



Public Workshop on the 2030 Target Scoping Plan

November 7, 2016



Welcome and Opening Remarks

All workshop materials and webcast link:

<https://www.arb.ca.gov/cc/scopingplan/meetings/meetings.htm>

Email address for questions:

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Workshop Outline

- ▣ 2030 Target Scoping Plan Overview
- ▣ Local Action
- ▣ Context for Policy Scenario Development
- ▣ Preliminary policy scenario evaluations
 - ▣ GHG emissions modeling
 - ▣ Economic analyses
- ▣ Discussion with Economic Reviewers
- ▣ Natural Working Lands
- ▣ Climate change and public health
- ▣ Discussion

2030 Target Scoping Plan Overview

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Directives and Legislation

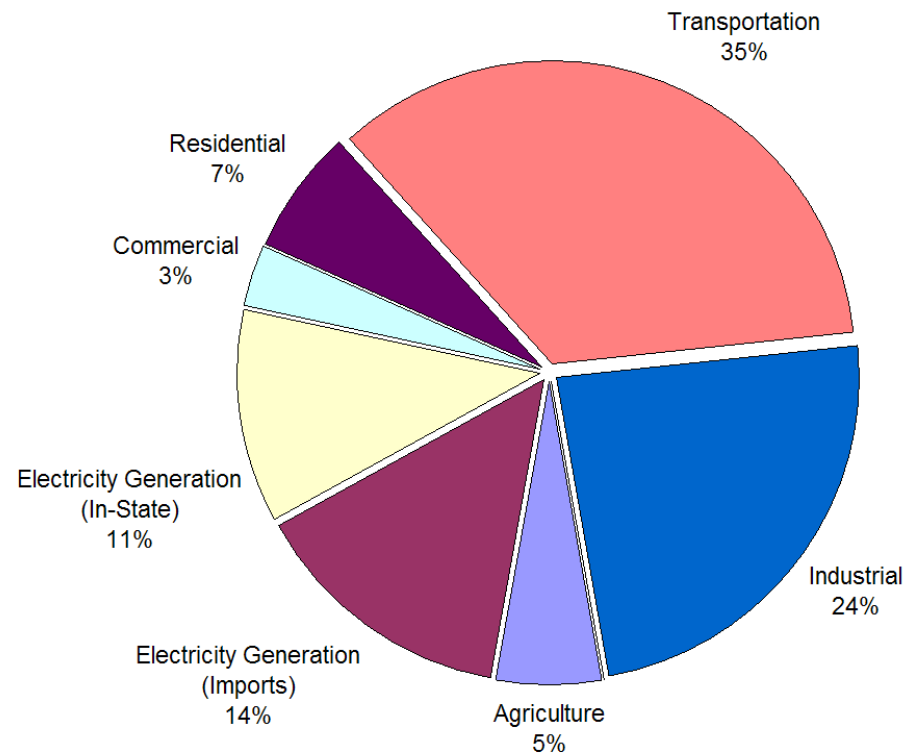
- ▣ Scoping Plan required by Assembly Bill 32
 - ▣ Must be updated at least every 5 years
- ▣ Executive Order B-30-15
 - ▣ Establishes midterm greenhouse gas (GHG) emissions reduction target of 40% below 1990 levels by 2030
 - ▣ Update the AB 32 Scoping Plan to incorporate the 2030 greenhouse gas target
- ▣ Senate Bill 32 (SB32) codifies 2030 midterm GHG target
- ▣ AB 197- ARB is required to consider the social costs of GHG reductions, to follow existing AB 32 requirements—including considering cost-effectiveness and minimizing leakage—and to prioritize measures resulting in direct emission reductions

