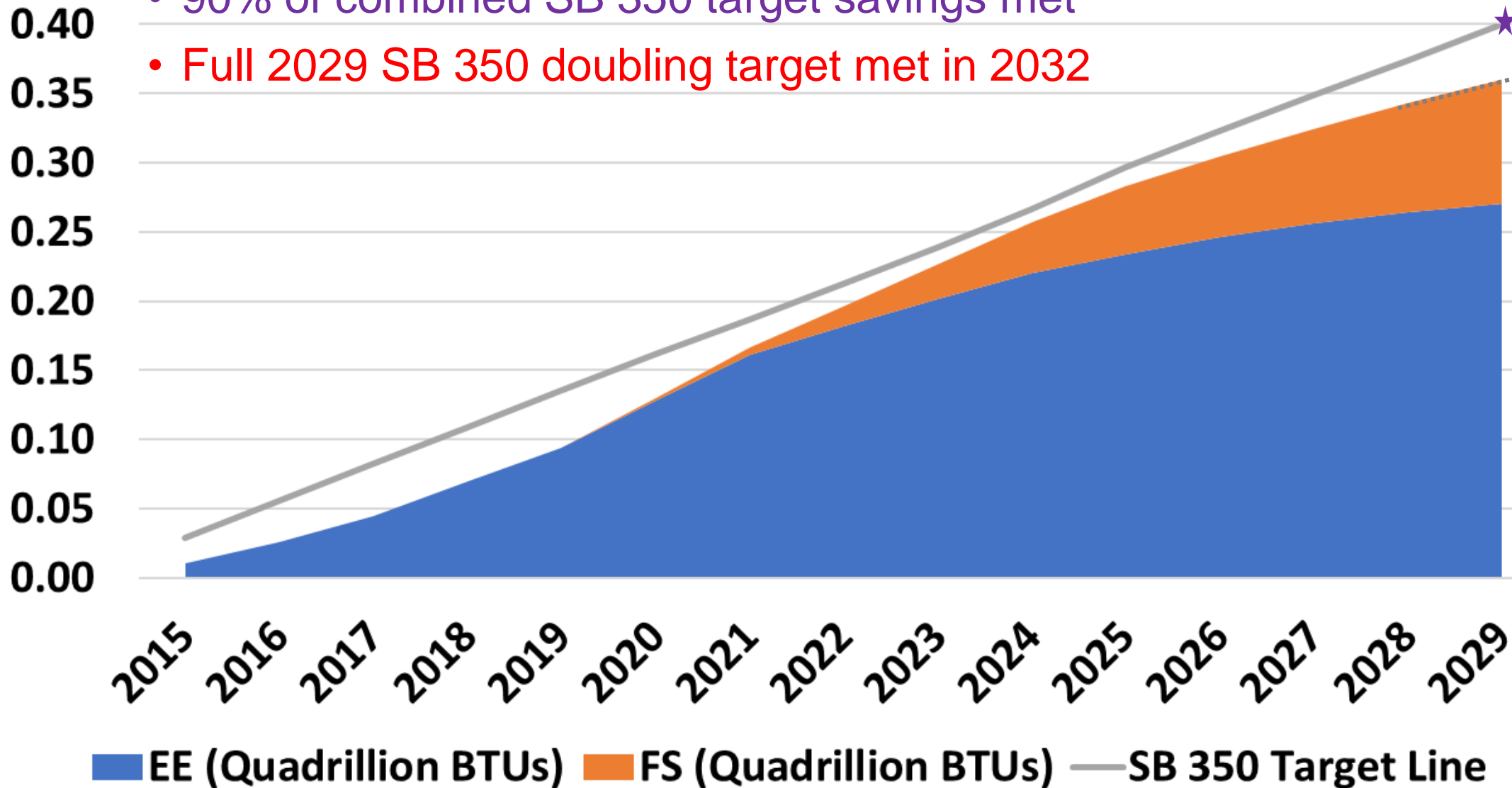
• 90% of combined SB 350 target savings met