Objectives for Scoping Plan

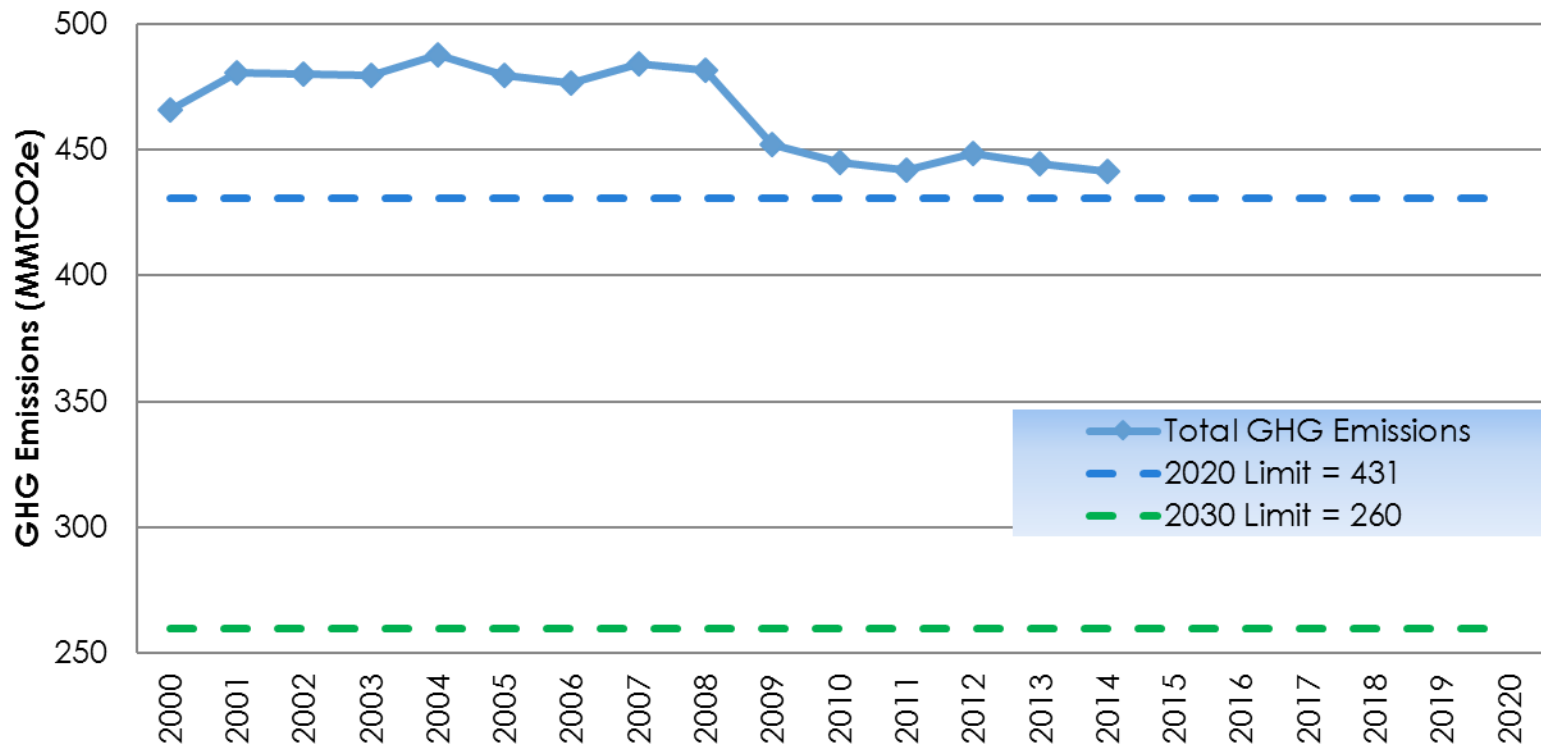
- Achieve 2030 target
- Provide direct GHG emissions reductions
- Minimize emissions leakage
- Facilitate sub-national and national collaboration
- Support cost-effective and flexible compliance
- Support US EPA Clean Power Plan
- Support climate investment for programs in disadvantaged communities
- Air quality co-benefits
- Protect public health

GHG Sources

- Natural & Working Lands (NWL) are not included in the scope of the statewide limit.
- Sector is evaluated in the Scoping Plan
- NWLs have significant role to play in climate change mitigation



California GHG Inventory Trend



Local Action

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Role of Local Action

- ▣ Local governments are critical partners in State strategy
 - ▣ Influence activities that emit GHGs and air pollutants (e.g. industrial permitting, land use and transportation planning, zoning, implementing building codes)
- ▣ Rate of reduction to achieve 2030 target requires an “all hands on deck” approach
- ▣ Many local governments are already leading climate efforts
 - ▣ Local Climate Action Plans
- ▣ Air district actions to reduce air pollutants are also reduce GHGs

Recommended Local Plan Level Goals

- Community-wide goal of 6 MTCO₂e per capita by 2030 and 2 MTCO₂e per capita by 2050 implemented through Climate Action Plan
 - Consistent with statewide limits in AB 32, SB 32 and EO S-3-05
 - Consistent with Under 2 MOU “fair share”
 - Consistent with Paris Agreement
 - Demonstrates leadership role on climate change mitigation
- Would replace “15% from 2008 levels by 2020” previously recommended in 2008 Scoping Plan
- Per person approach allows for population growth in a more sustainable manner

Local Climate Action Plans (CAPs)

- Benefits of developing region-specific CAPs
 - Holistic look at local strategies to support State target
 - Strategies generate local co-benefits (air quality, public health, green jobs, transportation choices; protect regional natural resources)
 - Streamline environmental review under CEQA
- ARB support for local CAPs
 - CoolCalifornia.org
 - “local government toolkit”
 - Local Government Operations Protocol for GHG inventories

Project Level GHG Goals

- Recommend projects to implement all feasible measures to reduce GHGs
 - Lead agency can develop numeric project level thresholds
 - Projects with emissions in excess of threshold, incorporate all feasible mitigation
 - Some projects are able to achieve no net increase in GHG emissions

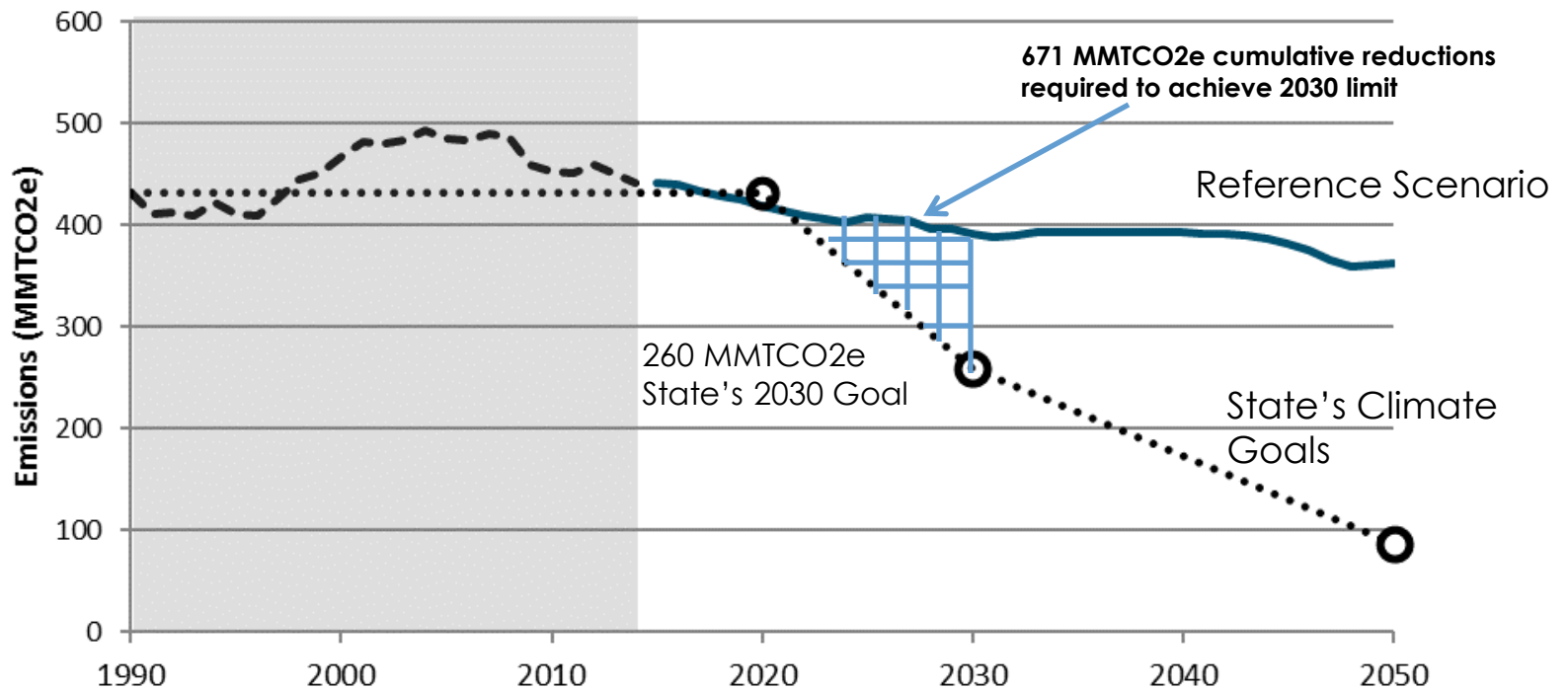
Project Level Thresholds, cont.

- Recommended mitigation scheme priorities
 - On-site design features
 - Off-site with direct investments in vicinity of project e.g. investment at social cost of carbon into local green fund to support energy efficiency and other demand side programs
 - Off-site within the State
 - Purchase and retire carbon credits from voluntary registry
- Please provide feedback on whether it would be helpful for ARB to provide recommendations on minimum or “floor” project level thresholds as a post Scoping Plan activity

Draft Scoping Plan Policy Scenarios

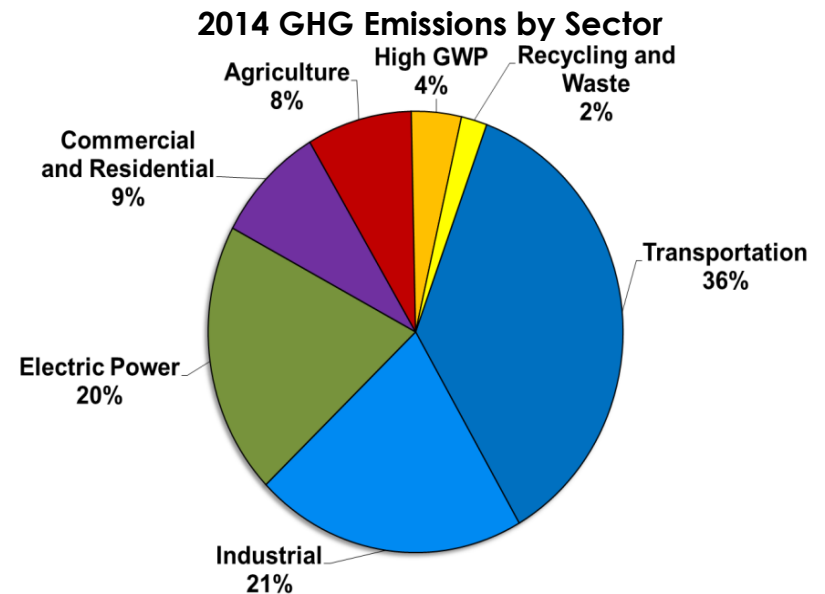
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Updated Reference Scenario



Choosing a Path Forward

- Understand sources of emissions when considering opportunities for policies and programs
- Sector contribution changes over time
- Consider integrated nature of built and natural environments on policies



Known Commitments

- SB 350-increase renewable energy and energy efficiency
- SB 1383 – reduce short-lived climate pollutants
- SB 375 – support sustainable community development
- Mobile Source Strategy- help State achieve its federal and state air quality standards
- Low Carbon Fuel Standard
- Sustainable Freight Action Plan
- Short Lived Climate Pollutant Plan

Achieving the 2030 Target

- ▣ State does not achieve the 2030 limit with the known commitments
- ▣ Need additional reductions to achieve the 2030 limit
- ▣ Consider legislative direction and Scoping Plan objectives
- ▣ Potential options to fill remaining gap:
 - ▣ Enhance and extend existing programs that are already delivering the GHG reductions to achieve the 2020 limit
 - ▣ New policies and regulations