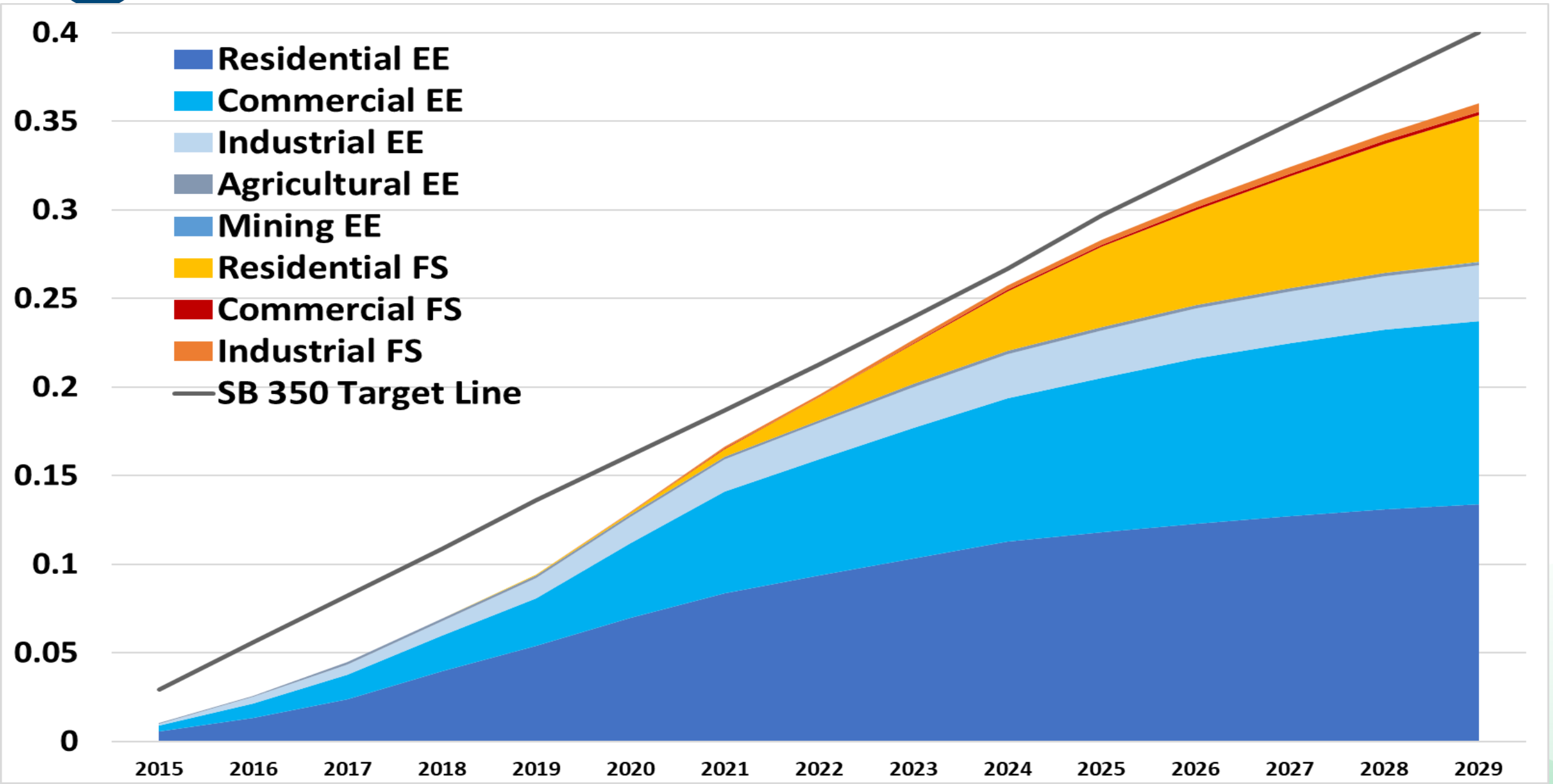
Statewide BAU Sc 1 in HE future

- 90% of combined SB 350 target savings met
- Full 2029 SB 350 doubling target met in 2032



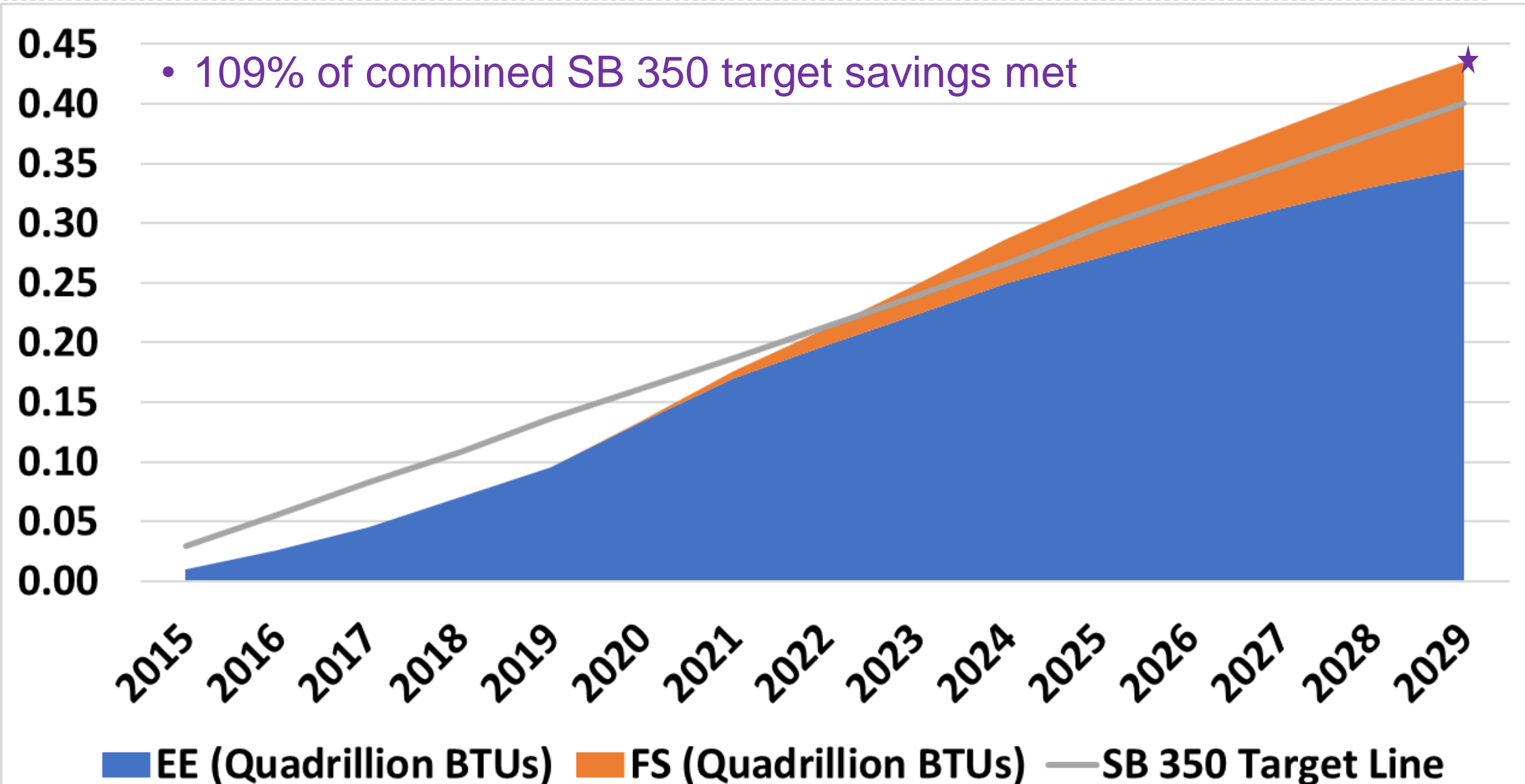


Statewide BAU Sc 1 in HE future (QBTUs)





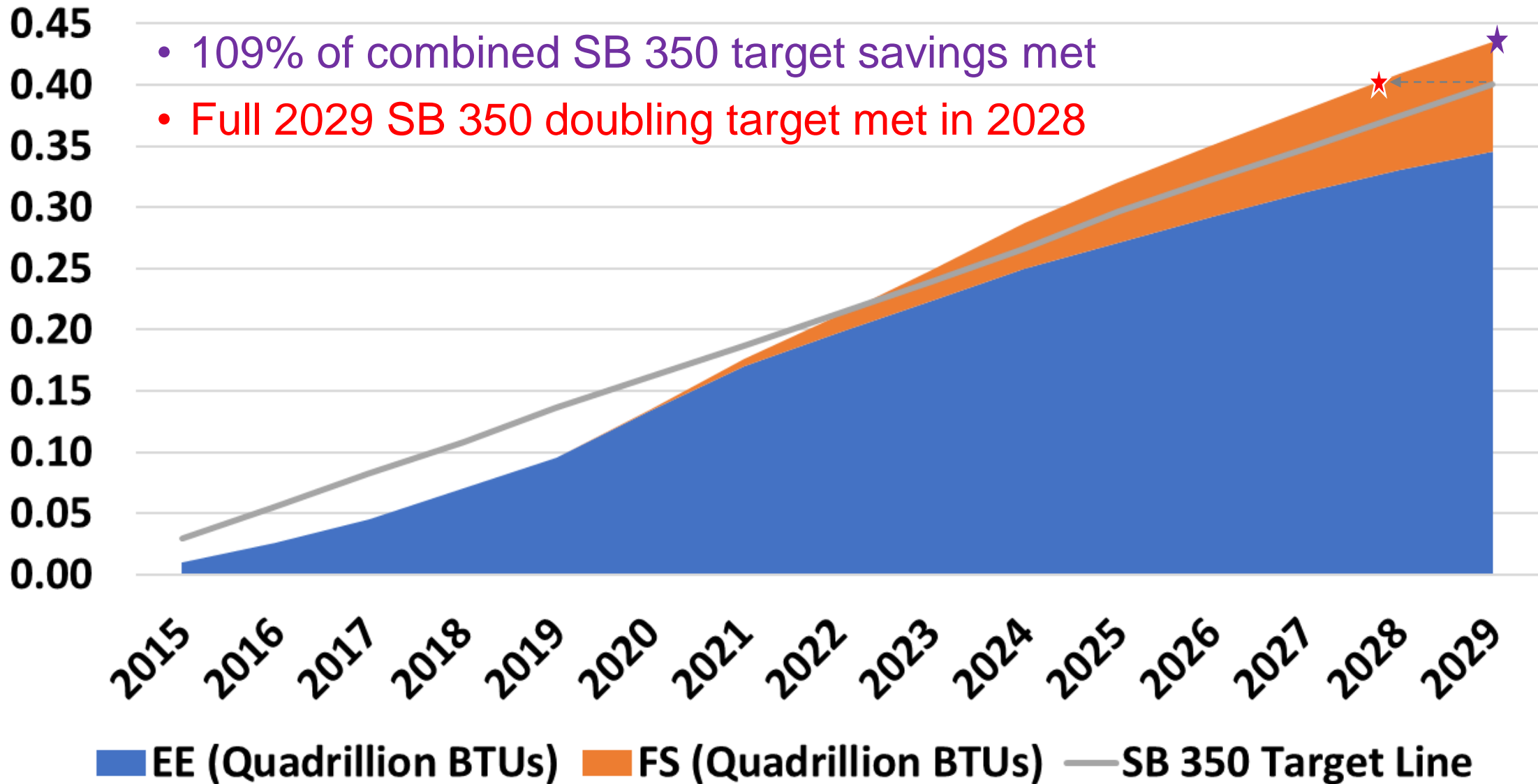
Statewide Aggressive Sc 2 in HE future





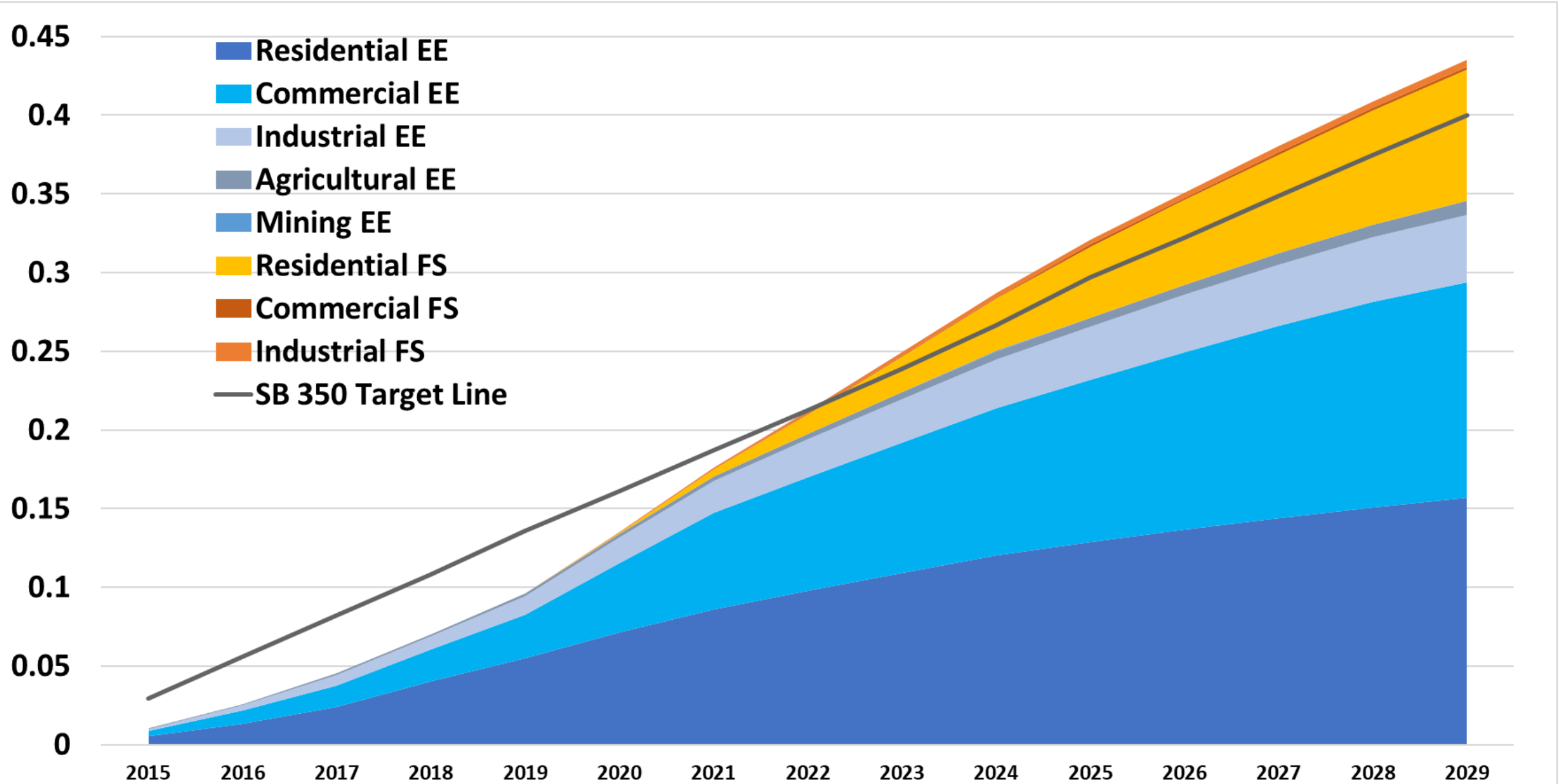
Statewide Aggressive Sc 2 in HE future

- 109% of combined SB 350 target savings met
- Full 2029 SB 350 doubling target met in 2028