Draft Scoping Plan Policy Scenario

- ▣ Known Commitments
- ▣ New Refinery Measure
 - ▣ 20 percent GHG reductions by 2030
- ▣ Post-2020 Cap-and-Trade Program

Alternative 1 (No Cap-and-Trade)

- ▣ **Enhanced** known commitments
- ▣ **Enhanced** Refinery Measure
 - ▣ 30 percent GHG reduction by 2030
- ▣ New Measure: Industrial Sector Measures
 - ▣ 25 percent GHG reduction by 2030
- ▣ New Incentive Measure: Early retirement of gasoline light-duty vehicles and furnaces
- ▣ New Measure: Renewable gas standard for residential, commercial, and industrial end users
- ▣ New Measure: Heat pumps in buildings

Alternative 2 (Carbon Tax)

- ▣ Known Commitments
- ▣ New Refinery Measure
 - ▣ 20 percent GHG reductions by 2030
- ▣ Carbon tax in lieu of Post-2020 Cap-and-Trade Program

GHG Modeling Results

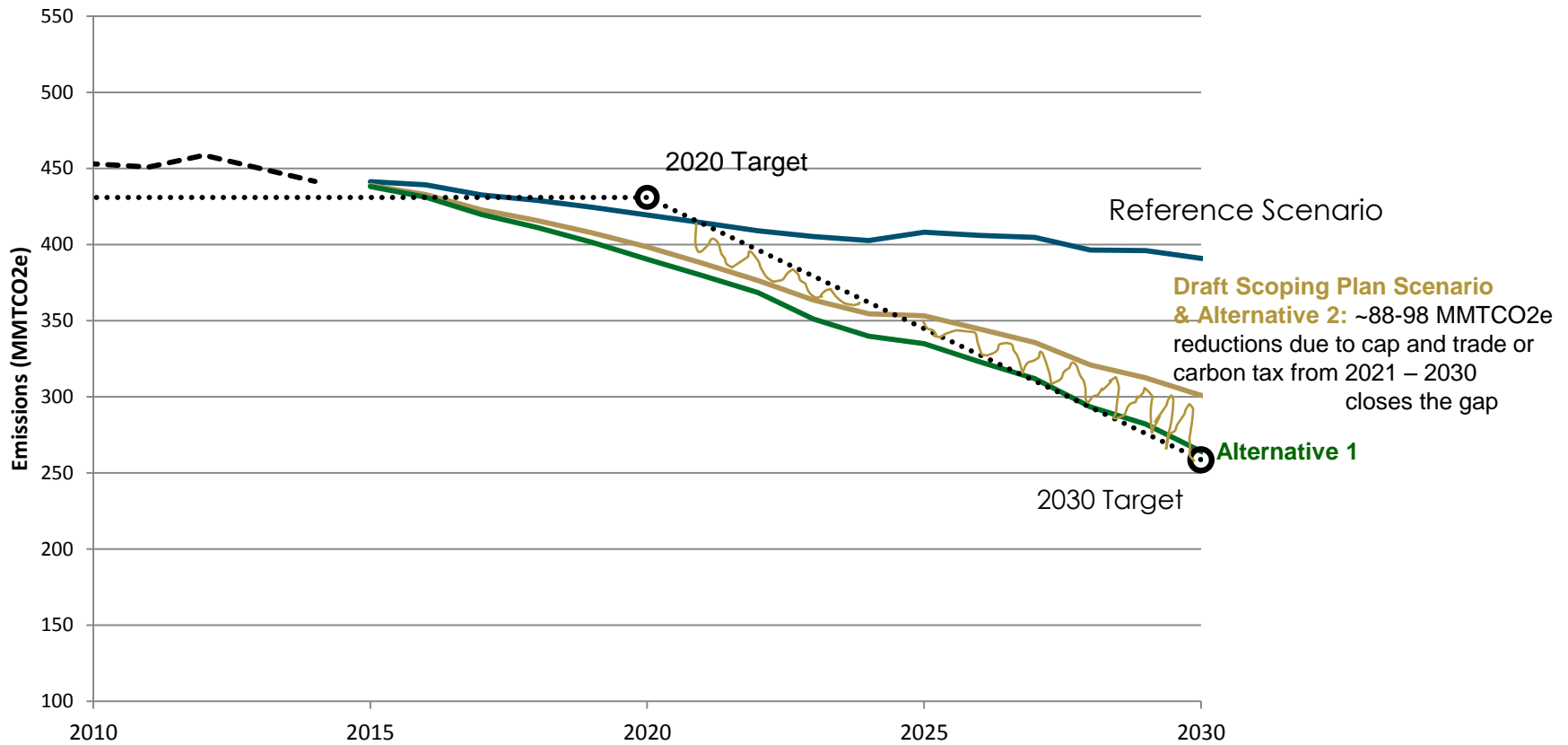
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Scenarios Modeled in PATHWAYS