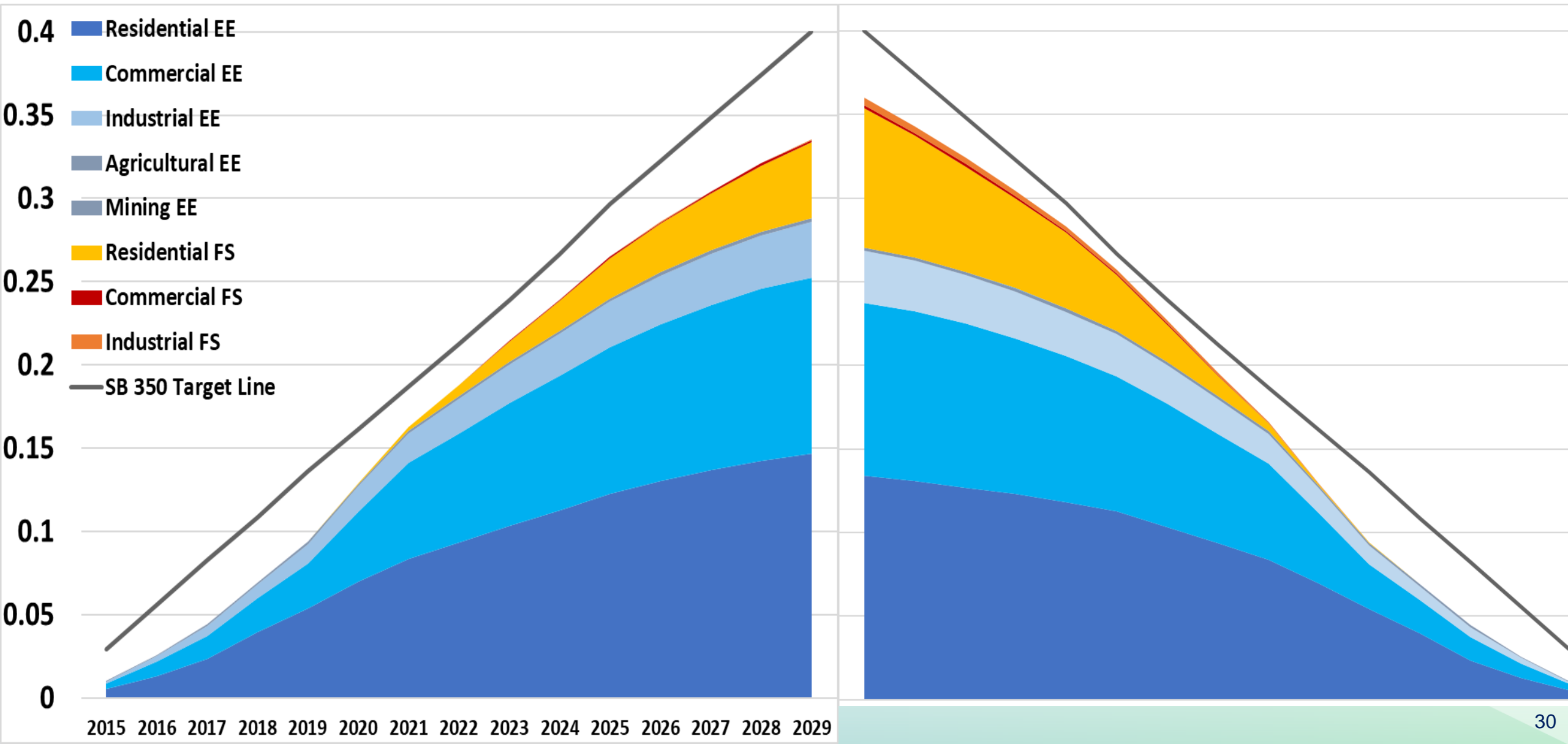


Statewide Aggressive Sc 2 in HE future (QBTUs)