	Reference	Draft Scoping Plan & Alternative 2	Alternative 1
RPS (% retail sales)	33% by 2030	50% by 2030, 80% by 2050	60% by 2030, 80% by 2050
Energy Efficiency	2015 IEPR Mid-AAEE	2.5x 2015 IEPR Mid-AAEE	
Rooftop PV	18 GW in 2030 (2015 IEPR mid PV forecast)	28 GW in 2030 (2015 IEPR high PV forecast)	
Electrification of buildings	No new electrification		Early retirement of natural gas and standard electric space heaters; Replacement with heat pumps
Transportation	Current Control Program scenario 3.0 million ZEVs by 2030	Clean Fuels & Technology Scenario, Sustainable Freight Strategy 4.2 million ZEVs by 2030	Clean Fuels & Technology Scenario plus 500-600K additional ZEVs in South Coast 4.7 million ZEVs by 2030 Early retirement of 1M pre-2015 ICE LDVs by 2030
Low Carbon Fuel Standard	10% reduction in carbon intensity by 2030	18% reduction in carbon intensity by 2030	25% reduction in carbon intensity by 2030
Res., com. & industrial pipeline gas	No renewable gas		5% energy renewable gas by 2030 (modeled as flexible H ₂ production)
Industrial & Oil and Gas Extraction	No new measures		25% reduction in energy demand by 2030
Refining	No new measures	20% reduction in energy demand by 2030	30% reduction in energy demand by 2030
Non-energy GHGs	Current practice in Short-Lived Climate Pollutant strategy	Mitigation scenario in Short-Lived Climate Pollutant strategy	
Carbon pricing	Not modeled	Not modeled in PATHWAYS but assumes cap and trade in Draft Scoping Plan or Carbon Tax in Alternative 2 Scenario	None

Preliminary GHG Modeling Results

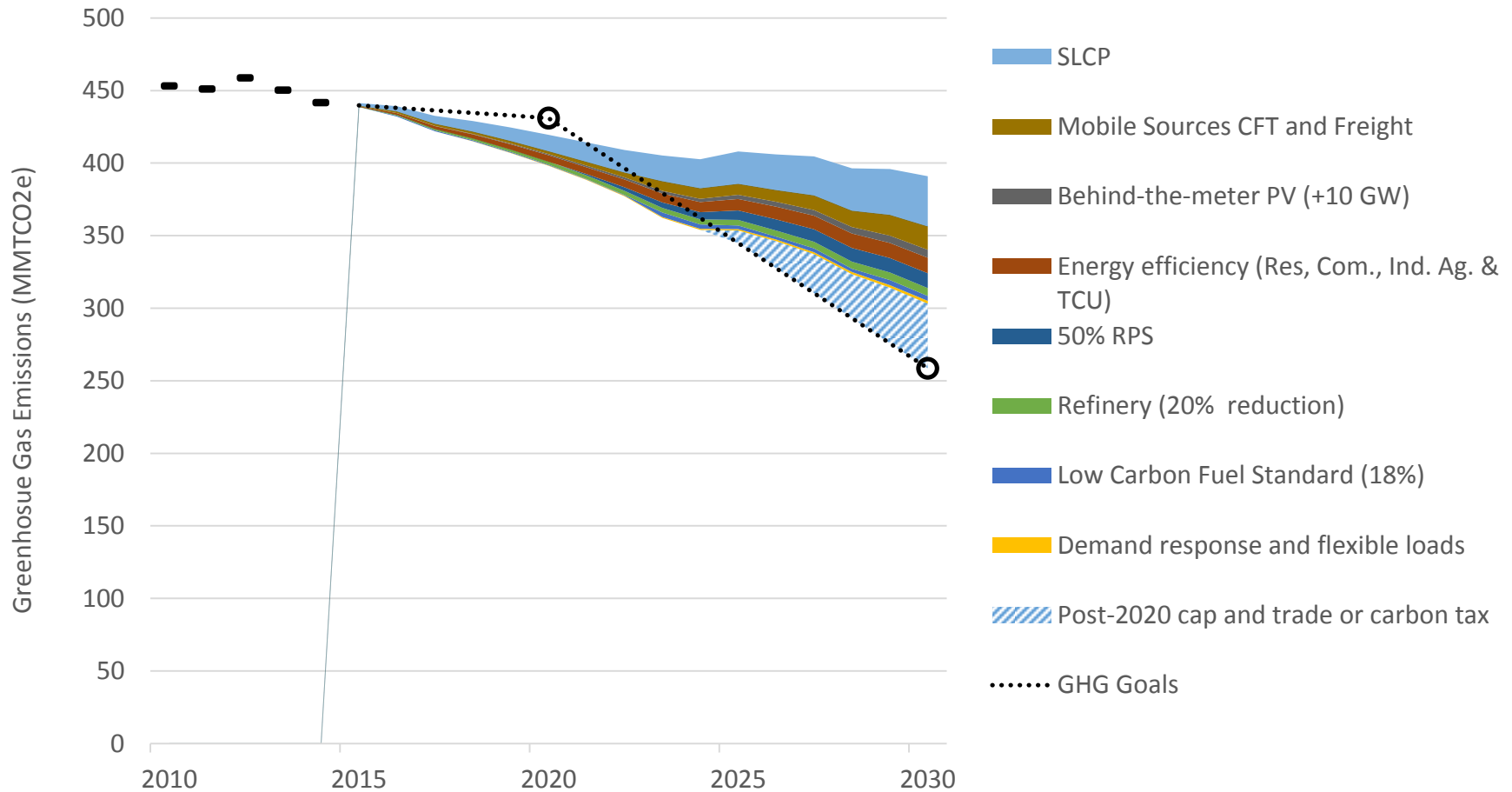
Total California GHG Emissions



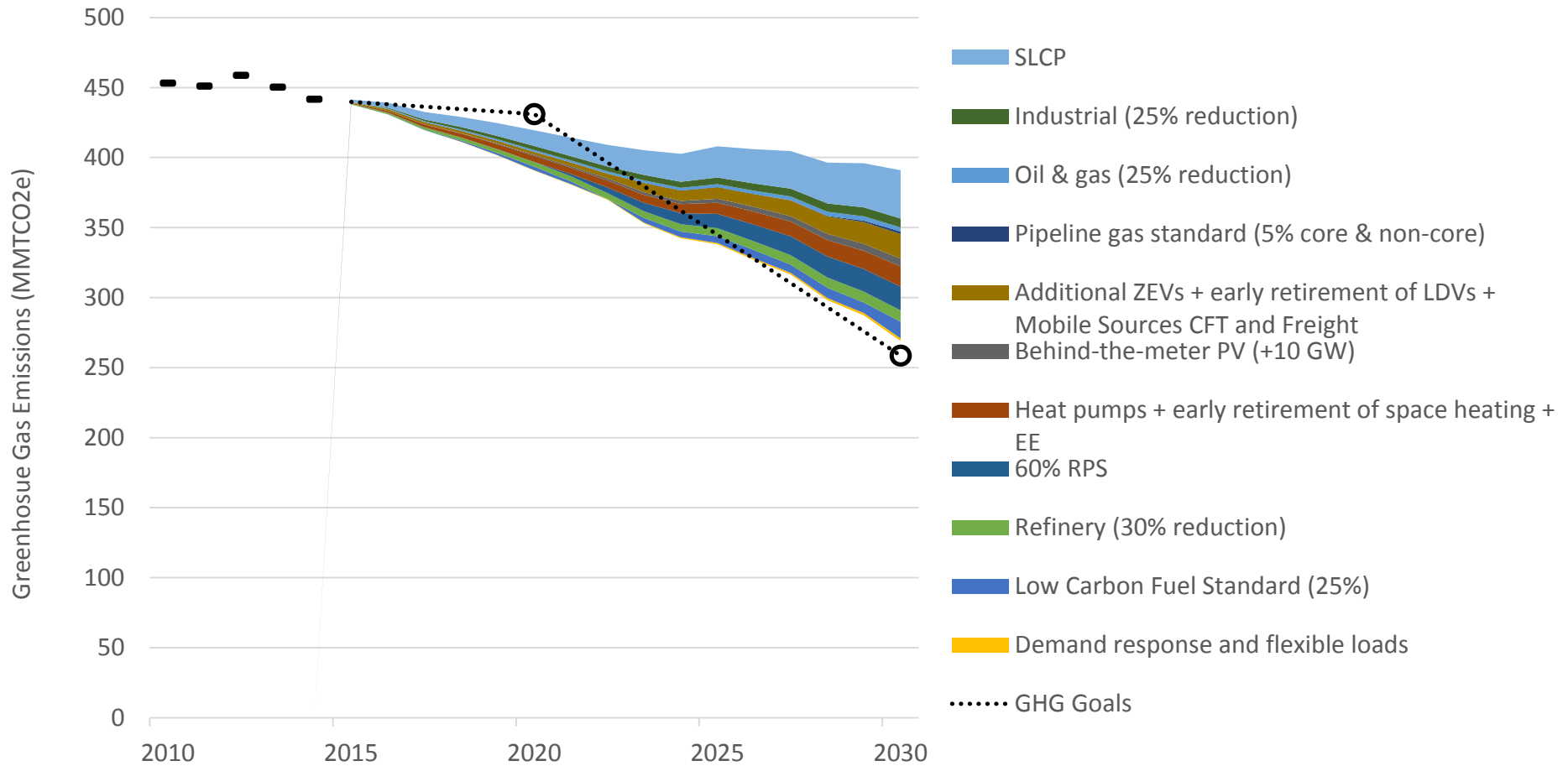
GHG Reductions by Measure

- Estimates of GHG reductions by measure reflect sensitivity analysis results and do not capture the interactive effects between measures
 - The sum of all sensitivity results will not match the total GHG reductions because not all scenario differences are captured and sensitivities do not fully capture the interactive effects in PATHWAYS
 - Total GHG reductions by scenario provide a more cohesive picture of how the measures and policies will impact total GHG emissions
- Values attribute GHG emissions reductions based on the PATHWAYS model structure
 - For example, LCFS reductions are based on tailpipe emissions and do not include avoided methane, those are attributed to SLCP

Preliminary GHG Modeling Estimates Draft Scoping Plan Scenario



Preliminary GHG Modeling Estimates Alternative 1 Scenario (No Cap-and-Trade)



Preliminary GHG Modeling Estimates Draft Scoping Plan Scenario

GHG Reductions Summary

Estimates of cumulative (2021 – 2030) measure reductions are based on modeled sensitivities