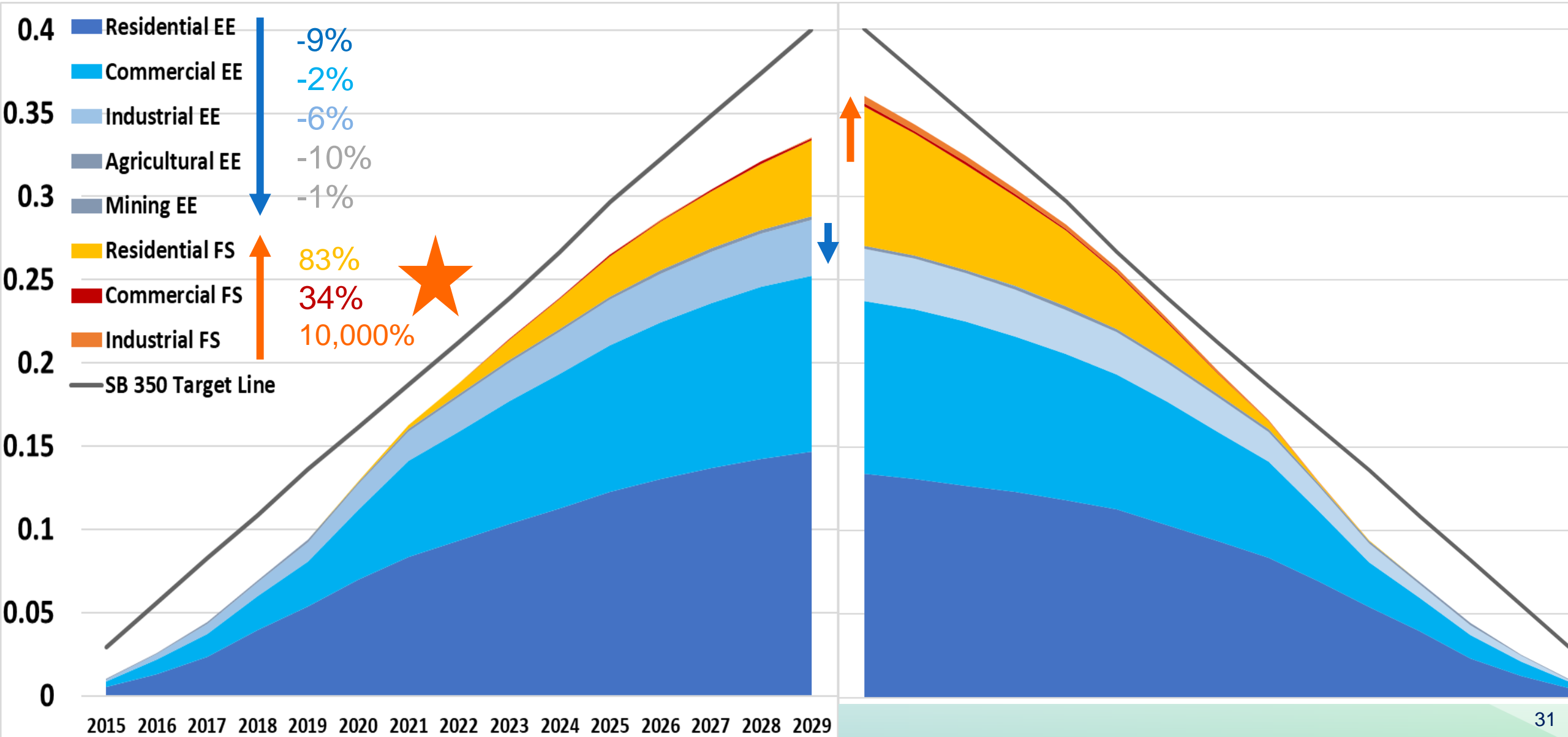


Sector build-up from BAU to BAU HE



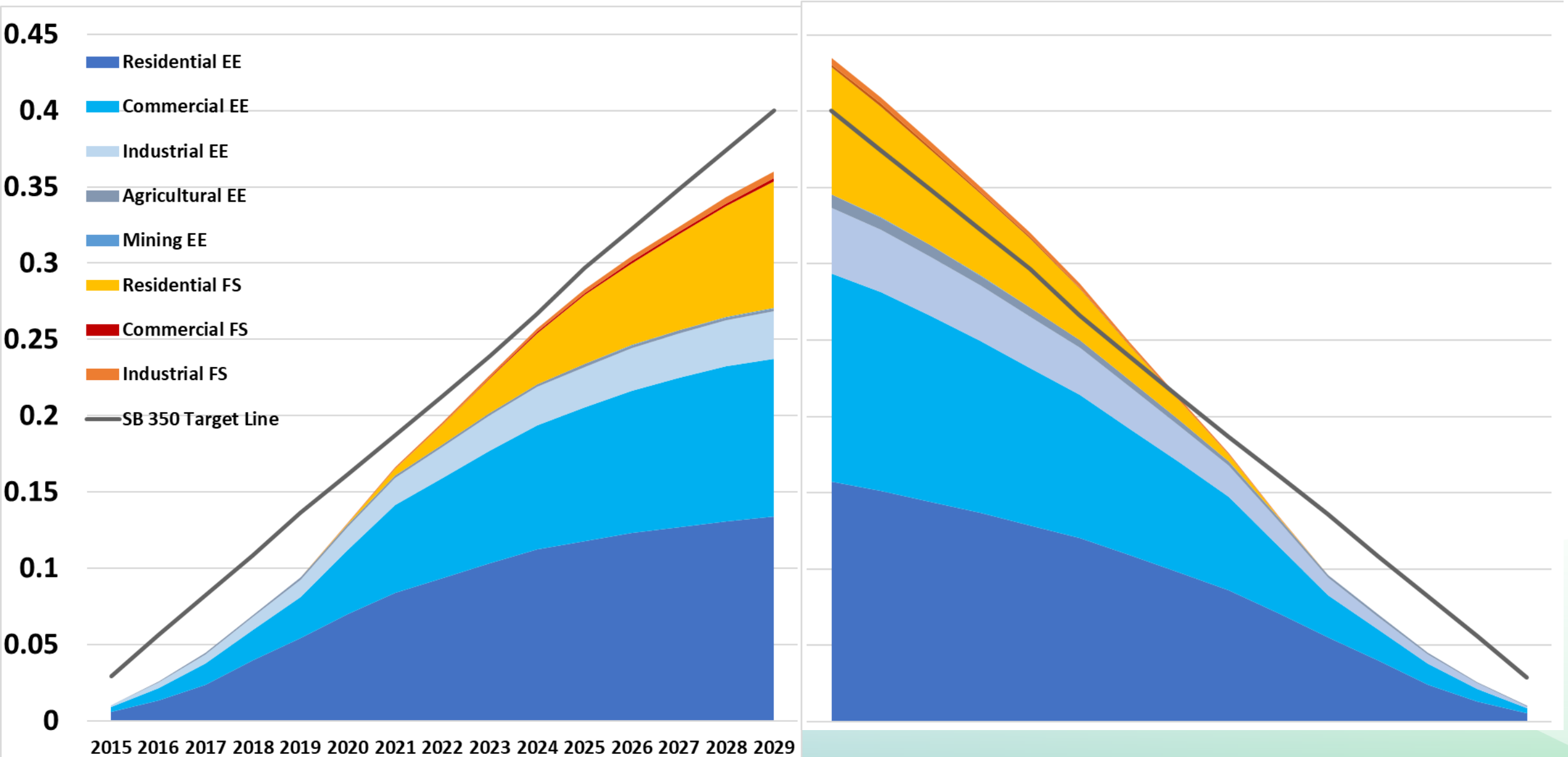


Sector build-up from BAU to BAU HE



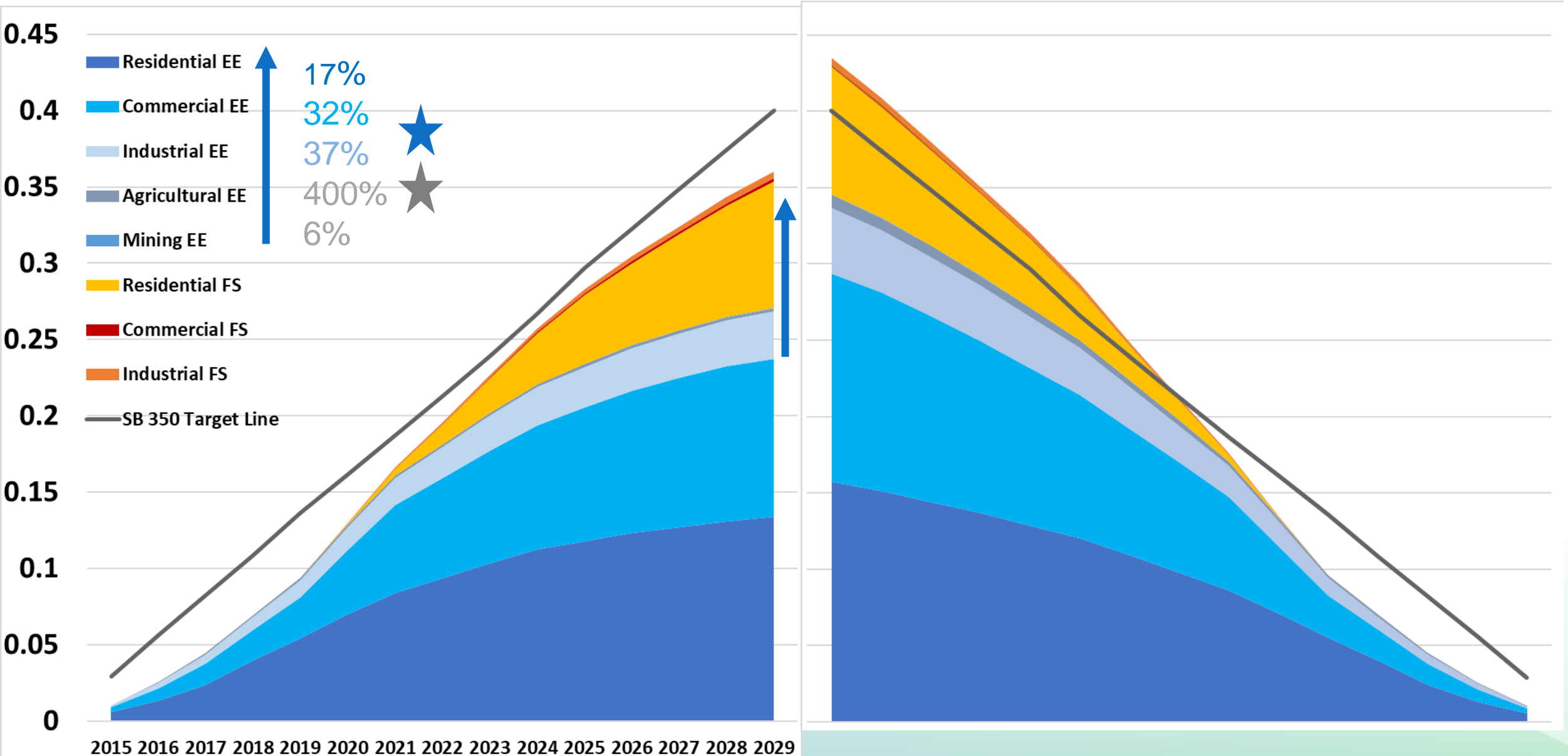


Sector build-up from BAU HE to AGGR HE





Sector build-up from BAU HE to AGGR HE