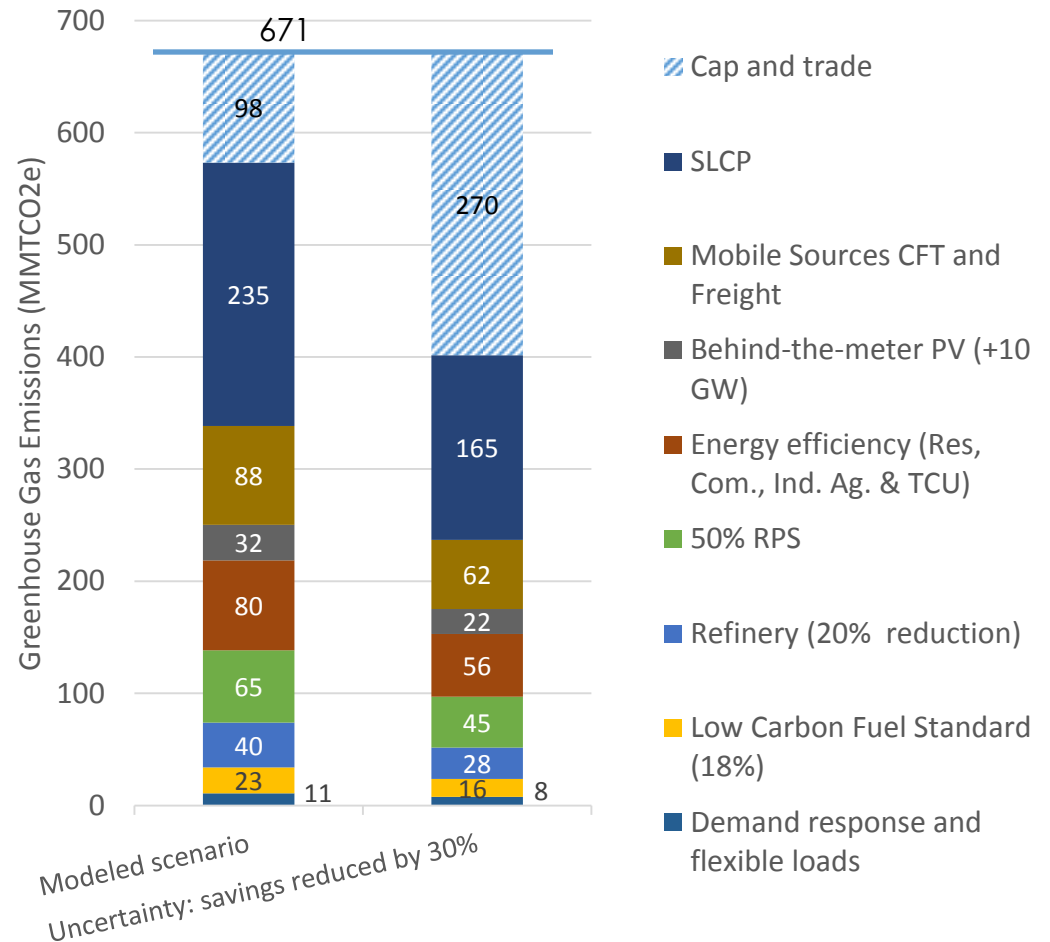
Uncertainties in timing and implementation of GHG reduction measures are reflected as 30% fewer reductions by measure (bounding estimates)

Known commitments achieve 543 MMTCO_{2e}

Refinery measure achieves ~40 MMTCO_{2e}

Cap-and-Trade achieves 88 – 98 MMTCO_{2e} if all measures meet expectations; it fills the gap if measures fall short to achieve the 2030 limit

Estimated Cumulative 2021 -2030 GHG Reductions Ranges MMTCO_{2e}*



*Ranges reflect uncertainty of achieving measure reductions, assumed here at 30%

Preliminary GHG Modeling Estimates Alternative 1 (No Cap-and-Trade)

GHG Reductions Summary

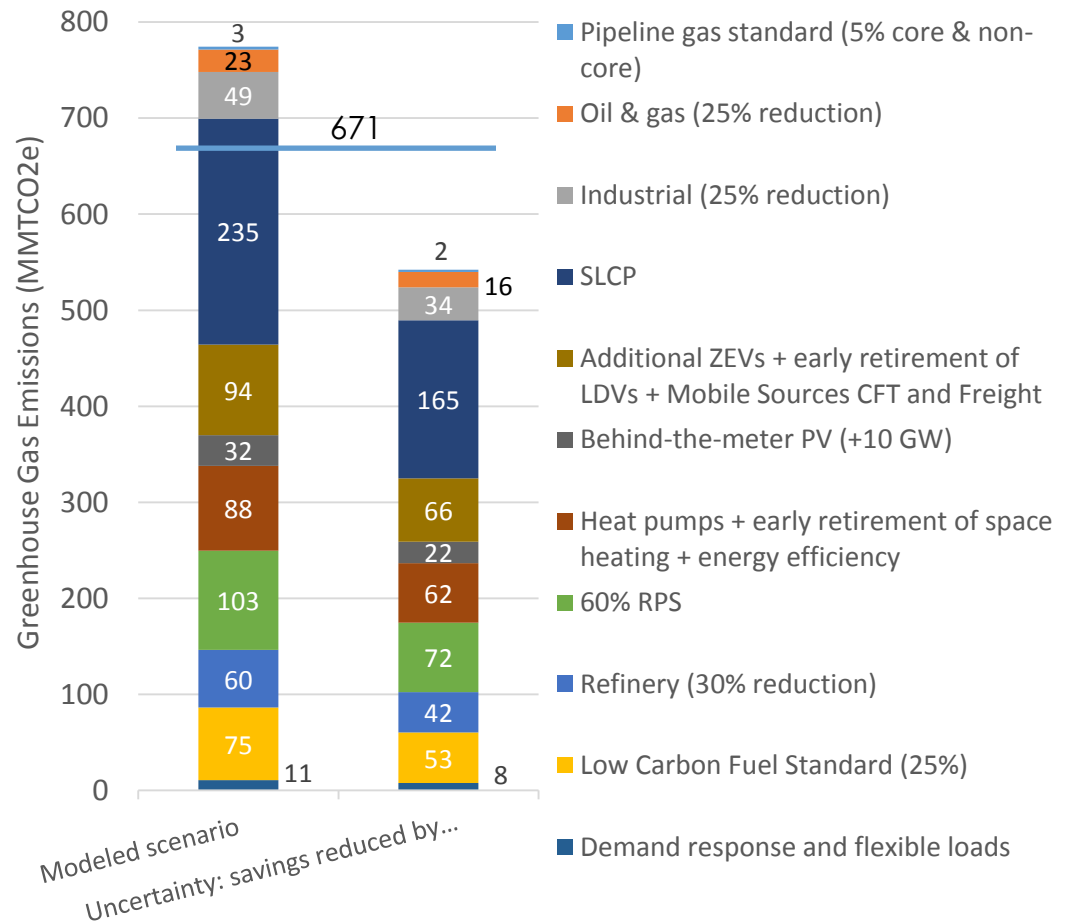
Estimates of cumulative (2021 – 2030) measure reductions are based on modeled sensitivities