SB 350 in the context of Building Decarbonization

- Comparing SB 350 to other goals requires translating between Energy Efficiency & Emissions Targets
- *Convert to GHG (MM Tons CO_{2e}) emissions averted*
- **What scenarios reach which emissions goals?**

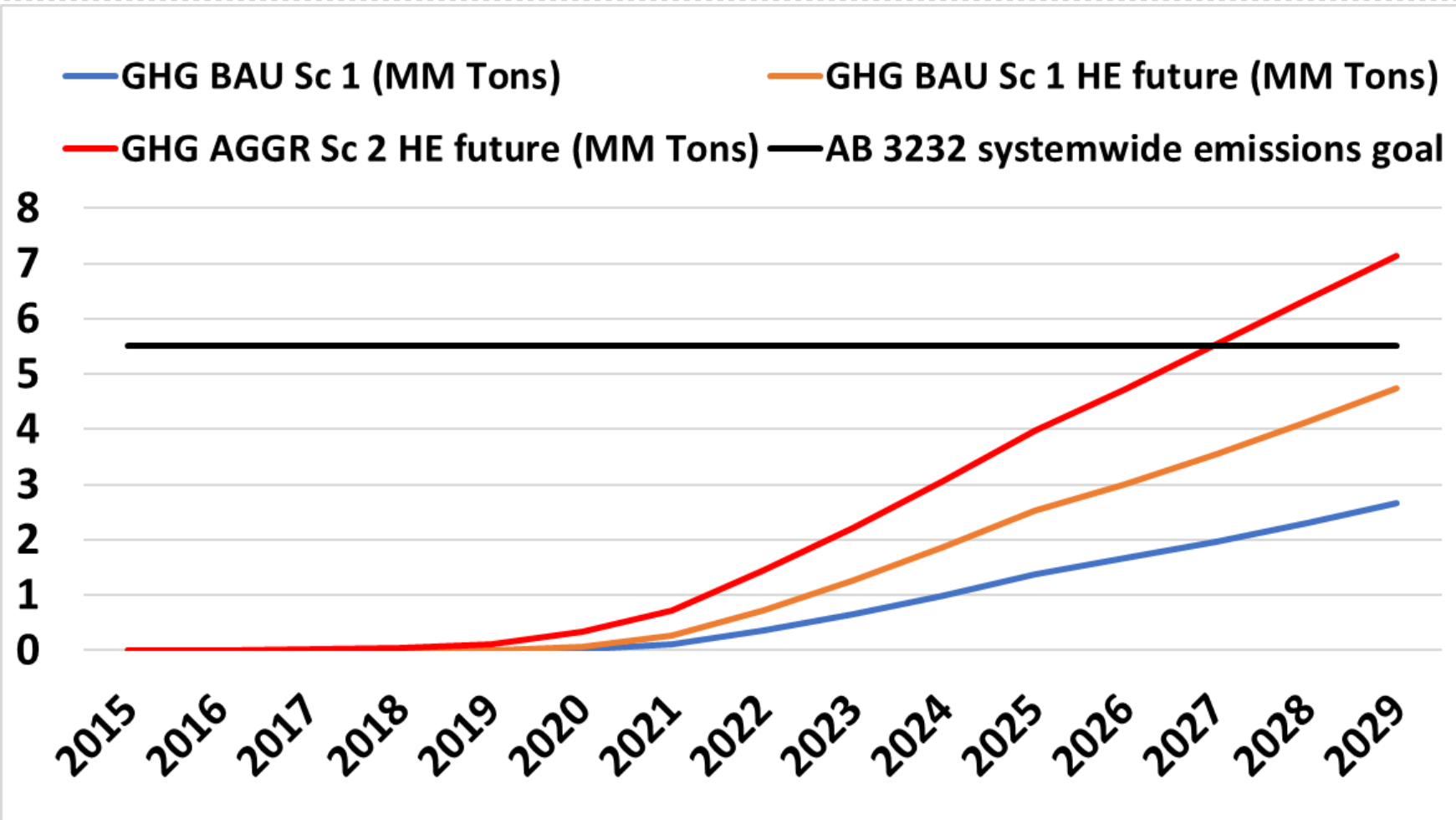


Comparing 2030 Goals...