Uncertainties in timing and implementation of GHG reduction measures are reflected as 30% fewer reductions by measure (bounding estimates)

If measures meet expectations, 2030 limit is almost achieved

If measures fall short of expected reductions, the scenario does not achieve the 2030 limit

Estimated Cumulative 2021 -2030 GHG Savings Ranges MMTCO₂e*



*Ranges reflect uncertainty of achieving measure reductions, assumed here at 30%

Preliminary GHG Modeling Estimates Alternative 2 (Carbon Tax)

- ▣ Modeled PATHWAYS GHG reductions same as Draft Scoping Plan Scenario
- ▣ Carbon Tax needs to deliver ~88 - 98 MMTCO₂e cumulative GHG reductions between 2021 and 2030 (same as Cap-and-Trade Program)

2030 GHG Emissions by Sector: Draft Scoping Plan and Alternative 2 (Carbon Tax)

GHGs by Sector [MMTCO2e]				
	1990	2030 Draft Scoping Plan	Change in GHGs	% change from 1990
Agriculture	25	24	-1	-5%
Residential and Commercial	44	38	-6	-14%
Electric Power	108	36	-72	-67%
High GWP	3	10	7	+217%
Industrial	97	77	-20	-20%
Recycling and Waste	7	9	2	+24%
Transportation	152	106	-46	-30%
Net sink	-7	n/a	n/a	n/a
Total	431	301 (261 w/ Cap-and-Trade or Carbon Tax)	-130	-30%

2030 GHG Emissions by Sector: Alternative 1 (No Cap-and-Trade)

GHGs by Sector [MMTCO ₂ e]				
	1990	2030 Draft Scoping Plan	Change in GHGs	% change from 1990
Agriculture	25	23	-2	-7%
Residential and Commercial	44	32	-12	-27%
Electric Power	108	30	-78	-73%
High GWP	3	10	7	+217%
Industrial	97	66	-31	-32%
Recycling and Waste	7	9	2	+24%
Transportation	152	93	-58	-38%
Net sink	-7	n/a	n/a	n/a
Total	431	264	-167	-39%

Scenario Policy Analysis

Draft Scoping Plan Scenario

- Majority of reductions due to known commitments
- Refinery facility GHG emission reductions
- Cap-and-Trade Program constrains emissions through a declining emissions limit
- Free allocation to minimize emissions leakage, where identified
- Provides compliance flexibility
- Allows for international and subnational collaboration through linkages
- Declining cap delivers additional GHG reductions at covered entities
- Provides auction proceeds for Greenhouse Gas Reduction Fund Investments
- Can easily be adapted for Clean Power Plan (CPP) compliance mechanism

Scenario Policy Analysis

Draft Scoping Plan Scenario, cont.

- Cap-and-Trade Program
 - Considerations to reflect AB 197 direction
 - Potential design changes could support greater GHG emissions reductions at covered entities
 - Evaluate limiting offsets for post-2020
 - Change allocation methodology to reflect expected decline in GHG compliance obligation, not just minimizing emissions leakage
 - Decrease allocation if a covered facility reports an increase in onsite criteria and toxics emissions

Scenario Policy Analysis

Alternative 1 (No Cap-and-Trade)

- Estimated to deliver more cumulative emissions reductions than needed to achieve the 2030 limit
- Majority of reductions due to enhanced known commitments
- New measures deliver refinery and industrial facility GHG emission reductions
- Minimizing emissions leakage: each industrial sector measure would need to be designed to address unique sector concerns, including facilities of different sizes within the same sector
- Limited compliance flexibility
- No clear opportunities for international or subnational collaboration through linkages
- No auction proceeds to fund Greenhouse Gas Reduction Fund Investments
- Would need to identify other regulations for compliance with CPP

Scenario Policy Analysis

Alternative 2 (Carbon Tax)

- Majority of reductions due to known commitments
- New measure delivers refinery facility GHG emission reductions
- Carbon tax does not include an explicit emissions constraint mechanism (does not guarantee reductions)
- Options to minimize emissions leakage include exemptions for trade exposed sectors, putting burden on other sectors for GHG reductions
- If reductions aren't realized, additional measures need to be implemented quickly to make up unrealized reductions

Scenario Policy Analysis

Alternative 2 (Carbon Tax) cont.

- ▣ Provides compliance flexibility
- ▣ No clear path for international and subnational collaboration through linkages
- ▣ Potential for additional GHG reductions at covered entities
- ▣ Could provide revenue for potential Greenhouse Gas Reduction Fund Investments, or other uses
- ▣ Would need to identify other regulations for compliance with CPP

Next: Preliminary Economic Analysis

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