- Both SB 350 and AB 3232 consider targets/goals in the relative near term; ie. through 2029 or January 1, 2030
 - SB 350 focuses on doubling EE savings using a baseline of 2015
 - EE baseline set by combined 2015 AAEE
 - AB 3232 seeks a reduction of GHG emissions from a baseline in 1990
 - Dual GHG baselines set
 - Systemwide Emissions (5.5 MM Ton CO_{2e})
 - Direct Emissions (22.1 MM Ton CO_{2e})



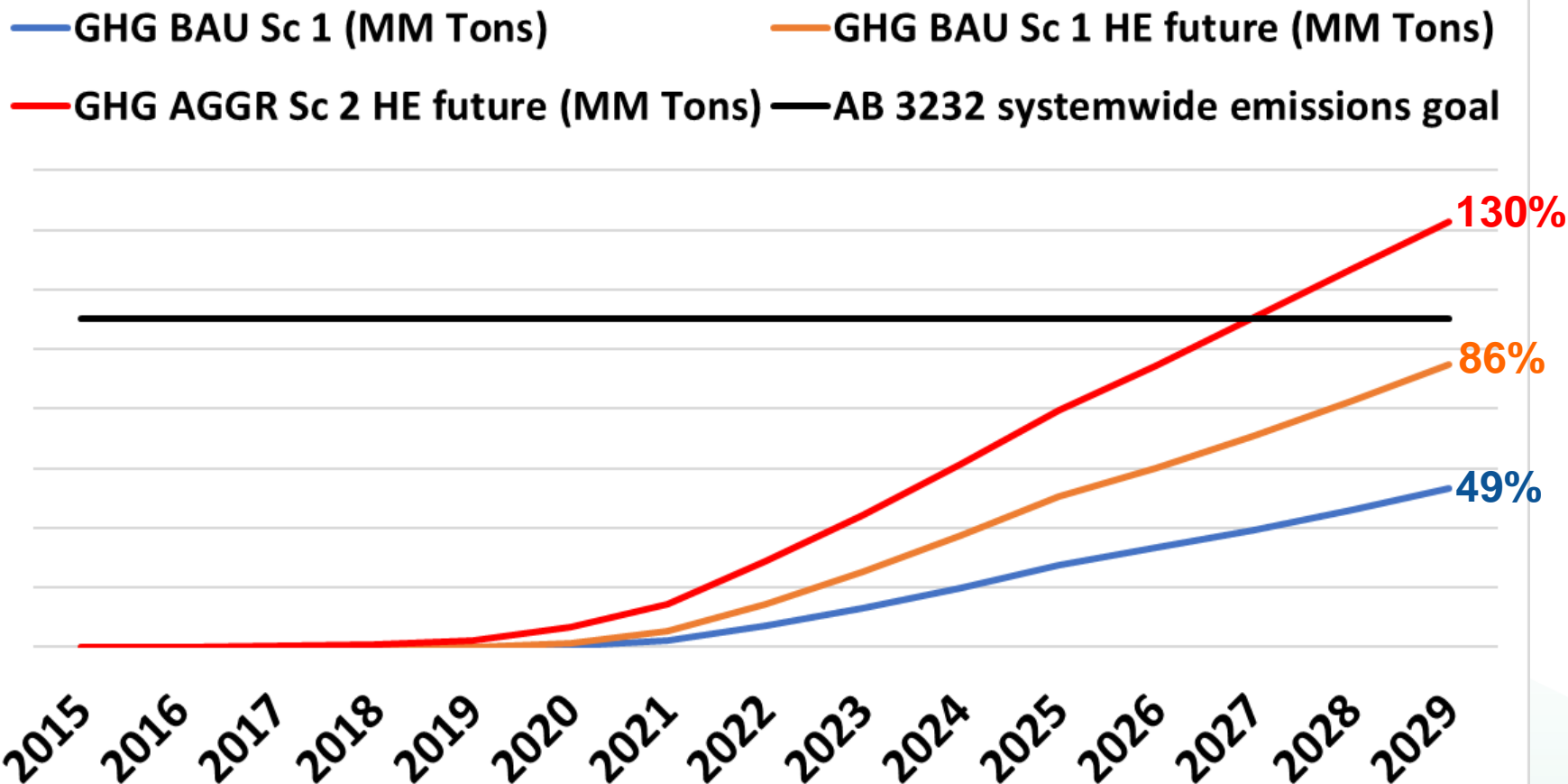
SB 350 Scenarios compared to AB 3232 Emissions Goals



- All GHG saved are measured with respect to BAU EE and negligible FS



SB 350 Scenarios compared to AB 3232 Emissions Goals

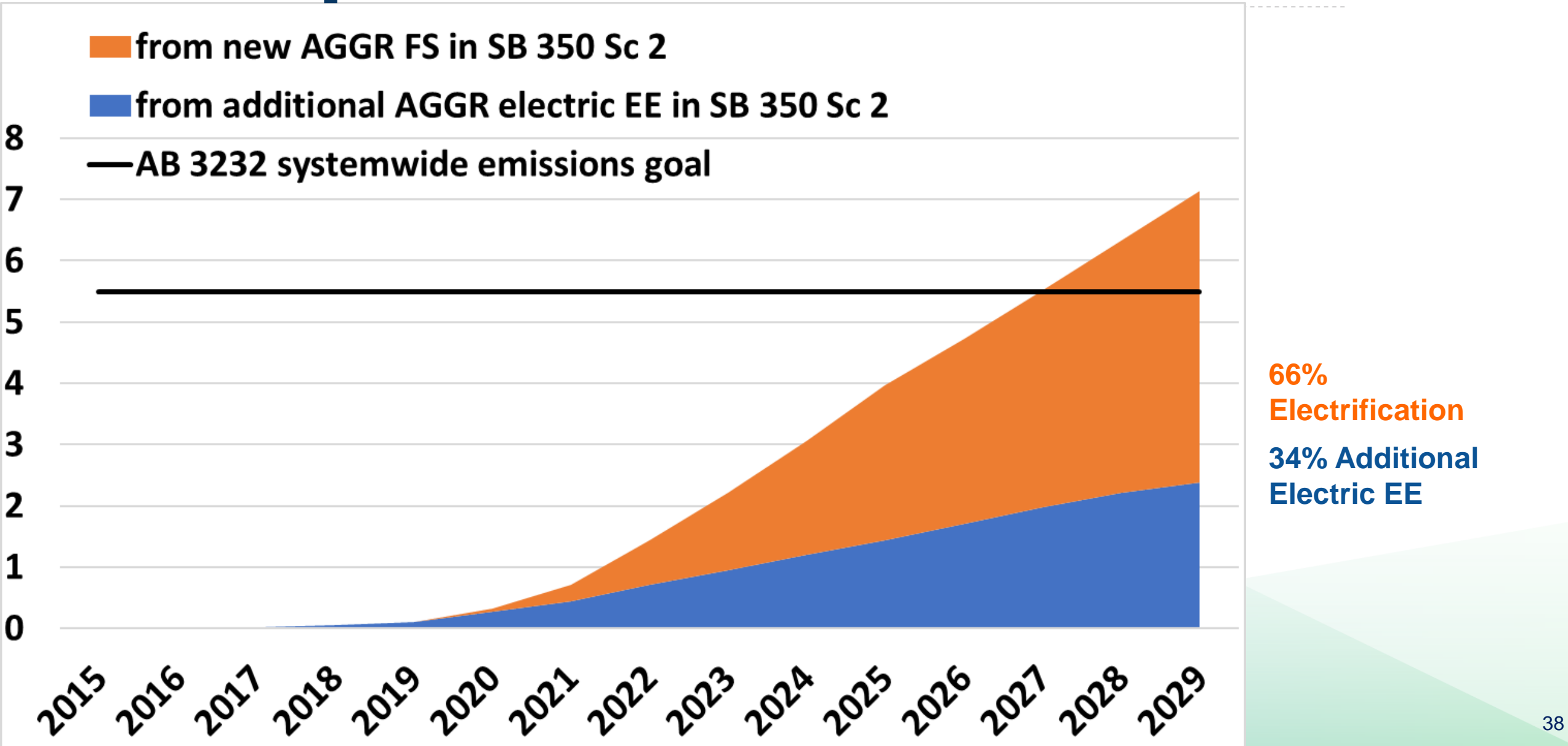


- BAU Sc 1
 - none assumed from traditional EE
 - only from new FS
- BAU Sc 1 HE future
 - none assumed from traditional EE
 - only from new aggressive FS
- AGGR Sc 2 HE future
 - Additional AGGR electric EE &
 - new aggressive FS

• All GHG saved are measured with respect to BAU EE and negligible FS

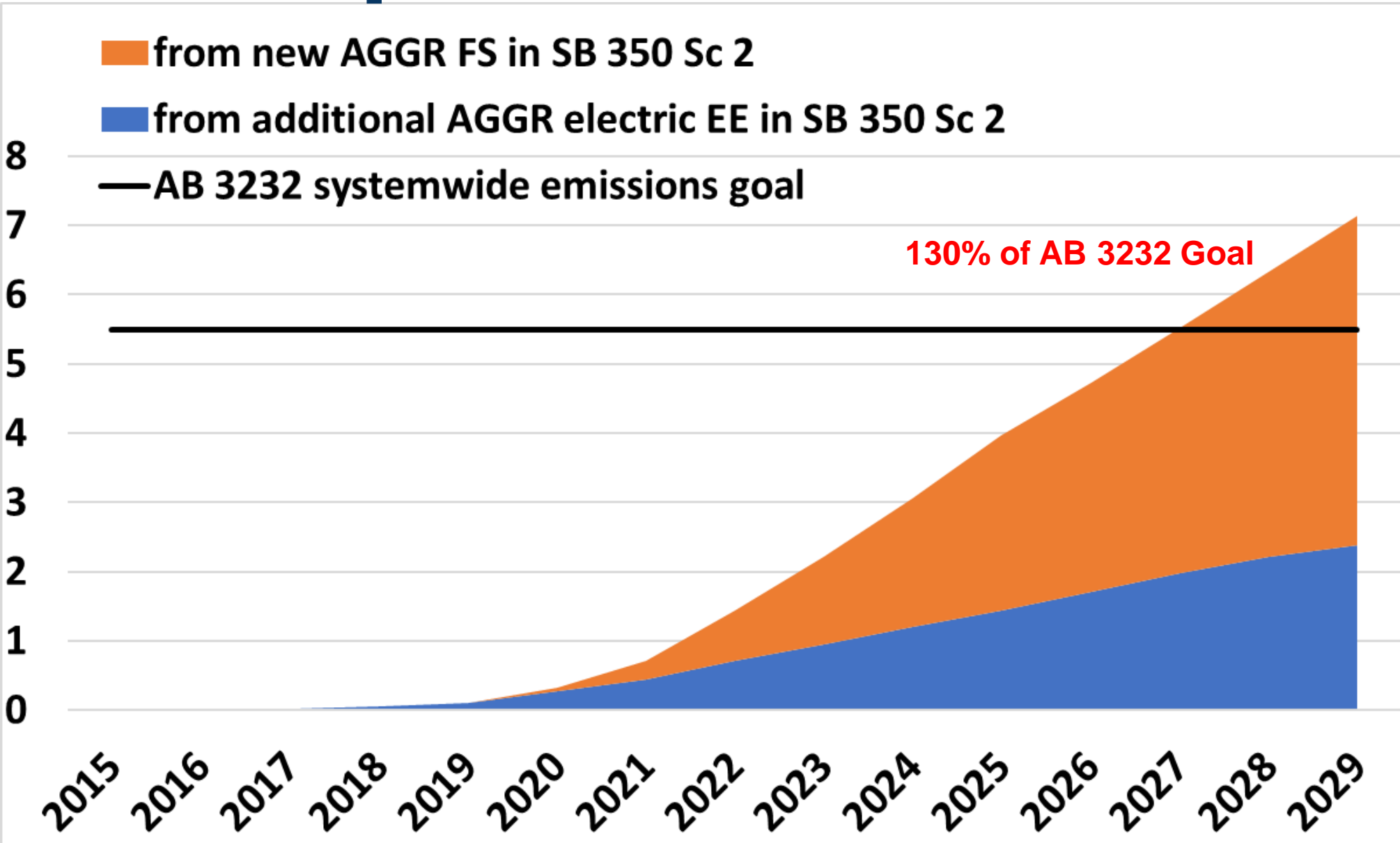


SB 350 Aggressive Sc 2 in HE future compared to AB 3232 Emissions Goals





SB 350 Aggressive Sc 2 in HE future compared to AB 3232 Emissions Goals



More GHG savings can be obtained from electrification than from traditional EE

66% Electrification
34% Additional Electric EE



Long Term Considerations

- Our analysis reported in the recently published California Building Decarbonization Assessment indicated that even if one focused on a Systemwide Emissions for meeting the AB 3232 goal, GHG reductions on the order of Direct Emissions goal would need to be attained in order to be on a trajectory for economywide carbon neutrality goals in 2045...
- **The CEC's Demand Scenarios Project, formally introduced in the 12/2 IEPR Workshop, will elaborate on various potential and possible futures progress towards mid-century decarbonization goals.**



Thank you!



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